Limits of Disclosure Regulation in the Municipal Bond Market*

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Abstract

Using a novel data set on municipal private debt disclosures, we study the effectiveness and market impact of disclosure regulation in the municipal debt market. By comparing reportable private debt events to the universe of realized disclosures, we find evidence that issuers significantly underreport private debt. Roughly 50-80% of reportable private debt events are not disclosed. Realized private debt disclosures exhibit substantial heterogeneity in terms of information content, making it difficult for retail investors to assess the typical filing. Event studies show disclosures to reveal negative information and are therefore especially informative to municipal bond investors in lower-rated bonds.

Keywords: Municipal disclosure of private debt, Debt structure, Bond pricing, Rule 15c2-12

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1 Introduction

In the presence of informational asymmetry, disclosure of investor-relevant information helps facilitate efficient and well functioning capital markets (Jensen and Meckling, 1976; Diamond and Verrecchia, 1991; Healy and Palepu, 2001). Unsurprisingly, timely and accurate disclosure is at the core of U.S. securities regulation. Since the enactment of the U.S. Securities Act of 1933, investor access to relevant information has improved tremendously and the majority of companies with publicly-traded securities now report information material to investors in a matter of days.[1]

One market in which investor-relevant information is still scarce is the $4 trillion municipal bond market. This market is of immense importance to less sophisticated retail investors, which the U.S. Securities and Exchange Comission (SEC) estimates to hold approximately 75% of all outstanding municipal bonds.[2] Yet, the scant disclosure environment is likely to put investors at significant disadvantage to informed market participants such as investment companies, banks, and other financial intermediaries. Despite repeated calls for higher market transparency,[3] even the most basic disclosure pertaining to events that may directly reduce the value of municipal bonds has been virtually non-existent in this market until 2019.

To this end, we study recent disclosure regulation in the municipal bond market and whether such regulation has diminished the inherent informational disadvantages in this market. Specifically, we examine the effectiveness and the market impact of the amendments to the SEC continuing disclosure rule (Rule 15c2-12) that mandates timely disclosure of private debt claims of state and local governments. The SEC rule was implemented in 2019 and addresses a recent trend in which state and local governments have significantly increased their reliance on bank loans and private placements. Importantly, increased reliance of governments on private debt may have significant adverse effects on the value of municipal bonds. Ivanov and Zimmermann (2021) document that newly-issued private debt of state and local governments has significantly shorter maturities relative to the municipal bonds of the same issuer, thereby decreasing the seniority of municipal bond investors. Consequently, effective continuing disclosure of private debt claims of governments is

[1] See Congressional Research Service Report dated June 25, 2019 at `https://fas.org/sgp/crs/misc/IF11256.pdf`.

[2] See, `https://www.sec.gov/news/studies/2012/munireport073112.pdf`. See also Ang et al. (2010) and Cornaggia et al. (2020) for evidence on the importance of retail investors in the municipal bond market.

[3] See, for example, `https://www.wsj.com/articles/SB10001424052748704471904576231002037599510`.

essential for the proper functioning of both the primary and secondary municipal bond markets.

To shed light on these questions, we bring together data from three sources. We rely on continuing disclosure data from the Municipal Securities Rulemaking Board (MSRB) to assess the information content of issuer-provided disclosures. We identify the state and local governments that are required to disclose private debt using data on recent bond issuance activity from the Mergent Municipal Bond Securities Database. Finally, we use loan-level data from the Federal Reserve's Y-14 Collection to identify all reportable municipal bank loans extended by large commercial banks in the United States. These data provide us with a unique opportunity to investigate the extent to which state and local governments may be underreporting private debt since the implementation of the SEC disclosure rule. Private debt obligations of municipal issuers are not publicly observable other than through continuing disclosures.

The first part of our paper studies the characteristics of municipal disclosures of financial obligations whenever issuers disclose private debt using the universe of continuing disclosures under Rule 15c2-12 since August 2018. During that time period, our data cover more than 6,800 unique disclosure documents associated with 4,920 municipal issuers and a wide variety of financial obligations such as private placements, term loans, credit lines, and bond anticipation notes. The number of disclosing issuers, however, pales in comparison to the universe of roughly 40,000 municipal bond issuers and especially given the frequent and significant renegotiation of contracts in private debt markets. Finally, the number of disclosures has increased substantially, in particular after the onset of the Covid-19 crisis, highlighting the higher disclosure demand in times of market uncertainty.

There is substantial heterogeneity in the information content and complexity across filings, with a large fraction of filings missing major investor-relevant information such as interest rates, maturities, or renegotiations of private debt agreements. Furthermore, the majority of disclosure filings do not contain summaries of the underlying private debt agreement, instead including boilerplate legal contracts not unlikely to exceed hundreds of pages. This may make it difficult for less sophisticated investors to assess the posted information, echoing calls by regulators and market participants for greater simplicity of municipal bond disclosure.[4]

[4]See former SEC chairman Arthur Levitt's call for simplicity in municipal disclosure: `https://www.wsj.com/articles/SB10001424052748704471904576231002037599510`.

We also study the information content continuing disclosures more formally in an event study framework. There are at least three mechanisms through which disclosures may affect bond returns. Given that the disclosed information is likely to be dilutive for pre-existing municipal bondholders (Ivanov and Zimmermann, 2021), disclosures might be associated with negative abnormal bond returns. Disclosure events may also contain adverse information about about the issuer's expected future income and its ability to repay pre-existing debt obligations. Both the "claim dilution" and the "information" channels are likely to be associated with negative bond returns. Despite these adverse effects of private debt, the municipal bond market may interpret such disclosures as positive news if they occur in times of high economic uncertainty such as the Covid-19 crisis. Issuing private debt claims in times of stress assures market participants that issuers have access to much needed liquidity.

We find that in a benign economic environment (prior to the onset of Covid), disclosing private debt obligations adversely revises valuations of affected municipal bonds. This effect is driven by lower-rated issuers for which claim dilution or adverse information revelation matters the most. The the negative effect of disclosures is approximately 65 basis points for entities rated 'A' and more than 100 basis points for entities rated 'BBB' or lower. In contrast, the corresponding effect for entities rated 'AAA' or 'AA' is close to zero and statistically insignificant. This relation fully reverses following the onset of the Covid crisis – mandatory private debt disclosures are now associated with approximately 20 basis points of positive abnormal returns. It appears that in periods of high market uncertainty obtaining additional financing through private debt constitutes positive news for municipal bond investors. The adverse effects of private debt agreements on bond prices, typically observed in normal economic times, are surpassed by the positive effect of issuers obtaining much needed liquidity.

In the final part of the paper we study the extent to which issuers underreport private debt claims that are otherwise reportable under the SEC continuing disclosure rule. The rule leaves substantial ambiguity as to what constitutes a reportable event. Properly capturing the economic reality in municipal private debt markets entails observing both originations and renegotiations of private debt contracts. Due to the fluid nature of bank lending to governments, contract renegotiation is frequent and changes contracts terms such as loan amount, maturity, or interest rates in a significant manner. For example, in our confidential supervisory data of bank loans to municipal governments,

loan originations or renegotiations account for more than half of all loan-quarters between 2011Q3 and 2021Q1. Of these, renegotiations represent the overwhelming majority of such economic activity in municipal bank loans. Although private debt renegotiations generally result in new contracts between the lender and the municipal issuer, the SEC rule could be narrowly interpreted by both issuers and underwriters to only include originations or distressed debt renegotiations.

To this end, our tests consider the propensity to report private debt within the sample of loan originations separately from the combined sample of renegotiations and originations. We show that only 20% to 46% of private debt agreements are ultimately disclosed with the MSRB whenever issuers are required to disclose private debt. Non-disclosing issuers tend to be smaller and of significantly lower credit quality. Additional analyses illustrate the importance of publicly reporting private debt claims. Newly-originated and renegotiated bank loans to non-reporting issuers are large and typically account for about 40% of recent bond issues of the same issuer. Furthermore, a quarter of non-disclosing issuers have bank loan events in which bank loans are at least as large as the recent bond issues of the same issuer. This result suggests that a substantial fraction of municipal bond investors may still face dilution risks from sophisticated private lenders.

Our study contributes to the literature exploring financial frictions in the municipal bond market that can generate significant risks for municipal bond investors. This literature has documented considerable investor segmentation and the lack of investor sophistication in the municipal bond market, both of which create costly negative externalities for investors (Babina et al., 2021; Cornaggia et al., 2020a; Pirinsky and Wang, 2011). Separately, prior research has also shown that sub-optimal financing decisions of state and local governments may hurt municipal bond valuations and in turn uninformed retail investors (Ang et al., 2017; Butler et al., 2009; Cornaggia et al., 2020b). Relatedly, Schultz (2012) and Chalmers et al. (2021) show that despite improvements in intermediation costs and reporting, the secondary municipal bond market remains largely characterized by high transactions costs (Biais and Green, 2019). Finally, in spite of the benefits of disclosure in such an informationally opaque market (Fairchild and Koch, 1998; Baber and Gore, 2008; Cuny, 2018; Baber et al., 2020; Park et al., 2020), prior literature shows that disclosure in the municipal bond market is still in a nascent state (Reck and Wilson, 2006).[5] Our study adds to this literature by showing that

[5]In addition, see `https://www.forbes.com/sites/investor/2020/09/21/municipal-bond-market-in-dogged-pursuit-of-a-framework/#30414bc67f7b`.

recent federal regulatory changes in disclosure requirements may have had little effect in mitigating the poor information environment in the municipal bond market. For example, only 20% to 46% of issuers with reportable obligations in our sample ultimately submit disclosure filings. Our findings, therefore, imply that the recent continuing disclosure regulation has had limited success in ensuring issuers make the disclosures that the SEC itself had deemed necessary for investors. Importantly, many of the above frictions documented in prior work are likely to be exacerbated by the lack of disclosure.

Finally, our paper is also related to the recent literature studying the impact of the Covid crisis on the municipal bond market. This literature has found that government guarantees of liquidity in the municipal bond market during the Covid crisis such as the Municipal Liquidity Facility (MLF) has led to lower financing costs for issuers in the primary market and decreased yields in the secondary market (see, Fritsch et al. (2021), Li and Lu (2020), Bordo and Duca (2021), Haughwout et al. (2021), Bi and Marsh (2020)). Other recent work shows that direct government transfers during the Covid crisis have mitigated the effect of the pandemic on state and local government employment by as much as forty percent (see Green and Loualiche (2021)). Finally, the economics literature has shown that the pandemic is likely to impose significant short-run and medium-term costs on state and local governments (Clemens and Veuger, 2020; Gordon et al., 2020; Whitaker, 2020), with likely adverse consequences for the municipal bond market. We complement these studies by showing that disclosure significantly mitigates the effect of the pandemic on municipal bond yields in the secondary market. This suggests that supervisors' efforts to encourage municipal disclosure may be an effective tool for normalizing spreads in the secondary bond market that complements government guarantees of liquidity.[6]

2 Institutional Background

2.1 Recent Private Debt Disclosure Regulation

Although most state and local governments are required to provide comprehensive annual financial reports (CAFRs), these statements did not contain sufficiently granular information on bank loans, privately-placed debt, and other material financial obligations until late 2018. Additionally,

[6]See `https://www.sec.gov/news/public-statement/statement-clayton-olsen-2020-05-04`.

municipal financial statements are often made public with substantial delays, rendering some of the financial information obsolete (see Edmonds et al. (2017)).

The lack of timely investor-relevant information on municipal bank loans became apparent in the aftermath of the Great Recession of 2008 with the rapid growth of municipal bank loans and private placements (see Bergstresser and Orr (2014) and Ivanov and Zimmermann (2021)). The shortage of such information was considered sufficiently severe by market participants that Standard & Poor's issued a statement warning of 'negative ratings implications' for issuers not voluntarily disclosing bank loans, and called for the Securities & Exchange Commission (SEC) to begin working on regulation addressing the lack of such disclosures.[7,8] Relatedly, very few issuers chose to disclose their bank loans voluntarily, and such disclosures were heavily redacted, not allowing investors to understand the extent or the price of such additional debt.

To alleviate the lack of investor-relevant information on private debt in the municipal debt market, in 2018, both the Government Accounting Standards Board (GASB) and the SEC finalized rules that require detailed disclosure upon incurring material financial obligations. GASB Statement Number 88 requires additional detail on private debt in notes to governments' CAFRs, including information on unused lines of credit.[9] The amendments to SEC Rule 15c2-12 require disclosure of material financial obligations to the Municipal Standards Rulemaking Board (MSRB) within ten business days of occurrence.[10] In this paper, we focus on the SEC Rule, as even if CAFRs are presently more complete, it is not clear whether they may supply market participants with relevant information in a timely manner.

2.2 Rule 15c2-12 and the Private Debt Market

The SEC as an agency of the U.S. federal government has direct supervisory authority over the financial institutions underwriting municipal bonds but does not have direct jurisdiction over state and local governments issuing these bonds. Consequently, the SEC can only require municipal disclosure of private debt obligations in an indirect manner, through the underwriters of municipal

[7] https://www.wsj.com/articles/SB10001424052702304675504579391431039227484

[8] https://www.reuters.com/article/usa-municipals-sec/u-s-sec-takes-aim-at-municipal-bank-loan-disclosure-idUSL2N1GE1M1

[9] https://www.gasb.org/jsp/GASB/Document_C/DocumentPage?cid=1176170308047

[10] https://www.federalregister.gov/documents/2018/08/31/2018-18279/amendments-to-municipal-securities-disclosure

bonds. Municipal bond underwriters have to ensure issuers disclose material financial obligations in accordance with Rule 15c2-12. Underwriters do so by entering into a legally-binding continuing disclosure agreement with municipal issuers whenever bond issuance meets certain conditions. Specifically, state and local governments are required to comply with the continuing disclosure requirements of Rule 15c2-12 to the extent that they have issued bonds with a principal amount of at least $1 million since the implementation date of the rule (February 27^{th}, 2019). Additionally, the rule does not apply to municipal issues that were sold to 35 or fewer sophisticated investors in denominations of at least $100,000, or to those maturing within nine months or less and sold in denominations of at least $100,000.

The amendments to Rule 15c2-12 including two additional disclosure event types were implemented on February 27^{th} 2019: "the incurrence of a financial obligation" (clause 15) and "events reflecting financial difficulties" (clause 16). Clause (15) is defined broadly to include "agreements to covenants, events of default, remedies, priority rights, or other similar terms of a financial obligation of the obligated person, any of which affect security holders, if material," while clause (16) includes "... modification of terms ... of a financial obligation of the obligated person, any of which reflect financial difficulties."[11] Financial obligations in the context of both clauses include virtually all types of private debt such as private placements of bonds, bank loans, leases and other financial arrangements.

While the SEC rule defines private debt agreements types broadly, there is substantial ambiguity as to what constitutes a reportable event. Properly capturing the economic reality in municipal private debt markets entails observing both originations and renegotiations of private debt contracts. Specifically, due to the fluid nature of bank lending to state and local governments, contract renegotiation is frequent and changes contracts terms such as loan amount, maturity, or interest rates in a significant manner. For example, in our confidential supervisory data of bank loans to municipal entities, loan originations or renegotiations account for more than half of all loan-quarters between 2011Q3 and 2021Q1. Of these, renegotiations represent the overwhelming majority of such economic activity in municipal bank loans with 82% of loan quarters, while only 18% of loan-quarters are associated with loan originations.

[11] See clauses (15) and (16) of Securities Exchange Act Rule 15c2-12(b)(5)(i)(C) `https://www.sec.gov/rules/final/2018/34-83885.pdf`.

Although private debt renegotiations generally result in new contracts between the lender and the municipal issuer, the SEC rule could be narrowly interpreted by both issuers and underwriters to only include originations under clause (15) and distressed debt renegotiations under clause (16). Such an interpretation is likely to miss the vast majority of economic activity in the private debt market. This problem is exacerbated by the lack of clarity on the type of events that constitute "financial difficulties" in clause (16). Given this overall ambiguity of clauses (15) and (16), the extent to which the SEC rule will capture the dynamics of the municipal private debt market is unclear. Our analysis in Section 5 studies private debt reporting rates for both originations and renegotiations to gauge the effectiveness of the rule.

3 Data description

We obtain the universe of municipal bond issuances between January 2010 and April 2021 from the Mergent Municipal Bond Securities Database. We exclude bonds in denominations exceeding $100,000 and placed with sophisticated investors (Rule 144A offerings and other private placements) as the SEC rule does not apply to such issuance.[12] After these basic filters our data contain information on 184,398 bond issuances by 32,525 unique issuers with 36,683 distinct 6-digit cusips.

To better understand how state and local governments that are required to provide continuing disclosures under the SEC rule differ from governments not required to disclose, we match Mergent to the Census of Governments from the U.S. Census Bureau.[13] We employ fuzzy matching techniques combined with manual edits to match all state and local governments in Mergent with bonds issuances since 2010 to the Census data.[14] The Census identifies and surveys the full set of state and local governments in years ending in "2" and "7"; in all other years the Census surveys only a subset of governments, predominantly the most populous ones. Consequently, we successfully match all general-purpose governments in Mergent to the entities in the last complete Census of Governments in 2017. Given the significantly higher costs associated with manually verifying special district matches, we only keep special districts for which we could obtain close to complete matches in both data sets. We obtain income statement and balance sheet data on the matched entities

[12] http://www.msrb.org/msrb1/pdfs/SECRule15c2-12.pdf

[13] https://www.census.gov/programs-surveys/cog/data/tables.All.html

[14] Appendix A describes the matching procedure in detail.

from the 2017 Census survey.

Our continuing disclosure data on private debt obligations under SEC Rule 15c2-12 (see Section 2.2) come from the Municipal Securities Rulemaking Board (MSRB) Subscription Service. The Subscription Service provides all disclosure filings posted on the MSRB website in PDF format together with the basic information about the filer and its related entities in XML format. We identify a filing by its unique submission ID. A typical continuing disclosure filing under clauses (15) and (16) of Rule 15c2-12 includes the filing submission date, the date of the underlying debt obligation, the submitter's contact information, the type of debt obligation referenced in the filing, all issuer CUSIPs associated with the filing, and a link to the actual filing document that can contain a description of the event, a contract or updated covenant agreement, or other additional documentation pertaining to the event filing. In the best case scenario issuers would include a term sheet of the underlying private debt obligation that details the lender, the obligation amount, maturity, interest rate, and other relevant contractual provisions. Figure 1 provides one such example for the private placement of West Lampeter Township with S&T Bank.

We supplement these data with information from the MSRB website's Electronic Municipal Market Access (EMMA) system[15] whenever the submission date is not available in the MSRB Subscription Service data. A given filing could be submitted by multiple filers, typically related entities of the same municipality, generating multiple occurrences on the EMMA website for each event. We focus on unique events but we also collect the number of filers associated with each event. Our sample includes all debt disclosure filings between August 2018 and February 2021 as the amendments to Rule 15c2-12 were finalized in August 2018 and implemented on February 27^{th}, 2019.

To gain insight into the characteristics of disclosures, we hand-collect information from over 2,300 filing documents. In each filing, we search for the obligation amount, interest rate and maturity. We also note whether the filing is new or amends an existing obligation, and whether the filing includes a term sheet summarizing the obligation.[16]

Given one of the goals of this study is to understand the extent to which issuers comply with the

[15] See `https://emma.msrb.org/home/index`. Among other information, the platform provides access to official statements for new bond issues, secondary market data for trading bonds, and continuing disclosure documents for municipal securities. Continuing disclosure filings include financial statements of municipal issuers as well as notifications of specific events that may affect the outstanding bonds of municipal issuers.

[16] Appendix B provides additional details on the manual collection process.

SEC continuing disclosure rule, we obtain granular information on bank loans to municipalities from the Federal Reserve's Y-14Q Collection. These data contain detailed loan contract-level information on all outstanding municipal bank loans with commitment amounts exceeding $1 million made by all banks in the United States exceeding $100 billion in total holding company assets.[17] In addition, banks provide their internal risk ratings for each loan contract together with the equivalent S&P rating in a ten-grade scale. The data allow us to study individual borrowers and loans, as well as the contract structure, riskiness and cost of private financing to state and local governments.

We restrict the loan data to all new loans or material renegotiations of existing loans, as these are the bank loan obligations that are potentially reportable under continuing disclosure agreements. We define a loan to be renegotiated if it experiences changes in any one or more of the three major contractual terms – maturity, amount, or interest rates – from one quarter to the next. We classify a loan to be a new origination if it either has a new loan ID or the loan origination date falls within the loan observation quarter. Similar to the corporate loan market that is characterized by frequent renegotiation of commercial loans (see, Roberts (2015), Roberts and Sufi (2009)), roughly 40% of the municipal bank loan-quarters in our sample correspond to renegotiations and on only about 10% of loan-quarters represent originations. Such frequent renegotiation implies that studying originations alone is insufficient to capture the dynamics of the private debt market. Separately, the fluid nature of bank lending to municipalities makes it infeasible to distinguish between renegotiations of existing and new municipal loan contracts as both originations and renegotiations will typically generate new legally binding agreements. Our analysis will consider compliance rates within all loan events as well as within renegotiations and originations separately as some issuers may narrowly interpret the SEC rule to only apply to origination events (also see the discussion in Section 2.2).

To assess whether issuers may underreport private debt contracts, we match the municipal loan borrowers in the Y-14 data to the entities in the Census of Governments using both fuzzy matching techniques and manual checks/edits. This allows us to link the loan events data to bond issuers from Mergent, using the unique Census identifier as a bridge between the two data sets. We supplement this bridge using the bank-provided 6-digit CUSIP of the borrower in the Y-14

[17]The reporting panel starts in Q3 of 2012 and covers all bank holding companies with at least US $50 billion in total assets. There were 37 institutions until 2018Q1. Regulatory changes increased the reporting threshold to $100 billion as of 2018Q2, thereby leading to the exclusion of four institutions with total assets below $100 billion.

Collection.[18] Additionally, by construction our data set is restricted to bank loans such as credit lines, term loans, and leases, while reportable private debt under continuing disclosure requirements also includes private placements of municipal bonds that we do not currently consider. Despite these limitations, our analysis is likely to provide useful insights into whether state and local governments underreport private debt.

Finally, to test for the information content of continuing disclosure events, we use secondary market municipal bond trading data published on the EMMA website. In line with other studies, we drop trades occurring at a bond's issue date, after a bond's maturity date, at dollar prices below 50% or above 150% of par, as well as trades with missing coupon information (see Green et al. (2010) or Cornaggia et al. (2020a)). If both buyer- and seller-initiated trades are available for a given 9-digit CUSIP on a given date, we compute the average price for that date as the midpoint of the maximum of seller-initiated trade prices and the minimum of buyer-initiated trade prices. If neither buyer- nor seller-initiated prices are available but dealer quotes are available, we compute the average price for that date to be the simple average across all dealer quotes. Finally, if only buyer- or seller-initiated prices are available on a given date but not both, we compute the average price on that date as the par-value weighted average dollar price based on the maximum of seller-initiated trade prices or on the minimum of buyer-initiated trade prices.

4 How informative is continuing disclosure of private debt?

4.1 Issuers subject to continuing disclosure

We first identify the set of issues that trigger continuing disclosure requirements according to the SEC rule. A bond issuance triggers continuing disclosure requirements if it is issued on or after February 27^{th} 2019 and has total outstanding amount exceeding $1 million. We exclude issues sold to sophisticated investors in large denominations or issues with maturities of less than nine months in large denominations as such issues do not trigger continuing disclosure (see Section 2.2 for more detail). Overall, 30,955 completed issuances by 13,032 unique issuers since February 27^{th} 2019 trigger such disclosure requirements. We account for partial and full bond redemptions as well

[18] Due to the complexity of borrower names in the Y-14 Collection our matching algorithm may exclude some viable matches.

as for repeat issuance that may lead to issuers exiting and/or re-entering the set of issuers required to disclose.

Figure 2 shows the cumulative share of issuers in the municipal bond market that become subject to continuing disclosure requirements since the implementation date of Rule 15c2-12. Panel (a) defines the municipal bond market as the set of issuers with at least one issue between January 1^{st} 2010 and February 26^{th} 2019. The black dashed line shows that approximately 40% of these issuers are now required to disclose agreements to private debt obligations. The red solid line shows that a significant number of issuers without issuance activity between 2010 and the implementation of the Rule have also become subject to the Rule in the same time frame. The size of the latter group is roughly equivalent to 10% of municipal issuers between 2010 and early 2019.

In Panel (b) of this figure we modify the definition of the municipal bond market as the set of issuers with at least one issue between January 1^{st} 2000 and the rule's implementation date. This definition is likely to provide an upper bound on the number of issuers with access to municipal bonds as fiscal conditions for some governments have been deteriorating since the Global Financial Crisis and they may not currently have municipal bond access. As a result, the fraction of issuers subject to continuing disclosure under this definition is likely to constitute a lower bound. Panel (b) shows that roughly 30% of municipal bond issuers are subject to continuing disclosure requirements under this alternative definition of the size of the municipal bond market. Overall, the SEC Rule applies to between 30% and 50% of the bond market in recent years.

We next study how issuers required to disclose private debt obligations differ from those that are not required to disclose. As disclosure requirements for private debt claims derive from public municipal bonds issuance activity, such requirements might simply be associated with greater access to the municipal bond market.

To this end, in Panel A of Table 1 we first provide a simple comparison of general purpose local governments with and without municipal bond market access. We measure access to the municipal bond market with whether governments have issued municipal bonds since January 1^{st} 2010. The summary statistics in this table indicate that governments with bond issuance are substantially larger than government that have not raised financing through bonds. Specifically, bond issuers have average general revenue of approximately $41 million as compared to only about $6 million for non-issuers. Similarly, consistent with bond issuers having greater investment opportunities,

their capital outlays account for a significantly larger fraction of total revenues and revenues from government sources represent a smaller fraction of total revenues. Importantly, issuers have average debt-to-total revenues that is more than twice as large as the average for non-issuers. Despite the substantially higher leverage, issuers also enjoy debt interest rates that are on average one percentage point lower than that for non-issuers. These results suggest that bond issuers may have greater access to debt markets than non-issuers.

Panel B of Table 1 restricts the sample to general purpose governments that have all issued municipal bonds since 2010 but some of these governments have also issued bonds since February 2019, triggering continuing disclosure requirements under Rule 15c2-12. This comparison generates statistically significant differences that are less stark than in Panel A and not necessarily economically large. For example, even though governments required to disclose are significantly larger and raise greater tax revenue, their average capital outlays, revenues from government sources, debt-to-revenues, and interest expense are all economically similar to the averages for governments not required to disclose. In other words, once we condition on bond market access, disclosure requirements are largely based on the timing of bonds issuance, explaining the diminished economic differences between governments on whether they are required to disclose.

Finally, we investigate the determinants of governments' bond market access or required disclosure in a multivariate regression setting in Table D.I. These tests are likely to give us insight as to whether individual government characteristics are incrementally relevant in explaining bonds market access or required disclosure. In line with the descriptive evidence in Table 1, this table indicates that larger and more leveraged entities are both more likely to have bond market access and to trigger continuing disclosure requirements. In addition, a greater share of revenues from government sources negatively predicts both bond market access and continuing disclosure requirements, suggesting that inter-government receipts act as a substitute for debt. Larger share of tax receipts in total revenues also positively predicts continuing disclosure requirements, consistent with more stable revenue streams allowing issuers to access capital markets more frequently.

4.2 Summary characteristics of continuing disclosures

In this section we examine how continuing disclosure of private debt has evolved since the implementation of Rule 15c2-12. Panel (a) of Figure 3 shows the number of filings per month over time

for the 6,835 unique filings submitted on the EMMA system between August 2018 and February 2021. The typical number of continuing disclosure filings per month hoovers around 200 after the implementation of Rule 15c2-12 and that this number has risen steeply after the onset of the Covid-19 crisis. For example, there are well over a thousand filings combined in the three months since March 2020 and monthly filing rates have remained elevated until early 2021.

Given that Rule 15c2-12 mandates disclosure of private debt obligations agreements dated on or after February 27^{th}, 2019 in Panel (b) of 3 we plot the number of filings based on the agreement date of the underlying private debt obligation (rather than the filing date). Doing so reduces our sample considerably from 6,835 to 5,797 filings as a large number of filings detail debt obligations agreed on prior to the finalization of the Rule in August 2018. Panel (b) shows that the majority of filings are voluntary or related to issuers that have not yet triggered the continuing disclosure requirements. Such voluntary disclosure spikes most prominently around the onset of the Covid crisis before returning to pre-crisis levels in August 2020. Interestingly, mandatory disclosure also increases significantly right after the Covid crisis and surpasses voluntary disclosure in August 2020. The evidence provided by this figure is consistent with the incidence of disclosure increasing with elevated market uncertainty as a result of the Covid crisis. While the uptick in disclosures may also be a byproduct of the Covid crisis leading to increased rates of loan renegotiation, the large increase in voluntary disclosure casts doubt on the idea that renegotiation is a major driver of this trend.

In Figure 4 we explore additional characteristics of continuing disclosure filings. Panel A shows significant heterogeneity in the type of debt detailed in the continuing disclosure filings. Specifically, private placements of municipal bonds and term loans are the most prevalent ones. Other frequent types include bond anticipation notes, credit lines, and leases. We are not able to identify the debt type in approximately a quarter of filings. Manually inspecting randomly selected filings from the "Other" group indicates that these obligations typically bear resemblance to term loans or to private placements.

One key dimension of continuing disclosures is the timeliness of the disclosed information as disclosure relevance generally increases with its timeliness. To this end, we examine the time it takes for an issuer to disclose a private debt obligation agreement. According to rule 15c2-12, disclosures have to be filed on the EMMA system within 10 business days of when they are incurred (see Section 2.2). Panels (b) and (c) of Figure 4 show that both mandatory and voluntary disclosures typically

occur in a timely manner since the implementation of the SEC rule. For mandatory filings, the median number of days between the private debt agreement date and disclosure date is 2 business days, and 75% and 90% of disclosures happen within 7 and 10 days, respectively.[19]

We also show that large municipal issuers such as states, cities, and counties account for the vast majority of private debt filings. Figure 5 shows that over the entire sample period, filings of city governments make up approximately 50% of all filings, and states, counties, and school districts account for 10-15% each. The figure also shows that in response to Covid, the larger and less opaque state governments have increased disclosure somewhat earlier than other governments, as their share of continuing disclosures increased substantially in March of 2020.

In the final part of this section, we examine heterogeneity in disclosed information of continuing disclosure filings. Table 2 shows obligation characteristics for different filing types for our hand-collected sample based on a subset of 2,300 filing documents. The obligation amount of a typical filing is not large – the median outstanding amount is between $1-2 million for term loans, bond anticipation notes and leases, and $5 million for privately-placed bonds. The average credit line amount is larger, consistent with prior research showing that credit lines are more likely to be used by larger entities such as state governments (see Ivanov and Zimmermann (2021)). Maturities and interest rates of private placements and term loans are largely similar, suggesting these debt instruments may be substitutable.

Although most filings provide information about the amount of the underlying debt obligation, a significant share does not provide information about interest rates (10 to 35 percent) or maturities (10 to 50 percent). A term sheet briefly summarizing the terms and times of repayment is only provided for less than half of the filings we read manually. The availability of a term sheet varies widely across private debt types. Credit lines and bond anticipation notes have term sheets in only 2% and 40% of the instances, respectively. In contrast, 71% of leases contain an associated term sheet. In the remaining cases we only have private debt (boilerplate) contracts that may be difficult for less sophisticated investors to understand. This echoes calls by regulators and market participants for greater transparency and simplicity of municipal bond disclosures given the high fraction of retail investors in this space.[20] Finally, despite the frequent and significant renegotiation

[19] In unreported tests we verify that the distribution appears stable over time.

[20] See former SEC chairman Arthur Levitt's call for simplicity in municipal disclosure: `https://www.wsj.com/articles/SB10001424052748704471904576231002037599510`.

of private debt claims, Table 2 shows that only a small minority of filings detail private debt that is an amendment of a previous agreement. Overall, the information in filing documents is often not sufficiently detailed about the nature of disclosed obligations. While Rule 15c2-12 does not stipulate the exact information to be disclosed, we find that even basic information necessary to make informed investment choices in response to disclosures is often not included.

In light the systemic deficiencies in information content of disclosure filings highlighted above, one additional potential area of concern is that there is space for issuers to narrowly interpret the rule to only apply to private debt terms that were previously disclosed. For example, if the issuer does not detail the maturity of a private debt contract in the initial disclosure filing but renegotiates the contact to substantially extend maturity, that issuer is unlikely to view the modification as something that is required to be disclosed. While fully assessing the importance of this possibility is currently difficult as the rule has been in effect for only two years, the significant ambiguity surrounding the provisions of Rule 15c2-12 may affect both compliance rates and the availability of key investor-relevant information in the municipal bond market.

4.3 The information content of continuing disclosures

In this section we study the informativeness of continuing disclosures of financial obligations in an event study framework. To the extent that these disclosures are informative to market participants, we should expect to see a significant secondary bond market reaction around such disclosure events. There are at least three mechanisms through which disclosures may lead to abnormal bond returns. Given that the disclosed information is likely to be dilutive for pre-existing municipal bondholders (Ivanov and Zimmermann, 2021), disclosures might be associated with negative abnormal bond returns. Disclosure events may also contain adverse information about about the issuer's expected future income and its ability to repay pre-existing debt obligations. For example, an issuer may tap the private debt market whenever it has experienced large adverse income shocks and thereby has insufficient access to municipal bonds. Such an "information channel" is also likely to be associated with negative abnormal returns. Telling the information channel apart from claim dilution is challenging as both mechanism generate negative abnormal returns.

Despite private debt obligations diluting municipal bond investors or revealing adverse information about the future prospects of the municipality, the municipal bond market may interpret

disclosures of private debt as positive news if they occur in times of high economic uncertainty such as the Covid-19 crisis. Issuing private debt claims in times of stress assures market participants that issuers have access to much needed liquidity. This implies a positive association between municipal disclosures and abnormal bond returns. While the relation between abnormal bond returns and private debt disclosures is an empirical question, the presence of abnormal returns will suggest that disclosures are informative to municipal bond investors. Section 4.3.1 describes our method and section 4.3.2 discusses results.

4.3.1 Methodology

We compute bond returns around disclosure events using trades that occur within 30 days of the related disclosure. If there are multiple trades satisfying that condition, we keep the trades closest to the disclosure event date. Using information on coupons, prices and remaining maturity we compute the yield-to-maturity, y_{bt} and duration, D_{bt} for each bond and trade date.

Due to infrequent trading of municipal bonds, we calculate returns between adjacent trades dates following the approach in Cornaggia et al. (2020a): Returns on bond b between two trades s and k (with $k < s$) are computed based on the duration-adjusted change in yield-to-maturity:

$$r_{b,s,k} = -(D_{bs} \times y_{bs} - D_{bk} \times y_{bk}) \tag{1}$$

To calculate abnormal bond returns, we construct bond return indexes based on remaining maturities and credit ratings using the method of repeat sales regressions (Bailey et al. (1963)) as refined for sub-markets/sub-indexes by Peng (2012) and adapted to the municipal bond market by Cornaggia et al. (2020a). In particular, we define a bond sub-index l in a given rating or maturity group (or both) and estimate the index return R_t^l for that sub-index on date t using the following specification:

$$r_{b,s,k} = \sum_{t=k+1}^{s} \mathbb{1}_t^l \times R_t^l + \sum_{t=k+1}^{s} \epsilon_{b,t}, \forall b \in l \tag{2}$$

Equation (2) is effectively a binary-variable regression with indicator variables for each trading date as regressors. Given our sample of disclosures starts in 2018, we include all trades that occur since

2017. The sub-indexes are defined for 6 maturity categories (up to 2 years, 2-5 years, 5-10 years, 10-15 years, 15-20 years, and greater than 20 years), 4 rating categories (AAA-AA, A, BBB or lower, and unrated), or for the combination of rating and maturity for a total of 24 sub-indexes.[21] In each of these sub-indexes we have a sufficiently large number of trades so that we can estimate equation (2) and obtain the estimated sub-index return R_t^l.

We calculate the abnormal bond return between two dates as the difference between the raw bond return in equation (1) and the estimated sub-index return over the same time period from Equation (2):

$$ar_{b,s,k} = r_{b,s,k} - \sum_{t=k+1}^{s} \widehat{R_t^l}, \forall b \in l. \tag{3}$$

Our main regression specification is:

$$r_{b,s,k} = \alpha + u_{b,s,k}. \tag{4}$$

In equation (4), $r_{b,s,k}$ is a bond's (raw or abnormal) return around the disclosure event, and $u_{b,s,k}$ is an error term. We double cluster standard errors at the bond issuer and disclosure date levels. α can be interpreted as the average raw (or abnormal) return around disclosure events. We estimate Equation (4) within different subsets of the data to explore whether abnormal returns vary across event types (mandatory/voluntary or obligation type). We also study whether abnormal returns differ prior to and after the onset of the pandemic.

4.3.2 Event Study Results

Table 3 shows our first set of event study results within the full sample of events since Rule 15c2-12 was implemented. Column (1) of Panel A shows that the average duration-adjusted return around disclosure events is approximately 14 basis points. However, columns 2, 3, and 4 show that once we adjust bond returns for credit risk, maturity, or both, we find no evidence that abnormal returns around disclosure events are significantly different from zero.

[21] The rating categories include Aaa-Aa3 (Moodys) / AAA-AA (S&P/Fitch), A1-A3 (Moodys) / A (S&P/Fitch), below A3 (Moodys) / below A (S&P/Fitch), and unrated bonds. If a bond is rated by more than one agency, we keep the most conservative rating across rating agencies.

Given the information content of voluntary and mandatory disclosures may differ, in Panel B we split the sample into mandatory and voluntary events and into pre- and post-Covid time periods.[22] We find that even though the return to mandatory disclosures in the full sample is small and insignificant, mandatory disclosures are associated with negative abnormal bond returns pre-Covid. Specifically, prior to March 2020, disclosing private debt obligations adversely increases municipal bond yields by about 37 basis points. This association fully reverses following the Covid crisis – mandatory private debt disclosures are now associated with approximately 20 basis points of abnormal return. Despite the potentially dilutive effects of private debt, it appears that in periods of high market uncertainty obtaining additional financing through private debt constitutes positive news for municipal bond investors. Overall, the large and significant bond market reaction suggests that mandatory disclosure events are highly informative to municipal bond investors. In contrast, voluntary disclosures appear to be uninformative to market participants both before and after the Covid crisis. This is because voluntary disclosures tend to be associated with larger issuers that are likely to have a less informationally opaque environment in bond markets.[23]

In Panel C of Table 3, we partition the sample of mandatory disclosure events based on the underlying credit quality of issuers. We show that pre-Covid abnormal returns are driven by disclosures within the lower rating categories. For example, bonds rated 'A' or 'BBB and lower' experience negative abnormal returns of approximately 65 and 103 basis points, respectively. In contrast, bonds rated 'AAA' or 'AA' experience no abnormal returns following private debt disclosures. This is consistent with the idea that in benign economic environments, mandatory disclosures are associated with claim dilution or adverse new information concerns as only lower rated bonds are impacted by the disclosures. Post-Covid abnormal returns are positive for bonds across the credit risk spectrum, also consistent with the results in Panel B that in periods of market turmoil it is the access to liquidity that matters.

Importantly, although investors value these positive liquidity effects for both low and high credit risk issuers, lower-rated issuers benefit the most from disclosing private debt following the onset of the Covid Crisis. Despite the outsized adverse claim dilution/information effects on valuations within

[22] We find that mandatory disclosures since the implementation of the continuing disclosure rule are about as timely as voluntary disclosures over the same time frame.

[23] For example, the average issuer with mandatory disclosures raises approximately $215 million in bonds from the primary market since the implementation of the SEC rule as compared to only $167 million for issuers with voluntary disclosures.

lowest-rated municipal bonds, the combined effect of disclosures is still a positive and significant 24 basis points suggesting large positive returns to disclosing additional liquidity in times of market stress.

In Panel A of Table 4 we further decompose abnormal returns pre- and post-Covid into the underlying type of the debt obligation and disclosure timeliness. We show that our effects are present for most private debt obligation types. For example, our results are concentrated within private placements of municipal bonds as well as within bank credit lines and term loans. Bond anticipation notes play a more important role after the onset of Covid, consistent with the greater importance of obtaining bridge financing in a time of stress. In Panel B of Table 4 we also test whether our results differ based on the timeliness of disclosure, or the time between private debt incurrence and disclosure dates. Disclosures are more likely to provide investor-relevant information for the debt structure of issuers when they are made in a timely manner. Our results are concentrated within the subsample of timely disclosures, those occurring within eight business days. Less timely disclosures do not appear to move prices, consistent with disclosed information being obsolete at the time of disclosure.

5 Do Bond Issuers Underreport Private Debt Claims?

In this section we examine the extent to which bond issuers comply with continuing disclosure requirements. Our sample of private debt events covers all major loan renegotiations or originations of bank loans extended by the largest banks in the United States to state and local governments.[24] Given the high precision necessary to match local governments between data sets, our name matching algorithm covers mostly general purposes governments and a small number of special districts that we match exactly to the bond issuance data sets using issuer CUSIPs (see section 3). Therefore, our tests are likely to have most relevance for general purpose governments such cities, towns, townships, counties, and parishes. Overall, we have a total of 3,103 entities with 25,246 loan events between 2019Q1 and 2021Q1 that have previously issued municipal bonds but are currently not required to report private debt. We separately have 955 entities that are currently required to report private debt agreements with 4,813 associated bank loan events since the first quarter of 2019.

[24]These include all bank holding companies with consolidated total assets exceeding $100 billion. For aditional detail on the Y-14 Collection see: `https://www.federalreserve.gov/reportforms/forms/FR_Y-14Q20210331_i.pdf`.

We next identify whether issuers subject to the SEC rule and have bank loan events are likely to disclose these events. To do so we simply check whether an issuer with bank loan events occurring in a given quarter has contemporaneous private debt agreements disclosed with MSRB. In other words, we assume that governments disclose the bank loan events whenever we identify private debt disclosure(s) with the same contract agreement quarter. This assumption is likely to overstate the compliance rate with continuing disclosure requirements as issuers might disclose different private debt agreements from the ones we identify in our loan data set. Overall, our estimates should be viewed as a lower bound on the under-reporting of required obligations.

We first compare the set of bank loan events according to whether the underlying issuers are required to report private debt (Panel A of Table 5). Even though bond issuers subject to continuing disclosure requirements have slightly larger bank loans and appear to be slightly less risky than bond issuers not required to disclose, these two groups appear economically similar in terms of the remaining loan characteristics. For example, loan type composition, interest rates, maturities, and collateral provisions are all comparable between the two groups of bond issuers. These results are consistent with our findings in Tables 1 and D.I in that once we condition on bond market access, disclosure requirements are largely based on the timing of bond issuance.

Panel B of Table 5 conditions the sample on issuers that are subject to continuing disclosure requirements and provides comparison of bank loans based on whether issuers submit disclosure filings with the MSRB. In the vast majority of bank loan events where disclosure is required, the associated issuer makes no disclosure on the EMMA system. For example, out of the 4,813 such bank loan events, only 935 events corresponding to 156 entities are associated with mandatory disclosures filings on the EMMA system.

This table also shows that disclosing issuers have substantially larger loans and are significantly less risky than non-disclosing issuers. The risk results are also striking – in 17 percent of bank loan events belonging to reporting issuers, the issuer is rated at or below BBB as compared to 27 percent of bank loan events for non-disclosing issuers. Similarly, in nearly 7 percent of bank loan events associated with non-disclosing issuers, the issuer is rated at or below BB as compared to only 3 percent for disclosing issuers. Panel (a) of Appendix Figure D.I further shows that this result is a byproduct of the risk distribution of non-disclosers being heavily weighted towards the lower rating categories. Overall, these results suggest that there may be significant underreporting of private

debt claims and that issuers that are not compliant with Rule 15c2-12 are substantially riskier than compliant issuers. Importantly, these are the cases in which the dilution of public bonds by private debt claims is likely to be most severe.

In Panel C we replicate the earlier analysis within the sub-sample of loan originations. As discussed in Section 2.2, issuers may interpret the rule to only apply to loan originations. We show that within the subset of loan origination the compliance rate is significantly higher at approximately 46%, suggesting that some issuers may narrowly interpret the continuing disclosure regulation to only apply to loan originations. Nevertheless, even with the sub-sample of loan originations the majority of reportable bank loan events remain not disclosed. Non-disclosers are similarly riskier than disclosers within this sub-sample. The issuer is rated BBB or lower in 28% of bank loan events of non-disclosers and BB or lower in 14% of events. Bank loan events of disclosers are 2-4 times less likely to fall into these categories. Overall, these results show that compliance with continuing disclosure regulation is low even under narrow interpretations of Rule 15c2-12.

It is possible that municipal bond underwriters and issuers may not have been fully aware of the amendments to Rule 15c2-12 immediately after the implementation of the rule. To this end, in Figure 6 we test whether the underreporting documented in Panels B and C of Table 5 has changed over time. Panel (a) of the figure shows that disclosure of bank loan events has remained low throughout the entire sample period and has notably declined even further in the the most recent quarters of the data. Panel (b) corroborates this pattern for loan originations.

In Figure 7 we also test whether the observed underreporting might be a byproduct of renegotiations changing loan terms in a manner that is immaterial for bondholders. We separate renegotiations into favorable or adverse to municipal bond holder and have any large associated changes in loan terms – loan amount change of at least 10%, interest rate change exceeding 50 basis points, reduction in maturity of 4 or more quarters. We define renegotiations to be unfavorable to bondholder if they increase loan interest rates, increase loan amounts, or decrease loan maturities. Conversely, favorable renegotiations increase maturities, decrease amounts, or decrease interest rates. Figure 7 shows that compliance rates remain low within both groups of renegotiations, despite all these events affecting municipal bond holders in a substantial manner.

In Table 6, we study the determinants of issuer bond market access, disclosure requirements, and the propensity to disclose within the universe of Y-14 bank loan borrowers. We collapse the

panel to the entity-quarter level and, given we are interested in studying income statement/balance sheet determinants of the interplay between bond market access and disclosure, we restrict the sample to the entities we can match to the Census of governments. Columns (1) and (2) show that bond market access among bank borrowers is largely determined by entity size and leverage (debt-to-revenue ratios), very similarly to the results in Table D.I. This association changes very little when we include bank rating fixed effects. Column (3) shows that larger issuers with larger fraction of revenues from stable sources such as taxation are more likely to be required to disclose. Finally, columns (4) through (6) examine the propensity to disclose conditional on being required to do so. Size and stability of government revenues once again factor in prominently. In other words, issuers that expect to use bond markets frequently are more likely to make disclosures conditional on being required to do so. In columns (5) and (6) we also include issuer-quarter aggregated loan event characteristics to understand whether these are important once we account for entity fundamentals. Almost none of the loan characteristics help explain the decision to disclose with the exception of interest rates – higher interest rates are associated with lower disclosure probability. This may be indicative of issuers withholding information from markets when such information can jeopardize their future bond market access.

It could be the case that the bank loan events that are not reported from both Table 5 and Figure 6 represent an immaterial fraction of the issuers' bonds that trigger continuing disclosure requirements. To this end, for each bond issuer-quarter we construct the ratio of total bank loan commitments experiencing renegotiations/originations to the total outstanding amount of bonds triggering continuing disclosure requirements. Panel A of Figure 8 plots this distribution for issuers that choose to report. Not surprisingly, the originated/renegotiated bank loans are economically significant for reporting issuers – the typical (median) reporter has reportable bank loans that are roughly 70% the size of the issuer's outstanding bonds triggering continuing disclosure. Furthermore, about one quarter of issuers' reportable bank loans are at least 40% larger than the issuer's bonds. Even the fraction in the 10^{th} percentile of the distribution seems economically meaningful at approximately 12% of the issuer's bonds.

Interestingly, Panel B of Figure 8 shows that the corresponding ratios for non-reporters are a little lower but largely similar to what we have documented in Panel A. For example, the typical (median) issuer that does not report newly modified/incurred bank loan obligations has reportable

loans that are approximately 40% of the issuer's outstanding bonds triggering continuing disclosure. In addition, for 90% of issuers bank loans account for at least 5% of outstanding bonds, about a quarter of non-reporting issuers have newly incurred/modified bank loans that are as large and larger than the same issuer's bonds and ten percent of issuers have bank loans that are twice as large as the bonds. Overall, the vast majority of non-disclosing issuers seem to have material reportable bank loan events.

As municipal bond underwriters have to ensure issuers disclose material financial obligations in accordance with Rule 15c2-12, it could be the case that it is too costly for underwriters to enforce compliance with the rule. To the extent that small underwriters are responsible for a significant portion of issues triggering continuing disclosure, the compliance with the rule will be consistent with insufficient underwriter resources. This is unlikely to be the case as the vast majority of municipal bond offerings triggering continuing disclosure are underwritten by the largest banks and broker-dealers. For example, over 80% of these offerings are underwritten by only 30 institutions (shown in Figure 9). Despite that underwriters may still face some difficulties ensuring compliance with the rule as they are not able to verify whether state and local governments have entered into private debt agreements until governments release their annual CAFRs that typically come with delays of over six-nine months.

6 Conclusion

This paper sheds light on the effectiveness and market impact of the recent changes to SEC's Continuing Disclosure Rule 15c2-12. We show that whenever private debt is disclosed, such disclosures are likely informative to market participants but there is substantial heterogeneity in their information content and complexity. We further show that disclosures in a benign economic environment are associated with negative abnormal bond returns, consistent with agreements to private debt representing negative news to municipal bond investors. In contrast, private debt debt disclosure is interpreted as positive news by municipal bond investors after the onset of the Covid crisis.

Relying on confidential supervisory information from the Y-14 Collection, we present evidence that issuers significantly underreport private debt. For example, among issuers required to report

private debt, only 20% to 46% of private debt agreements are ultimately filed with the MSRB. Our results, therefore, imply that the recent continuing disclosure regulation has had limited success in ensuring issuers make the disclosures the SEC itself deemed necessary for investors. While disclosure is unlikely to be costly to issuers, the low compliance with the regulation seems consistent with the rule's ambiguity on what constitutes reportable private debt events. Overall, it is unlikely that this disclosure regulation has improved the opaque information environment for investors in the municipal bond market.

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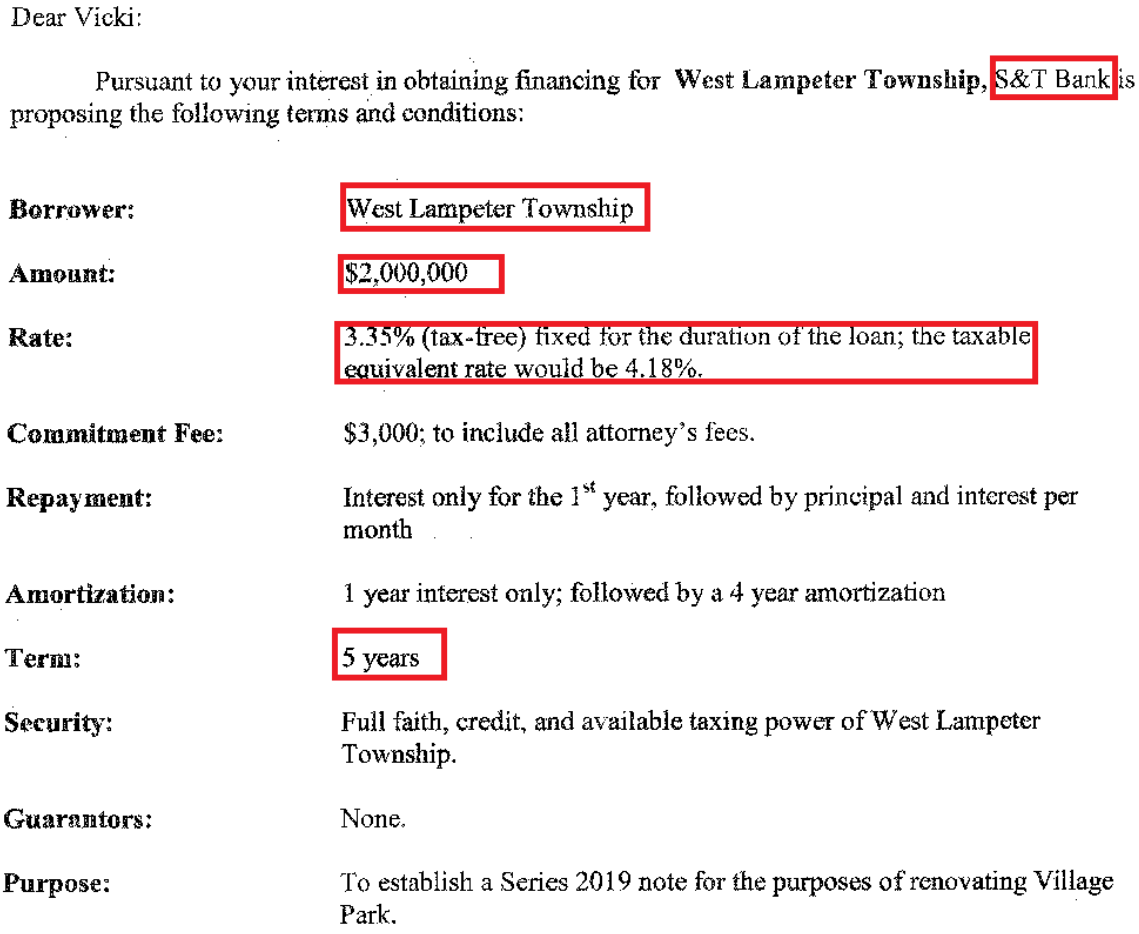
Figures and Tables

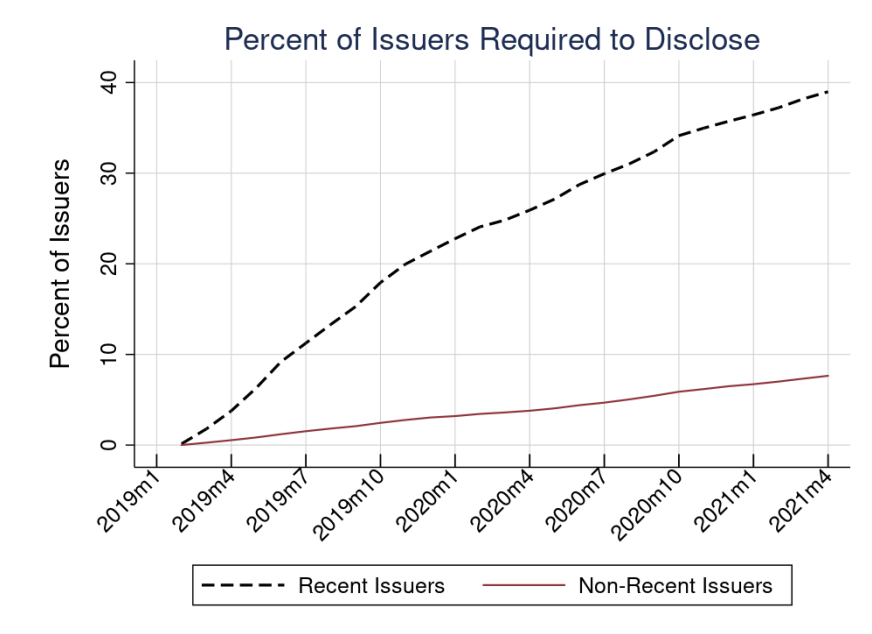


Dear Vicki:

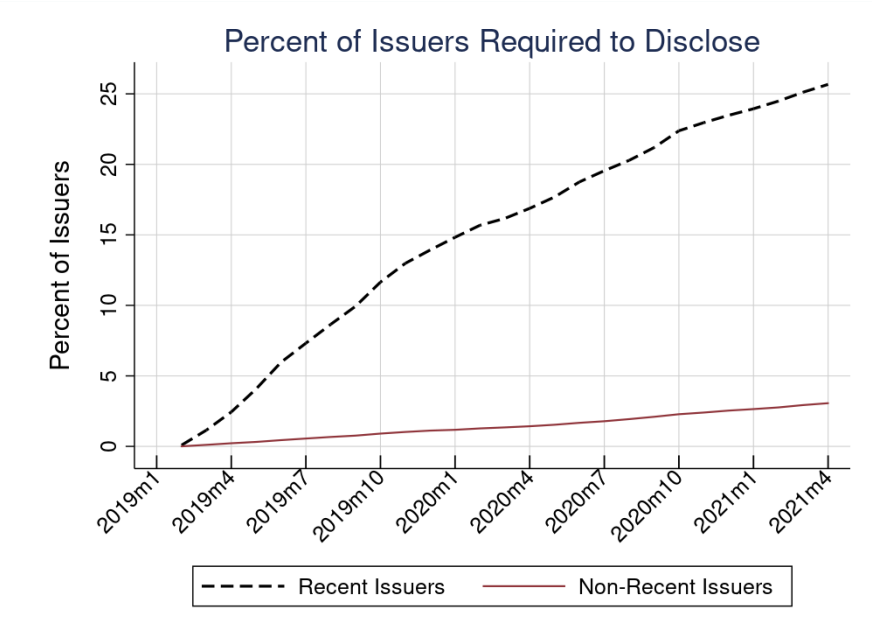
Pursuant to your interest in obtaining financing for **West Lampeter Township**, S&T Bank is proposing the following terms and conditions:

Borrower:	West Lampeter Township
Amount:	$2,000,000
Rate:	3.35% (tax-free) fixed for the duration of the loan; the taxable equivalent rate would be 4.18%.
Commitment Fee:	$3,000; to include all attorney's fees.
Repayment:	Interest only for the 1st year, followed by principal and interest per month
Amortization:	1 year interest only; followed by a 4 year amortization
Term:	5 years
Security:	Full faith, credit, and available taxing power of West Lampeter Township.
Guarantors:	None.
Purpose:	To establish a Series 2019 note for the purposes of renovating Village Park.

Figure 1: An example of a continuing disclosure filing. This figure presents a simple example of a term sheet within a continuing disclosure filing.

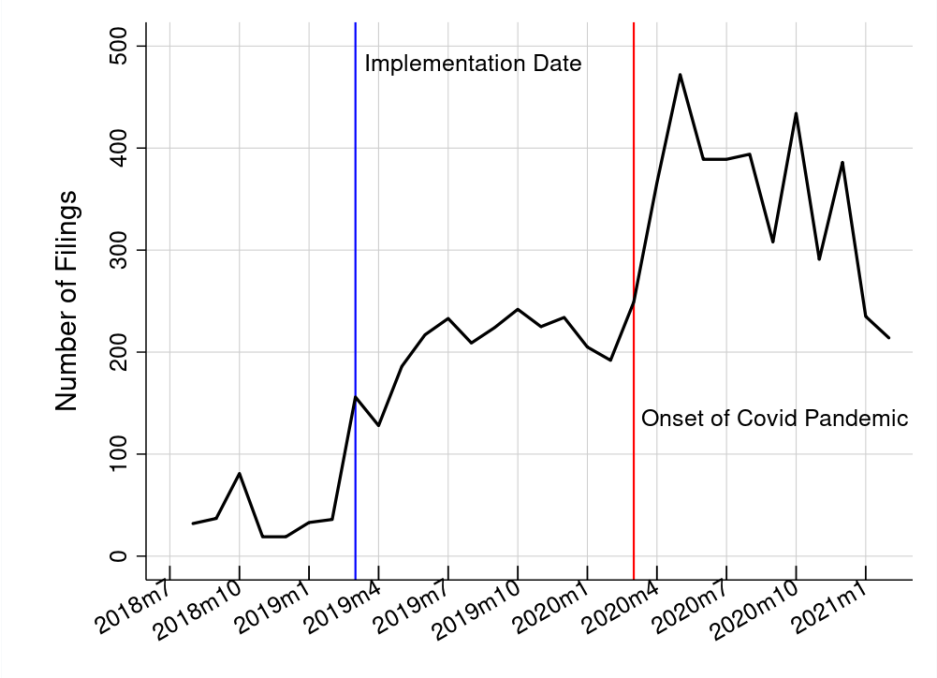


(a) Municipal Bond Market (Jan 2010-Feb 2019)

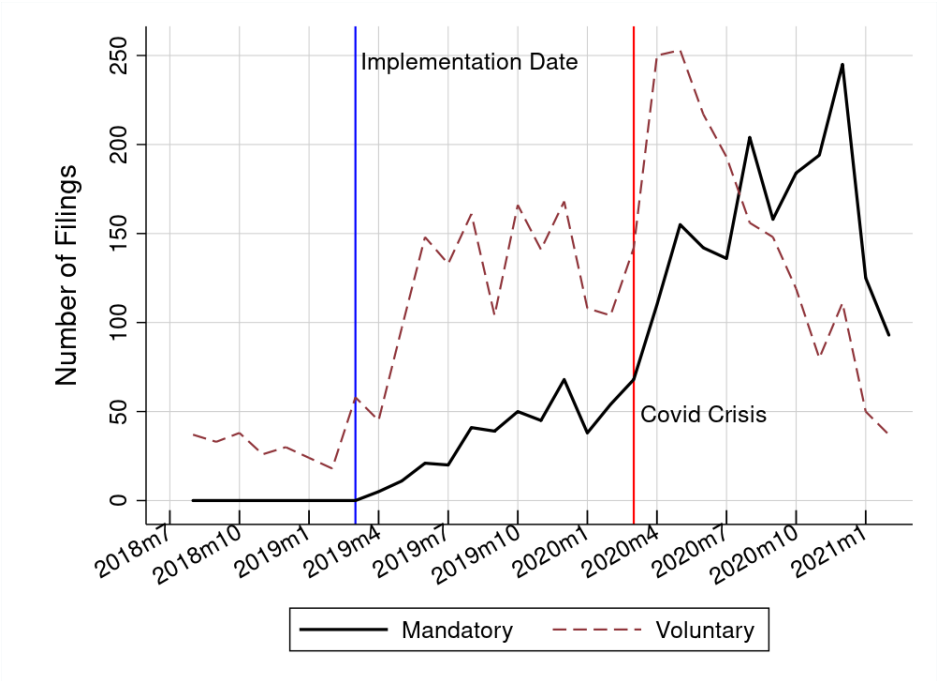


(b) Municipal Bond Market (Jan 2000-Feb 2019)

Figure 2: Continuing Disclosure Requirements over Time. This figure presents the cumulative share of issuers in the municipal bond market over time that are required to comply with Rule 15c2-12. The municipal bond market in panel (a) is defined as the set of issuers with at least one bond issue between January 1^{st} 2010 and February 26^{th} 2019, while in panel (b) we expand that window to January 2000 through February 2019. Isuers are split into two groups – (1) 'recent issuers' or those with at least one bond issue between January 1, 2010 (2000 in panel b) and February 26, 2019; (2) 'non-recent issuers' or those that haven't issued bonds between January 1, 2010 (2000 in panel b) and February 26, 2019. Both groups are expressed relative to all 'recent issuers'.

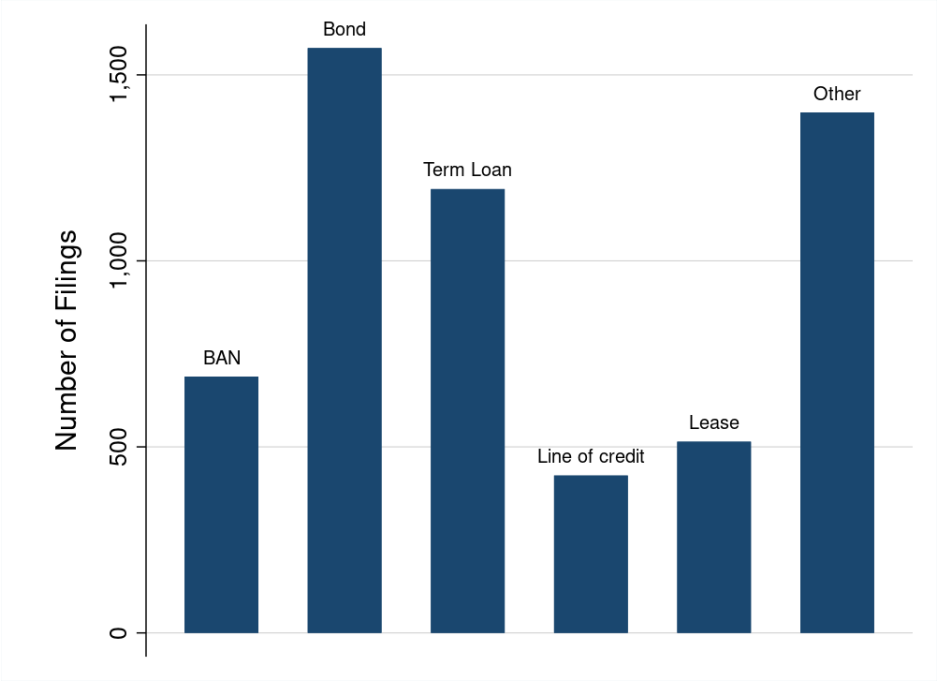


(a) Total Disclosures

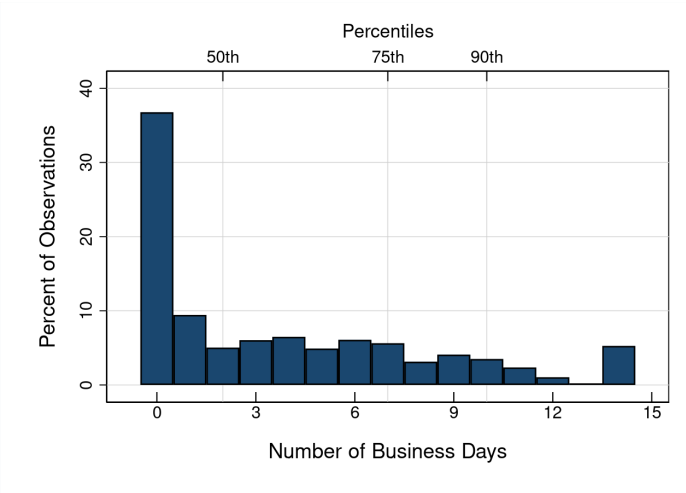


(b) Mandatory and Voluntary Disclosures

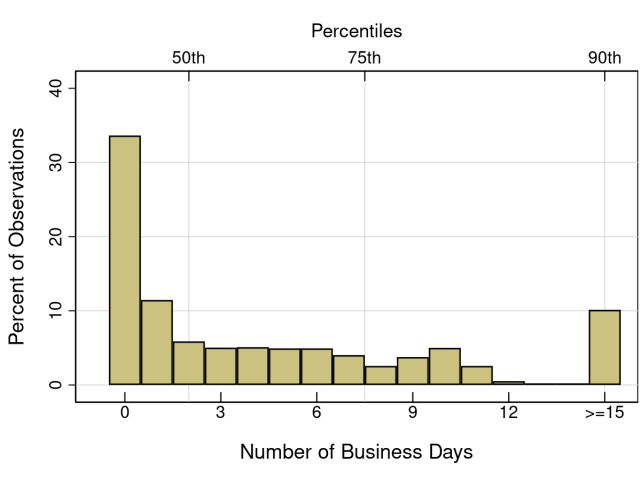
Figure 3: Continuing disclosure filings over time. Panel (a) of this figure shows monthly total municipal disclosures of debt obligations, while panel (b) breaks down the total disclosure count into mandatory and voluntary disclosures.



(a) Types of Private Debt



(b) Time Since Private Debt Agreement (Mandatory)



(c) Time Since Private Debt Agreement (Voluntary)

Figure 4: Private debt type and timeliness of continuing disclosure. Panel (a) of this figure presents the distribution of financial obligations type underlying continuing disclosures. Panels (b) and (c) shows the distribution of time (in business days) between the obligation agreement date and obligation disclosure date for mandatory and voluntary filings, respectively. The sample includes all continuing disclosure filings since February 27^{th} 2019.

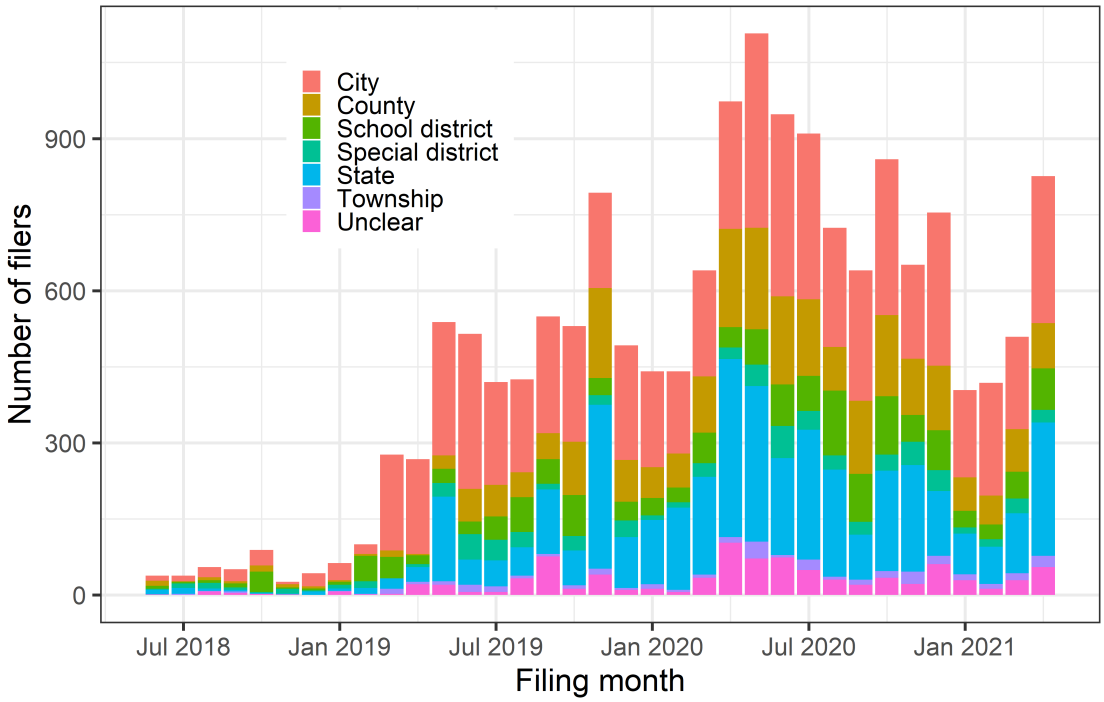
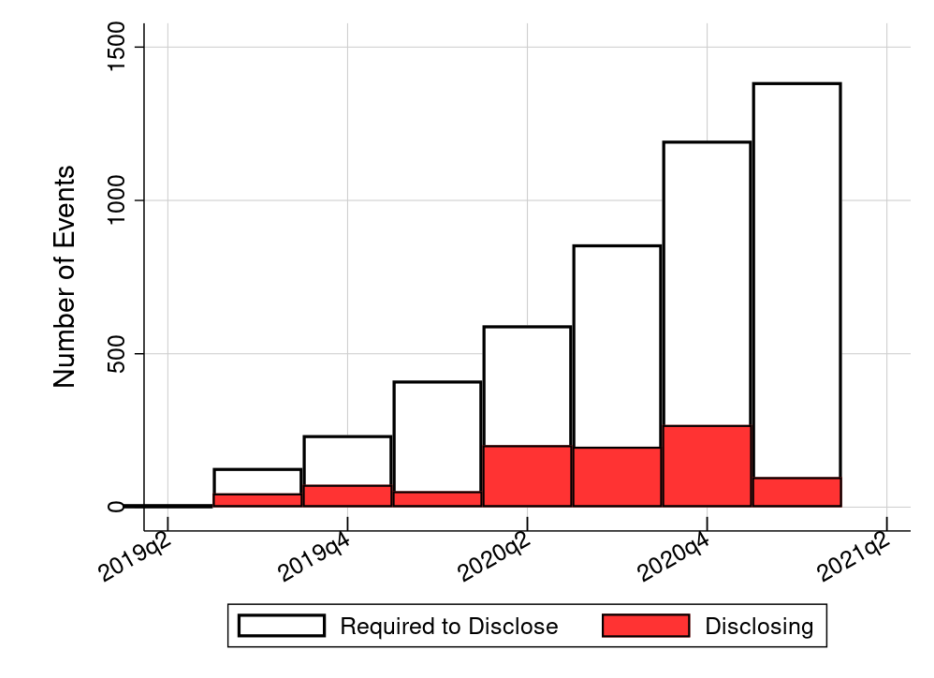
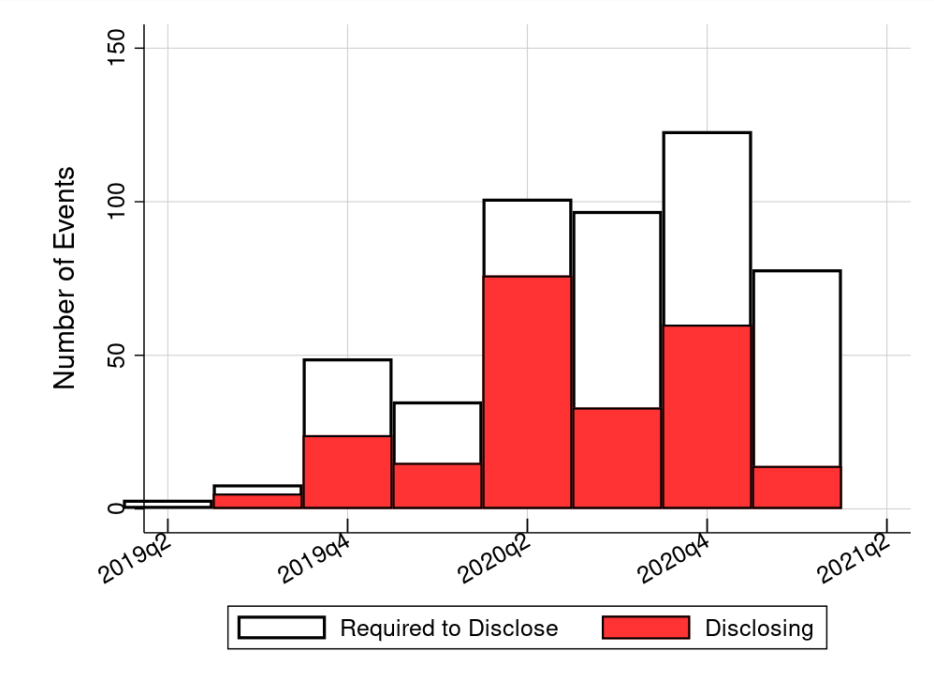


Figure 5: Continuing disclosure and filer government type. This figure shows the distribution of government types for filers of continuing disclosures over time (on a monthly basis). The counts in this figure exceed those in Figure 3 because multiple government types can often submit the same filing.

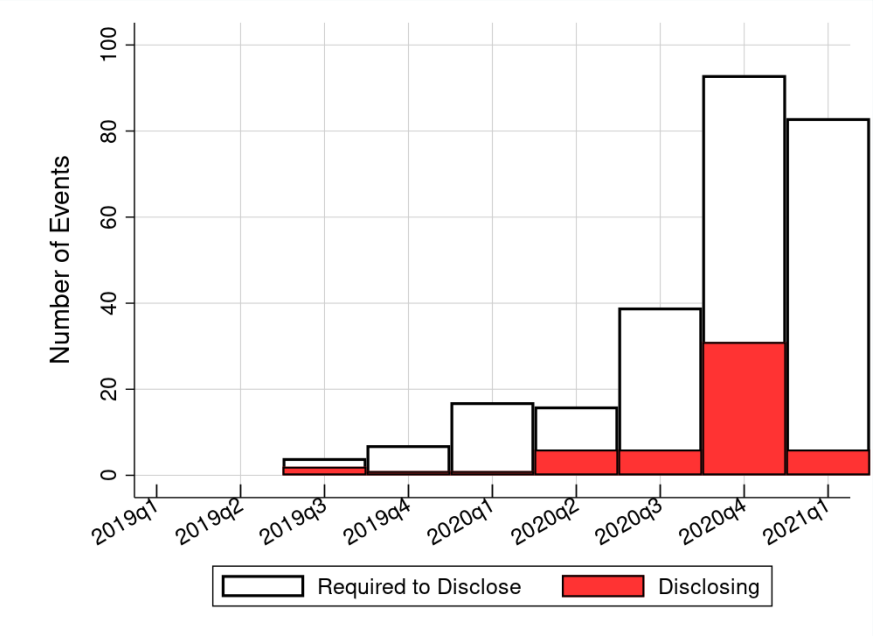


(a) All Loan Events

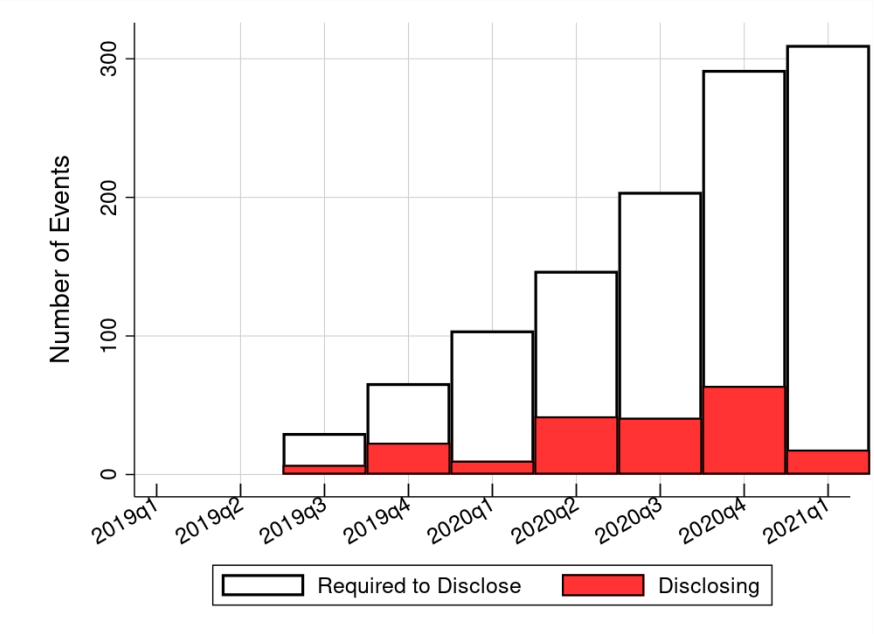


(b) Loan Originations

Figure 6: Compliance with continuing disclosure requirements. This figure compares the number of bank loan events subject to continuing disclosure requirements relative to the number of disclosed events over time. The white bars show the number of bank loan events in the Y-14 Collection that are subject to disclosure pursuant to Rule 15c2-12, while the red bars show the number of required bank loan events in which the issuer has actual associated disclosures on the EMMA system. Panel (a) includes all loan events (originations and renegotiations), while panel (b) shows only loan originations.

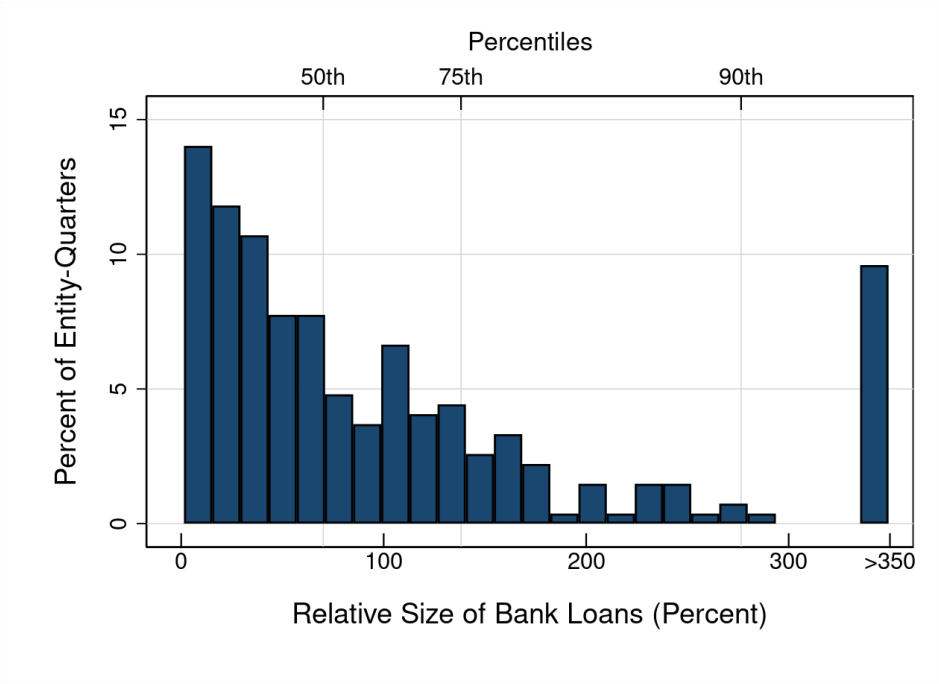


(a) Adverse to Bondholders

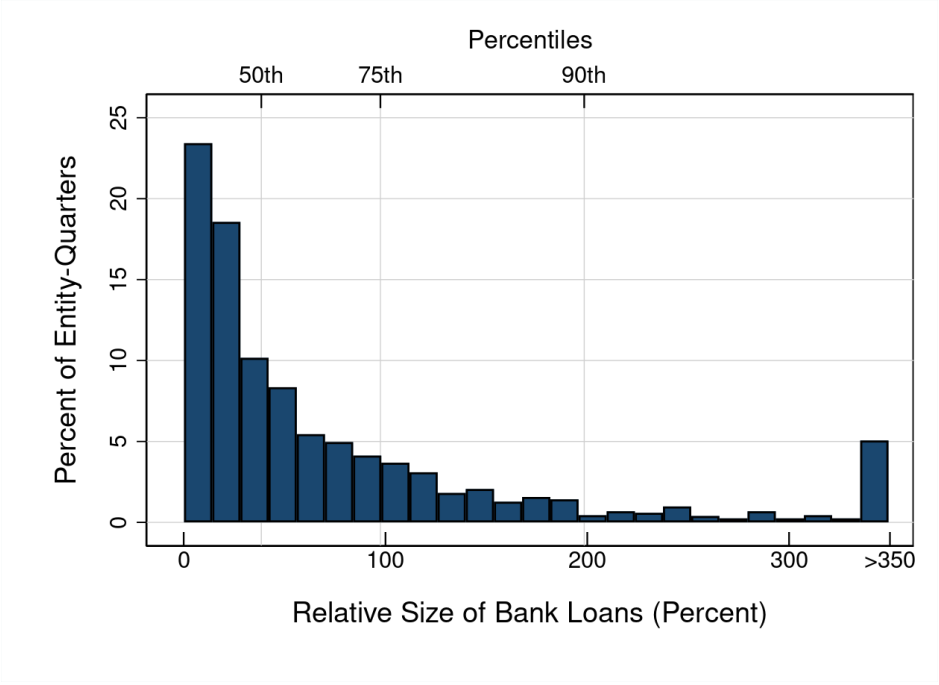


(b) Favorable to Bondholders

Figure 7: Private debt renegotiation and compliance with continuing disclosure. This figure compares the count of major bank loan renegotiations to the number of realized disclosures. The white bars show the number of bank loan events in the Y-14 Collection that are required to be disclosed pursuant to Rule 15c2-12, while the red bars show the number of required bank loan events in which the issuer has actual associated disclosures on the EMMA system. Panel (a) shows adverse loan renegotiations or those associated with large reductions in loan maturities (of more than 4 quarters), increases in loan amounts (of at least 10%), or increases in interest rates (of at least 50 bps), while panel (b) shows favorable renegotiations associated with changes that are at large reductions in loan amounts (of at least 10%), increases in maturity (of more than 4 quarters), or reductions in interest rate (of at least 50 bps).



(a) Associated Disclosures on EMMA



(b) No Associated Disclosures

Figure 8: Size of Loan Commitments Relative to an Issuer's Bonds. This figure shows the size of total (renegotiated or newly-originated) loan commitments of a given issuer-quarter relative to the total outstanding amount of bonds triggering continuing disclosure requirements. Panel (a) presents the distribution for issuers that disclose private debt claims incurred in the same quarter on the EMMA system and Panel (b) restricts the sample to issuers that do not report the private debt agreements in that quarter.

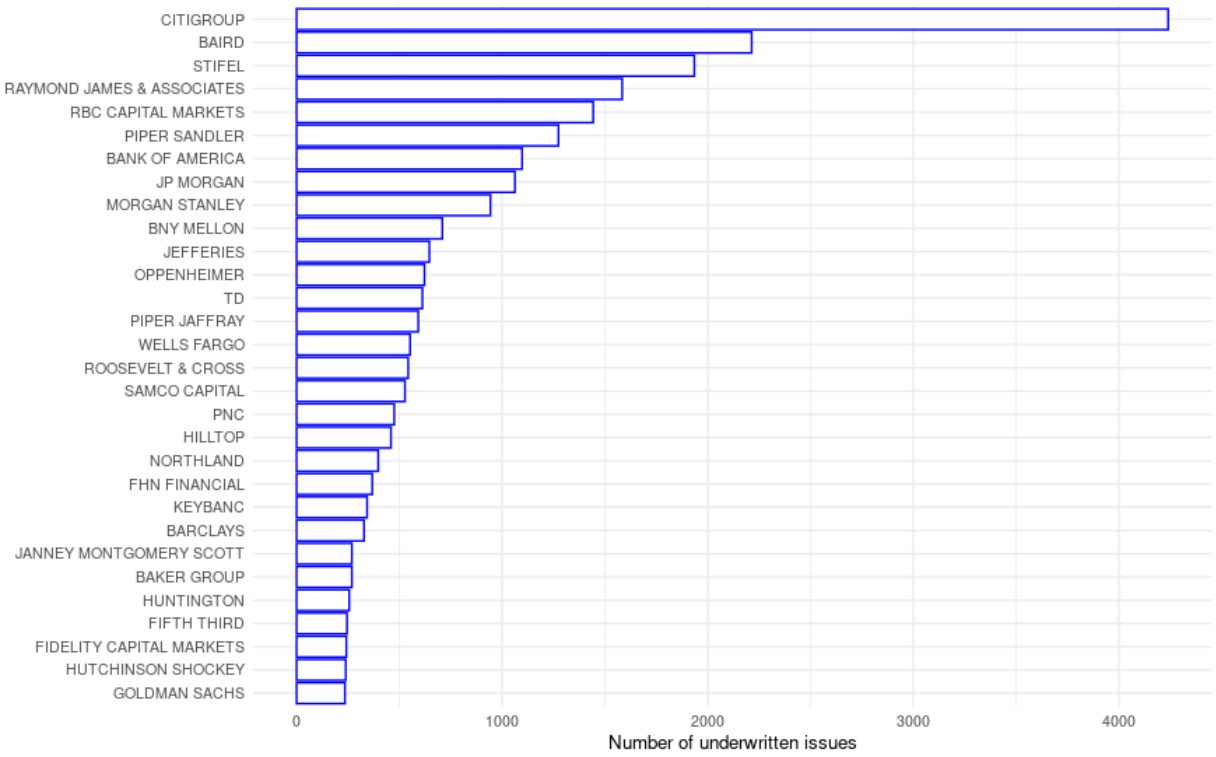


Figure 9: Underwriters of municipal bond issues triggering continuing disclosure This figure presents the number of offerings triggering continuing disclosure requirements underwritten by each of the top 30 underwriters by offering count. Source: Mergent Municipal Securities Database.

Table 1: Bond market access and private disclosure requirements. This table presents summary statistics and t-tests for differences in means for general purpose local governments in our sample, excluding state governments. Panel A splits the sample based on whether governments have access to the municipal bonds market. Panel B restricts the sample to governments with bond market access and compares governments according to whether they are required to disclose private debt agreements. All variables are defined in Appendix C.

A. Bonds Market Access and Government Characteristics

	No Bonds Issuance (N=30,500)		*Bonds Issuance (N=7,854)*		
	Mean	*St. Dev.*	*Mean*	*St. Dev.*	*Difference*
General Revenue, $m	5.85	26.12	41.35	70.1	-35.50***
Total Expenditures	0.99	0.53	0.99	0.34	0.00
Capital Outlays	0.10	0.21	0.15	0.20	-0.05***
Revenue Gov Sources	0.25	0.22	0.18	0.15	0.07***
Total Taxes	0.50	0.28	0.45	0.22	0.05***
Sales Tax Share	0.16	0.27	0.19	0.25	-0.03***
Property Tax Share	0.73	0.33	0.70	0.29	0.03***
Debt-to-Revenue	0.45	1.38	0.97	1.21	-0.52***
Interest Expense	0.05	0.03	0.04	0.02	0.01***

B. Issuers Required to Disclose and Government Characteristics

	Not Required (N=4,209)		*Required (N=3,645)*		
	Mean	*St. Dev.*	*Mean*	*St. Dev.*	*Difference*
General Revenue, $m	27.41	55.34	57.44	81.07	-30.03***
Total Expenditures	0.99	0.35	0.99	0.33	0.00
Capital Outlays	0.16	0.23	0.15	0.17	0.01**
Revenue Gov Sources	0.19	0.16	0.17	0.14	0.01***
Total Taxes	0.42	0.22	0.47	0.21	-0.05***
Sales Tax Share	0.21	0.26	0.18	0.23	0.03***
Property Tax Share	0.69	0.29	0.72	0.28	-0.03***
Debt-to-Revenue	0.95	1.24	1.00	1.16	-0.05**
Interest Expense	0.04	0.02	0.04	0.02	0.00**

Table 2: Characteristics of private debt contracts. This table reports summary statistics for the hand-collected financial obligations from continuing disclosure filing documents. We manually read a sample of approximately 2,300 filing documents, see Appendix B for a description of the initial screening procedure. For each filing we identify the underlying obligation type (the column headers), the obligation amount, maturity, and interest rate, as well as whether the filing includes a term sheet, or whether the referenced obligation amends an existing obligation. We also show the fraction of contracts that have missing values for each contract term.

	BAN	**Bond**	**Lease**	**Credit line**	**Term loan**
N	414	704	188	298	704
Amount (USD Mill.)					
Mean	12.15	40.92	5.22	141.32	26.94
SD	50.29	123.36	14.79	303.33	88.74
Median	1.33	5.08	1.00	73.00	1.71
Missings	0.00	0.02	0.03	0.03	0.03
Maturity (years)					
Mean	0.93	14.45	7.81	2.46	15.57
SD	0.95	9.06	5.30	3.33	73.48
Median	1.00	13.80	5.02	1.01	10.01
Missings	0.03	0.15	0.53	0.18	0.12
Interest rate					
Mean	1.88	2.31	2.97	1.67	2.41
SD	0.61	1.16	1.11	1.59	1.25
Median	1.89	2.13	2.77	1.20	2.49
Missings	0.09	0.34	0.36	0.60	0.22
Has Term Sheet					
Mean	0.40	0.54	0.71	0.02	0.56
SD	0.49	0.50	0.46	0.15	0.50
Median	0.00	1.00	1.00	0.00	1.00
Missings	0.00	0.00	0.00	0.00	0.00
Amendment					
Mean	0.02	0.01	0.06	0.20	0.02
SD	0.13	0.10	0.24	0.40	0.15
Median	0.00	0.00	0.00	0.00	0.00
Missings	0.00	0.00	0.00	0.00	0.00

Table 3: Event study results. This table presents average abnormal returns for bonds with associated continuing disclosure events. Panel A uses the full sample of disclosure events since February 27, 2019 with available secondary market bonds trading data. This panel presents abnormal returns adjusted for bond duration, or for the average return on sub-indexes based on credit risk, maturity, or both. Panels B and C present result for abnormal bond returns adjusted for bond duration, and for the average return on sub-indexes based on both credit risk and maturity. Panel B partitions the sample into mandatory and voluntary disclosures, before and after the onset of the Covid Crisis. Panel C restricts the sample to mandatory disclosure events, and partitions the results into different credit quality groups, pre- and post-Covid. The standard errors are double clustered by trade date and issuer CUSIP.

Panel A: Abnormal Returns, Full Sample

	Bond Duration Adjustment, Additional Adjustments for:			
	None	Risk	Maturity	Risk & Maturity
Bond Returns	0.137**	0.006	0.108	0.050
	(0.067)	(0.070)	(0.072)	(0.071)
Observations	144,673	142,562	143,350	139,604
Number of Events	6,201	6,192	6,185	6,173

Panel B: Abnormal Returns, Mandatory vs. Voluntary Disclosures

	Mandatory			Voluntary		
	All	Pre-Covid	Post-Covid	All	Pre-Covid	Post-Covid
Bond Returns	0.095	-0.365**	0.192**	0.011	-0.065	0.058
	(0.076)	(0.152)	(0.075)	(0.085)	(0.083)	(0.113)
Observations	65,435	11,450	53,985	74,169	28,059	46,110
Number of Events	3,200	655	2,545	2,973	1,538	1,435

Panel C: Abnormal Bond Returns and Credit Quality (Mandatory)

	Pre-Covid			Post-Covid		
	AAA-AA	A	BBB & Lower	AAA-AA	A	BBB & Lower
Bond Return	-0.088	-0.650**	-1.031***	0.258***	0.058	0.244**
	(0.141)	(0.281)	(0.281)	(0.081)	(0.100)	(0.121)
Observations	6,856	3,044	1,550	30,091	17,221	6,673
Number of Events	435	158	56	1,676	761	254

Table 4: Event study results: heterogeneity tests. This table presents heterogeneity splits for average abnormal returns to bonds associated with continuing disclosure events. The sample in both panels includes all mandatory disclosure events since February 27, 2019 with available secondary market bonds trading data. We compute abnormal returns to bonds relative the corresponding average return on sub-indexes based on both credit risk and maturity over the same time window as the given bond's returns. Panel A partitions the sample into private debt types underlying each continuing disclosure filing, before and after the onset of the Covid Crisis. Panel B partitions the sample into timely and less timely disclosures based on the gaps between disclosure date and debt agreement date (in business days), before and after the onset of the Covid Crisis. The standard errors are double clustered by trade date and issuer CUSIP.

Panel A: Abnormal Bond Returns by Debt Disclosure Type

	Pre-Covid			Post-Covid		
	Coeff	Obs	N Events	Coeff	Obs	N Events
BANs	0.131	226	30	0.236*	2,806	93
	(0.137)			(0.124)		
Bonds (PPs)	-0.368*	4,060	201	0.003	16,165	642
	(0.189)			(0.130)		
Leases	0.222***	995	84	-0.552	1,219	137
	(0.075)			(0.345)		
Credit Lines	-0.747***	1,942	58	0.314***	11,706	379
	(0.302)			(0.121)		
Term Loans	-0.393**	1,731	157	0.253***	8,168	524
	(0.190)			(0.085)		
Other PPs	-0.324*	2,496	125	0.331**	13,921	770
	(0.167)			(0.053)		

Panel B: Timeliness of Disclosures

	Pre-Covid			Post-Covid		
	Coeff	Obs	N Events	Coeff	Obs	N Events
Timely (≤8 days)	-0.447***	9,215	530	0.197**	46,481	2214
	(0.178)			(0.082)		
Less Timely (>8 days)	-0.030	2,235	125	0.162	7,504	331
	(0.199)			(0.102)		

Table 5: Private debt events and disclosure requirements. Panel A of this table presents comparisons of loan terms for all loan events in our sample (both renegotiations and originations) based on whether continuing disclosure may be required. Panels B and C restrict the sample to loan events for which disclosure is required and compare loan terms based on whether there is associated disclosure on EMMA. All variables are defined in Appendix C.

A. Loan Characteristics and Disclosure Requirements

	Not Required (N=25,246)		*Required (N=4,813)*		
	Mean	*St. Dev.*	*Mean*	*St. Dev.*	*Difference*
Credit Line	0.14	0.34	0.15	0.36	-0.02***
CL Utilization	0.42	0.46	0.45	0.46	-0.03
Term Loan	0.55	0.50	0.56	0.50	-0.01
Lease	0.28	0.45	0.27	0.44	0.02**
Committed Amt, $m	11.01	31.40	12.71	48.08	-1.70***
Interest Rate	0.03	0.01	0.03	0.01	0.002***
Rem. Maturity	6.50	4.62	6.35	4.45	0.15**
Secured	0.82	0.38	0.85	0.35	-0.03***
Fixed Rate	0.91	0.29	0.90	0.30	0.00
Prepayment Penalty	0.51	0.50	0.56	0.50	-0.06***
Tax Exempt	0.68	0.47	0.73	0.44	-0.05***
Fr. $\leq$ BBB	0.27	0.44	0.25	0.43	0.02***
Fr. High-yield	0.07	0.26	0.06	0.24	0.01***

B. Required and Actual Disclosure: Loan Originations and Renegotiations

	Required, Not Disclosed (N=3,878)		*Required, Disclosed (N=935)*		
	Mean	*St. Dev.*	*Mean*	*St. Dev.*	*Difference*
Credit Line	0.15	0.36	0.17	0.38	-0.02
CL Utilization	0.46	0.46	0.42	0.46	0.04
Term Loan	0.57	0.50	0.55	0.50	0.02
Lease	0.27	0.44	0 0.26	0.44	0.01
Committed Amt, $m	10.74	26.42	20.85	94.49	-10.11***
Interest Rate	0.03	0.01	0.02	0.01	0.002***
Rem. Maturity	6.35	4.35	6.35	4.84	-0.00
Secured	0.86	0.35	0.84	0.36	0.01
Fixed Rate	0.91	0.29	0.89	0.32	0.02*
Prepayment Penalty	0.57	0.49	0.52	0.50	0.05***
Tax Exempt	0.74	0.44	0.69	0.46	0.05***
Fr. $\leq$ BBB	0.27	0.44	0.17	0.37	0.10***
Fr. High-yield	0.07	0.26	0.03	0.176	0.05***

C. Required and Actual Disclosure: Loan Originations

	Required, Not Disclosed (N=267)		*Required, Disclosed (N=227)*		
	Mean	*St. Dev.*	*Mean*	*St. Dev.*	*Difference*
Credit Line	0.18	0.39	0.15	0.36	0.03
CL Utilization	0.35	0.42	0.38	0.46	-0.03
Term Loan	0.53	0.50	0.71	0.46	-0.18***
Lease	0.22	0.41	0.11	0.31	0.11***
Committed Amt, $m	16.28	43.88	33.38	172.81	-17.10
Interest Rate	0.02	0.01	0.02	0.01	0.001
Rem. Maturity	6.08	4.76	7.39	5.55	-1.31**
Secured	0.76	0.43	0.78	0.41	-0.02
Fixed Rate	0.85	0.36	0.92	0.28	-0.07**
Prepayment Penalty	0.38	0.49	0.36	0.48	0.02
Tax Exempt	0.67	0.47	0.65	0.48	0.02
Fr. $\leq$ BBB	0.28	0.45	0.18	0.38	0.10**
Fr. High-yield	0.14	0.35	0.03	0.17	0.11***

Table 6: Bond market access, disclosure requirements, and actual disclosure. This table reports the relation between bond market access (columns 1 and 2), being required to disclose (columns 3), or disclosing when required (columns 4 through 6) and government characteristics. The balance sheet data on governments come from the 2017 Census of Governments, the loan characteristics, from the Y-14 Collection, are aggregated to the Census Government ID level and correspond to newly-originated/renegotiated loans to a given borrower. The sample in columns 1 and 2 includes all governments with a bank loan, column 3 limits this set to governments that also have bond market access, and columns 4 through 6 further limits the sample to governments that are required to disclose. The standard errors are clustered at the state level. All variables are defined in Appendix C.

Dependent variable:	*Has Bonds*		*Required*		*Disclosing*	
	(1)	(2)	(3)	(4)	(5)	(6)
Log(General Revenue)	0.119***	0.115***	0.031***	0.032***	0.035***	0.036***
	[0.013]	[0.013]	[0.006]	[0.009]	[0.009]	[0.009]
Total Expenditures	0.013	0.016	-0.040	0.037	0.035	0.035
	[0.042]	[0.042]	[0.034]	[0.061]	[0.063]	[0.064]
Revenue Gov Sources	-0.115	-0.110	-0.013	-0.138*	-0.144*	-0.142**
	[0.078]	[0.079]	[0.043]	[0.070]	[0.074]	[0.067]
Total Taxes	0.060	0.031	0.123***	-0.050	-0.061	-0.054
	[0.090]	[0.090]	[0.039]	[0.046]	[0.045]	[0.045]
Sales Tax Share	0.011	0.011	0.063	0.090	0.144	0.180**
	[0.136]	[0.135]	[0.059]	[0.090]	[0.096]	[0.088]
Property Tax Share	0.091	0.096	0.004	0.013	0.031	0.046
	[0.124]	[0.123]	[0.051]	[0.095]	[0.097]	[0.098]
Debt-to-Revenue	0.046***	0.048***	0.010	0.024	0.029	0.026
	[0.015]	[0.015]	[0.007]	[0.021]	[0.022]	[0.022]
Interest Expense	0.410	0.477	0.235	-0.941	-0.970	-1.056
	[0.363]	[0.370]	[0.284]	[0.726]	[0.824]	[0.804]
Commitments-to-Revenue					0.045	0.039
					[0.041]	[0.033]
Rem. Maturity					-0.002	-0.000
					[0.003]	[0.003]
Loan Interest Rate					-4.674***	-5.301***
					[0.915]	[0.877]
Credit Line					-0.175	-0.164
					[0.206]	[0.197]
Term Loan					-0.133	-0.119
					[0.207]	[0.197]
Lease					-0.126	-0.095
					[0.197]	[0.184]
Secured						-0.035
						[0.031]
Fixed Rate						0.053
						[0.036]
Prepay. Penalty						-0.030
						[0.019]
Tax Exempt						-0.048*
						[0.025]
Observations	14627	14608	10132	1560	1508	1508
Government Type FE	Y	Y	Y	Y	Y	Y
State FE	Y	Y	Y	Y	Y	Y
Rating FE	N	Y	Y	Y	Y	Y

Appendix Description

- Appendix A: Name matching algorithm for municipalities
- Appendix B: Hand-collection of information from continuing disclosure filings
- Appendix C: Variable definitions
- Appendix D: Additional analyses

Appendix A Name Matching Algorithm

Municipal Entity Name Matching Procedure

In order to create a bridge between the municipal bond issuers in Mergent and the municipal entities with bank loans in the Regulatory FR Y-14 Data Collection, we first expand any common abbreviations that can be identified in the municipal entities names and then develop an algorithm to try and match the names of municipal entities to their name in the Census of Local Governments. We score the name matches as being full matches or partial matches, based on whether the entire municipal entity name or just part of the municipal entity name matches to the Census entity. If the entire name matches with a cosine similarity score of 95% or greater, we consider it a full match. For full match scores less than 95%, we then try to obtain a partial name match, attempting to first partial match the entity name to the set of the local governments in a given state such as cities and townships and then to the more general county governments and state government until we obtain a partial match greater than or equal to 95%. If no match is obtained, we consider it unmatched by the algorithm. In some cases, the municipal entity's state is misspecified in the data, and we attempt to reconcile the data error by matching all entities unmatched by the algorithm by hand to their corresponding Census entity. In the final stage, we review all partial matches from the algorithm to ensure the match was not made in error, and verify that general purpose municipal governments such as townships, cities, counties, and states were not matched to either a school district or a special district that is distinct from the general purpose municipal government in the given geographical region. Name matches that violate this restriction are classified as false positives and are dropped from the final matched dataset.

Municipal Entity Name Matching Algorithm

To conduct the name matching procedure, we first expand any common abbreviations that can be identified in the municipal entities names, such as "DIST" for "DISTRICT" and "SCH" for "SCHOOL." After expanding all common abbreviations, we then proceed by passing the issuer names in the dataset to the full name matching procedure. The full name matching procedure leverages the municipal entity's state to narrow down potential matches in the Census data, and

creates a set of potential matching names from that state in the Census, renaming the Census entities so that their naming convention matches the pattern used by the dataset. With this set of potential matches from the Census, the municipal entity is scored against all these names using cosine similarity and the top scoring match is returned by the function with its score. If the match is scored as being greater than or equal to 95%, we define the municipal entity as being a full match to the Census entity. For scores below 95%, we then try to obtain a partial name match, attempting to first partial match the entity name to the set of local governments in a given state such as cities and townships and then to the more general county governments and state government until we obtain a partial match greater than or equal to 95%. If no match is obtained, we consider it unmatched by the algorithm. Those entities unmatched by the algorithm due to data errors are then matched by hand.

Regulatory FR Y-14 Obligor Name Matching

For the FR Y-14 data, each loan has an *obligor name* and a five digit zip code. We use the data from the zip code to parse the potential city, township, or county name from the obligor name. If any of the below patterns with the city or county name from the zip code match are in the obligor name, we categorize the loan as belonging to that municipal entity type, and then create a new name for the matching algorithm based on the convention used in the Census entity's name. For instance, for an obligor name containing *Springfield City of* in the state of Illinois, we would flag it as a city, and create a new alias containing *Springfield City Illinois*. Since this has the potential to occasionally flag special districts and school districts as special purpose entities, we impose a restriction in the final dataset that these entities may not contain keywords such as "schools" or "authority" since those tend to be separate entities in the Census, with the exception being when that general government entity in the Census has no special districts or school districts. Using the names of the special districts and school districts from the Census, for each general government entity we determine whether there is a school district or special district in the same geographical county with a similar name, and drop any of the false matches to general government entities with keywords that pertain to special districts or school districts when there is one located within the county.

Cities

We search for the following keywords in the obligor name with the city name from the zip code to determine if the given general government entity is a city.

1. *City of cityName*
2. *cityName City of*
3. *cityName City and County of*

If it contains a match to any of the patterns above, we designate it as a city and assign it a new name for the matching, *cityName City stateName*.

Townships

We search for the following keywords in the obligor name with the township name from the zip code to determine if the given general government entity is a township.

1. *Village of townshipName*
2. *townshipName Village of*
3. *Borough of townshipName*
4. *townshipName Borough of*
5. *Township of townshipName*
6. *townshipName Township of*
7. *Town of townshipName*
8. *townshipName Town of*
9. *Charter Township of townshipName*
10. *townshipName Charter Township of*
11. *townshipName Township*

12. *townshipName Township countyName County stateName*
13. *townshipName Township countyName County*
14. *townshipName Village countyName County stateName*
15. *townshipName Village countyName County*
16. *townshipName Borough countyName County stateName*
17. *townshipName Borough countyName County*

If it contains a match to any of the patterns above, we designate it as a city and assign it a new name for the matching, *townshipName Township countyName County stateName*.

Counties

After failing to identify either a city or township in the name using the above keywords, we search for the following keywords in the obligor name with the county name from the zip code to determine if the given general government entity is a county.

1. *County of countyName*
2. *countyName County of*
3. *countyName County*
4. *Parish of countyName*
5. *countyName Parish of*
6. *countyName Parish*

If it contains a match to any of the patterns above, we designate it as a county and assign it a new name for the matching, *countyName County stateName*.

States

After failing to identify a city, township, or county in the name using the above keywords, we search for the following keywords in the obligor name with the state name from the zip code to determine if the given entity is a state government.

1. *stateName State*
2. *State of stateName*
3. *stateName State of*
4. *Commonwealth of stateName*
5. *stateName Commonwealth of*

After exiting the matching process, we determine if the obligor name matched to a city, township, or county has keywords that indicate a special district or school district. In those cases, we drop the matches from the final dataset. We also review any partial matches manually to determine false positives and drop them from the sample or correct them where possible.

Mergent Municipal Securities Issuer Name Matching

To match the Mergent municipal bond issuers to the Census, we search for keywords such as "township", "borough", "village", "county" or "state" (after expanding their abbreviations) and categorize the bond issuer and its attached issuer CUSIP as belonging to that municipal entity type, and then create a new name for the matching algorithm based on the convention used in the Census entity's name.

Cities

We search for the following keywords in the Mergent issuer name with the city names from the issuer's state to determine if the given general government entity is a city.

1. *cityName stateName*

If it contains a match to he pattern above, we designate it as a city and assign it a new name for the matching, *cityName City stateName*.

Townships

We search for the following keywords in the Mergent issuer name with the township and city names from the issuer's state to determine if the given general government entity is a township.

1. *townshipName Township countyName County stateName*
2. *townshipName Township countyName County*
3. *townshipName Borough countyName County stateName*
4. *townshipName Borough countyName County*
5. *townshipName Village countyName County stateName*
6. *townshipName Village countyName County*

If it contains a match to he pattern above, we designate it as a township and assign it a new name for the matching, *townshipName Township countyName County stateName*.

Counties

After failing to identify either a city or township in the name using the above keywords, we search for the following keywords in the Mergent issuer name with the county names from the issuer's state to determine if the given general government entity is a county.

1. *countyName COUNTY*
2. *countyName PARISH*

If it contains a match to any of the patterns above, we designate it as a county and assign it a new name for the matching, *countyName County stateName*.

States

After failing to identify a city, township, or county in the Mergent issuer name using the above keywords, we search for the following keywords with the issuer's state to determine if the given entity is a state government.

1. *stateName STATE*

After exiting the matching process, we determine if the Mergent issuer name matched to a city, township, or county has keywords that indicate a special district or school district. In those cases, we drop the matches from the final dataset. We also review any partial matches manually to determine false positives and drop them from the sample or correct them where possible.

Appendix B Hand-collection of information from continuing disclosure filings

We supplement the MSRB filings data with individual filing characteristics that we hand collect from reading around 2,300 filing documents. To select the filing documents that we read in detail, we use a simple initial screening algorithm:

1. We assign all non-machine-readable pdfs to manual reading (436 documents)

2. For the machine-readable documents, we automate reading the first three pages and look for keywords identifying potential obligation types:

    - Bond: revenue bond; general obligation bond; refunding bond; bond indenture; construction and improvement bond; bonds, series; go bond; new issue
    - Loan: revolving line; revolving credit; revolving; term loan; loan agreement; loan purpose; loan amount; amortizing loan; line of credit; direct placement; credit agreement; loan and security agreement; paycheck protection program; ppp
    - Lease: lease/purchase agreement; lease agreement; master lease
    - Bond anticipation note: anticipation note

3. We read all documents that contain one or more of the keywords above (or are non-machine readable) and identify the actual obligation type, the obligation amount, interest rate and maturity, whether the filing includes a term sheet, and whether the filing amends an existing obligation.

Appendix C Variable definitions

Below we present variable definitions for the government balance sheet data from the Census of Governments and the municipal loan data coming from the FR-Y-14Q Collection. The item numbers of data fields refer to Schedule H1 of the Y-14Q data on the Federal Reserve's website:

`https://www.federalreserve.gov/reportforms/forms/FR_Y-14Q20210331_i.pdf`

Credit Line – an indicator variable that takes the value of one if a given bank loan is a credit line, based on field #20.

CL Utilization – The drawn amount under a given municipal bank credit line as a fraction the commitment amount of the same loan.

Term Loan – an indicator variable that takes the value of one if a given bank loan is a term loan, based on field #20.

Lease – an indicator variable that takes the value of one if a given bank loan is a lease, based on field #20.

Committed Amt – The commitment amount of a given municipal bank loan in millions of U.S. dollars (field #24 in Schedule H1).

Interest Rate – The interest rate of a given municipal bank loan (field #38 in Schedule H1).

Remaining Maturity – The difference between the maturity date of a given municipal bank loan (based on the maturity date field #19 in Schedule H1) and the current observation date expressed in quarters.

Secured – We define a municipal bank loan to be secured if either the bank has first-lien or second-lien security on the borrower's assets or cash flows (based on fields #35 and #36 in Schedule H1).

Fixed Rate – We define a municipal bank loan to be fixed rate if the loan interest rate does not vary with base rate indexes such as the LIBOR or prime rates (field #37 in Schedule H1 takes the value of one).

Prepayment Penalty – We define a municipal bank loan to have a prepayment penalty if the loan currently has a prepayment penalty or it had a prepayment penalty in the past that has expired (field #94 in Schedule H1 takes the value of 1 or 2).

Tax-Exempt – A municipal bank loan is identified in the Y-14 data as tax-exempt if the interest

income the bank receives from the loan is tax-exempt (field #43 in Schedule H1 takes the value of 2).

Internal Rating – This variable is only defined for all municipalities with bank debt in Schedule H1 of the Y-14Q data. This is the municipal borrower internal credit rating assigned by the bank (field #10 in Schedule H1 of the Y-14Q data) converted to a 10-grade S&P ratings scale, with 1 denoting AAA and 10 denoting D.

$\leq BBB$ – This variable takes the value of one whenever a state or local government is rated $\leq$ BBB in terms of the lenders internal risk rating.

$High - yield$ – This variable takes the value of one whenever a state or local government is rated $\leq$ BB in terms of the lenders internal risk rating.

Below we present variable definitions for the governments' balance sheet data coming from the 2017 Census of Governments at the Census Bureau:
`https://www.census.gov/programs-surveys/cog.html`

General Revenue, $\$m$ – The total general revenue of a state or local government government.

Total Expenditures – The total expenditures of a given state or local government scaled by the government's total revenues.

Capital Outlays – The total capital outlays of a given state or local government scaled by the government's total revenues.

Revenue Gov Sources – The total revenue coming from government sources of a given state or local government scaled by the government's total revenues.

Total Taxes – The total tax revenue of a given state or local government scaled by the government's total revenues.

Sales Tax Share – The sales tax revenue of a given state or local government scaled by the government's total tax revenues.

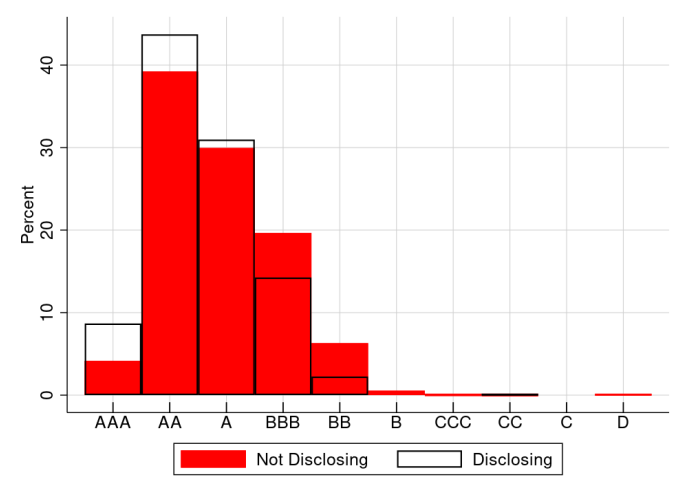
Property Tax Share – The property tax revenue of a given state or local government scaled by the government's total tax revenues.

$Debt - to - Revenue$ – The total outstanding debt of a given state or local government scaled by the government's total revenues.

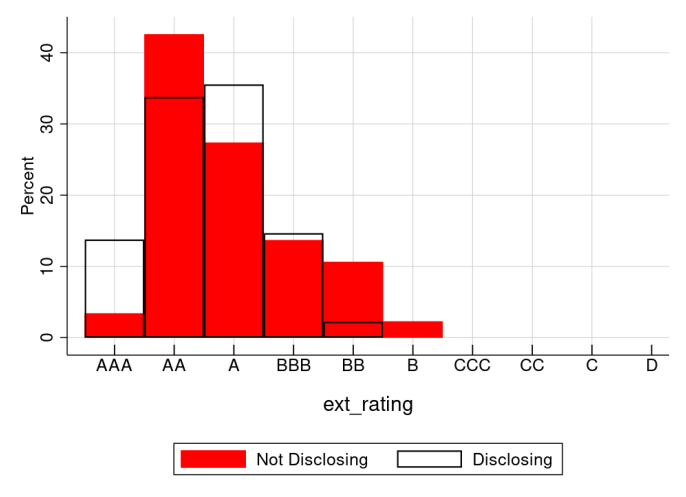
Interest Expense – The total interest expense incurred by a given state or local government scaled by the government's total outstanding debt.

$Commitments - to - Revenue$ – The total loan commitments from the Y-14 data of a given state or local government divided by the government's total revenues.

Appendix D Additional analyses

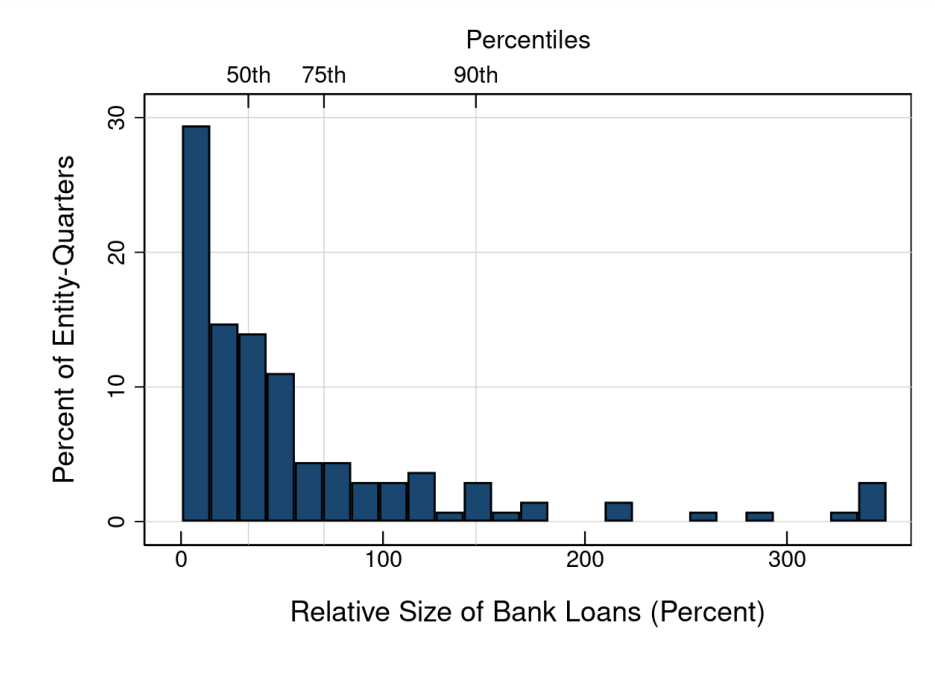


(a) All Loan Events

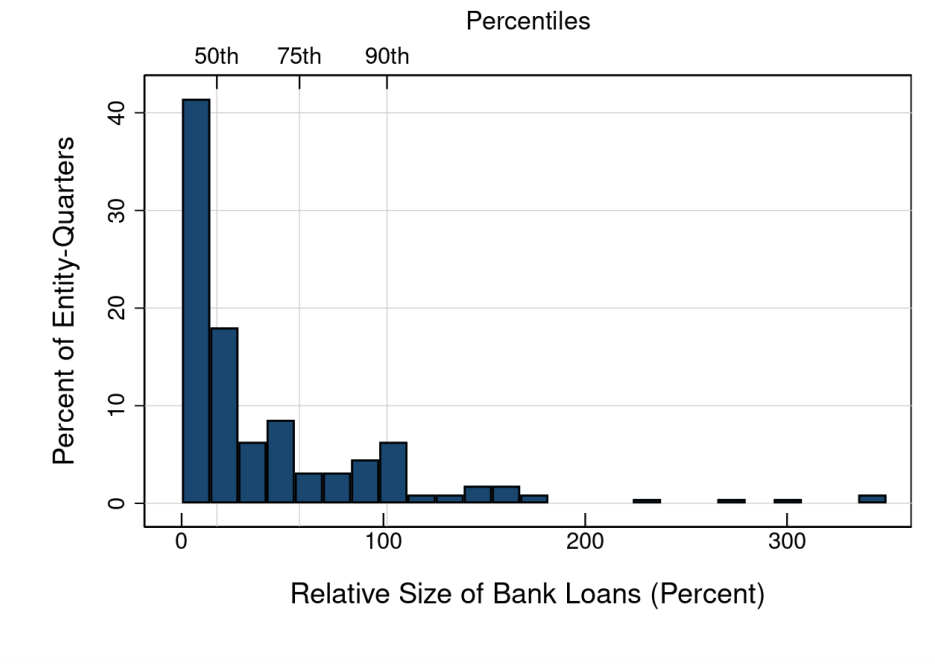


(b) Loan Originations

Figure D.I: Issuer credit quality and continuing disclosure. This figure compares issuer credit quality distributions (in terms of the lenders' internal risk ratings from the Y-14 Collection) for bank loan events that belong to disclosers or non-disclosers. The 'Disclosing' group includes issuers that are require to disclose bank loan events and that provide actual continuing disclosures. Issuers in the 'Not Disclosing' group do not provide continuing disclosures even though they are required to disclose bank loan events. Panel (a) includes all loan events (originations and renegotations), while panel (b) includes originations only.



(a) Associated Disclosures on EMMA



(b) No Associated Disclosures

Figure D.II: Size of Loan Commitments Relative to an Issuer's Bonds. This figure shows the size of total newly-originated loan commitments of a given issuer-quarter relative to the total outstanding amount of bonds triggering continuing disclosure requirements. Panel (a) presents the distribution for issuers that disclose private debt claims incurred in the same quarter on the EMMA system and Panel (b) restricts the sample to issuers that do not have associated disclosure in that quarter.

Table D.I: Bond Market Access, Government Characteristics, and Disclosure Requirements. This table reports the relation between bond market access (columns 1 through 3) or being required to report private debt obligations (columns 4 through 6) and government characteristics from the 2017 Census of Governments of the Census Bureau. The sample in columns 1 through 3 includes all general purpose governments with the exception of state governments. The sample in columns 4 through 6 is further restricted to governments with bonds market access. All independent variables are as of 2017, a government in the sample has bonds market access if it has at least one bonds issuance since 2010 and it is required to disclose if it has at least one bonds issuance since February 27^{th} 2019, triggering continuing disclosure requirements pursuant to Rule 15c2-12. The standard errors are clustered at the state level. All variables are defined in Appendix C.

Dependent variable:	*Bond Market Access*			*Required to Disclose*		
	(1)	(2)	(3)	(4)	(5)	(6)
Log(General Revenue)	0.092***	0.114***	0.127***	0.103***	0.108***	0.128***
	[0.008]	[0.010]	[0.006]	[0.010]	[0.011]	[0.007]
Total Expenditures	0.033***	0.029	0.004	0.054***	0.047***	0.030**
	[0.010]	[0.020]	[0.006]	[0.011]	[0.012]	[0.013]
Revenue Gov Sources	-0.193***	-0.223**	-0.176***	-0.091	-0.114	-0.131**
	[0.068]	[0.085]	[0.057]	[0.078]	[0.084]	[0.065]
Total Taxes	-0.093	-0.084	-0.076*	0.182**	0.174**	0.095**
	[0.061]	[0.078]	[0.044]	[0.073]	[0.076]	[0.045]
Sales Tax Share	0.021	0.010	-0.019	-0.051	-0.058	-0.020
	[0.058]	[0.071]	[0.038]	[0.070]	[0.070]	[0.052]
Property Tax Share	0.140**	0.201**	-0.043	0.149**	0.156**	-0.069
	[0.058]	[0.080]	[0.037]	[0.065]	[0.068]	[0.043]
Debt-to-Revenue		0.024***	0.025***		0.022***	0.027***
		[0.007]	[0.006]		[0.008]	[0.007]
Interest Expense		-0.526***	-0.382***		0.020	0.272
		[0.128]	[0.074]		[0.392]	[0.292]
Constant	-0.467***	-0.661***	-0.586***	-0.715***	-0.777***	-0.772***
	[0.084]	[0.096]	[0.056]	[0.105]	[0.113]	[0.074]
Observations	37,688	22,445	22,444	7,842	7,464	7,463
Government Type FE	Y	Y	Y	Y	Y	Y
State FE	N	N	Y	N	N	Y