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Limits of disclosure regulation in the municipal bond market

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ECONtribute
Discussion Paper No. 186

**Limits of Disclosure Regulation in the
Municipal Bond Market**

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Limits of Disclosure Regulation in the Municipal Bond Market*

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Abstract

We examine recent regulation requiring US municipal governments to disclose private debt. We show that governments fail to disclose 55-80% of reportable debt events and that, conditional on disclosure, filings often omit contract details essential for bond pricing. Non-compliant issuers are also riskier than compliers, with disclosure decreasing in the potential of private debt to adversely affect bondholders. Event studies suggest that disclosure reveals positive news and is especially informative to investors in low-rated bonds or during market turmoil episodes. Overall, private debt disclosure remains largely voluntary, highlighting challenges to recent federal initiatives to increase transparency for municipal bond investors.

Keywords: Bond pricing, disclosure regulation, private debt

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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). As a result, timely and accurate disclosure is at the core of U.S. securities regulation. Since the U.S. Securities Act of 1933, the scope of financial disclosure has improved tremendously and investors in publicly-traded companies can now access most material information in a matter of days.

By contrast, investor-relevant information is still scarce in the \$4 trillion municipal bond market. This market is of immense importance to less sophisticated retail investors, which the U.S. Securities and Exchange Commission (SEC) estimates to hold approximately 75% of all outstanding municipal bonds.¹ Yet, the scant disclosure environment is likely to put these investors at significant disadvantage to informed market participants such as investment companies, banks, and other financial intermediaries. Even the most basic disclosure of events that may directly reduce the value of municipal bonds has been virtually non-existent in this market until 2019.²

In this paper we study whether recent municipal disclosure regulation has reduced the inherent informational asymmetries in this market. Since 2019, SEC Rule 15c2-12 has mandated the timely disclosure of private debt obligations of state and local governments. The rule targets a recent trend in which governments have significantly increased reliance on bank loans and private placements without publicly disclosing these obligations. As private borrowing may have significant adverse effects on the value of municipal bonds (Ivanov and Zimmermann, 2021), private debt disclosure is essential for the proper functioning of municipal bond markets.

We use granular data from the confidential Federal Reserve’s Y-14 Collection to investigate the extent to which governments comply with disclosure requirements because private debt obligations of municipal issuers are not publicly observable other than through disclosure filings. We show that issuers required to disclose private debt agreements do so in only 20%–45% of loan events. Non-compliant issuers tend to be smaller and significantly riskier than compliers. The private debt obligations of non-compliers are also large and typically account for a fifth to a third of the issuers’

¹See, <https://www.sec.gov/news/studies/2012/munireport073112.pdf>. See also Ang et al. (2010) and Cornaglia et al. (2020) for evidence on the importance of retail investors in the municipal bond market.

²See, for example, <https://www.wsj.com/articles/SB10001424052748704471904576231002037599510>.

recent municipal bond offerings. Furthermore, a quarter of non-compliant issuers have bank loans that are over half the size of their recent bond issues.

Given the risks to municipal bonds posed by bank loans are rooted in loan contract structure, we explore the relative importance of major loan terms for underreporting. We show that issuers facing higher financing and contracting costs in the private debt market are more likely to underreport obligations. For example, a one percent higher interest rate is associated with a four- to twelve-fold lower probability of disclosing, while a one-year reduction in remaining maturity translates to approximately a 15% reduction in disclosure. Similarly, loan utilization rates and the incidence of contract guarantees are negatively related to disclosure propensity. Overall, issuers are significantly less likely to disclose risky loans, indicating that municipal bond investors still face large dilution risks from sophisticated private lenders.

We also investigate whether municipal bond underwriters, bond counsels, and financial advisers help alleviate underreporting. Underwriters enter into continuing disclosure agreements (CDAs) with issuers at the settlement date of each qualified offering. However, the ability of underwriters to ensure compliance with Rule 15c2-12 is limited as they are only required to report issuer noncompliance at offerings subsequent to the one triggering continuing disclosure. As bonds issuance is highly infrequent for most governments, market discipline exercised by underwriters is unlikely to increase disclosure rates. Similarly, while issuers often retain bond counsels and financial advisers, the role of these intermediaries tends to be limited to advice on the optimal financing structure and timing of bond offerings (Garrett, 2021). We find no empirical evidence that underwriters, bond counsels, and financial advisers matter for underreporting of private debt obligations. Specifically, intermediary fixed effects do not significantly improve the explanatory power of our disclosure specifications. Underreporting rates for issuers working with high market share intermediaries are also similar to those of issuers working with less reputable intermediaries.

An important implication of our study is that any regulation that aims to comprehensively capture contracting activity in the municipal private debt market should cover both private debt originations and renegotiations. In fact, private debt renegotiations represent the overwhelming majority of debt contracting activity as renegotiation is frequent and substantially changes major contracts terms such as loan amount, maturity, interest rates, or required collateral.³ The SEC

³For example, in our confidential supervisory data of bank loans to municipal governments, loan originations or

Rule does not sufficiently distinguish between originations and renegotiations and leaves substantial ambiguity as to what may constitute a reportable loan event. Such ambiguity may lead to market participants narrowly interpreting the SEC rule to only cover loan originations or distressed debt renegotiations. Consistent with this interpretation, we find lower underreporting in the subset of loan originations, but even then municipalities fail to report over half of private debt obligations.

In the remainder of the paper, we explore the information content of disclosure filings. Our data cover more than 9,285 unique disclosure documents since the enactment of Rule 15c2-12 associated with 6,039 municipal issuers. We find that there is substantial heterogeneity in the information content and complexity across filings, with a large fraction of filings missing key investor-relevant information such as interest rates, maturities, or renegotiations of private debt agreements. Furthermore, the majority of disclosure filings lack easily accessible 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

We also study the bond market impact of disclosures in an event study framework. There are at least three mechanisms through which disclosures may affect bond returns. The disclosed information may reveal dilution of pre-existing municipal bondholders by private debt investors as shown in Ivanov and Zimmermann (2021) and may also contain adverse information about the issuer's ability to access bond markets or its expected future income. Both of these channels are likely to lead to negative revisions in bond prices around disclosure events. Given the high non-compliance with the disclosure regulation, however, all disclosure is effectively voluntary. In this setting, financially healthy issuers will choose to reveal private debt agreements or certify to markets that they are of high credit quality, while riskier issuers will choose not to report (Akerlof, 1970). Our empirical tests corroborate this idea. This separating equilibrium arises because disclosure is substantially costlier to riskier issuers as their filings are more likely to reveal adverse information to market participants. Overall, the municipal bond market is likely to interpret private debt

renegotiations account for more than half of all loan-quarters between 2011Q3 and 2021Q2. Of these, renegotiations account for the bulk of amended and new contracts.

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

disclosures as positive news.

We find that in a benign economic environment such as that prior to the onset of the Covid crisis, disclosing private debt obligations positively revises the valuations of affected municipal bonds by approximately 34 basis points. Abnormal returns to disclosure jump to 130 basis points in the aftermath of the Covid crisis and then decline to pre-pandemic levels since the final implementation of the Federal Reserve's Municipal Liquidity Facility (MLF). These results suggest that the certification role of disclosures is the primary mechanism driving abnormal bond returns and that this certification value appears to be the highest in periods of high market uncertainty and among low-rated issuers. Specifically, issuers of low observable credit quality that have positive private information choose to disclose, helping them better differentiate themselves from other high-risk issuers. Finally, both mandatory and voluntary disclosures are associated with similar returns because the low compliance with the rule renders all disclosures voluntary.

A simple back-of-the-envelope calculation illustrates that a sizable fraction of outstanding municipal bonds are likely to be affected by the noncompliance with the SEC disclosure regulation. Out of the over \$1 trillion in outstanding bonds as of September 30th 2021 covered in our analysis, in nearly \$255 billion the issuer has bank loan events that it never discloses. In another \$440 billion of currently outstanding bonds, the issuer discloses only a small fraction of private debt activity. This suggests that municipal bond investors may face significant adverse selection that could be detrimental to their bond holdings.

Our study contributes to the literature exploring financial frictions in the municipal bond market that generate significant risks for municipal bond investors. This literature has documented considerable investor segmentation, significant market power of underwriters, and the lack of investor sophistication that are all costly for investors (Babina et al., 2021; Garrett et al., 2021; Cornaggia et al., 2020a; Pirinsky and Wang, 2011). 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; Chen et al., 2021). 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), disclosure in the municipal bond market is still in a nascent state (Reck and Wilson, 2006).⁵ Our study contributes to this literature by showing that 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 45% of issuers with reportable obligations in our sample 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 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 transfers and guarantees of liquidity in the municipal bond market during the Covid crisis such as the MLF has led to lower financing costs for issuers in the primary market and decreased yields in the secondary market (see, Bernhardt et al. (2021), Fritsch et al. (2021), Li and Lu (2020), Bordo and Duca (2021), Haughwout et al. (2021), Bi and Marsh (2020)).⁶ 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 supervisory efforts to increase disclosure may be an effective tool for normalizing spreads in the secondary bond market that complements government interventions.⁷

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, municipal financial statements are often made public with substantial delays, rendering some of the

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

⁶This is especially important in light of evidence that the pandemic has imposed significant costs on state and local governments (Clemens and Veuger, 2020; Gordon et al., 2020; Whitaker, 2020). Other recent work shows that direct government transfers during the Covid crisis have also mitigated the effect of the pandemic on state and local government employment by as much as forty percent (see Green and Loualiche (2021)).

⁷See <https://www.sec.gov/news/public-statement/statement-clayton-olsen-2020-05-04>.

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.^{8,9} 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.¹⁰ 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.¹¹ 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.¹² Consequently, the SEC can only require municipal disclosure of private debt obligations in an indirect manner, through the underwriters of municipal

⁸<https://www.wsj.com/articles/SB10001424052702304675504579391431039227484>

⁹<https://www.reuters.com/article/usa-municipals-sec/u-s-sec-takes-aim-at-municipal-bank-loan-disclosure-idUSL2N1GE1M1>

¹⁰https://www.gasb.org/jsp/GASB/Document_C/DocumentPage?cid=1176170308047

¹¹<https://www.federalregister.gov/documents/2018/08/31/2018-18279/amendments-to-municipal-securities-disclosure>

¹²The 1975 Tower Amendment to the Securities and Exchange Act of 1934, see <https://ots.uconn.edu/wp-content/uploads/sites/1109/2021/02/GFOA-Disclosure-Article-8-2018.pdf>.

bonds. Municipal bond underwriters have to ensure issuers enter in continuing disclosure agreements (CDAs) to disclose material financial obligations in accordance with Rule 15c2-12. Specifically, state and local governments that have issued bonds with a principal amount of at least \$1 million and settlement dates since the implementation of the rule, February 27th, 2019, are required to enter such CDAs with underwriters. 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 include two additional disclosure event types: “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.”¹³ 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, interest rates, or collateral/guarantee requirements 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 2021Q2. Of these, renegotiations represent the 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.

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).

¹³See 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>.

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 settled between January 2000 and September 2021 from the Mergent Municipal Bond Securities Database. We exclude bonds in denominations exceeding \$100,000 and placed with sophisticated investors as the SEC rule does not apply to such issuance.¹⁴ After these basic filters our data contain information on 357,241 bond issuances by 52,542 unique issuers with 53,396 distinct 6-digit cusips.

To better understand disclosure requirements in relation to issuer characteristics, we match state and local governments in Mergent to governments in the Census of Governments from the U.S. Census Bureau.¹⁵ We do so by using string matching techniques combined with manual verification of each potential match.¹⁶ 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. Therefore, we match the governments in Mergent to the entities in the last four complete Censuses (2002, 2007, 2012, and 2017). We obtain income statement and balance sheet data on the matched entities from the 2017 Census, which is also the most recent complete survey.

The continuing disclosure data on private debt obligations pursuant to SEC Rule 15c2-12 (see Section 2.2) come from the Municipal Securities Rulemaking Board (MSRB) Subscription Service. These data include 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

¹⁴<http://www.msrb.org/msrb1/pdfs/SECRule15c2-12.pdf>

¹⁵<https://www.census.gov/programs-surveys/cog/data/tables.All.html>

¹⁶Appendix A describes the matching algorithm.

(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 complete filing document. Documents vary widely in content from a brief event description to the full boilerplate text of the debt contract. In the best case scenario issuers include a term sheet of the underlying obligation that details the lender, the obligation amount, maturity, interest rate, and other relevant contractual provisions in addition to the contract document. 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 whenever the submission date is not available in the MSRB Subscription Service data.¹⁷ 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 27th, 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.¹⁸

There are a total of 7,771 unique filings submitted to the EMMA system with private debt agreement dates since August 2018. We use the obligation agreement date to determine if a filing is mandatory. “Mandatory” filings have at least one associated bond issue triggering continuing disclosure requirements settled since the implementation date of the rule and prior to the agreement date.¹⁹ Figure 2 shows that the typical number of continuing disclosure filings per month hovers around 200 after the implementation of Rule 15c2-12 and that this number has risen steeply after the onset of the Covid-19 crisis to about 300-400 filings per month. The figure also shows that the majority of filings are mandatory. Mandatory disclosure spikes most prominently around the onset of the Covid crisis, while voluntary filings have remained stable over the sample period. This

¹⁷See <https://emma.msrb.org/home/index>. 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.

¹⁸Appendix B provides additional details on the manual collection process.

¹⁹Appendix Figure D.I shows substantial heterogeneity in private debt type reported in the filings including bond anticipation notes (BANs), term loans, credit lines, leases, and private placements. The major difference between these obligation types is in terms of maturity – BANs, credit lines, and term loans tend to be short- to medium-term, while private placements are longer-term.

is consistent with the incidence of disclosure increasing with high market uncertainty and with a greater fraction of issuers triggering continuing disclosure requirements over time. However, the 5,632 disclosing issuers since the implementation of the SEC rule pale in comparison to the over 50,000 issuers with access to the municipal bond market, suggesting that the compliance with the rule may be low.

To formally assess compliance with the rule, we obtain granular information on bank loans to municipalities from the confidential Federal Reserve's Y-14Q Collection. These data cover 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.²⁰ In addition, banks provide their internal risk ratings for each loan contract together with the equivalent S&P rating in a ten-grade scale. These contract-level data allow us to study individual borrowers and loans, as well as the riskiness and cost of private debt financing to state and local governments.

We restrict the sample to all new loans or renegotiations of existing loans, as these are the bank loan obligations that are potentially reportable under CDAs. We define a loan to be renegotiated if it experiences changes in any one or more of the five major contractual terms – maturity, amount, interest rates, or the presence of collateral or guarantee requirements – 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. This results in a total of 3,139 entities with 27,190 loan events between 2019Q1 and 2021Q2 that have previously issued municipal bonds. Of those, we have a total 1,808 entities that are currently required to report private debt agreements with 12,074 associated bank loan events since the first quarter of 2019.

Similar to the corporate loan market, renegotiations in our sample account for the bulk of loan-quarters (82%) with contracting activity (Roberts and Sufi, 2009; Roberts, 2015). This implies 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 typically generate new legally binding agreements. As some issuers may narrowly

²⁰The 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. For additional details see: https://www.federalreserve.gov/reportforms/forms/FR_Y-14Q20210331_i.pdf.

interpret the SEC rule to only apply to originations, our analysis also considers compliance rates with the subset of originations.

We match the municipal loan borrowers in the Y-14 data to the entities in the Census of Governments using string matching techniques combined with manual verification of each potential match. 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 Collection.²¹ 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 are unable consider. Despite these limitations, our analysis is likely to provide useful insights into whether 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. Consistent with prior literature, 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 (Green et al., 2010; Cornaggia et al., 2020a; Schwert, 2017). 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 Issuers required to disclose

A bond issuance triggers continuing disclosure requirements under the amendment of Rule 15c2-12 if it settles on or after February 27th 2019 and has total outstanding amount exceeding \$1 million. We exclude issues sold to sophisticated investors in large denominations or issues with maturities of

²¹Due to the complexity of borrower names in the Y-14 Collection our matching algorithm may exclude some viable matches.

less than nine months in large denominations as such issues do not trigger continuing disclosure (see Section 2.2 for more detail). Overall, 46,887 completed issuances by 17,053 unique issuers since February 27th 2019 trigger disclosure requirements.

Figure 3 shows the cumulative share of issuers in the municipal bond market subject to private debt disclosure requirements since the implementation of Rule 15c2-12, conditional on previous activity in the municipal bond market. The red solid (the black dashed) line shows the percent of issuers required to disclose among issuers with at least one bond issue settled between January 2000 (2010) and February 26th 2019. Using issuance activity since 2000 is likely to provide an upper bound on the number of issuers with access to the municipal bond market or a lower bound on the fraction of issuers subject to continuing disclosure. This is because fiscal conditions for some governments have been deteriorating since the Global Financial Crisis leading to inability of these issuers to access bond markets. Analogously, the black dashed line represents an upper bound on the the fraction of issuers facing disclosure requirements. This means that as of September 2021 only between 27%–40% of municipal issuers were required to disclose private debt.

The low coverage of the rule is driven by the regulation requiring continuing disclosure only for municipalities with bonds issuance since February 27th 2019, or those with new CDAs. This is because municipal bonds issuance for mid-sized and small issuers is highly infrequent. Alternatively, the rule could have required the disclosure of new private debt for all issuers with pre-existing continuing disclosure agreements. This would have substantially expanded the set of covered issuers as all governments with currently outstanding bonds settled since July 1995 have enforceable CDAs.

As disclosure requirements for private debt claims derive from public municipal bonds issuance activity, they are likely to be correlated with greater access to the municipal bond market. Panel A of Table 1 provides a simple comparison of local governments with and without previous bond issuance since January 1st 2000. Unsurprisingly, previous issuers are substantially larger in terms of average general revenue (\$65 vs \$6 million), have higher average debt-to-revenues, and face lower interest costs than issuers without bond market access. Panel B of Table 1 compares governments with bond market access based on whether they have issued bonds since February 2019, thereby triggering continuing disclosure requirements. This comparison generates similar differences that are less stark than in Panel A but still significant. For example, on average governments required to disclose are significantly larger, more levered in terms of debt-to-revenues, and have interest costs

that are 30 basis points lower than governments not required to disclose.

Table 2 explores the incremental relevance of these characteristics in explaining rule coverage. These tests confirm the descriptive patterns established in Table 1. Specifically, once we condition on government type and state fixed effects, the most relevant predictor of whether an issuer is subject to disclosure requirements is size and debt-to-revenue. None of the other factors such as expenditures-to-revenues, revenue source, or the share of tax revenues appear to be important in predicting disclosure requirements. Once again, less opaque issuers with greater bond market access are more likely to trigger continuing disclosure requirements. Overall, the disclosure regulation is still not applicable to the exact segments of the municipal bond market that face the most severe information problems and are likely to see the greatest benefits of such regulation.^{22,23}

5 Do Bond Issuers Underreport Private Debt Claims?

In this section we examine the extent to which bond issuers comply with continuing disclosure requirements. We deem a municipal issuer to be in compliance with continuing disclosure regulation if the issuer is required to disclose, has bank loan events in a given quarter in the Y-14 data, and also has filed private debt agreements contemporaneously on the MSRB website. In other words, we assume that governments disclose bank loan events whenever we identify private debt disclosure(s) on the MSRB website 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.

Panels (a) and (b) of Figure 4 show compliance rates over time for all bank loan events and loan originations, respectively. Panel (a) shows that disclosure of loan events has remained low throughout the entire sample period, including the most recent quarters of the data. 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 12,074 such bank loan events, only 2,358 events

²²Appendix Table D.I shows these associations are robust across government types.

²³We also compare issuers required to disclose to those not required in Panel A of Appendix Table D.II. Bond issuers subject to continuing disclosure requirements have larger bank loans and appear to be slightly less risky than bond issuers not required to disclose. In contrast, loan type composition, interest rates, maturities, and collateral provisions are all comparable between the two groups of bond issuers.

(or roughly 20% of events) corresponding to 569 entities have associated disclosures filings on the EMMA system. Panel (b) shows that compliance rates within the subset of loan originations are higher at approximately 45%, suggesting that some issuers may narrowly interpret the continuing disclosure regulation to only apply to loan originations. Nonetheless, even within loan originations over half of reportable bank loan events remain not disclosed. Compliance rates remain low across local government type (Appendix Figure D.IV) or geography (Appendix Figure D.V). Therefore, municipal bond investors only appear to observe a very limited fraction of private debt activity.

In Panels (c) and (d) of Figure 4 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 require large associated changes in loan terms – loan amount change of at least 10%, interest rate change exceeding 50 basis points, maturity change 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 4 shows that compliance rates remain low within both groups of renegotiations, despite all these events affecting municipal bond holders in a substantial manner.

In a regulatory setting in which disclosure requirements are ambiguous and the regulation is difficult to enforce, the disclosure decision may in effect be voluntary with only high credit quality issuers choosing to disclose. To this end, in Table 3 we study the determinants of the propensity to disclose, conditional on being required to do so. We collapse the Y-14 loan-quarter panel to the government-quarter level and, given we are interested in studying the relation between loan characteristics and disclosure choice conditional on government characteristics, we restrict the sample to the entities we can match to the Census of governments. Columns (1) through (3) present results for the full sample of events, while columns (4) through (6) restrict the sample to loan originations. Interest rates factor prominently in the decision to disclose across most specifications. For example, one percent higher interest rate is associated with between four- and twelve-fold lower probability of disclosing. Similarly, shorter maturities and higher incidence of contract guarantees are associated with lower disclosure rates among originations, while higher utilization rates negatively predict disclosure choice in the full sample. These results imply that issuers are less likely to disclose loan events riskier to bondholders.

The differences in risk between disclosers and non-disclosers are stark (see Appendix Table D.II and Figure D.II). For example, non-disclosers are 6 (or 2) percentage points more like to be rated BBB or lower (or BB or lower) by lenders than disclosers. This difference in risk is even larger within loan origination events – the issuer is rated BBB or lower (or BB or lower) in 29% (8%) of bank loan events of non-disclosers as compared to 21% (3%) for disclosers. In other words, issuers not compliant with Rule 15c2-12 are substantially riskier and therefore have the subset of bank loan events most likely to dilute public bonds.

Table 3 also shows weak evidence that that the size of loan commitments relative to government revenues positively predicts disclosure probability. This association, however, only holds for renegotiations as we fail to find a statistically significant association within loan originations. This finding suggests that the materiality of loan contracts positively predicts disclosure probability.

We further explore materiality in Figure 5. Specifically, it could be the case that the bank loan events that are not reported represent an immaterial fraction of the issuers' bonds that trigger continuing disclosure requirements. 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 5 plots this distribution for issuers that choose to report. Not surprisingly, bank loans are economically significant for reporting issuers – the typical (median) reporting issuer has bank loans that are roughly 44% the size of the issuer's outstanding bonds triggering continuing disclosure. Furthermore, about one quarter of issuers' reportable bank loans are at least 12% larger than the issuer's bonds.

Panel (b) of Figure 5 shows similarly that the typical non-reporting issuer has reportable loans that are approximately 32% of the issuer's outstanding bonds triggering continuing disclosure. In addition, about a quarter of non-reporting issuers have bank loans that are at least as large as the same issuer's bonds, and ten percent of issuers have bank loans that are twice as large as outstanding bonds. Overall, the vast majority of non-disclosing issuers seem to have material reportable bank loan events. Similarly, Panels (c) and (d) show that most originations are also material, irrespective of reporting status. Finally, to ensure the low compliance rates in Figure 4 are not driven by immaterial loan agreements we replicate panels (a) and (b) of this figure while requiring that the loan agreements represent at least 20% or 50% of the issuer's outstanding bonds triggering continuing disclosure. Appendix Figure D.III shows very similar results in terms of

compliance rates.

We also explore whether municipal bond underwriters, bond counsels, and financial advisers may help facilitate compliance with Rule 15c2-12. For example, underwriters enter into continuing disclosure agreements with issuers at the settlement date of each qualified offering. Although underwriters have to verify issuers disclose material financial obligations in accordance with Rule 15c2-12, they only have to do so at offerings subsequent to the one triggering continuing disclosure. Given issuance is infrequent for most governments, such market discipline exercised by underwriters is unlikely to be significant in the short run. Additionally, 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 low compliance with the rule will be consistent with insufficient underwriter resources. This explanation, however, is unlikely to explain the underreporting as the vast majority of municipal bond offerings triggering continuing disclosure are underwritten by the largest banks and broker-dealers.

Nonetheless, in Table 4 we examine the possibility that issuers working with highest market share underwriters, bond counsels, and municipal financial advisers are more likely to be compliant with continuing disclosure regulation.²⁴ Compliance rates may be higher for such issuers as high market share intermediaries are likely to engage in greater issuer due diligence to maintain reputation (see, for example, Fang (2005)). We find no evidence that the highest market share underwriters, bond counsels, and municipal advisers (in the top 5% of market share in a given year) improve disclosure for either the full sample or the subset of loan originations. Additionally, Appendix Table D.III shows that including underwriter, bond counsel, and financial adviser fixed effects also does not materially improve the explanatory power of the disclosure specifications. For example, in the full sample the adjusted R-squareds improve from 11% to at best 14%, while in the origination specifications adjusted R-squareds improve from 18% to at best 23%.

Finally, we assess the extent to which investors in the municipal bond market may be affected by the noncompliance with the SEC disclosure regulation. In Figure 6 we show that out of the over \$1 trillion in outstanding bonds as of September 30th 2021 covered in our analysis, in nearly \$255

²⁴The vast majority of offerings in our sample triggering continuing disclosure have underwriters, bond counsels, and financial advisers that are in the top 20% of the respective market share distributions. For example, Appendix Figure D.VI shows that over 80% of offerings are underwritten by the 30 largest banks and broker-dealers. The distributions of bond counsels and financial advisers are very similar.

billion the issuer has bank loan events that it never discloses. In another \$440 billion of currently outstanding bonds, the issuer discloses only some bank loan events, typically a small fraction of private debt activity. Only less than \$20 billion of outstanding bonds belongs to issuers that have bank loan events but have not yet triggered continuing disclosure requirements. The remaining \$461 billion in outstanding bonds belongs to issuers that do not have any bank loan events in the Y-14 data. Overall, municipal bond investors likely face a high degree of adverse selection that could be detrimental to their holdings. Additionally, these statistics are likely to underestimate the incidence of bank loan events for municipal bond issuers as we only observe bank loans provided by the largest banks in the United States.

6 The information content of continuing disclosures

6.1 Summary statistics

In this section we examine heterogeneity in the information content of continuing disclosure filings. We rely on a subset of about 2,300 filings for which we hand collect obligation characteristics.²⁵ Figure 7 shows that although most filings provide information about the amount of the underlying debt obligation, a significant share does not provide information about interest rates or maturities. Furthermore, the text of the underlying private debt contracts is also missing in the majority of cases and even basic summaries are unavailable in about a third of filings. Lastly, a term sheet briefly summarizing contract terms is only provided for less than half of filings. The availability of a term sheet is crucial for understanding the extent to which private debt agreements affect bondholders, especially for less sophisticated retail investors.²⁶ This echoes calls by regulators and market participants for greater transparency and simplicity of municipal bond disclosures given the significant presence of retail investors.²⁷

Finally, despite the frequent and significant renegotiation of private debt claims as documented earlier, only a small minority of filings detail private debt that is an amendment of a previous agreement (see Appendix Table D.IV). Overall, the information in filing documents is often not

²⁵See Appendix Table D.IV for summary statistics of these characteristics across filing types.

²⁶Even if available, the text of private debt contracts is typically boilerplate and spanning hundreds of pages, making it difficult to process for less sophisticated retail investors.

²⁷See former SEC chairman Arthur Levitt's call for simplicity in municipal disclosure: <https://www.wsj.com/articles/SB10001424052748704471904576231002037599510>.

sufficiently detailed to be (fully) informative about the nature of the disclosed obligations. While Rule 15c2-12 does not stipulate the exact information to be disclosed, even the most 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, 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 contract 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 less than three years, the significant ambiguity surrounding the provisions of Rule 15c2-12 may also affect the availability of key investor-relevant information in the municipal bond market in both the near and the intermediate term.

6.2 Event studies around disclosure events

We also study the information content of continuing disclosures in an event study framework. As there is substantial degree of asymmetric information between municipal bond issuers and bond investors, there are at least three major mechanisms through which disclosures may affect bond returns. The disclosed information may reveal dilution of pre-existing municipal bondholders by private debt investors as shown in Ivanov and Zimmermann (2021) or adverse information about the issuer's ability to access bond markets or its expected future income. Both of these channels are likely to lead to negative revisions in bond prices around disclosure events. However, in light of evidence that compliance with the disclosure regulation is low, all disclosure is likely to be in effect voluntary. In this setting, financially healthy issuers will choose to reveal private debt agreements thereby certifying to markets that they are of high credit quality, while riskier issuers will choose not to report such obligations facing higher disclosure costs (Akerlof, 1970). Risky issuers face higher disclosure costs because disclosing is likely to reveal adverse information to market participants. Municipal bond investors will therefore interpret private debt disclosure as positive news.

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 6.2.1 describes our methodology and section 6.2.2 discusses results.

6.2.1 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). The return on bond b between two trades s and k (with $k < s$) is computed based on the duration-adjusted change in yield-to-maturity:

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

To calculate abnormal bond returns, we construct bond return indexes based on remaining maturities, credit ratings, and liquidity using the method of repeat sales regressions (Bailey et al., 1963; Peng, 2012; Cornaggia et al., 2020a). In particular, we define a bond sub-index l in a given rating, maturity, or liquidity group (or combinations of these groups) and estimate the index return R_t^l for that sub-index on date t using the following specification:

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

Equation (2) is effectively a binary-variable regression with indicators for each trading date as regressors. Given our sample of disclosures starts in August of 2018, we include all trades that occur since July of 2018. 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), 3 liquidity categories (having less than 1, 1-5, or greater than 5 trades per month), and for the combination of rating, maturity, and liquidity for a total of 72 sub-indexes.²⁸ 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 .

²⁸The rating categories are based on ratings from the three ratings agencies — Moody's, Standard&Poor's, and Fitch. If a bond is rated by more than one agency, we keep the most conservative rating across rating agencies.

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):

$$ar_{b,s,k} = r_{b,s,k} - \sum_{t=k+1}^s \widehat{R}_t^l, \forall b \in l. \quad (3)$$

As the abnormal returns span different trading windows (typically 10 business days), we compute the equivalent 10-day return for each bond-event pair. Our main regression specification is:

$$ar_{b,e} = \alpha + u_{b,e}. \quad (4)$$

In equation (4), $ar_{b,e}$ is the abnormal return of bond b around the disclosure event e , and $u_{b,e}$ is an error term. We double cluster standard errors at the bond issuer and disclosure date levels. α is the average abnormal return around disclosure events. We estimate Equation (4) within different subsets of the data to explore whether abnormal returns vary across event or issuer types. We also study whether abnormal returns differ prior to and after the onset of the pandemic.

6.2.2 Event Study Results

Table 5 shows our first set of event study results, splitting the sample into three time periods around the onset of the Covid crisis. The Pre-Covid period runs from the implementation of the SEC rule through March 9th, before the onset of the Covid crisis caused a sell-off in the municipal bond market.²⁹ The Covid period starts right after the passage of the CARES Act, March 28st, and ends right before the last modification to the Federal Reserve’s Municipal Liquidity Facility, August 10th 2020.³⁰ Even though the CARES Act ended the sell-off in the municipal bond market, the “Covid” period defined above was characterized by substantial uncertainty about issuer liquidity and solvency that the MLF gradually alleviated (Haughwout et al., 2021). Finally, the Post-Covid period runs from August 12th 2020 through the end of the sample period, September 30th 2021.

Given the information content of voluntary and mandatory disclosures may differ, we also

²⁹<https://www.wsj.com/articles/how-the-muni-market-became-the-epicenter-of-the-liquidity-crisis-11585823404>

³⁰<https://www.federalreserve.gov/monetarypolicy/muni.htm>

split the sample along this dimension in Panel A of Table 5. Specifically, during the pre-Covid period, mandatory disclosures of private debt are associated with positive abnormal returns of approximately 34 basis points. This association strengthens significantly during the Covid period – mandatory disclosures now translate to roughly 130 basis points of abnormal return. Post-covid abnormal bond returns decline to about 36 basis points, which is of similar magnitudes to returns pre-Covid. Overall, despite the potentially dilutive effects of private debt, disclosures appear to be highly informative and constitute positive news for municipal bond investors. These results are consistent with the idea that issuers of high credit quality or having positive private information are more likely to disclose, while lower-prospect issuers choose not to disclose. Abnormal returns to voluntary disclosures are similarly positive and of comparable magnitudes to mandatory disclosures across all time periods, in line with the low compliance with rule 15c2-12 rendering all disclosures voluntary. In light of this evidence, all subsequent tests include both mandatory and voluntary disclosure events.³¹

Returns to disclosure are also likely to vary across the issuer credit quality distribution. Specifically, issuers with observably lower credit quality that have positive private information are likely to earn greater returns to disclosure if such disclosure helps them better differentiate themselves from other low credit quality issuers. We test this idea by estimating the event studies within sub-samples based on the issuer's most conservative credit rating from the three major credit agencies (Standard & Poor's, Moody's, and Fitch). Panel B of Table 5 shows that abnormal returns are substantially larger for disclosures within lower credit quality categories. For example, bonds rated 'AA-A' or 'BBB' earn over 60 basis points of positive abnormal returns to disclosure as compared to bonds rated 'AAA' that only earn 44 basis points. Such abnormal returns to disclosure accelerate even further to roughly 81 basis points for below-investment grade bonds. Therefore, disclosing may help issuers credibly signal to credit markets that they have favorable future prospects, especially among observably low credit quality issuers.

Finally, we study whether the returns to disclosure vary with the level of detail provided in filings, for the set of filings for which we hand collect contract information. Abnormal returns to disclosure of more comprehensive filings should arguably be larger to the extent these filings are more informative to investors. We study abnormal bond returns based on whether filings contain maturity

³¹Our results are very similar if we only consider mandatory disclosure events.

or interest rates (given most filings detail loan amounts), or whether the filing is an amendment of a prior credit agreement. Observing loan terms is essential for understanding the impact of private debt on outstanding bonds. Additionally, in light of the ambiguity of disclosure requirements, disclosing renegotiations may be associated with greater abnormal returns as renegotiations may represent commitment to market participants to provide private debt information more frequently.

Panel A of Table 6 shows that abnormal bond returns are significantly larger for disclosures that detail the maturity of private debt agreements than for those that do not. Contract maturity is especially important in assessing whether private debt may dilute municipal bonds (Ivanov and Zimmermann, 2021). Additionally, there is weak evidence that contracts detailing interest rates are associated with larger positive abnormal returns than those that provide neither interest rates nor maturity. These results provide support for the idea that more comprehensive disclosures are likely to be more informative to market participants. Also in line with expectations, we show that private debt amendments translate to significantly larger abnormal returns than originations.

One key dimension of information content is the timeliness of the disclosed information as disclosure relevance generally increases with timeliness. According to rule 15c2-12, issuers have to disclose private debt on the EMMA system within 10 business days of incurrence (see Section 2.2). While Appendix Figure D.VII shows that the majority of disclosures occur within the mandated 10 business day window, a significant fraction of agreements take longer to reach market participants. In Panel B of Table shows that disclosure informativeness as measured by the magnitude of abnormal bond returns is highly correlated with disclosure timeliness. Specifically, disclosure filings posted publicly within one business day of private debt agreements are associated with 81 basis points of abnormal bond returns, while filings posted within 2 to 10 business days translate to slightly more than 60 basis points of abnormal returns. Abnormal returns are even lower within the subset of filings that are posted outside of the mandated 10 business day window at about 48 basis points. Overall, the municipal bond market places significant value on timely disclosures.

7 Conclusion

This paper sheds light on the effectiveness and market impact of the recent changes to the SEC's disclosure regulation in the municipal bond market. Relying on confidential supervisory information

from the Federal Reserve, we present evidence that issuers significantly underreport private debt. For example, among issuers required to report private debt, only 20% to 45% of private debt agreements are publicly filed. 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. The low compliance with the regulation is consistent with the ambiguity of reporting requirements and potential inability of the federal government to enforce the regulation. Overall, private debt disclosure remains largely voluntary, highlighting challenges to recent initiatives to increase transparency for municipal bond investors.

Whenever private debt is disclosed, such disclosures are highly informative to market participants but there is substantial heterogeneity in their information content and complexity. Event studies suggest that disclosure reveals positive news and is especially informative to investors in low-rated bonds or during market turmoil episodes. However, a large fraction of filings miss key investor-relevant information such as interest rates, maturities, or renegotiations of private debt agreements. We show such omissions matter to bond market participants as more comprehensive and timely filings tend to earn greater positive abnormal returns.

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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 1 st 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.

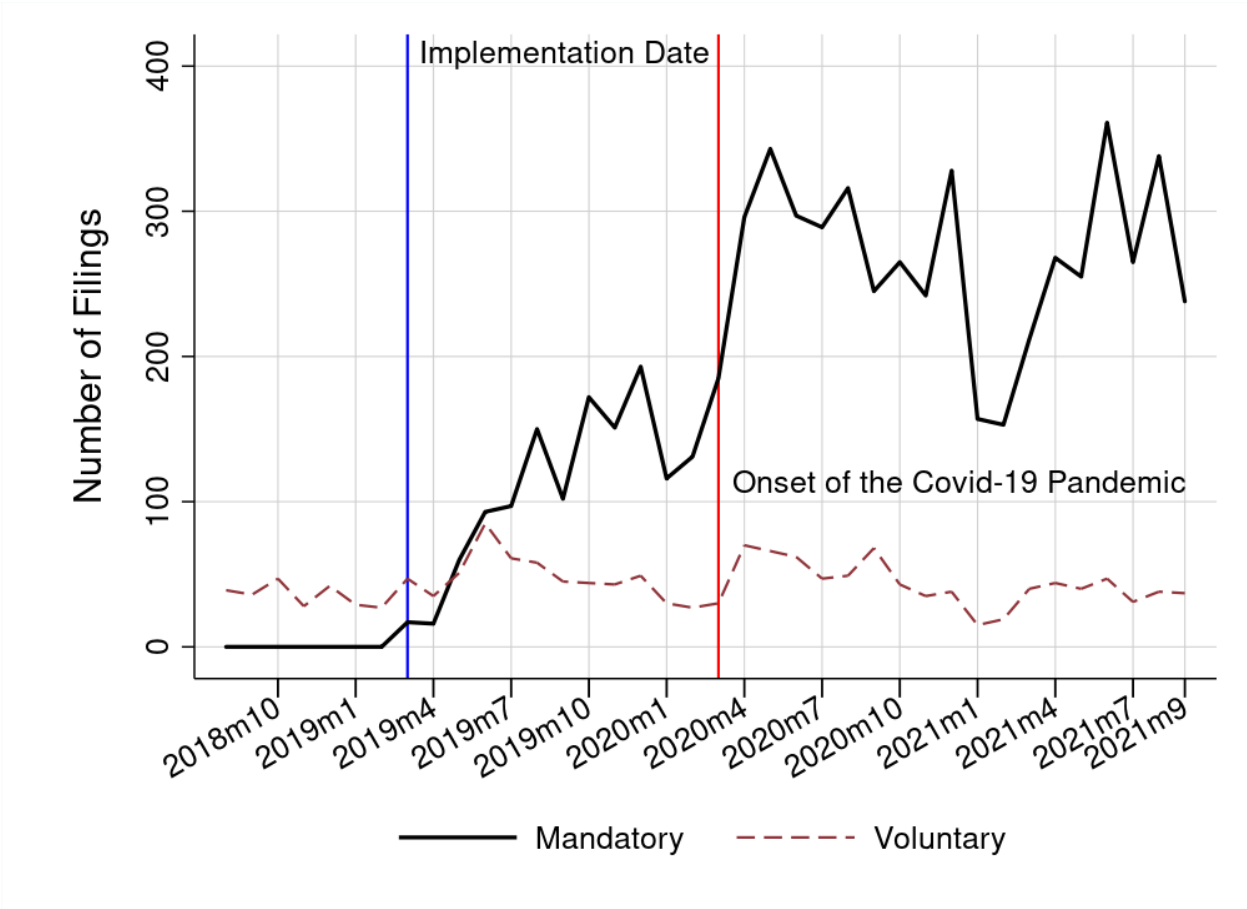


Figure 2: Continuing disclosure filings over time. This figure shows monthly total municipal disclosures of private debt obligations, split into mandatory (the black solid line) and voluntary (the red solid line) disclosures.

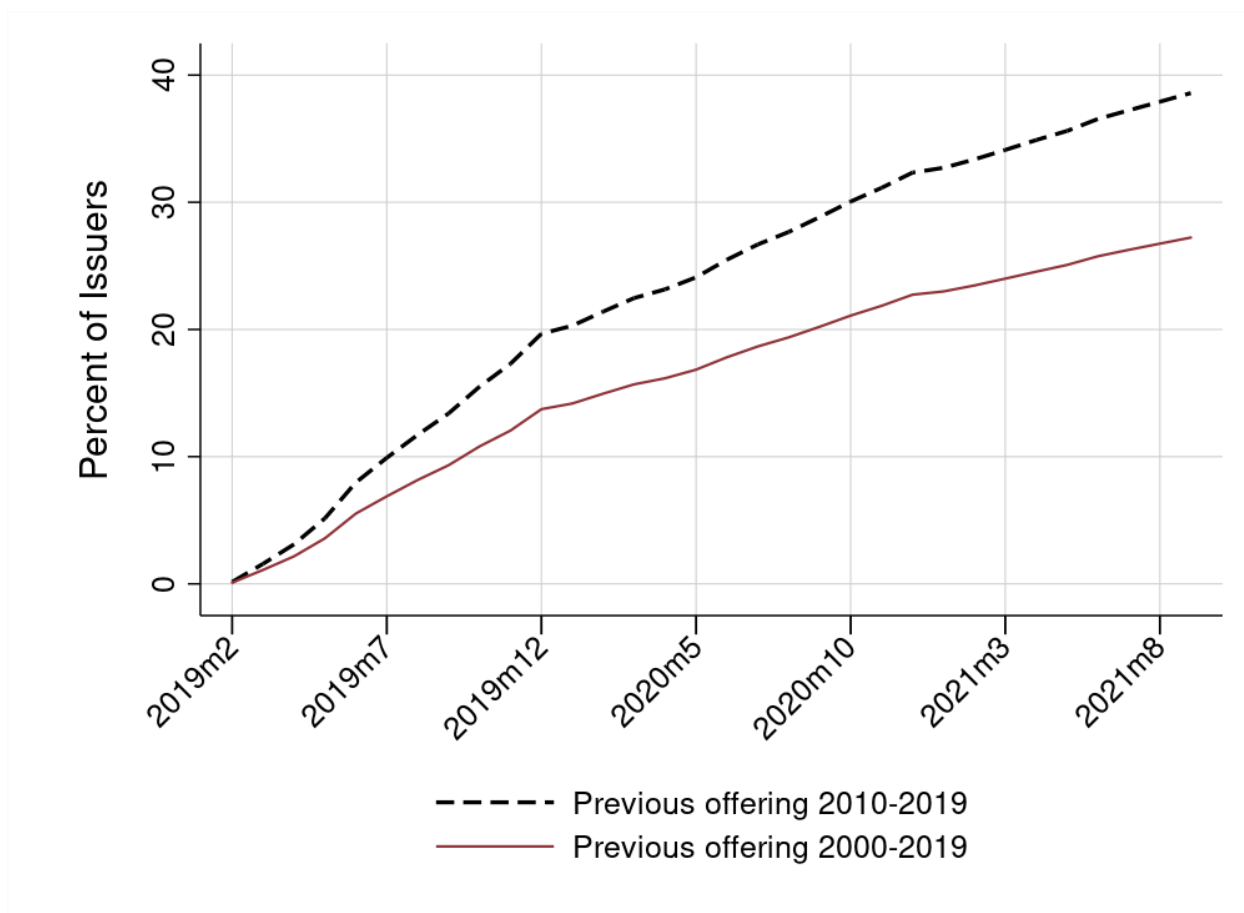


Figure 3: Continuing disclosure requirements over time. This figure presents the cumulative share of issuers in the municipal bond market over time that are required to comply with Rule 15c2-12. The black dashed line shows the fraction of issuers required to disclose among issuers with at least one previous bond offering between January 1st 2000 and February 26th 2019. The red solid line depicts that fraction for issuers with at least one previous bond offering between January 1st 2010 and February 26th 2019.

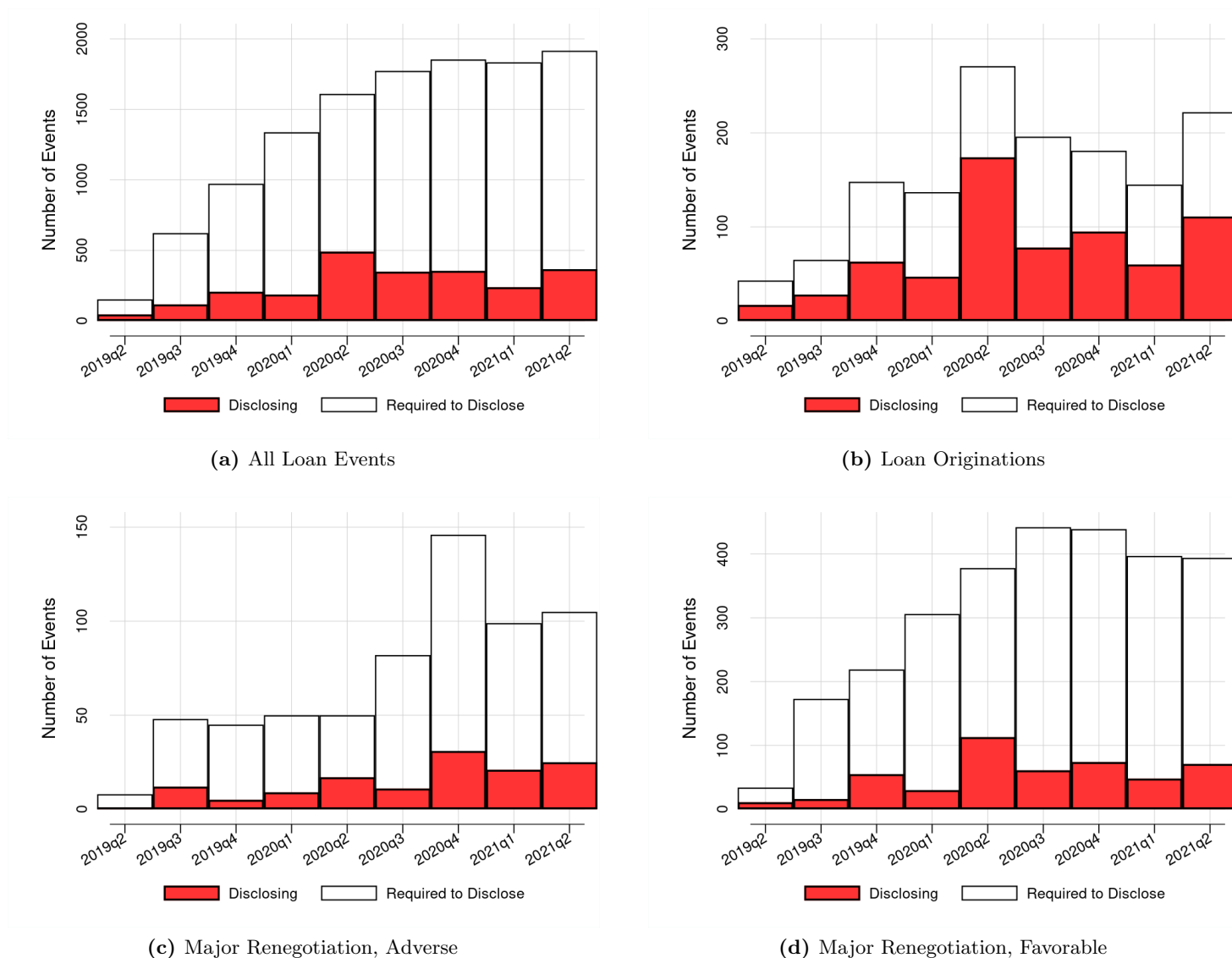
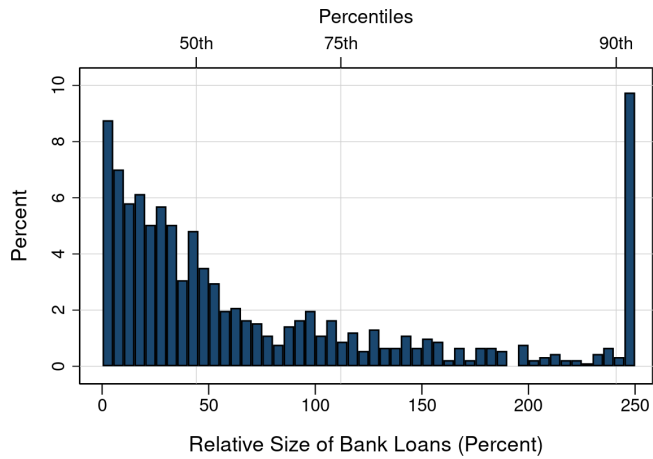
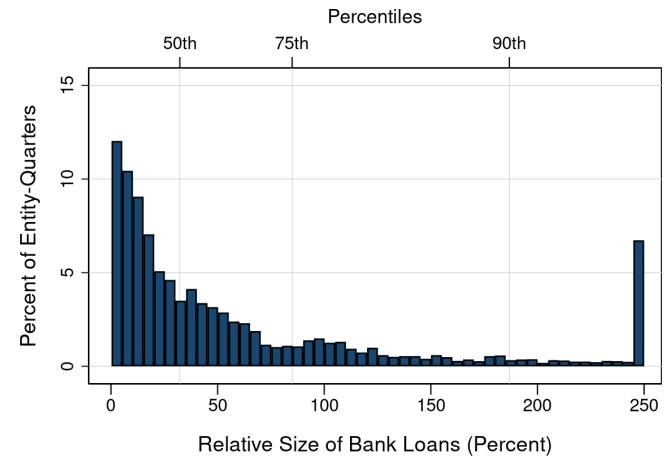


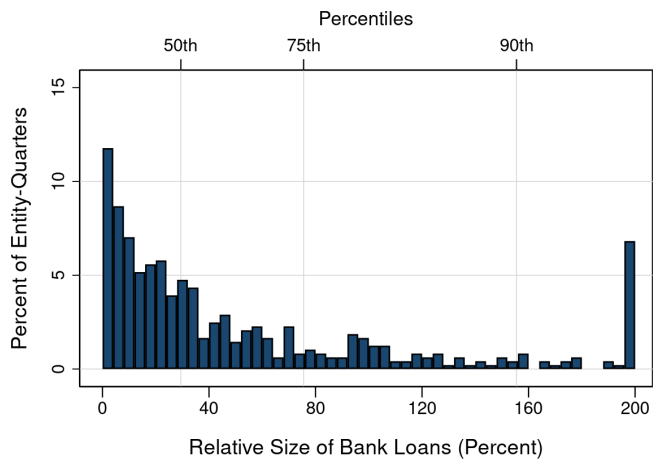
Figure 4: Compliance with continuing disclosure requirements. This figure shows the time series evolution of compliance with Rule 15c2-12. The white bars show the number of bank loan events in the Y-14 Collection that are subject to disclosure pursuant to Rule 15c2-12, while the red bars show the number of bank loan events in which the issuer has actual associated disclosures on the EMMA system when required to disclose. Panel (a) includes both originations and renegotiations, panel (b) includes only loan originations. Panel (c) shows renegotiations associated with 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 (d) shows renegotiations associated with 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.



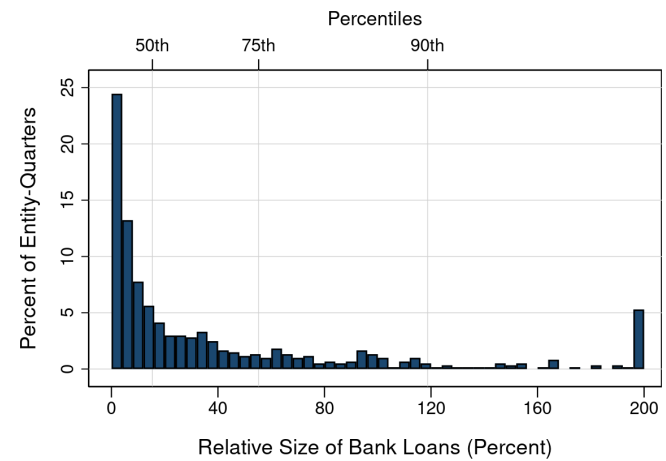
(a) All Events: Associated EMMA Disclosures



(b) All Events: No Associated Disclosures



(c) Originations: Associated EMMA Disclosures



(d) Originations: No Associated Disclosures

Figure 5: Materiality of Loan Commitments. 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 that distribution for issuers that disclose private debt on the EMMA system, while Panel (b) shows issuers that do not report the private debt agreements. Panels (c) and (d) mirror the distributions in (a) and (b), restricting the sample to loan originations.

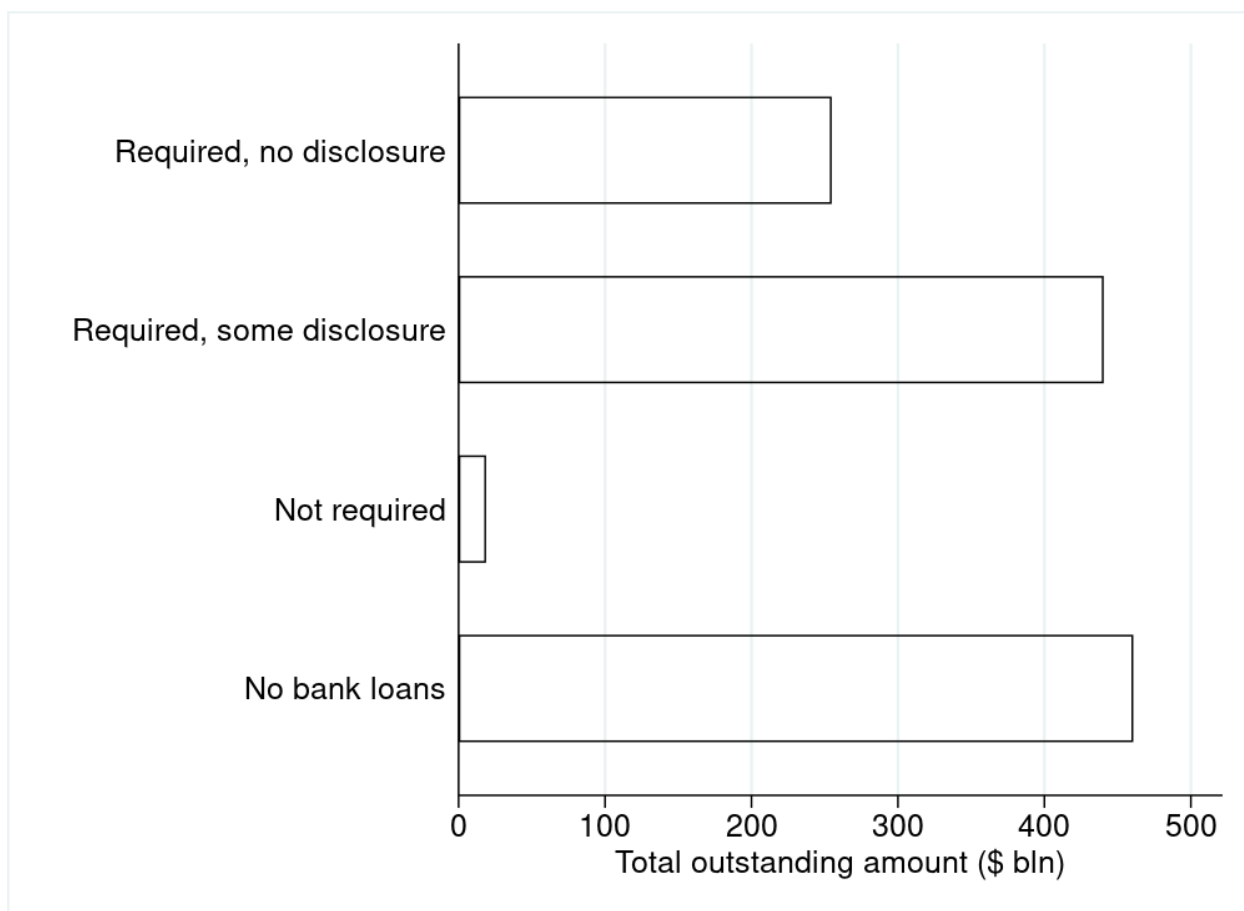


Figure 6: The economic significance of low regulatory compliance. This figure presents the outstanding dollar amount of bonds as of September 30th (net of repayments) for four groups of issuers: 1. “required, no disclosure” are those with bank loan events in the Y-14 Collection that are required to disclose but fail to do so, 2. “required, some disclosure” are those with bank loan events in the Y-14 data that are required to disclose but only disclose some loan events, 3. “not required” are those issuers with bank loan events in the Y-14 data that are not required to report, and 4. “no bank loans” are issuers with no bank loan events in the Y-14 data. The data in this bar chart are restrict to all entities in Mergent and the Y-14 data that we could successfully match to the Census of Governments.

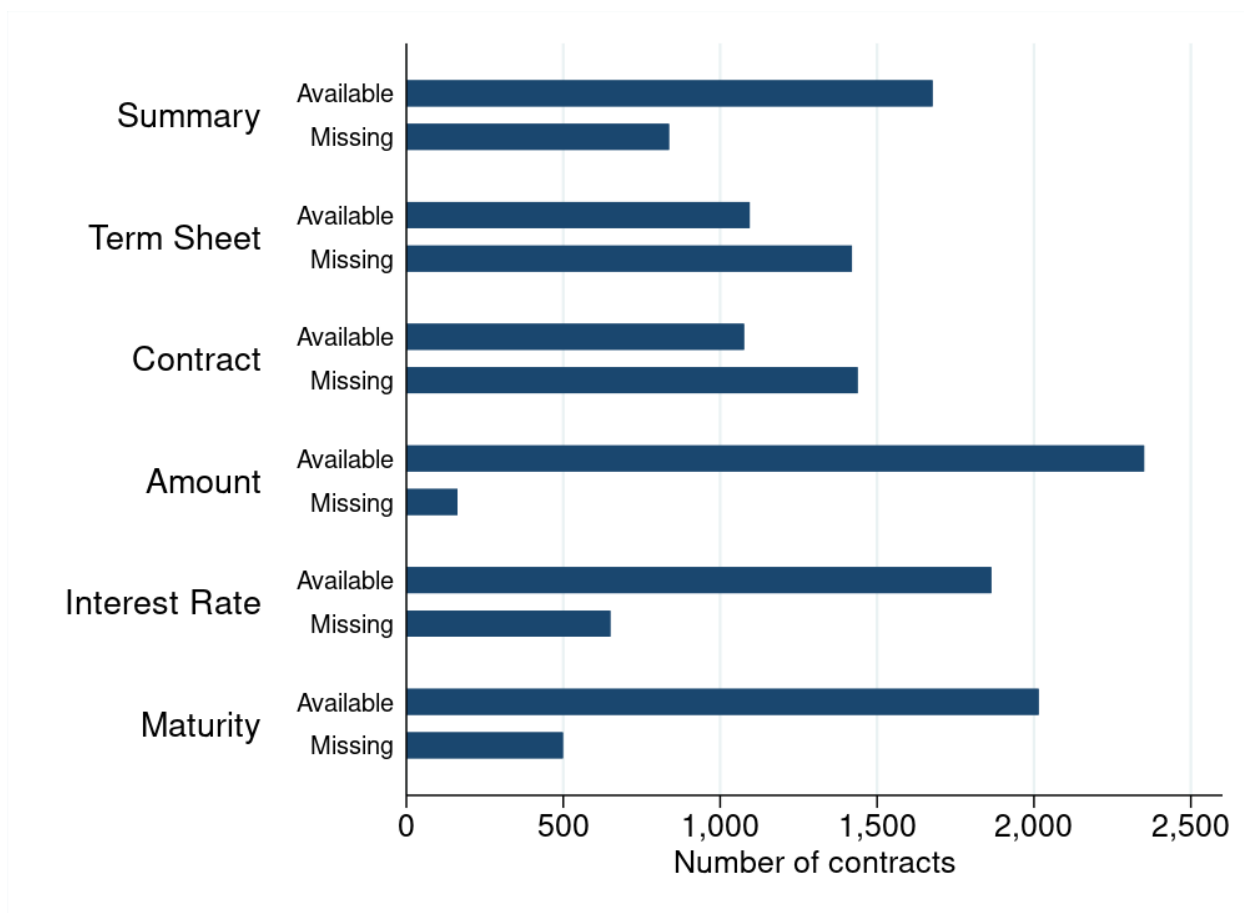


Figure 7: The information content of CD filings. This figure presents the number of debt disclosure filings with available or missing information across a number of key filing dimensions such as the availability of a summary statement, term sheet, the underlying private debt contract, or major contract characteristics (issuance amount, interest rate, interest rate).

Table 1: Bond market access and private debt disclosure requirements. This table presents summary statistics and t-tests for differences in means for major characteristics of local 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. The data on government characteristics come from the 2017 Census of Governments. All variables are defined in Appendix C.

A. Bonds Market Access and Government Characteristics

	<i>No Bonds Issuance (N=67,695)</i>		<i>Bonds Issuance (N=19,502)</i>		<i>Difference</i>
	<i>Mean</i>	<i>St. Dev.</i>	<i>Mean</i>	<i>St. Dev.</i>	
General Revenue, \$m	6.05	24.80	36.79	65.12	-30.74***
Total Expenditures	1.01	0.72	1.01	0.48	0.002
Capital Outlays	0.12	0.28	0.13	0.22	-0.01***
Revenue Gov Sources	0.25	0.32	0.25	0.27	-0.004
Total Taxes	0.43	0.36	0.41	0.26	0.02***
Sales Tax Share	0.08	0.21	0.14	0.23	-0.06***
Property Tax Share	0.83	0.31	0.79	0.28	0.04***
Debt-to-Revenue	0.83	2.76	1.36	2.76	-0.53***
Interest Expense	0.04	0.03	0.04	0.03	0.003***

B. Issuers Required to Disclose and Government Characteristics

	<i>Not Required (N=11,097)</i>		<i>Required (N=8,405)</i>		<i>Difference</i>
	<i>Mean</i>	<i>St. Dev.</i>	<i>Mean</i>	<i>St. Dev.</i>	
General Revenue, \$m	21.19	43.45	57.40	81.25	-0.3622***
Total Expenditures	1.01	0.52	1.01	0.42	0.0004
Capital Outlays	0.14	0.24	0.13	0.19	0.002
Revenue Gov Sources	0.24	0.27	0.27	0.28	-0.03***
Total Taxes	0.40	0.27	0.43	0.24	-0.03***
Sales Tax Share	0.15	0.24	0.13	0.22	0.02***
Property Tax Share	0.78	0.29	0.80	0.27	-0.02***
Debt-to-Revenue	1.33	2.87	1.40	2.61	-0.08***
Interest Expense	0.04	0.03	0.04	0.02	0.003***

Table 2: 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. The sample in columns 1 through 3 includes all governments with the exception of state governments. The sample in columns 4 through 6 is further restricted to governments with bond market access. A government in the sample is considered to have bond market access if it has at least one bond issuance since 2000. Additionally, an issuer is required to disclose private if it has at least one bond issuance since February 27th 2019 that triggers 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:	<i>Bond Market Access</i>			<i>Required to Disclose</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
Log(General Revenue)	0.082*** [0.005]	0.107*** [0.007]	0.116*** [0.006]	0.099*** [0.010]	0.108*** [0.010]	0.138*** [0.007]
Total Expenditures	0.024*** [0.004]	-0.000 [0.007]	-0.003 [0.008]	0.046*** [0.015]	-0.014 [0.026]	-0.017 [0.025]
Revenue Gov Sources	-0.090*** [0.031]	-0.055 [0.049]	-0.052 [0.049]	0.065 [0.080]	0.049 [0.079]	0.054 [0.069]
Total Taxes	0.016 [0.025]	0.007 [0.035]	-0.002 [0.028]	0.158** [0.066]	0.112** [0.056]	0.070 [0.052]
Sales Tax Share	-0.050 [0.072]	-0.033 [0.077]	-0.043 [0.054]	-0.039 [0.077]	-0.029 [0.080]	-0.126 [0.087]
Property Tax Share	0.048 [0.038]	0.094* [0.052]	0.006 [0.034]	0.097 [0.063]	0.128* [0.066]	0.006 [0.072]
Debt-to-Revenue		0.018*** [0.004]	0.017*** [0.004]		0.039*** [0.012]	0.038*** [0.008]
Interest Expense		-0.258** [0.126]	-0.209** [0.102]		-0.193 [0.263]	0.067 [0.147]
Observations	69,607	40,470	40,469	18,284	16,974	16,974
Government Type FE	Y	Y	Y	Y	Y	Y
State FE			Y			Y

Table 3: Disclosure regulation compliance and loan contract terms. This table reports the relation between the decision to disclose private debt obligations when required and bank loan characteristics, controlling for government characteristics. The loan characteristics come from the Y-14 Collection and correspond to newly-originated/renewed loans to a given borrower in a given quarter; we aggregate all loan characteristics to the Census Government ID level. Some specifications also include balance sheet data on governments from the 2017 Census of Governments (Log(General Revenue), Total Expenditures, Revenue Gov Sources, Total Taxes, Debt-to-Revenue, Interest Expense) or loan characteristics (Remaining Maturity, Interest Rate, Commitments-to-Revenue, Commitment Utilization, Secured, or Guaranteed). The standard errors are clustered at the state level. All variables are defined in Appendix C.

Dependent variable:	<i>Disclosing</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
	All Events			Originations		
Rem. Maturity	0.000 [0.003]	0.002 [0.003]	0.013** [0.005]	0.008** [0.004]	0.010*** [0.003]	0.014* [0.008]
Interest Rate	-4.428*** [0.863]	-4.472*** [0.733]	-11.275*** [1.847]	-9.652*** [2.248]	-9.650*** [2.548]	-12.196*** [3.963]
Committed-to-Rev	0.097 [0.089]	0.300*** [0.100]	0.526** [0.255]	-0.093 [0.153]	0.151 [0.191]	0.259 [0.456]
Utilization	-0.143*** [0.045]	-0.086** [0.042]	-0.043 [0.081]	-0.100 [0.078]	-0.079 [0.078]	0.069 [0.183]
Secured	-0.035 [0.033]	-0.035 [0.031]	0.072 [0.058]	0.075 [0.067]	0.070 [0.061]	-0.010 [0.139]
Guaranteed	0.002 [0.029]	-0.002 [0.034]	0.017 [0.067]	-0.275** [0.109]	-0.309*** [0.099]	-0.299 [0.432]
Adjusted R-Sq	0.09	0.11	0.22	0.14	0.17	0.30
Observations	5,524	5,445	5,034	862	847	364
Issuer Characteristics		Y			Y	
Issuer FE			Y			Y

Table 4: Disclosure regulation compliance and municipal underwriters, bond counsels, and advisers. This table reports the relation between the decision to disclose private debt obligations and intermediary characteristics. The loan characteristics come from the Y-14 Collection and correspond to newly-originated/renewed loans to a given borrower in a given quarter; we aggregate all loan characteristics to the Census Government ID level. All specifications include government type, state, calendar quarter, and loan type fixed effects. All specifications also include balance sheet data on governments from the 2017 Census of Governments (Log(General Revenue), Total Expenditures, Revenue Gov Sources, Total Taxes, Debt-to-Revenue, Interest Expense), as well as loan characteristics (Rem. Maturity, Interest Rate, Committed-to-Rev, Utilization, Secured, Guaranteed). The standard errors are clustered at the state level. All variables are defined in Appendix C.

Dependent variable:	<i>Disclosing</i>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Events				Originations			
Top 5 Underwriter	-0.001 [0.012]			-0.001 [0.012]	0.031 [0.027]			0.031 [0.028]
Top 5 Bond Counsel		-0.015 [0.018]		-0.015 [0.018]		-0.026 [0.044]		-0.028 [0.044]
Top 5 Financial Adviser			0.006 [0.012]	0.006 [0.012]			0.005 [0.047]	0.003 [0.047]
Adjusted R-Sq	0.11	0.11	0.11	0.11	0.18	0.18	0.18	0.18
Observations	5387	5387	5387	5387	715	715	715	715

Table 5: Event study results. This table presents average abnormal returns for bonds with associated continuing disclosure events. Panel A presents results within sample partitions in three time periods and based on whether disclosures are mandatory. The Pre-Covid period runs from the implementation of the SEC rule, February 27th 2019, through March 9th 2020. The Covid period starts right after the passage of the CARES Act, March 28st, and ends right before the last modification to the Federal Reserve’s Municipal Liquidity Facility, August 10th 2020. The Post-Covid period runs from August 12th 2020 through the end of the sample period, September 30th 2021. Panel B presents results within partitions into different credit quality groups based issuer credit ratings. All abnormal returns are adjusted for bond duration and for the average return on sub-indexes based on credit risk, maturity, and liquidity. The standard errors are double clustered by trade date and issuer CUSIP.

Panel A: Mandatory vs. Voluntary Disclosures						
	Mandatory			Voluntary		
	Pre-Covid	Covid	Post-Covid	Pre-Covid	Covid	Post-Covid
Bond Return	0.339** (0.154)	1.262*** (0.133)	0.357*** (0.029)	0.366*** (0.095)	1.522*** (0.255)	0.496*** (0.144)
Observations	31,033	56,874	72,970	9,167	1,100	1,732
Number of Events	1,633	1,965	3,602	645	136	220

Panel B: Disclosures and Credit Quality				
	AAA	AA-A	BBB	Non-IG
	Bond Return	0.440*** (0.065)	0.656*** (0.077)	0.619*** (0.073)
Observations	17,775	127,636	24,058	7,617
Number of Events	1,084	6,470	571	264

Table 6: The information content of disclosures and abnormal returns. This table presents average abnormal returns for bonds with associated continuing disclosure events, in subsamples based on whether disclosed private debt contracts contain maturity, interest rates, and amendment information or based on disclosure timeliness. Disclosure timeliness is defined in terms of the difference between the filing date and the private debt contract date (in business days). All abnormal returns are adjusted for bond duration and for the average return on sub-indexes based on credit risk, maturity, and liquidity. The standard errors are double clustered by trade date and issuer CUSIP.

Panel A: Abnormal Bond Returns and Filings Granularity						
	No		Yes			
	No	Yes	No	Yes	No	Yes
Has Maturity	No	No	Yes	Yes	-	-
Has Interest Rate	No	Yes	No	Yes	-	-
Amendment	-	-	-	-	No	Yes
Bond Return	0.641*** (0.167)	0.869*** (0.146)	1.026*** (0.237)	0.928*** (0.151)	0.795*** (0.113)	1.258*** (0.315)
Observations	17,125	2,446	15,426	34,433	57,162	12,268
Number of Events	589	143	425	1,583	2,424	316

Panel B: Abnormal Bond Returns and Disclosure Timeliness				
Days since incurrence	1	2-5	6-10	10+
Bond Return	0.806*** (0.171)	0.605*** (0.079)	0.633*** (0.132)	0.477*** (0.080)
Observations	20,322	30,865	28,108	12,282
Number of Events	822	1,692	1,568	957

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

Since municipal bond issuers in Mergent and municipal entities with bank loans in the FR Y-14 data collection do not share a common identifier (CUSIP is available for a small subset of observations in the Y-14 data), we rely on a name matching algorithm to identify entities across datasets.

We first match each data set to the Census of Governments which provides a near-complete universe of state and local governments. Our matching strategy proceeds in a series of steps, outlined below for each of the two datasets.

Matching Municipal Bond Issuers from Mergent to the Census of Governments

The Mergent data set provides two types of names for each issuer: the “`issuer_long_name`” and the “`issuer_short_name`”. We use the “`issuer_long_name`” as this field is more likely to include district numbers (for school and special districts) and details the the type of bond obligation, which we employ in some of the manual verification processes. Our sample includes all issuers that have at least one municipal bond offering in Mergent from January 2000 through present.

In the initial stage of the algorithm, we remove any suffixes from the issuer name that mainly detail the type of the municipal bond obligation (“GO”, “REV”, ...) from a list of approximately 300 suffixes. We then identify the government type of each issuer based on different sets of keywords and the following multistep process:

1. Check for keywords identifying school districts (“sch dist”, “school district”, “schools”, “pubsch”, “schs”, ...). If any of these keywords is present in the issuer name, classify the issuer as a school district. If no keyword is present, proceed to the next step.
2. Check for keywords identifying special districts (“district”, “dist”, “dists”, ...). If any of these keywords is present, classify the issuer as a special district. If not, proceed to the next step.
3. Check for keywords identifying authorities (“auth”, ...) or corporations (“corp”, “corpus”, “ltd”). If any of these phrases is present in the issuer name, classify the issuer as an authority or a corporation. If not, proceed to the next step.

4. Check for keywords identifying townships (“twp”, “vlg”, “township”, ...). If any of these keywords is present, classify the issuer as a township. If not, proceed to the next step.
5. Check for keywords identifying cities (“city of”, “ city”, “town of”, “town” ...). If any of these phrases is present in the issuer name, classify the isuer as a city. If not, proceed to the next step.
6. Check for keywords identifying counties (“county”, “parish”, “cnty”, ...). If any of these phrases is present in the issuer name, classify the isuer as a county. If not, proceed to the next step.
7. Check for keywords identifying state governments (“ state ”, “ st ”). If any of these phrases is present in the issuer name, classify the isuer as a state. If not, proceed to the next step.
8. Check if city or township names from all names in the Census of Governments shows up in the Mergent issuer name. If so, classify the issuer as a city or a township. If not, assign entity to the “unclear” category.

In the second step, we match the Mergent issuers within each government type to the municipal entities that appear in at least one Census of Governments in full census year (2002, 2007, 2012, and 2017) within the same government type. The government type of each entity is readily available in the Census of Governments. The exact name matching algorithm depends on the government type as follows:

- School Districts: For all steps below, if we arrive at multiple matches for each issuer name, we keep the match with the lowest associated Jaro-Winkler string distance score.
 1. We require an exact match on state, the first word in the issuer/Census names, and district number.
 2. If the previous step produces no match for a given issuer name, we then require an exact match on state and district number.
 3. If the previous step produces no match, we require an exact match on state, the first word of the issuer and Census names, and county name (only if the county name is present in the Mergent issuer name).

4. If the previous step produces no match, we then require an exact match on state and the first word of the issuer and Census names.
 5. If the previous step produces no match, we then require an exact match on state and require the first word of the Census name to appear anywhere in the issuer string.
 6. We then manually check each potential match produced by the string matching algorithm above. We verify, correct, or discard each potential match produced by the algorithm.
- **Special Districts:** Nearly identical to the matching algorithm for school districts with one modification due to the institutional specifics of special district names. We augment the second step to require exact match on state and the first word of the issuer and Census names, and also require at least half of all words in both strings to overlap.
 - **General purpose entities:** We consider county, state, township and city governments jointly. We again match in a series of steps and in the case of multiple matches for each issuer name we keep the match with the lowest Jaro-Winkler string distance score.
 1. We first require an exact match on state, the first word of the issuer and Census names, and government type.
 2. If the previous step produces no match, we attempt to match exactly on state and first word.
 3. If there is no match in the previous step, we require an exact match on state and that the first word of the Census name appears anywhere in the issuer string.
 4. We then manually verify, correct, or discard each potential match produced by the algorithm.

Matching Y-14 Borrowers to the Census of Governments

The Y-14 Collection provides the name of each borrower in the “obligor_name” field. We first clean this field by removing punctuation, non-letter characters, and extra spaces between words. We require that all borrowers are domiciled in the United States. We remove all borrower name entries in which the borrower name is not available or unknown; whenever the borrower receives guarantees from the Small Business Administration as those borrowers are unlikely to be state and

local government borrowers; or whenever the borrower is a U.S. government entity. Finally, we standardize borrower names by expanding common abbreviations such as “INC”, “CORP”, “CO”, and “LTD” and abbreviating phrases such as “LIMITED LIABILITY COMPANY” or “LIMITED PARTNERSHIP.”

In the initial stage of the algorithm, we identify the government type of each Y-14 borrower based on different sets of keywords. We first identify corporations using the following list of keywords: “INCORPORATED”, “LLP”, “LLC”, “COMPANY”, and “CORPORATION”; authorities/commissions/agencies using keywords such as “AUTH”, “COMMISSION”, “AGENCY”, “ECONOMIC DEVELOPMENT”; hospitals as all entities with three-digit NAICS 2007 codes of “622”; colleges as all entities with three-digit NAICS 2007 codes of “611”. We then classify the remaining entities using the following sequence of steps:

1. Check for keywords identifying school districts (“sch dist”, “school district”, “schools”, “pub sch”, “schs”, “isd”, “csd”, “psd”, “usd”, “hsd”, ...). If any of these keywords is present in the issuer name, classify the issuer as a school district. If no keyword is present, proceed to the next step.
2. Check for keywords identifying special districts (“district”, “dist”, “wcid”, “mud”, “municipal wd”, ...). If any of these keywords is present, classify the issuer as a special district. If not, proceed to the next step.
3. Check for keywords identifying cities/towns/townships (“twp”, “township”, “city of”, “city”, “town of”, “village of”, “borough” ...), while requiring that the entity is not an authority, college, or a corporation. If any of these keywords is present, classify the issuer as a township. If not, proceed to the next step.
4. Check for keywords identifying counties (“county”, “parish”, “cnty”, “cty”, “prsh”), while requiring that the entity is not an authority or a college. If any of these phrases is present in the issuer name, classify the issuer as a county. If not, proceed to the next step.
5. Check for keywords identifying state governments (“state of”, “commonwealth of”, ...). If any of these phrases is present in the issuer name, classify the issuer as a state. If not, proceed to the next step.

6. Assign all other entities to the “unclear” category.

In the second step, we match the Y-14 borrowers within each government type to the municipal entities that appear in at least one Census of Governments in full census year (2002, 2007, 2012, and 2017) within the same government type. The advantage of the Y-14 data relative to Mergent is that each borrower has an associated 5-digit zip code, which we could use to identify the county of the borrower. We could then use the county to make the pool of potential matches between the Y-14 and the Census more similar. The exact name matching algorithm depends on the government type as follows:

- School Districts: For all steps below, if we arrive at multiple matches for each borrower name, we keep the match with the lowest associated Jaro-Winkler string distance score.
 1. We require an exact match on state, county, the first word in the issuer/Census names, and district number.
 2. If the previous step produces no match for a given borrower name, we then require an exact match on state, the first word in the issuer/Census names, and district number.
 3. If the previous step produces no match for a given borrower name, we then require an exact match on state, county, and district number.
 4. If the previous step produces no match for a given borrower name, we then require an exact match on state, county, and the first word in the issuer/Census names.
 5. If the previous step produces no match for a given borrower name, we then require an exact match on state and county, and that the first word of the Census name appears anywhere in the borrower name.
 6. We then manually check each potential match produced by the string matching algorithm above. We verify, correct, or discard each potential match produced by the algorithm.
- Special Districts: Similar to the matching algorithm for school districts with a few modifications due to the institutional specifics of special district names:
 1. We require an exact match on state, the first word in the issuer/Census names, and district number.

2. If the previous step produces no match for a given borrower name, we then require an exact match on state, county, and the first word in the issuer/Census names. Here, we also require at least half of all words in both strings to overlap.
 3. If the previous step produces no match for a given borrower name, we then require an exact match on state and the first word in the issuer/Census names and that at least half of all words in both strings to overlap.
 4. If the previous step produces no match for a given borrower name, we then require an exact match on state, county, and the first and the second words in the issuer/Census names.
 5. If the previous step produces no match for a given borrower name, we then require an exact match on state, county, and the first and the third words in the issuer/Census names.
 6. If the previous step produces no match for a given borrower name, we then require an exact match on state and the first word in the issuer/Census names, and that the first word of the Census district type appears anywhere in the borrower name.
 7. We then manually check each potential match produced by the string matching algorithm above. We verify, correct, or discard each potential match produced by the algorithm.
- General purpose entities: We consider county, township and city governments jointly. We again match in a series of steps and in the case of multiple matches for each issuer name we keep the match with the lowest Jaro-Winkler string distance score.
 1. We require an exact match on state, county, the first word in the issuer/Census names, and entity type (city/township/village or county).
 2. If the previous step produces no match for a given borrower name, we then require an exact match on state, the first word in the issuer/Census names, and entity type.
 3. We then manually check each potential match produced by the string matching algorithm above. We verify, correct, or discard each potential match produced by the algorithm.

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).

Guaranteed – We define a municipal bank loan to be guaranteed if it is fully or partially guaranteed by a third party (based on field #44 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

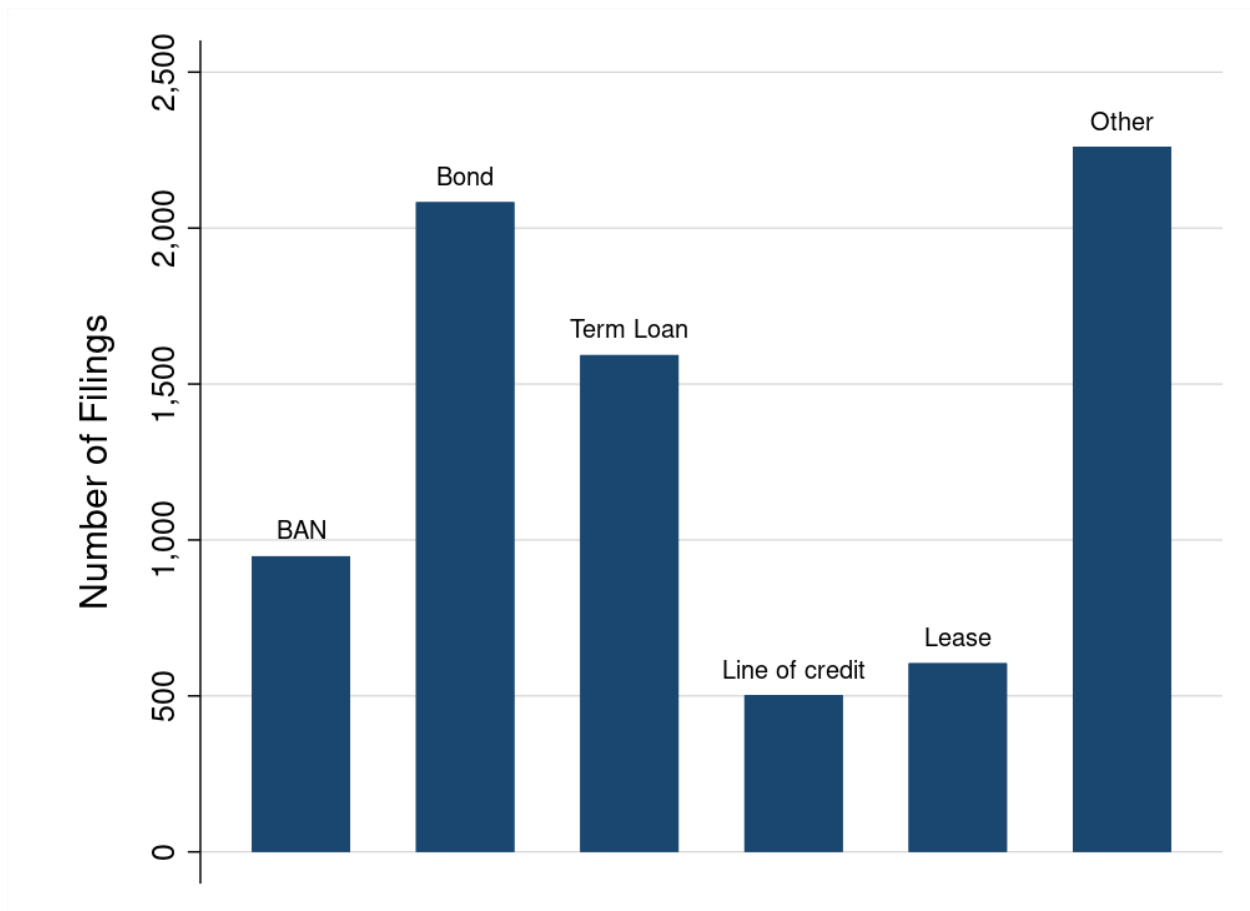
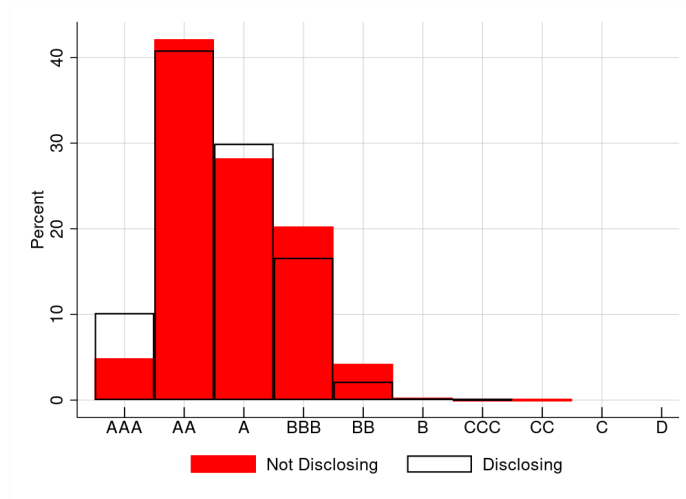
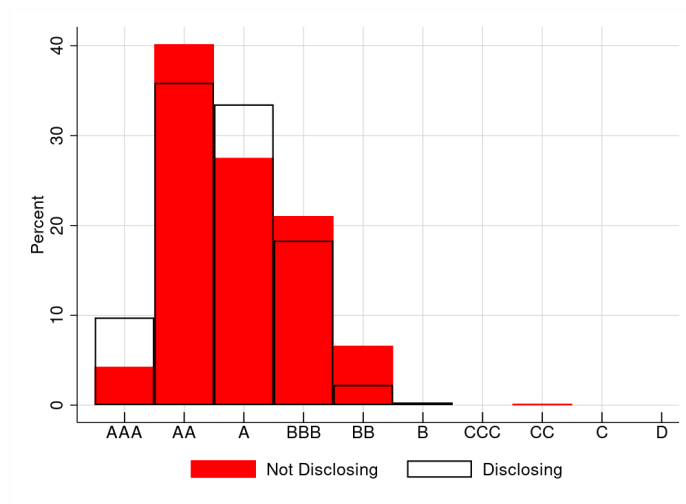


Figure D.I: Private debt type associated with continuing disclosure filings. In this figure we explore the heterogeneity in the type of debt detailed in continuing disclosure filings. Specifically, private placements of municipal bonds and term loans are the most prevalent ones. Other frequent types 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.

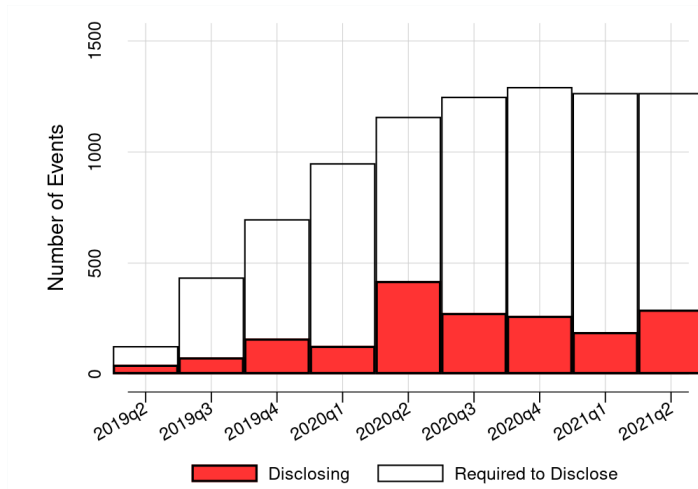


(a) All Loan Events

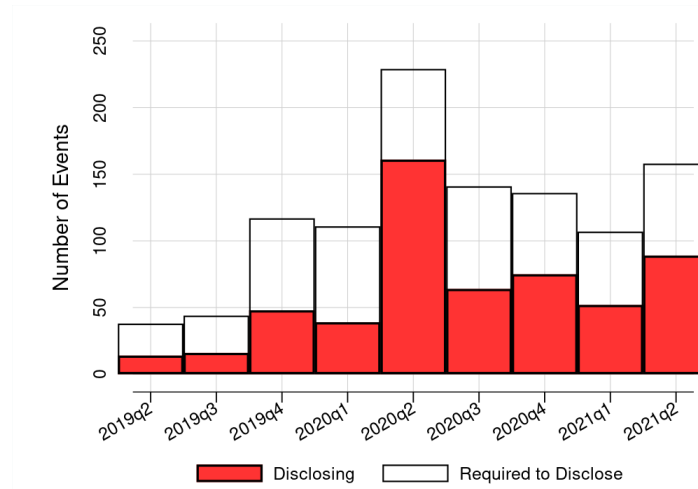


(b) Loan Originations

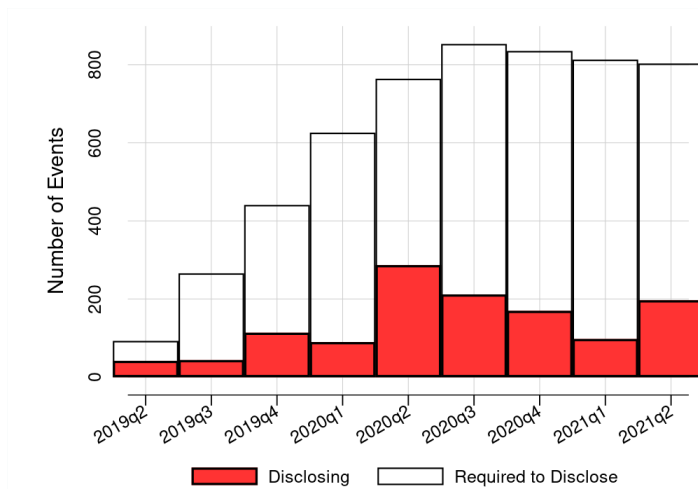
Figure D.II: Issuer credit quality and continuing disclosure. This figure compares the issuer credit quality distributions (in terms of the lenders' internal risk ratings from the Y-14 Collection) for bank loan events that belong to disclosers or non-disclosers. The 'Disclosing' group includes issuers that are required to disclose bank loan events and that provide continuing disclosure filings on the EMMA system. 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 renegotiations), while panel (b) includes originations only.



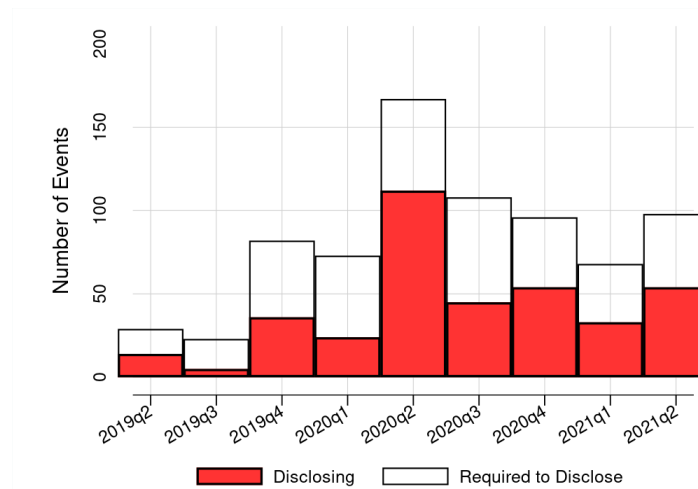
(a) All Loan Events, Loan Amt > 20%



(b) Loan Originations, Loan Amt > 20%

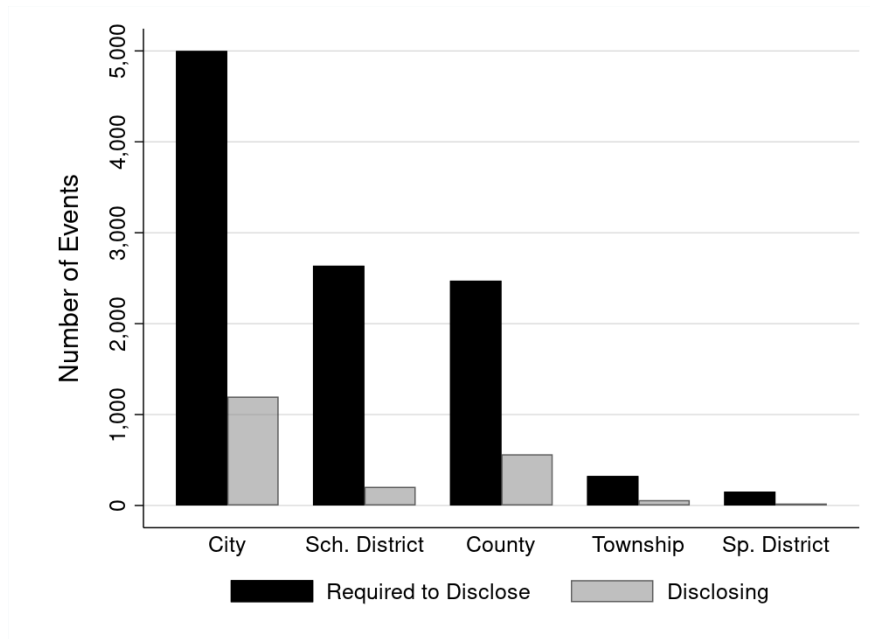


(c) All Loan Events, Loan Amt > 50%

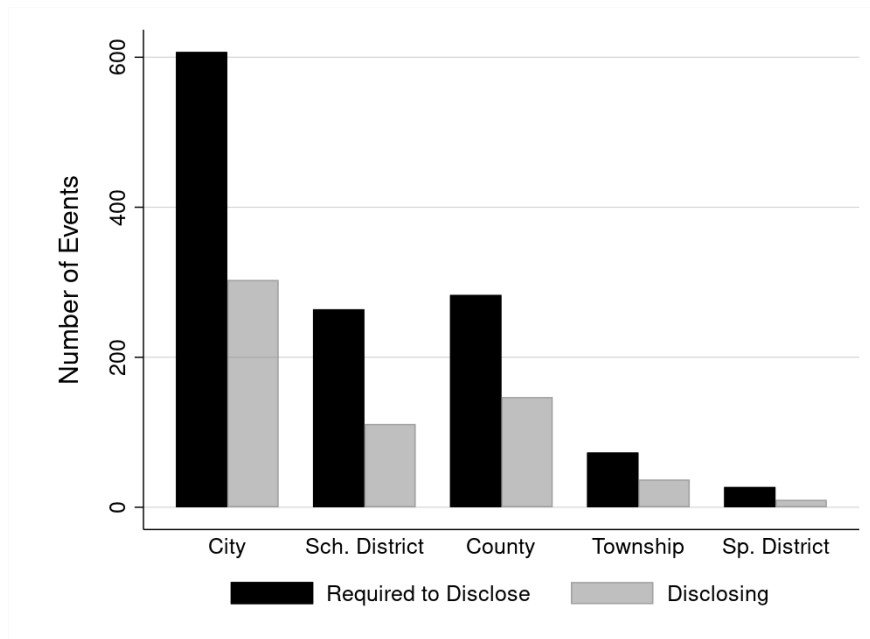


(d) Loan Originations, Loan Amt > 50%

Figure D.III: Compliance with continuing disclosure requirements and loan materiality. This figure shows the time series evolution of compliance with Rule 15c2-12. 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 bank loan events in which the issuer has associated disclosures on the EMMA system when required to disclose. Panels (a) and (c) include both originations and renegotiations, where the loan amount exceeds 20% or 50% of the issuer's outstanding bonds triggering continuing disclosure, respectively. Panels (b) and (d) includes only loan originations, where the loan amount exceeds 20% and 50%, respectively.

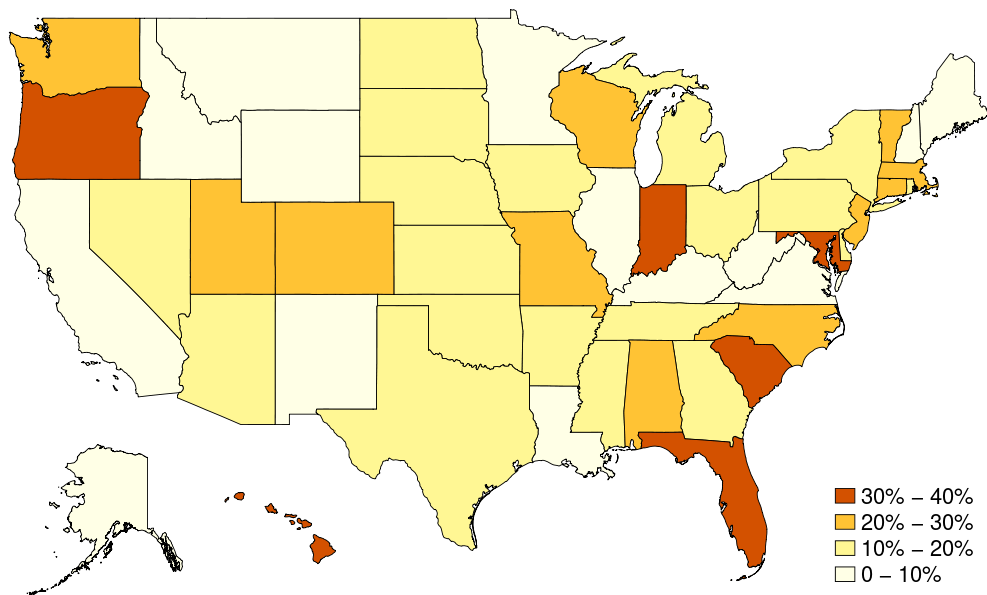


(a) All Events

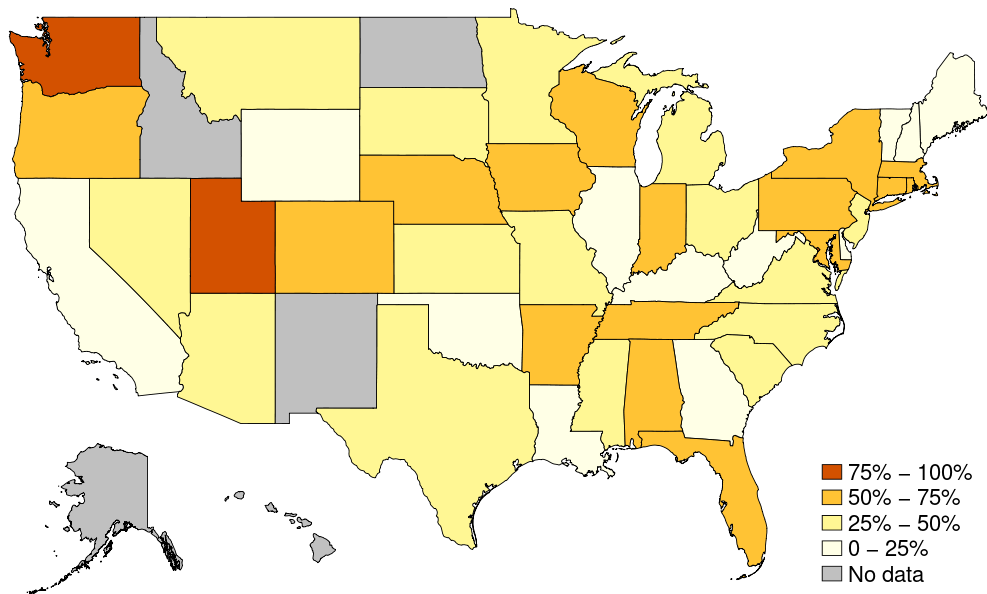


(b) Originations

Figure D.IV: Compliance with continuing disclosure requirements and government type. This figure presents summary statistics of compliance with Rule 15c2-12 across government type. The black 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 gray bars show the number of bank loan events in which the issuer has associated disclosures on the EMMA system when required to disclose. Panel (a) includes all loan events (originations and renegotiations), while panel (b) shows only loan originations.



(a) All Events



(b) Originations

Figure D.V: Compliance with continuing disclosure requirements across states. This figure presents the percentage of bank loan events in which the issuer submits a disclosure filing on the EMMA system conditional on the issuer being required to disclose pursuant to Rule 15c2-12 across states. Panel (a) defines bank loan events as all loan renegotiations and originations, while panel (b) restricts the sample to loan originations.

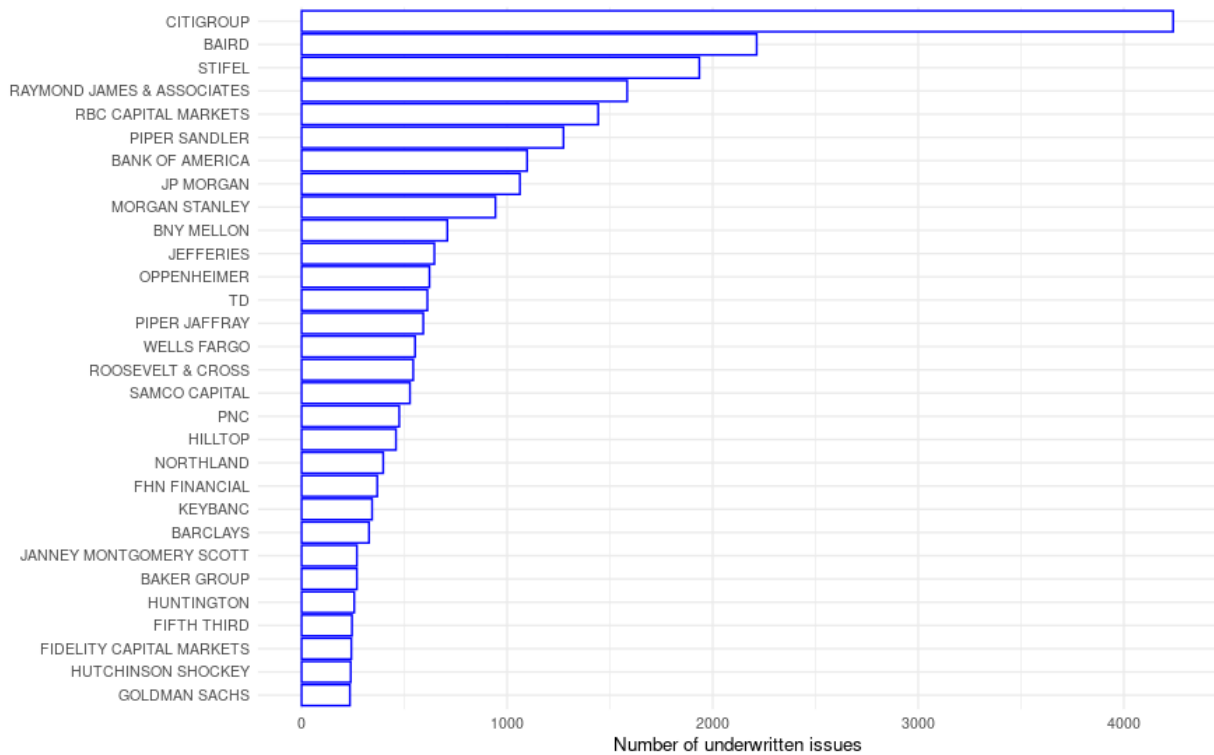
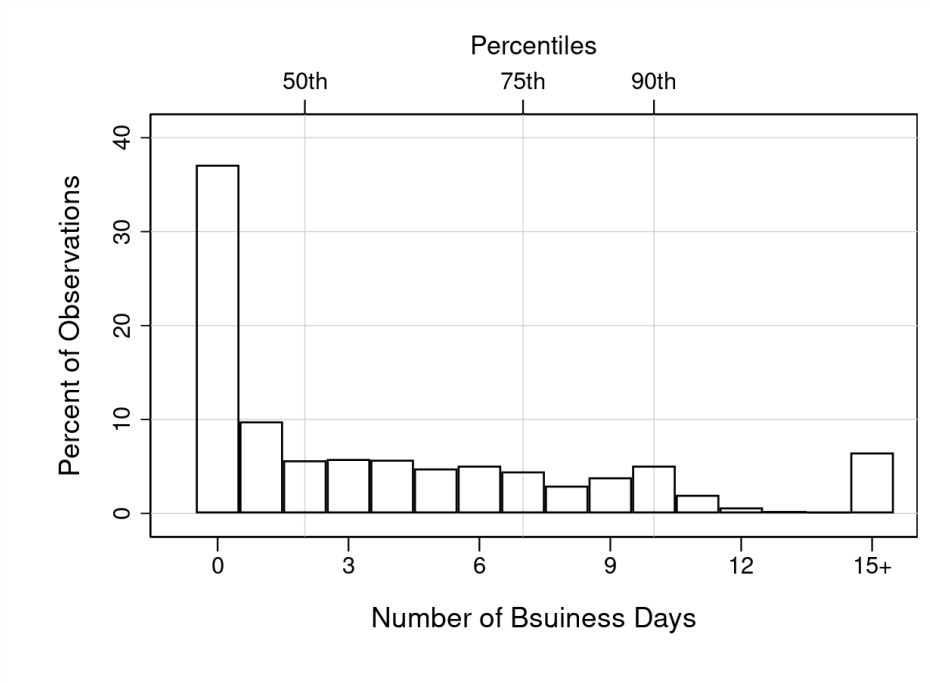
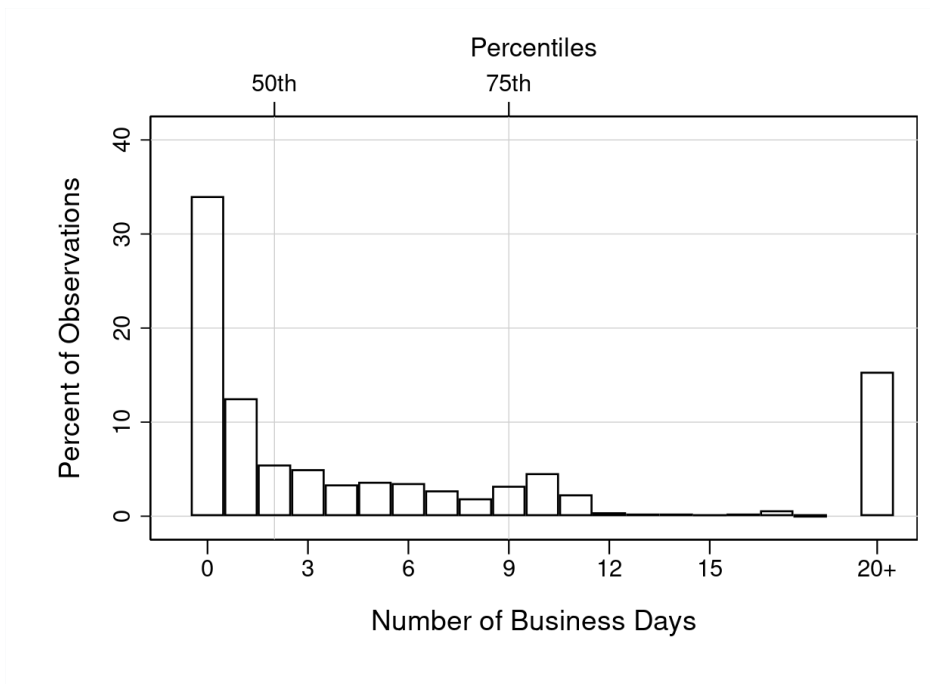


Figure D.VI: Underwriters of municipal bond issues triggering continuing disclosure This figure presents the number of offerings triggering continuing disclosure requirements underwritten by each of the top 30 underwriters by offering count. Source: Mergent Municipal Securities Database.



(a) Time Since Private Debt Agreement (Mandatory)



(b) Time Since Private Debt Agreement (Voluntary)

Figure D.VII: The timeliness of continuing disclosure filings. Panels (a) and (b) of this figure 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 27th 2019.

Table D.I: Determinants of disclosure requirements and government type. This table reports the relation between being required to report private debt obligations and government characteristics from the 2017 Census of Governments. The sample in columns 1 through 5 is restricted to county, city, township, special district, and school district governments, respectively. A government in the sample is required to disclose if it has at least one bonds issuance since February 27th 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:	<i>Required to Disclose</i>				
	(1)	(2)	(3)	(4)	(5)
	County	City	Twp	Sp Dist	Sch Dist
Log(General Revenue)	0.159*** [0.010]	0.150*** [0.007]	0.178*** [0.019]	0.035*** [0.007]	0.143*** [0.007]
Total Expenditures	0.027 [0.040]	0.017 [0.014]	0.051 [0.030]	-0.016 [0.020]	-0.136*** [0.047]
Revenue Gov Sources	0.116 [0.085]	-0.227*** [0.058]	0.139 [0.115]	-0.140*** [0.049]	0.011 [0.097]
Total Taxes	0.275*** [0.040]	0.026 [0.037]	0.074 [0.080]	-0.030 [0.039]	0.015 [0.132]
Debt-to-Revenue	0.020*** [0.007]	0.036*** [0.006]	0.068** [0.023]	0.015** [0.006]	0.098*** [0.017]
Interest Expense	-0.105 [0.324]	-0.134 [0.200]	1.132** [0.491]	-0.117 [0.260]	0.132 [0.266]
Observations	1,862	6,986	1,404	2,774	5,034
State FE	Y	Y	Y	Y	Y

Table D.II: 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 is 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. Finally, Panel C restricts the sample to loan origination events. All variables are defined in Appendix C.

A. Loan Characteristics and Disclosure Requirements					
	<i>Not Required</i> (<i>N=15,116</i>)		<i>Required</i> (<i>N=12,074</i>)		<i>Difference</i>
	<i>Mean</i>	<i>St. Dev.</i>	<i>Mean</i>	<i>St. Dev.</i>	
Credit Line	0.10	0.30	0.14	0.34	-0.03***
CL Utilization	0.44	0.46	0.51	0.47	-0.06***
Term Loan	0.59	0.49	0.55	0.50	0.04***
Lease	0.28	0.45	0.29	0.45	-0.01**
Committed Amt, \$m	9.02	19.05	10.22	21.45	-1.20***
Interest Rate	0.03	0.01	0.03	0.01	0.002***
Rem. Maturity	6.69	4.60	6.33	4.42	0.36***
Secured	0.83	0.38	0.85	0.35	-0.03***
Fixed Rate	0.93	0.25	0.92	0.27	0.01***
Prepayment Penalty	0.55	0.50	0.53	0.50	0.02***
Tax Exempt	0.73	0.44	0.72	0.45	0.01*
Fr. \leq BBB	0.24	0.43	0.24	0.43	-0.00
Fr. High-yield	0.06	0.24	0.04	0.20	0.02***

B. Required and Actual Disclosure: All Loan Events					
	<i>Required, Not Disclosed</i> (<i>N=9,716</i>)		<i>Required, Disclosed</i> (<i>N=2,358</i>)		<i>Difference</i>
	<i>Mean</i>	<i>St. Dev.</i>	<i>Mean</i>	<i>St. Dev.</i>	
Credit Line	0.13	0.34	0.16	0.37	-0.03***
CL Utilization	0.53	0.47	0.43	0.46	0.10***
Term Loan	0.55	0.50	0.54	0.50	0.01
Lease	0.30	0.46	0.26	0.44	0.04***
Committed Amt, \$m	8.85	19.00	15.88	28.79	-7.03***
Interest Rate	0.03	0.01	0.02	0.01	0.003***
Rem. Maturity	6.37	4.38	6.16	4.60	0.21**
Secured	0.87	0.34	0.81	0.39	0.06***
Fixed Rate	0.93	0.26	0.89	0.32	0.04***
Prepayment Penalty	0.54	0.50	0.49	0.50	0.05***
Tax Exempt	0.73	0.44	0.67	0.47	0.06***
Fr. \leq BBB	0.25	0.43	0.19	0.39	0.06***
Fr. High-yield	0.05	0.21	0.03	0.16	0.02***

C. Required and Actual Disclosure: Loan Originations					
	<i>Required, Not Disclosed</i> (<i>N=732</i>)		<i>Required, Disclosed</i> (<i>N=669</i>)		<i>Difference</i>
	<i>Mean</i>	<i>St. Dev.</i>	<i>Mean</i>	<i>St. Dev.</i>	
Credit Line	0.17	0.37	0.17	0.38	-0.01
CL Utilization	0.30	0.42	0.34	0.43	-0.04
Term Loan	0.49	0.50	0.65	0.48	-0.17***
Lease	0.26	0.44	0.13	0.33	0.13***
Committed Amt, \$m	12.40	26.40	21.26	34.21	-8.86***
Interest Rate	0.02	0.01	0.02	0.01	0.004***
Rem. Maturity	5.77	4.67	6.31	5.11	-0.54**
Secured	0.75	0.43	0.74	0.44	0.01
Fixed Rate	0.90	0.30	0.86	0.35	0.04**
Prepayment Penalty	0.36	0.48	0.33	0.47	0.03
Tax Exempt	0.63	0.48	0.64	0.48	-0.01
Fr. \leq BBB	0.29	0.45	0.21	0.41	0.07***
Fr. High-yield	0.08	0.27	0.03	0.17	0.05***

Table D.III: Disclosure regulation compliance and municipal underwriters, bond counsels, and financial advisers fixed effects. This table reports the relation between the decision to disclose private debt obligations when required and bank loan characteristics, controlling for government characteristics. The loan characteristics come from the Y-14 Collection and correspond to newly-originated/renewed loans to a given borrower in a given quarter; we aggregate all loan characteristics to the Census Government ID level. All specifications include government type, state, calendar quarter, and loan type fixed effects. All specifications also include balance sheet data on governments from the 2017 Census of Governments (Log(General Revenue), Total Expenditures, Revenue Gov Sources, Total Taxes, Debt-to-Revenue, Interest Expense), as well as loan characteristics (Rem. Maturity, Interest Rate, Committed-to-Rev, Utilization, Secured, Guaranteed) and some include underwriter, bond counsel, or financial adviser fixed effects. The standard errors are clustered at the state level. All variables are defined in Appendix C.

Dependent variable:	<i>Disclosing</i>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Events				Originations			
Rem. Maturity	0.002 [0.003]	0.002 [0.003]	0.002 [0.003]	0.001 [0.003]	0.011*** [0.003]	0.012*** [0.003]	0.012*** [0.003]	0.012*** [0.004]
Interest Rate	-4.480*** [0.752]	-4.584*** [0.737]	-4.934*** [0.918]	-4.580*** [0.789]	-10.599*** [2.900]	-10.618*** [3.367]	-11.819*** [3.228]	-10.131*** [2.818]
Committed-to-Rev	0.305*** [0.101]	0.329*** [0.106]	0.384*** [0.091]	0.338*** [0.118]	0.223 [0.204]	0.196 [0.247]	0.246 [0.205]	0.204 [0.254]
Utilization	-0.079* [0.043]	-0.080* [0.042]	-0.057 [0.044]	-0.084* [0.048]	-0.082 [0.081]	-0.063 [0.088]	-0.084 [0.117]	-0.113 [0.088]
Secured	-0.032 [0.031]	-0.033 [0.032]	-0.040 [0.032]	-0.030 [0.035]	0.073 [0.068]	0.049 [0.073]	0.049 [0.068]	0.025 [0.070]
Guaranteed	-0.003 [0.034]	-0.008 [0.034]	-0.009 [0.029]	-0.005 [0.035]	-0.279** [0.118]	-0.226 [0.157]	-0.259** [0.123]	-0.313** [0.143]
Adjusted R-Sq	0.11	0.12	0.14	0.13	0.18	0.21	0.19	0.23
Observations	5387	5387	5387	5387	715	715	715	715
Issuer Characteristics	Y	Y	Y	Y	Y	Y	Y	Y
Underwriter FE		Y				Y		
Bond Counsel FE			Y				Y	
Adviser FE				Y				Y

Table D.IV: 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