# Gas, Guns, and Governments:

# Financial Costs of Anti-ESG Policies*

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**Abstract**

We study how government regulation limiting the adoption of environmental, social, and governance (ESG) policies distorts financial market outcomes. The state of Texas enacted laws in 2021 that prohibit municipalities from contracting with banks that have certain ESG policies. This led to the exit of five of the largest municipal bond underwriters from the state. We find that municipal bond issuers with previous reliance on the exiting underwriters are more likely to negotiate pricing and incur higher borrowing costs after the implementation of the laws. Among remaining competitive sales, issuers face significantly fewer bidding underwriters and higher bid variance, consistent with a decline in underwriter competition. Additionally, underpricing increases among issuers most reliant on the targeted banks and bonds are placed through a larger number of smaller trades. Overall, our estimates imply Texas entities will pay an additional $303–$532 million in interest on the $32 billion in borrowing during the first eight months following the Texas laws.

**Keywords:** ESG Policies, Public Finance, Municipal Bonds, Banking Competition

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# 1 Introduction

Banks have a central role in intermediating credit to households, businesses, and governments, which gives them outsize importance for the adoption of ESG policies in the broader economy. Most large banks in the US have committed to ESG policies through divestment of assets, active engagement with clients, or near- or medium-term net zero carbon emissions goals potentially due to shifts in investor preferences and government policy (Scenga, 2021; Bauer, Ruof and Smeets, 2021; Dimson, Karakas and Li, 2021). Consequently, economies reliant on less sustainable industries such as fossil fuel production or firearm manufacturing are likely to be adversely affected by bank ESG policies (Jones, 2021). For example, fossil fuel companies have recently faced increased uncertainty in bank credit availability and significant increases in the cost of credit (Ivanov, Kruttli and Watugala, 2021; Delis, de Greiff and Ongena, 2019).

Governments dependent on less sustainable industries may attempt to counter the adoption of ESG policies, thereby imposing substantial costs on both the financial intermediaries and affected economies. To assess the impact of anti-ESG laws on financial market outcomes, we study a significant and unexpected regulatory change in the state of Texas barring some of the largest banks in the US from government contracts in the state. Senate Bills 13 and 19 bar any Texas municipality from contracting with a bank that restricts funding to oil & gas or firearms companies. The laws were implemented in September 2021 and led to the abrupt exit of five of the largest municipal bond underwriters from Texas. These laws provide quasi-exogenous variation to assess the impact of anti-ESG policies on public finance as they were unexpected and unlikely to be related to endogenous bank entry, bank integration decisions, or changes in municipal creditworthiness.

We exploit the differential exposure of Texas municipalities to the five exiting underwriters to examine how the anti-ESG laws affect borrower behavior and outcomes. Relationships between municipal issuers and underwriters are sticky with many issuers repeatedly choosing the same underwriters (Chen, Cohen and Liu, 2022). We use this stickiness to identify the reliance of municipal issuers on the exiting underwriters prior to the regulatory change. We find that issuers previously reliant on the targeted banks are more likely to negotiate pricing instead of holding an auction and

receive worse prices after the implementation of the Texas laws.

Although negotiated sales are associated with higher issuance costs than competitive offerings, they also allow underwriters to obtain a more complete picture of the potential market for the municipal bond issue and better place the bond with investors when issue or market uncertainty is high (Sorensen, 1979*b*; Smith, 1987; Cestau, Green, Hollifield and Schürhoff, 2019). Thus, issuers with significant reliance on the targeted banks opt into negotiations to soften the large volatility and higher borrowing costs we document among competitive sales. Nevertheless, borrowing costs still increase by approximately 10 basis points for issuers with an additional standard deviation of reliance on the targeted banks.[1] Borrowing costs increase by up to 45 basis points for issuers that had previously raised the majority of bond financing through the exiting underwriters.

The remaining competitive offerings, which make up slightly less than half of the Texas market, provide a particularly clear window into the impact of the Texas laws on bank competition. The number of underwriting bidders declines sharply, the variance among remaining bids increases, and the winning bid in terms of yield to maturity increases after the implementation of the Texas laws for issuers with previous reliance on the exiting banks. These results suggest that the exit of the targeted underwriters from the Texas market has significant impact on underwriter competition and that the remaining banks may enjoy increased market power due to barring banks with certain social and environmental policies from the market.

Finally, we show that the exit of the five major banks led to significant changes in the placement of municipal bonds with investors as issuers lose direct access to the distribution networks of the targeted banks. The large underwriters targeted by the new Texas laws typically have national distribution networks and may be better able to place municipal bonds with a wider array of investors than regional underwriters. This is especially important for Texas municipal bonds that are widely-held out-of-state due to having no state income tax (Babina, Jotikasthira, Lundblad and Ramadorai, 2021). The efficiency of bond placement can be assessed by comparing the underpricing of new issues before and after the Texas laws as lower cost placement should have a smaller gap

[1] One standard deviation of reliance on exiting banks is equivalent to 22% higher bond dollar volume underwritten by exiting banks.

between the offering price and the eventual market price. Although on average underpricing of the municipal bonds of affected issuers remains similar after the implementation of the laws, issuers previously reliant on the targeted banks for the majority of underwriting activity face increases in underpricing of about 14 basis points. We also document changes in placement patterns that are consistent with more costly placement. Customer purchases increase as a share of trades and the average size of customer trades for affected issuers shrinks. These dynamics lead to a higher total dollar volume of customer purchases. Concurrently, average dealer trade size increases but dealer volume remains unchanged. These results combined imply a higher direct participation of retail investor trades and less dealer intermediation. This evidence is consistent with issuers substituting the national intermediation of municipal bonds provided by the exiting banks with a more local placement at higher average costs.

We perform a variety of robustness checks to show that our results are not spuriously driven by contemporaneous factors. We highlight that pre-trends in issue type and offering yields are consistent between Texas and other states for the five years leading up to the implementation of the laws in September 2021. Additionally, given that previous reliance on the exiting banks is based on observable and potentially unobservable issuer characteristics, we employ a triple-difference approach to compare the evolution of outcomes for similar issuers in and out of Texas. The triple difference regressions are also useful for comparing Texas issuers who are unlikely to be directly affected by the Texas laws with other issuers around the US to test for potential spillover effects on the Texas control group. We also use an inverse probability weighting method in the spirit of Hirano, Imbens and Ridder (2003) to directly compare outcomes for observably similar issuers, ensuring the effects we document are not a function of different secular trends across issuer type. To rule out seasonality we use the auction data and show that a placebo shock starting on September 1, 2019 does not have any of the same impacts on auction outcomes as the actual anti-ESG policies in 2021. Finally, we show that our difference-in-differences results are robust to dropping all auctions that occur during the most volatile period of the COVID-19 crisis.

Our paper contributes to the nascent literature on ESG investing by documenting the real effect

of anti-ESG regulation. ESG policies in the financial services industries have proliferated substantially in recent years. For example, the investment management industry in the US has seen record inflows into ESG funds in 2019, 2020, and 2021 of $285, $542, and $649 billion, respectively.[2] Prior research shows that adopting sustainable investing can be consistent with shareholder value maximization as suggested in Jagannathan, Ravikumar and Sammon (2018). ESG policies help hedge climate and other downside risks associated with companies' poor sustainability practices in an environment with ESG uncertainty (Avramov, Cheng, Lioui and Tarelli, 2021; Gibson, Glossner, Krueger, Matos and Steffen, 2022; Hoepner, Sautner, Starks and Zhou, 2022; Krueger, Sautner and Starks, 2020). Recent shifts in the preferences for sustainable strategies of institutional investors and shocks to climate concerns have also exerted upward pressure on equity prices of ESG adopters (Bauer, Ruof and Smeets, 2021; Pastor, Stambaugh and Taylor, 2021), leading to even higher equity valuations (Krueger, Gibson and Mitali, 2021; Pelizzon, Rzeznik and Weiss Hanley, 2021). Although some firms have not fully met sustainability commitments (Basu, Vitanza, Wang and Zhu, 2022; Gibson, Glossner, Krueger, Matos and Steffen, 2022) or some investors do not necessarily exhibit preferences for ESG policies (Moss, Naughton and Wang, 2021), the literature documents significant adoption of ESG policies in recent years. This may have been further facilitated by investor engagement (Dimson, Karakas and Li, 2021). Although these trends have been largely driven by market forces that are unlikely to reverse, we document that governments dependent on less sustainable economic activity may impose additional costs on both financial intermediaries and taxpayers when attempting to slow ESG adoption. In the case of Texas, we document that these efforts to curb ESG activities result in significant adverse impact on the capital raising of affected municipalities.

Prior research shows that banks respond to increases in climate policy uncertainty by penalizing corporate customers with less sustainable business models and increasing flexibility to revoke credit to these firms in the future (Delis, de Greiff and Ongena, 2019; Ivanov, Kruttli and Watugala, 2021). Analogously, banks engage in less monitoring of environmental outcomes when they

[2] See https://www.reuters.com/markets/us/how-2021-became-year-esg-investing-2021-12-23/

face less environmental liability (Bellon, 2021). The adoption of sustainable policies in banking may have been accelerated by the enhanced focus of the Securities and Exchange Commission (SEC), the primary financial markets regulator in the US, on ESG disclosures.[3] There is, however, substantial ambiguity as to how ESG policies in the banking sector affect stakeholders such as governments reliant on less sustainable industries and how these stakeholders may respond to ESG policies. In our empirical setting, Texas bars banks with ESG policies from public finance in the state. In perfectly competitive credit markets with homogeneous preferences and beliefs about asset payoffs (Fama and French, 2007), barring banks with ESG policies may have no effect on issuer outcomes as other banks without such policies enter the market. We show that such prohibition has large adverse consequences for Texas municipalities in terms of higher borrowing costs that are ultimately born by taxpayers in the state.

This paper also contributes to the extensive literature since Petersen and Rajan (1995) and Gande, Puri and Saunders (1999) that studies how competition among financial intermediaries affects borrower outcomes (Yanelle, 1997; Boot and Thakor, 2000; Corwin and Schultz, 2005; Dick and Lehnert, 2010; Allen, Carletti and Marquez, 2011; Liu and Ritter, 2011; Cornaggia, Mao, Tian and Wolfe, 2015; Carletti and Leonello, 2019). While this literature has largely focused on deregulation and the resulting increase in competition due to bank entry, this paper highlights that the simultaneous loss of a significant number of intermediaries cannot be fully absorbed by a market even if the market is large and highly competitive. Going beyond the existing literature, we also show that the banks most likely to leave a market over ESG concerns are the largest, most interconnected banks. The exit of such banks with the largest dealer networks leads to deterioration in distribution quality that may have important implications for financial stability. Our results thus also complement the more extensive literature on competition in financial markets (Berk and Van Binsbergen, 2022; Clark, Houde and Kastl, 2021).

Finally, we also complement the literature studying intermediation in public finance markets (Green, Hollifield and Schürhoff, 2007; Brancaccio, Li and Schürhoff, 2017; Cestau, 2019, 2020;

[3]For a list of the six major categories of increased attention and enforcement priorities by the SEC, see https://www.sec.gov/sec-response-climate-and-esg-risks-and-opportunities.

Garrett, 2021; Garrett, Ordin, Roberts and Suárez Serrato, 2017) and to the growing body of work on the effect of social, political, and environmental issues on public finance (Goldsmith-Pinkham, Gustafson, Lewis and Schwert, 2021; Cornaggia, Li and Ye, 2021; Gao, Lee and Murphy, 2021; Cornaggia, Hund, Nguyen and Ye, 2022; Gao, Lee and Murphy, 2020). We find that forcing underwriters with ESG policies to exit the market leads to significant changes in public finance outcomes such as the method of sale, primary market costs, and secondary market placement patterns. We show that the loss of banking relationships have large adverse effects for borrowers in line with prior research on municipal banking relationships (Liu, 2015; Moldogaziev and Luby, 2016). Furthermore, we show that that even the largest issues in the market are not immune from higher yields following a substantial reduction in the set of available underwriters.

## 2 Institutional Background

Texas has a large market for municipal bonds, which has made it the focus of many existing studies on public policy and municipal finance. Notably, Texas has transparent reporting of school district data, which allows analysis of bond market access and financial and educational outcomes (Martorell, Stange and McFarlin Jr, 2016; Yu, Chen and Robbins, 2022). The state has also publicly reported results of competitive sales prior to the availability of market-wide sources such as Ipreo and The Bond Buyer, which allowed granular measurement of competitive outcomes (Clarke, 1997). Ownership of municipal bonds issued in Texas is also more geographically diversified than that of bonds from most other states because Texas does not have a state income tax from which to exempt bond interest (Babina, Jotikasthira, Lundblad and Ramadorai, 2021).

The ability of Texas to regulate the business practices of banks that engage in public finance in the state is an important reason why the municipal market is the primary laboratory through which we can study anti-ESG regulation in the US. The most recent round of such rules in Texas began in 2017 with House Bill 89/Senate Bill 252, the "Prohibition on Contracts with Companies Boycotting Israel," which forbids the state and contained governments from contracting with banks

that have policies restricting credit to firms with ties to Israel. The Municipal Advisory Council of Texas (MAC) keeps a record of the letters that banks submit to the Texas Attorney General and documented that 42 banks submitted letters verifying their compliance with the law at the time.[4]

Since then, there have been increasing calls by both the general public and various stakeholders for banks to promote environmentally and socially sustainable investments and business practices. On the environmental side, many banks have increased their flexibility to divest from energy companies in response to current or expected future climate change regulation (Ivanov, Kruttli and Watugala, 2021). Texas is one of the largest producers of oil and gas in the U.S. and some Texas lawmakers saw this as a direct boycott of their state. In March 2021, lawmakers introduced Senate Bill 13 which would ban banks that divest from the the oil and gas sector from participating in public finance markets in the state, or as one reporter worded it: "boycott Texas, and we'll boycott you" (Adams-Heard, 2021). The new rule was slated to be implemented on September 1, 2021.

Over the same time frame, some of the major financial services firms introduced company policies regarding relations with the firearms industry. In the aftermath of the Las Vegas shooting in 2017 and the Stoneman Douglas High School shooting in 2018 several banks introduced policies restricting credit to the firearms industry in certain cases. For example, Citigroup adopted a policy to not offer credit to firearm retailers that (1) do not always perform background checks, (2) sell firearms to those below 21 years of age, or (3) sell "bump stocks or high-capacity magazines." Citigroup stated in their public announcement of this policy that: "we want to do our part as a company to prevent firearms from getting into the wrong hands" (Skyler, 2018). Several other large banks followed suit in implementing similar policies in 2018 including JP Morgan Chase, Bank of America, and Goldman Sachs.[5] Consequently, Texas lawmakers introduced Senate Bill 19, which prohibited state and local governments in Texas from contracting with lenders that limit business with the firearms industry. The implementation date of this regulation was also September 1, 2021.

Although Texas has been the only state to currently adopt anti-ESG laws, it is important to note

[4] https://www.mactexas.com/Document/HB89Letter/

[5] See Catlett (2019) for a discussion of the history of these decisions on the parts of the banks and the legal context.

the state is not an isolated case of such laws. Other states including Arizona, Indiana, Kentucky, Missouri, Ohio, Oklahoma, South Dakota, West Virginia, and Wyoming have similar proposals that are currently going through the legislative process. In addition, even though an anti-ESG law in Lousiana has been vetoed by the governor, the Attorney General of the state has since rejected municipal bonds underwriters on anti-ESG grounds.[6] Finally, such anti-ESG laws have reached national prominence with the former vice president of the United States, Michael Pence, calling on states to adopt "measures to discourage the use of ESG principles."[7]

There were four banks in particular that seemed to be the target of the anti-ESG laws: Citigroup, JP Morgan Chase, Goldman Sachs, and Bank of America, all of which had taken public stance on ESG issues.We also use a data-driven approach to check if other underwriters appear to have also left the Texas market. First, we create a list of banks underwriting or bidding for at least five municipal securities in Texas between 2008 and 2021. We then check whether each underwriter/bidder has filed a letter of compliance with the Texas Attorney General's office as reported by the MAC. We consider an underwriter to have left the state if the underwriter has not filed a letter of compliance with the Texas laws and no longer participates in the Texas market starting in September 2021. Finally, we check that each underwriter underwrites at least five bonds in non-Texas states after September 2021 so that we do not confuse leaving the municipal underwriting business with leaving Texas. This process indicates that Fidelity Capital Markets also appears to have left Texas in response to SB 13/19 and we count them as a targeted bank. We use "targeted" and "exiting" interchangeably to describe the set of banks that exited the Texas market. All five targeted underwriters stopped submitting competitive bids after SB 13 and 19 were implemented (see Figure 1) although Citigroup, in particular, has tried to reenter the market a number of times. The anti-ESG bills may have an even larger impact on bank exit in the foreseeable future as the SEC has started regulatory probes against banks that have simultaneously declared compliance with the Texas laws and included ESG disclosures in their SEC filings.[8] Potentially in response

[6] See https://www.bondbuyer.com/news/louisiana-legislature-tries-again-to-implement-pro-gun-litmus-test.

[7] See https://www.wsj.com/articles/only-republicans-can-stop-the-esg-madness-woke-musk-consumer-demand-free-speech-corporate-america-11653574189?mod=trending_now_opn_6.

[8] For example, see https://www.reuters.com/markets/us/exclusive-secs-texas-office-probes-banks-over-disclosure

to these probes, TD Securities withdrew their letter of compliance with SB 13 and 19 on March 8 according to the MAC and could end their municipal finance business in Texas.

Municipal bond underwriters are responsible for distributing bonds with secondary market investors. In a negotiated sale, the underwriter works directly with the issuer to structure the issue contract terms and arrive at the best price and yield for the issuer. In a competitive sale, the underwriter places a bid in terms of yield-to-maturity in a first-price, sealed-bid auction for a bond package that has already been assembled. The underwriter who bids the lowest yield gets to distribute the bonds to investors.[9] The complexity of the offering type decision as well as the wide array of services offered by underwriters imply that a change in the structure of the underwriter market can have far-reaching effects on municipal securities contracts beyond just issue prices. The set of available underwriters can affect the method of sale, the structure of the eventual issue, the issuance costs incurred by municipalities, and whether municipalities seek external finance at all. Consequently, underwriters are key in determining the cost of public funds and potentially the scale of public investment.

# 3 Data

We obtain the universe of municipal bond issues between January 2007 and April 2022 from the Mergent Municipal Bond Securities Database (Mergent). Mergent identifies municipal issuers as well as a wide range of issuance characteristics both at the issue and the maturity level. These include offering amount, type, maturities, the presence of bond insurance, and yields. These data also include the identity of the municipal underwriter for each offering. We exclude issues with missing issuer state information given our focus on Texas issuers. We also exclude variable rate demand obligations (VRDOs) since only a very small fraction of issuers typically have access to such short-term financing. This results in a sample of 234,849 bond offerings by 37,516 unique issuers since 2007.

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[9] See Appendix B for a more detailed discussion of the bond issuance process and the roles of various agents.

We obtain data on the competitive sales through April of 2022 from The Bond Buyer, which is a trade publication for the municipal bond market. Each day, The Bond Buyer publishes the outcomes of all public auctions that took place on the previous day (The Bond Buyer, 2022). The Bond Buyer includes basic issue and issuer characteristics and, importantly, the identity of all bidders and their bids expressed in yield-to-maturity. These data are particularly beneficial because they allow us to clearly gauge changes in the competitive dynamics in the state for the set of issues that are placed through public auction.

Finally, to test for the effect of the Texas laws on municipal bond underpricing and to understand how underwriters place issues with investors, we use the universe of secondary market trading data published on the Electronic Municipal Market Access (EMMA) website provided by the Municipal Securities Rulemaking Board (MSRB). We exclude issuers we are unable to identify in Mergent and remove trades occurring after a bond's maturity date, with non-transaction based compensation arrangements, where the MSRB is unable to verify the dollar price submitted by the dealer, or where the transaction amount or price are missing. As we are interested in trading activity related to the the initial distribution of municipal issues—those occurring within 30 days of the issue date—we focus on customer purchases and dealer trades because customers have very few sales back to dealers. Finally, to mitigate the effect of outliers and data errors, we trim trade prices at the $0.5^{th}$ and the $99.5^{th}$ percentiles.

## 3.1 Texas Borrowers Reliant on the Exiting Underwriters

In this section, we explore characteristics of the banks that exit the Texas underwriting market after September 2021 as well as characteristics of the Texas borrowers previously reliant on the exiting banks. This description yields two novel facts that are important for interpreting our results. First, governments reliant on the exiting banks are the largest issuers in the Texas market. These issuers typically raise seven times as much in bond financing as other Texas issuers upon issuance, while having similar bond maturities, yields, and propensities to negotiate pricing or float taxable issues. Second, the exiting banks are much more likely to underwrite municipal bonds nationally,

albeit several large, national banks do maintain their municipal underwriting business in Texas immediately after SB 13/19.

We show summary statistics of the bond issuance data from Mergent in Table 1. Panel (A) describes the differences between Texas bond issues and issues in the rest of the US from 2017 through April 2022. Texas accounts for 9,506, or 12.4%, of the 76,866 bond issues in our sample between 2017 and April 2022. The distribution of offering amounts in Texas, ranging from $2 million at the $25^{th}$ percentile to over $18 million at the $75^{th}$ percentile and an average size of 30 million, is very similar to the distribution of issue size from the remaining US states. Texas municipalities issue longer maturity bonds than municipalities in other states, while yields and negotiated shares are similar across the two groups. However, issuers in Texas have an average reliance on the five targeted banks of about 15% as compared to 20% for issuers in the rest of the country.

In Panel (B), we zoom in on the difference between issues in Texas that are underwritten by the exiting banks or the remaining banks. The average issue underwritten by the exiting banks has a principal value of $135 million, while issues underwritten by the remaining banks are usually $1/6$ the size with an average value of $21 million. The size difference remains large along the distributions of the two groups—the median issue underwritten by the targeted and the non-targeted banks has principal values of $5 and $37 million, respectively. However, on other margins, the issues underwritten by the two groups of banks are more comparable. For example, bonds issued in Texas have slightly longer maturities in months than in the rest of the US (164 versus 131 months), but within Texas, the exiting banks underwrote issues with maturities averaging 162 months compared to an average of 164 months for other underwriters. Issues underwritten by the exiting banks also had slightly higher interest cost and were slightly more likely to be competitive sales.

Municipal borrowers in Texas range from small special districts to large cities and state agencies. For example, Mesquite Independent School District (ISD) serves over 38,000 students in a suburb east of Dallas, TX. From 2007-2016, Mesquite ISD never worked with any of the exiting

banks and thus has no reliance on the exiting banks according to our measures. On the other side of the spectrum, Pflugerville ISD serves over 25,000 students in a suburb to the north of Austin, TX, and has historically relied on the targeted banks for approximately 70.2% of their bonds issuance volume. We consider Pflugerville to be highly reliant on the exiting banks since they have over 50% of their historical borrowing underwritten by one of them. Similarly, cities and counties range from having no exposure to the targeted banks, such as Lewisville with 107,740 residents, to having high exposure, such as El Poso with 64% reliance and 678,815 residents. Larger cities tend to have higher exposure in general. Historically, the state of Texas itself has also had significant reliance on targeted banks for over 60% of their underwriting volume.

The auction data further highlight the role of the exiting banks for the Texas market and the types of borrowers most likely to be impacted by the exit of these underwriters. These bidding data covering the whole US include 509 bidders that submit at least 5 bids from January 2017 through April 2022. Of these underwriters, 62 submit bids in Texas with five of those bidders leaving the market after Senate Bills 13 and 19. Table 2 shows summary statistics on auctions, based on all competitive bids submitted in the US for each underwriter. The average underwriter targeted by the Texas laws submitted 7,980 competitive bids for underwriting business between 2008 and 2021 with an average principal amount of $113.9 million while non-targeted underwriters submitted 4,145 bids with an average principal value of $54.9 million.

Targeted banks also typically participate in the most competitive auctions with an average of 6.3 additional bidders per issue. We may expect these highly competitive auctions and the associated issuers to be the most resilient to underwriter exit given that the marginal impact of an additional bidder on the issue yield is declining in the number of bids in this market (Garrett, Ordin, Roberts and Suárez Serrato, 2017). Additionally, the exiting banks have significantly more national participation than the remaining banks, bidding, on average, in 47.4 states as compared to 34.7 states.[10] Three of the five targeted banks were actively submitting underwriting bids in all 50 states in recent years. However, some remaining banks also appear to have significant national

[10]The auction data are discussed more in Appendix F with additional summary statistics included in Table F.1.

presence, with over half of the remaining underwriters participating in auctions in at least 41 states.

Targeted banks submit 7.7% of their bids in Texas, while the remaining banks submit 21.1% of their bids in Texas, which suggests that the importance of Texas for the overall underwriting business of a given bank is an important factor behind the exit decision. However, Texas accounts for an insignificant fraction of the underwriting business for several of the remaining underwriters—a quarter of banks submit only 3.3% of their bids in Texas.

The shares of underwriting and of competitive bidding by targeted banks over time are shown in Panels (A) and (B) of Figure 1, respectively. Before 2021, the five targeted banks underwrote about 40% of the municipal debt for Texas entities and made up just over 25% of the bids submitted in competitive sales in the state when weighting by volume. Starting in early 2001, the share of underwriting by the targeted banks starts to falter a bit, then falls to 0% in September 2021 as does the share of bids from targeted banks.[11] However, the shares do not stay at zero as Citigroup has tried to re-enter the Texas market by submitting bids on a small number of issues in November then again in 2022. In Panel A, the increase in underwriting in April 2022 is explained by Citigroup underwriting a $1.2 billion deal for the Dallas/Fort Worth International Airport. Citigroup's attempts to reenter the market suggest the importance of the Texas market to the bank and that such rules may have adverse consequences for banks with ESG policies.

# 4 Empirical Design for Assessing Borrowing Outcomes

In this section, we detail the methodologies that we use to examine how the Texas laws limiting the participation of banks with ESG policies affect municipal bond issuers in the state.

[11] A potential reason for the slightly earlier decline in the share of total underwriting relative to the sharp decline in competitive bidding in September is that negotiated sales typically start several months prior to the issue date. Senate Bill 13 was first introduced on March 11, 2021, so issuers may move away from the targeted underwriters in negotiated deals before bill enactment. By contrast, competitive deals are placed with the underwriter on the issue date, so the targeted banks could underwrite such deals up until the enactment date.

## 4.1 Comparison of Affected Issuers in Texas

We compare issuance outcomes around the implementation of the Texas law for issuers with differential reliance on the targeted underwriters between 2007 and 2016 using a standard difference-in-differences regression:

$$y_{j,i,t} = \lambda Targeted\ Share_i \times Implementation_t + \psi_i + \phi_t + \delta_m + \varepsilon_{j,i,t}, \quad (1)$$

where $t$, $j$, and $i$ denote offering date, distinct municipal bond offerings, and municipal issuers, respectively. $Targeted\ Share_i$ is the share of total dollar volume of municipal securities of each issuer underwritten by the targeted banks between 2007 and 2016, standardized by its standard deviation of 0.22. $Implementation_t$ is an indicator variable that takes the value of one whenever the issue date is in September 2021 or later, and zero otherwise. $\psi_i$, $\phi_t$, and $\delta_m$ are issuer, offering date, and time to maturity (in months) fixed effects.

We examine six major types of issuance outcomes: the likelihood of selecting a negotiated issue, offering yields, and placement characteristics for all issues in the sample and the number of bids, bid variance, and the winning bid for competitive issues. The placement characteristics shed light on how the offering is placed with investors in terms of underpricing, number of trades, trade size, and dealer/retail customer dollar volume as a share of total volume.

The model in Equation 1 estimates continuous treatment effects of the share of previous issues underwritten by the exiting banks on bond issuance outcomes after the implementation of the Texas laws. In alternative specifications, we use discrete versions of the treatment variable denoting whether an issuer's reliance on the targeted underwriters exceeds 10%, 20%, or 50% of the issuer's total issue volume between 2007 and 2016. In robustness specifications, we include calendar time $\times$ time-to-maturity fixed effects in addition to the offering date fixed effects to control for changes in the shape of the yield curve in the municipal bond market over time or other risk time-varying risk factors that are related to bond maturity. Due to the large potential number of fixed effects, we convert the units of the time variable to calendar months and the time-to-maturity variable to years.

Standard errors for all specifications are double clustered at the issuer and offering date level.

## 4.2 Extended Robustness Tests and Heterogeneity

The regression specification in Equation 1 compares Texas issuers that differ in terms of their reliance on the five exiting banks. In this section, we extend the comparison in two dimensions. First, this framework naturally extends to a triple difference specification by expanding the sample to the rest of the municipal bond market in the US. Second, we estimate average treatment effects in the spirit of Hirano, Imbens and Ridder (2003) by using weights calculated from an issuer's likelihood of being most observably similar to the Texas issuers reliant on the exiting banks. Finally, we split the *Targeted Share* variable into the shares of negotiated and the share of competitive bond issues underwritten by the exiting banks to examine whether there is important heterogeneity in the nature of the relationship with targeted banks.

The triple difference specification allows us to difference out any impact that unobservable borrower type has on borrowing costs around the implementation of the Texas laws. The underlying assumption of this model is that municipal issuers in Texas and other states select underwriters with ESG policies for similar unobservable reasons. For example, Texas and non-Texas issuers are likely to have significant reliance on JP Morgan Chase because the bank specializes in large, competitive issues that tend to be placed nationally. This analysis allows us to examine whether issuers reliant on the targeted banks in other states that do not bar intermediaries with ESG policies, have different outcomes than the issuers reliant on the targeted banks in Texas. We add a new subscript, $s$, to the triple difference specification to describe the state in which each bond issue takes place:

$$\begin{aligned} y_{j,i,s,t} =& \lambda \mathit{Targeted\ Share}_i \times \mathit{Texas} \times \mathit{Implementation}_t \\ &+ \gamma \mathit{Targeted\ Share}_i \times \mathit{Implementation}_t + \xi \mathit{Texas} \times \mathit{Implementation}_t \\ &+ \psi_i + \phi_{s,t} + \delta_m + \varepsilon_{j,i,s,t} \end{aligned} \tag{2}$$

In Equation 2, the coefficient of interest is $\lambda$, which is the differential impact of being exposed

to the targeted banks in Texas relative to being exposed to the targeted banks in other states. The specification also includes calendar time $\times$ state fixed effects to allow state-specific time variation in issuance outcomes. To illustrate the benefits of the triple difference specification, assume that mutual funds working exclusively with the targeted banks specialize in the municipal bonds of a certain type of issuers. Changes in fund flows to and from these mutual funds is then likely to represent a common shock to all issuers reliant on the targeted banks. In this setting, $\gamma$ will capture such concurrent effects on these types of issuers, while $\lambda$ will only capture the the incremental impact of reliance on the targeted banks by Texas issuers after the implementation of the anti-ESG laws.

The triple difference approach has the added benefit of shedding light on potential spillover effects in Texas from the exit of the targeted banks. The exit of the targeted banks may also adversely affect financing outcomes for issuers with low/no reliance on these banks, or those we use as a control group in Equation 1. This could happen if the targeted banks represented a viable outside option for the less reliant issuers. We can test this hypothesis by removing the time $\times$ state fixed effects and adding an interaction term of $Implementation_t$ with an indicator variable for the state of Texas, $\xi$ from Equation 2. This coefficient tells us whether financing outcomes change for Texas issuers that are potentially indirectly affected by the anti-ESG laws.

Another way of alleviating concerns that the issuers reliant on the targeted banks may be different from non-reliant issuers is to directly re-weight the two issuer groups to focus on issuers that are observably very similar. We follow the method of Hirano, Imbens and Ridder (2003) to first estimate a model of the likelihood of reliance on the exiting banks. We discretize the reliance variable similar to the previous difference-in-differences models and define municipalities with over 50% of their previous issues underwritten by the exiting banks as "treated" and those issuers that have no reliance on the exiting banks between 2007 and 2016 as "control" issuers.

We estimate a logistic model using issue data from January 2017 through August 2021, or the pre-period in our difference-in-differences specifications, as a first stage equation determining the likelihood of each issuer falling in the treatment or control groups. The regression includes controls

for average issue size, the number of bond issues, the average maturity of the issues, the share of issues that are taxable, the share of issues that are refunding outstanding bonds, and the share of issues that are placed via negotiation.[12] We then create inverse probability weights of treatment using the estimates of the likelihood of targeted bank reliance according to:

$$weight_i = \frac{treat_i}{P(treat_i = 1)} + \frac{1 - treat_i}{P(treat_i = 0)},$$

where $P(treat_i = 1)$ is the estimate of the treatment likelihood from the first stage regression. We then use these weights in a weighted least squares regression according to Equation 1.[13]

One potential disadvantage of the targeted share variable as measured so far is that it masks variation in the type of transactions that underlie the issuer-underwriter relationship. For example, relationships based on negotiated issues may be different from relationships based on auctions. To address this potential heterogeneity, we also re-estimate 1 while splitting the targeted share into the share of previous negotiations and the share of previous competitive sales.

# 5 The Texas Laws and Borrowing Outcomes

## 5.1 Baseline Difference-in-Differences Results

We first explore how the propensity of issuers to negotiate bond issue pricing has changed around the implementation of the Texas laws for issuers affected by these laws. We expect affected issuers to increase the use of negotiations following the implementation of the laws as issue uncertainty is likely to be substantially higher with the exit of five of the largest underwriters in the market. Negotiated sales allow underwriters to obtain a more complete picture of the potential market for the municipal bond issue and better place the issue with investors when uncertainty is high (Sorensen, 1979*b*; Smith, 1987). Table 3 presents the estimates of our baseline difference-in-

[12] The estimates of this first stage regression are shown and discussed in Appendix C.

[13] The weights can get very large if issuers strongly predicted to receive one type of treatment receive the other type of treatment. In this application, predicted probabilities of receiving the opposite treatment do not exceed 99.9% or fall lower than 0.1%, so we do not put undue weight on individual observations.

differences specification described in Equation 1.

Panel (A) presents the coefficients from this estimation, where the outcome of interest, $y_{i,j,t}$, is an indicator variable equal to one whenever the issue is placed via negotiation, and zero otherwise. The first column shows a difference-in-differences estimate of 0.08, which is significant at the 1% level. This means that a one standard deviation increase in issuer reliance on the targeted banks in Texas (0.24) is associated with 8 percentage point (pp.) higher probability of issuing bonds through negotiation after September 2021. Negotiations make up just over 50% of issues in Texas since September 2021, so an increase of 8pp. is indicative of a substantial change in issuer behavior away from public auctions toward negotiations. Columns 2 through 4 of Panel (A) explore the scale of the impact by discretizing the extent of reliance on the targeted banks to show that the impact on negotiations is increasingly economically significant with greater reliance. Issuers with a targeted share of at least 10% of their historical underwriting with the exiting banks are 18pp. more likely to negotiate, while issuers with over 50% of previous reliance on the exiting banks increase their likelihood of negotiation by 25.2pp (all statistically significant at the 1% level). Our results show that affected issuers attempt to mitigate the increased volatility associated with the exit of the targeted banks by retaining underwriters earlier in the issuance process.

The main assumption behind this analysis is that issuers with no reliance and issuers with high reliance on the exiting banks would have chosen the same method of issue sale absent the Texas laws barring the five banks from the Texas market. While this assumption is not directly testable, we provide evidence that this assumption has historically held in the Texas market. Specifically, we test whether choices of reliant and non-relient issuers were trending differently in the 19 quarters leading up to the enactment of the Texas laws. We show estimates of Equation 1 where we replace the implementation indicator with an indicator variable for each quarter (three-month period) since the implantation of the laws.[14] We define reliant issuers as those with more than 50% historical reliance on the exiting banks. Panel (A) of Figure 2 shows that from the first quarter of 2017 through the second quarter of 2021, the difference in negotiation propensity between the two

[14]For the sake of presentation, 2021Q4 is defined as September through November, 2022Q1 as December-February, and 2022Q2 as March and April. This ensures the SB 13/19 implementation happens between quarters.

groups is very close to zero. By contrast, negotiation propensity starts increasing in the last quarter of 2021 and jumps significantly in the first two quarters of 2022 well above all historical estimates. The long pre-period shows no other change of this magnitude and no other statistically significant change, which is evidence in favor of the parallel trends assumption. This result shows a sudden and large increase in the likelihood of negotiating or retaining an underwriter significantly earlier in the issuance process.

Even though issuers adjust the issue sale method as they lose access to five major underwriters, borrowing costs could still be impacted. To the extent that the exit of five of the largest underwriters reduces underwriter competition in the Texas market, issuers may face higher offering yields. However, affected issuers are also forced to choose new underwriters, which may lead to lower borrowing costs if sticky relationships allowed the exiting banks to extract local monopoly rents prior to the enactment of the Texas laws.

Panel (B) of Table 3 presents the regression estimates in offering yield specification (in percentage points). Column 1 shows an estimate of 0.097, which indicates that a one standard deviation increase in issuers' reliance on the targeted banks is associated with 10 basis points (bps) higher offering yields after the implementation of the Texas laws. Columns 2-4 highlight that this effect is driven by issuers that are most reliant on the targeted banks. For example, offering yields increase by 19.3bps for issuers that have at least 10% of their previous underwriting business with the targeted banks. Offering yields increase by roughly 23bps and 39bps for issuers with reliance on the targeted banks of over 20% and 50%, respectively. The baseline difference-in-differences estimates suggest that issuers that were previously most reliant on exiting banks for underwriting services face a reduced ability to use competitive sales and, consequently, higher interest costs. The average offering yield from September 2021 through April 2022 was 1.83pp., which means that the issuers with over 50% previous reliance on the targeted banks had a roughly 20% (0.39/1.83) increase in borrowing costs due to SB 13 and 19.

Another way of putting these estimates into context is to calculate the additional expenditure needed to raise the same amount of debt at the new borrowing costs. Municipalities in Texas

in our estimation sample issued $31.7 billion in municipal bonds from September 2021 through April 2022, or about $4 billion per month, and have an average 1.59 standard deviations reliance on the targeted banks accounting for bond size. Assuming there are no spillover effects to control borrowers in Texas, our estimates imply that barring banks with ESG policies led to 15.4bps ($\approx 1.59 * 0.097$) higher yields on the average dollar of borrowing. Assuming municipal bonds will be outstanding until maturity, the higher yields on the $31.7 billion issued since Senate Bills 13 and 19 with an average duration of 10.9 years leads to an additional cost to taxpayers of $532 million ($\approx 31.7 * 0.00154 * 10.9$).[15] If we instead assume all bonds will be called on the first call date, the average duration is 6.2 years with a total cost to taxpayers of $303 million. Yet another way of contextualizing these estimates is to focus on aggregate debt in equilibrium. Texas and its contained municipalities had $289 billion in outstanding public bonds according to the 2017 Census of Governments. If this policy were to remain in place long enough that the interest rate on that debt went up by 15.4bps, this would cost taxpayers in the state of Texas an additional $445 million per year in interest payments ($\approx 289 * 0.00154$). In 2017, Texas and contained municipalities paid $10.8 billion in interest, suggesting the response to these laws would increase interest expenditure outlays in the state by over 4%. Total state and local expenditures in Texas were $263 billion in 2017, suggesting this additional spending could be about 0.18% of the total public budget.

We also show the impact on offering yields over time in Panel (B) of Figure 2. The estimates in this figure show a very similar pattern to the impact on the propensity of negotiated sales. First, from the first quarter of 2017 to the third quarter of 2021, the yields for reliant and non-reliant issuers track each other closely despite the large amount of volatility in the market during this period. Then, in the the fourth quarter of 2021 and the first quarter of 2022, yields for the most reliant issuers increase substantially and remain elevated through April. The quarterly point estimates are not statistically significant due to a lack of power, but the pooled estimate of these three point estimates is the estimate displayed in Column 4 of Panel (B) of Table 3, which shows an increase in yields of 39bps (significant at the 1% level).

[15] This calculation uses the intuition that duration is the scalar characterizing of price changes corresponding to change in yield, and follows the discussion in Gao, Lee and Murphy (2021).

## 5.2 Design Robustness and Heterogeneity

Table 4 presents results from the triple difference specification described in Equation 2, corroborating the robustness of our results to state-specific as well as national trends in bonds issuance outcomes over time. For the sake of comparability, we present two sets of specification for each measure of issuer reliance on the targeted banks—one with the set of controls and fixed effects from Table 3 and with state $\times$ month of sale fixed effects in addition to the controls and fixed effects from Table E.1. The estimates shown in Panel A show the impact on the likelihood of negotiation, while those in Panel B present the effect on offering yields. In line with the Texas difference-in-differences results, issuers most reliant on the targeted banks ($> 20\%$ and $> 50\%$) in Texas are 14-17pp more likely to issue bonds through negotiation relative to similarly reliant issuers in other states after the implementation of the anti-ESG laws. Panel B shows an increase in offering yield for issuers reliant on the targeted banks in Texas relative to similarly reliant issuers in other states. For example, columns 5 and 6 show triple difference estimates of 32-45bps, which is very close to the baseline estimate of 39bps for the increase in yield faced by Texas issuers that were over 50% reliant on the exiting banks.

The triple difference approach is also useful in showing potential spillover effects in Texas from the exit of the targeted banks to issuers with low/no exposure to the targeted banks. The specifications in columns 1, 3, and 5 examine this possibility by showing the estimate on the Texas $\times$ Post term and excluding the time $\times$ state fixed effects. The estimates in Panel A show the propensity to negotiate pricing remains similar for issuers with low/no reliance after the implementation of the Texas law. Column 1 of Panel B indicates a 5.8bps increase in yields for these issuers but focusing on the most reliant issuers shows a smaller and statistically insignificant change in offering yields in columns 3 and 5. These results suggest that the spillover effects to less reliant issuers are likely to be limited.

As a complement to the triple difference analysis, we also present inverse probability weighted regression estimates in Table 5, re-weighting the treatment and control groups to be more observably similar. The first column shows that the likelihood of choosing a negotiation for issuers that

are at least 50% reliant relative to the control group of issuers with no reliance increases by 30bps. This estimate is similar to that in our baseline and triple difference specifications. The point estimate in column 2 indicates that issuers reliant on the exiting banks face an increase in offering yields by roughly 26bps, also closely comparable, albeit slightly smaller, to the 39bps point estimate shown in Panel B of Table 3. The combination of the triple difference analysis and the inverse probability treatment weights analysis provides evidence that the observed increase in negotiated sales and the increase in borrowing costs are unlikely to be driven by issuer selection based on unobservable or observable issuer and issue characteristics.

Finally, Table 6 explores the heterogeneity by treatment source. Issuer-underwriter relationships can be formed through repeated negotiated sales with the same underwriter or through underwriters consistently winning the issuer's auctions. These different types of relationships may have different implications for how the capital acquisition outcomes for an affected municipality may change after the implementation of the Texas laws. We test this hypothesis by constructing the targeted share variable based separately on either negotiated or auction offerings, but not both.

The estimates in the first two columns replicate Table 3. In columns 3 and 4 we construct the targeted share variable only based on previous negotiations, while in columns 5 and 6 the targeted share variable is based only on previous competitive sales.[16] These estimates point to an increase in the share of negotiations across both measures, but show a markedly different pattern for previous competitive interactions of issuers with the targeted banks. Issuers reliant on the targeted banks in previous auctions are much more likely to switch away from competitive to negotiated sales. Finally, the effect of targeted reliance on offering yields is similar across specifications.

Our estimates show the borrowing costs of Texas issuers rising substantially, despite the attempts of issuers to mitigate such adverse effects. However, these estimates rely on parametric forms of the controls. In additional analysis in Appendix E, we show robustness to several modeling decisions. First, Table E.1 presents a version of the baseline difference-in-differences specifications that allows for the yield curve and issuance size to have a differential effect on issuance

[16]Issuers that have no negotiated or competitive deals between 2007 and 2016 have a missing targeted share in columns 3 and 4 or 5 and 6, respectively.

outcomes over time, and issuer fixed effects to vary with issue type (general obligation or revenue). This specification adds maturity (in years) $\times$ month of sale fixed effects, the natural logarithm of the issuance amount interacted with month of sale fixed effects, and fixed effects for issuer $\times$ an indicator for general obligation bonds to our main specification. The idea behind these heavily saturated regressions is to allow differential time trends for different types of debt to be removed from the variation in outcomes. The past issuer reliance on the targeted banks loses both statistical and economic significance in explaining the choice of negotiated offerings after the inclusion of the additional fixed effects.Including the fixed effects in a sequential manner (in unreported tests) shows that adding issuance amount interacted with month of sale fixed effects reduces the size of the difference-in-differences estimate. Panel A of Appendix Table D.1 sheds light on this seemingly puzzling result in that issuers previously most reliant on the targeted underwriters who issue the largest bonds raise lower offering amounts after the implementation of the Texas laws, although the estimates are statistically imprecise. This means that the higher propensity of affected issuers to choose negotiations is correlated with these same issuers raising less financing after the implementation of the Texas laws. The inclusion of issuance amount $\times$ time fixed effects is likely a bad control in that it controls for a portion of the effect of interest as we discuss further in Appendix D. The average effect of issuer targeted bank reliance on offering yields with this more saturated specification is very similar to results reported in Table 3 with an increase of 11.4ps instead of 9.7bps in the baseline specification. For the specification focusing on issuers with over 50% reliance on the targeted banks, the estimate is 36.3bps and still statistically significant at the 5% level despite the highly granular controls. We also use the triple difference specifications to show robustness to the use of different issue-level controls added sequentially, to the definition of an issuer, and to the construction of the sample and set of control issuers and control states in Appendix E. All of these results show that our findings of higher borrowing costs in Texas for affected issuers after SB 13/19 are not sensitive to parametric modeling decisions in the regressions specifications.

## 5.3 The Texas Laws and Direct Underwriter Competition

Conditional on still holding a competitive sale after the Texas laws, auction outcomes shed light on how the municipal bond market responds to the decrease in potential competition from the five large, exiting underwriters. Such evidence is useful for understanding the potential for competition to contribute to the results in Section 5.1. We therefore estimate Equation 1 only for the subset of competitive sales for three different auction outcomes: the winning bid (yield to maturity), the number of participating bidders, and the variance of the submitted bids.

Panel A of Table 7 shows the difference-in-difference estimates for the specifications matching Table 3. Column 1 shows that issuers most reliant on the exiting banks face significant increases in the winning bid, with a point estimate of 3.6bps.[17] The number of bidders, a measure positively correlated with underwriter competition, decreases by 0.8 bidders for an additional standard deviation in reliance on targeted banks (in column 2). Similarly, we find that an additional standard deviation of reliance on targeted banks increases the bid variance by 12.2bps, which is a factor decreasing with competition in first price auctions (Garrett, Ordin, Roberts and Suárez Serrato, 2017). In other words, fewer institutions participate in auctions, leading to less aggressive bidding by the remaining potential underwriters conditional on entry.

In Panel B of 7, we show these results are robust to the substantial primary market volatility in the early months of the COVID-19 pandemic by dropping all issues from March 2020 through August 2021. The results in all panels are qualitatively similar albeit slightly larger in economic magnitude for the number of bidders and the winning bid, while the bid variance point estimate is similar but loses some statistical significance. Panel C presents a placebo test such that treatment begins on September 1, 2019 instead of in 2021. We fail to find any evidence that reliance on the targeted banks affects the competitive landscape, suggesting that general seasonality in auction participation around the implementation of the Texas laws does not explain our difference-in-differences estimates.

[17] Targeted share here is similarly normalized to standard deviations, but is calculated from historical bids and has a smaller standard deviation than the reliance measures from the Mergent data.

## 5.4 Placement of Offerings with Investors

The increase in negotiation propensity and offering yield presented so far is consistent with a decrease in underwriter competition. It is important to understand whether these results are also driven by changes in the quality of underwriting services in the Texas market.

As issuers face lower access to the distribution networks of the targeted banks, underpiricing of the municipal bonds of affected issuers may also increase. The large underwriters targeted by the new Texas laws are much more likely to have national distribution networks and may be better at placing municipal bonds with a wider array of investors than the non-targeted regional underwriters. We compute underpricing at the bond issue level as we are interested in studying the effect of the Texas laws on issue placement. Similar to Bergstresser and Luby (2018) and Bergstresser and Herb (2021), we define underpricing as the log-difference of the volume-weighted average customer purchase prices within thirty days of the offering and the offering price of a given maturity, averaged across different maturities in an issue proportional to a maturity's outstanding dollar volume.

Table 8 shows that although on average underpricing of the municipal bonds of affected issuers remains similar after the implementation of the laws, issuers previously reliant on the targeted banks for the majority of their underwriting face underpricing increases of about 14 basis points in our preferred specification (Column (4)). Overall, the Texas laws appear to have additional pricing impact beyond a simple impact on bank competition in terms of underpricing that may have accrued to issuers had they been able to continue working with the targeted underwriters. These estimates explaining the change in underpricing are not directly comparable to the yield increases explained in our main analysis. Instead, we numerically calculate the decrease in yields that would explain this 14bp increase in underpricing for affected issuers and find that the lower average offering price is equivalent to a 1.3bps increase in offering yields, or 3% of the estimated impact on yields from Panel B of Table 3.[18] This suggests a portion of the change in borrowing costs is

[18]The average bond with over 50% previous reliance on targeted banks has a maturity of 13.67 years, coupon rate of 3.65%, and offering yield of 1.79%.

more than just a decrease in underwriter competition, although it is small. Further, underpricing may not be a comprehensive measure of underwriter productivity or quality. If new underwriters are not able to place bonds with the investors who value them most in 30 days, underpricing will understate any adverse secondary market consequences of barring certain underwriters.

Table 9 also shows that the number of customer purchases increases by approximately 8% in response to a one standard deviation increase in reliance on the targeted banks. While the average size of customer trades declines since the implementation of the Texas laws, the total dollar volume of customer purchases as a fraction of outstanding issue amount increases by between 2.8-4.6%. Concurrently, average dealer trade size increases but dealer volume remaining unchanged. These results imply a significant shift towards retail investor trades. This evidence is consistent with issuers substituting the national intermediation of municipal bonds issues provided by the exiting banks with a more local placement at higher average costs.

## 5.5 Decomposition of Yield Increases for Certain Factors

So far, we have shown that municipalities most affected by SB 13/19 in Texas (1) increase their use of negotiations and (2) face a large increase in borrowing costs. These patterns are consistent across a large set of robustness checks. Additionally, there is a material decline in auction participation and a slight increase in underpricing accompanied by placing issues through a larger number of smaller, retail trades. In this section we quantify the importance of the time-invariant impacts of choices such as offering type and underwriter identity in explaining the observed increase in borrowing costs. While our results and robustness tests show that it is the anti-ESG laws that drive the increases in borrowing costs, it is plausible that merely switching the offering and underwriter type mechanically accounts for the bulk of our estimates. We rely on an effect decomposition in the spirit of Kitagawa-Oaxaca-Blinder (Kitagawa, 1955; Oaxaca, 1973; Blinder, 1973), in which the predicted change in outcomes can be decomposed into the change in characteristics multiplied by original coefficients and the change in coefficients multiplied by the original controls. We focus here on the endogenous change in discrete choices and its impact on borrowing costs since we

already control for the underlying characteristics of the bonds.

We show that in response to the anti-ESG laws, issuers are more likely to negotiate pricing. Prior literature has shown mixed results on whether negotiated sales are more expensive (higher yields) than competitive offerings (for example, see Sorensen, 1979*a*; Smith, 1987; Kriz, 2003; Liu, 2017; Cestau, Green, Hollifield and Schürhoff, 2019). To assess the importance the importance of this adjustment for interpreting our results, we combine some estimates of the cost differential for negotiations with our result that a 1 s.d. increase in targeted share translates to 7.9 percentage points increase in negotiation propensity (Table 4, Panel A, column (2)). To the extent that negotiating pricing allows issuers to obtain lower yields in some scenarios, then our estimates are likely to understate the true impact on borrowing costs as yields would be higher in the absence of the ability to switch to negotiations. Using a selection model, Kriz (2003) estimates that negotiations have yields that are 24bps lower than counterfactual competitive sales, which combines with our estimates to suggest that the cost impact would have been 1.9bps ($\approx 24bps \times 7.9\%$) larger per standard deviation of reliance on targeted banks without this adjustment margin. In the other direction, the two most recent studies of Cestau, Green, Hollifield and Schürhoff (2019) and Liu (2017) show an average increase in yields of 17bps and 22bps, respectively, when choosing negotiations. The average of these estimates suggests that a 1 s.d. increase in targeted share leads to 1.5bps higher issue yields ($\approx 7.9\% \times 19.5bps$), or 12% of our yield estimate of 12.4bps in column (2) of Table 4. This calculation suggest that the higher negotiation propensity, at most, accounts for a small portion of the higher offering yields we document following Texas SB 13/19.

Next, we quantify the impact of time-invariant underwriter characteristics. One of the mechanical effects of removing the five underwriters from the market is that issuer match with different underwriters after SB 13/19. To the extent that the newly-selected underwriters of affected issuers always place bonds through a different, higher-cost, distribution network, we may expect average yields to go up. Using the same intuition as above, we assess the importance of this mechanical change in underwriters by first estimating average yields for each underwriter in the pre-SB 13/19 period and then multiplying the targeted share in the post-period by this average yield estimate. We

estimate underwriter fixed effects in the issue yield specification using equation 2 on the pre-period data (same as in column (2) of Table 4). The average underwriter fixed effects for issuers with 24% reliance on the targeted banks (a 1 s.d.) in the pre-period in Texas is -3.5bps—such issuers enjoyed roughly a 3.5 basis point lower issue yield on average. Following SB 13/19 in Texas, this changes to -1.3bps, an increase of 2.1bps. Relative to column (2) of Table 4, time-invariant underwriter identity mechanically explains 17% of the yield increase.

Overall, based on the Kitagawa-Oaxaca-Blinder decomposition, time-invariant impacts of choices including offering type and underwriter identity explain up to 29% of our yield estimate. Given such limited explanatory power of time-invariant factors and the decline in underwriter competition (see Section 5.3), it is plausible that higher mark-ups associated with reduced competition account for the bulk of the effect of SB13/19 on offering yields. However, there are other explanations that could potentially be relevant for the increase in offering yields such as underwriter capacity constraints (Boeh and Dunbar, 2016) or losing underwriter relationships (Dick-Nielsen, Nielsen and von Rüden, 2021).

# 6 Conclusion

ESG investing has become one of the top priorities for the banking sector. Such policies, however, may pose significant challenges for jurisdictions that have historical reliance on less sustainable industries. The recent laws in Texas highlight how governments can respond to ESG policies to the detriment of local borrowers.

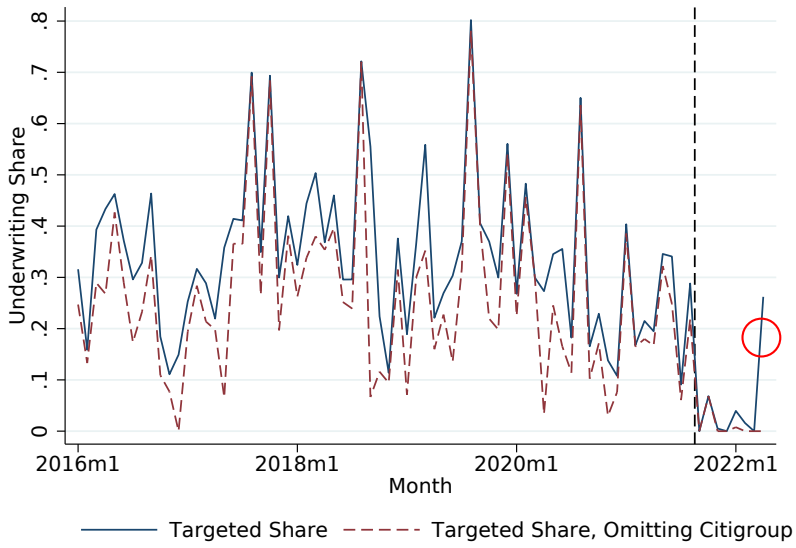
This paper explores how the policy changes in Texas in 2021 through Senate Bills 13 and 19 affect municipal bond market outcomes. These laws stipulate that banks with ESG policies restricting credit to oil & gas companies or to firearms firms can no longer contract with local governments, causing five of the largest underwriters to exit municipal underwriting in the state. We exploit the stickiness of underwriter relationships in the municipal market to examine the impact of the anti-ESG laws on municipal financing.

We show that affected issuers are more likely to issue through a negotiation than an auction, receive fewer and less competitive bids from underwriters, raise less financing, and incur higher borrowing costs after the state prohibits banks with ESG policies from operating in the market. Assuming no other banks leave the state, Texas taxpayers can expect these bills to cost them about $445 million a year in additional borrowing costs. If more banks leave, these costs will go up. Ultimately, borrowing costs increase because there are fewer municipal underwriters competing for the state's municipal bonds, and because issuers no longer have access to the national bond placement networks of the major banks. Overall, the Texas laws have a large negative impact on the ability for local governments to access external finance. Our results suggest that if economies around the world that are heavily reliant on fossil fuels attempt to undo ESG policies by imposing restrictions on the financial sector, local borrowers are likely to face significant adverse consequences such as decreased credit access and poor financial markets outcomes.

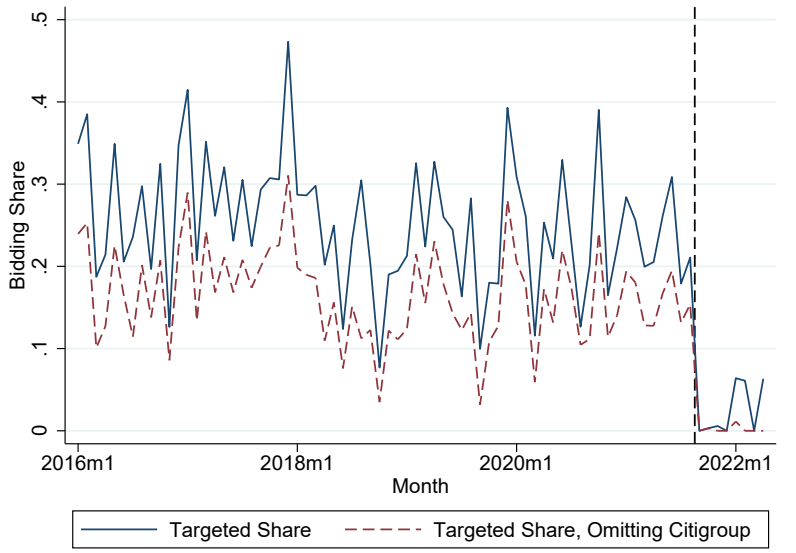
# Figures

Figure 1: Texas Market Share of Targeted Banks

**A. Share of Underwriting by Targeted Banks, Weighted by Offering Amt**

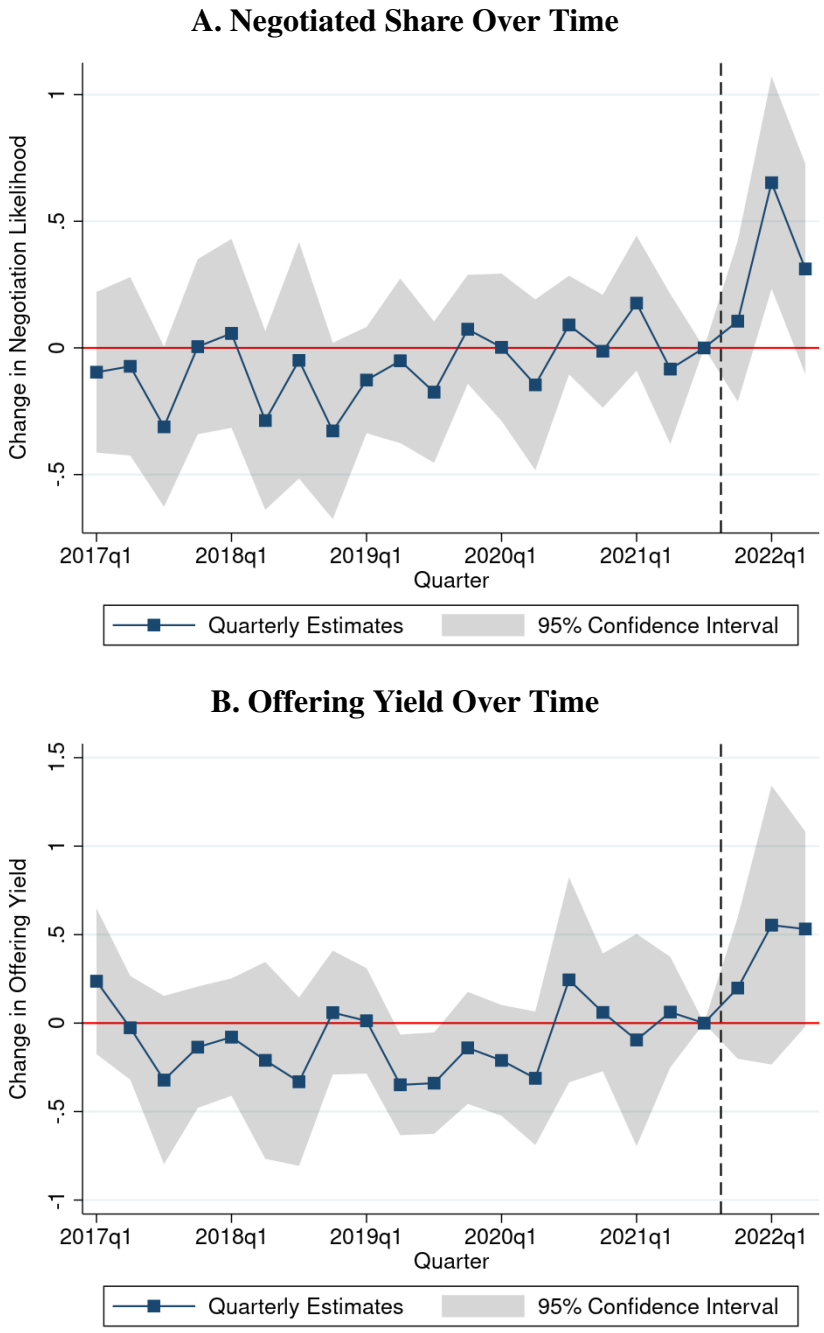



**B. Share of Bids from Targeted Banks, Weighted by Principal**




*Note:* Figure 1 shows the share of total underwriting activity (Panel A) and competitive bidding (Panel B) in Texas by banks targeted by Texas SB 13/19. Both panels are weighted according to par value of the issues. Before 2011, targeted banks underwrote around 40% of municipal bonds in Texas and submitted around 25% of competitive bids. These shares both drop to 0% in September 2021. The vertical dashed line represents the break before September 2021 when Senate Bills 13 and 19 were implemented. In following months, Citigroup attempts to resume submitting a small number of bids and underwriting in a limited capacity. In Panel A, the increase in underwriting in April 2022, circled in red, is due to Citigroup underwriting a $1.2 billion deal for the Dallas/Fort Worth International Airport.

Figure 2: Long Term Trends in Negotiated Share and Offering Yields by Targeted History




*Note:* Figure 2 shows the quarterly distribution of the estimated effect of issuer targeted bank reliance on negotiated share (Panel A) and offering yield (Panel B) over time. We estimate these effects using specifications with issuer, offering date, maturity (in months), and issue type (in the yield specification) fixed effects. Issuer reliance on the targeted banks takes the value of one if these banks underwrite at least 50% of the issuer's municipal bond volume between 2007 and 2016. The quarterly effects are defined relative to the implementation of the Texas law of September 1, 2021. In other words 2021q4 corresponds to September, October, and November of 2021, while 2022q1 corresponds to December, January, and February of 2022.

# Tables

Table 1: Municipal Bonds Issuance Characteristics

**A. Differences Between Texas and non-Texas offerings**

| | Mean | SD | Obs | $25^{th}$ | $50^{th}$ | $75^{th}$ |
|---|---|---|---|---|---|---|
| Average Offering Amount (Mil), 2017-22 | 32 | 120 | 76866 | 2 | 7 | 22 |
| Non-Texas | 33 | 113 | 67360 | 2 | 7 | 23 |
| Texas | 30 | 165 | 9506 | 2 | 6 | 18 |
| Average Maturity (Months) | 131 | 97 | 69230 | 55 | 118 | 186 |
| Non-Texas | 127 | 99 | 61457 | 46 | 109 | 179 |
| Texas | 164 | 73 | 7773 | 115 | 158 | 204 |
| Average Yield (Percent) | 1.96 | 1.24 | 74241 | 1.17 | 1.79 | 2.51 |
| Non-Texas | 1.97 | 1.26 | 64871 | 1.17 | 1.79 | 2.51 |
| Texas | 1.88 | 1.06 | 9370 | 1.21 | 1.77 | 2.49 |
| Targeted Share | 0.16 | 0.26 | 64371 | 0.00 | 0.00 | 0.25 |
| Non-Texas | 0.16 | 0.26 | 56767 | 0.00 | 0.00 | 0.27 |
| Texas, Texas | 0.13 | 0.23 | 7604 | 0.00 | 0.00 | 0.16 |
| Negotiated Share | 0.50 | 0.50 | 76866 | 0.00 | 1.00 | 1.00 |
| Non-Texas | 0.50 | 0.50 | 67360 | 0.00 | 1.00 | 1.00 |
| Texas | 0.51 | 0.50 | 9506 | 0.00 | 1.00 | 1.00 |
| Fraction Taxable | 0.14 | 0.34 | 69230 | 0.00 | 0.00 | 0.00 |
| Non-Texas | 0.14 | 0.35 | 61457 | 0.00 | 0.00 | 0.00 |
| Texas | 0.09 | 0.29 | 7773 | 0.00 | 0.00 | 0.00 |

**B. Within Texas Statistics: Targeted Bank Reliance**

| | Mean | SD | Obs | $25^{th}$ | $50^{th}$ | $75^{th}$ |
|---|---|---|---|---|---|---|
| Average Offering Amount (Mil), 2017-22 | 32 | 120 | 76866 | 2 | 7 | 22 |
| Texas, Non-targeted | 21 | 65 | 8769 | 2 | 5 | 14 |
| Texas, Targeted | 135 | 537 | 737 | 15 | 37 | 112 |
| Average Maturity (Months) | 131 | 97 | 69230 | 55 | 118 | 186 |
| Texas, Non-targeted | 164 | 72 | 7041 | 116 | 160 | 203 |
| Texas, Targeted | 162 | 83 | 732 | 106 | 150 | 210 |
| Average Yield (Percent) | 1.96 | 1.24 | 74241 | 1.17 | 1.79 | 2.51 |
| Texas, Non-targeted | 1.87 | 1.07 | 8649 | 1.19 | 1.75 | 2.47 |
| Texas, Targeted | 2.04 | 0.84 | 721 | 1.43 | 2.04 | 2.60 |
| Negotiated Share | 0.50 | 0.50 | 76866 | 0.00 | 1.00 | 1.00 |
| Texas, Non-targeted | 0.51 | 0.50 | 8769 | 0.00 | 1.00 | 1.00 |
| Texas, Targeted | 0.44 | 0.50 | 737 | 0.00 | 0.00 | 1.00 |
| Fraction Taxable | 0.14 | 0.34 | 69230 | 0.00 | 0.00 | 0.00 |
| Texas, Non-targeted | 0.09 | 0.28 | 7041 | 0.00 | 0.00 | 0.00 |
| Texas, Targeted | 0.12 | 0.32 | 732 | 0.00 | 0.00 | 0.00 |

*Note:* Table 1 presents summary statistics of municipal offerings comparing Texas offerings based on issuers have previously worked with banks targeted by Texas SB 13/19 (Panel A) and Texas and non-Texas offerings (Panel B). The data come from Mergent and focus on the sample from 2017 through April 2022.

Table 2: Characteristics of Underwriter Auction Participation by Targeted Status

| | Mean | SD | Obs | $25^{th}$ | $50^{th}$ | $75^{th}$ |
|---|---|---|---|---|---|---|
| Total Number of Bids, 2008-21 | 771.3 | 2649.6 | 509 | 10.0 | 33.0 | 233.0 |
| Texas Presence, Non-targeted | 4145.2 | 5624.2 | 57 | 634.0 | 2479.0 | 5718.0 |
| Texas Presence, Targeted | 7980.0 | 4954.5 | 5 | 3655.0 | 10217.0 | 10521.0 |
| Average Size of Issue (Millions) | 14.1 | 60.7 | 509 | 1.5 | 3.0 | 8.6 |
| Texas Presence, Non-targeted | 54.9 | 162.0 | 57 | 6.9 | 14.7 | 29.6 |
| Texas Presence, Targeted | 113.9 | 98.3 | 5 | 83.8 | 88.0 | 104.0 |
| Average Maturity of Issue with Bid | 6.7 | 5.9 | 509 | 1.1 | 4.2 | 11.5 |
| Texas Presence, Non-targeted | 13.7 | 4.9 | 57 | 11.4 | 14.4 | 16.4 |
| Texas Presence, Targeted | 14.6 | 1.5 | 5 | 13.4 | 15.4 | 15.6 |
| Average Number of Other Bidders | 4.0 | 1.8 | 509 | 3.1 | 3.8 | 4.8 |
| Texas Presence, Non-targeted | 6.1 | 1.9 | 57 | 4.9 | 5.9 | 6.7 |
| Texas Presence, Targeted | 7.3 | 1.1 | 5 | 7.1 | 7.1 | 7.4 |
| Texas Bids as a Share of all bids | 4.1 | 14.1 | 509 | 0.0 | 0.0 | 0.0 |
| Texas Presence, Non-targeted | 21.1 | 29.0 | 57 | 3.3 | 10.0 | 26.2 |
| Texas Presence, Targeted | 7.7 | 3.0 | 5 | 4.7 | 8.6 | 9.6 |
| Number of States with Bids | 8.9 | 14.2 | 509 | 1.0 | 2.0 | 8.0 |
| Texas Presence, Non-targeted | 34.7 | 15.8 | 57 | 24.0 | 41.0 | 47.0 |
| Texas Presence, Targeted | 47.4 | 4.3 | 5 | 47.0 | 50.0 | 50.0 |

*Note:* Table 2 presents summary statistics of the Bond Buyer data aggregated to the bidder level. 509 banks submit at least 5 bids from 2008 to April 2022, of which 62 participate in the Texas Market. This figure shows the average characteristics separately for all 509 underwriters, the 57 underwriters who underwrite in Texas and don't appear to leave in September 2021, and the 5 targeted banks who do leave the Texas municipal underwriting market in September 2021.

Table 3: **Within Texas Impact on Borrowing Outcomes**

**A. Effects on Negotiated Share**

| | Negotiated | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Targeted Share × Post | 0.080*** | | | |
| | (0.022) | | | |
| Targeted Share 10% × Post | | 0.180*** | | |
| | | (0.057) | | |
| Targeted Share 20% × Post | | | 0.159** | |
| | | | (0.065) | |
| Targeted Share 50% × Post | | | | 0.252*** |
| | | | | (0.091) |
| Observations | 6,789 | 6,789 | 6,789 | 6,789 |
| Issuer FE | Yes | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes | Yes |
| Maturity-Month FE | Yes | Yes | Yes | Yes |
| Offering Type FE | No | No | No | No |

**B. Effects on Offering Yields**

| | Offering Yield | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Targeted Share × Post | 0.097*** | | | |
| | (0.034) | | | |
| Targeted Share 10% × Post | | 0.193*** | | |
| | | (0.057) | | |
| Targeted Share 20% × Post | | | 0.227*** | |
| | | | (0.071) | |
| Targeted Share 50% × Post | | | | 0.390*** |
| | | | | (0.139) |
| Observations | 6,727 | 6,727 | 6,727 | 6,727 |
| Issuer FE | Yes | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes | Yes |
| Maturity-Month FE | Yes | Yes | Yes | Yes |
| Offering Type FE | Yes | Yes | Yes | Yes |

*Note:* This table presents investigates the relation between bond issuance outcomes and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19. We study two outcomes at the municipal offering level between January 2017 and April 2022: the probability of a negotiated offering (Panel A) and average yield. Targeted Share is defined as the share of the total dollar volume of municipal securities of each issuer underwritten by the targeted banks between 2007 and 2016. Targeted Share 10%, 20%, and 50% are indicator variables taking the value of one whenever the targeted banks had underwritten at least 10%, 20%, and 50% of offering volume for a given issuer and zero otherwise. Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. All specifications include the natural logarithm of the total offering dollar amount as well as the fixed effects denoted at the end of each panel. The standard errors are double clustered at the issuer and offering date level.

Table 4: **Impact on Borrowing Outcomes: Triple Difference**

**A. Effects on Negotiated Share**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Targeted Share × Post × TX | 0.077*** | 0.079*** | | | | |
| | (0.027) | (0.025) | | | | |
| Targeted Share 20% × Post × TX | | | 0.162** | 0.153** | | |
| | | | (0.067) | (0.064) | | |
| Targeted Share 50% × Post × TX | | | | | 0.147 | 0.164* |
| | | | | | (0.093) | (0.093) |
| Post × TX | 0.004 | | -0.037 | | -0.016 | |
| | (0.028) | | (0.033) | | (0.031) | |
| Observations | 59,682 | 57,620 | 59,682 | 57,620 | 59,682 | 57,620 |

**B. Effects on Offering Yields**

| | Yield | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Targeted Share × Post × TX | 0.076* | 0.124*** | | | | |
| | (0.043) | (0.047) | | | | |
| Targeted Share 20% × Post × TX | | | 0.103 | 0.181** | | |
| | | | (0.072) | (0.073) | | |
| Targeted Share 50% × Post × TX | | | | | 0.326** | 0.441** |
| | | | | | (0.148) | (0.171) |
| Post × TX | 0.058** | | 0.028 | | 0.024 | |
| | (0.026) | | (0.027) | | (0.025) | |
| Observations | 57,943 | 55,950 | 57,943 | 55,950 | 57,943 | 55,950 |
| Issuer FE | Yes | No | Yes | No | Yes | No |
| GO x Issuer FE | No | Yes | No | Yes | No | Yes |
| Date FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Maturity FE | Yes | No | Yes | No | Yes | No |
| Mat x Month FE | No | Yes | No | Yes | No | Yes |
| State x Month FE | No | Yes | No | Yes | No | Yes |
| Issuance x Month FE | No | Yes | No | Yes | No | Yes |

*Note:* This table presents investigates the relation between bond issuance outcomes and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19. We study two outcomes at the municipal offering level between January 2017 and February 2022: the probability of a negotiated offering (Panel A) and average yield (Panel B). Targeted Share is defined as the share of the total dollar volume of municipal securities of each issuer underwritten by the targeted banks between 2007 and 2016. Targeted Share 10%, 20%, and 50% are indicator variables taking the value of one whenever the targeted banks had underwritten at least 10%, 20%, and 50% of offering volume for a given issuer and zero otherwise. Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. TX is an indicator equal to one if the issue takes place in Texas. All specifications include the natural logarithm of the total offering dollar amount as well as the fixed effects denoted at the end of each panel. The standard errors are double clustered at the issuer and offering date level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: **Within Texas Impact on Borrowing Outcomes: Inverse Probability Weights**

| | Negotiated | Yield |
|---|---|---|
| | (1) | (2) |
| Targeted Share 50% × Post | 0.302*** | 0.264** |
| | (0.117) | (0.129) |
| Log(Issuance Amt) | 0.025** | -0.073 |
| | (0.011) | (0.063) |
| Observations | 3,365 | 3,325 |
| Issuer FE | Yes | Yes |
| Month FE | Yes | Yes |
| Maturity FE | Yes | Yes |
| Offering Type FE | No | Yes |

*Note:* This table presents investigates the relation between bond issuance outcomes and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19. We study 4 outcomes at the municipal offering level between January 2017 and February 2022: (1) the probability of a negotiated offering, (2) the probability of a negotiated or private offering, (3) the probability of a credit enhancements, and (4) average yield. The observations are weighted according to inverse likelihoods from a logistic first stage. Targeted Share 50% is defined as a dummy variable equal to one if the share of the total dollar volume of municipal securities of each issuer underwritten by the targeted banks between 2007 and 2016 is greater than 50% and zero if the issuer has no reliance on targeted banks. Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. TX is an indicator equal to one if the issue takes place in Texas. All specifications include the natural logarithm of the total offering dollar amount as well as the fixed effects denoted at the end of each panel. The standard errors are double clustered at the issuer and offering date level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: **Within Texas Impact on Borrowing Outcomes: Heterogeneity**

| | Negotiated | Yield | Negotiated | Yield | Negotiated | Yield |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Targeted Share × Post | 0.080*** | 0.097*** | | | | |
| | (0.022) | (0.034) | | | | |
| Targeted Share (NEG) × Post | | | 0.071** | 0.081*** | | |
| | | | (0.030) | (0.028) | | |
| Targeted Share (COMP) × Post | | | | | 0.108*** | 0.069** |
| | | | | | (0.027) | (0.029) |
| Observations | 6,789 | 6,727 | 4,925 | 4,877 | 5,852 | 5,808 |
| Issuer FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Maturity FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Offering Type FE | No | Yes | No | Yes | No | Yes |

*Note:* This table presents investigates the relation between bond issuance outcomes and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19. We study two outcomes at the municipal offering level between January 2017 and February 2022: the probability of a negotiated offering (Panel A) and average yield (Panel B). Targeted Share is defined as the share of the total dollar volume of municipal securities of each issuer underwritten by the targeted banks between 2007 and 2016. Share Targeted (NEG) and (COMP) restrict to only the share of sales of each type that were underwritten by exiting banks. Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. TX is an indicator equal to one if the issue takes place in Texas. All specifications include the natural logarithm of the total offering dollar amount as well as the fixed effects denoted at the end of each panel. The standard errors are double clustered at the issuer and offering date level. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

Table 7: Within Texas Impact on Competitive Sale Outcomes

**A. Outcomes for Affected Auctions**

| | Winning Bid | # Bidders | Bid Variance |
|---|---|---|---|
| | (1) | (2) | (3) |
| Targeted Share × Post | 0.036*** | -0.772*** | 0.122*** |
| | (0.014) | (0.242) | (0.041) |
| Log(Issuance Amt) | -0.035*** | 0.565*** | 0.004 |
| | (0.009) | (0.113) | (0.021) |
| Observations | 2425 | 2425 | 2425 |
| Issuer FE | Yes | Yes | Yes |
| Date FE | Yes | Yes | Yes |
| Maturity Month FE | Yes | Yes | Yes |

**B. Robustness to Dropping COVID-19 Months**

| | Winning Bid | # Bidders | Bid Variance |
|---|---|---|---|
| | (1) | (2) | (3) |
| Targeted Share × Post | 0.061*** | -1.470*** | 0.100* |
| | (0.018) | (0.305) | (0.059) |
| Log(Issuance Amt) | -0.053*** | 0.538*** | 0.024 |
| | (0.011) | (0.200) | (0.032) |
| Observations | 1424 | 1424 | 1424 |
| Issuer FE | Yes | Yes | Yes |
| Date FE | Yes | Yes | Yes |
| Maturity Month FE | Yes | Yes | Yes |

**C. Outcomes for Placebo Auctions**

| | Winning Bid | # Bidders | Bid Variance |
|---|---|---|---|
| | (1) | (2) | (3) |
| Targeted Share × Post (2019) | 0.011 | 0.201 | 0.008 |
| | (0.016) | (0.216) | (0.034) |
| Log(Issuance Amt) | -0.047*** | 0.662*** | 0.012 |
| | (0.014) | (0.113) | (0.027) |
| Observations | 1793 | 1806 | 1806 |
| Issuer FE | Yes | Yes | Yes |
| Date FE | Yes | Yes | Yes |
| Maturity Month FE | Yes | Yes | Yes |

*Note:* This table presents estimates of a regressions of competitive auction outcomes as a function of the share of bids that are coming from the exiting banks. Standard errors are clustered at the issuer and offering day levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: **Underpricing of Municipal Bonds.**

| | Underpricing | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Targeted Share × Post | 0.0002 | -0.0001 | -0.0001 | | | |
| | (0.0002) | (0.0004) | (0.0003) | | | |
| Targeted Share 50% × Post | | | | 0.0014** | 0.0014 | 0.0016 |
| | | | | (0.0007) | (0.0011) | (0.0010) |
| Log(Issuance Amt) | 0.0003** | | | 0.0003** | | |
| | (0.0001) | | | (0.0001) | | |
| Log(Av. Trade Size) | -0.0010*** | -0.0011*** | | -0.0010*** | -0.0011*** | |
| | (0.0001) | (0.0001) | | (0.0001) | (0.0001) | |
| Observations | 6,057 | 5,309 | 5,309 | 6,057 | 5,309 | 5,309 |
| Issuer FE | Yes | No | No | Yes | No | No |
| GO x Issuer FE | No | Yes | Yes | No | Yes | Yes |
| Date FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Maturity FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Offering Type FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Mat x Month FE | No | Yes | Yes | No | Yes | Yes |
| Log(Issuance) x Month FE | No | Yes | Yes | No | Yes | Yes |
| Log(Av. Trade Size) x Month FE | No | No | Yes | No | No | Yes |

*Note:* This table investigates the relation between 30-day underpricing and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19. Underpricing is the log-difference of the volume-weighted average customer purchase prices within 30 days of the offering and the offering price of a given bond series, averaged across all series in a given issue that trade on the secondary market proportionally to each series principal amount. The sample runs from January 2017 through April 2022. Targeted Share is the issuer-level share of sales of each type that were underwritten by the exiting banks from 2007 through 2016, while Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. All specifications include the natural logarithm of the total offering dollar amount, the natural logarithm of the average par value per customer trade, as well as the fixed effects denoted at the end of each panel. The standard errors are double clustered at the issuer and offering date level. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

Table 9: **Placing the Issuance with Investors.**

**A. Base Specification**

| | Log(# Trades) | | Log(Trade Size) | | Volume | |
|---|---|---|---|---|---|---|
| | Customer | Dealer | Customer | Dealer | Customer | Dealer |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Targeted Share × Post | 0.079* | -0.062 | -0.130*** | 0.068 | 0.028*** | 0.065 |
| | (0.044) | (0.065) | (0.050) | (0.057) | (0.010) | (0.052) |
| Observations | 6,333 | 5,533 | 6,333 | 5,533 | 6,694 | 6,694 |
| Issuer FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Date FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Maturity FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Offering Type FE | Yes | Yes | Yes | Yes | Yes | Yes |

**B. Robustness**

| | Log(# Trades) | | Log(Trade Size) | | Volume | |
|---|---|---|---|---|---|---|
| | Customer | Dealer | Customer | Dealer | Customer | Dealer |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Targeted Share × Post | 0.109 | -0.101 | -0.202*** | 0.164* | 0.046*** | 0.130* |
| | (0.067) | (0.094) | (0.074) | (0.086) | (0.014) | (0.071) |
| Observations | 5,597 | 4,806 | 5,597 | 4,806 | 5,949 | 5,949 |
| GO x Issuer FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Date FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Mat (years) x Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Issuance Amt x Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Offering Type FE | Yes | Yes | Yes | Yes | Yes | Yes |

*Note:* This table investigates the relation between trade count, average trade size, and total par traded volume in the secondary municipal bond market within 30 days of an issue's offering date and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19. Log(# Trades) is the natural logarithm of the total trade count across all trades of a given bond issue. Log(Trade Size) is the natural logarithm of the average trade size for a given bond series, averaged across all series in a given issue that trade on the secondary market proportionally to the principal amount of each series. Volume is the total par value of a given bonds issue, divided by the total principal amount of the bonds series within the issue that trade on the secondary market. The sample runs from January 2017 through April 2022. Targeted Share is the issuer-level share of sales of each type that were underwritten by the exiting banks from 2007 through 2016, while Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. All specifications include the natural logarithm of the total offering dollar amount, the natural logarithm of the average par value per customer trade, as well as the fixed effects denoted at the end of each panel. The standard errors are double clustered at the issuer and offering date level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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# Online Appendix: Not For Publication

This appendix includes several sections of supplemental information. Appendix A contains definitions for all the variables used in the paper.

## A Variable Definitions

| Variable Name | Description |
|---|---|
| Targeted Banks | The targeted banks are the 8 banks that were targeted and do appear to have exited the Texas market after Texas Senate Bills 13/19. These banks include JPMorgan Chase, Citigroup, Goldman Sachs, Bank of America, Fidelity Capital Markets. This list includes banks that (1) were active in Texas underwriting in 2007-2021, (2) did not file a letter of compliance, (3) do not underwrite in Texas in September 2021 through the end of the year except Citigroup who publicly tried to reenter, and (4) continue underwriting in other states during the period when they do not operate in Texas. *Source:* The Municipal Advisory Council of Texas and manual data gathering by the authors. |
| Targeted Share | The share of an issuer's total dollar value of bond sales underwritten by the targeted banks between 2007 and 2016. *Source:* Authors' calculations from the Mergent Municipal data. |
| Targeted Share X% | An indicator variable taking the value of one whenever the issuer's share of bond sales underwritten by the targeted banks between 2007 and 2016 exceeds X% (by issue amount), and zero otherwise. X takes the value of 10, 20, and 50. *Source:* Authors' calculations from the Mergent Municipal data. |
| Targeted Share (Bids) | The share of all bids, weighted by the principal value of the underlying issue, received from the targeted banks. *Source:* Authors' calculations from The Bond Buyer. |
| Post | Post-August 31, 2021, indicator. |
| Offering Amount | Also referred to as "issuance amount" throughout the text, is the total principal dollar value of a given bond issue. The offering amount is also the sum of the principal amounts across all bonds series of a given issue. A given bond issue is typically comprised of different series, or "maturities." *Source:* Mergent Municipal. |
| Offering Date | The date at which the underwriter purchases the municipal bond issue from the issuer. *Source:* Mergent Municipal. |

*Continued on next page*

Table A.1 – *Continued from previous page*

| **Variable** | **Description** |
|---|---|
| Maturity | The issue maturity is the principal-weighted average maturity across all series of a given bonds issue, rounding the resulting values to the nearest month. The maturity of a given bond series is defined as the difference between the maturity date of the series and the issue offering date. *Source:* Mergent Municipal. |
| Type of Sale | This is a description of how a bond is placed with an underwriter or final investor. The main categories are competitive sales (auctions) and negotiations. Other categories include limited and private placements. *Source:* Mergent Municipal. |
| Offering Yield | The offering yield at the issue level is the principal-weighted average of offering yields across different bond series in the same bond issue. The offering yield for a given bond series is the original yield at which the series is made available to issuers. *Source:* Mergent Municipal. |
| Underpricing | The log-difference of the volume-weighted average customer purchase prices within 30 days of the offering and the offering price of a given bond series, averaged across all series in a given issue that trade on the secondary market proportionally to each series principal amount. *Source:* MSRB Trade Data. |
| Log(# Trades) | The natural logarithm of the total trade count across all trades of a given bond issue within 30 days of the offering date. We compute this measure separately for customer purchases and dealer trades. *Source:* MSRB Trade Data. |
| Log(Trade Size) | The natural logarithm of the average trade size for a given bond series within 30 days of the offering date, averaged across all series in a given issue that trade on the secondary market proportionally to the principal amount of each series. We compute this measure separately for customer purchases and dealer trades. *Source:* MSRB Trade Data. |
| Volume | The total par value of a given bonds issue traded within 30 days of the offering date, divided by the total principal amount of the bonds series within the issue that trade on the secondary market. We compute this measure separately for customer purchases and dealer trades. *Source:* MSRB Trade Data and Mergent Municipal. |
| Issuer | The group of the long issuer name and the state in which the issuer exists. *Source:* Mergent Municipal. |
| State of Issue | The state in which a given issuer exists. *Source:* Mergent Municipal. |

*Continued on next page*

Table A.1 – *Continued from previous page*

| Variable | Description |
|---|---|
| Winning Bid | The yield that the winning underwriter submitted in each auction. *Source:* The Bond Buyer. |
| # Bidders | The count of bids submitted in each auction. *Source:* The Bond Buyer. |
| Bid Variance | The variance of bids that are submitted in each auction. *Source:* Authors' calculations from The Bond Buyer. |
| Low Local Clientele | A group of states without state-level beneficial tax treatment for local muni bond interest. This includes all states without a personal income tax (Alaska, Florida, New Hampshire, Nevada, South Dakota, Tennessee, Texas, Washington, and Wyoming) as well as states that do not exempt income on local bonds from state taxes (Illinois, Iowa, Nebraska, Oklahoma, Utah, and Wisconsin). |

# B Municipal Bond Primary Market Process

State and local governments in the US issue $400 billion per year of municipal bonds to finance projects such as roads, schools, and water treatment plants. Over 50,000 unique state and local governments have issued municipal bonds since 1965 and there are currently over 1.2 million individual securities outstanding in the market. The bond issuance process exhibits substantial heterogeneity driven by differences in state regulations and project type. After selecting an investment project, municipalities typically choose four major aspects of the issuance process: (1) the bond counsel and municipal advisor, (2) whether to hold a public sale (a first price, sealed bid auction) or to negotiate directly with the underwriter, (3) the issuance amount and a timeline of repayment, and (4) covenants and contract terms such as call provisions credit enhancements, and collateral.

The bond counsel is a law firm that ensures the bond offering complies with state and local statutes (for further discussion, see Kraft (2012)). Similarly, the municipal advisor is a financial firm that offers a variety of services guiding a municipal entity through the issuance process and aids with public disclosure (Bergstresser and Luby, 2018; Garrett, 2021). The sale type—either public sale through an auction, negotiation with a single underwriter, or private placement with a final investor—guides the rest of the issuance process. In a public sale, the municipality first structures the bond package into different securities based on maturity and creates the necessary public disclosure documents. Underwriters then compete on offering the lowest combined yield-to-maturity to the municipality, referred to as "True Interest Cost" or "Net Interest Cost." The underwriter with the lowest bid purchases the entire issue at this price and then sells it to investors.

In a negotiation, the issuer involves the underwriter earlier in the issuance process. The underwriter can help the municipality choose a term structure and other bond characteristics that are most appropriate for both parties. Many municipalities still try to have competitive forces keep cost low in a negotiation by holding a request for proposals before choosing an underwriter with whom to negotiate. In a private placement, the timeline is more similar to a negotiation than to a

public sale, but the final securities do not need to be structured in a way that would allow sale in the secondary market.

The offering type decision depends on two key aspects of the issue. The first aspect pertains to whether the bond will trade on the secondary market—auction or negotiation offerings typically do, while bank loans and private placements do not. Ivanov and Zimmermann (2021) explore the increase in "private" debt in the municipal space in the last 20 years noting that it has become a more substantial portion of the market. The second aspect relates to whether the issuer chooses an underwriter before or after the bond is structured. The choice of competition vs. negotiation is one of the oldest lines of inquiry in the security design literature (Sorensen, 1979*a*), with recent studies corroborating this margin has a large impact on municipal borrowing costs. For example, Cestau, Green, Hollifield and Schürhoff (2019) finds that negotiations are costlier than competitive sales while focusing on variation in offering types driven by statutory requirements.

## C Estimates of Selection Model for Inverse Probability Weights

Before Texas Senate Bills 13 and 19, the targeted banks were not working with a perfectly random sample of issuers in Texas. These banks, by their stature as large national banks, often work with the largest issuers and issuers who may be trying to place bonds outside of Texas. In Section 5.2, we present an inverse probability of treatment weights approach that allows us to focus the attention of the analysis on marginally treated issuers. In that analysis, we discretize the treatment into issuers who were over 50% reliant on exiting banks while the control group is made up of issuers who had no interaction with exiting banks. The idea of the analysis is to verify that the selection on issuer types is not the key factor driving the results. The weighted regressions find very similar magnitudes as the baseline difference-in-differences specifications, which suggests that these differences in issuer observables is not important for our inference although the selection may be very important for contextualizing the business these banks engage in.

In a first stage in the inverse probability weights analysis, we estimate a logit model that describes the likelihood of being in the treated group relative to the control. The control variables are all defined by the historical issuing patterns of the issuer defined from January 2017 through August 2021. The control variables include average issue size in millions of nominal dollars, the number of issues, the share of issues that were placed with an underwriter by negotiation, the share of issues that are exempt from all personal income taxes, the share of issues that were refunding outstanding debt and the average time to final maturity in years.

The estimates from this procedure are presented in Table C.1. The results paint a striking picture of how issuers with more reliance on targeted banks are different from other issuers. First, the issuers with a large targeted share are much larger than most issuers, issuing much larger bonds more frequently than the control issuers. There is not readily apparent selection for issuers who prefer to negotiate or hold competitive auctions. Issuers with more taxable bond issues, which are often placed with a more national or global set of investors instead of the general in-state segmentation common with munis (Babina, Jotikasthira, Lundblad and Ramadorai, 2021), are much more likely to be reliant on the exiting banks. However, it does not appear this is related to the TCJA new tax treatment of advanced refunding issues because those issuers with relatively more refunding issues are less likely to have been reliant on exiting banks. Finally, issuers with shorter maturity bonds, on average, are more likely to be reliant on the targeted banks.

Table C.1: **Selection of Targeted Banks**

| | Targeted Share (50%) |
|---|---|
| | (1) |
| Average Issue Size (Millions) | 0.032*** |
| | (0.004) |
| Number of Issues | 0.060*** |
| | (0.013) |
| Share Negotiated | 0.542 |
| | (0.418) |
| Share Tax Exempt | -0.802* |
| | (0.473) |
| Share Refunding | -0.831* |
| | (0.451) |
| Average Maturity (Years) | -3.137** |
| | (1.239) |
| Observations | 1,270 |

*Note:* Table C.1 presents estimates from a logit regression that predicts which issuers, as a function of their recent borrowing histories, are likely to be heavily reliant on the exiting banks. The sample for this regression is restricted to issuers who issue at least once in Texas between January 2017 and August 2021. Robust standard errors are included in parentheses. See Section C for a discussion of the control variables. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

# D Credit Quantity Responses

A possible margin of response when losing access to a certain group of underwriters is whether to issue at all or to change the size of a municipal issuance. A change in equilibrium quantities of credit could arise either due to the change in prices–the increasing yield decreases quantity of credit demanded–or due to losing market access through a relationship with an intermediary.

This section tests whether there are observable changes on the extensive margin of seeking credit or on the intensive margin of the size of the issue. To begin, we aggregate the bond issuance data in Mergent Municipal to the issuer-month level for all issuers in Texas with at least one bond issue between 2017 and 2022. The variables of interest are the count of issues and the total principal value issued in each month for each issuer from January 2017 through February 2022. With this panel, we follow a similar difference-in-differences specification as described in equation 1 while changing the outcome variable to be one of three quantity outcomes: (1) an indicator equal to one for a month-issuer with a bond issue, (2) the inverse hyperbolic sine of the principal issued, and (3) the nominal amount of principal issued. The specifications include month and issuer fixed effects, but they must omit day and maturity controls due to the level of aggregation.

We regress each outcome on the interaction of $Targeted\ Share_i$, which is fixed at the issuer level, and an indicator for months after August 2021 in addition to the issuer and month fixed effects. The coefficient of interest is the marginal impact of having more reliance on exiting banks after the 8 large banks were barred from operating in Texas. These estimates are displayed in Panel A of Table D.1. The column (1) shows the estimate for the linear probability regression where the outcome is a dummy variable equal to one if an issuer issues any bond in a given month. The sample average of the issuance dummy is 0.039, which indicates that the average issuer has

Table D.1: **Impact on Likelihood and Amount of Borrowing**

**A. Quantities Compared within Texas, Difference-in-Differences**

| | P(Issue) | IHS(Principal Issued) | Principal Issued |
|---|---|---|---|
| | (1) | (2) | (3) |
| Targeted Share × Post | -0.001 | -0.024 | -87.965 |
| | (0.002) | (0.047) | (63.282) |
| Observations | 102,720 | 102,720 | 102,720 |
| Issuer FE | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes |

**B. Comparing Texas to Other States, Triple Difference**

| | P(Issue) | IHS(Principal Issued) | Principal Issued |
|---|---|---|---|
| | (1) | (2) | (3) |
| Targeted Share × Post × Texas | -0.001 | -0.018 | -52.200 |
| | (0.002) | (0.044) | (58.776) |
| Observations | 1,053,504 | 1,053,504 | 1,053,504 |
| Issuer FE | Yes | Yes | Yes |
| State × Month FE | Yes | Yes | Yes |

*Note:* Table D.1 investigates the relation between bond issuance outcomes and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19. We study three outcomes at the issuer-month level between January 2017 and April 2022: probability of issuing (column 1), the inverse hyperbolic sine of the principal issued (column 2), and the (column 3). Targeted Share is defined as the share of the total dollar volume of municipal securities of each issuer underwritten by the targeted banks between 2007 and 2016 scaled to standard deviations. Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. All specifications include issuer and month fixed effects. Panel A shows the estimates from a difference-in-differences specification while the second panel shows estimates from a triple difference specification with state-by-month fixed effects. Standard errors clustered at the issuer and month levels are included in parentheses. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

a 3.9% chance of issuing a bond in a given month. After the Texas rules that restrict the set of underwriters, a 1 s.d. increase in the share of previous reliance on existing banks leads to a 0.1pp decline in the likelihood of borrowing, which is statistically insignificant at conventional levels. While this could be a non-trivial economic quantity, the standard error of the estimate suggests we can reject a decline of 0.5pp with 90% confidence.

The relatively low frequency of issuance, about once every 18 months for the average issuer, leads to a lack of power on the extensive margin. Another method of measuring the equilibrium quantity of credit provided is the scale the principal issued by the inverse hyperbolic sine. This scaling gives the same interpretation as the natural log in the limit, but allows the inclusion of zeros, which implicitly weights the intensive and extensive margins. The estimates from this specification are displayed in column (2), and suggest a 1 s.d. increase in Targeted Share led to a 2.4% decrease in issuance, although this is still insignificant at traditional levels. We can reject declines larger than 10.1% with 90% confidence. The final column shows the corresponding estimate when the outcome variable is the nominal principal value in $1,000s. This specification is similarly negative but indistinguishable from zero, statistically but does indicate an average decline of $88 million, which is economically large and further suggests size of issuance is a margin of response.

Panel B of D.1 shows the corresponding estimates from a triple difference specification which compares the relative change in frequency and quantity of borrowing for issuers with previous reliance on banks targeted by Texas Senate Bills 13 and 19. The results are very similar with the specification and are all similarly negative and insignificant. We take this to mean there may be declines in borrowing on the part of affected issuers, but these declines are relatively small and not statistically significant. We can rule out a large scale change in frequency of issuing or in quantities issued.

## E Robustness to Specification and Controls

This appendix presents five robustness checks to the primary analysis in the paper by using variations of the preferred difference-in-differences results presented in Table 3 and of the triple difference results presented in Table 4. First, we present estimates of the preferred difference-in-differences regressions allowing for time-varying impacts of maturity. Second, in the triple difference we show the impact of sequentially adding issue-level controls (including flexible time- and size- controls from the previous robustness) on the main coefficients of interest. Third, we show robustness to restricting the sample to bonds that are not guaranteed by state programs intended to insure borrowing for education. Fourth, we redefine issuers by the 6-digit CUSIP instead of issuer name in Mergent to test whether issuer aggregation matters. Fifth, we show that the results are robust to the group of control states that either (i) have no personal income tax from which bond income can be exempt or (ii) do not exempt the interest on local bonds from the state income tax.

We begin by documenting the robustness of the coefficients of interest in the difference-in-differences regressions to allowing the impact of maturity to vary over time in Table E.1. The difference between these estimates and the estimates in Table 3 is that it includes a time-varying impact of bond size and a time-varying impact of maturity (now measured in years) on the outcomes. All columns for the yield outcome show coefficients that are indistinguishable from the baseline analysis. However, the negotiation outcomes seem to be potentially explained by the inclusion of additional controls, particularly the flexible control for time interacted with size. A potential reason for this connection is that size is a bad control, in that it is potentially endogenous

as discussed in Appendix D, and that this overly granular use of a bad control absorbs the variation we may care about as many of the largest issuers all have relatively high reliance on the exiting banks. There is potential for spillovers onto the competitive sales of issuers who weren't directly reliant on the exiting underwriters, but testing for such a spillover is beyond the scope of this paper.

To show the impact of individual controls more clearly, we also show the estimates of the triple difference regressions with sequential addition of issue-level controls in Table E.2. The first three columns use the outcome of an indicator variable equal to one for negotiations. The first column matches column (1) of Panel A of Table 4. The second column adds a series of issue level controls with their coefficients. These controls include the share of a bond issue that is taxable, the share of a bond issue that is senior, the share of a bond issue that is bank-qualified (also exempt from corporate taxes when held by banks), the share of a bond issue backed by a specific revenue source, the share of an issue that is refunding an outstanding bond, and the share of a bond issue that is insured by any source. All of these shares are scaled between 0 and 1. Column (3) also adds interactions of maturity with month FE and state with month FE. Across all 3 columns, the coefficient is between 0.076 and 0.077 and statistically significant at the 1% level. Columns (4) through (6) provide the same exercise where the outcome is the offering yield. Column (6) matches the specification in column (2) of Panel B of Table 4. The coefficient with additional controls is 0.107 instead of 0.108 without controls, and both coefficients are significant at the 1% level. Our results are not sensitive to the inclusion of a plethora of issue-specific controls.

Next, we show that the results are the same in Table E.3 when we restrict to only examine the set of bonds that are not backed by specific state guarantees for certain school bonds. Texas has a program that provides additional guarantees to certain education bonds: the Texas Permanent School Fund. This fund is backed by the state to provide additional credit enhancement and will pay investors in the event of default. Such insured bonds are said to have a PSF wrap. This sort of state guarantee can eliminate most or all credit risk and means that insured bonds may trade very differently and among different investors and the underwriting issues may be different. In order to make sure idiosyncratic issues affecting the state-guaranteed market are not driving our results, we replicate the continuous results from Table E.2 with the sample restricted to only bonds that do not have any sort of state guarantee. The estimate for the impact on negotiation is 0.073, which is indistinguishable from the baseline estimate of 0.067. The impact of reliance on targeted underwriters on offering yields is larger in this sample, with an estimate of one standard deviation increasing yields by 15.1bps after SB 13/19.

In Table E.4, we show replicate the triple difference estimates where we create issuer identifiers based on the first six digits of the CUSIP code instead of by the long issuer names defined by Mergent. The first six digits of the CUSIP generally signify the issuer of a security, although some municipal issuers under a given name will issue under multiple CUSIP codes. We rerun the regressions using this more narrow definition of issuer and verify that the pooling of issuer identities does not have a material impact on our results.

Finally, Table E.5 shows that our results are robust to different control states included to be more similar to Texas in the tax treatment of municipal bond income. We restrict the comparison sample to make sure that Texas' somewhat unique tax treatment of their munis, which leads to lower local market clientele Babina, Jotikasthira, Lundblad and Ramadorai (2021), does not have any impact on our estimated coefficients. To this end, we define a set of control states that do not have special tax treatment for local bonds. This includes states that have no income tax from which to exempt bond interest (Alaska, Florida, New Hampshire, Nevada, South Dakota, Tennessee,

Washington, and Wyoming) as well as states that do not exempt income on local bonds from state taxes (Illinois, Iowa, Nebraska, Oklahoma, Utah, and Wisconsin). These states all likely have less segmented ownership of local bonds and may experience different secular trends than the rest of the market. We show the estimates when restricting to this sample of low local clientele control states in Table E.5 where columns (2) and (4) show that the impacts on both the negotiated share and on yields are 10bps and 11bps per standard deviation, respectively, indicating that our results are not sensitive to the control states.

Table E.1: **Within Texas Impact on Borrowing Outcomes: Robustness**

**A. Effects on Negotiated Share**

| | Negotiated | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Targeted Share × Post | 0.026 | | | |
| | (0.030) | | | |
| Targeted Share 10% × Post | | 0.039 | | |
| | | (0.071) | | |
| Targeted Share 20% × Post | | | 0.040 | |
| | | | (0.083) | |
| Targeted Share 50% × Post | | | | 0.011 |
| | | | | (0.124) |
| Observations | 6,039 | 6,039 | 6,039 | 6,039 |

**B. Effects on Offering Yields**

| | Yield | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Targeted Share × Post | 0.114*** | | | |
| | (0.044) | | | |
| Targeted Share 10% × Post | | 0.199** | | |
| | | (0.080) | | |
| Targeted Share 20% × Post | | | 0.214** | |
| | | | (0.093) | |
| Targeted Share 50% × Post | | | | 0.363** |
| | | | | (0.167) |
| Observations | 5,985 | 5,985 | 5,985 | 5,985 |
| GO x Issuer FE | Yes | Yes | Yes | Yes |
| Date FE | Yes | Yes | Yes | Yes |
| Mat (years) x Month FE | Yes | Yes | Yes | Yes |
| Issuance Amt. x Month FE | Yes | Yes | Yes | Yes |
| Offering Type FE | Yes | Yes | Yes | Yes |

*Note:* This table presents investigates the relation between bond issuance outcomes and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19. We study two outcomes at the municipal offering level between January 2017 and April 2022: the probability of a negotiated offering (Panel A) and average yield. Targeted Share is defined as the share of the total dollar volume of municipal securities of each issuer underwritten by the targeted banks between 2007 and 2016. Targeted Share 10%, 20%, and 50% are indicator variables taking the value of one whenever the targeted banks had underwritten at least 10%, 20%, and 50% of offering volume for a given issuer and zero otherwise. Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. All specifications include the natural logarithm of the total offering dollar amount as well as the fixed effects denoted at the end of each panel. The specifications in this table include time (year-month) X time-to-maturity (in years) fixed effects. The standard errors are double clustered at the issuer and offering date level. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

Table E.2: Triple Difference with Sequential Controls

| | Negotiated | | | Yield | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Targeted Share × Post × TX | 0.077*** | 0.077*** | 0.076*** | 0.076* | 0.067* | 0.107** |
| | (0.027) | (0.026) | (0.025) | (0.043) | (0.037) | (0.043) |
| Share Taxable | | 0.017*** | 0.009 | | 0.623*** | 0.642*** |
| | | (0.006) | (0.006) | | (0.013) | (0.013) |
| Share Senior | | -0.062*** | 0.004 | | -0.233*** | -0.372*** |
| | | (0.008) | (0.012) | | (0.019) | (0.038) |
| Share Bank-Qualified | | 0.012* | 0.005 | | -0.042*** | -0.033*** |
| | | (0.006) | (0.006) | | (0.008) | (0.008) |
| Share Revenue | | 0.045*** | 0.036** | | 0.162*** | 0.178*** |
| | | (0.013) | (0.015) | | (0.028) | (0.032) |
| Share Refunding | | 0.092*** | 0.086*** | | -0.067*** | -0.065*** |
| | | (0.009) | (0.010) | | (0.008) | (0.008) |
| Share Insured | | 0.040*** | 0.040*** | | -0.095*** | -0.113*** |
| | | (0.011) | (0.012) | | (0.021) | (0.023) |
| Observations | 59,682 | 59,682 | 57,620 | 57,943 | 57,943 | 55,950 |
| Issuer FE | Yes | Yes | Yes | Yes | Yes | Yes |
| GO x Issuer FE | No | No | Yes | No | No | Yes |
| Date FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Maturity FE | Yes | Yes | No | Yes | Yes | No |
| Additional Controls | No | Yes | Yes | No | Yes | Yes |
| Mat x Month FE | No | No | Yes | No | No | Yes |
| State x Month FE | No | No | Yes | No | No | Yes |
| Issuance x Month FE | No | No | Yes | No | No | Yes |
| Offering Type FE | No | No | No | No | Yes | Yes |

*Note:* This table presents investigates the robustness of the relation between bond issuance outcomes and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19 to the inclusions of additional control variables. We study two outcomes at the municipal offering level between January 2017 and February 2022: the probability of a negotiated offering (columns 1-3) and average yield (column 4-6). Targeted Share is defined as the share of the total dollar volume of municipal securities of each issuer underwritten by the targeted banks between 2007 and 2016. Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. TX is an indicator equal to one if the issue takes place in Texas. All specifications include the natural logarithm of the total offering dollar amount as well as the fixed effects denoted at the end of each panel. The standard errors are double clustered at the issuer and offering date level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table E.3: Triple Difference Dropping Issues with State Guarantees

| | Negotiated | | Yield | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Drop Guaranteed | N | Y | N | Y |
| Targeted Share × Post × TX | 0.079*** | 0.073*** | 0.124*** | 0.151*** |
| | (0.025) | (0.028) | (0.047) | (0.054) |
| Observations | 57620 | 48139 | 55950 | 46493 |
| GO x Issuer FE | Yes | Yes | Yes | Yes |
| Date FE | Yes | Yes | Yes | Yes |
| Mat x Month FE | Yes | Yes | Yes | Yes |
| State x Month FE | Yes | Yes | Yes | Yes |
| Issuance x Month FE | Yes | Yes | Yes | Yes |

*Note:* This table investigates the robustness of the relation between bond issuance outcomes and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19 when excluding bonds guaranteed by state school funds. We study two outcomes at the municipal offering level between January 2017 and February 2022: the probability of a negotiated offering (columns 1-3) and average yield (column 4-6). Targeted Share is defined as the share of the total dollar volume of municipal securities of each issuer underwritten by the targeted banks between 2007 and 2016. Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. TX is an indicator equal to one if the issue takes place in Texas. All specifications include the natural logarithm of the total offering dollar amount as well as the fixed effects denoted at the end of each panel. The standard errors are double clustered at the issuer and offering date level. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

Table E.4: Triple Difference Estimates with Different Issuer Definition

| | Negotiated | | Yield | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Targeted Share × Post × TX | 0.065** | 0.063** | 0.108** | 0.147*** |
| | (0.029) | (0.029) | (0.049) | (0.054) |
| Observations | 58,558 | 56,542 | 56,829 | 54,894 |
| Issuer FE | Yes | No | Yes | No |
| GO x Issuer FE | No | Yes | No | Yes |
| Date FE | Yes | Yes | Yes | Yes |
| Maturity FE | Yes | No | Yes | No |
| Additional Controls | No | Yes | No | Yes |
| Mat x Month FE | No | Yes | No | Yes |
| State x Month FE | No | Yes | No | Yes |
| Issuance x Month FE | No | Yes | No | Yes |

*Note:* This table investigates the robustness of the relation between bond issuance outcomes and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19 to alternative definition of issuers. We define issuers in terms of the 6-digit CUSIP associated with the largest proceeds in a given offering. We study two outcomes at the municipal offering level between January 2017 and February 2022: the probability of a negotiated offering (columns 1-2) and average yield (columns 3-4). Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. TX is an indicator equal to one if the issue takes place in Texas. All specifications include the natural logarithm of the total offering dollar amount as well as the fixed effects denoted at the end of each panel. The standard errors are double clustered at the issuer and offering date level. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

Table E.5: Triple Difference Comparing to States without Taxes or Exemptions

| | Negotiated | | Yield | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Low local clientele | N | Y | N | Y |
| Targeted Share × Post × TX | 0.079*** | 0.100*** | 0.124*** | 0.110* |
| | (0.025) | (0.029) | (0.047) | (0.059) |
| Observations | 57,620 | 20,058 | 55,950 | 19,542 |
| GO x Issuer FE | Yes | Yes | Yes | Yes |
| Date FE | Yes | Yes | Yes | Yes |
| Mat x Month FE | Yes | Yes | Yes | Yes |
| State x Month FE | Yes | Yes | Yes | Yes |
| Issuance x Month FE | Yes | Yes | Yes | Yes |

*Note:* This table investigates the robustness of the relation between bond issuance outcomes and issuer exposure to the underwriters targeted by Texas Senate Bills 13/19 when restricting the sample to states that have no income taxes or municipal bond income exemptions. We study two outcomes at the municipal offering level between January 2017 and February 2022: the probability of a negotiated offering (columns 1-2) and average yield (columns 3-4). For comparison purposes the results in Targeted Share is defined as the share of the total dollar volume of municipal securities of each issuer underwritten by the targeted banks between 2007 and 2016. Post takes the value of one since the implementation of SB 13/19 in September of 2021 and zero otherwise. TX is an indicator equal to one if the issue takes place in Texas. All specifications include the natural logarithm of the total offering dollar amount as well as the fixed effects denoted at the end of each panel. The standard errors are double clustered at the issuer and offering date level. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

# F Extended Auction Information

This appendix describes the auction data and summary statistics. The auction results are derived from the Bond Sales Results Archive posted by The Bond Buyer, which details the bidding results for bond auctions. The reports go back to early 2008. The data include the bids submitted by each underwriter in terms of "True Interest Cost" (or sometimes Net Interest Cost if that is the statutorily relevant outcome) for the complete package from each bidder as well as the complete term structure for the winning bidder. An example of the reported data is shown in Figure F.1, which shows the city of Richmond, TX, receiving 5 bids from underwriters with Baker Group winning the auction with a bid of 2.3854%. The winning yields for each individual maturity are only available for the winning bid. The other bids and identities are shown at the bottom.

The auction data aggregated to the issuer level is described in Table F.1. Here, we compare issuers in Texas to other issuers who host auctions elsewhere in the US. Auctions are often controlled by statute in a way such that auctions in Texas may be different than auctions in other places. These statutory restrictions are discussed at length in Cestau, Green, Hollifield and Schürhoff (2019).

Outside of Texas, the average issuer who holds at least 1 auction holds 7.2 total auctions, or about 0.55 auctions per year. In Texas, the average issuer only hosts 4.1 auctions, closer to 0.3 auctions per year. The sizes are similar with bond auctions mostly being for issues with principal value of 12 million, but the Texas issues have much longer maturities—20.3 years instead of 11.8 years elsewhere in the US. Texas auctions are also among the most competitive in the US, with the average issuer getting 5.5 bids instead of 4.6 bids in other states. This higher competition is also consistent with the lower bid variance in Texas relative to other states.

The share of bids from targeted banks at the issuer level (scaled by 100 in the table) is around 4% for the average issuer both in an out of Texas. This distribution is very skewed with the $75^{th}$ percentile being 3.3% and the $90^{th}$ percentile being 16% across the whole US. In Texas, the distribution is similarly skewed with 3.7% and 18% being the $75^{th}$ and $90^{th}$ percentiles, respectively. To put this differently, if we assume all Texas issuers receive the state average 5.5 bids in each auction, 10% of such issuers are receiving at least one bid (# bids$\approx$1/0.18) from a targeted bank in every single auction.

Table F.1: Auction Data Characteristics

| | Mean | SD | Obs | $25^{th}$ | $50^{th}$ | $75^{th}$ |
|---|---|---|---|---|---|---|
| Total Number of Auctions, 2008-21 | 6.8 | 9.8 | 13529 | 1.0 | 3.0 | 8.0 |
| Non-Texas | 7.2 | 10.2 | 11945 | 1.0 | 3.0 | 9.0 |
| Texas | 4.1 | 5.4 | 1584 | 1.0 | 2.0 | 5.0 |
| Average Issue Size | 11.9 | 38.1 | 13529 | 2.2 | 4.7 | 9.9 |
| Non-Texas | 11.9 | 31.6 | 11945 | 2.0 | 4.7 | 10.0 |
| Texas | 12.0 | 69.6 | 1584 | 3.3 | 5.0 | 9.0 |
| Average Issue Maturity | 12.8 | 7.6 | 13529 | 6.3 | 12.9 | 19.0 |
| Non-Texas | 11.8 | 7.2 | 11945 | 5.5 | 11.6 | 17.0 |
| Texas | 20.3 | 5.7 | 1584 | 17.2 | 20.5 | 24.7 |
| Average Auction Participation | 4.7 | 2.2 | 13529 | 3.2 | 4.5 | 6.0 |
| Non-Texas | 4.6 | 2.1 | 11945 | 3.0 | 4.3 | 5.8 |
| Texas | 5.5 | 2.2 | 1584 | 4.0 | 5.3 | 7.0 |
| Average Bid Variance | 0.3 | 0.5 | 13529 | 0.0 | 0.1 | 0.4 |
| Non-Texas | 0.3 | 0.5 | 11945 | 0.0 | 0.1 | 0.4 |
| Texas | 0.2 | 0.4 | 1584 | 0.0 | 0.0 | 0.2 |
| Share Bids from Targeted Banks | 4.0 | 8.7 | 11593 | 0.0 | 0.0 | 3.3 |
| Non-Texas | 4.0 | 8.7 | 10367 | 0.0 | 0.0 | 3.3 |
| Texas | 3.9 | 8.2 | 1226 | 0.0 | 0.0 | 3.7 |

*Note:* This table shows the characteristics of the issuers that hold auctions reported in the Bond Buyer data. The issuers are split into Texas and the non-Texas. There are 13,529 issuers who host auctions 6.8 times on average over the sample.

Figure F.1: Auction Report Example

**TEXAS**
*Richmond (City)*
23-Feb-22 $5,215,000
Combination Tax and Revenue Certificates of Obligation, Series 2022 (bank qualified) (book entry).
Dated Mar 1, 2022.
Due Mar 1, 2023 to 2042.
Callable Mar 1, 2031 at par.
Winning bid: Baker Group, at 106.4195, TIC 2.3854%.

| DUE | AMOUNT | CPN | YIELD | CONC | INS |
|---|---|---|---|---|---|
| 3/1/2023 | $210,000 | 4.00% | 0.95% | | BAM |
| 3/1/2024 | $220,000 | 3.75% | 1.20% | | BAM |
| 3/1/2025 | $230,000 | 3.00% | 1.35% | | BAM |
| 3/1/2026 | $235,000 | 2.75% | 1.45% | | BAM |
| 3/1/2027 | $235,000 | 2.63% | 1.60% | | BAM |
| 3/1/2028 | $245,000 | 4.00% | 1.65% | | BAM |
| 3/1/2029 | $260,000 | 4.00% | 1.75% | | BAM |
| 3/1/2030 | $265,000 | 4.00% | 1.80% | | BAM |
| 3/1/2031 | $275,000 | 4.00% | 1.85% | | BAM |
| 3/1/2032 | $290,000 | 3.00% | 1.90% | | BAM |
| 3/1/2033 | $295,000 | 2.00% | 2.00% | | BAM |
| 3/1/2034 | $305,000 | 3.00% | 2.00% | | BAM |
| 3/1/2035 | $310,000 | 3.00% | 2.05% | | BAM |
| 3/1/2036 | $320,000 | 3.00% | 2.10% | | BAM |
| 3/1/2037 | $330,000 | 3.00% | 2.15% | | BAM |
| 3/1/2039 | $455,000 | 3.00% | 2.20% | | BAM |
| 3/1/2041 | $485,000 | 3.00% | 2.30% | | BAM |
| 3/1/2042 | $250,000 | 3.00% | 2.35% | | BAM |

L.O.: Hunton Andrews Kurth LLP, Houston, TX; and State Attorney General.
F.A.: Hilltop Securities Inc., Houston, TX.
Other bidders were:
BOK Fin Secs, TIC 2.4306%
FHN Fin Cap Mkts, TIC 2.5419%
Raymond James, TIC 2.5529%
Baird, TIC 2.6085%

*Note:* This figure gives an example of the Competitive Sale Reports from The Bond Buyer. The example is for Richmond's $5.2 million bond issued on February 22, 2022. The winning bidder was Baker Group with a yield of 2.3854%. The total term structure for Baker Group's bid is shown in the table. The other bidder identities and bids are displayed at the bottom.