The Cost Burden of Negotiated Sales Restrictions: A Natural Experiment Using Heterogeneous State Laws

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Abstract

Should legislation restrict the use of negotiated sales of municipal bonds? What are the costs of such a restriction? We estimate the effects that the restrictions on negotiated sales have on gross spreads and reoffering yields by comparing the bond issues of unrestricted school districts to the bond issues of school districts that are bound by law to use competitive sales. We develop a standardized way of classifying a bond's statutory security, and use this classification to obtain a sample of comparable bonds. The classification is informative, parsimonious, and scalable. We classify the statutory security of 42,493 new-money bonds, and collect the statutory sales provisions and amendments thereof of 40 states. Restrictions on negotiated sales increase gross spreads by $1.03 for every $1000 of par value. Restrictions also increase reoffering yields for maturities up to 20 years, and decrease them for longer maturities.

Keywords: Primary market, statutory provisions, private sales, public sales, municipal bonds.

Classification: H3, H7, G1.

1. Introduction

Each year, states and municipalities in the U.S. issue approximately $400 billion of municipal bonds, about 40% of the corporate bond issue volume. States and municipalities issue bonds either through negotiated sales or through competitive sales. In a negotiated sale, the issuer sells the bonds directly to the underwriter without previous public bidding by the underwriters. In a competitive sale, the issuer requests the underwriters to submit a firm offer to purchase the bonds, and the issuer awards the new issue to the underwriter providing the lowest interest rate cost. Many state laws require the use of competitive sales for new bond issues. We estimate the costs of such statutory restrictions in terms of offering yields and underwriter fees, and make policy recommendations.

For decades, policymakers, bond lawyers, financial advisors, and scholars have debated which method is better for issuing securities. The debate concerns not only municipal bonds, but also many other asset classes. For example, Degeorge, Derrien & Womack (2010) find that auctioned IPOs are effective alternatives to book building in a sample of U.S IPOs and Derrien & Womack (2003) find similar results in s sample of French IPOs.

The solution to this debate has so far been elusive because we cannot observe and compare the potential costs of both selling methods for all bond issuers. We only observe the cost of competitive sales for those issuers that choose competitive sales and observe the negotiated costs for those issuers that choose negotiated sales. Heckman (1974) shows that the average difference between observed competitive and negotiated costs is a biased estimate of the true average difference because of selection bias. Several authors correct for selection bias by explicitly modeling the issuers' choice problem or by using instrumental variables methods. Liu (2017), Guzman & Moldogaziev (2012), Robbins &

Simonsen (2007), and Robbins & Simonsen (2015) find that competitive sales have lower interest costs than negotiated costs, while Fruits, Booth, Pozdena & Smith (2008), Kriz (2003), and Peng & Brucato (2003) find that negotiated sales have lower costs. However, the selection bias corrections used by these researchers either require strong assumptions or face potential issues from weak instruments (Newey, Powell & Walker (1990)).

In this paper we use the legal restrictions on the method of sale to directly answer several policy questions. Should legislation restrict the negotiated sale of bonds? What are the costs of such restrictions? Such questions circumvent the choice problem because municipal issuers must abide by the legal provisions regarding the method of sale. If there is no selection involved, there is no selection bias. The municipal bond market is a valuable empirical setting to study many economic problems because of the many natural experiments that arise from the heterogeneity in bond laws and the laws' frequent amendments. For example, Cestau (2016) uses state CDS spreads and bond authorization laws to measure the effect of political parties on credit risk. Robbins (2002) uses the exogenous variation in the volume of competitive sales caused by a policy change to show that competitive issues do not face higher costs with higher volumes.

Several states outlaw the use of negotiated sales. We estimate the effect of the legal restrictions on negotiated sales by comparing unrestricted school districts' bond issues to restricted school districts' bond issues. Generally, school district bonds are regulated only by public state laws, while several other bond types are regulated by local laws and private state laws. Using school district bonds allows us to just use only public state laws in our empirical approach. State laws are easier to collect than local and private laws. Another advantage of using school bonds is that they are a large part of the municipal market, accounting for about 15% of all municipal issues.

The key in our analysis is that we compare bonds with similar legal security, where legal security means the sources of funds legally available to pay the bonds, and the legal

remedies for investors. General obligation bonds (GO bonds) can have very different statutory security, to the point that many GO bonds are not comparable with each other. We therefore, develop a new and standardized way of classifying a bond's legal security that extends the traditional GO/Revenue classification. Our classification method is informative, parsimonious, and scalable.

Our method is informative because the collected data truly capture the bonds' statutory security. Our method is parsimonious because the data have few fields, because the fields take few values, and because the values are not exclusive to any particular data type. Our method is scalable because we can increase the sample size without adding new fields and field values. We develop a standardized language to summarize the type and security of the bonds with short descriptions, and we use our method to classify the statutory security of 42,493 new-money school bonds and notes. We collect the bonds' statutory sales provisions of 40 states, and the amendments to such sales provisions over last 20-30 years.

Every year, competitive sales represented more than 80% of total bond issues in states where negotiated sales were legally restricted according to our measure, indicating that our restriction measure has validity and reliability in the sample. Issuers predominantly use negotiated sales whenever they are legally allowed to use them according to our measure. We estimate that restrictions on negotiated sales increase gross spreads by \$1.03 for every \$1000 of bond par value issued. Restrictions also increase the offering yield by 0.2 percentage points for 1-yr maturity bonds. The increase in offering yields decreases with maturities but remains positive for maturities up to 20 years. For longer maturities, the restrictions decrease offering yields. The decrease is larger in absolute terms for longer maturities and reaches a peak reduction of 0.53 percentage points in yields for 28-year maturity bonds. Considering that there are around four trillion par value of municipal bonds outstanding every year, our estimated yield effects have more than a \$300 billion impact on taxpayer funding costs each year.

2. Our empirical approach

Are competitive sales cheaper than negotiated sales of school bonds? Simply comparing the observed cost of competitive sales to the observed cost of negotiated sales can lead to biased estimates of the difference between costs. As a numerical example, suppose that the cost of negotiated sales is $20 for every issuer, and the cost of competitive sales is $10 for half of the issuers and $90 for the other half. The average negotiated cost is $20 and the average competitive cost is $50 ($30 higher). If issuers can choose the method of sale, issuers facing high competitive costs of $90 will use negotiated sales because they are cheaper, but issuers with low competitive costs of $10 will use competitive sales. Therefore, we will only observe negotiated sales at $20 and competitive sales at $10. A naive comparison between the observed costs yields a difference of $10 in favor of competitive sales, when the true cost difference is $30 in favor of negotiated sales. The selection bias is the disparity between the observed difference and the true difference that arises because issuers are able to select the method of sale.

Selection bias can be avoided by using the state laws that regulate debt issuance. State laws lay down numerous provisions, such as the statutory security of the bonds, and the bonds' manner of sale. In some cases, the law does not restrict school districts from choosing between competitive and negotiated sales, while in other cases, school districts are required by law to use competitive sales. The law obliges both low-competitive-cost issuers and high-competitive-cost issuers, and issuers cannot select to abide by the law or not. Therefore, if instead of estimating the cost difference between negotiated and competitive sales, we estimate the effects of the laws that proscribe the negotiated sale of school bonds, we avoid the selection bias described above, because there is no selection by the issuers.

Our policy variable — statutory sales provisions — varies only at the state level, but

not at the issuer level. Therefore, the only source of omitted variable bias (OVB) when evaluating the sales provisions must be unobserved variables at the state level. That is, the statutory sales provisions may be correlated with common characteristics or systemic characteristics of the school districts in the state, but not with idiosyncratic and purely individual characteristics of the school districts. For example, state laws might allow negotiated sales in states where all school districts tend to have high competitive costs to begin with. Thus, we can avoid OVB by simply including state fixed effects in a regression equation.

3. Sample

State laws include several legal authorizations under which school districts are authorized to issue different types of debts. These statutory authorizations are generally divided by: Temporary Borrowings, Lease/Appropriation-Backed bonds, Revenue Bonds, General-Law bonds and notes, and a number of Special-Law bonds and notes. Temporary Borrowings include obligations such as Tax and Revenue Anticipation Notes (TRANs), Bond Anticipation Notes (BANs), and a few other anticipation notes. TRANS are short-term obligations, normally with statutory maximum maturity of no more than 15 months, that are secured by budgeted revenues for the current fiscal year, and by liens thereon. BANs are notes issued in anticipation of bonds to be issued in the upcoming years, paid non exclusively from the proceeds thereof, that normally have a statutory maximum maturity of no more than 3 years. Lease/Appropriation-Backed bonds (COP/Ins) include obligations such as Certificates of Participation, Installment Agreements, or Lease Agreements. These obligations are not secured by mandatory appropriations to pay the bonds, i.e. issuers may legally omit to include their debt service in the annual budget. Revenue Bonds are secured by and have a lien on specific stream of revenues, and are non-recourse to the school district. General-Law bonds and notes

are obligations issued under general law. They are mandatory obligations of the district, and are secured by and have a lien on[1] taxpayer dollars. Special-Law bonds and notes are issued under alternative sets of public laws that confer additional powers to the powers conferred to the issuers by general law. They are also mandatory obligations of the district, and are also secured by and have a lien on taxpayer dollars.

Bonds are normally issued under general law, while a high proportion of notes are issued under special public laws. Table 1 compares TRANs, BANs, COPs/Ins, bonds, notes, and revenue bonds issued between 2004 and 2015 across multiple dimensions. The differences between types are evident. TRANs and BANs have average maturities of around one year. COPs/Ins, bonds, and revenue bonds are long-term obligations having average maturities 10 years or longer. Notes have average maturity between both groups. TRANs and BANs tend to have very low gross spreads, whereas revenue bonds and COPs have much higher gross spreads than notes and bonds. Bonds and notes have the highest proportions of rated issues, and TRANs and BANs the lowest proportional of rated issues. Restrictions on negotiated sales are only prevalent for bonds, but only half of the bonds are issued through competitive bids, while a high percentage of TRANs and BANs are sold through public bids. COPs/Ins and revenue bonds offer the highest average reoffering yields, TRANS and BANs the lowest reoffering yields, with bond and note reoffering yields in between.

Given the marked differences across bond types, it is possible that the effects of the statutory sales provisions are also different across bond types. Therefore, we focus the analysis only on bonds and notes to avoid mixing potentially different effects, and also because they constitute the highest fraction of all bond issues, and because they are the bond types that determine future tax burdens.

Any bond type in Table 1, except revenue bonds, may be classified as general obli-

[1]Open to debate after Detroit's bankruptcy.

gations, however, they have very different statutory security. In order to increase the accuracy of our estimates, and to reduce the likelihood of omitted variable bias, we collect a novel set of statutory security variables that has no precedent in the literature. Issuers generally provide abundant and varied qualitative information about the security of a new bond issue. The challenge is to store this qualitative information in the most informative, parsimonious, and scalable way possible to enable the use of it for quantitative analyses. Informative means that the stored data should be a true reflection of the security of the bond. Parsimonious means that the data should be stored using the least possible number of fields, that fields should take the lowest possible number of values, and to avoid fields and field values that are exclusive to few particular sets of laws. Scalable means that it should be possible to increase the sample size, to add more bond types issued under different sets of laws, and to add different issuer types, without creating new fields and/or adding new field values. We believe that we achieve these objectives with the classification in Table 2.

3.1. Sample Construction

All bond issues have a short issue description with a brief statement of the bond's type and legal security. However, these descriptions have no standardized language. Thus, they cannot be used in quantitative analyses. Bonds of the same type and the same or similar legal security may have very different descriptions. Our sample of school bonds from 44 states has 4,032 different issue descriptions, when in general, there are no more than 10 sets of laws that authorize school bond issues per state.

We match every bond issue to a bond type in Table 1 and a authorizing law in two steps. First, we use a number of regular expressions[2] to separate TRANs, BANs,

[2]A regular expression it a specific sequence of symbols and characters that represents a text pattern to be searched for in a longer text. For example the regular expression 'G*Obl*Bo' is found in the text 'General Obligation Bonds'.

COP/Ins, revenue bonds, and refunding bonds from general-law bonds, and special-law bonds and notes. Second, we select a random sample of bonds for each issue description, and use their official statements to obtain the authorization laws under which the bonds were issued. That search cannot be automated; we use hand-collected data from the official statements.

For the bonds issued under general laws as herein defined, and the bonds issued under special laws with substantial number of issues, we collect the variables listed in Table 2 from the bonds' official statements. This data collection cannot be automated; it is hand-collected data. Subsequently, we assign the authorization laws and security data of the sampled bonds to the non-sampled bonds with the same issue description, and also to issues with similar issue descriptions that do not have official statements available. We develop a standardized language to summarize the type and security of the bonds with short issue descriptions.

We collect the sales provisions of the general bond laws and the special laws. This is a challenging task for three reasons. First, laws are dynamic sets of provisions that override, complement, and offer alternatives to each other so it is not always easy to determine the specific provisions that oblige the issuers. Second, general sales provisions that restrict negotiated sales often provide for a number of exceptions to the restriction. For example, if it is a small issue, or interest income is not exempt from federal income tax, or bonds are to be issued to finance the purchase of school buses, or in many other cases. Third, sometimes the texts of the laws have no direct interpretation; the same text in two different statutes can take opposite meanings. In such cases, we contact bond lawyers to correctly interpret the laws.[3]

Sales provisions are often amended. In addition to collecting current sales provisions, we also collect the entire history of their amendments. We track and obtain all the

[3]We have contacted more than 400 bond lawyers.

amendments to sales provisions from online repositories of every legislative act passed in past legislative sessions. These online repositories of legislative acts normally go as far as 1997, and in a few cases they go beyond 1990.

In general, the lists of purposes for authorizing bonds or notes in special laws are subsets of the lists of purposes prescribed in general laws. The legislators' intentions when enacting such special laws is to expedite the issuance of debt for some specific purposes. For example, to avoid a referendum, or to provide means to issue debt for specific purposes that do not count for the constitutional debt limits. Although many special laws do not restrict negotiated sales of bonds and notes, this is not the reason why a school district would choose to issue under such laws, i.e. not only school districts with high competitive costs choose to issue under such special authorizations. Our policy variable $Rest_{st}$ therefore will be uncorrelated with ε_{sti}, even if the issue purpose is provided for under more than one set of laws.

4. Data

We obtain information about bonds and issuers from SDC Platinum. These data include issuer characteristics such as name, state, type, reoffering prices or yields for each bond issue, and issue characteristics such as issue description, maturity, sale date, coupon, coupon type, call schedule, taxable status, bank qualified indicator, ratings, a refunding indicator, and sinking fund provisions. These data also provide information on the underwriting syndicate including the gross spread. Municipal bonds are typically issued in series. Multiple bonds with different maturities are underwritten simultaneously in one deal. Each maturity of the deal trades as a separate security in the primary and the secondary market.

We start with a sample of 129,519 deals by districts and boards of education from

1966 to the end of 2014. More complete data starts from 1997. We analyze the names of the issuers to be able to separate school districts from other types of districts such as water districts, and fire districts, universities, community colleges, vocational schools, and financial authorities. School districts deals are issued under separate authorization laws than these other deals.

We use 45 regular expressions to capture all the name patterns of all school districts in every state, and identify 94,477 school deals between 1966 and 2014. Of those, we keep just the 67,452 new money deals since refunding deals are issued under separate statutory provisions. We are able to assign a bond type to 65,687 of these deals, we obtain statutory sales provisions for 46,759 deals and security data for 42,493 deals. Our self-constructed 'issue descriptions' take just 14 different values as compared to the 4,032 different 'issue descriptions' in the original data. We separate TRANs, BANs, COP/Ins, and revenue bonds from this sample, which leads to a sample of 42,469 school deals in 40 states between 1966 and 2014. We drop data from states with less than 30 deals because most issuers in such states use a municipal bank to fund projects, and we drop data from Tennessee because school districts in Tennessee are generally created by private acts that are not codified. This filter eliminates four states and 131 deals. Of the 42,338 deals remaining in the sample, 41,072 have security data and statutory sales provisions data. Of these, 16,661 were issued between 2004 and the end of 2014. Our yield data are from 2004 to the end of 2014. Of the 16,661 deals described above, 13,815 have yield data, and 6,138 have gross spread data.[4]

5. Results

Figure 1 compares states' sales provisions to issuers' choices. For each state, the column on the left shows the percentage of bonds sold by negotiated sale per year since 1997. The

[4]Gross Spread=(Underwriter's discount)/(Par Value)*1000

column on the right shows the percentage of the bonds sold per year that had no sales restrictions since 1997. Lighter shades of gray indicate higher proportions of competitive sales and higher proportions of restricted bonds respectively. Darker shades of gray indicate higher proportions of negotiated sales and higher proportions of unrestricted bonds. White indicates no data[5]. Figure 1 is computed using a sample of unlimited general obligation fixed-rate tax-exempt bonds issued to fund building or purchasing of school buildings, purchasing of school lots, alterations or additions to the school building or buildings other than those necessary for current maintenance, operation, or repairs, and other similar purposes. We use these bonds in order to minimize the probability of sales provisions missclassification.

Every year and in every state, issuers predominantly used competitive sales whenever they were legally restricted to use negotiated sales according to our measure, which indicates that our restriction measure has validity and reliability in the sample (lighter shades of gray in the columns on the left correspond to lighter shades of gray in the columns on the right). Most of the exceptions come from data errors, such as the misclassification of the method of sale. In other few cases, bonds were issued under home rule charters or private acts that provide exceptions to the general bond laws. Strikingly, every year and in every state, issuers predominantly used negotiated sales whenever they were legally allowed to use them, according to our measure (darker shades of gray in the columns on the left correspond to darker shades of gray in the columns on the right). The correlation between an "unrestricted" indicator and a negotiated sale indicator is 0.82. Noticeable exceptions are issuers in Utah and Connecticut. In New York, there is an apparent mismatch between columns because many of what appear to be competitive sales are hybrids between competitive and negotiated. Overall, the matching between shades of gray between columns is almost perfect.

The first row of Table 3 reports average gross spreads for deals where negotiated sales

[5]Observations are grouped together.

are restricted, and deals where negotiated sales are not restricted in the full sample. In order to avoid selection bias, we do not compare gross spreads between competitive and negotiated sales. Instead, we compare the gross spreads of bonds issued under sets of laws where negotiated sales are restricted, to the gross spreads of bonds issued under sets of laws where negotiated sales are not restricted, regardless the proportion of deals sold by either method. That is, we measure the cost of the restrictions and not the issuer's optimal choice. Consider the following example. Suppose that the gross spread of competitive sales is $10 for every issuer, and that of negotiated sales is $12 for every issuer. The optimal choice is to use always competitive sales because they are $2 cheaper. The cost of the restriction is $0, because a restriction on negotiated sales does not impose a cost on school districts because nobody wants to use them anyway. Thus, the issuer's optimal choice and the cost of the restriction are two different matters. Between 2004 and 2014, the average gross spread of restricted deals was $1.38 higher for every $1000 of par value, than the average gross spread of unrestricted deals.

The second row of Table 3 shows average gross spreads for restricted deals and unrestricted deals in a sample of deals secured by unlimited ad-valorem taxes. The intention here is to compare similar deals in terms of statutory security. The average gross spread of restricted deals was $0.53 higher than the average gross spread of unrestricted deals.

The third row shows average gross spreads in a sample of deals secured by unlimited ad-valorem taxes, and issued to fund building or purchasing of school buildings, purchasing of school lots, making of alterations or additions to the school building or buildings other than as may be necessary for current maintenance, operation, or repairs. In general, deals issued to fund such purposes do not have exceptions to the general sales provisions, while occasionally, deals issued to fund other purposes benefit from exceptions to the general sales provisions. We drop the deals that finance other purposes to the previously described to avoid estimation bias caused by the miss-classification of the sales provisions caused by unobserved exceptions. When deals have no purpose data

we drop those deals where the longest maturity bond maturity in the deal is 10 years or less for the following reasons. Deals that finance "building" purposes have maximum statutory maturities between 20 years and 40 years. Consistent with the laws, bonds with observed "building" purposes generally have maturities longer than 10 years in the sample. Deals that finance other purposes ,such as the purchase of school equipment or school buses, often have maximum statutory maturities of 10 years. The legislator's intention is to match the financing maturity with the underlying project's useful life. In this sample of "building" bonds, restricted deals have an average gross spread of $2.00 higher than unrestricted deals.

The last row of Table 3 shows average gross spreads in a sample of deals secured by unlimited ad-valorem taxes issued to fund building projects with fixed coupon rates and interest income exempt from federal income tax. Most general bond laws do not restrict the negotiated sale of variable rate bonds, taxable bonds, and in some instances, appreciation bonds–zero-coupon bonds. These types of bonds naturally have higher gross spreads because they are harder to sell. Our intention is to avoid the selection bias from comparing restricted deals with bonds that are not restricted because they are naturally harder to sell and naturally have higher gross spreads. Not surprisingly, once we correct the selection bias, the difference between average gross spreads increases. In this sample, the average gross spread of restricted deals was $2.47 higher than the average gross spread of unrestricted deals.

Table 3 provides evidence that the restrictions on negotiated sales increase the gross spreads that school district have to pay to issue bonds. It is possible that the states where negotiated sales are restricted are states where gross spreads are naturally high and legislation requires competitive sales to force lower prices than absent a restriction. Although at first sight the states where negotiated sales are restricted do not look intrinsically different from the states where negotiated sales are not restricted, this issue can be formally addressed by simply estimating a regression equation where we include

state fixed effects. Let GS_{sti} denote issue i's gross spread in state s at time t. Our baseline specification for estimating the effect on GS_{sti} of the restrictions on the negotiated sale of school bonds is:

$$GS_{sti} = \gamma_s + \lambda_t + \delta * Rest_{st} + S'_{sti}\theta + X'_{sti}\beta + \varepsilon_{sti}. \quad (1)$$

Here γ_s are state fixed effects, and λ_t are month-year fixed effects that capture national trends. $Rest_{st}$ is the policy variable of interest that indicates whether negotiated sales are restricted in state s at time t, and δ is the effect we want to estimate. S_{sti} are security covariates of issue i. The security covariates include the primary source of funds, a dummy variable that indicates whether the bond is secured by unlimited ad-valorem taxes but not necessarily the primary source of security, and a dummy variable that indicates whether debt service is guaranteed by the full faith and credit of the state. We do not include the whole set of security covariates discussed in Section 2 because many of them are constant in our sample, and also to avoid measurement error when they are hard to observe, such as liens, secondary revenue pledges, and guarantee programs. X_{sti} are other covariates commonly employed in the literature, such as in Cestau, Green & Schürhoff (2013), and Green, Hollifield & Schürhoff (2007). These include the issue amount, the deal maturity, the deal rating, and a set of dummy variables that indicate whether it is a fixed-rate deal, not exempt from federal income tax, callable, sinkable, bank qualified, and issued in California in 2011, which was a special period in which bonds followed a different time-trend to the other states. Finally, θ and β are parameters to be estimated.

The first row of Table 5 reports estimates of the effect on gross spreads δ for five different specifications for Equation (1). The first specification does not include security covariates or state fixed effects. The second specification adds the security covariates and other control covariates. The third specification adds state fixed effects. The fourth

specification measures the effect in a sample of deals secured by unlimited ad-valorem taxes—the unlimited sample. Two of the security covariates take constant values in this sample, so they are dropped from the estimation. The fifth specification measures the effect in the Building sample above described. Consistent with Table 3, the estimated effects are always positive, statistically significant at the 1% or 5% significance levels, and economically meaningful. Restricting the negotiated sale of school bonds increases the gross spread that school districts have to pay when they issue bonds.

Although not shown in the table, the coefficients on the control variables have the expected sign. Deals not exempt from federal income tax, deals that do not pay fixed coupons, and small size deals are more expensive to issue. The gross spread decreases with better ratings and increases with longer maturities. Infrequent or small issuers, as measured by the bank qualified dummy variable, face higher gross spreads. Deals secured by the full faith and credit of the state, and deals secured by unlimited Ad-valorem taxes face lower gross spreads. Deals that are secured by special taxes are more expensive to issue.

We now analyze the effect of the method of sale restrictions on reoffering yields. We do not compare the reoffering yields of competitive sales to the reoffering yields of negotiated sales. Instead, to avoid selection bias, we compare the reoffering yields of bonds issued under sets of laws where negotiated sales are restricted to the reoffering yields of bonds issued under sets of laws where negotiated sales are not restricted, regardless the proportion of deals sold by either method. The baseline specification for estimating the effect on reoffering yields is similar to Equation 1, but instead of including deal-level covariates, we include analogous bond-level covariates. Because municipal bonds are issued in series, and each maturity of the deal is sold as a separate security in the primary market, we have yield observations for multiple maturities per deal. Therefore, although bond issues tend to be long-term deals, we have a large number of observations for each year of the term structure. Thus, we can estimate a separate

restriction effect for each year in the term structure by including a dummy variable per maturity year, and including additional dummy variables per maturity year just for restricted bonds.

Table 6 reports maturity-specific estimates of δ—the effect of the restriction on reoffering yields—for five specifications similar to those presented in Table 5. The first specification does not include security covariates or state fixed effects. The second specification adds the above-mentioned security covariates and other control covariates. The third specification adds state fixed effects. The fourth specification measures the effects in the unlimited sample. The fifth specification measures the effects in the Building sample. The first thirty rows show the difference in average reoffering yields between restricted and unrestricted bonds of the same maturity. For example, the first row shows the difference in average reoffering yields between a 1-yr restricted bond and a 1-yr unrestricted bond. The second row shows the difference in average reoffering yields between a 2-yr restricted bond and a 2-yr unrestricted bond, and so on. Columns (1) and (2) provide evidence that the restrictions on negotiated sales reduce average reoffering yields regardless the maturity. Estimated coefficients are negative, statistically significant at the 1% level, and economically meaningful. Once we add state fixed effects in column (3)—our preferred specification—the coefficients are positive for shorter maturities, and negative for longer maturities. The restrictions on negotiated sales increase the financing costs for shorter maturities, and decrease them for longer ones. Once again, every coefficient is statistically significant at the 1% significance level, and economically significant except at the maturity when the coefficients change from positive to negative. We find similar results in the unlimited sample and the building sample. Most notably, in every specification the estimated effects become monotonically more negative with longer maturities. The average difference between the 1-yr effect and the 28-yr effect is -0.77 percentage points — a high magnitude compared to average bond yield levels between 2%-2.5% in the sample.

Although not shown in Table 6, all other coefficients have the expected sign. Bonds not exempt from federal income tax, bonds that do not pay fixed coupons, and small size bonds have higher reoffering yields. Reoffering yields decrease with better credit ratings, and increase with longer maturities. Bonds from infrequent or small issuers, and bonds secured by special taxes have higher yields. Bonds secured by the full faith and credit of the state, and bonds secured by unlimited Ad-valorem taxes have lower yields.

6. Identification

It is evident from Eq. (1) that if the policy variable $Rest_{st}$ was constant by state, then $Rest_{st}$ would be co-linear with the state fixed effects, and we would not achieve identification. However, $Rest_{st}$ may not be constant in a state "s" for several reasons, which include special authorization laws, the purpose of the issue, the deal size, the deal maturity, the taxable status of the issue, the coupon type, and because sales provisions might have changed between 2004 and 2015. We obtain identification based on the following argument:

Suppose that there are two states, $s = \{1, 2\}$, and two bond types $b = \{T, E\}$, for example, taxable and exempt. A bond can be restricted or non-restricted, $l = \{R, NR\}$. Assume that both bond types are restricted in state $s = 2$, but only type $b = E$ is restricted in state $s = 1$. Let $GS_s^{b,l}$ be the gross spread at state "s", of the bond type "b", with policy variable "l". From Eq. (1), the gross spreads of the two bond types in each state are:

$$GS_1^{E,R} = GS_1^{E,NR} + \delta * Rest, \quad (2)$$

$$GS_1^{T,NR} = GS_1^{E,NR} + \theta_{b=T}, \quad (3)$$

$$GS_2^{E,NR} = GS_2^{E,NR}, \quad (4)$$

$$GS_2^{T,NR} = GS_2^{E,NR} + \theta_{b=T}, \quad (5)$$

where "b" is one of the covariates included in X_{sti} (X_{sti} includes deal size, deal maturity, taxable status, and coupon type), and $\theta_{b=T}$ is the parameter in vector θ that captures the effect of $b = T$. We identify $\theta_{b=T}$ by subtracting (4) from (5). We identify δ by subtracting $\theta_{b=T}$ from (5), and the result from (2). Notice that it is not required that $b = T$ be exogenous to obtain unbiased estimates of δ. If $b = T$ is not exogenous, the estimate of $\theta_{b=T}$ will be biased. However, as long as the bias is the same in both states, the estimate of δ will be unbiased. Also notice that the above identification argument is also valid even if states followed separate trends. If that was the case, the state-time trends would cancel out with each subtraction. Therefore, the assumption of common national trends is not necessary to obtain unbiased estimates of δ.

Table 7 summarizes the different identification channels in the sample. Each channel is presented in a different panel. The first column in each panel shows the states that provide identification. The second column indicates whether there was a change in the sales provisions in the state, with respect to the corresponding channel. The third column shows the number of deals that provide identification by state and channel. The identification channel in Panel A is the "2^{nd} Bond Type" channel. Most states have enacted special laws that, under certain circumstances, authorize school districts to issue bonds with the same credit quality as those issued under general law, that do not require a referendum, or/and that do not alter the legal debt capacity of the district. The issuance of a second bond type is clearly exogenous to ε_{sti} in Eq. (1), because the intension is to avoid an election, or/and to keep debt capacity unchanged. Most times these alternative bonds share the same sales provisions as the general-law bonds. Alabama and Wisconsin have the particularity that these alternative bond types, contrary to the

general-law ones, were unrestricted. Oregon also had two bond types with different sales provisions until September 25, 1991.

The identification channel in Panel B is the "Taxable Status" channel. Most state legislatures have enacted special provisions that apply only to "taxable" bonds. In states such as Nevada, New Mexico, Montana, Minnesota, and South Carolina, those special provisions also include different sales provisions to the general law ones. There are two reasons why a district would issue a taxable bond. The first one is when the purpose of the issue (the project to be financed) does not qualify to federal tax exemption, e.g.: pension bonds, bond issued to finance sport facilities, private activity bonds. The purpose, or financing need, and therefore the taxable status, is clearly independent of ε_{sti} in Eq. (1). The second one is when the issuer participates in a federal bond program. Federal bond programs include: Qualified Zone Academy Bonds (QZAB), Qualified School Construction Bonds (QSCB), Qualified Energy Conservation Bonds (QECB), Recovery Zone Economic Development Bonds (RZEDB), and Build America Bonds (BAB). The first four bond types provided significant and direct savings to the issuer, but had limited allocations by state, and they were allocated to local school districts by the state legislatures. BABs only provided indirect savings to the issuer, but issuers could participate in the BAB program at their own choice. Most taxable bonds in our sample are QSCB, which are allocated by state legislature, and therefore, exogenous to ε_{sti} in Eq. (1). BAB represent a small part of the taxable bonds in our sample, and are arguably exogenous to ε_{sti} in Eq. (1) once we control by deal size.

The identification channel in Panel C only applies to the state of Kansas. In Kansas, school bonds may be sold through negotiated sale when the issue is accompanied by an issuance of refunding bonds. Between 2009 and 2010 there was a large refunding shock in the municipal bond market due to the prevailing low interest rates, which allowed many school bonds in Kansas to be sold by negotiation. The national shock on interest rates is clearly independent of ε_{sti}. The identification channel in Panel D is the "Deal

Size" channel. In states such as South Carolina, New York, Nevada, New Jersey, North Dakota, Minnesota, and Kansas, where negotiated sales are not allowed, state laws allow negotiated sales of small-sized deals. Deal size in only partly determined by the purpose of the issue, because the issuer may increase the deal size by combining several purposes into one issue. Thus, it is unclear that deal size is exogenous to ε_{sti}, however, it is likely.

The identification channel in Panel E is the "Deal Maturity" channel. Deal maturity is tied by law to the useful life of the purpose of the issue. For example, if the purpose of a bond issue is to provide funds for the construction of a new school building, the legal maturity of the deal may go beyond 20 years. However, if the purpose of the issue is to buy school buses, the deal maturity may not exceed 10 years by law. It is an empirical regularity that issuers prefer maturities close to the legal limits, because they would rather delay taxes to avoid political costs. Therefore, the deal maturity is mostly determined by the purpose of the issue. In states such as South Carolina, Nevada, and Minnesota, where negotiated sales are not allowed, state laws allow negotiated sales when the deal maturity is below certain levels.

The identification channel in Panel F is the "Variable-Rate" channel. In states such as Wisconsin, Nevada, New Mexico, and Minnesota, where competitive sales are required by law, state laws allow negotiated sales when the bonds pay interest at variable rates. However, in our sample, this channel does not provide identification because we do not observe variable-rate bonds from these states. Another potential channel of identification comes from the “Purpose” of the issue. In some states, state laws provide alternative provisions to the general law when bonds are issued for certain purposes. Although they could include different sales provisions, this is not the case in our sample. The purpose is not an identification channel in our case.

As shown in column two of the panels, some of the state laws that provide identification in panels A to G have changed between 2004 and 2015. In those cases identification

is achieved entirely within the state. To prove it, it is enough to change the meaning of $s = \{1, 2\}$ in the above argument, from two states to two time periods, before the shock, and after the shock. Some of these shocks took place between 2009 and 2010. They where a response to the new taxable bond types created by the federal bond programs enacted by the Congress in 2009.

In states such as New Mexico, Montana, Alabama, Oregon, Texas, and Idaho, the sales provisions in the general bond law were amended to allow negotiated sales. Panels H and I show the dates when these amendments became effective. Only the sates in Panel H – the treated states– provide identification in our sample, because the effective dates of the amendments in Panel I are prior to 2003. Identification in panel H is achieved by Dif-in-Dif. A necessary condition to achieve unbiased estimates using Dif-in-Dif is that treated and untreated states must follow the same time trends λ_t. The upper-left chart in Figure 2 compares the time-series of average gross spreads between treated states and untreated states. Gross spreads in treated states seem to follow a different trend to gross spreads in untreated states. Therefore, Dif-in-Dif estimates of the gross spread effect from Panel H are probably biased. The lower-left chart in Figure 2 compares the time-series of average reoffering yields between treated states and untreated states. We exclude California because we allow their bonds to follow a different trend in 2011. The trend in average yields in treated states almost perfectly match the trend in average yields in untreated states. The correlation between the time-series is 0.99. Therefore, Dif-in-Dif estimates of the yield effect from Panel H are most likely unbiased.

Table 8 lists the states where negotiated sales are permitted, the states where negotiated sales are not permitted without exceptions, and the states where negotiated sales are not permitted with exceptions. In our sample of 36 states, exactly half of them, the unrestricted states, allow negotiated sales, and the other half, the restricted states, do not allow sales by negotiation. Of the restricted states, eleven provide exceptions to the general sales provisions. The upper-right chart in Figure 2 compares the time-series of

average gross spreads between restricted and unrestricted states. The lower-left chart in Figure 2 compares the time-series of average reoffering yields between restricted and unrestricted states. Between 2004 and 2014, gross spreads have been systematically higher in restricted states than in unrestricted states. However, reoferring yields have been systematically lower in restricted states. School districts in restricted states pay higher underwriter fees, but they manage to offer lower yields to investors.

7. Conclusion

The classification of a bond's statutory security that we developed is parsimonious by construction. It is likely that it is also scalable given that it already includes a number of bond types issued under the several chapters and sections of the statutes of 40 states. We also show evidence that it is informative: Despite including bond ratings covariates, the security parameters are statistically significant and economically meaningful in every regression. Nevertheless, we do not test whether they capture all the relevant information of the statutory security of bond. We recommend that future research use this classification when seeking a sample of comparable bonds, regardless of the policy question being addressed.

Special laws allowing negotiated sales for specific purposes in states where negotiated sales are restricted, are usually accompanied by statutory maximum terms of ten years. Table 6 shows that the negotiated sales restrictions increase the reoffering yields for maturities up to twenty years, and decrease them thereafter. Therefore, although these special laws are a good first step, there is room for improvement. We recommend that future legislation include additional purposes in these special laws. It also optimal to increase the maximum maturity to twenty years. It might be optimal to increase them above twenty years, or even eliminate the negotiated sales restrictions altogether. In designing these extensions, the policy maker must take into account the trade-off between

lower yields and higher gross spreads of the restrictions for maturities above 20 years.

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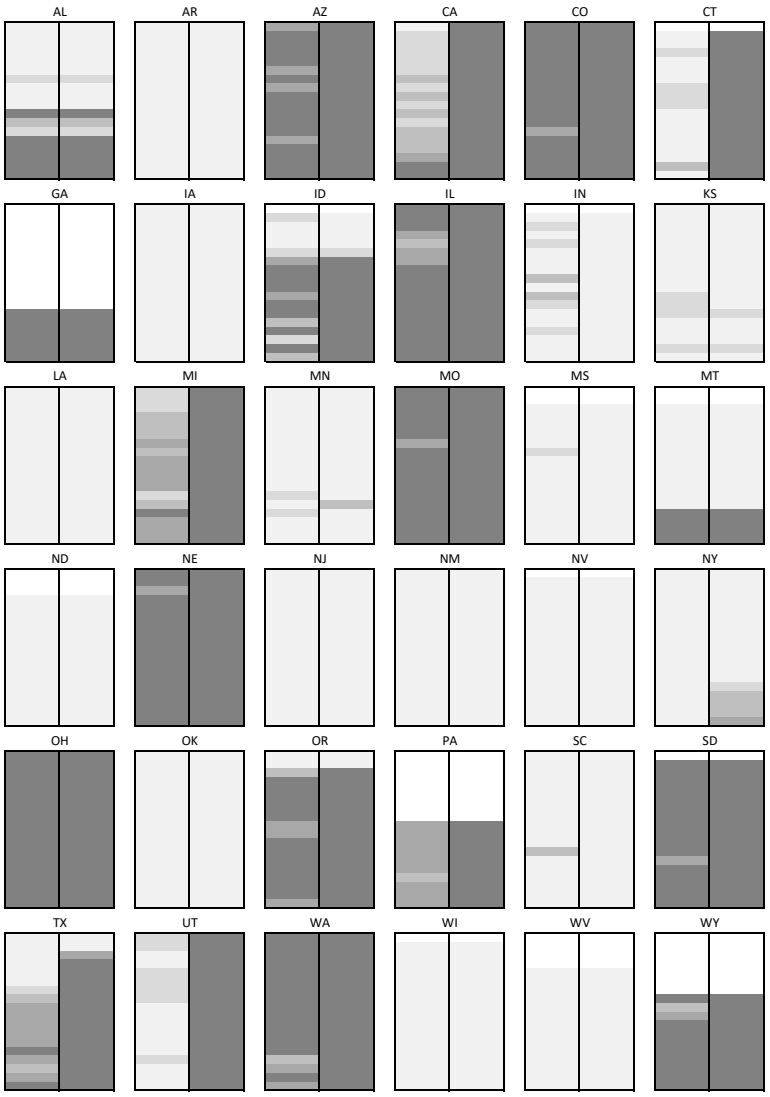

Figure 1: Sales Provisions and Issuers' Choices. The figures compare states' sales provisions to issuers' choices. Left columns show the percentage of bonds sold by negotiated sale, per year, since 1997. Right columns show the percentage of the bonds sold per year that had no sales restrictions, since 1997. The five shades of gray correspond to a partition of the 0%-100% interval into five equal-size parts. Darker shades of gray indicate higher proportions of negotiated sales and higher proportions of unrestricted bonds sold in the year. White indicates no data.

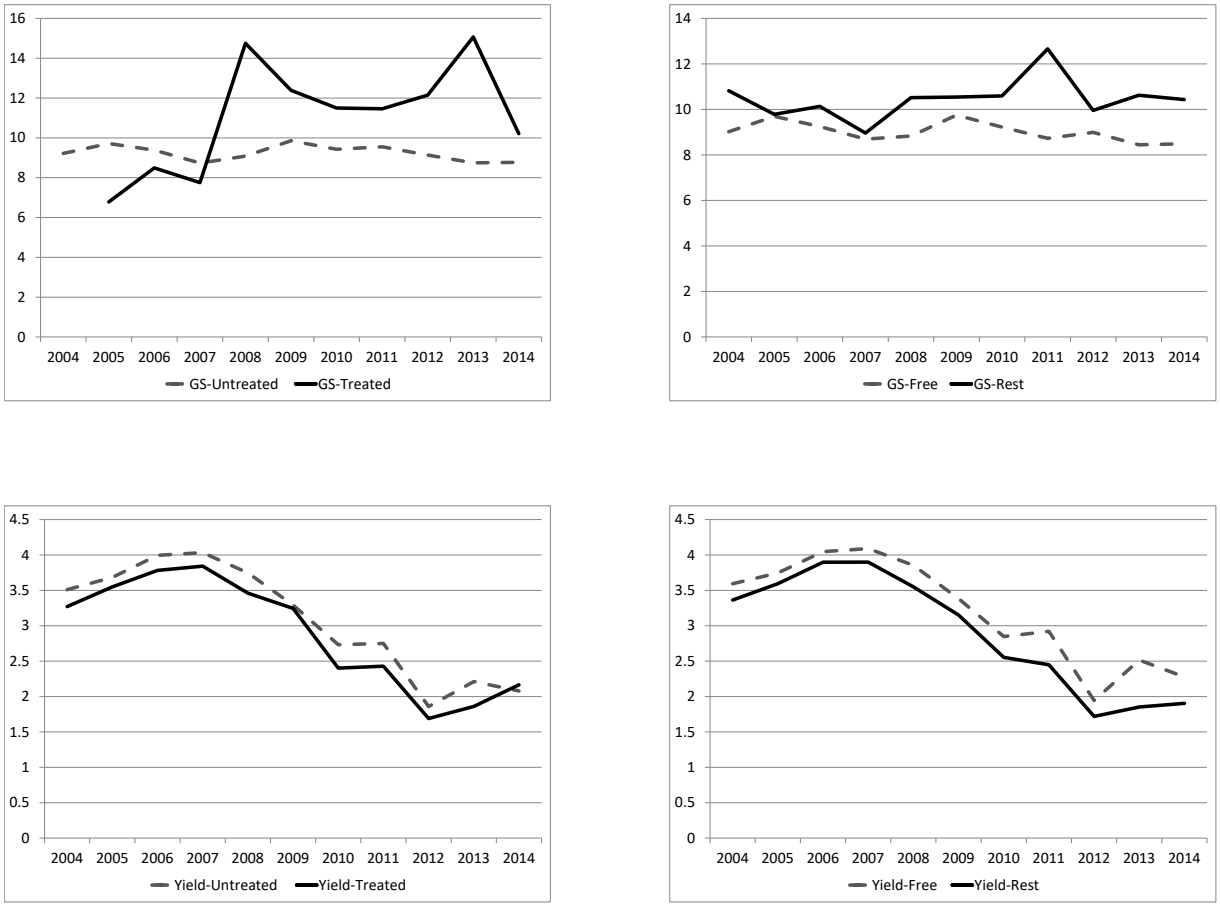

Figure 2: Time Trends. The upper-left chart compares the time-series of average gross spreads between treated states (NM, MT, AL) and untreated states. The lower-left chart compares the time-series of average reoffering yields between treated and untreated states. California is excluded from the untreated states because we allow their bonds to follow a different trend in 2011. The upper-right chart compares the time-series of average gross spreads between restricted states and unrestricted states. The lower-left chart compares the time-series of average reoffering yields between restricted and unrestricted states. California is excluded from the unrestricted states.

Type	Maturity	GS	Rated(%)	Rest(%)	Bid(%)	Yield(%)
TRANs	0.9	2.27	14	0 (19%)	84	2.21%
BANs	1.0	3.86	14	0 (18%)	85	2.13%
COP/Ins	13.3	12.38	54	0 (32%)	17	3.36%
Bonds	15.1	8.86	74	37 (99%)	52	3.17%
Notes	8.4	9.36	61	0 (55%)	28	2.89%
Revenue	17.7	15.06	44	13 (59%)	37	3.55%

Table 1: Bond types. The table compares the six types of obligations of column 1 across six dimensions. The second column displays average maturity in years, and the third one (GS) shows the underwriter discount every 1000 USD of par value. Rated (%) is the percentage of issues with a credit rating. Rest(%) is the percentage of obligations in the sample with restricted negotiated sales. We show between parenthesis the fraction of obligations for which we have analyzed the statutory sales provisions. Bid (%) shows the percentage of issues sold through a competitive sale. Yield(%) displays average annual reoffering yield rates.

Field	Description
Primary source of security	– Takes six possible values that describe the primary source of funds to pay the bonds.
Primary creates new revenues	– A dummy variable that indicates whether the prime source of security creates new revenues, i.e. the issue is self-supported.
Primary source role	– Takes three possible values that indicate whether the entire issue is expected to be paid from the primary source or most of it, or 'unless and for the part not paid from other sources.'
Primary source restricted	– A dummy variable that indicates whether the primary revenues come from a legally restricted or an unrestricted source of revenues, before transfer to the debt service fund.
Pledge/Lien on primary source	– Takes three possible values that indicate whether the issuer has pledged the primary source for the repayment of the bonds, whether bondholders have a lien on the primary source, or none of the above.
Primary source continuing appropriation	– A dummy variable that indicates whether debt service is secured by an irrevocable continuing appropriation or mandatory appropriations of the primary source of funds.
Primary unlimited	– A dummy variable that indicates whether the primary source can provide unlimited revenues for the repayment of the bonds.
Unlimited	– A dummy variable that indicates whether the bond is secured by unlimited ad-valorem taxes, not necessarily the primary source of security.
Secondary source of security	– Takes seven possible values that describe any explicit secondary source of funds to pay the bonds.
Pledge/Lien on secondary source	– Takes three possible values that indicate whether the issuer has pledged the secondary source for the repayment of the bonds, whether bondholders have a lien on the secondary source, or none of the above.
Full Faith and Credit	– A dummy variable that indicates whether the issuer has pledged its full faith and credit for the repayment of the bonds.
Unrestricted funds and revenue sources	– A dummy variable that indicates whether the bonds can be paid from any unrestricted revenues or funds of the issuer.
State Guaranty	– Takes four possible values that indicate whether debt service is guaranteed by a state program/fund, by the apportioned state aid to the issuer, by the full faith and credit of the state, or none of the above.

Table 2: Bond Classification Method. The table describes the fields used in classifying bonds' legal security.

	Unrestricted			Restricted			
		Observations			Observations		
Sample	Mean ($)	w/ Spread	Total	Mean ($)	w/ Spread	Total	Difference ($)
Full Sample	9.07	5,403	10,740	10.45	735	5,921	1.38
Unlimited	8.52	4,390	8,615	9.06	538	5,376	0.53
Building	8.51	3,908	6,517	10.51	404	2,820	2.00
Fixed & Exempt	8.22	2,397	4,228	10.68	353	2,697	2.47

Table 3: Average Gross Spreads. The table shows average gross spreads for Restricted deals and Unrestricted deals between 2004 and 2014. Restricted deals are restricted from using negotiated sales. Unrestriced deals are not restricted from negotiated sales. The full sample is the sample of 16,661 deals described in section 3. The Unlimited sample only contains deals secured by unlimited ad-valorem taxes. The Building sample only contains unlimited-sample deals that were issued to fund building or purchasing of school buildings, purchasing of school lots, major alterations or additions to the school building or buildings, and similar purposes. The Fixed & Exempt sample only contains building-sample deals, with fixed coupon rates exempt from federal income tax. Columns three and five show the number deals with gross spread data and the total number of total observations.

	Issue Controls
Not Exempt	Indicator variable for bonds in the issue being tax exempt or not
Not Fixed	Indicator variable for bonds in the issue with fixed or floating rates
Callable	Indicator variable for callable bonds in the issue
Bank Qualified	Indicator variable for bank qualified issues
Sinkable	An indicator variable for the bonds in issue with sinkable provisions
Issue Amount	The total par amount of the issue
Deal Final Mat	The longest maturity of the issue
Bond Rating	indicator variables for the issue's credit rating:
No rating	AAA, AA+ AA, AA-, A+, A, A-, BBB+ BBB, BBB-
	Legal Security Controls
Primary source of security	Categorical variable for the primary source of funds to pay the bonds.
Unlimited	Indicator variable if the bond is secured by unlimited ad-valorem taxes, not necessarily the primary source of security.
Full Faith and Credit	Indicator variable for whether the state has pledged its full faith and credit for the repayment of the bonds.

Table 4: Deal and bond control variables. The table describes the control variables.

Dependent: Gross Spread	(1)	(2)	(3)	Unlimited	Building
Restricted	0.878	0.507	1.032	1.359	2.379
	(0.19)	(0.20)	(0.48)	(0.49)	(0.55)
Security Control Variables	No	Yes	Yes	Yes	Yes
Other Control Variables	No	Yes	Yes	Yes	Yes
State Fixed Effects	No	No	Yes	Yes	Yes
Month-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
N	6135	6135	6135	4926	4311
R-sq	0.259	0.288	0.372	0.316	0.305

Table 5: The effect of issue choice restrictions on gross spreads. The table shows the estimated coefficients of the gross spread determinants in Equation (12). Restricted is a dummy variable indicating if negotiated sales are restricted and is our variable of interest. The Unlimited sample only contains deals secured by unlimited ad-valorem taxes. The Building sample only contains unlimited-sample deals that were issued to fund building or purchasing of school buildings, purchasing of school lots, major alterations or additions to the school building or buildings, and similar purposes. The control variables are describe in Table 4. Standard errors are clustered by month of issuance.

	(1)	(2)	(3)	Unlimited	Building
Rest * 1-yr Mat	-0.0963	-0.100	0.197	0.199	0.201
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Rest * 2-yr Mat	-0.248	-0.246	0.132	0.130	0.186
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Rest * 3-yr Mat	-0.172	-0.173	0.182	0.176	0.171
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Rest * 4-yr Mat	-0.158	-0.159	0.185	0.179	0.166
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Rest * 5-yr Mat	-0.149	-0.152	0.183	0.180	0.168
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Rest * 6-yr Mat	-0.137	-0.140	0.162	0.164	0.162
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Rest * 7-yr Mat	-0.135	-0.138	0.158	0.163	0.171
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Rest * 8-yr Mat	-0.137	-0.141	0.153	0.164	0.171
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Rest * 9-yr Mat	-0.141	-0.145	0.146	0.160	0.169
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Rest * 10-yr Mat	-0.145	-0.150	0.141	0.154	0.165
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Rest * 11-yr Mat	-0.154	-0.160	0.134	0.150	0.162
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Rest * 12-yr Mat	-0.158	-0.165	0.131	0.146	0.157
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Rest * 13-yr Mat	-0.169	-0.176	0.119	0.132	0.144
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Rest * 14-yr Mat	-0.175	-0.183	0.110	0.123	0.135
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Rest * 15-yr Mat	-0.160	-0.168	0.126	0.148	0.162
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)

Table 6: Yield Regressions. The table shows the effect on reoffering yields, by maturity year, of the restrictions on negotiated sales. Rest *yr mat is a dummy variable that takes a unit value for restricted bonds of a given maturity. Columns (1) to (5) are analogous to columns (1) to (5) in Table 3. Standard errors are clustered by month of issuance. The table is continued on the next page

	(1)	(2)	(3)	Unlimited	Building
Rest * 16-yr Mat	-0.187	-0.196	0.1000	0.117	0.132
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Rest * 17-yr Mat	-0.178	-0.187	0.108	0.123	0.139
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Rest * 18-yr Mat	-0.195	-0.205	0.0929	0.107	0.125
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Rest * 19-yr Mat	-0.191	-0.200	0.0967	0.104	0.123
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Rest * 20-yr Mat	-0.196	-0.208	0.0871	0.0989	0.115
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Rest * 21-yr Mat	-0.372	-0.384	-0.0575	-0.0381	-0.0187
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)
Rest * 22-yr Mat	-0.419	-0.436	-0.0852	-0.101	-0.0811
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)
Rest * 23-yr Mat	-0.524	-0.538	-0.176	-0.192	-0.171
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)
Rest * 24-yr Mat	-0.569	-0.583	-0.203	-0.191	-0.169
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)
Rest * 25-yr Mat	-0.423	-0.440	-0.0912	-0.107	-0.0846
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)
Rest * 26-yr Mat	-0.740	-0.761	-0.406	-0.424	-0.391
	(0.06)	(0.06)	(0.06)	(0.08)	(0.08)
Rest * 27-yr Mat	-0.843	-0.872	-0.488	-0.532	-0.489
	(0.08)	(0.08)	(0.07)	(0.11)	(0.11)
Rest * 28-yr Mat	-0.899	-0.923	-0.527	-0.556	-0.525
	(0.09)	(0.09)	(0.08)	(0.11)	(0.11)
Rest * 29-yr Mat	-0.710	-0.733	-0.305	-0.328	-0.296
	(0.08)	(0.08)	(0.08)	(0.11)	(0.11)
Rest * 30-yr Mat	-0.435	-0.462	-0.0490	-0.0713	-0.0644
	(0.08)	(0.08)	(0.08)	(0.12)	(0.12)
State Fixed Effects.	No	No	Yes	Yes	Yes
Maturity Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes	Yes
Month-Year Fixed effects	Yes	Yes	Yes	Yes	Yes
N	124,556	124,556	124,556	108,994	97,794
R-sq	0.815	0.815	0.824	0.822	0.809

Table 6: Yield Regressions (continued). The table shows the effect on reoffering yields, by maturity year, of the restrictions on negotiated sales. Rest *yr mat is a dummy variable that takes a unit value for restricted bonds of a given maturity. Columns (1) to (5) are analogous to columns (1) to (5) in Table 3. Standard errors are clustered by month of issuance.

A - 2nd Bd/Nt Type	Shock	♯ Deals
Wisconsin	No shock	215
Alabama	No shock	12
Oregon	25-Sep-91	0
C - With Refunding	**Shock**	**♯ Deals**
Kansas	No shock	35
D - Deal Size	**Shock**	**♯ Deals**
South Carolina	No shock	12
New York	25-Apr-10	878
Nevada	No Shock	0
New Jersey	No shock	12
North Dakota	No Shock	0
Minnesota	No Shock	74
Kansas	1-Jul-08	19
G - Purpose	**Shock**	**♯ Deals**
None	–	–
H - Dif-in-Dif	**Shock**	**♯ Deals**
New Mexico	7-Apr-13	270/36
Montana	1-Mar-11	53/32
Alabama	1-Jan-11	21/26

B - Taxable	Shock	♯ Deals
Nevada	3-Jun-09	12
New Mexico	7-Apr-09	9
Montana	1-Jun-09	15
Minnesota	No shock	50
South Carolina	3-Jun-09	0
E - Deal Maturity	**Shock**	**♯ Deals**
South Carolina	No shock	12
Nevada	No Shock	0
Minnesota	No Shock	1
F - Variable	**Shock**	**♯ Deals**
New York*	No shock	1
Wisconsin	No shock	0
Nevada	No shock	0
New Mexico	5-Apr-05	0
Minnesota	1985	0
I - Dif-in-Dif	**Shock**	**♯ Deals**
Oregon	25-Sep-91	0
Texas	19-Jun-99	0
Idaho	1-Jun-01	0

Table 7: Identification Channels. The table summarizes the different identification channels in the sample. Each channel is presented in a different panel. The first column in each panel shows the states that provide identification. The second column indicates whether there was a change in the sales provisions in the state, with respect to the corresponding channel. The third column shows the number of deals that provide identification by state and channel. *New York laws allow the negotiated sale of zero-coupon bonds.

100% Negotiated	♯ Deals	100% Competitive	♯ Deals	Identification	♯ Deals
Wyoming	12	West Virginia	18	Wisconsin	315
Washington	255	Oklahoma	2,250	South Carolina	319
Utah	89	Mississippi	38	New York	1,858
Texas*	1,425	Louisiana	172	Nevada	51
South Dakota	150	North Dakota**	91	New Mexico	279
Pennsylvania	1,120	Indiana	168	New Jersey	282
Oregon*	132	Iowa	179	North Dakota**	91
Ohio	509	Arkansas	439	Montana	100
Nebraska	315			Minnesota	494
Missouri	637			Kansas	158
Michigan	646			Alabama	59
Illinois	1,655				
Idaho*	81				
Georgia	207				
Connecticut	25				
Colorado	130				
California	1,661				
Arizona	345				

Table 8: Sales Provisions by State. The table lists the states where negotiated sales are permitted, "100% Negotiated", the states where negotiated sales are not permitted without exceptions, "100% Competitive", and the states where negotiated sales are not permitted with exceptions, "Identification". It also indicates the number of deals per state in the sample. *These states amended their sales provisions prior to our observation period. **Although North Dakota laws provide exceptions, 100% of the bonds in the sample are restricted.