

Not all General Obligations Are Created Equal: A Commentary

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Abstract

We document a comprehensive new classification of the legal structures backing municipal bonds and the effects that different legal features have on bond yields. It is a well-documented fact that investors rely on credit ratings to determine the credit risk of municipal bonds. However, rating agencies do not fully factor in the legal structures backing the bonds because measuring and testing the effects of said legal structures is inherently onerous. Since the price of risk is unusually high in this market, these flaws have important effects on yields.

Keywords: Municipal bonds, credit ratings, rating agencies, bond yields, general obligations, legal security, state law.

JEL: G12, G24, H74, K22, K34.

1. Introduction

The municipal bond market is the financial backbone of America's infrastructure, and the effective functioning of this market is crucial for the provision of public services. With \$4 trillion in par value outstanding in 2021, it is one of the largest capital markets in the US, and with about \$400 billion issued every year, no less can be said about its primary market. For decades, this market has been a synonym of extraordinary credit stability and low default rates. However, it is evolving in fundamental ways. As rating volatility and cumulative default rates continue to increase (Moody's, 2020), this perception of invulnerability may be abandoned once again after nearly a century since the Great Depression. The sector is confronting unprecedented challenges that threaten the financial health of municipal issuers. In addition to a global health and economic crisis and the threat of climate change, municipal issuers are experiencing a substantial increase in debt and pension burdens as well as pervasive demographic shifts.

Opacity and fragmentation are two defining characteristics of the municipal bond market, and these are the cause of numerous frictions and inefficiencies.¹ One in particular is the unusually high price of risk in this market; the yield spreads of municipal bonds are too high for their low credit risk. This means that small variations in risk have large effects on yields and consequently, even larger effects on local economies. Directly or through fiscal multipliers, bond yields are an important determinant of local employment and growth; Adelino et al. (2017) and Dagostino (2018) find that local governments increase capital expenditures when borrowing costs decrease, and these expenditures have a local income multiplier of about 1.9. In a different strand of the literature, Cornaggia et al. (2017) show that investors rely on credit ratings to determine

¹Cestau (2019) documents that the municipal bond market is visibly fragmented along state lines, which limits arbitrage and risk diversification. Babina et al. (2021) find that local tax asymmetries make tax-exempt yields more sensitive to political uncertainty and supply shocks. Schultz (2013) shows that they contribute to systematic yield differences between states, and Li and Schürhoff (2019) argue that they create sub-markets that curb dealer competition. Similarly, the federal income tax exemption also limits arbitrage between municipal bonds and taxable bonds (Green, 1993), although it also creates price distortions beyond those caused by market segmentation (Cestau et al., 2013; Landoni, 2018). Cestau (2020) shows that political connections, distance to issuers and other underwriters are correlate with market power.

credit risk. This means that issuers and investors are susceptible to potential flaws in the assessments made by rating agencies. Since small changes in credit risk have large impacts on yields and the real economy, the consequences of these flaws may be very costly for investors and especially for issuers.

This begs the questions: Do credit ratings provide correct assessments of municipal bond credit risk? Is the real credit risk embedded in bond yields? Emerging literature finds that they do not. Until few years ago, rating agencies paid no attention to the legal structures that back municipal bonds, but recent events unveiled that they are an important risk factor. However, they are yet to fully incorporate these legal structures in their credit risk assessments. Today, the bulk of the credit rating is determined by financial, social and economic factors. The specific legal structures that back municipal bonds still have marginal notching effects.

We argue that, if legal security has not been fully incorporated, it is because rating agencies have not yet developed adequate measures of the legal protections granted by state laws or have not been able to test them. Any risk model requires not only identifying the relevant risk factors, but also learning to measure them and determining their impact on credit risk. Both prove challenging when it comes to the legal structures that back municipal bonds. The credit rating is based on factors that are “universal and measurable” (Moody’s, 2021), but it is very complicated to condense the varied state laws into comprehensive, parsimonious and universal measures. Not only due to their chaotic, complex and tangled layers of legal provisions, but also because they have a very different language, style, structure, and interpretation in each state; a same text can be interpreted differently in different states. And if we build a good measure, it is useless if we cannot test it, and this is very difficult to do due exceedingly low number of municipal defaults. In fact, this is why it is hard to create good risk models for municipal bonds.

Studying the legal structures that back municipal bonds is not only relevant because they affect credit risk and they are not captured by credit ratings, also because they are determined and changed by legislators. These studies may have immediate real

implications as these types of laws are easily and frequently modified. In this paper, we document the different types of protections afforded to bondholders by state laws. We also review the emerging literature on the legal security of municipal bonds, including new classifications of the legal structures backing these bonds, and discuss promising avenues for future research. However, before diving into these topics, we introduce and explain the appropriate framework to interpret legal texts and predict how courts will behave in each case.

2. The legal security of municipal bonds

General obligations (GO) provide the greatest protections to bondholders. However, GO bonds are not ironclad payment guarantees, and ‘not all general obligation bonds are created equal’ (DeMarco et al., 2017; D’Imperio and Hackett, 2013). Until recently, it was believed that all local general obligation bonds were backed by a pledge of the “full faith and credit” and the taxing power of the issuer, and because of these pledges, they all enjoyed the same protections during defaults and bankruptcies. However, the unfoldings and settlements of recent bankruptcy events surprised many: of the two types of general obligations outstanding during the 2011 Jefferson County bankruptcy, only one of them defaulted (Moody’s, 2020)². In the case of Detroit’s bankruptcy, despite all enjoying recourse against the general funds of the city, recovery rates for unlimited general obligations, limited general obligations, and lease bonds backed by the general funds of the city were substantially different: 73%, 42% and 12%, respectively (Cestau et al., 2018). Furthermore, in both cases, some GO bonds were treated as *secured* debt and some not. (NFMA, 2017; Moody’s, 2020). In light of these events, it became clear that the general obligation moniker does not always mean the same. Moreover, differences matter.

The term is often employed in the constitutions and statutes of every state. However, it acquires different meanings depending on the case. To begin with, the term entails

²It had a 88% recovery rate

different protections to bondholders depending on the issuer type; GO bonds are usually supported by some degree of property taxing power at the local level, but not at the state level. The general obligation pledge even permits different degrees of security for the same issuer, as the Detroit case demonstrate. More importantly, the legal security implied by the general obligation pledge varies considerably across states. For example, a GO bond issued by a school district in California is secured solely by an exclusive and dedicated levy of ad valorem property taxes and no other revenues, while in New England, GO bonds are secured by all the general revenues of the issuer but the general obligation pledge does not create a separate property tax levy.

The years ensuing the Detroit and Jefferson bankruptcies witnessed a growing interest in understanding the extent to which the *legal security* of a bond prevents defaults, and what protections they provide when defaults or bankruptcies materialize. Rating agencies changed the way they evaluate the credit risk (Chang and Thompson, 2016), and bond lawyers developed more comprehensive classifications of general obligation bonds (Doty, 2013; DeMarco et al., 2017; D’Imperio and Hackett, 2013). These new classifications concurred that two “opposite” classes of legal features affected the security of municipal bonds: the *breadth* of the pledge, and the degree of *specificity* of the pledge. The breadth of the pledge refers to the scope of resources legally available to pay bondholders. Broader pledges, encompassing all or most of a government’s resources provide more flexibility and range of action to the issuer to service debt. As long as the sources of funds are not perfectly correlated, they provide greater shielding from specific revenue shocks.

However, broad pledges that use blanket language such as “the full faith and credit” or “all available resources” possibly provide little or no protection during events of default or bankruptcy. Court decisions on governmental matters are strongly restricted by the principle of ‘separation of powers’. Because of this principle, courts cannot directly impose taxes or seize funds for the benefit of bondholders. All they can do is issue a court order compelling a government official to execute a duty he is legally obligated to perform. Because judges are reluctant to meddle in government affairs, the more specific

the law is about these duties, the more likely a judge is to compel performance of such duty. Also relevant are the *force* and *effect* of the language of the statute itself and the clarity with which it states that it is a non-discretionary duty (Artin et al., 2014). We refer to all these attributes as the specificity of the pledge, and the degree of specificity will directly determine the probability that a judge issues a court order compelling debt service; this is our premise for evaluating the legal protections afforded to bondholders during defaults and bankruptcies. Let us illustrate this by looking at three very common examples of legal languages.

‘The issuer shall pledge its full faith and credit for the prompt payment of the bonds’; ‘the issuer shall pledge its full faith and credit and shall collect an annual property tax sufficient to pay the bonds unless paid from other sources’; ‘the issuer shall pledge its full faith and credit... [A superior third party authority] is obligated to annually levy separate and dedicated ad valorem property taxes, in addition to all other taxes, in an amount sufficient to pay the bonds, without limitation as to rate or amount. Such taxes will be placed directly [by the third party authority] in a segregated fund held by said authority, which is designated for the payment of the bonds and for no other purpose’.

All of the above legal securities possess the same broad pledge, which includes general revenues and the taxing power of the issuer. In theory, a judge could order to collect additional property taxes for the benefit of the bondholders based on this pledge. However, this is very unlikely in the first of the examples because, since there is not a specific pledge of property taxes, it is not clear that it is a mandatory duty. Moreover, the law does not implicitly or explicitly prioritize debt service over other essential government services, and this will also result in a court being unwilling to issue a writ of mandamus. The second and third examples are quite different in the sense that the bonds are additionally secured by a *specific pledge* of property taxes. Because there is a clear mandatory duty, this specific pledge increases the chances that a judge compels collection of additional taxes. Not by much, however. Even if priorities have been established

in favor of bondholders by legislation, the very reason a local government exists is to provide certain government functions. They are an inherent priority because if debt service prevents a government from performing them, it would cease to exist and the debt would be extinguished. Furthermore, it is difficult to determine the boundaries of what constitutes an essential service, the extent to which essential services and debt service compete for the same limited dollars, and whether an increase in the tax rate would further deteriorate the tax base and tax revenues. The judge will be reluctant to make these determinations and create a precedent.

Nevertheless, the third legal language also calls for other specific duties that will positively and greatly affect the protections afforded to bondholders, as well as recovery rates. First, this legal protection explicitly prohibits the issuer from using the collected funds for any other purpose other than paying the bonds. Regardless of the level of financial distress, any court will be willing to issue an order restraining a government official from performing an act prohibited by law. As a general rule, explicit and specific prohibitions provide effective and strong protections to bondholders. This security feature was the prime reason behind the higher recovery rates for unlimited tax GO bonds during Detroit's bankruptcy. Rather than claiming an increase in the tax rate over the constitutional limit, the plaintiff alleged that the city was unlawfully diverting voter-approved property taxes that were only to be collected and used for the sole purpose of paying the bonds (Cestau, 2018). Detroit's limited tax GO bonds, on the other hand, while also backed by a specific pledge of property taxes, did not benefit from this particular security feature, and this led to much lower recovery rates. Second, the third example requires a third-party tax collector to transfer the collected funds directly to the bond's trustee so that they never flow into the issuer's general fund. Courts will have no qualms to compel performance of this duty. Moody's calls the combination of these two features a 'lock box', and since 2016, it adjusts credit ratings a notch up when present.

Moreover, the force and effect of the language in the third example probably creates a statutory lien on pledged revenues. In states where municipal issuers can file for bankruptcy protection, statutory liens are important risk and recovery rates determi-

nants because they give bondholders a secured claim on pledged revenues that continues to attach to revenues collected after a bankruptcy filing. The law does not need to specifically state that there is a statutory lien; a court would probably find that the force and effect in this example effectively creates one. It would not be without contention, however. It had always been believed that all GO bondholders were to be treated as secured creditors in bankruptcy, but during Detroit's bankruptcy, the city's Emergency Manager declared that limited and unlimited GO bonds should be treated as unsecured debt. He contended that there was no sufficiently explicit language in the state law to grant GO bonds a statutory lien on tax revenues (NFMA, 2017). While Detroit's case, and recent similar cases, were solved in court-approved settlements and not by judgement, the sanctity of the full faith and credit pledge was surely undermined by these claims. To avoid controversy, recent legislation have included explicit statutory liens language such as "bonds issued and sold pursuant to this chapter shall be secured by a statutory lien on all revenues received pursuant to the levy and collection of the tax".³

The degree of specificity not only protects bondholders in bankruptcy or default, it also helps to prevent these events. First, a requirement to levy an additional property tax effectively creates an additional source of revenues for the issuer. Absent this requirement, this resource, and the flexibility it conveys, would not be available to the issuer since local governments can only collect those taxes that constitution or legislation expressly allows. Second, data shows that local governments are more reluctant to default when the security features of the bonds make it very likely that a court compels debt service. In other words, they will not default if they estimate unfruitful to seek debt relief. For example, when Jefferson County defaulted on its general obligations, its school warrants were not impaired (Moody's, 2020), probably due to the superior features of their legal security. Like this we find many other examples, generally involving a default on lease revenue bonds but not on general obligations.

The new classifications developed by bond lawyers were consistent in that the breadth and specificity of the pledge were determining risk factors, however, they were

³Section 15251(b), Education Code, California Law.

not tested taxonomies. They did not provide a measure of fit or the frequencies with which each legal characteristic was observed in the data. The only empirically tested classification was developed by economists in Cestau et al. (2018). Cestau et al. (2018) classify the legal security backing long-term obligations issued by independent school districts throughout the country. The classification is comprehensive and parsimonious, and although it was developed for school bonds, it is scalable to most local government bonds because applicable laws are either common to all municipal issuers in a state or drafted similarly. In the following sections, we will discuss and analyze in detail this classification and how the different legal structures affect the protections granted to bondholders. We will also discuss what risk factors are not captured by this classification.

Regarding the breadth of the pledge, Cestau et al. (2018) state that every contract that creates a long-term financial obligation, bonded or not, has recourse against the general funds of the issuer. Statutory law may require the issuer to augment the recourse by pledging its “full faith and credit”. In Detroit’s case, the bonds with the lowest recovery rate lacked this additional pledge. Conversely, the law may also require to limit the recourse to different degrees. It may fully restrict it, or it may partially restrict it against certain funds or revenues, such as the capital fund. All in all, Cestau et al. (2018) recognize four types of broad pledges: full faith and credit, unrestricted (all available funds), restricted (capital fund), and no recourse whatsoever.

Regarding the specificity of the pledge, they state that, in addition to or in lieu of the general pledge, the issuer may specifically pledge ad valorem property taxes. The specific pledge of property taxes can be *limited* or *unlimited*. If unlimited, the issuer may be compelled to raise property taxes to the extent necessary to pay its obligations in full without regard to constitutional tax limits. They also find that pledged property taxes may originate from tax levies with varying degrees of usage restrictions or prohibitions. They can come from *dedicated debt levies* solely for paying debt, *special levies* for ‘special’ purposes, *capital levies* for capital expenses, or the *general levy* for general purposes. As mentioned earlier, the usage restriction was critical in determining recovery rates during

Detroit's bankruptcy. Sometimes, dedicated debt levies produce an *offsetting* reduction in the general levy. Finally, in addition to or in lieu of the general pledge and the specific ad valorem pledge, the issuer may specifically pledge other *special revenues* such as: sales taxes, federal aid, state aid, special assessments, property tax abatements, incremental tax receipts, judgment settlements.

Table 1, presented in Cestau et al. (2019b), provides the first and only measurement of the heterogeneity of the legal securities of municipal bonds. It lists all the observed types of legal securities, along with their frequencies, for the population of all long-term new-money "deals" issued between 1990 and 2014 by independent school districts reported in the SDC Platinum database. The table shows that, while a handful of legal structures accumulate the majority of the observations, this sample alone presents 34 different combinations of the various kinds of broad and specific pledges. The table probably underestimates the true variance of legal securities as it is based only on long-term bonds issued by independent schools. Table 1 reveals that the legal securities of municipal bonds are much more heterogeneous than originally thought. It also indicates the extent to which a simplistic binary classification that divides bonds into general obligations and revenue bonds fails to capture the diversity in the legal protections afforded to bondholders.

Sometimes it is not even clear how to classify a bond into one of these two categories based on its legal security. Table 1 divides the observed legal securities into general obligations and revenue bonds, and compares this categorization to the GO-revenue classification reported in the SDC database. Previously we said that the statutory definitions of general obligations differ across laws and states, and the same is true for revenue bonds. The term is generally used in state constitutions and statutes in connection with obligations that do not have recourse against the general funds of a local government with broad taxing powers and that are secured solely by a special property tax or other special revenues. Based on the statutory uses of these terms, Cestau et al. (2018) define a general obligation as any obligation with recourse against the general funds of the issuer or backed by an unlimited pledge of property taxes, and revenue bonds the rest. Table 1

shows that for some security structures, this classification differs from that used that by the SDC Platinum, as well as by other data services and rating agencies.

One case of a legal security that is difficult to categorize is when the bond is paid exclusively from the levy of a special ad valorem property tax with a fixed tax rate. Special property taxes consist of separate and additional taxes that states occasionally authorize to provide funds for essential purposes, such as environmental cleanup, accessibility and life safety, when they are not adequately funded. Most times, the law authorizes to issue bonds to anticipate the proceeds of the special levy provided that they are solely paid from said taxes. In essence, these bonds have all the distinctive features of a revenue bond. However, data services and rating agencies generally classify them as general obligations simply because they are backed by property taxes.

Another case of discrepancy is that of lease-backed obligations. Lease-backed obligations are a special case of securities that are issued by a separate legal entity that is created and controlled by a local government. They take the form of either lease revenue bonds or certificates of participation, and they are secured by the lease payments stipulated in a capital lease between the issuer and the local government. These types of securities have become a major source of funds for local governments. Detroit alone had \$1.45 billion certificates of participation outstanding at the time it declared bankruptcy. While technically revenue bonds, the obligation of the governmental lessee can vary substantially. Generally, the lessee has the right to not appropriate funds for the lease payments (appropriation leases), or is not obligated to do so if leased property is not used (abatement leases). Although the issuer is not unconditionally obligated to draw from its general fund to pay, bonds with either termination clause are known as general fund securities. However, sometimes statutory law establishes recourse against the lessee's general or capital funds, or even stronger legal structures, comparable to those of general obligations. Nevertheless, data services always classify them as revenue bonds, regardless of the underlying security structure.

Nonetheless, better and more precise classifications should emerge. A good classification ought to be: consistent, where the same value must represent the same security

Table 1: Security Structures: The table compares the security structures of long term financings of school districts in the U.S. since 1985 to the SDC GO-RV classification. Types of obligations: bonds (Bd) and lease-backed obligations/certificates of participation (Cp). Types of recourse against general revenues: full faith and credit (FF), unrestricted (GF), restricted (CF), no recourse (RV), termination clause (AP). Limits to the ad valorem pledge: unlimited (Ult) and limited (Ltd). Types of ad valorem levies: for debt service (Dadval), for special purposes (Sadval), for capital expenses (Cadval), for general expenses (Gadval). Other pledged revenues: sales taxes (Sales), federal aid (Fedaid), state aid (Staid), special assessments (Asmt), property tax abatements (Abat). Source: Cestau et al. (2019b)

General Obligations:	GO	RV	Cadval Ult	Dadval FF	Bd	18	0
Ult Dadval FF Bd	17,082	35	Abat Ult	Dadval FF	Bd	5	0
Ult Gadval FF Bd	7,931	9	GF Cp			95	933
Ult Dadval RV Bd	3,676	16	Ult Dadval	GF Cp		96	397
Ult Dadval GF Bd	3,647	21	FF Cp			40	202
Ltd Gadval FF Bd	1,982	39	Ltd Dadval	GF Cp		66	147
Staid Ult Dadval FF Bd	1,479	13	Ltd Gadval	FF Cp		46	31
Ltd Dadval FF Bd	1,132	3	Ult Dadval	FF Cp		61	10
FF Bd	375	70	Ult Gadval	FF Cp		1	13
Sales Ult Dadval FF Bd	333	0	Revenue Bonds:				
Ult Cadval GF Bd	215	5	Ltd Sadval	RV Bd		1,207	31
Ult Dadval off FF Bd	169	0	Sales RV	Bd		153	502
Sales Ult Dadval GF Bd	74	0	Asmt RV	Bd		32	407
Staid Ltd Dadval GF Bd	64	1	Ltd Cadval	RV Bd		266	13
GF Bd	22	25	Ltd Gadval	RV Bd		7	15
Ltd Dadval GF Bd	43	0	Fedaid RV	Bd		0	10
Ltd Sadval FF Bd	59	4	AP Cp			46	2,722
CF GF Bd	19	2	CF Cp			0	27

feature in all cases and vice versa; comprehensive, that captures the heterogeneity in the legal structures to a large extent; and parsimonious or dense, where each value and category includes a large number of cases from the largest possible number of states.

Returning to the fact that recent literature has documented great heterogeneity in legal securities, questions arise such as to what extent this heterogeneity carries over to the protections granted to bondholders and what are the effects on offering yields. The answers to these questions will provide critical information for decision making that reduce borrowing costs for local governments. While this topic has gained momentum in the municipal financial press, the academic literature still needs to develop. It is a promising field for exciting research, and giving the size of the market and the pressing need for capital by local governments, its relevance is undeniable. Directly or through fiscal multipliers, borrowing costs are an important determinant of infrastructure and the quality of public services (Adelino et al., 2017; Dagostino, 2018).

While the effects on credit spreads are largely unknown, we know that they are

not fully captured by the credit ratings. Moody's adjusts the credit rating up by one notch when a 'lock box' is used, and may notch it down when taxing headroom is low. However, the bulk of the credit rating is determined by completely different factors. About 30% of the credit rating is determined by economic indicators of the strength of the local economy and the tax base, another 30% is determined by financial indicators of the issuer's fiscal position, financial leverage has about a 20% weight, and the remaining 20% measures the issuer's legal, institutional, and historical ability to match general revenues with general expenditures. It is similar with the S&P rating. We do not know to what extent rating agencies have tested and ruled out the effects of different legal structures, but there is a clear trend to incorporate better and more precise information about them. And each time they do it, the effects on credit ratings are sizable (Chang and Thompson, 2016). If rating agencies do not fully factor in the legal security, it is probably because they have not yet developed or tested a consistent, comprehensive and parsimonious classification. In any case, it is a fact that legal security affects recovery rates. Even if the effects on yields are small on average, they certainly become significant when credit conditions worsen.

Testing the different legal structures poses a real challenge, however. To begin with, default and bankruptcy events involving general obligation bonds are too limited in number to allow credible statistical inference. Furthermore, most cases are resolved by negotiated settlement rather than court judgment, and when it is not the case, judges are careful to avoid creating precedents with their sentences. Due to this lack of case law, it is impossible to accurately predict how judges will balance the rights of bondholders and taxpayers. Measuring the effects on yield spreads rather than on recovery rates or default events is not a panacea. Since legal security is determined by state law, cross-sectional variation within states is low. Therefore, state fixed effects are detrimental to identification, but if they are not included, legal security effects soak up those of unobserved state variables. Even a good estimation design spared from unobserved confounding variables would not be exempt of problems. Until recently, investors and rating agencies paid no attention to legal security, so there is no guarantee that it is priced correctly and embedded in bond yields. Therefore, in what follows, we provide a

qualitative analysis of the different security features, discuss the little evidence provided in the existing literature, and suggest different alternatives for testing them.

Two papers provide novel empirical research on the legal security of municipal bonds, Moldogaziev et al. (2017) and Cestau et al. (2019a). Moldogaziev et al. (2017) study the effect of statutory liens on borrowing costs. They find that statutory liens have very modest effects, on the order of one digit in terms of basis points, on offering yields. However, their identification comes from comparing bond yields across states with and without statutory liens, and of course, they cannot include state fixed effects. Very likely, their estimates capture the effects of unobserved state variables. This does not mean it is not possible to obtain within-state variation in statutory liens. Some states authorize multiple types of GO bonds and revenue bonds, some with and some without statutory liens, which provide cross-sectional variation in those states. There have also been recent law changes in some states that have established or reaffirmed statutory liens, providing also time-series variation. Both cases allow estimating the effect of statutory liens while still controlling for unobserved state variables.

Cestau et al. (2019a) estimate the residual effects on bond yields of six different legal securities after controlling for the credit rating. The legal security is a pure component of credit risk and, if properly incorporated into the credit rating, it should have a zero effect on bond yields. However, the paper finds significant residual effects, demonstrating that rating agencies do not process all relevant data on legal security. To begin with, they find that bonds only backed by the general or capital funds of the issuer—not to be confused with general fund securities, where there is no obligation to pay—offer significantly higher yields than bonds backed by the full faith and credit, or a specific pledge, or both, after controlling for the credit rating. Although rating agencies generally assigns the same rating to all bonds issued by the same entity on the grounds that, after all, it is the same issuer and issuers have historically shown to act in good faith, investors require a premium for holding the aforementioned bonds beyond that corresponding to their credit rating. This result is consistent with the fact these bonds typically have the lowest recovery rates and perhaps higher default rates.

Cestau et al. (2019a) also find no significant differences between the different types of bonds backed by the full faith and credit of the issuer, whether they are enhanced by a limited or unlimited specific pledge, or not. This result is consistent with our analysis of the three examples of legal securities conducted above, where we concluded that a specific pledge should have small effects on credit risk because judges will be reluctant to compel the collection of additional taxes or determine priorities between bondholders and essential services. We also concluded that other specific duties have more decisive effects on credit risk, such as a 'lock box'. Rating agencies take this legal structure into account when computing the credit rating, and this explains why there is no residual effect for unlimited GO bonds even though they often entail dedicated taxes. Finally, they find that revenue bonds backed by special revenues have no difference with revenue bonds backed by property taxes, have slightly higher yields than full faith and credit bonds, and have lower yields than bonds only backed by the general or capital funds of the issuer; all after controlling for credit rating.

This begs the question: what does the full faith and credit pledge have that other pledges do not? Realistically, not much, bond lawyers say. The term makes many uneasy because it is often employed in constitutions and statutory laws but it is seldom defined by any of their provisions, or in case law. In the context of local governments, based on the statements of the Supreme Court of Florida in *State ex rel. Babson v. Sebring*⁴ and the New York court of Appeals in *Flushing National Bank v. Municipal Assistance Corp.*⁵, the pledge means that the issuer makes an express undertaking to use in good faith its full credit and resources to produce sufficient funds to pay the bonds. This basically means that a judge could compel collection of an additional tax or revenue, but, for the reasons stated above, this is unlikely to happen. Therefore, from a legal point of view, the pledge does not differ much from a simple recourse against the general funds. In the end, timely debt service really depends on the good faith and willingness of the issuer to do that which it cannot be realistically compelled to do. This is exactly Moody's argument, but instead of being applicable to all bonds, data shows it should be applied to those bonds

⁴155 So. 669, 672 (Fla. 1934)

⁵358 N.E.2d 848 (N.Y. 1976)

for which the issuer has expressly committed its honor and good faith by means of the 'full faith and credit' symbolism, at least as seen by investors.

Nevertheless, future research may improve the analysis carried out by Cestau et al. (2019a) in many respects. Identification may be expanded by also including lease-backed obligations and other types of issuers beyond school districts, which is the sample of issuers they use. The legal security comprising all revenue bonds backed by special revenues may be too broad to be representative of its components. Special revenues may be very different in nature and therefore have substantially different volatilities. Future research should test each of them individually. The term 'limited pledge' may also be too broad, as it encompasses all types of legal limitations to property taxation, and these can vary to a great extent. There are ceiling limitations and growth limitations, these can be on the tax-rate or on the levy dollar amount, and they may apply to issuers or geographic regions. Each variation may have a different effect on credit risk, and this should be the subject of future research.

Future research should also expand the incipient literature on legal security along the following lines. To begin with, new literature should study the effects of the different usage restriction levels. The usage restrictions are effective legal structures from a legal point of view and there is strong evidence that they affect recovery rates. A usage restriction isolates the source of the pledged revenues from shocks to otherwise competing expenditures, protecting the resources available to pay bondholders. Investigating interaction effects between the different legal features also deserves further exploration, not to mention interactions with default probability. Also relevant is to classify and measure the effects of other legal structures not mentioned here, such as those related to reserve funds. Beyond all this, the challenge remains to determine the channels through which each legal security affects credit risk, whether it is by preventing defaults or by enabling higher recovery rates, and within the former, whether it is by affecting the willingness to pay or the resources available to pay. After all, evidence suggests that underlying all effects, legal structures affect credit risk through three channels: willingness to pay, resources available to pay, and enforceability in court. To succeed in these tasks,

researchers must also work out the apparent mispricing of fundamental risks.

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