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The Effect of State-Level Constitutional Debt Limitations On the Costs of Capital

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The Effect of State-Level Constitutional Debt Limitations On the Costs of Capital

by

Micah Johnson

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Executive Summary

Forty-five states have adopted some form of constitutional limitation on their own legislature's ability to issue debt and raise capital. Eleven states have more than one such limitation. It seems intuitive to assume that constitutional strictures on a state's ability to manage its fiscal policy would affect that state's standing in the market, and it seems equally safe to assume that different combinations of the various forms of debt limitation would lead to varying effects in the market from state to state. However, the specific effects arising from the various constitutional provisions have proven to be difficult to measure. This research explores the substance of these constitutional debt limitations, the history of academic research attempting to measure the effects of these limitations, and the fruitfulness or futility of these academic attempts.

I. Preamble

The term “municipal debt” can be confusing to the uninitiated. There are at least two sources of this confusion. First, the term can refer both to debt issued by a local government (municipality) and to debt issued by a state government. This distinction is substantive, because many states treat local government issues differently than state government issues, either statutorily or constitutionally (or both).

The second source of confusion concerning the meaning of the term “municipal debt” derives from the special tax status of many, but not all, municipal issuances (or bonds). The federal government provides terms by which proceeds from municipal bonds may be tax-exempt; that is, as long as the issuance meets the standards set by the Internal Revenue Service, purchasers of those corresponding bonds pay no taxes on the proceeds of those bonds. When market actors speak of “municipal debt,” or “municipal bonds,” those actors are typically referring to tax-exempt municipal debt. However, much debt undertaken by municipalities and states do not meet these federal standards, and consequently taxable “municipal debt” is far from rare.

The research presented in this paper focuses on state-issued, tax-exempt municipal debt. Any references made to “municipal debt” or “municipal bonds” designates only this limited class of debt. The limitation is more practical than theoretical; while the correlations relayed in this study may apply equally to locally-issued and taxable debt, a six-state survey of all debt issuances over a five-year period exceeds the scope of this project. Instead, the research limits its

attention to state issuances from the period spanning the years 2013-2017, across the selected states.

II. Introduction

State constitutions differ from the U.S. Constitution in many ways. For example, while the U.S. Constitution establishes a federalist system in which the U.S. government possesses limited, specifically enumerated powers to regulate, states are not comparably limited in the scope of their regulatory reach (Serk & Goldman 1304). Furthermore, state constitutions tend to be more easily amendable than the U.S. Constitution (Serk & Goldman 1304). These two qualities, taken together, are conducive to the evolution of state constitutions that advocate specific policy positions, many of which are reactionary, “provoked by local crises of the moment.” (Serk & Goldman 1304). With the passage of time, some of these provisions grow irrelevant, or worse, antithetical to the needs and functions of the modern state (Serk & Goldman 1304).

No state-level constitutional provision embodies this process more clearly than constitutionally-mandated restrictions on the issuance of municipal debt. Only five states have no constitutional provision limiting the state issuance of debt (Kiewiet & Szakaly 67). The vast majority of these constitutional provisions were adopted by the states in the middle- to late nineteenth century in response to a deluge of ill-conceived debt-financed infrastructure projects preceding the economic depression of 1837 (Kiewiet & Szakaly 67). After several states defaulted on their debt obligations in the wake of the 1837 depression, a trend toward constitutionally mandated “fiscal responsibility” swept the nation.

While strictly limiting a state's ability to issue debt may have seemed like good fiscal policy in 1850 (when Kentucky adopted its constitutional provision), most contemporary fiscal policy analysts advocate for debt financing of infrastructure investment as preferable to paying "as you go" (O'Hara 57). These proponents of state debt funding argue that the costs of those infrastructure investments should be paid by those taxpayers taking advantage of the benefits of the investment (O'Hara 57-59). Whereas the antiquated fiscal theory posited that future generations should not be obligated to pay for the excesses of the current generation, most contemporary fiscal analysts argue that current taxpayers also should not be obligated to pay for infrastructure improvements that will benefit future generations (O'Hara 57-59). Thus, the reactionary policy embodied in the constitutional debt limits adopted in the 1800s now runs counter to the exigencies of contemporary state fiscal management.

Furthermore, research in the field indicates that constitutional debt limits may be actively harmful to the fiscal health of those states that have them. Rather than repeal the constitutional debt limits, many states have devised "work-arounds" that allow them to issue debt and raise capital without violating the literal terms of the constitutional mandates. Recent research has suggested that these work-arounds are not without costs, however. The artifice of the work-arounds may lead to lower credit ratings, higher coupon rates, or both. Also, there is limited evidence that states with more restrictive constitutional debt limitations do not issue any less debt than those states with less restrictive mandates.

This research explores the topic of the effects of constitutional debt limits on coupon rates and number of issuances from a period spanning from 2013 to 2017. I begin with a brief history of municipal debt, the adoption of constitutional debt limitations, and the states' strategies for circumventing the constitutional mandates. I follow this history with a review of

the literature that focuses on the effects, both intended and unintended, of the constitutional mandates. I then describe the data and the development of the model applied in this research. I conclude with my results and a brief summary of the implications of those results.

III. Historical Background

State issuance of debt in the form of municipal bonds in the United States predates the American Revolution, and the states accumulated considerable debt in order to finance the war (Kiewiet & Szakaly 64). Alexander Hamilton estimated in January of 1790 that the sixteen states of the Union owed a collective \$25,000,000 (Ratchford 50). Hamilton saw this debt as a threat to the economic viability of the several states, and advocated fiercely for the federal assumption of this burden (Ratchford 67). Hamilton was successful, and the United States assumed all but approximately \$3,000,000 of the states' debt (Ratchford 68). The federal assumption left a few states completely debt-free, and the majority of states were left with nominal, easily-managed debts that were further reduced by sound state fiscal policy (Ratchford 68).

Following the federal assumption of the several states' debts, those states largely avoided debt financing. New York was a minor exception, and borrowed nominal amounts, beginning with \$73,000 in 1797 (Ratchford 73). However, these funds typically entered the general fund, and the state utilized the capital primarily to pay for daily operations. Then, in 1812, New York undertook a new approach to debt, and the actions of the state led to a revolution in debt financing across the country.

In 1812, the City of New York issued the first officially labeled "municipal bond" (Cockren et al. 135). This issuance was fundamentally different from previous municipal and state debts, because the inaugural municipal bond was the first state-issued debt to be issued in

order to pay for internal infrastructure improvements, and was issued in order to pay for the construction of a new City Hall (Cockren et al. 135). Prior to this issuance, state issued debt had been used either to meet war costs or to cover operating deficits (Ratchford 74). A new round of state debt briefly flourished as states sought to support their war efforts during the War of 1812, but with the exception of New York, state debts entering the 1820s were nominal and manageable (Ratchford 77).

After New York utilized the first recognized municipal bond for infrastructure investment in 1812, it embraced this mode of financial funding of infrastructure needs with eager abandon. In 1817, the state began construction of the Erie Canal, which was completed in 1825. The canal was municipal bond-funded, and the costs of construction reached \$7 million (Ratchford 82). However, despite the exorbitant cost of the construction and the concomitant debt burden to the state, the Erie Canal was widely considered an unreserved success ((Kiewiet & Szakaly 64). Trade along the route grew exponentially, and thriving villages and cities sprung up along the river, providing increased economic activity within the state and growing property tax revenues for the state coffers (Ratchford 82-83). Other states saw the success of the Erie Canal project, recognized that the costs of debt can be outweighed by the benefits of increased economic activity that result from prudent investment of the capital raised, and an early conception of the revenue bond began to take form (Kiewiet & Szakaly 64).¹

While the spate of state borrowing for large infrastructure investments laid the foundation for the state debt crisis that was to follow, the Depression of 1837 played a large role in transforming a potential crisis into an actual one. The Depression played two distinct roles in

¹ Revenue bonds are debt issuances “for which specific revenues, not governments’ full faith, credit, and taxing power, are the source of repayment” (O’Hara 5).

undermining the debt-financed investment strategies of the states. First, many of the large infrastructure projects (such as railroads, canals, and turnpikes) were incomplete when the Depression struck (Kiewiet & Szakaly 64). The states were forced to choose between abandoning the project and losing the investment to that point, or continuing to debt-finance the project despite the skyrocketing interest rates (and consequently, skyrocketing costs of capital to the states) (Kiewiet & Szakaly 64). Second, the Depression led to a substantial decrease in economic activity nationally, which, in turn, led to the completed infrastructure projects producing less revenue than expected for the states (Kiewiet & Szakaly 64). Eventually, nine states defaulted on their debt in the wake of the 1837 Depression (Kiewiet & Szakaly 65). State legislators advocated for a federal assumption of the oppressive debt burden, but unlike the earlier assumption proposal supported by Hamilton, this latter movement failed to develop the strength to succeed in the federal Congress (Ratchford 103-104).

What followed was a crisis of confidence for state debt issuers in the United States. Foreign investment in state instruments dwindled, and infrastructure projects sat incomplete, with the states lacking the necessary capital to continue their construction (Kiewiet & Szakaly 64). State legislators, in order to regain investor confidence, were forced to adopt unpopular revenue measures such as excise and property tax increases (Kiewiet & Szakaly 65). Taxpayers responded with outrage, and they demanded that the legislators establish protections against irresponsible debt accrual. According to Benjamin Ratchford, “[p]revious to 1840 no state constitution limited the debt which the legislature might incur, but within a period of fifteen years thereafter the constitutions of nineteen states were amended to include such limitations” (121).² Rhode Island was the first state to adopt a debt-limiting constitutional amendment, when

² Note that there were thirty-one states in 1855.

it both created a referendum requirement for debt issuances and capped debt to no more than \$50,000 (Ratchford 122). Currently, there are only five states that have no constitutional limit on debt (Kiewiet & Szakaly 65).

Justice Louis Brandeis once famously wrote in dissent that “[i]t is one of the happy incidents of the federal system that a single courageous State may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country” (New State Ice Co. 311). This principle of federalism could not be clearer than in the various states’ approaches to constitutional debt limitation. While “virtually every state constitution has some unique features in its debt provisions,” Roderick Kiewiet and Kristin Szakaly, in their *Constitutional Limitations on Borrowing: An Analysis of State Bonded Indebtedness*, have identified four “basic forms” of state constitutional debt limitations (65). These four basic forms are critical in the methodology of this research and deserve a careful review.

Kiewiet and Szakaly offer the following four basic structures of state constitutional debt limitations:

- (i) the requirement that such bond issues be approved by the voters of the state in a referendum; (ii) the requirement that all guaranteed debt issues be approved by a supermajority (ranging from three-fifths to three-fourths) of the state legislature; (iii) a prohibition against issuing guaranteed debt; (iv) a provision limiting guaranteed debt to some fraction of state taxes, state expenditures, assessed property valuations, or some other revenue base (65).

Twenty-one states have some form of referendum requirement. Twelve states have a supermajority requirement, and nine states have a prohibition against issuing guaranteed debt. Fifteen states have a formulaic limit applied to a specific revenue source, and five states have no

constitutional limitation whatsoever. Eleven states have more than one form of debt limit, which explains why the above-enumerated list provides for fifty-seven applications over forty-five states (Kiewiet & Szakaly 65).

With such an impressive array of constitutional debt limitations in force across the nation, one would expect the several states' ability to issue debt to be severely curtailed. However, as was mentioned earlier in this paper, states could hardly function in the complex, contemporary economy without practical access to debt financing. The routes that individual states have taken to access credit markets is even more variegated than the field of constitutional limitations themselves. The variety stems both from the different legislative approaches to circumventing the constitutional limitations and also from the state courts' various interpretations of the constitutional mandates. Sterk and Goldman argue that while constitutional debt limitations do little to actually limit debt, the constitutional provisions do take some fiscal decision-making power away from the state legislatures and grant it to the state's judiciary. For a clarifying example, I now look at Kentucky's experience.

Kentucky's first Constitution, drafted in Danville, Kentucky, and approved by the United States Congress in 1792, did not include a limitation on debt (Legislative Research Commission 12-13). However, by 1850, the state's debt had grown to \$4.5 million (or approximately \$145.8 million in 2019 dollars), and the next iteration of the state's constitution unambiguously limited debt to \$500,000 (Kleber 225). This limitation was roughly equal to one year's revenue receipts at the time, but the amount has not been subsequently adjusted for inflation, despite the fact that current state revenue projections for 2019 exceed \$11 billion (Legislative Research Commission 14). The strict limitation on general obligation debt also included a provision that any such debt is allowed only with the permission of the electorate through a direct vote during a general

election year (Legislative Research Commission 14). Thus, Kentucky is one of the twenty-one states that require referendum approval for long-term debt issuance, though many companion states have much larger, more functional nominal limits (Kiewiet and Szakaly 65).

The Commonwealth and its municipalities have attempted “creative” structurings of debt-like instruments over the years in attempts to circumvent the constitutional limit, but the state’s Supreme Court has resisted a “formalistic” interpretation of these instruments and has consequently stricken many attempts at long-term debt issuance as unconstitutional.

A foremost example is *Curlin v. Wetherby*. In this 1955 case, the high court considered the constitutionality of the legislature’s grant of authority to the Kentucky Highway Authority to issue long-term municipal bonds (935). The legislature had structured the transaction in a manner intended to bypass the debt limitation (935). First, in establishing the Kentucky Highway Authority, the legislature transferred selected state highways to the Authority (935). The Authority would then issue municipal bonds backed only by the full faith and credit of the Authority (and not the full faith and credit of the state) (935). The Authority would use the bond proceeds to improve the selected highway systems, and finally, the state would then lease back the improved highways from the Authority (935). The state would make the lease payments by using revenues from gasoline and motor vehicle taxes (935).

The Kentucky Supreme Court struck down the law (Curlin 935). The Court began its analysis by defining “debt” as the commitment of future revenues with the inability to later abandon the commitment (the “full faith and credit” obligation) (935). The Court held that while the proposed structure of the highway bonds led to municipal bond issuance that was not state “debt” in the traditional sense (because the bonds would be issued by the special authority, and consequently not backed by the full faith and credit of the state), the lease, on the other hand,

was an unconstitutional indebtedness (935). The Court focused on the terms of the lease, and specifically the language that pledged “current resources” of the Authority (composed of all monies accruing biennially to the State Road Fund) *for the full term of the lease* (935-937). The legislature tried to argue that the use of “special funds” consisting of gasoline and motor vehicle taxes avoided the constitutional limitation on the future commitment of revenues generally, but the Court did not agree with the legislature’s interpretation (935). The gasoline and motor vehicle taxes, the Court reasoned, are not collected for the use of “a particular facility,” but instead “for the use of the roads generally” (937). Consequently, the Court found, the funds are general revenue (937). By committing general funds “for the term of the lease,” the Court held, the legislature had violated the debt limitations of the Constitution of Kentucky (938-939). The “formalistic” approach of the legislature did not assuage the “substantive” constitutional requirements as interpreted by the Supreme Court.

Despite the Court’s insistence that the constitutional debt limit be given substantial deference, the legislature has managed to establish a procedure for accessing credit for capital projects that does not run afoul of the Court’s high standard. This constitutionally permissible structure is very similar to the structure of the Kentucky Highway Authority in *Curlin v. Wetherby* above, but with a couple of critically important “tweaks” to the methodology. The first substantive difference is that the state’s remittance of the lease payments to the municipal corporation or special authority is contractually guaranteed only for a biennium, eliminating the “for the full term of the lease” language found in *Curlin* (Hayes 802-803).

The second substantive difference between the methodology unsuccessfully pursued in *Curlin* and the current, operative methodology is that in the current system, lease payments are guaranteed *only* by revenue increases produced by the capital project, rather than by the state’s

general revenue (Hays 803-804). The Court has held in as early as 1925 that similar arrangements meet constitutional muster, and has consistently upheld this finding, despite several opportunities to relitigate the issue (Waller 1925). In general, the high court has thus established a three-pronged factor analysis for determining whether a debt issuance violates the constitutional limit on general obligation debt: 1) debt instrument cannot be issued directly by the state, but must be issued by a third-party entity such as a municipal corporation or special authority; 2) the contractual terms of the issuance cannot commit state funds beyond a period of two years; and 3) the relationship between the project being funded and the source of the debt service must be “sufficiently direct and apparent that . . . the . . . tax may be treated as revenue of the project” (Turnpike 557). The Commonwealth’s Supreme Court provides further latitude by holding that, if the debt issuance passed the factor analysis outlined above, it is not subject to the \$500,000 absolute limitation, because it is not “debt” in the constitutional sense of the term (557).

While many state judiciaries have followed a path similar to Kentucky’s,³ others have interpreted similar constitutional language to require substantively different approaches. An excellent example is the judicial history of New Jersey’s approach to its constitutional limitation. New Jersey, like Kentucky, has both a limit on the amount of debt issued annually and a referendum requirement. Also similarly, the New Jersey legislature initially attempted to circumvent the constitutional provisions by establishing a public authority, the New Jersey Turnpike Authority. However, unlike in the holdings of the Kentucky legislature, the New Jersey Supreme Court held in *New Jersey Turnpike Authority v. Parsons* that simply the establishment

³ See, for example, the history of the judiciary’s interpretation of Ohio’s constitutional limit, as outlined in Sterk & Goldman (1334-1337).

of a public authority was enough to circumvent the constitutional requirements, despite the fact that the terms of the lease agreement with the turnpike authority committed state funds to a period much greater than a biennium (875).

This concludes the historical background for this research project. The goal of this project is to determine, through quantitative analysis, whether the four distinct forms of constitutional debt limitation outlined by Kiewit and Szakaly are successful in limiting debt issuance, and whether they come at a cost in the form of discernably higher costs of capital for those states with constitutional strictures. These questions are not entirely novel to this research, and I now provide a review of the literature addressing different aspects of these questions.

IV. Literature Review

Increased Cost of Capital

The primary difficulty with evaluating quantitatively the effects of constitutional debt limitations on the costs of capital is developing a model that disentangles those effects from unenumerable state-specific effects. This problem is illustrated in an early study by B. U. Ratchford in his “State and Local Debt Limitations,” published in 1958. While the article begins with an excellent history of debt limitations, including constitutional provisions, his quantitative analysis falls short. He begins by grouping states into three categories: 1) states with constitutional limits; 2) states with constitutional referendum requirements; and 3) states with legislative and statutory limits on debt issuance. Ratchford finds that the states with constitutional limits held debt half as large as those states with only legislative limits, and states with referendum requirements fell between these two extremes (225).

While this approach may be interesting (and, in fact, I provide a similar analysis of the states for the years covered by this research), this simple descriptive approach fails to recognize the enormous effects of other state-specific factors not accounted for in the statistics. Ratchford recognizes the limitations of his approach (his study was written long before the widespread use of multiple regression models), and states clearly that “this comparison is interesting but probably not very significant” (226). There are any number of state-specific factors that may influence debt practices, and without a model that disentangles those effects from the effects of the constitutional limitations, there is a risk that any results may overestimate the causal relationship.

John O’Donnell, in his “The Tax Cost of Constitutional Debt Limitation in Indiana” (1962), develops an approach slightly more sophisticated than Ratchford’s descriptive statistical analysis. As the title suggests, O’Donnell focuses on debt issuances originating from Indiana. Indiana is one of a few states uniquely positioned for his approach, because the state’s limitation is functional, allowing legislators to issue general obligation debt up to two percent of the previous year’s property tax revenues. However, the state found that its need for debt financing consistently exceeded the two percent cap, and the legislature began utilizing the “work-around” of incorporating public authorities to meet its needs beyond the allowed general obligation debt.

O’Donnell’s model focuses specifically on bonds issued by the Indiana School Holding Corporation, and compares those bonds to bonds deriving from the state’s authority to issue general obligation debt. O’Donnell controls for the bond’s ratings and for the maturity dates of the issues and finds that the coupon rate for the special authority debt is “about 20 per cent more” than the coupon rate for the general obligation bonds (411). O’Donnell concludes that his

findings show “that American taxpayers are paying a substantial price for the privilege of maintaining statutory debt limits” (412).

Thomas Pogue was the first scholar to approach the issue by using a multiple regression model. Pogue, in his “The Effect of Debt Limits: Some New Evidence” (1970) calculated per capita total debt outstanding as a function of a multitude of explanatory variables, including the type of debt limitation in force, state income data, land area, percent change in population, urban/rural population proportions, as well as several other variables. He applied his model across the 48 contiguous states for the years 1958 and 1962. Pogue’s model found a statistically significant negative coefficient between the different debt limitations and the amount of per capita debt issued.

As I will explain more carefully in the model design section of this research, however, Pogue’s model contains a flaw that he (like I) will only partially correct. Pogue’s model fails to account for the state-specific effects; that is, the designation of whether a state has a constitutional limitation on debt, as well as the nature of that limitation, corresponds exactly to the state itself. This feature arises from the fact that all of the states in the study adopted their constitutional provision long before the research period. Pogue tries (as I will) to capture some of the state-specific effects by including as explanatory variables a number of state-specific data, such as population size, population density, income data, etc. However, even the amalgamation of all the included state-specific data does not serve as a true instrumental variable for the state effects, and Pogue never addresses this substantial shortcoming to his model. Pogue, in turn, overestimates the reliability of his model’s results.

A similar problem plagues Craig Johnson and Kenneth Kriz’s model in their “Fiscal Institutions, Credit Ratings, and Borrowing Costs” (2005). Johnson and Kriz are interested in a

number of fiscal institutions, such as debt limitations, referendum requirements, balanced budget rules, and tax and expenditure limitations; they model the presence or absence of these fiscal institutions on default risks, credit ratings, and borrowing costs (84). The authors apply their model to all state general obligation bonds during the period from 1990-1997. Like Pogue's model, Johnson and Kriz's model also includes various state-specific explanatory variables such as unemployment rate, personal income rate, and population size (90). The authors find that while a referendum requirement does not produce a statistically significant negative effect on the costs of capital, state debt limits do, in fact, raise the cost of capital by 3.3 basis points (102).

However, a similar specter haunts the work of Johnson and Kriz. Perhaps because their model looks at the effects of a variety of fiscal institutions, not all of which originate in the early 1800s, they fail to acknowledge the problem of the collinearity of state-specific effects and the state constitutional debt limitations. In this regard they fall short of even Pogue's model, because he clearly recognizes and addresses the concern, albeit insufficiently. Despite Johnson and Kriz's lack of "lip service" concerning the collinearity problem, they do, in the end, incorporate in their model the same strategy proffered by Pogue. That is, they include as explanatory variables their (insufficient) instrumental demographic variables.

Effectiveness at Limiting Debt Assumed

From Ratchford's seminal article in 1958 to Mary Harris and Vincent Munley's recent work on the effects of debt limitations and referenda requirements on school district bonds, the trend seems to point toward an increased cost of capital correlated with the presence of one of the four basic forms of constitutional debt limitation. However, as I have noted, these findings are somewhat marred by the collinearity problem between the constitutional provisions and the state-specific effects. Unfortunately, that same issue will problematize the scholarly literature

asking the question: “Do state constitutional debt limitations actually limit the amount of debt assumed?”

Scott Bollens, in “Examining the Link between State Policy and the Creation of Local Special Districts,” looks at the number of special districts nationally during the years 1962, 1967, 1972, 1977, and 1982, and finds that while the presence of special districts have grown across all states during this period, they have grown disproportionately in states with limitations on general obligation debt (123). However, his descriptive analysis fails to account for even the most modest state-specific effects (such as population size), and compares only the number of special districts in each state, and cross-compares these quantities with the presence or absence of various statutory and constitutional debt limitation. While his article provides interesting correlative information, it lacks the complexity from which to draw causal arguments.

The next article under review, Beverly Bunch’s “The Effect of Constitutional Debt Limits on State Governments’ Use of Public Authorities” (1991) is an oft-cited and much celebrated look at the relationship between constitutional debt limits and the most popular means of circumventing those limits. Bunch develops a regression model, and applies the explanatory variables in that model on a number of dependent variables, including the number of public authorities, the scope of functions addressed by those authorities, and the state’s reliance on public authorities to issue infrastructure debt (60). Using cross-sectional data spanning the years 1982-1986, Bunch finds a positive correlation between constitutional debt limitations and an increase in the number of public authorities incorporated, as well as an increase in the scope of functions addressed by those authorities and the state’s reliance on public authorities to finance infrastructure projects (66).

While Bunch's article makes a strong argument that the presence of constitutional debt limitations do correlate positively with increased use of public authorities, Bunch does not establish that those constitutional provisions either have no effect on the amount of debt accrued or affect negatively the amount of debt accrued. She focuses, in other words, on the number of public authorities incorporated within the states, and not the amount of debt accrued generally. Kiewiet and Szakaly address this issue more directly in their "Constitutional Limitations on Borrowing: An Analysis of State Bonded Indebtedness" (1996). Kiewiet and Szakaly find that constitutional limitations on state debt do, in fact, correlate negatively with the amount of debt issued, but with an important caveat. The lower state-level debt issuance seems to be more than made up for by a concomitant increase in local and municipal debt issuances. Kiewiet & Szakaly argue that the various constitutional limitations on debt shift the burden of public finance onto the shoulders of the municipalities, and that those municipalities finance that increased burden through an increased use of public corporations and public authorities.

V. Research Design

My research strives to answer two distinct questions about constitutional limitations on state-issued municipal bonds: 1) Do states with constitutional limitations on debt issuance actually issue less debt than states with no such limitations?; and 2) Is the cost of capital higher for states with constitutional debt limits than it is for states with no such limits?

A. Data

My data comes from several sources. I collect data on the specific bond issuances, including the bond title, the dollar amount of the issuance, the year of the issuance, the state of origin, and the coupon rate, from the Municipal Security Regulatory Board's (MSRB) Electronic Municipal

Market Access (EMMA) website. The MSRB was created by federal legislative action in the Securities Acts Amendments of 1970 (hereafter “the Amendments”). Among many other edicts, the Amendments mandated the creation of an authority to monitor and regulate the municipal securities industry. The Amendments accomplished this feat by inserting Section 15B into the already existing Securities Exchange Act of 1934. In 2009, the MSRB established the EMMA website as “the official repository for municipal securities disclosures” (EMMA website). The website provides the public access to many official documents, including the issuer’s prospectus, the trades prices and other data about the bond’s trading history, financial disclosure documents, as well as a plethora of other information not relevant to this project. From this website, I gathered data on nearly ten thousand individual bond issues from six states. These data represent all state-issued bonds from the selected states over a period spanning from 2013-2017.

My second source of data is the United States Census Bureau’s website. From this source I collect state-specific population data, demographic data, income data, and data relating to political affiliation, as is included in my regression model. For a history of state credit ratings from Standard & Poor’s, I accessed Ballotpedia’s “State Credit Ratings” dataset. Finally, my third source of data is Roderick Kiewiet and Kristin Szakaly’s article, *Constitutional Limitations on Borrowing: An Analysis of State Bonded Indebtedness*. In this article, Kiewiet and Szakaly divide the states’ myriad forms of constitutional limitations on debt into five categories: those states with referenda requirements, those with supermajority requirements, those with strict limitations, those with “functional” limitations, and those with no constitutional provision at all. There is a de facto sixth category, which is the category of states that have adopted more than one of the first four categories. I utilize Kiewiet and Szakaly’s framework for organizing state

constitutional debt limits, and I have created a series of five dummy variables for each state for each year under observation.

B. Methodology

What at first glance seems a simple series of questions to model proves itself upon closer deliberation to be much more complicated. The problem, touched on briefly in the literature review, arises from the perfect collinearity between two explanatory variables. As I explained in the historical overview, the several states adopted the constitutional debt limitations predominantly in the mid-1800s, long before reliable annual state-level data were available. Because the data set utilized in this research comes from the 21st century, there is no intrastate variability to distinguish the effects of the explanatory variables which are the constitutional limitation dummy variables and the explanatory variable which is the state-specific random effects. For example, while it is not true that all bonds with referendum requirements will originate from Kentucky, it is unfortunately true that all bonds originating from Kentucky will be limited by referendum requirements. The inability to disentangle the explanatory variable from the state-specific effects leads to a strict limitation on the results of this research. I can offer a descriptive comparison of states with various combinations of my dummy variables, but it would be academically disingenuous to draw causal inferences from these descriptive analyses. In other words, I can argue that states without any constitutional limitation on debt do, in fact, issue more debt on average than those states with some sort of constitutional stricture, but I cannot argue from that information that the model proves that the constitutional limitations *cause* the states to issue less debt.

This fact is further illustrated when I apply regression modeling to the data. If, for example, I use only two states, and I run a regression in which coupon rate is the dependent

variable and the constitutional limitation dummy variables are the explanatory variables, I get a result. However, that result is the same as if I had simply averaged all of the coupon rates for each year for each state, and then averaged the difference between the two states over the years studied. This result is equally true if bonds from all six states are included in the regression. The regression produces those results, but those results are no different than simply performing a descriptive analysis of the average difference of the average coupon rate over the six states, over again the years in question. For the sake of posterity, I conduct the analysis both ways; I build multivariate regression models that explain coupon rate and debt per capita as a function of the dummy variables, as well as various demographic variables. I then simply perform a descriptive statistical analysis of the average differences between the states based upon the dummy variables. While I can argue a causal connection between the demographic data and the dependent variables (because that demographic data changes intrastate from year to year), I cannot reasonably argue a causal connection between the dummy variables and the dependent variables.

In conclusion, I explain why I have included demographic data. This is an attempt, however inadequate, to account for some of the state-specific effects. Because the demographic data changes from year to year within each state, it is the perfect candidate for an explanatory variable in a multivariate regression model. Furthermore, the inclusion of state-specific demographic data captures some, but not all, of the state-specific effects. In other words, some of the effect of a bond being issued in California is likely explained by California's population size. This fact is also true of California's income per capita, its racial composition, etc. By including state-specific demographic data into the model, I shrink the size of the state-specific effects that otherwise cannot be disentangled from the dummy variables. Unfortunately, however, no

practical number of state-specific demographic explanatory variables will eliminate the states' effects to the degree necessary to reasonably argue causation between those dummies and the dependent variables. In other words, there is no practical manner to construct a reliable instrumental variable for the state-specific effects. In the end, I am left with a carefully conceptualized descriptive analysis.

VI. Results

To begin, I illustrate the problem of collinearity with the modelling of the effects of debt limits on coupon rate, I simplify the dataset significantly. I isolate the simplified model to bonds issued in the year 2014 by two states: Alabama (1) and Alaska (2). I apply the following model:

$$\text{CouponRate} = \alpha + \beta_{\text{state}} + \beta_{\text{referenda}} + \varepsilon$$

The results are as follows:

Coupon Rate	Coef.	Std. Err.	t	P> t 	[95% Conf. Interval]
State	0.2696211	0.1769187	1.52	0.13	-0.0804958 0.6197379
Referendum	0	(omitted)			
_cons	4.130379	0.3177926	13	0	3.501477 4.759281

Note that “Referendum” was omitted as an explanatory variable, because the presence or absence of a referenda requirement is perfectly collinear with the state. This perfect collinearity exists equally with all forms of debt limitations in relation to the state, because no state changes its constitutional debt strictures during the period encompassed in the sample. However, this problem is solved easily enough – I now omit the “State” variable as an explanatory variable, and regress the coupon rate using only the presence or absence of the referendum requirement:

$$\text{CouponRate} = \alpha + \beta_{\text{referenda}} + \varepsilon$$

Coupon Rate	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Referendum	0.2696211	0.1769187	1.52	0.13	-0.0804958	.6197379
_cons	4.4	0.152416	28.87	0	4.098373	4.701627

Problem solved! I now have a coefficient for the effect that the “Referendum” variable has on the coupon rate (albeit not a statistically significant one). Note that this is the result argued by more than one author in the literature review of this paper. There is a significant limitation to this finding, however. In order to fully illuminate the nature of this limitation, I take a detour for a moment into some simple descriptive statistics.

First, I calculate the means of the CouponRate for each of my two categorical variables.

Referendum = 0				
	Variable	Obs.	Mean	St. Dev.
	CouponRate	33	4.4	1.249562
Referendum = 1				
	Variable	Obs.	Mean	St. Dev.
	CouponRate	95	4.669621	0.704303

The mean of the coupon rates in the absence of a referendum requirement is 4.4. The mean of the coupon rates with the presence of a referendum requirement is 4.669621. The difference between them means is $4.669621 - 4.4 = 0.269621$, which matches exactly the coefficient from our regression analysis. Because of the collinearity between the states and the constitutional strictures, I cannot model a regression analysis that disentangles the two. As such, the results of a regression analysis that explains the coupon rate in terms of constitutional strictures is nothing

more than a descriptive comparison of differences of averages. To utilize regression in this instance is to mask simplicity in complexity's clothing.

Some researchers have tried to further disentangle the collinearity of the State variable and various debt limit variables by including demographic data in the model that serve as (inadequate) instrumental variables capturing the State variable effect. Thus, the argument goes, some of the State effect is captured by an explanatory variable expressing state revenue. Different aspects of the State effect are captured by racial and political data. Adding the other three debt limitation categorical variables and other demographic variables over a period of years can certainly conceal this basic descriptive relationship expressed in the coefficients, but adding the complexity does not fundamentally alter the relationship. Thus, for example:

$$\begin{aligned} \text{CouponRate} = & \alpha + \beta_{\text{year}} + \beta_{\text{principal}} + \beta_{\text{referenda}} + \beta_{\text{supermajority}} + \beta_{\text{hardlimit}} + \beta_{\text{softlimit}} + \beta_{\text{governor}} + \\ & \beta_{\text{house}} + \beta_{\text{senate}} + \beta_{\text{population}} + \beta_{\text{statepercrgdp}} + \beta_{\text{gdppercapita}} + \beta_{\text{employment}} + \beta_{\text{race1}} + \beta_{\text{race2}} + \beta_{\text{race3}} + \beta_{\text{race4}} + \\ & \beta_{\text{race5}} + \varepsilon \end{aligned}$$

Where:

CouponRate = the interest rate offered on the bond

Year = the year issued

Principal = the amount of the issuance

Referenda = a categorical variable denoting a referendum requirement

Supermajority = a categorical variable denoting a supermajority requirement

Hardlimit = a categorical variable denoting a hard limit on debt issuance

Softlimit = a categorical variable denoting a formulaic limit on debt issuance

Governor = a categorical variable denoting the party affiliation of the governor

House = a categorical variable denoting the party affiliation of the state house

Senate = a categorical variable denoting the party affiliation of the state senate

Population = the total population size

StatepercGDP = the state's percentage of total GDP

Unemployment = the rate of unemployment

Race1 = White

Race2 = Black or African American

Race3 = American Indian or Alaska Native

Race4 = Asian

Race5 = Native Hawaiian or Other Pacific Islander

Number of obs.	7217			
R²	0.1182			
CouponRate	Coef.	Std. Error	t	[95% Conf. Interval]
Year	1.227238	0.1320712	9.29	0.96834 1.486136
Referendum	3.302464	1.423948	2.32	0.5111081 6.093819
Supermajority	-137.5773	44.7119	-3.08	-225.2257 149.92883
HardLimit	-109.1745	18.10714	-6.03	-144.6698 -73.67918
SoftLimit	0	(omitted)		
Governor	-0.6041343	0.1262202	-4.79	-0.8515629 -0.3567057
StateHouse	5.330741	0.4202514	12.68	4.506924 6.154557
StateSenate	-0.0356024	0.1001178	-3.56	-0.5522846 -0.159764
Population	6.83E-06	1.52E-06	4.49	3.85E-06 9.81E-06
GDPbyState	0.000337	3.85E-06	8.75	0.0000261 0.0000412
GDPpercapita	-190.4229	40.10411	-4.75	-269.0387 -111.8071
TotalEmployment	-7.93E-06	1.12E-06	-7.08	-0000101 -5.73E-06
Race1_percapita	4249.563	489.7029	8.68	3289.602 5209.524
Race2_percapita	4123.118	486.3769	8.48	3169.677 5076.56
Race3_percapita	4227.442	503.4163	8.4	3240.598 5214.286
Race4_percapita	3390.511	514.1529	6.59	2382.621 4398.402
_cons	-6568.955	645.0086	-10.18	-7833.361 -5304.549

Note that not only is the Referendum coefficient substantially different from the result in our simplified model, but the coefficient is now statistically significant. However (and this is the

crux of the limitation on the regression model), because the added demographic variable will always only partially capture the state effects, the statistical significance indicates only that there is a correlation. I cannot argue a causal relationship from this flawed model. As such, I am left to present a descriptive analysis of the data.

There are several severe limitations to conducting a fifty-state descriptive analysis of state-issued municipal debt. There is no standardized reporting methodology for “aggregate” state-level coupon rates, nor is there a standard repository for this information, other than the MSRB’s EMMA website. Unfortunately, EMMA reports coupon rates on individual issuances, and many states have multiple thousands of issuances per year, making the task of assembling a comprehensive database of all fifty states over a period of years a task too daunting for the scope of this research. I begin, however, by examining the aggregated data from the six states I incorporated into my earlier regression analysis.

Mean Coupon Rate by State and Year

	Alabama	Alaska	Arizona	Arkansas	California	Colorado
2013	4.17	4.64	4.79	3.03	4	4.31
2014	4.3	2.36	4.25	3.41	4	4.09
2015	4.22	4.34	4.42	3.41	4.11	4.56
2016	4.43	4.82	4.64	3.5	4.48	4.33
2017	3.98	4.72	4.25	3.09	4.08	3.64

The first noticeable trend is that there does not seem to be a noticeable trend. Arkansas is the only state that seems to consistently have access to significantly cheaper capital. However, while Arkansas has relatively strong strictures against state debt issuances, with both a constitutional referendum requirement and a constitutional hard limit on the amount of debt

issued, these restrictions mirror those of Alaska, which trends toward the highest cost of capital among the six. Alabama, Arizona, and Colorado all have hard limits only, and California has both a supermajority requirement and a referendum requirement. In short, this data tells us little.

I next examine a more easily accessed data set that reflects the cost of capital; namely, the states' Standard & Poor's credit rating. I gathered data on the credit ratings for the years under study (2013-2017). I coded those ratings numerically (AAA=1, AA+=2, AA=3, etc.) and then took the average of the years for each state. I then categorized the states according to their constitutional debt limitation provisions, and my results follow:

	Yes	No
Referendum	2.8	2.15862069
Supermajority	2.933333333	2.268421053
Hard Limit	2.523076923	2.394594595
Soft Limit	1.92	2.645714286
No Limitations	2.28	2.444444444

Again, while there is substantial variability between the states, that variability does not seem to correlate with the absence or presence of any of the constitutional debt limitations, nor does it correlate with the absence of such limitation compared to the presence of one or more.

While there seems to be little correlative evidence that constitutional limitations on debt issuance affect the coupon rate (or alternatively, the cost of capital) to the state, there does seem to be a correlation between some forms of debt limitation and the amount of debt issued by the states.

Referendum	Yes	No
Public Debt (billions)	32.17295238	16.50406897
Public Debt per Capita (millions)	3814.548712	3724.642836
Supermajority	Yes	No
Public Debt (billions)	36.538	18.83668421
Public Debt per Capita (millions)	4547.73148	3514.404933
Hard Limit	Yes	No
Public Debt (billions)	14.41415385	26.13151351
Public Debt per Capita (millions)	2525.41433	4197.021052
Soft Limit	Yes	No
Public Debt (billions)	15.79773333	26.20811429
Public Debt per Capita (millions)	3104.002258	4044.575181
No Limit	Yes	No
Public Debt (billions)	15.9416	23.87871111
Public Debt per Capita (millions)	5228.679631	3599.483712

While the referendum requirement seems to be weakly correlated with increased borrowing, and the supermajority requirement seems to be even more so positively correlated with debt issuance, both the hard and soft limits are strongly correlated with an effective decrease in the amount of debt issued. Furthermore, the strongest negative correlation in the lot lies between not having any constitutional strictures, and having one or more. While we can not draw causal inferences from these results, these results are in keeping with what one would expect if the constitutional strictures are, in fact, effective in limiting the amount of debt issued.

VII. Conclusion

In conclusion, I want to step back and look at the broader strokes of the implications of this research. In doing so, I want to make two points. First, as policy analysts, we can be confronted with legislative proposals or actions that would seem to have massive, unmeasurable

consequences to the well-being of the governed body, be it a municipality, a state, or a national government. In our example, I would argue that it is reasonable to assume that constitutionally mandated strictures on a state's ability to issue debt and raise capital potentially have a significant effect on that state's fiscal health, be it through increased/decreased cost of capital, the willingness or ability of the state's legislators to take on new debt, or any other number of possible consequences. However, because of the history and nature of the constitutional mandates, it is practically impossible to quantitatively measure the effects of the policy, once implemented. We, as policy analysts, assume that the policy is affecting the market, but we have no way to measure these effects. There are no performance measures. The best we can do is to extrapolate from simple descriptive statistical comparisons, and recognize the profound limitations to this approach.

My second point serves as a counterpoint to my first. In the end, the policy analyst really does not need to know how much a constitutional stricture on debt issuance actually affects the amounts issued by the states in order to judge the success or failure of the policy. In order to explain this assertion, I refer all the way back to the beginning of this paper, specifically to the "Historical Background" section. Reeling from the Depression of 1837, states were struggling to regain their ability to raise capital. Nine states defaulted on their debt obligations, the federal government was refusing to assume the massive debts accumulated, and investors were citing the mantra, "fool me once, shame on you; fool me twice, shame on me." States were desperate to regain their creditworthiness, and the passage of strict fiscal responsibility requirements into the states' constitutions was one piece of the process to regain the trust of the investing community. It is possible that the legislators passing these constitutional provisions did not even care if they functioned as actual limits or not. Their goal was to send as many signals to the market as

possible that they had learned their lessons, and that fiscal responsibility was first priority moving forward. According to the U.S. Census Bureau, the combined states in 2015 owed more than \$1.15 trillion in outstanding debt issuances. That tells us two things; 1) the constitutional debt limitations are marginally effective, at best; and 2) investors seem more than happy to trust the fiscal security of the states. In one manner of interpretation, the constitutional debt limitations are an utter failure. But in another regard, perhaps they are fabulously successful.

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