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Prioritization in Private-Activity-Bond Volume Cap Allocation

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This paper proposes and tests a structural model reflecting the process of authorizing private-activity municipal bond issuance. Private-activity municipal bonds offer tax-exempt financing for programs including industrial development, utilities, low-income housing, and student loans. The Federal tax code sets annual caps on the total tax-exempt issuance within each state, so authorization becomes a scarce resource distributed via a political process. Interviews with program administrators in several states suggested the authorization process involves prioritizing categories of use, authorizing bonds for high-priority uses first, and then authorizing bonds for lower-priority uses until the cap is exhausted. A model representing this process suggests variables to include in reduced-form estimations and an alternative interpretation of the coefficients. The fit of the model can be improved by adding measures of political influence and imposing a structure that reflects the political prioritization process. In general, industrial development and utilities appear to be the highest priority uses of private-activity municipal bonds. Mortgage revenue bonds are the residual category most frequently.

Keywords: Private-activity municipal bonds, private-activity volume cap, political resource allocation process.

JEL Classifications: D72, H71, H81.

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1 Introduction

The authority to issue private-activity municipal bonds, and realize an effective interest rate subsidy, is a scarce resource in most states and years. The Federal tax code imposes a limit on the volume of private-activity bonds that can be issued, so industries within a state must compete for the authorization (IRS Code Section 141). After forbidding or exempting various uses, the tax code steers almost all the cap authority to five uses: industrial development, utilities, mortgage revenue bonds, multifamily housing bonds, and student loan bonds (IRS Code Section 146). This paper proposes a model that reflects the public officials' prioritization of these uses. The model suggests a different interpretation of the coefficients from a reduced form estimate with the borrowing for a specific sector as the dependent variable. The theory also suggests the addition of political covariates and a structure relating them to the borrowing. Measures of latent and organized political strength improve the fit of the model substantially when included within the structure suggested by the theory.

The political economy literature of government resource allocation covers a wide spectrum, and this study of private-activity bonds offers an opportunity for an unusual insight. Elected officials at the state level have an opportunity to use these bonds to assist a diverse, yet limited and clearly defined, set of private interests. In this program, we can observe manufacturers competing against affordable housing non-profits and universities. The scarce resource is not completely fungible, such that it could be reallocated to state employees' pensions, road construction, or other line items. State officials cannot return the resource to their voters in the form of tax breaks. While the private activity debt burden can raise the interest rates on future public borrowing, public officials regard that as a small, heavily discounted cost. This leaves the public officials in a position to hand out something of value based on economic efficiency, purely political interests, or anything in between. The design of the program creates exogenous variation in the generosity of the cap, which allows us to investigate how the public officials behave when their endowment is more or less abundant. Likewise, part of the decision is made by the private partners, so this program allows us to see the extent of private demand for subsidized funding.

The opportunity to learn about this form of government intervention in credit markets is especially useful following the financial turmoil of recent years. Policymakers would like to know if lower interest rates would spur industrial development and thereby lower unemployment. They would like to know if private activity bonds could replace some of the lost volume in the mortgage backed securities market. Congress would benefit from knowing, if the private activity volume cap is raised, how are state officials likely to allocate the authority.

This paper proceeds as follows. In the second section, I explain the private activity bond programs and review the literature relevant to their allocation. In section 3, I present the theories of the allocation process. Section 4 describes the data and section 5 present empirical results. In section 6, I explore the implications of a policy of raising the volume caps. Section 7 concludes.

2 Background and Existing Literature

Municipal bonds are widely used to fund public infrastructure such as roads, schools, courthouses, etc. The practice of fiscal federalism in the U.S. dictates that the national government does not tax the activities of the states and the local entities they establish. The tax exemption extends to the interest paid on municipal bonds. During the era of high interest rates around 1980, many private entities discovered that they could realize an interest rate advantage by partnering with a state or local government. The local governments issued tax exempt municipal bonds and transferred the proceeds to a private entity. The company or non-profit repaid the bonds at the lower interest rate. While this made no direct claims on the local taxpayers, it did lead to lost income tax revenue for the Federal government. The volume of this type of borrowing grew rapidly until Congress set a limit in the Tax Reform Act of 1986.

Previous research has shown that the volume cap is binding in most states and years (Kenyon 1991, Whitaker 2009). For each additional dollar per capita of authorized borrowing, additional borrowing of $0.79 per capita is observed. Borrowing for mortgage revenue bonds and student loans exhibit the highest correlation with the volume cap.

States and municipalities can still issue bonds for any partnership they choose, but bonds for certain purposes cannot have tax-exempt status. Bonds that fund casinos, stadiums, and retail outlets, for example, cannot be federally tax exempt. Tax exemption is unlimited for partnerships with for-profit companies if they are providing a service that has a major public benefit, such as operating an airport. Likewise, states that assist 501(c)3 organizations, such as private universities, need not count those bonds toward their cap. When all these provisions are considered, there remain five purposes that utilize over 95 percent of cap-subject borrowing authority: industrial development, utilities, mortgage revenue bonds, multifamily housing bonds, and student loan bonds. The proceeds of mortgage revenue bonds must be directed to households with below-median incomes for the bonds to maintain their tax exempt status. Likewise, low-income renters must occupy at least 20 percent of the units in a multifamily building if it is funded with private activity bonds.

In what appears to be a concession to the small-population state senators, the private-activity volume cap was established as a two tier system. States with a population over three million were allowed to authorize borrowing up to \$50 per capita. State with populations below three million could authorize up to \$150 million, regardless of their population. The total volume cap of populous states was well above \$150 million, but relative to their economies, the cap was quite low. In contrast, the per capita cap was more generous for the small states the smaller they were. The value ranged to over \$400 per capita. In 2001 and 2002, Congress raised the caps, and thereafter, they have been adjusted for inflation.

The codes governing the volume cap made provision for the time that passes between authorizing a project and issuing the bonds. If, by the end of the calendar year, a state has not exhausted its issue authority, it can file a notice with the Internal Revenue Service stating that it intends to issue tax-exempt bonds for a particular project. It has three years in which to use this "carryforward" authority. If a current year project is cancelled before 31 December, the state can reallocate the authority to another borrower, but carryforward authority cannot be reallocated. If the carryforward project is cancelled, or fails to issue the bonds within three years, then the authority is forfeited. These provisions create the possibility that a state could have intense competition for allocation authority in a given year, but three years later, the total bonds issued with that year's authority are below the cap.

The total volume of private activity borrowing is substantial, but still modest relative to the larger credit markets. It is reasonable to treat the size of the sectors and their demand for credit as exogenous to the private activity bond programs. Among state-year private activity volumes by category, 90 percent are below 12 percent of the GSP in their sector. Relative to measures of purely private borrowing, private activity bond issues are below .06 for 95 percent of the state-year observations in manufacturing and single and multifamily housing. In the years when the bond issuances exceed these thresholds, the data often have little or no private-activity municipal bond borrowing in the category in the years preceding or following. The "lumpy" observations are due to carryforward projects issuing in the same year as some current year projects or funding being set aside for several years (i.e. a student loan bond in 2000 provides loans in 2000, 2001 and 2002). There are significant fixed costs when bonds are issued, so issuers prefer larger, periodic issues. A key question regarding exogeneity is whether this type of less-expensive funding caused the market to be at its observed size. If this funding were not available, presumably borrowers would switch to the next least expensive source of funding and borrow slightly less. As in a price-taker assumption, I assume the relatively large statewide economic sectors influence the level of the borrowing while the influence of the bond programs on the size of those sectors is negligible.

On the specific topic of private-activity bonds, the literature is remarkably limited. The Advisory Commission on Intergovernmental Relations (ACIR) sponsored a survey of the mechanisms the states used to monitor their cap-subject borrowing (Zimmerman 1990). Zimmerman reported on the change in the levels of borrowing from before the cap was imposed to after. The total volume in 1989 was only 34 percent of the average volume during the years 1984-1986. Multifamily housing showed the largest decline, 88 percent, while student loans showed the smallest decline, 36 percent. Another paper from the same era regressed the borrowing volume on the cap and added controls. Kenyon found a significant coefficient of .77 (1991). Using data from after the volume cap was imposed, Temple attempted to refute the idea that issuing private activity bonds was costless to the state or locality (1993). She reasons that if the private-activity debt burden increases the cost of issuing private-activity bonds, heavily indebted states will substitute away from bonds, toward local tax breaks and other incentives in their efforts to lure plant locations. She finds evidence of the increased borrowing costs in the data. Finally, one study documented an increase in regional home prices following the issue of mortgage revenue bonds for Shreveport, LA (Clauretie, Sirmans, and Merkle 1986).

The political economy dimension of this analysis is situated in a much larger literature. Growing from Olson's theories of collective action, numerous authors have estimated the impact of interest groups on political allocations of resources (1965). Over the decades, research has demonstrated that public investments are not always made in a way that is rational from an intertemporal perspective (Holtz-Eakin and Rosen 1989). Public officials sometimes intentionally sacrifice economic efficiency to pursue geographic equality (Yamano and Ohkawara 2000) or to win favor in competitive electoral districts (Castells and Solé-Ollé 2005). Cadot, Röller and Stephan show that concentrated interests, in the form of large corporations, can influence resource allocation to diverge from economic efficiency (2005). Another strain of the literature examines the channels of political influence specifically. De Figueiredo and Edwards offer evidence that campaign contributions from utilities companies impact rates set by utilities regulations boards (2007). A working paper by Bombardini and Trebbi shows that companies with large employment numbers make fewer contributions to elected officials representing those workers (2008). They theorize that elected officials will act in the best interest of the large employer, despite receiving fewer donations, because the workers and their families are significant voting blocks.

3 Theories of Allocation of Private-Activity Borrowing Authority

This section will discuss theories of the allocation of the private-activity borrowing authority to various purposes. Some of the ideas relevant here are those growing out of Olson's theory of collective action (1965). In these models, interest groups intervene in an allocation process according to their number of members, the value of the rents available to them, and their ability to organize. In private-activity bond programs, various constituencies demand a scarce resource through a political allocation process. While it may be natural to assume the private-activity volume cap is a credit constraint, because it limits the quantity and purpose of tax-exempt borrowing, this is not appropriate. It is more useful to think of the regulation as a budget constraint. A private-activity borrowing authorization gives the recipient the right to access credit markets at a lower cost. One could calculate a subsidy that would make the borrowers indifferent between the tax exemption and the subsidy. The state has a budget, set by the cap, from which it can distribute this de-facto subsidy.[1] To think about the volume cap authorization process, three groups of actors need to be

[1]The concept of a credit constraint is often modeled as an intertemporal choice, where a consumer wishes to shift consumption from the future into the current period. For some reasons, credit may not be available to the individual at all. In other situations, credit is only available at very high interest rates, so the consumer opts to consume at his or her endowment point, or borrow very small amounts. These situations arise if there is no collateral, there is no authority to enforce a contract, or authorities specifically forbid a contract. Also, there may be rationed borrowing, where credit is available at a favorable rate, but laws or regulations limit the quantity a consumer can borrow. From this perspective, we cannot say that states are credit constrained. Because they are sovereign, they cannot declare bankruptcy or flee their jurisdiction. They are always available for lenders to seek the return of their principal, and they will have the tax base to provide those funds barring a complete economic collapse. Municipalities, on the other hand, are credit constrained very often, usually by state regulations. I am doing this analysis at the state level, so

considered: firms, public officials, and voters. I will discuss the firms first.

All cap-subject private-activity borrowing, even that which directs money to individual homeowners and students, is handled at some point by for-profit firms or loss-minimizing non-profits. Interested constituencies face a price for borrowing funds, P_A, and an administrative cost of borrowing through municipal bonds. The application process can be expensive and time consuming, in addition to the extra reporting requirements needed to maintain the bonds' tax-exempt status. Let a designate a fixed administrative cost of using municipal funds beyond the administrative cost of private funds. Let i indicates the firm, and L indicates a numeraire input (perhaps labor). A profit function of a firm with a production function $y_i = f(L_i, A_i)$ could be represented by $\pi_i = p_y y_i - P_l L_i - P_A A_i - a$. The firm derives its factor demand curve and demands A_i at price P_A. Consider N identical firms within a state, each demanding A_i. The private-activity volume cap is binding if $\sum_{i=1}^{N} A_i > V$. The cap is more likely to be binding if N is high, corresponding to a more developed state economy, at least in the relevant industries. Anything that can change the factor demand curve (e.g. p_y, P_L, etc.) can impact A_i and whether aggregate demand exceeds the cap. If the firms are in different industries, they will have different levels of demand for the funding, corresponding to different levels of profit they could realize, and different interest rates they are willing to pay.[2] Let j indicate industry and P_{Tj} be the price a firm in industry j would pay for unsubsidized (non-tax-exempt) funding. If $P_{T1} > P_{T2}$, then firms in industry 1 stand to gain more by shifting to P_A, the bond-funded cost. Aggregate demand with J industries is:

$$A^* = \sum_{j=1}^{J} \sum_{i=1}^{N_j} A_{ij}. \tag{1}$$

For unconstrained states, this remains below V, and A^* depends only on A_j and N_j. For constrained states, public officials must make an allocation decision. They may wish to maximize total welfare by directing cap authority to firms that benefit the most from it (maximum $(P_{Tj} - P_A)$). Or, the firms could transfer part of this additional profit to the public officials. If there is an implicit

I will not consider the government credit constrained. The states could always approve taxable borrowing for the private-activity purposes. In reality, most of the funding for the private-activity projects will be in the private sector, where there is no tax exemption. The cap-subject private-activity funds bring subsidized capital to specific markets, as opposed to changing legal limits.

[2]This can be seen in two common uses of private-activity bond funding, namely mortgages and student loans. The private market interest rate for consumer loans to students is very high (think of credit cards at 18%). In contrast, a house was considered good collateral, so mortgage rates were much lower.

bidding process between firms seeking bond authorization, they will establish a market price $P*_A$. The public official could collect rents to the extent $P*_A$ exceeds the financial markets' price for providing tax-exempt funding[3]

When we consider the larger policy context, we realize that each one of the industries has many policies that it is seeking from the government in addition to private-activity borrowing authority. Perhaps each firm or industry seeks influence in general, and then all policies, including borrowing authority, are allocated in proportion to the influence obtained. This leads to an important assumption that may be necessary for the empirical analysis. The assumption is that transfers from the firm to public officials determines the allocation of A, and not the reverse.[4]

Voters may have financial or ideological reasons for preferring allocation to one industry over another. The electorate could be comprised of latent interest groups who know which public officials make favorable allocations to the industries they rely on. Transfers from firms to state officials often take the form of campaign contributions, which are used to reach voters in general. Campaign volunteer efforts of union members, in addition to union contributions, are also valuable to the public officials. It is possible, although unlikely, that the number of voters aligned with the constituent industries is proportional to the transfers an industry could provide. In that case, the allocations of borrowing authority could be the same as in a market, even if only direct votes are provided to the public officials.

I am using the terms state officials, public officials, and state interchangeably, and treating them individually, or their aggregates, as rational actors. The state officials seek to maximize their state's welfare (if they are benevolent), or their personal welfare, subject to their cap-imposed

[3]Which firms in the sector get the funding? If they are identical, the allocation process could be purely random. It could be purely political if the firms have identical technology and scale, but different political influence. I conduct this analysis at the industry level. Micro data would be necessary to investigate allocations to specific firms.

[4]To test this assumption, I regressed the total and industry-specific campaign contributions on the ratio of the total allocation to the cap authority. If scarcity of private-activity funding was inducing campaign contributions, then there should be a positive relationship between the borrowing/cap ratio and the contributions. In fact, I find the opposite of this. The dependent variable is the log of the per capita contributions. The regressions include state and Year FE and the set of control variables. I divided the contributions by the population to scale them because more money is donated in more populous states. I took the log to reduce the increase in the variance of the residuals at higher levels of per capita contributions. The total contributions and most subcategories display a negative relationship between the ratio and logged per capita contributions. In the case of industrial development, the sign is positive, but it is not significant. Only contributions from education interests exhibit a significant small positive relationship with the borrowing ratio. These results suggest that scarcity of private-activity borrowing authority is not inducing additional campaign contributions. Just to confirm this model is plausible, I replace the borrowing/cap ratio with a measure of political competition. In this case, three of the coefficients are significant. This suggests that heated party competition does induce additional contributions from various interests. These models demonstrate that inducement could be identified if it existed in the borrowing ratio models.

budget constraint. The volume cap regulation gives them an endowment, V, of cap authority to distribute to constituents. If there are no direct costs borne by anyone in the state for allocating the authority, the state officials maximize their utility by maximizing the authorization of private-activity borrowing.[5]

Following the standard political economy models that are credited to Lindbeck and Wiebull and summarized in Grossman and Helpman(2001). The public official is allocating a resource across competing interests in a way that maximized his utility. The utility is the product of the probability of winning election (or re-election) and the utility of holding the office. The complementary term, the utility of losing weighted by its probability, is assumed to be zero and not written. The model can be written with the probability of election a linear function of the allocation vector, as in equation 2. γ is a constant representing the public official's baseline likelihood of election, based on party, charisma, or name recognition. H is a vector of the measures of the voting constituency's size or strength. G is a vector of parameters that represents how the strength of the constituency translates into the probability of election (perhaps a measure of political organization or effectiveness). I impose a similar structure on the equation that represents a reward or something else transferred from the firms in exchange for the allocation they receive. ψ is the constant utility of holding office (all utility beyond what is modeled here). P is the industries' potential rents from a dollar of allocation. W is a schedule of transfers that translate the industry's rents into the public official's rents. In choosing an allocation vector, the public official is thinking about how the allocations will improve her election probability and what transfers she will receive from the partner industries.

$$U(\mathbf{A}) = [\gamma + \sum_C G_c H_c A_c][\sum_C W_c P_c A_c + \psi] \tag{2}$$

$$\max_{\mathbf{A}} U(\mathbf{A}) \quad \text{s.t.} \quad \sum_C A_c \leq V \text{ and } A_c \leq f_c(D_c) \ \forall \ c \tag{3}$$

D_c is the relevant gross state product which, through the function f_c, specifies the maximum allocation the borrowers in the category would request. From this specification, it is evident that the political and economic gains from allocating a dollar to one category are made in the context

[5]There could be an indirect economic cost to the state in the form of higher borrowing costs on future municipal bond issues. Here, I will assume these are negligible. See Whitaker, for an analysis related to this possibility. (2009).

of the covariates and parameters in all categories. The model suggests that factors that increase a constituency's contribution to the official's election or contribution to the official's rents should be positively associated with allocations to that constituency. Although the relationship is highly complex and non-linear, a unique solutions does exist, given the assumptions.

In the first quarter of 2009, I conducted interviews with twelve state administrators.[6] I tried to contact the individuals in each state who were familiar with the private-activity volume cap allocation process. I asked each of them about how interested constituencies could intervene in the allocation process, and how elected officials responded to voter preferences regarding the allocations. Most of the respondents expressed the opinion that the process is not the subject of active lobbying. The main reason is that there is a widely held consensus on how volume cap authority should be allocated. The administrators perceived a hierarchy of priorities, with industrial development bonds (IDBs) at the top. IDBs are seen by public officials as creating or retaining jobs, which in turn provide tax revenue and economic demand for every other type of activity. States are eager to assist with any reasonable IDB request, and rarely receive as many proposals as they plan for. In Ohio, a lottery system was in place to decide which industrial projects received borrowing authority if requests exceeded the allocation. However, the lottery was only held twice in two decades because the requests were less than the allocation in all other years (Ohio has the lowest possible per capita cap, and is highly industrialized). IDB borrowing rarely exhausts the allocation it is given by the state's statutes or executive orders, and most states have a procedure for reallocation late in the year. When reallocation occurs, the remaining borrowing authority from IDBs is transferred to housing agencies and student loan programs. Utilities and multifamily housing fall somewhere in between.

The other reason that there is little political wrangling over private activity bonds is that they are seen as having no direct cost to the state's taxpayers. Taxpayers do not pay the principal or interest on the bonds, and in most cases, they are not even responsible for the rare defaults. The borrowers are required to purchase credit enhancement if it is not provided already through another

[6]The administrators I spoke to include: James W. Parks, CEO, Louisiana Public Facilities Authority; Steve Kitowicz, Principal Budget Specialist, Office of Policy and Management, State of Connecticut; Steven Greenfield, COO, Vermont Economic Development Authority; Gene Eagle, Finance Development Vice President, State of Arkansas; Mike Martin, Business Finance Program Manager, Wyoming Business Council; Gail Wagner, Manager, Pennsylvania Department of Community and Economic Development's Center for Private Financing; Candace Jones, Chief Legal Counsel, Department of Development, State of Ohio; Carolyn Seward, Loan Officer, Ohio Energy Office; Steven Brooks, Executive Director, State Education Assistance Authority, North Carolina.

quasi-federal agency such as Sallie Mae or Fannie Mae. Therefore, legislators and governors who seek to keep expenditures and taxes low do not target these programs. Likewise, it is not possible to reallocate funding out of these programs to other state government functions such as education or Medicaid. This leads to the situation where state governments set up general guidelines in their laws or administrative procedures, and then leave the year-to-year details of the allocation to appointees and committees. Recalling the discussion above of latent and organized interest groups, the description of these programs suggests public officials will generally steer allocations to interest groups who vote in large numbers, have politically active unions, and contribute to campaign funds, but there is not an explicit dollar-for-dollar exchange taking place annually. There is variation between states' interest groups that could cause differences in this prioritization process.

With this qualitative data, I returned to the simple calculation of exhausting the cap, and restated it as follows. Let T be a value that represents the public officials' total gain from allocating cap authority to a category. The gain could include support from the constituencies, as well as altruistic satisfaction from making allocations to the most welfare-enhancing use. R is a function that translates this into a rank. The public official maximizes her utility by fully funding the highest priority categories, giving the remaining authority to the marginal category, and possibly denying funding to the least beneficial category.

$$\max_{\mathbf{A}} U(\mathbf{A}) = \mathbf{TA} \text{ s.t. } \mathbf{A_c} \leq \mathbf{f_c}(\mathbf{D_c}) \ \forall \ \mathbf{c} \text{ and } \sum_{\mathbf{C}} \mathbf{A_c} \leq \mathbf{V} \tag{4}$$

$$R_c = R(\mathbf{T}) \tag{5}$$

$$A_c = \begin{cases} f_c(D_c) & \text{if } \sum_{R_j \leq R_c} f_j(D_j) < V \\ V - \sum_{R_j < R_c} f_j(D_j) & \text{if } \sum_{R_j \leq R_c} f_j(D_j) > V \\ 0 & \text{if } \sum_{R_j < R_c} f_j(D_j) > V \end{cases} \tag{6}$$

This concept can be illustrated graphically as in figure 1. The y-axis is the T value, and the public official sorts the categories from left to right. The width of the areas represents the allocation they receive, and the category that overlaps the cap is the marginal category. Categories to the right of the cap do not receive borrowing authority. The assumption that all projects in a category have equal T values is simplifying, but not necessary. It could be that each project has its own T value, and there is some overlap of the distributions. However, if all IDB projects can be covered by the cap, and they have the highest distribution of T values, then IDB is clearly not the marginal category. Categories that receive no funding are also clearly not the marginal category and not the highest priority category.

If we define $P[M_c]$ as the probability that category c is marginal, then we can define the conditional expectation of A_c. If we observe that $A_c = 0$, we know that it is not the marginal category. Given that some borrowing occurs in category c, the probability that the category is marginal is the complement of the probability that it is not marginal. The expected allocation, given that anything is allocated, is the probability that the category is marginal, times the remainder of the cap, plus the probability that it was fully funded multiplied by the market's demand in that category. To estimate this, there must be an assumption about the functional form of the relationship between the economic activity in the industry, and the demand for private-activity borrowing that it creates. I proceed with a simple linear model in equation 8.

Equation 12 shows an equation that can be estimated from the data. From the regression estimates, a few calculations (equations 13 and 14) return the parameters of the simple model. These estimates are based on two relationships between variables: the relationship between the remainder and the allocation, and the relationship between the relevant GSP and the allocation.

$$E[A_c|A_c > 0] = P[M_c][V - \sum_{j \neq c} A_j] + [1 - P[M_c]][f_c(D_c)] \tag{7}$$

$$f(D) = m + dD + \epsilon_f \tag{8}$$

$$R_c = V - \sum_{j \neq c} A_j \tag{9}$$

$$E[A_c|A_c > 0] = P[M_c][R_c] + [1 - P[M_c]][m_c + d_c D_c] \tag{10}$$

$$E[A_c|A_c > 0] = [1 - P[M_c]]m_c + P[M_c]R_c + ([1 - P[M_c]]d_c)D_c \tag{11}$$

$$A_{c|A_c>0} = \alpha + \beta_1 R_c + \beta_2 D_c + \epsilon \tag{12}$$

$$d_c = \frac{[1 - P[M_c]]d_c}{1 - P[M_c]} = \frac{\beta_2}{1 - \beta_1} \tag{13}$$

$$m_c = \frac{[1 - P[M_c]]m_c}{1 - P[M_c]} = \frac{\alpha}{1 - \beta_1} \tag{14}$$

It is also possible to extend this model to estimate the impact of other covariates on the probability of a category being marginal. In the Lindbeck-Wiebull models, several possible factors were suggested. The potential profit for firms from getting the allocation should matter, either because the public official wants to create rents in his district, or because part of the rents will be transferred to the public official. A direct measure of part of the transfers can be used in the form of campaign contribution data. Also, the priority of a category can be related to measures of constituencies, as defined by voters involved in the industries. Additionally, a measure of how well a broad constituency has overcome its collection action problem will be of interest. In this case, I will use unionization data. In equation 15, I specify a linear probability model, where each covariate is an X variable, indexed by i. After making the substitution and arranging, the model that can be estimated is given in equation 16.

$$P[M_c] = a_c + \sum_i B_{ic} X_{ic} \tag{15}$$

$$\begin{aligned} E[A_c | A_c > 0] &= [1 - a_c - \sum_i B_{ic} X_{ic}] m_c + [a_c + \sum_i B_{ic} X_{ic}] R_c \\ &\quad + [1 - a_c - \sum_i B_{ic} X_{ic}] d_c D_c \end{aligned} \tag{16}$$

$$\begin{aligned} A_{c|A_c>0} &= \tau_c + (\alpha_c) R_c + \sum_i (\gamma_{ic}) X_{ic} \\ &\quad + (\phi_{ic}) D_c + \sum_i (\beta_{ic}) X_{ic} R_c + \sum_i (\theta_i) X_{ic} D_c + \epsilon_c \end{aligned} \tag{17}$$

Unlike the simpler model, these parameters must be estimated with a technique that allows for these constraints to be imposed:

$$m = \frac{\tau}{1-\alpha} = \frac{\gamma_i}{\beta_i} \tag{18}$$

$$d = \frac{\phi}{1-\alpha} = \frac{\theta_i}{\beta_i}. \tag{19}$$

4 Data

Data on cap-subject private-activities bond issues is collected each year by the *Bond Buyer*. All states except Illinois participate. Prior to the year 2000, bonds issued with carryforward authority were not included in this data. After 2000, carryforward issues were included with the current year total. Unfortunately, there is no way to disaggregate the figures and assign them to their authorization year. This introduces a measurement error. I perform the analysis with the more complete post-2000 data and add the 1990s data to one set of estimates for comparison. The *Bond*

Buyer reports volumes for each state in eight categories.[7] Figure 2 illustrates the volume totals reported in the survey.

The Campaign contribution data used in this analysis was collected and processed by the National Institute on Money in State Politics.[8] The data are collected from state disclosures and coded by the Standard Industrial Code of the donor. Election cycles and contribution reporting are biennial in most states. To ensure that every year has observations, I average over the two most recent cycles. This also reflects some durability of political influence gained through contributions. The unionization and employment data are based on calculations from the Current Population Survey.[9]

Throughout the empirical work, I convert dollar figures to year 2000 dollars using the Consumer Price Index.[10] State-population totals are used to change figures into per capita terms and to categorize states into high-, middle- and low-population categories. The population data are from the Census Bureau estimates.[11] The estimates are based on the decennial census and updated with data from the Current Population Survey (CPS), the Vital Statistics reports (births and deaths), and the American Community Surveys. The regional designations assigned to the states are according to the Census Bureau's four region definitions.

The other control variables originate from a variety of sources. I use the CPS data to estimate urbanization, college attainment, and low-income status for each state and year. The data on state and local taxes are from the Census Bureau's *Quarterly Summary of State and Local Government Tax Revenue*. I accessed the tax data through the Haver Analytics system, which reflects all revisions. From the total taxes I subtracted severance taxes because the incidence of that type of tax falls primarily on non-residents. Bed and other taxes that fall heavily on tourists are not tracked separately, so I could not excluded them. I use unemployment estimates that the Bureau of Labor Statistics calculates from the CPS data.[12]

[7] I combined the figures for mortgage credit certificates into the much larger mortgage revenue bond figures. The "Other Housing" figures are included with multifamily housing. The "Other" category is included in the total borrowing figures, but not in any of the categories.

[8] National Institute on Money in State Politics. http://www.followthemoney.org/.

[9] Miriam King, Steven Ruggles, Trent Alexander, Donna Leicach, and Matthew Sobek. Integrated Public Use Microdata Series, Current Population Survey: Version 2.0. [Machine-readable database]. Minneapolis, MN: Minnesota Population Center [producer and distributor], 2009. http://cps.ipums.org

[10] http://www.bls.gov/cpi/ (Accessed August 30, 2010)

[11] http://www.census.gov/popest/states/ (Accessed August 30, 2010)

[12] http://www.bls.gov/lau/ (Accessed August 24, 2010)

5 Empirical Analysis

5.1 Descriptive Statistics

As a first contact with the data, I present how much of the volume cap the states use, and how they allocate it. In the *Bond Buyer* data, we can observe considerable variety in the percentages of the volume cap that were used each year. Table 1 summarizes the ratios of borrowing to the cap, and how often these ratios are above certain thresholds. The fact that 57 percent of states were observed borrowing an amount over 85 percent of their cap value suggests that most states are using most of their cap. The cap is more likely to be binding when the ratio is high. In cases when states do not borrow as much as their full volume cap, they may still behave as if they were constrained. The main reason is the cancellation of authorized projects or bond issues. Many projects have various sources of funding, and if one of the other sources is lost, or some other change cancels the project, there may not be time to reallocate the authority. Also, some requestors of funding may decide to issue at an amount below their authorization due to changes in market condition or the scope of their projects.

Table 2 shows the summary statistics for the state-year observation on per capita borrowing. The averages are over the state-year observations, so the numerous small states have a lot of representation in the data. We see that mortgage revenue borrowing has the largest per capita average at $44 per capita per year. Student loans and multifamily housing figures averaged under half the mortgage revenue figure at just under $20 per capita per person. The averages for industrial development and utilities are lower at $7.50 to $8 per capita. The second section of table 2 gives the descriptive statistics after the zero-value observations have been dropped, as they will be for the analysis. Without the zero observations, student loans have a higher mean than multifamily housing, suggesting less frequent, large issues. Figure 2 gives a graphic representation of the national totals by category. The national totals appear to have a moderate upward trend with student loans expanding until 2004 and mortgage revenue bonds increasing in 2005 and 2006.

To begin thinking about how the per capita cap relates to borrowing, I average the per capita cap over the study period and assign the states to low and high categories. Table 3 shows how the categories of states differ in their use of the borrowing authority. States with more generous per capita caps borrow more for every purpose. The most pronounced differences are observed in the mortgage revenue and student loan categories, where states with generous caps allocate three times as much authority per capita as is allocated in tight-cap states.

While very few states opt for no private-activity borrowing in any given year (2.2 percent of all annual totals are zero), many states opt for no borrowing within specific categories for a year. Table 4 shows what percentage of the state-year observations show no borrowing in each category.

Table 5 presents descriptive statistics for a set of controls used in the analysis. These controls measure general demographic and economic conditions in the states. They could have predictive power in modeling the demand for borrowing for each purpose. College graduates may favor making student loans available while a growing low income population seeks assistance with multi-family housing. The population categories are included to represent economies of scale. The total gross state product per capita measures if the state is wealthy while the tax measure indicates more or less active governments in the states. Table 6 lists the descriptive statistics for the industry specific per capita gross state products and the measures of political influence. The highest means and variances of per capita GSP appear in the manufacturing and real estate sectors. The political variables are expressed as shares because the theoretical model suggests the relative strength of the competing interests is more important than the levels. Manufacturing and construction have the highest representation both among the households and among unionized workers. Real estate and construction interests are the largest contributors to state and local political campaigns. I am showing the descriptive statistics for all 400 observations, but a subset will be pulled corresponding to the state-years that have a non-zero observation in the five sector models that are estimated separately.

In the analysis, I include state fixed effects in one specification, to demonstrate their effect, but I do not include state indicators in the other models. It is common in literature that uses state panels to include a state fixed effect to capture unobserved characteristics of the states. However, while there is variation in the per capita volume cap within states, there is much more variation between states. Including state and Year FE does not leave much variation for identification of the parameters. For the per capita cap, the between standard deviation is more than five times the magnitude of the within standard deviation. Several of the control variables also have much more between variation than within variation, including urbanization, per capita GSP, per capita taxes, college attainment, and percentage of households that are low income. Obviously, the regional indicators and the population categories (defined over the whole period) have no within variation. All of the estimates in the analysis recognize that the observations are not independent. In considering which type of model is a truer representation of reality, the stable nature of the volume caps should be taken into consideration.

5.2 Model Estimates

In this section, I will present several reduced form models to serve as comparisons for the structural models outlined in section 3. The reduced form models begin with the obvious variables that may determine the levels of borrow and then add additional variables suggested by the theory. The structural models treat the allocation process as a prioritization process. If a sector has high priority, it receives all the borrowing authority it requests. The request is larger if the sector has more economic activity. The lowest priority category often receives no allocation. If the cap is exhausted, there is a marginal category that is allocated whatever remains under the cap, after the high priority projects are funded. This remainder is calculated:

$$R_c = V - \sum_{j \neq c} A_j. \tag{20}$$

To estimate the parameters in the non-linear specifications, such as equation 17, I used the non-linear regression algorithm. Written in general form, the procedure selects β to satisfy $\mathbf{X^T}(\beta)(\mathbf{y} - \mathbf{x}(\beta)) = \mathbf{0}$ and minimize the sum of squared residuals, $SSR(\beta) = (\mathbf{y} - \mathbf{x}(\beta))^{\mathbf{T}}(\mathbf{y} - \mathbf{x}(\beta))$. The algorithm available for use in Stata is based on the text of Davidson and MacKinnon, and it employs Newton's minimization method (2004). Fortunately, the models suggested by the theory are simple enough that there is no danger of failure to converge or of convergence on a local minimum. In the models attempted here, there are no higher orders of the parameters beyond squares, and parameter interactions are pair wise only. The first order conditions have a unique solution given the data.

Building on the theory in section 3, the model that is estimated is

$$E[A_c|A_c > 0] = P[M_c][R_c] + [1 - P[M_c]][m_c + d_c D_c + g_c Z_c] \tag{21}$$

$$A_{c|A_c>0} = \widehat{P[M_c]} R_c + [1 - \widehat{P[M_c]}][\hat{m}_c + \hat{d}_c D_c + \hat{g}_c \mathbf{Z_c}] + \epsilon_{\mathbf{c}}. \tag{22}$$

$\mathbf{Z_c}$ is a vector of control variables that improve the model of the demand for private-activity bond funding.

The next specification, which I refer to as the political model, takes the additional step of including three political factors that could contribute to a category being higher priority. These are the share of households with wage earners in the relevant industries, the share of campaign contributions from relevant industries, and the share of union members among the relevant industries. Recall from the theory that higher priority purposes are less likely to be marginal. Having political influence through votes, money, or organization makes an interest group higher priority. Therefore I hypothesize that higher relative shares of households, contributions, and union members will be associated with lower probabilities of the category being marginal. The model is unranked, so the remainder is the difference between the cap and the borrowing for all other purposes. The model that is estimated is:

$$\begin{aligned} E[A_c|A_c > 0] &= [1 - a_c - \sum_i B_{ic}X_{ic}]m_c + [a_c + \sum_i B_{ic}X_{ic}]R_c \\ &\quad +[1 - a_c - \sum_i B_{ic}X_{ic}]d_cD_c + [1 - a_c - \sum_i B_{ic}X_{ic}]g_c\mathbf{Z_c} \qquad (23) \\ A_{c|A_c>0} &= [\hat{a}_c + \sum_i \hat{B}_{ic}X_{ic}]R_c + [1 - \hat{a}_c - \sum_i \hat{B}_{ic}X_{ic}][\hat{m}_c + \hat{d}_cD_c + \hat{g}_c\mathbf{Z_c}] + \epsilon_\mathbf{c}. \qquad (24) \end{aligned}$$

where A_c is per capita borrowing, D_c is per capita GSP, c indexes the industry, and the X values are share covariates for households, campaign contributions, and unionization.

For comparison, I first attempt several OLS models using the same observations and variables as will be used in the structural estimation. The sample is limited to the state-year-category cells with non-zero borrowing observed. The dependent variable is the per capita borrowing for the sector. What is appropriate to include in a comparison model? The answer is not clear-cut. Before developing the prioritization theory, I explored the data with reduced form models that related each type of borrowing to the volume cap. Introducing prioritization suggests added data on borrowing for the other purposes. Adding that variable, the sum of borrowing for the four other sectors, gives the model an extra degree of freedom. The variable that is included in the structural model is the remainder, the difference between the cap and the other borrowing. Including the remainder rather than the cap keeps the degrees of freedom the same because it implicitly fixes the relationship between the coefficients on the cap and the other borrowing.

To be thorough, I am presenting the results of all three sets of models. The first set of reduced form regression, presented in table 7, includes the per capita cap. We see that there are positive relationships between the cap and each type of borrowing. The coefficients are significant for the mortgage revenue and student loan models. The cap is significant at the 10 percent level in the utilities model and just misses significance in the multifamily housing model. When the measures of political influence are included, as shown in table 8, the coefficients on the cap barely change, suggesting the cap's influence on borrowing is not correlated with the political measures. The political measures, individually and jointly, do not have much explanatory power in the reduced form models. Only one coefficient, household share in the utilities industry, is individual significant, and the political variables are jointly significant on in the multifamily housing model (see table 17, row I). In tables 9 and 10, I add the sum of borrowing for the other categories in the same state and year. This measure is significant in all models except that of the utilities data. The coefficients are negative, as they should be if there is competition for the borrowing authority.

In tables 11 and 12, the results are from models including the same variable that will be used in the structural estimates, the remainder. There is a positive relationship between the remainder and borrowing for mortgage revenue bonds, student loans, and multifamily housing. The model for industrial development is not quite significant. Judged by the R^2, the models for industrial and utilities borrowing are worse when the remainder is used in place of the volume cap (an F-test is not possible because the degrees of freedom are unchanged). In the other three models, the additional information contained in the remainder improves the explanatory power.

The results of the simple structural models are presented in table 13 and are in line with the qualitative information gained from the interviews. Conditional on having any allocation, it appears that industrial revenue and utilities bonds are the least likely to be the marginal category. $P[M]$ for utilities is estimated to be .15. There is only a small relationship between the remainder of the cap and the allocation IDBs receive. Multifamily housing and student loans are the marginal categories somewhat more often. The models suggests that in one out of five occasions in which multifamily housing receives an allocation, it is the marginal category. The residual category appears to be mortgage revenue bonds. It displays a strong relationship between the remainders and its allocation. Mortgage revenue borrowing is the most likely to be the marginal category ($P[M] = .35$), while student loans are the second most likely ($P[M] = .28$). In the control variable coefficients, only one is strongly significant. Demand for mortgage revenue bonds is higher in per capita terms in the states with populations below 1.9 million.

It is reasonable to think that the coefficient on the marginal probabilities might add to one. However, this is not necessary because not every state-year set of observations has a marginal category. In years when a state's cap is not exhausted, all non-zero allocations are at the level determined by the economic activity, so there is no marginal category. The probability estimates in table 13 add to 1.16. The positive overstatement may come from the industrial development or utilities models (their true parameters could be zero), or some combination of any of the models.

When the probability parameter is replaced with a linear probability model, two coefficients are significant and in keeping with the theory. Higher relative values in the measures of political influence should decrease the probability that the category is the marginal category. Therefore the coefficients on the measures should be negative. Higher shares of wage earners in the real estate industry are associated with mortgage revenue bonds being less likely to be marginal. Higher contributions from manufacturing interests are associated with industrial development bonds being less likely to be the marginal category. Running counter to the theory, the political measures are associated with a higher probability of being the marginal category in the utilities, multifamily and student loan models. However, both linear probability models have a large negative constant, which the variable coefficients are offsetting. Several more coefficients on the control variables are significant in the model with political covariates. The small population indicator is now significant in the utilities, mortgage and student loan models. A higher total GSP per capita is associated with more mortgage revenue borrowing while higher taxes are associated with more multifamily borrowing. Urbanization is associated with lower mortgage revenue bond borrowing.

Do the structural models explain the data better than the reduced form? The goodness of fit measures and F-tests in tables 15, 16 and 17 display some mixed results. Among the simple models, two of the reduced form models have the same degrees of freedom as the structural model, precluding F-tests. The reduced form model that includes the remainder is actually the same as the structural model with a different interpretation of the coefficients. Using the remainder, rather than the cap alone, improves the fit for multifamily housing, slightly improves the mortgage revenue model, but makes the other three models less well-fitting. This judgment is based on the RMSE, AIC and BIC figures which all reflect the same pattern. Allowing the cap and the other borrowing to have their own unrestricted coefficients, as in the second reduced form model, produces a significantly better fit. The F-tests (table, 17, row V) confirm this.

In the three types of reduced form models, adding the political covariates only improves the model for multifamily housing (see rows I to III, 17). However, comparing the structural models (row IV), the political covariates significantly improve all five models. In the two other F-tests that are possible (rows VI and VII), the structural political model definitively bests the reduced form models in all five sectors. The closest contender with the political structural model is the reduced form model with the political covariates, the cap and the other borrowing. In the industrial development, utilities and multifamily models, the AIC and BIC are improved by 1 to 2 percent by imposing the structure. The student loan model is slightly worse and the mortgage revenue model has a miniscule improvement.

Overall, there are two important conclusions from the goodness-of-fit measures and the F-tests. If the political measures are available, they should be included. They evidently improve the model. If the political variables are included, the structural model is better in most cases and at least a good in the others. The advantages of the political structural models are even more apparent if they are compared against the reduced form models that only include the per capita cap as their main independent variable. A major contribution of the prioritization model is that it suggests including the residuals or other borrowing in models of this process. In this way, the theoretical model informs both the structural and reduced form estimates.

At this point, I will present the results of several variations of the model. Some offer new insights by approaching the data from different angles while others investigate the robustness of the results. Shifting focus to table 18, I now investigate whether imposing a rank order can improve the model. I am using the priority order suggested by the interviews and the previous model: (1) Industrial Development (2) Utilities (3) Multifamily Housing (4) Student Loans (5) Mortgage Revenue Bonds. The major change is that the remainder is now defined as:

$$R_c = V - \sum_{r_j < r_c} A_j \tag{25}$$

where r is the priority rank of the category. For example, $R_{multifamily} = V - A_{industrial} - A_{utilities}$.

The shift to this calculation of the remainder reduces the simple model's estimate of the probability of being marginal for the multifamily category. The other notable changes are in the utilities model. The probability estimate for utilities increases to .35 from .15 in the unranked model, and becomes significant. The coefficient relating per capita GSP to per capita borrowing also increases in the utilities model. The R^2 suggests the ranked model seems to be a better fit for the utilities data. These results would support the assertion that utilities is the marginal category often, roughly a third of the occasions in which utilities borrowing is observed. However, subtracting the mortgage, multifamily and student loan figures from the cap introduces enough noise to attentuate the estimate.

Table 19 presents the results of the two models when state fixed effects are included. The results in the simpler model are eliminated. In the political covariates model, the coefficients display a similar pattern of direction, magnitude and significance, but they are attenuated. Another alternate specification (table 20), taking the logs of the dependent variable and the independent variable in levels (sector GSP per capita), changes the results somewhat. In the simple model, the probabilities of the categories being marginal are reduced by about half. All values are at least marginally significant except the utilities estimate. In the political covariate models, the negative, significant coefficients on the contributions measure in the industrial development model remains. The coefficients on the sector GSP in the utilities and multifamily housing models, which were not significant in the levels estimates, are positive and significant.

If the models are run without controls, the probability of be a marginal category is much higher for mortgage revenue bonds, multifamily housing and student loan bonds. The results appear in table 21. Without controls, the only political variable that displays a coefficient in keeping with the theory is the household measure in the mortgage model.

In the descriptive statistics, it was evident that states with generous per capita volume caps allocate borrowing in a different way than states with low per capita caps. The models in presented in table 22 investigate the difference in the political processes with the data set split. Estimating the model for the states with low caps shows only that a high share of households with wage earners in higher education corresponds to student loans being the marginal category less frequently. In high cap states, both the predicted relationships from table 14 show through. Contributions from manufacturing interests and employment in real estate are associated with higher priority for their sectors. In fact, the coefficients in the models on the data of the high cap states are very similar to the pooled estimates, suggesting the results for the generous cap states are driving the results.

Tables 23 and 24 present the results of the models estimated on two other subsets of the data. The first is a trimmed set. I calculated the cooks distance for each observation, drop those with the 20 largest values, and re-estimate the model. All the probability estimates decline, but those in the mortgage revenue and multifamily models remain significant. Among the political covariates, the coefficient on households in mortgage model loses its significance. The coefficient on contributions in the industrial model remains significant in the trimmed data. The second variation of the data set involves removing the states with the five largest and five smallest populations in the year 2000. This change reveals that the states with extreme population levels are not creating the results by themselves. The probability estimates are significant in the mortgage, multifamily and student models. The significant coefficients in the industrial and mortgage political covariates remain significant.

Raising the household, contribution and union shares to the second power appears to improve the fit of the model for the relationship between contributions and industrial borrowing, unions and utilities borrowing, and unions and mortgage borrowing (see table 25). In both cases, a diminishing returns shape appears. The direct effect of additional contribution or union shares decreases the sector's probability of being marginal, but the square's coefficient has the opposite sign. In the same table, a categorical estimate is presented. Here, high contribution shares, high household shares, or both should increase the category's priority relative to observations with lower than median values of both. The results are mixed.

Any discussion of politics naturally raises the question of partisanship. We may wonder if Democrats prioritize some uses of private activity bonds more than Republicans or vice versa. In table 26, I add a measure of partisanship into the structural model with the other political variables. The measure is the percentage of the lower house of the state legislature that is held by Democrats. A house entirely held by Democrats would have a value of 1 while a evenly divided house would have a value of .5. For Nebraska, which has non-partisan state legislators, and Washington DC, I substitute imputed figures using the voting percentages in the presidential elections of 2000, 2004 and 2008. This variable differs from the others in that it has the same value in all five models, rather than representing an industry-specific measure of strength or organization. The coefficients on the measure of Democratic party power are negative in the models for borrowing for mortgage revenue bonds, multifamily housing and student loans. This suggests more Democratic legislatures increase the probability of these categories being marginal.

Finally, I attempt the two main models with the 1990s data included. The results are similar for the simple model. In the estimates with the political covariates, the two significant negative coefficients in the 2000 only estimates lose their significance. When the 1990s observations are included, it appears that a higher share of contributions for utilities interests is associated with utilities borrowing being less likely to be the marginal category.

6 Policy Implications

When policy debates related to private-activity bonds occur, the primary question is whether to raise the caps. To help policy makers think about this possibility, I use the models estimated here to forecast how borrowing might change if the volume caps were raised by 10 percent.[13] In estimating the parameters, the models are linked by the dependent variable (borrowing) in each model appearing as an independent variable embedded in the remainder values. For the simulation, I have to reflect that an increase in the cap will be spread across all five categories in some way. I did this by iterating the process. First I estimate borrowing in each category with a 10 percent increase in the cap, as if all that additional authorization were available to each category. Then I take the higher estimated borrowing figures, recalculate the five remainders and re-estimate the models. I repeat this process until the estimates stop changing. After five rounds, the changes in the estimates become quite small, so I report the results of the fifth iteration. The results are

[13] The calculations for the predicted values are as follows. C_{it} is the value of the per capita volume cap for state i in year t. F is the non-linear function of the cap and other covariates that predicts a per capita borrowing value. P is population. $\mathbf{B}$ is the vector of other parameter estimates. $\mathbf{X}$ is the vector of other variables.

$$Mean\_PC\_Borrow = \frac{1}{N}\sum_{IT} F(1.1C_{it}, \mathbf{X}_{it}, \mathbf{B}) \quad (26)$$

$$Mean\_Borrow = \frac{1}{N}\sum_{IT} P_{it}F(1.1C_{it}, \mathbf{X}_{it}, \mathbf{B}) \quad (27)$$

$$Annual\_Total\_Borrow = \frac{1}{T}\sum_{IT} P_{it}F(1.1C_{it}, \mathbf{X}_{it}, \mathbf{B}) \quad (28)$$

The changes in the mean borrowing and annual total borrowing are a smaller percentage of the actual that the predicted changes in mean per capita borrowing because the smallest changes in the per capita measure C are weighted by the largest populations, P. Likewise, the largest values of C are weighted by the smallest P values.

presented in table 28.

The simple model's predicted increases in per capita borrowing in the average state and year range from \$0.88 for industrial development and \$0.83 for utilities up to \$4.28 for student loan bonds. This difference reflects the model's implication that industrial projects already receive most of the allocations they request, and are not absorbing the residual of the cap, as student loan bonds do. When the numbers are weighted by the larger volumes in the larger states, the emphasis shifts away from mortgage revenue bonds and toward utilities and multifamily housing. Student loans remain the largest category when averaged over the observations.

Shifting to the results of the political model's predictions (29), there is a strong preference for utilities investment. The results of both the average per capita estimate and the national aggregation suggest that utilities bond issuance would experience by far the largest increases in response to a 10 percent increase in the cap. This reflects that that political variables are influential on the allocation to utilities. The estimates for industrial development are again the lowest, reflecting that demand is being already being met in this sector. The estimated aggregate increases for mortgage revenue bonds, multifamily housing, and student loans are 1.7, 8.1, and 9.0 percent respectively.

7 Conclusion

The allocation of private-activity borrowing authority can be successfully modeled with the concept that the activities are prioritized. The empirical models support the qualitative data which suggests that industrial development and utilities are the highest priority uses of funding, followed by multifamily housing. Student loans and mortgage revenue bonds are evidently the residual categories that receive the authority to borrow that remains after all feasible industrial, utility, and multifamily housing projects have been funded. The model suggests that, conditional on receiving any allocation, the probability that mortgage revenue bonds are the marginal category is .35.[14] The probabilities for student loans and multifamily housing are .28 and .21 respectively. The theory suggests that higher values in measure of political influence should correspond to a category being marginal less frequently. The empirical results for the political influence measures are mixed—some individual coefficients accord with the theory and others run counter to it. However, the political

[14] I define the marginal activity as the lowest priority activity that receives a non-zero allocation.

covariates are jointly significant and, when added to the model with a structure suggested by the prioritization theory, substantially improve the fit of the model to the data. With these results, we can conclude that conceiving of the allocation of the authority to issue private-activity municipal bonds as a prioritization process is a useful way to understand this process. More generally, in situations where public officials are given a non-fungible subsidy to distribute, with no direct costs to the officials, we might expect them to prioritize the potential recipients, and fill the requests until the demand or the subsidy is exhausted.

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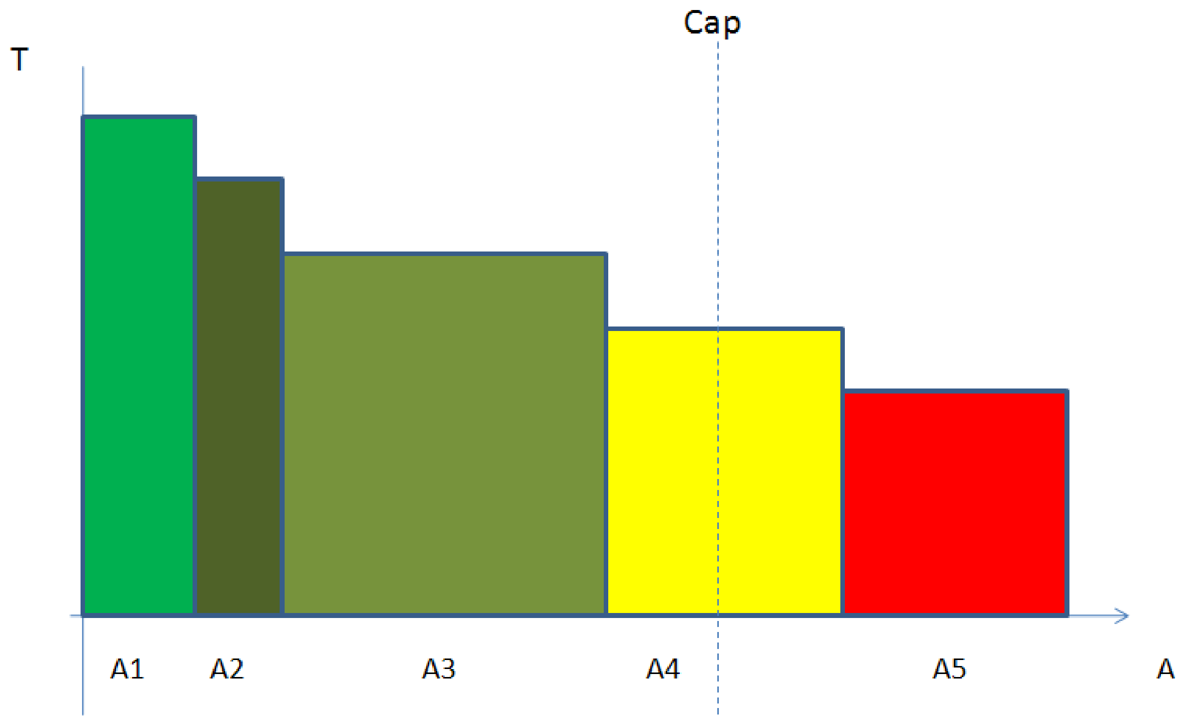

Figure 1: Prioritization in the Allocation of Private-Activity Borrowing Authority. T is the utility the public official obtains from allocating a dollar of private-activity borrowing authority. The width of the rectangles is determined by the requests made by the private-activity borrowers. The public official funds the highest priority (highest T) purposes first, placing them to the left. Category 4 is the marginal category, which receives an allocation of the difference between the volume cap and the higher priority requests. Use 5 receives no borrowing authority. The volume cap is exhausted in this state and year.

Variable	Median	Mean	SD	Minimum	Maximum
Ratio	0.90	0.86	0.37	0.00	2.38
Ratio > .85	1.00	0.57	0.50	0.00	1.00
Ratio > 1	0.00	0.30	0.46	0.00	1.00

Table 1: Descriptive Statistics: Private-Activity Borrowing/Cap Ratios. The calculations are based on the *Bond Buyer* data.

Per Capita Borrowing	N	Mean	SD	Min	Max
Total	400	99.672	94.205	0.000	613.794
Industrial	400	7.580	26.384	0.000	427.359
Utilities	400	7.935	22.217	0.000	357.526
Mortgage	400	43.892	64.954	0.000	526.724
Multifamily	400	19.880	34.636	0.000	291.207
Student	400	19.657	38.196	0.000	307.650
Other	400	1.340	5.051	0.000	52.216
Per Capita Borrowing (non-zero)	N	Mean	SD	Min	Max
Industrial	292	10.383	30.418	0.162	427.359
Utilities	243	13.062	27.32	0.203	357.526
Mortgage	335	52.409	67.767	0.162	526.724
Multifamily	333	23.880	36.687	0.247	291.207
Student	236	32.279	46.071	0.491	311.497
Log Per Capita Borrowing	N	Mean	SD	Min	Max
Industrial	292	1.80	0.92	0.15	6.06
Utilities	243	2.10	0.95	0.19	5.88
Mortgage	335	3.41	1.11	0.15	6.27
Multifamily	333	2.67	0.99	0.22	5.68
Student	236	2.94	1.02	0.40	5.75

Table 2: Descriptive Statistics: Private-Activity Borrowing by Purpose. All figures are adjusted for inflation to year 2000 dollars. The *Bond Buyer* data are used.

	Per Capita Borrowing				
Per Capita Volume Cap Level	Industrial	Utilities	Mortgage	Multifamily	Student
Below Median	5.474	6.305	21.614	15.725	9.135
	(8.690)	(6.745)	(20.478)	(13.725)	(11.032)
Above Median	9.685	9.566	66.171	24.034	28.954
	(36.212)	(30.640)	(83.918)	(46.714)	(51.904)

Table 3: Private-Activity Borrowing by Purpose and Volume Cap Level. The states were divided into two categories based on their average per capita volume cap between 2000 and 2007. All figures are the means of the borrowing observed for the purpose (column) by states in the volume cap category (row). Standard deviations appear in parentheses below. The units are per capita year 2000 dollars.

Category	Percent Zeros
Industrial	27
Utilities	39
Mortgage	16
Multifamily	17
Student Loans	41

Table 4: Percent Zero Borrowing Observations by Purpose. The figures are the percentage of all state-year observations that have observations equal to zero for the specified purpose in the *Bond Buyer* data.

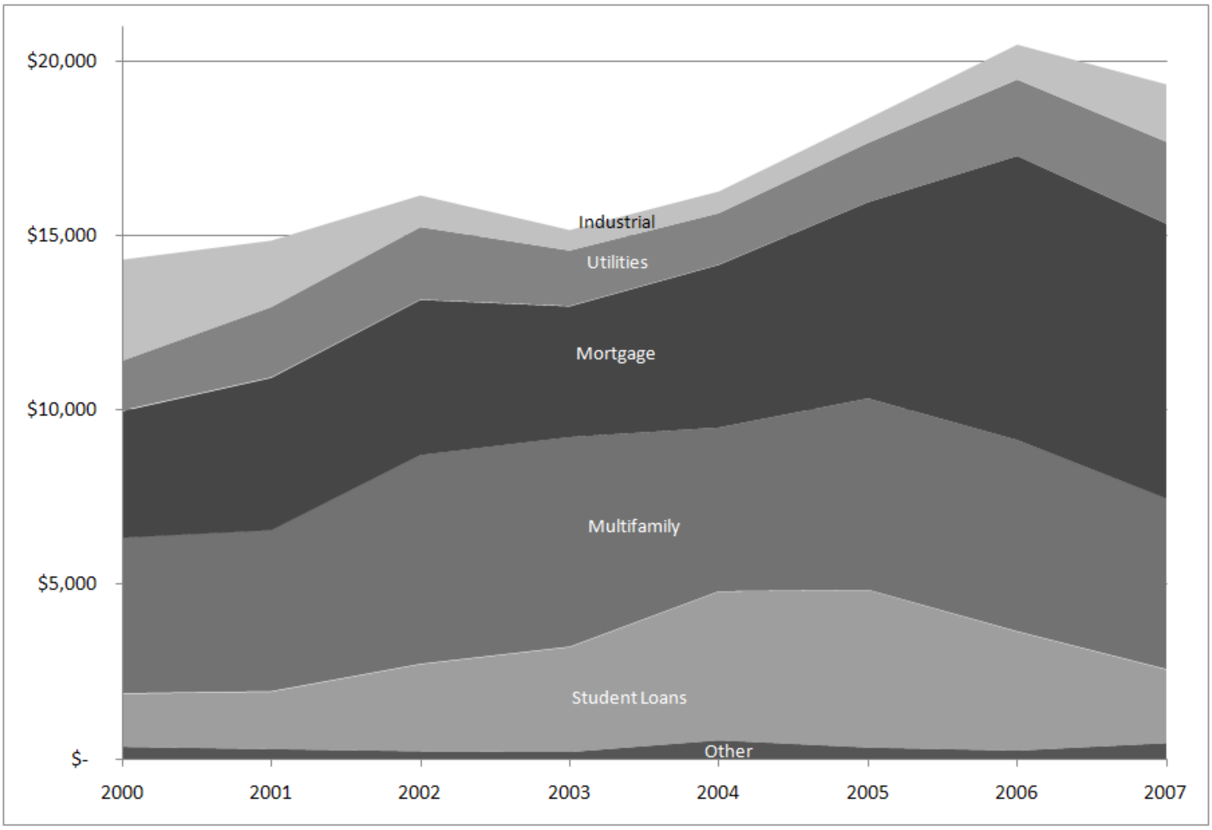

Figure 2: Total Allocation of Private-Activity Borrowing. Figures are in millions of year 2000 dollars.

Variable	N	Mean	SD	Min	Max
Northeast	400	0.180	0.385	0	1
South	400	0.340	0.474	0	1
West	400	0.260	0.439	0	1
Urbanization	400	71.159	20.995	22.575	100.000
Per Capita Gross State Product	400	37.273	14.423	22.356	138.884
Per Capita State and Local Taxes	400	3.074	0.783	2.056	6.967
Unemployment	400	4.759	1.135	2.258	8.142
College Attainment	400	26.742	5.606	14.649	49.949
College Attainment Growth	400	0.430	1.009	-1.928	3.874
Low Income	400	20.830	4.761	10.553	35.487
Low Income Growth	400	-0.095	1.214	-5.378	3.042
Population <1.9 M	400	0.340	0.474	0	1
Population >5.3 M	400	0.320	0.467	0	1

Table 5: Descriptive Statistics: Control Variables. The regional variables and population groups are binary indicators. The GSP and tax units are thousands of year 2000 dollars per capita. All other units are percentages or differences in percentages. See section 4 for the various sources of the data.

	Per Capita Gross State Product			
Category	Mean	SD	Min	Max
Manufacturing (Industrial)	4.615	1.797	0.289	9.815
Utilities	0.746	0.272	0.126	2.316
Real Estate (Mortgage)	4.246	1.629	2.102	14.256
Construction (Multifamily)	1.675	0.436	0.970	3.954
Higher Education (Student Loan)	0.327	0.299	0.062	3.415
	Share of Households			
Category	Mean	SD	Min	Max
Manufacturing (Industrial)	43.736	9.431	20.981	67.876
Utilities	3.545	1.808	1.057	12.725
Real Estate (Mortgage)	5.887	2.872	0.831	22.264
Construction (Multifamily)	32.635	9.060	8.906	53.122
Higher Education (Student Loan)	14.745	4.326	4.141	33.580
	Share of Contributions			
Category	Mean	SD	Min	Max
Manufacturing (Industrial)	12.165	7.948	0.541	46.601
Utilities	15.694	7.057	2.557	35.410
Real Estate (Mortgage)	34.100	12.125	6.917	78.810
Construction (Multifamily)	32.273	10.324	3.720	68.533
Higher Education (Student)	5.978	4.334	0.291	21.128
	Share of Union Members			
Category	Mean	SD	Min	Max
Manufacturing (Industrial)	33.886	28.403	0.000	100.000
Utilities	9.534	12.109	0.000	56.233
Real Estate (Mortgage)	1.408	4.628	0.000	33.936
Construction (Multifamily)	38.999	28.156	0.000	100.000
Higher Education (Student)	15.710	20.547	0.000	100.000

Table 6: Descriptive Statistics: GSP and Households by Industry. The GSP data are from the Bureau of Economic Analysis calculations based on the Survey of Current Business. The household data are estimated using the Current Population Survey and weights provided by the Minnesota Population Data Center. Households are counted if they have any wage earner employed in the indicated industry. Households can have wage earners in multiple industries. The shares figures are the percentage of GSP or households for the row's industry within the five industries.

	Industry	Utilities	Mortgage	Multifamily	Student
Per Capita Cap	0.268	0.212*	0.411***	0.185	0.376***
	(0.151)	(0.089)	(0.073)	(0.092)	(0.103)
Sector GSP PC	−3.432	33.667***	0.192	2.705	30.803
	(2.327)	(7.998)	(5.634)	(6.036)	(16.568)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Constant	155.286	31.481*	38.189	−88.246**	−12.211
	(80.593)	(12.704)	(35.536)	(28.000)	(33.199)
R^2	0.523	0.485	0.553	0.467	0.607
N	292	243	335	333	236

Table 7: Simple, reduced form model with volume cap. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. This is the extended note in table. All of the following statements in this note apply to all the regression results unless otherwise noted. Only observations with non-zero values were included. All dollar values used in the calculations are adjusted to year 2000 real dollars using the Consumer Price Index. All standard errors are corrected for heteroskedasticity using a Huber-White procedure. All private-activity borrowing data are from the *Bond Buyer* survey. "Control Variables" refers to a standard set of variables including region indicators, urbanization, GSP per capita, state and local taxes per capita, unemployment, college attainment, college attainment growth, low income percentage, low income percentage growth, and population category indicators. See section 4 for a complete description of the control variables. All variables with labels "share" are the percentage of the five-industry total that corresponds to the individual industry indicated in the column heading. State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
Per Capita Cap	0.269	0.188*	0.411***	0.193	0.376***
	(0.152)	(0.077)	(0.075)	(0.099)	(0.103)
Sector GSP PC	−3.469	32.991***	1.853	4.235	30.169
	(2.296)	(7.048)	(6.300)	(6.418)	(17.680)
Household Share	0.131	2.327*	−2.545	0.768	−0.458
	(0.168)	(1.091)	(1.418)	(0.616)	(0.896)
Contribution Share	−0.044	−0.158	0.076	0.001	0.352
	(0.242)	(0.183)	(0.286)	(0.226)	(0.749)
Union Share	−0.003	0.021	0.772	0.095	0.065
	(0.056)	(0.091)	(0.922)	(0.125)	(0.086)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Constant	147.305	22.276	35.385	−129.006**	−12.244
	(77.904)	(14.798)	(38.231)	(39.215)	(34.831)
R^2	0.524	0.497	0.559	0.496	0.609
N	292	243	335	333	236

Table 8: Political reduced form model with volume cap. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. For additional details, see the extended note in table 7 State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
Per Capita Cap	0.328*	0.268	0.487***	0.271*	0.467***
	(0.160)	(0.167)	(0.051)	(0.111)	(0.117)
Other Borrowing	−0.129*	−0.101	−0.235 * *	−0.177*	−0.187*
	(0.063)	(0.141)	(0.070)	(0.085)	(0.083)
Sector GSP PC	−3.085	34.606***	−2.953	2.363	37.271*
	(1.956)	(9.732)	(5.138)	(5.428)	(15.335)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Constant	134.757*	28.652*	33.814	−77.531*	−12.000
	(65.581)	(14.041)	(28.450)	(29.666)	(27.789)
R^2	0.568	0.497	0.575	0.507	0.638
N	292	243	335	333	236

Table 9: Simple reduced form model with volume cap and other borrowing. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. For additional details, see the extended note in table 7 State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
Per Capita Cap	0.329*	0.239	0.488***	0.270*	0.469***
	(0.161)	(0.160)	(0.051)	(0.111)	(0.118)
Other Borrowing	−0.130*	−0.089	−0.233***	−0.159*	−0.188*
	(0.064)	(0.147)	(0.062)	(0.078)	(0.084)
Sector GSP PC	−3.006	33.446***	−1.566	3.690	37.738*
	(1.862)	(8.315)	(5.996)	(5.645)	(15.887)
Household Share	0.077	2.095*	−2.049	0.637	−0.616
	(0.175)	(1.013)	(1.505)	(0.606)	(0.801)
Contribution Share	−0.075	−0.070	0.056	−0.006	0.238
	(0.220)	(0.246)	(0.243)	(0.198)	(0.704)
Union Share	−0.018	0.020	0.905	0.087	0.077
	(0.061)	(0.095)	(0.973)	(0.127)	(0.072)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Constant	171.449*	16.456	35.366	−132.089 * *	−18.980
	(77.810)	(22.442)	(32.838)	(42.913)	(34.243)
R^2	0.568	0.506	0.580	0.529	0.640
N	292	243	335	333	236

Table 10: Political reduced form model with volume cap and other borrowing. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. For additional details, see the extended note in table 7 State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
Remainder	0.175	0.154	0.346***	0.205*	0.283*
	(0.093)	(0.141)	(0.058)	(0.089)	(0.115)
Sector GSP PC	−3.857	42.105 * *	−6.136	2.109	35.346*
	(2.527)	(12.599)	(4.595)	(5.954)	(17.416)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Constant	156.362	36.138*	61.630	−68.777*	26.219
	(83.897)	(15.140)	(34.328)	(29.250)	(33.910)
R^2	0.522	0.474	0.559	0.501	0.591
N	292	243	335	333	236

Table 11: Simple reduced form model with remainder. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. For additional details, see the extended note in table 7 State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
Remainder	0.175	0.134	0.344***	0.192*	0.282*
	(0.095)	(0.142)	(0.053)	(0.085)	(0.118)
Sector GSP PC	−3.787	39.404***	−5.341	3.170	33.048
	(2.346)	(9.735)	(5.493)	(6.107)	(19.004)
Household Share	0.057	2.515	−1.893	0.587	−0.226
	(0.185)	(1.274)	(1.650)	(0.598)	(1.019)
Contribution Share	−0.034	−0.018	0.159	−0.059	0.289
	(0.174)	(0.265)	(0.224)	(0.192)	(0.779)
Union Share	−0.043	0.051	0.839	0.085	0.125
	(0.063)	(0.115)	(1.000)	(0.129)	(0.077)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Constant	153.948	20.712	62.309	−96.726 * *	27.502
	(88.510)	(20.010)	(39.861)	(35.074)	(33.915)
R^2	0.523	0.488	0.564	0.520	0.595
N	292	243	335	333	236

Table 12: Political reduced form model with remainder. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. For additional details, see the extended note in table 7 State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
$P[M]$	0.175	0.154	0.346***	0.205*	0.283*
	(0.093)	(0.141)	(0.058)	(0.089)	(0.115)
m	189.477	42.721*	94.300	−86.479*	36.582
	(117.704)	(19.136)	(48.043)	(33.899)	(46.913)
d	−4.674	49.774*	−9.389	2.652	49.316
	(3.446)	(22.086)	(7.540)	(7.541)	(29.208)
Northeast	18.965	0.432	12.158	6.009	7.678
	(12.169)	(4.577)	(11.210)	(7.547)	(14.966)
South	3.027	3.620	1.512	5.171	7.402
	(7.241)	(4.756)	(12.228)	(8.515)	(12.720)
West	19.491	24.091*	13.015	10.413	8.756
	(16.286)	(11.181)	(13.869)	(11.065)	(13.258)
Urbanization	−0.671	−0.566	−0.713*	−0.326	−0.780
	(0.425)	(0.339)	(0.291)	(0.371)	(0.481)
GSP PC	1.421	0.620	1.083*	0.325	−1.326
	(0.807)	(0.485)	(0.484)	(0.419)	(0.916)
Taxes PC	0.484	0.715	−5.466	8.243	−6.326
	(5.142)	(4.145)	(11.822)	(4.889)	(13.263)
Unemployment	−1.270	−1.373	−0.875	10.963*	−2.330
	(2.892)	(1.703)	(3.784)	(5.180)	(4.657)
College	−3.838	−1.184	1.686	1.454	2.732
	(2.513)	(0.660)	(1.387)	(0.963)	(2.118)
College Growth	1.164	4.722	−0.854	−4.757	−0.997
	(1.485)	(2.772)	(3.419)	(2.863)	(2.645)
Low Income	−2.727	−1.090	−1.823*	0.171	0.711
	(1.784)	(0.559)	(0.900)	(1.235)	(1.808)
Low Income Growth	1.282	0.915	4.230	−4.425	−0.549
	(1.510)	(1.088)	(3.572)	(3.603)	(2.006)
Population $<$ 1.9M	−28.382	3.370	45.317***	18.547	39.090*
	(19.752)	(10.495)	(12.201)	(11.945)	(15.168)
Population $>$ 3.8M	3.371	5.337	−2.839	4.299	7.698
	(5.310)	(3.401)	(7.406)	(5.940)	(7.518)
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.522	0.474	0.559	0.501	0.591
N	292	243	335	333	236

Table 13: Simple Structural Models. The dependent variable is the observed per capita borrowing for the indicated purpose. Additional notes relevant to all regression tables appear below table 7. Standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Industry	Utilities	Mortgage	Multifamily	Student
a	0.231	−0.984***	0.240	−0.508*	0.014
	(0.290)	(0.171)	(0.242)	(0.202)	(0.254)
$B_{household}$	0.005	0.048	−0.047 **	0.017 **	−0.007
	(0.004)	(0.030)	(0.016)	(0.006)	(0.014)
$B_{contribution}$	−0.020*	0.041***	0.011	0.007	0.043 **
	(0.009)	(0.009)	(0.007)	(0.005)	(0.014)
B_{union}	−0.003	0.019***	−0.005	−0.001	0.005
	(0.002)	(0.004)	(0.013)	(0.003)	(0.004)
m	96.128	−4.235	62.906	−108.979 **	43.210
	(60.051)	(24.418)	(46.376)	(36.963)	(40.503)
d	−1.462	−13.162	−10.443	1.547	66.950
	(1.559)	(15.472)	(8.830)	(6.456)	(46.761)
Northeast	11.030	−3.708	11.783	1.950	15.034
	(6.119)	(5.603)	(11.866)	(6.737)	(13.912)
South	0.750	0.759	3.969	0.751	17.847
	(4.394)	(4.296)	(11.681)	(7.937)	(10.906)
West	6.927	−6.362	18.292	6.156	13.586
	(8.354)	(9.509)	(15.849)	(10.825)	(12.402)
Urbanization	−0.373	0.232	−0.943 **	−0.234	−0.738
	(0.198)	(0.202)	(0.274)	(0.326)	(0.412)
GSP PC	0.911	−0.446	1.847 **	0.402	−0.667
	(0.464)	(0.414)	(0.550)	(0.418)	(0.777)
Taxes PC	−0.444	1.146	−2.150	10.913 **	−7.066
	(2.908)	(3.399)	(12.255)	(3.612)	(8.382)
Unemployment	0.246	2.092	−0.287	6.139*	−2.184
	(1.642)	(1.691)	(4.020)	(2.922)	(3.032)
College	−2.011	0.158	1.677	1.574	1.881
	(1.354)	(0.768)	(1.273)	(0.962)	(1.796)
College Growth	1.562	1.615	−0.563	−3.863	−0.446
	(1.209)	(1.683)	(2.997)	(2.201)	(2.515)
Low Income	−1.393	0.033	−1.334	1.307	−0.092
	(0.990)	(0.585)	(1.010)	(0.988)	(1.194)
Low Income Growth	1.677	0.170	4.705*	−5.700*	1.678
	(1.227)	(0.987)	(2.061)	(2.452)	(2.219)
Population < 1.9M	−8.334	31.777 **	38.399 **	18.385	32.004 **
	(6.554)	(10.814)	(11.692)	(12.362)	(11.118)
Population > 3.8M	−0.130	1.332	−0.934	4.310	7.517
	(2.923)	(2.761)	(8.562)	(5.356)	(7.672)
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.652	0.656	0.747	0.722	0.749
N	292	243	335	333	236

Table 14: Political Structural Models. The dependent variable is the observed per capita borrowing for the indicated purpose. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Sum of Squared Residuals (SSR)	df	Industrial	Utilities	Mortgage	Multifamily	Student
Simple, cap only	22	128,457	93,010	685,065	238,261	196,067
Simple, cap and other borrowing	23	116,330	90,831	652,242	220,075	180,682
Simple, remainder	22	128,579	95,045	676,782	223,028	203,767
Simple, structural	22	128,579	95,045	676,782	223,028	203,767
Political, cap only	25	128,255	90,797	676,238	225,098	194,874
Political, cap and other borrowing	26	116,204	89,208	644,368	210,685	179,344
Political, remainder	25	128,346	92,472	669,231	214,624	202,236
Political, structural	26	104,745	76,459	621,509	176,820	186,590
Root Mean Squared Error (RMSE)		Industrial	Utilities	Mortgage	Multifamily	Student
Simple, cap only		21.853	20.561	46.859	27.723	30.340
Simple, cap and other borrowing		20.834	20.365	45.796	26.687	29.194
Simple, remainder		21.863	20.785	46.574	26.822	30.930
Simple, structural		21.863	20.785	46.574	26.822	30.930
Political, cap only		23.974	21.053	49.744	27.879	34.028
Political, cap and other borrowing		20.940	20.322	45.740	26.240	29.293
Political, remainder		21.966	20.643	46.538	26.440	31.033
Political, structural		19.844	18.771	44.848	23.999	29.808

Table 15: Goodness of fit measures. The parameter estimates can be found in tables 7 through 14.

Akaike Information Criterion (AIC)	Industrial	Utilities	Mortgage	Multifamily	Student
Simple, cap only	2652	2181	3550	3180	2302
Simple, cap and other borrowing	2625	2177	3536	3155	2285
Simple, remainder	2652	2186	3546	3158	2311
Simple, structural	2652	2186	3546	3158	2311
Political, cap only	2657	2181	3552	3167	2307
Political, cap and other borrowing	2631	2179	3538	3147	2289
Political, remainder	2658	2185	3549	3151	2316
Political, structural	2598	2139	3524	3087	2297
Bayesian Information Criterion (BIC)	Industrial	Utilities	Mortgage	Multifamily	Student
Simple, cap only	2737	2261	3638	3267	2382
Simple, cap and other borrowing	2713	2261	3628	3247	2368
Simple, remainder	2737	2266	3634	3245	2391
Simple, structural	2737	2266	3634	3245	2391
Political, cap only	2753	2272	3651	3266	2397
Political, cap and other borrowing	2730	2273	3641	3250	2383
Political, remainder	2753	2276	3648	3250	2406
Political, structural	2694	2230	3623	3186	2387

Table 16: Goodness of fit measures. The dependent variable for each model is the per capita borrowing for the indicated purpose in state-year observations. The parameter estimates can be found in tables 7 through 14.

Test		Industrial	Utilities	Mortgage	Multifamily	Student
I	Political cap only vs. Simple, cap only	0.14	1.77	1.35	6.00	0.43
		(0.936)	(0.154)	(0.259)	(0.001)	(0.731)
II	Political, cap and other borrowing vs. Simple, cap and other borrowing	0.10	1.32	1.26	4.56	0.52
		(0.962)	(0.270)	(0.289)	(0.004)	(0.667)
III	Political, remainder vs. Simple, remainder	0.16	2.02	1.17	4.02	0.53
		(0.922)	(0.112)	(0.323)	(0.004)	(0.661)
IV	Political, structural vs.	15.13	13.19	6.87	20.06	4.83
	Simple, structural	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
V	Simple, cap and other borrowing vs. Simple, structural (remainder)	28.32	10.21	11.74	4.16	27.21
		(0.000)	(0.002)	(0.001)	(0.042)	(0.000)
VI	Political, structural vs. Political, cap only	59.70	40.69	27.21	83.82	9.32
		(0.000)	(0.000)	(0.000)	(0.000)	(0.003)
VII	Political, structural vs. Political, remainder	59.93	45.45	23.73	65.64	17.61
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
VIII	Political, structural vs. Simple, cap and other borrowing	9.81	13.60	5.09	25.03	-2.22
		(0.000)	(0.000)	(0.002)	(0.000)	-

Table 17: F-tests. The parameter estimates can be found in tables 7 through 14.

	Industry	Utilities	Mortgage	Multifamily	Student
$P[M]$	0.268	0.346*	0.345***	0.150	0.271 **
	(0.151)	(0.160)	(0.058)	(0.078)	(0.097)
m	212.137	80.572	92.250	−93.609 **	27.637
	(143.869)	(47.959)	(49.210)	(34.035)	(45.046)
d	−4.688	60.256*	−9.914	2.833	48.118
	(3.831)	(28.470)	(7.619)	(7.328)	(26.469)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.523	0.610	0.558	0.460	0.582
N	292	243	335	333	236

	Industry	Utilities	Mortgage	Multifamily	Student
a	0.217	−0.177	0.234	−0.235	0.129
	(0.142)	(0.132)	(0.249)	(0.186)	(0.172)
$B_{household}$	0.001	0.034***	−0.047 **	0.010	−0.001
	(0.002)	(0.009)	(0.016)	(0.006)	(0.006)
$B_{contribution}$	−0.003	0.003	0.011	0.002	0.016
	(0.002)	(0.003)	(0.008)	(0.002)	(0.013)
B_{union}	−0.000	0.001	−0.003	0.002	0.004***
	(0.001)	(0.003)	(0.013)	(0.002)	(0.001)
m	191.148	20.489	60.692	−134.789 **	55.408
	(127.459)	(14.082)	(47.902)	(42.606)	(37.135)
d	−4.186	24.882 **	−10.469	4.737	23.704
	(3.513)	(7.209)	(9.248)	(7.991)	(24.890)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.583	0.777	0.746	0.685	0.751
N	292	243	335	333	236

Table 18: Simple and Political Structural Models: Forced Rank. The dependent variable is the observed per capita borrowing for the indicated purpose. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

	Industry	Utilities	Mortgage	Multifamily	Student
$P[M]$	0.054	0.289	0.120	0.110	0.052
	(0.042)	(0.167)	(0.109)	(0.092)	(0.061)
m	−2277.319	−0.000	11.065	242.124	−131.774
	(0.000)	(12.965)	.	.	(95.531)
d	−2.708	−3.749	16.486	−7.206	−47.723
	(5.678)	(60.590)	(21.468)	(21.767)	(100.791)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
R^2	0.860	0.600	0.610	0.739	0.810
N	292	243	335	333	236

	Industry	Utilities	Mortgage	Multifamily	Student
a	0.463	−0.793***	−0.231	−0.311	−0.529
	(0.272)	(0.119)	(0.252)	(0.271)	(0.499)
$B_{household}$	−0.009	0.054	−0.048*	0.018**	0.023
	(0.006)	(0.037)	(0.019)	(0.006)	(0.032)
$B_{contribution}$	−0.004	0.039***	0.019	0.002	0.011
	(0.002)	(0.011)	(0.010)	(0.006)	(0.030)
B_{union}	0.001	0.005*	−0.016	−0.003	0.006
	(0.001)	(0.002)	(0.014)	(0.002)	(0.005)
m	112.031	37.324	−0.839	−89.783	−988.956
	(105.575)	(39.527)	(117.881)	(90.209)	(0.000)
d	−1.859	−31.437	7.841	−49.900	−29.210
	(3.141)	(19.540)	(9.339)	(25.224)	(96.569)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
R^2	0.881	0.865	0.780	0.815	0.825
N	292	243	335	333	236

Table 19: Simple and Political Structural Models: State FE. The dependent variable is the observed per capita borrowing for the indicated purpose. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Industry	Utilities	Mortgage	Multifamily	Student
$P[M]$	0.062*	0.039	0.161 **	0.098***	0.085*
	(0.024)	(0.030)	(0.047)	(0.024)	(0.041)
m	4.722 **	3.755***	5.177***	−2.174*	4.283***
	(1.723)	(0.822)	(0.591)	(0.962)	(1.190)
d	0.034	0.517***	−0.616	1.036*	0.349
	(0.255)	(0.138)	(0.505)	(0.471)	(0.258)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.518	0.381	0.582	0.391	0.583
N	292	243	335	333	236

	Industry	Utilities	Mortgage	Multifamily	Student
a	0.051	−0.076	0.010	−0.093	0.254
	(0.120)	(0.063)	(0.135)	(0.121)	(0.141)
$B_{household}$	0.001	0.003	−0.018	0.001	−0.015
	(0.003)	(0.011)	(0.016)	(0.003)	(0.011)
$B_{contribution}$	−0.005 **	0.005	0.008***	0.004*	0.010
	(0.002)	(0.004)	(0.002)	(0.002)	(0.006)
B_{union}	0.001	0.003	−0.014*	0.001	0.001
	(0.001)	(0.002)	(0.006)	(0.001)	(0.002)
m	4.518 **	4.110***	5.225***	−2.123*	5.172***
	(1.681)	(1.014)	(0.617)	(0.980)	(1.196)
d	0.069	0.565 **	−0.817	0.890*	0.362
	(0.256)	(0.192)	(0.550)	(0.432)	(0.277)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.904	0.898	0.962	0.928	0.958
N	292	243	335	333	236

Table 20: Simple Structural Models: Logs. The dependent variable is the log of the observed per capita borrowing for the indicated purpose. The log of the per capita industry GSPs also is used. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Industry	Utilities	Mortgage	Multifamily	Student
$P[M]$	0.223	0.190	0.546***	0.319***	0.449 **
	(0.159)	(0.129)	(0.030)	(0.081)	(0.152)
m	12.376	−30.084	45.953***	11.656	13.267
	(7.046)	(24.080)	(12.635)	(11.256)	(11.105)
d	−1.524	56.044	−2.702	3.402	46.925
	(1.771)	(32.788)	(2.399)	(6.023)	(40.147)
R^2	0.212	0.290	0.392	0.322	0.375
N	292	243	335	333	236

	Industry	Utilities	Mortgage	Multifamily	Student
a	0.046	−0.751 **	0.473	−0.072	0.130
	(0.346)	(0.235)	(0.282)	(0.314)	(0.189)
$B_{household}$	0.011 **	0.053*	−0.025 **	0.009*	−0.010
	(0.004)	(0.025)	(0.008)	(0.004)	(0.014)
$B_{contribution}$	−0.024	0.028 **	0.006	0.006	0.053 **
	(0.012)	(0.010)	(0.009)	(0.007)	(0.015)
B_{union}	−0.003	0.017***	0.033***	−0.001	0.006
	(0.002)	(0.005)	(0.005)	(0.003)	(0.003)
m	11.822*	6.407	67.293 **	16.078	6.292
	(5.561)	(6.673)	(19.651)	(11.058)	(16.959)
d	−0.695	5.491	−7.918	0.762	63.633
	(0.965)	(9.306)	(4.338)	(5.820)	(69.793)
R^2	0.516	0.582	0.653	0.565	0.652
N	292	243	335	333	236

Table 21: Political Structural Models without Controls. The dependent variable is the observed per capita borrowing for the indicated purpose. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Below Median	Industry	Utilities	Mortgage	Multifamily	Student
a	$-0.191*$	-0.132	-0.166	0.273	$0.386**$
	(0.093)	(0.077)	(0.253)	(0.196)	(0.131)
$B_{household}$	$0.007**$	0.026	0.026	-0.007	$-0.036***$
	(0.002)	(0.019)	(0.023)	(0.005)	(0.009)
$B_{contribution}$	-0.001	0.003	$0.010*$	0.004	$0.054***$
	(0.003)	(0.006)	(0.004)	(0.005)	(0.011)
B_{union}	-0.001	0.002	$-0.036*$	-0.000	$0.005**$
	(0.001)	(0.003)	(0.015)	(0.002)	(0.001)
m	$32.488*$	$27.761**$	37.440	$-102.904***$	$45.963*$
	(11.653)	(7.560)	(26.829)	(19.232)	(16.863)
d	0.486	$11.848***$	-6.667	1.269	-8.456
	(0.676)	(2.415)	(6.566)	(3.608)	(6.681)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.739	0.273	0.485	0.539	0.578
N	167	160	176	189	125
Above Median	**Industry**	**Utilities**	**Mortgage**	**Multifamily**	**Student**
a	0.413	$-1.352***$	0.222	$-0.536*$	-0.485
	(0.364)	(0.230)	(0.245)	(0.200)	(0.238)
$B_{household}$	0.000	0.058	$-0.050**$	$0.018**$	0.015
	(0.006)	(0.040)	(0.015)	(0.005)	(0.013)
$B_{contribution}$	$-0.019*$	$0.067***$	0.011	0.007	$0.047**$
	(0.008)	(0.016)	(0.008)	(0.005)	(0.016)
B_{union}	-0.002	0.011	-0.002	-0.001	0.006
	(0.002)	(0.007)	(0.018)	(0.003)	(0.004)
m	179.161	-41.063	79.214	-57.092	-13.591
	(119.719)	(57.869)	(68.477)	(62.830)	(139.190)
d	-1.869	$-79.607**$	-11.496	-11.789	$214.215*$
	(2.652)	(26.496)	(10.127)	(11.072)	(96.471)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.688	0.841	0.774	0.758	0.801
N	125	83	159	144	111

Table 22: Political Structural Models: Below/Above Median Per Capita Cap. The dependent variable is the observed per capita borrowing for the indicated purpose. The top set of parameters are estimated on states that had below-median average per capita caps during the study period. The bottom set of parameters were estimated on states that had above-median average per capita caps during the study period. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Industry	Utilities	Mortgage	Multifamily	Student
$P[M]$	−0.003	0.012	0.180*	0.074***	0.049
	(0.005)	(0.014)	(0.071)	(0.017)	(0.047)
m	9.881	17.598*	61.499**	−53.021**	46.489**
	(6.406)	(8.333)	(19.085)	(15.346)	(15.176)
d	0.550	4.923*	−5.806	5.281	16.431
	(0.335)	(2.344)	(2.931)	(2.972)	(10.627)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.420	0.251	0.588	0.277	0.542
N	272	223	315	313	216

	Industry	Utilities	Mortgage	Multifamily	Student
a	−0.060	−0.020	0.025	−0.098	0.356
	(0.041)	(0.058)	(0.170)	(0.081)	(0.193)
$B_{household}$	0.002	−0.005	−0.014	0.002	−0.024
	(0.001)	(0.005)	(0.008)	(0.002)	(0.014)
$B_{contribution}$	−0.001**	0.002	0.007*	0.003	0.008
	(0.000)	(0.003)	(0.003)	(0.002)	(0.013)
B_{union}	0.000	0.002	0.009*	0.000	0.002
	(0.000)	(0.001)	(0.004)	(0.001)	(0.002)
m	9.769	18.743*	46.988*	−56.881**	62.192***
	(6.157)	(8.347)	(20.979)	(16.911)	(15.767)
d	0.525	5.976*	−5.054	4.817	10.638
	(0.331)	(2.728)	(3.272)	(2.888)	(11.862)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.752	0.713	0.825	0.709	0.823
N	272	223	315	313	216

Table 23: Simple and Political Structural Models: Trimmed Data. The dependent variable is the observed per capita borrowing for the indicated purpose. In each case, the twenty observations with the largest dependent variable values were removed before the model was estimated. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

	Industry	Utilities	Mortgage	Multifamily	Student
$P[M]$	0.017	0.016	0.330***	0.147 **	0.358 **
	(0.013)	(0.028)	(0.079)	(0.048)	(0.108)
m	8.526	18.642	66.133	−33.943	46.772
	(13.737)	(12.907)	(46.840)	(33.188)	(53.915)
d	1.199	12.574	−12.302	8.731	25.895
	(0.714)	(7.118)	(6.288)	(5.946)	(24.083)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.492	0.449	0.489	0.285	0.601
N	241	197	267	270	184
	Industry	**Utilities**	**Mortgage**	**Multifamily**	**Student**
a	−0.161*	0.069	−0.350	0.342	−0.115
	(0.067)	(0.131)	(0.289)	(0.343)	(0.211)
$B_{household}$	0.005*	−0.014	−0.065*	−0.006	0.025
	(0.002)	(0.019)	(0.025)	(0.009)	(0.018)
$B_{contribution}$	−0.003 **	−0.001	0.033***	−0.003	0.017
	(0.001)	(0.004)	(0.006)	(0.006)	(0.011)
B_{union}	−0.000	0.001	−0.020	0.003	0.001
	(0.000)	(0.003)	(0.013)	(0.003)	(0.006)
m	10.365	20.296	89.580	−34.488	24.355
	(13.501)	(14.621)	(46.042)	(32.521)	(40.184)
d	1.150	12.942	−18.767*	7.929	22.276
	(0.718)	(7.656)	(8.912)	(5.598)	(28.152)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.709	0.670	0.732	0.601	0.779
N	241	197	267	270	184

Table 24: Simple and Political Structural Models: Middle-Population States. The dependent variable is the observed per capita borrowing for the indicated purpose. The five most populous and five least populous states were removed from the data before the models were estimated. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Industry	Utilities	Mortgage	Multifamily	Student
a	2.667***	−0.700	0.252	−0.108	−0.269
	(0.617)	(0.536)	(0.450)	(0.469)	(0.536)
$B_{household}$	−0.083*	0.120	−0.018	0.000	0.044
	(0.037)	(0.078)	(0.033)	(0.028)	(0.055)
$B_{household^2}$	0.001	−0.007	0.000	0.000	−0.001
	(0.000)	(0.007)	(0.001)	(0.000)	(0.001)
$B_{contribution}$	−0.082***	0.098	0.003	−0.006	−0.008
	(0.021)	(0.079)	(0.026)	(0.023)	(0.055)
$B_{contribution^2}$	0.002**	−0.003	0.000	0.000	0.003
	(0.000)	(0.003)	(0.000)	(0.000)	(0.003)
B_{union}	−0.006	−0.052*	−0.054*	0.002	−0.006
	(0.004)	(0.021)	(0.025)	(0.007)	(0.006)
B_{union^2}	0.000	0.002**	0.003**	−0.000	0.000*
	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
m	34.583	14.892	91.902	−108.004**	20.725
	(26.093)	(10.635)	(50.186)	(33.545)	(40.635)
d	0.501	19.929***	−25.543***	0.748	63.874
	(0.891)	(5.314)	(6.331)	(6.160)	(34.252)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.756	0.769	0.755	0.726	0.759
N	292	243	335	333	236

	Industry	Utilities	Mortgage	Multifamily	Student
a	0.181	−0.214	0.484***	0.082	0.204
	(0.127)	(0.140)	(0.057)	(0.075)	(0.146)
C_{High}, H_{High}	−0.126	0.301	−0.099	0.392	−0.088
	(0.081)	(0.170)	(0.096)	(0.210)	(0.154)
C_{High}, H_{Low}	−0.041	0.190	−0.007	0.067	0.313
	(0.088)	(0.154)	(0.103)	(0.083)	(0.164)
C_{Low}, H_{High}	0.230*	0.009	−0.367**	0.054	−0.083
	(0.093)	(0.138)	(0.127)	(0.123)	(0.258)
B_{union}	−0.003	0.013	0.030***	−0.000	0.006
	(0.002)	(0.007)	(0.005)	(0.003)	(0.004)
m	99.075	35.594	126.310*	−97.707**	61.342
	(59.799)	(21.537)	(49.609)	(29.465)	(40.540)
d	−1.593	33.356	−28.518**	1.883	61.271
	(1.694)	(20.122)	(9.893)	(5.708)	(40.637)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.638	0.630	0.742	0.686	0.745
N	292	243	335	333	236

Table 25: Political Structural Models: Higher Order and Categorical Specifications. The dependent variable is the observed per capita borrowing for the indicated purpose. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Industry	Utilities	Mortgage	Multifamily	Student
a	0.306	$-0.910**$	0.015	$-0.961**$	-0.024
	(0.509)	(0.312)	(0.212)	(0.282)	(0.173)
$B_{Democrat}$	-0.001	-0.001	0.008*	0.006**	0.012***
	(0.003)	(0.005)	(0.003)	(0.002)	(0.002)
$B_{household}$	0.004	0.050	$-0.066**$	0.023**	$-0.019*$
	(0.006)	(0.032)	(0.019)	(0.008)	(0.009)
$B_{contribution}$	$-0.020*$	0.041***	0.012	0.007	0.025*
	(0.009)	(0.010)	(0.007)	(0.004)	(0.010)
B_{union}	-0.003	0.018***	-0.004	-0.002	0.001
	(0.002)	(0.005)	(0.012)	(0.002)	(0.002)
m	89.705	-3.780	86.619	$-75.208*$	16.248
	(53.231)	(23.215)	(44.170)	(30.467)	(56.932)
d	-1.262	-13.748	-12.121	4.521	109.726
	(1.442)	(15.862)	(8.857)	(6.452)	(65.650)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.652	0.656	0.752	0.742	0.774
N N	292	243	335	333	236

Table 26: Political Structural Models: Party Affiliation. The dependent variable is the observed per capita borrowing for the indicated purpose. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Industry	Utilities	Mortgage	Multifamily	Student
$P[M]$	0.115	0.180	0.369***	0.167*	0.255 **
	(0.066)	(0.091)	(0.052)	(0.076)	(0.080)
m	85.428	22.009	9.152	−45.505*	31.856
	(57.164)	(14.946)	(31.070)	(20.944)	(33.443)
d	−1.315	36.364*	−9.936	3.816	43.572
	(1.836)	(15.984)	(5.373)	(5.945)	(25.725)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.131	0.324	0.421	0.292	0.375
N	628	490	552	589	392

	Industry	Utilities	Mortgage	Multifamily	Student
a	0.006	0.053	0.202	−0.407*	−0.167
	(0.075)	(0.078)	(0.226)	(0.200)	(0.169)
$B_{household}$	0.005	0.035 **	−0.019	0.014*	0.011
	(0.004)	(0.013)	(0.011)	(0.007)	(0.012)
$B_{contribution}$	−0.008	−0.004***	0.009	0.005	0.041 **
	(0.005)	(0.001)	(0.006)	(0.004)	(0.014)
B_{union}	−0.002	0.002	−0.007	−0.001	0.000
	(0.002)	(0.003)	(0.015)	(0.002)	(0.002)
m	61.977	22.287	−20.983	−48.614 **	17.742
	(39.803)	(12.692)	(33.415)	(17.393)	(34.079)
d	−0.326	29.276*	−13.517*	−2.509	59.462
	(1.257)	(14.140)	(5.085)	(4.499)	(40.472)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.529	0.629	0.720	0.617	0.713
N	628	490	552	589	392

Table 27: Simple and Political Structural Models: including 1992-1999. The dependent variable is the observed per capita borrowing for the indicated purpose. The 1990s observations exclude bonds issued with carryforward authority. Additional notes relevant to all regression tables appear below table 7. State-clustered standard errors appear below in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Industrial	Actual	Predicted	Difference
Mean Per Capita Borrowing	10.383	11.266	0.882
Mean Borrowing	35.271	37.147	1.876
Annual Total Borrowing	1287.383	1355.856	68.474
Utilities	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	13.062	13.888	0.826
Mean Borrowing	61.560	73.380	11.820
Annual Total Borrowing	1869.891	2228.909	359.018
Mortgage	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	52.409	55.371	2.962
Mean Borrowing	147.318	146.080	-1.238
Annual Total Borrowing	6168.934	6117.103	-51.831
Multifamily	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	23.880	25.217	1.338
Mean Borrowing	126.204	135.226	9.022
Annual Total Borrowing	5253.242	5628.785	375.543
Student Loans	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	32.279	36.557	4.278
Mean Borrowing	97.714	112.200	14.486
Annual Total Borrowing	2882.573	3309.895	427.322

Table 28: Simple Structural Models: Private-Activity Borrowing with a 10% Increase in the Volume Cap. After running the OLS models displayed in table 13, I replace the actual volume caps with 110% of their values. I predict borrowing for each category, recalculate the remainders with the predicted borrowing, and iterate this process five times. After five iterations, the totals of the absolute values of the changes are less than 2.5% of the actuals. The means are across all state-year observations. The annual national borrowing is the sum over all states and years with the predicted per capita values multiplied by the population in the state-year. All dollars figures are adjusted for inflation using the consumer price index. Only state-years with non-zero observations are used.

Industrial	Actual	Predicted	Difference
Mean Per Capita Borrowing	10.383	10.624	0.241
Mean Borrowing	35.271	37.719	2.448
Annual Total Borrowing	1287.383	1376.730	89.347
Utilities	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	13.062	16.508	3.445
Mean Borrowing	61.560	91.467	29.907
Annual Total Borrowing	1869.891	2778.308	908.417
Mortgage	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	52.409	54.621	2.212
Mean Borrowing	147.318	149.888	2.571
Annual Total Borrowing	6168.934	6276.580	107.646
Multifamily	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	23.880	25.273	1.393
Mean Borrowing	126.204	136.478	10.274
Annual Total Borrowing	5253.242	5680.905	427.663
Student Loans	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	32.279	34.547	2.267
Mean Borrowing	97.714	106.554	8.839
Annual Total Borrowing	2882.573	3143.338	260.765

Table 29: Political Structural Models: Private-Activity Borrowing with a 10% Increase in the Volume Cap. After running the OLS models displayed in table 13, I replace the actual volume caps with 110% of their values. I predict borrowing for each category, recalculate the remainders with the predicted borrowing, and iterate this process five times. After five iterations, the totals of the absolute values of the changes are less than 2.5% of the actuals. The means are across all state-year observations. The annual national borrowing is the sum over all states and years with the predicted per capita values multiplied by the population in the state-year. All dollars figures are adjusted for inflation using the consumer price index. Only state-years with non-zero observations are used.