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Private-Activity Municipal Bonds: The Political Economy of Volume Cap Allocation

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State governments allocate authority, under a federally imposed cap, to issue tax-exempt bonds that fund "private activities" such as industrial expansion, student loans, and low-income housing. This paper presents political economy models of the allocation process and an empirical analysis. Due to an idiosyncrasy of the tax code, the annual per capita volume cap varies widely between states. I estimate that, on average, there is an additional $0.80 per capita per year of borrowing for each additional dollar per capita of volume cap. This confirms that the cap is a binding constraint in most cases, and authority to issue tax-exempt bonds is a scarce resource. I find that mortgage revenue bonds and student loan bonds are the most responsive to differences in the cap. The gross state product and employment in manufacturing and utilities drive allocations to industrial development bonds and utilities bonds. While controlling for the size of the education sector, I find campaign contributions from educational interests are associated with higher authorizations for student loans. One result runs counter to the theoretical models. Higher campaign contributions from utilities interests are associated with lower utilities borrowing. Unions do not have an independent effect on allocations.

JEL Codes: D72, H71, H81.

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1 Introduction

In 1986, the federal government placed a cap on the volume of tax-exempt municipal bonds that states can issue each year if the proceeds are used by private entities. The cap, in year 2000 dollars per capita, has ranged from just under $50 to over $400 depending primarily on a state's population. In most states and years, the cap appears to be binding, so state governments are allocating a scarce resource. This study looks into the political economy of the allocation of the volume cap authority within states. I estimate that an additional dollar per capita of private-activity volume cap authority results in an additional $0.80 per capita of private-activity municipal bond borrowing. The regulation has a strong impact on private-activity borrowing for mortgage revenue bonds and student loans. The prominence of the manufacturing and utilities sectors in the state influences the authorizations for industrial development and utilities bonds. Explicit political activity does not seem to greatly influence the process. Union members do not appear to draw authorization to their industries. Among the competing industries, only in the case of higher education is there some evidence that campaign contributions positively affect allocation decisions.

The political economy of the private activity volume cap distribution is interesting because it sheds light on an unusual type of resource allocation. The program gives elected officials, and their appointees, the ability to allocate a valuable, scarce resource without taxing their constituents or authorizing any funds from their state or local budgets. The limitations of the program result in a diverse but fairly well defined set of interests (manufacturers, utilities, mortgage lenders, commercial residential developers, post-secondary education) competing for the authorization. In an exploration of the data, we find insights into both the relative strength of the interests and the channels of their influence.

In light of the recent (2008-2009) near collapse of credit markets, the next few years will witness massive changes in the scope and nature of government relationships to these markets. In particular,

government participation in private credit markets will be re-evaluated. There is much discussion of the perverse incentives created by securitization of mortgage and consumer debt, and interest rates that reflected risk transferred to the taxpayer. The topic covered in this article is relevant because it represents a parallel to the systems that may have failed. Rather than securitizing mortgages and student loans after they have been written, municipal governments issue bonds and relend the proceeds to private entities.

2 Background

The institutions of fiscal federalism have developed in the United States such that the federal government does not tax local government activities, and vice versa. States and municipalities can issue an unlimited amount of municipal debt for public purposes, and all interest paid to the investors is exempt from federal income tax. Municipalities enjoy a lower cost of borrowing than corporations, non-profits, or individuals in part because the tax exemption means investors will

accept a lower interest rate.[1] Municipalities also pay a relatively low interest rate because their default risk is low. They have a low default risk because they have the ability to raise revenue by force through taxation, they often have a more diversified economic base than most corporations, and they are more likely to be bailed out by a higher level of government if they approach default. In fact, the municipal default rate over the period 1980 to 2006 was just 0.78%. This is far better than the default rate for similarly rated corporate bonds, which averaged 9.69% from 1970 to 2006 (Ou 2008).

In addition to funding public buildings, schools, and roads, municipal bonds are issued for purposes that are usually funded privately, but that have some public benefit. The largest use is mortgage revenue bonds, which are believed to have benefits to the public generally by increasing investment in residential communities. Student loans, another major use, are justified in the same way public schooling and state university subsidies are. Higher education enables people to be more productive workers and effective citizens, thereby improving economic well-being and quality of life for the residents of the state.

[1] Let t be the tax rate faced by the investor. The principal (P) can be invested in a corporate (c) bond or other investment that provides a stream of taxable returns. P is returned when the bond matures in X periods. Alternately, the principal can be invested in a tax-free municipal (m) bond. With a real interest rate of i, and coupon of r, the municipal bond is preferable as long as the investor has a positive income tax liability ($t > 0$).

$$\sum_{x=1}^{X} \frac{rP}{(1+i)^x} + \frac{P}{(1+i)^X} > \sum_{x=1}^{X} \frac{(1-t)rP}{(1+i)^x} + \frac{P}{(1+i)^X}. \quad (1)$$

$$PV_m > PV_c. \quad (2)$$

Knowing this, the borrower can offer a lower coupon r_m, as long as the tax exemption makes the present value of the municipal bond preferable to corporate bonds paying r_c.

$$\text{if} \quad r_m \geq (1-t)r_c \quad (3)$$

$$\text{then} \quad \sum_{x=1}^{X} \frac{r_m P}{(1+i)^x} + \frac{P}{(1+i)^X} \geq \sum_{x=1}^{X} \frac{(1-t)r_c P}{(1+i)^x} + \frac{P}{(1+i)^X}. \quad (4)$$

In the case of municipal borrowing for private activity, the demander of the funds is generally a profit-maximizing firm, a loss-minimizing nonprofit, or a rational individual consumer. If given the choice between identical amounts of capital, one with a higher borrowing cost and the other with a lower borrowing cost, borrowers would always choose the latter. Three forces prevent all borrowing from being done through state and local governments. The first limitation is market discipline. While municipalities have a strong ability to repay their debts, it is not limitless. The interest rates municipalities pay are an increasing function of the total outstanding debt from previous periods. Market participants monitor the ratio of outstanding debt to the tax base, and investors demand higher rates from heavily indebted municipalities (Bayoumi, Goldstein, and Woglom 1995).

The second limitation is the complex political process that allocates municipal bond funding. Firms and consumers cannot simply bid for the supplied units of bond-funded capital. Obtaining the funds involves working with state agencies or conduit banks, completing a costly application process, influencing legislative activity, and sometimes appealing to voters through ballot measures. These administrative burdens introduce costs, delays, and risks that may overwhelm the tax advantage and guarantee.

The third limitation is the federal legislation that limits the volume of tax-exempt financing of private activity that can be undertaken by a state or any of its entities in a calendar year. There was a significant increase in private-activity borrowing during the late 1970s and early 1980s. In the mid-1980s, Congress became concerned that state and local governments were defining "public activity" too broadly when using tax-free municipal bonds to fund projects such as professional sports stadiums. This meant that large volumes of taxable investment activity were being replaced with tax-exempt investments and thereby reducing federal income tax receipts. In the 1986 tax reforms, a definition was established for private-activity borrowing, and a cap was placed on the total volume permitted in each state. The cap was the greater of $50 per capita or $150 million.

Any interest paid on private-activity borrowing beyond the cap would be subject to federal income taxes.

Congress began by defining private-activity bonds to be any bond of which more than 10% of the proceeds is transferred to a private entity[2]. Also, if more than 10% of the interest and principal of the bonds will be repaid by a private entity, the bonds are designated to be private-activity bonds. Bonds that meet one of the criteria generally meet both. Congress then imposed the cap on the volume of private-activity bonds that would be issued as tax exempt bonds[3]. Of course, there were exceptions. Private-activity bonds are not counted toward the cap if the proceeds are used for the following purposes: airports, docks and wharfs, mass commuting facilities, 501(c)(3) non-profit organizations (including most universities and museums), pollution control equipment for hydroelectric power plants, veterans' mortgages, high-speed intercity rail, and immediately refunding outstanding bonds (refinancing). With these exceptions, the volume cap falls on the remaining categories: mortgage revenue bonds, multifamily rental housing bonds, student loan bonds, industrial development bonds (IDBs), private utility infrastructure (often referred to as exempt facilities), and miscellaneous purposes (farm programs, etc.).

Within these categories, there are further qualifications that must be met. I summarize the main ones here.

Mortgage revenue bond proceeds must be used to purchase owner-occupied homes. Borrowers must be first-time buyers. The home's price must be below 90% of the area's average. The borrower's income must be below 115% of the area's median family income. The funds must be used for new mortgages, not refinancing. Funding can be used for rehabilitation, but not more than $15,000 per borrower.

Industrial development bonds are limited to $10 million per facility. They cannot be used

[2]Internal Revenue Code, *U.S. Code* 26, Section 141

[3]Internal Revenue Code, *U.S. Code* 26, Section 146

for retail outlets, entertainment, or recreational facilities.

Multifamily housing bonds must fund projects in which 20% of the residents have incomes less than 50% of the area median or 40% of the residents have incomes less than 60% of the area median.

Student loan bonds must be used with federally guaranteed loan programs or equivalent state programs. Student borrowers must be residents of the state and attend a college or university in the state.

As figures 1 through 3 illustrate, the language of the legislation created variation in the private-activity volume cap in several ways. First, states with populations above 3 million people were bound by the $50 per capita cap while the per capita cap was inversely related to population for the smaller states (see figure 2). The total volume was still much higher for the larger states (see figure 1). The caps were not indexed for inflation, so they became progressively more binding in real terms from 1990 until 2001. Also, as years passed following the 1990 decennial census, the population estimates grew less accurate, creating a gap between the legal limits and a true $50 per capita value. Finally, in 2001, the legislation was amended to increase the volume caps and then index them to inflation. The time variation, and some cross-sectional variation can be seen in the trends for the four western states represented in figure 3. The fact that states and certain lobbying groups requested the increase in the cap suggests the caps were binding.

Another provision of the private-activity bond regulations allows cap authorization to be carried forward. If the end of the calendar year approaches and a state has not issued private-activity bonds totaling more than its volume cap, it can file a notice with the IRS, stating it intends to issue bonds for a specific project within the next three years. Unused cap authority expires if the paperwork is not filed, or the anticipated bonds are not issued within three years. If a carryforward project falls through, or finds a preferable funding source, the authority that was carried forward cannot

be re-allocated. This creates a situation in which a state may have had intense competition for allocation (current and carryforward) during a calendar year, but looking back after three years, total bonds issued were less than that year's volume cap. Also, the data sets that track bond issues record the issue date but not the authorization year. In many states, there are years when total issues exceed the volume cap because some issues are making use of prior-year authority.

Total private-activity-bond volume is substantial but modest relative to other financial markets. The largest state-year total issue was in California in 2002, $92 billion.[4] That same year, total outstanding municipal debt was $1,812 billion. Over the years 1992 to 2007, private-activity-bond volume averaged 6.31% of nonfinancial corporate volume.

2.1 Existing Literature

While the subject matter here intersects with several literatures within public finance, corporate finance, and political institutions, very little has been published on the private-activity volume caps specifically. Zimmerman, working with the Advisory Commission on Intergovernmental Relations (ACIR), surveyed the mechanisms the states had established to track and allocate the private-activity authorization (1990). He also collected data on the use of private-activity authority in 1989 and compares it to the borrowing activity before the cap was imposed. Overall, there was a 66% decrease in the 1989 totals relative to the 1984-1986 average. Of the major categories, student loan borrowing declined the least at 36%, while multifamily housing borrowing declined the most at 88%. In a paper published the next year, Kenyon improved on the descriptive statistics by including controls in regression models (1991). She found a large, significant coefficient of 0.77, relating the per capita limit to the per capita borrowing.

Looking only at data from before the volume cap was imposed, Temple sought to explain the

[4]The next four largest state-year totals were NY 2005: $64 billion, CA 2004: $63 billion, NY 2003: $59 billion, and CA 2003: $58 billion.

differences in the use of private-activity bonds across states (1993). She theoretically refuted the notion that private-activity bonds are costless to the issuing municipality if private entities repay them. In her model, The issuers pay higher interest rates for all future public and private issues. She does not show that the costs are higher directly, but she reasons that if the costs are higher, municipalities will substitute away from industrial development bonds toward tax breaks and other incentives for business attraction. As evidence, she shows a negative elasticity of 0.2 relating the outstanding bond debt to the use of industrial development bonds in economic development programs.

One additional set of publications should be noted. These are the IRS's *Statistics of Income Bulletin* articles on private-activity bonds. Nutter (1996) and Belmonte (2003, 2005, 2006) provided descriptive statistics aggregated from the IRS Form 8036-Gs (submitted by all bond-issuing state and local governments).

Another relevant area of literature is that regarding interest group politics influencing public investment decisions. Much of this work grows out of Olson's theory of collective action (1965). There is the question of which groups overcome their free-rider problem and organize their efforts to influence officials. If the interest groups are observed as they currently exist, there is the question of how they behave and how public officials respond to them. The existing theories are summarized in the texts of Grossman and Helpman (2001), Drazen (2000), and Persson and Tabellini (2000). These texts are theoretical, but there are numerous articles with related empirical tests.

Researchers have addressed the question of whether public officials are aiming to maximize efficiency or achieve some other political or equity goals. Holtz-Eakin and Rosen proposed a model of rational, forward-looking capital spending and tested it, using data from New Jersey municipalities (1989). They found that smaller jurisdictions and suburbs displayed rational behavior from an economic benefit perspective. Larger central cities made investments that appeared more political

and short-term in nature. In a paper using Japanese data, Yamano and Ohkawara estimated returns to public infrastructure in economically developed and underdeveloped regions (2000). They then used simulations to estimate a tradeoff between investing for efficiency goals versus equity goals. They concluded that the central government was achieving its stated goal of convergence between prefectures by shifting investment from the developed to the underdeveloped, but this was decreasing GDP by approximately 4%. Castells and Solé-Ollé performed a similar analysis on Spanish data on transportation infrastructure (2005). Again, political factors weigh more heavily than economic efficiency in their results. Finally, Cadot, Röller and Stephan used French data to test their theoretical model and found that electoral concerns (pork-barrel) drove investment decisions in France more than economic considerations (2005).

In addition to establishing that political influence matters in investment decisions, the political economy literature has explored the channels of influence. Of particular interest is the tradeoff between votes and campaign contributions. Levitt (1994) estimates that attracting a marginal vote costs a candidate between $130 and $390, and Stratmann identifies a higher cost of votes in dense urban areas (2004). A recent working paper by Bombardini and Trebbi explicitly modeled the tradeoff between votes and campaign contributions (2008). They showed that in states where specific industries have large numbers of employees, those industries give less in campaign contributions. It is assumed that elected officials will act in the best interest of large employers to keep the votes of the employees, their families, and the communities they support. In some cases, industrial groups rally voter support for candidates in lieu of cash contributions.

3 Theories of the Allocation Process

The first question of this analysis is whether the private-activity volume cap influences the behavior of the participants in the borrowing process. If the cap is a potential constraint, we need to know if

it binds. 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, if given in the year the borrowing occurs, 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.

The state officials seek to maximize their state's welfare (if they are benevolent), or their personal welfare, subject to their cap-imposed 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]

Interested constituents face a price for borrowing funds, P_A, and an administrative cost of borrowing through municipal bonds. P_A includes the financing costs as well as the cost of outbidding rivals to influence state official's allocations. 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. Treating the borrowed capital as a factor of production, each third-party borrower must select a quantity to demand.

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 nonprofits. Let the profit function be represented by $\pi_i = p_y y_i - P_l L_i - P_A A_i - a$, where i indicates the firm, and L

[5]There could be an indirect economic cost to the state in the form of higher borrowing costs on future municipal bond issues.

indicates a numeraire input (think of labor). The firm's production technology is $y = f(A, L)$. Firm i's demand for A is discontinuous at zero, because the administrative cost applies only with interior bundles. Alternately, a is a fixed cost of producing the interest-subsidized product. 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. N will be positively correlated with V, as both are related to population. Binding is more likely when the price of the output, p_y, is higher, and when the quantity sold in the output market, y, is higher. Whether P_l is positively or negatively correlated with binding depends on the marginal rate of technical substitution between L and A.

Now let us relax the assumption that all firms are in the same industry. Different industries will have different levels of demand for the funding, corresponding to the different levels of profit they could realize and the different interest rates they are willing to pay. Let j indicate industry, and we will begin with two industries. I maintain the assumption that firms are identical within industries. Let P_{Aj} be the price a firm in industry j would pay for the capital without bond funding. If $P_{A1} > P_{A2}$, then firms in industry 1 stand to gain more by shifting to P_{Am}, the bond-funded cost. The profit functions for the firms become

$$\pi_{ij} = p_{yj} y_{ij} - P_{lj} L_{ij} - P_{Am} A_{ij} - a. \tag{5}$$

Assuming the administrative cost remains the same for firms in both industries, aggregate demand becomes

$$A^* = \sum_{j=1,2} \sum_{i=1}^{N_j} A_{ij}. \tag{6}$$

For unconstrained states, this remains below V, and A^* depends only on A_j and N_j. For constrained states, the story becomes more complicated.

As specified in this model, aggregate demand would be a step function with a step down at $(\sum_{i=1}^{N_1} A_{i1}, P_{A1})$ if we arbitrarily label the industry with higher demand as industry 1. If the volume cap is binding, all firms in industry 1 would get A_{i1}, and some industry 2 firms would get A_{i2}. Which industry 2 firms? 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.

Having discussed the firms, I will turn specifically to the state officials now. I am using the terms state officials, public officials, and state interchangeably, and treating them individually, or their aggregates, as rational actors. Following the standard political economy models summarized in Grossman and Helpman, the public official's utility is the expected return for a specific allocation of the scarce resource (2001). This 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 is assumed to be zero and not written. The probability of election depends on a platform promising an allocation of $\mathbf{A}$. ψ is a general office rent that the public official receives if elected. The elected official also receives utility that is a function of $\mathbf{A}$. 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 reward function. P is the industries' potential rents from a dollar of allocation, driven by the interest rate advantage it provides. W is a vector of parameters that translates the industries' rents into the public official's rent. Values of W could represent how much the official cares about the constituencies and her utility from seeing them succeed. If the official is self-interested rather than benevolent, W could be a schedule of bribes or other transfers such as board seats and post-office employment. If all values of W_c are the same, then the elected official is interested in pure economic efficiency, and

will allocate the borrowing authorization to its highest value use.

$$U(\mathbf{A}) \quad = \quad [\gamma + \sum_{C} G_c H_c A_c][\sum_{C} W_c P_c A_c + \psi] \tag{7}$$

$$\max_{\mathbf{A}} U(\mathbf{A}) \quad \text{s.t.} \quad \sum_{C} A_c \leq V \text{ and } A_c \leq f_c(D_c) \; \forall \; c \tag{8}$$

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 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. The budget constraint, when binding, dictates that the allocation to category c depends on G_c, H_c, W_c, and P_c as well as these measures for all the other categories.

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 highly politicized. The main reason is that private-activity bonds are seen as having no direct cost to the state's taxpayers (despite some studies contradicting this). Taxpayers do not pay the principal or interest on the

[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.

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 quasi-federal agency such as Sallie Mae or Fannie Mae.

The administrators perceive 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 held only 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.

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. 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 categories.

$$\max_{\mathbf{A}} U(\mathbf{A}) = \mathbf{TA} \text{ s.t. } \mathbf{A_c} \leq \mathbf{f_c}(\mathbf{D_c}) \; \forall \; \mathbf{c} \text{ and } \sum_{\mathbf{C}} \mathbf{A_c} \leq \mathbf{V} \tag{9}$$

$$R_c = R(\mathbf{T}) \tag{10}$$

$$A_c = \begin{cases} f_c(D_c) & \text{if } \sum_{R_j \leq R_c} f_j(D_j) < V \\ V - \sum_{R_j < R_c} f_j(D_j) & \text{if } \sum_{R_j \leq R_c} f_j(D_j) > V \\ 0 & \text{if } \sum_{R_j < R_c} f_j(D_j) > V \end{cases} \tag{11}$$

This concept can be illustrated graphically as in figure 4. 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. 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 probably not the marginal category. Categories that receive no funding are also clearly not the marginal category nor the highest-priority category. From this perspective, we should not expect all types of borrowing to display a close relationship to the volume cap, even for competitive states. Rather, the volume cap may have no relationship with the highest- and lowest-priority borrowing and a strong relationship with marginal types of borrowing.

4 Data

The bond data used in this analysis are from the annual *Bond Buyer* survey. The *Bond Buyer*, a trade publication for the municipal bond industry, has surveyed states each year since 1992 regarding the allocation of their state's private-activity cap authority.[7] The survey results reported how much each state borrowed in each of eight categories.[8] It includes only borrowing that is

[7]The survey was conducted in 1990, but not 1991. I use the data from 1992 onward to avoid an interruption in the panel.

[8]In my analysis, 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

subject to the cap.

Until 1999, all borrowing that was completed with carryforward authority was excluded.[9] In 2000, the reported results of the survey changed. From 2000 to 2007, the survey reports a sum of borrowing done with current-year and carryforward authority. It is not possible, within this dataset, to disaggregate the figures into the years their authorization originated. One state, Illinois, never participated in the *Bond Buyer* survey. For consistency, Illinois is excluded from all descriptive statistics and analysis in this study.

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 after 2000. I use the 1990s population estimates that were adjusted after the 2000 census, rather than the population estimates published annually in the 1990s. The regional designations assigned to the states are according to the Census Bureau's four region definitions.

The gross state product data, in aggregate and by category, are from the Regional Economic Accounts of the Bureau of Economic Analysis (BEA).[12] The BEA calculations are based on data collected on business activity by the Census Bureau and the U.S. Department of Agriculture. For

in the total borrowing figures, but not in any of the categories.

[9] A figure was given and labeled as the carryforward to the next year, but it was simply the difference between the cap and total borrowed with the current-year authorization. This figure is not reliable because carryforward authority is often abandoned.

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

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

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

the measures of wage earners and union members, I performed my own calculations using CPS data. The Minnesota Population Data Center makes available the entire series of the March CPS data with weights to create count estimates of any measured characteristic by individual or household.[13]

For the campaign contribution data, I accessed the online database available from the National Institute on Money in State Politics.[14] The institute collects data from all state campaign finance disclosure agencies. The data can be downloaded in aggregates for state-year-category cells, including the categories of manufacturing, utilities, real estate, construction, and education.[15] In most instances, the data reflect 100% of the donations to candidates for state offices. Institute staff code the donations by Standard Industrial Classification. The figures follow the election cycles very closely, with zero donations generally reported in years when the state has no statewide elections. The calculation of the contributions per capita made by competing interests are based on the current year and the three preceding years, to guarantee there are no years of all-zero observations. This also reflects the assumption that political influence gained through contributions does not depreciate immediately.

The 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

[13]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

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

[15]The classifications distinguish post-secondary education contributions. I exclude contributions from primary and secondary teachers' unions because these groups are not directly concerned with student loans.

tracked separately; They are included. I use unemployment estimates that the Bureau of Labor Statistics calculates from the CPS data.[16]

In the robustness checks, I add additional controls for the college students enrolled per capita and utilities rate changes. The enrollment data are from the National Center for Education Statistics' Higher Education General Information Survey.[17] The electricity and natural gas retail price data are collected and posted online by the U.S. Energy Information Administration.[18] The values are annual rate changes minus the national average rate change for the year. These are meant to capture if the utilities in a state were allowed to significantly raise their prices without confounding with market-wide energy price shocks. The robustness checks also include estimates with controls for public-activity and private activity debt burdens. The debt burden data are from the Census Bureau's *Annual Survey of State and Local Government Finances.*[19]

For the estimates that control for first time homebuyers, I used the difference between home-ownership rates in each state at five-year age intervals. I multiplied these by the population in the state in those age categories in the year. For example, if in Ohio, 35% of 30-year-olds own homes while 20% of 25-year-olds own homes, then about 3% of the people aged 26 to 30 are first time home buyers in a year. Adding 3% of the 730 thousand people in that state and age group to the equivalent in the other age groups (21-25, 31-35, and 36-40) and dividing by the total population gives an estimate of per capita first time home buyers.

In another variation of the models, I replace the GSP data with a more direct measure of the market for financing in the sector. Because most financing is done in national or international markets, most data available is not tracked in a relevant manner. For example, an industrial

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

[17] http://nces.ed.gov/programs/digest/d09/tables/dt09_207.asp

and equivalent, earlier tables (Accessed September 1, 2010)

[18] http://www.eia.doe.gov/ (Accessed 23 August, 2010)

[19] http://www.census.gov/govs/estimate/ (Accessed August 25, 2010)

firm may issue bonds from its headquarters in New York and use the proceeds to expand plants in five states. Unless the data is disaggregated and reported by the firm, it cannot serve as a measure of the demand for industrial financing in Ohio or Indiana. For each of the five sectors' demand for financing, I must use a different measure collected in a different survey. Therefore, the coefficients are not comparable across sectors. For industrial development bonds, I use the capital expenditures figure for the state and year, as estimated from the Annual Survey of Manufacturers and the Economic Census.[20] Unfortunately, there is no complete panel of investment in utilities infrastructure, so the alternate measure in that estimate is growth in the state's utilities GSP. Data on new mortgage originations is available from the Inside Mortgage Finance Publications, Inc. (2009). To represent demand for multifamily housing, I used the value of new construction of residential buildings with 5 or more units. This data is collected by the Census Bureau and processed by Haver Analytics.[21] The student loan data are publicly available aggregates from the administrative records of the U.S. Department of Education.[22]

5 Results

5.1 Descriptive Statistics

As a first contact with the data, I present summaries of the states' usage of the cap. Recall that bonds issued with carryforward authority were excluded before 2000 and included afterward. Table 1 summarizes the ratios of borrowing to the cap, and how often these ratios are above certain thresholds. The fact that 57% of states in the 2000s were observed borrowing an amount over 85% of their cap value shows that most states were using most of their cap. The number of observations

[20] http://www.census.gov/manufacturing/asm/historical_data/index.html

http://www.census.gov/econ/census/guide/index.html (Accessed August 25, 2010)

[21] http://www.census.gov/mcd/ (Accessed August 25, 2010)

[22] http://www2.ed.gov/finaid/prof/resources/data/opeloanvol.html (Accessed August 25, 2010)

with observed borrowing above the cap, due to carryforward, is quite high at 35%. If the borrowing could be credited to the year it was allocated, the percentage of state-year observations approaching the cap would be even higher. The cap is more likely to be binding and create a competitive environment when the ratio is this high.

Table 2 shows the summary statistics for the state-year observations on per capita borrowing. We see that industrial borrowing and utilities borrowing have similar means in both time periods, and both decline in real terms from the first to the second period. The means of mortgage, multifamily, and student loan borrowing are all observed at higher levels in the second period. Figure 5 gives a graphic representation of the national totals by category.

To begin understanding how the per capita cap relates to borrowing, I average the per capita cap over the study period and assign the states to an above-the-median or below-the-median category. 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, with the greatest difference in the mortgage and student loan categories.

To visualize the relationship between the per capita cap and the per capita borrowing, figures 6 and 7 present scatter plots of the data for the grand total and largest subcategory. Positive relationships are visually suggested by each. However, trends in the dense cloud near the $50 cap are not clear.

While very few states opt for no private-activity borrowing in any given year (2.2% of all annual totals are zero), many states opt for no borrowing within specific categories for a year. The percentage of the state-year observations that show no borrowing are, by category: Industrial 22%, utilities 39%, mortgage 31%, multifamily 26%, student loans 51%.

Tables 4 and 5 present the descriptive statistics for the covariates. All dollar amounts are adjusted to 2000 dollars using the Consumer Price Index. The variables in table 4 are the set of

control variables used in the estimates. They were chosen to capture characteristics and trends in the economies and political systems of the states. The regional indicators should pick up benchmarking, which is the tendency of public officials, rating agencies, and investors to compare any given state to similar neighbors. The GSP figure should capture whether the state is generally wealthy, while the taxes per capita measure reflects whether it has more active governments. Urbanization changes the demand for and cost of projects funded with private-activity bonds. The percentage of adults with college degrees and its change should reflect whether the state has an information-based economy and whether it is attracting skilled migrants. The unemployment, low-income percentage, and low-income growth variables represent demand for social programs and job-creating investments. Finally, the population categories are meant to identify economies of scale. In the campaign contribution data, summarized in table 5, we see that real estate and construction organizations donate heavily to state officials. In the unionization data, manufacturing and construction workers appear to be organized in larger numbers than those in other industries.

Throughout the analysis, I will estimate each model without and with state fixed effects. 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 fixed effects leaves very little variation for identification of the parameters. The between standard deviation of the per capita volume cap is 84.4 while the within standard deviation is only 16.2. 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. The regional indicators and the population categories (defined over the whole period) have no within variation. All of the estimates in the analysis account for the fact that the observations are not strictly independent. In considering which type of model is most appropriate, the stable

nature of the volume caps should be taken into consideration.

As I progress from descriptive statistics to regression-based models, I need to mention a few points regarding the estimation techniques. I examined the residual, normal probability, and leverage plots for all of the models presented. The plots all displayed similar patterns of heteroskedasticity, with increasing variance of the residuals at the higher levels of borrowing per capita. The state-clustered standard error correction (see Appendix B) is applied in the results above to allow for proper inferences. Taking the log of both the outcome and independent variable of interest corrects the heteroskedasticity problem but introduces the issue of how to treat the zero observations. I present the results of models estimated in both levels and logs.

For the purposes of testing the null hypothesis that the parameters are zero, I would like to have normally distributed errors that are not serially correlated. I applied the Wooldridge test to the unadjusted OLS estimates of my models and confirmed that there is serial correlation in the panel data. To correct this, I use the procedure suggested in Bhargava, Franzini, and Narendranathan (1982), which is similar to a Cochrane-Orcutt correction. The Bhargava corrections is described in Appendix B. The remaining assumptions of my regression estimates relate to causality and the exogeneity of the independent variables of interest. I am assuming that projects funded with private-activity bonds are not large enough to significantly change the size of the relevant sector. I assume production and employment levels in an industry cause borrowing authority to be allocated to that industry, not that bond funding causes the industry activity to be at its observed level. This is analogous to a price-taker argument.[23]

[23]Ninety-nine percent of the ratios of the state-year borrowing total to the state-year sector gross state product, for manufacturing, utilities, single family homes and multifamily housing, are below .12. For student loans, 90 percent of the ratios are below .13, but these observations are lumpy. States often make large bond issues for student loans, and then make no student loan issues in the following two years. Relative to the measures of total sector borrowing described in section 4, the ratios are higher, but still below .06 for 95 percent of the observations in manufacturing

This section will present several models in which the dependent variable is the observed per capita borrowing. It is very important to keep in mind that the carryforward provision complicates the relationship between the cap, the true borrowing, and the borrowing observed in the *Bond Buyer* survey. In Appendix A, I formulate the differences between the true value and the survey results as a measurement error, and I derive the biases this error would introduce in a regression of the observed borrowing on the cap. With these results in mind, the coefficients estimated here can suggest, but not strictly support, a statement such as "for each additional dollar of per capita cap, $\$\beta$ of additional per capita borrowing will occur." The coefficients may be close to the true dollar-for-dollar relationship, but they will contain a measurement error bias. Therefore, they should be interpreted more conservatively as a positive or negative relationship with varying magnitude and significance.

The private-activity volume cap should be exogenous to decisions made by states. It is determined by only two things: a federal regulation and the state's population. The regulation's relative treatment of the states has been constant since 1986, so there is no chance that particular states influenced it. The increases in volume caps after 2000 were applied uniformly. I partially control for population by dividing the cap, the borrowing, and the appropriate covariate figures by the states' populations. If economies of scale exist, they should favor additional borrowing in the states with higher absolute caps. This would push toward a negative relationship between the per capita caps and per capita borrowing.

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and single and multifamily housing. Student loans again display lumpy observations, with 10 percent being above .4. In every case, the key question 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. The supply curve would be shifted up in the absence of the subsidy, but the demand would remain the same.

I am estimating the following reduced-form equation:

$$PC\_Borrow_{it} = \alpha + \beta_1 PC\_Cap_{it} + \beta_2 Report_{it} + \beta_3 PC\_Cap_{it} * Report_{it} + \sum_j \gamma_j X_{jit} + \sum_t \lambda_t Year_{it} + \epsilon_{it}. \quad (12)$$

Report is a binary variable indicating that the data are from the years 2000 to 2007, rather than 1992 to 1999. The X's are control variables, and $Year$'s are dummies for the years. When the models are estimated for borrowing for the five main purposes, they are estimated separately, but the political variables are expressed in relative terms. The number of households with a wage earner in the industry, the contributions, and the union membership are all divided by the total in the five sectors in that state and year. This represents the size or influence of the interest groups relative to other groups that are competing for private activity borrowing authorization.

The first set of models presented in tables 6 and 7 confirm that the private-activity volume cap does impact total borrowing.[24] Models I, II, III, and V include the per capita cap, an indicator for the second type of reporting (including carryforward borrowing after 1999), and then an interaction of the two. The relationship between the cap and the observed borrowing appears stronger after 2000, but this is in part because of the reporting difference. Adding the year fixed effects and the control variables changes the coefficients on the cap variables only slightly. The coefficient on the

[24]This is the extended table note for all regression results. All of the statements in this note apply to all the regression results unless otherwise noted. All dollar values used in the calculations are adjusted to year 2000 real dollars using the Consumer Price Index. All estimates on panels are corrected for serial correlation using the Bhargava procedure (see Appendix B). All standard errors are clustered by state. All private-activity borrowing data are from the *Bond Buyer* survey. "Control Variables" refers to a standard set of variables including region indicators, urbanization, total 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 descriptions of the control variables. "Quality Controls" refers to indicators for each observation and each variable that was imputed.

report-group indicator is absorbed by the year fixed effects (throughout the rest of the tables, I do not display a result for the direct effect of *Report*). It is interesting to note that only a few of the control variables are individually significant.

Including state fixed effects reduces the apparent relationship between the cap and spending. In the specification of model IV, only the within-state variation is being used to identify the coefficient. The majority of the variation in the independent variable is between states. The coefficient on the direct effect of the cap is large and negative, but not significant (-0.75). The coefficient on the interaction is large and positive, but the direct and interaction effects offset, giving a net impact of essentially zero. Given the differences seen in the descriptive statistics, this figure seems unreasonably low. Taking the log of the dependent and independent variables gives another variation on the result, although with a different interpretation. The coefficient on the log of the per capita cap in table 7 model V is almost zero. In the later years represented by the interaction between the report group indicator and the logged per capita cap, the elasticity is just over one. A 1% increase in the per capita cap was associated with a 1% increase in per capita borrowing.

The last two models are estimated on the data from each of the report groups separately. The results are consistent with those of model III. The additional per capita cap was associated with additional borrowing in the first period (0.28), and strongly associated in the second period (0.78). For each of the seven models, I tested whether the sum of the coefficients on the cap and cap interaction variable was equal to one. There is evidence to reject that hypothesis in every case, suggesting that despite the strong relationship between the cap and borrowing, something is still leading states to not exhaust their cap in a significant share of the states and years. The situation is more complex than would be captured by assuming the borrowing is equal to the cap. There are some differences in the impact of the control variables in each era. Higher per capita taxation

is strongly associated with lower per capita borrowing in the 1990s. After 2000, Borrowing in the Northeast is significantly higher than the omitted regional category, the Midwest.

Regression estimates of models of per capita borrowing by purpose are presented in tables 8. Breaking the analysis down by category reveals that the relationship between the per capita cap and borrowing is stronger in some categories than in others. Two coefficients on cap variables are significant. After 2000, an additional dollar per capita of volume cap appears to translate into $0.42 of additional mortgage bond borrowing per capita. The cap variables in the student loan results are jointly significant. In the first report group, an additional dollar of per capita cap translated into $0.10 of additional per capita student loan borrowing. After 2000, the relationship doubles to $0.21.

While most of the control variables do not have significant coefficients, we can see that the fast-growing states of the South borrowed more per capita for utilities than the Midwestern states. The Northeastern states borrowed more for student loans. Other things being equal, states with high total GSP per capita borrowed more for multifamily housing.

In table 9, the results of several variations of the models are presented. The introduction of state fixed effects does not change the significant result in the mortgage revenue data. None of the other models with state fixed effects have joint significance for the cap and the interaction. When both the per capita cap and the per capita borrowing are transformed into log points, the positive and significant relationship between the cap and mortgage borrowing after 2000 remains. The coefficients on the cap variables in the student loan model are positive but not highly significant. In this specification, there appears to be negative relationships between the cap and borrowing for industrial development and multifamily housing, which is not consistent with the theories presented in section 3.

When running the analysis on only the 1990s' or 2000s' data, I find consistent, but stronger,

results in the second reporting period. In the 1990s' estimates, the relationship between the cap and borrowing is positive for all categories but significant only for student loans. After 2000, the positive relationships for industrial, mortgage, and student loan bonds are significant. To address concerns that the results might be driven by a few unusual observations, I estimate the models while excluding the 40 most influential observations, as measured by Cook's distance. I also estimate the models with the five smallest and five largest states excluded. The results for mortgage and student loan borrowing both persist through these restrictions of the sample. The results are also robust to the removal of all the controls and removing the correction for serial correlation.

Turning now to the political economy models, I add four covariates that could influence the allocation of borrowing authority. The main results are presented in table 10. The variations and robustness checks are presented in tables 11 through 15. Comparing the results in table 10 to those in table 8, it is evident that the influence of the cap is independent of the political variables in the mortgage and student loan estimates. The cap coefficients change only modestly, and the significance patterns are the same with the economic and political variables as without. The results are quite steady through the variations. The variations attempt are (1) adding state-fixed effects, (2) taking logs of the dependent and independent variables of interest, (3) splitting by reporting period, (4) trimming influential observations, (5) limiting data to the middle 40 states (by population), (6) including no controls (7) using the Prais-Winston correction for serial correlation, (8) including political variables in levels instead of shares, (9) using a tobit specification, (10) controlling for debt burden, (11) controlling for utility rate changes, (12) controlling for college enrollment, (13) controlling for first time homebuyers, and (14) using alternative measures of demand for financing.

The per capita gross state product in utilities is strongly related to private-activity-bond borrowing for utilities. The coefficient on the GSP variable is large and significant in almost all variations of the estimates. The relationship between the wage earners in manufacturing and in-

dustrial development borrowing is positive and significant in every specification. In the student loan models, campaign contributions per capita from higher education interests are positively related to borrowing. The coefficients are significant in the baseline model and most of the alternate specifications. Throughout the estimates with all states pooled together, the coefficients on the union measures are inconsistent and never significant.

Running counter to my hypothesis, the per capita contributions from utilities interests have strong negative relationship with borrowing for utilities.[25] The relationship seems robust and persists through all variations of the model, even when controls are added for retail energy price changes (see table 14). The rate increases are important because most utilities are regulated by state agencies, and attempts to influence these agencies certainly involve campaign contributions (De Figueiredo and Edwards 2007). Utility companies that are aggressively pursuing a rate increase may delay the financing of new capacity until the rate increase is approved, leading to the negative relationship between contributions and borrowing.

Much of the theory in section 3 hinges on the idea that volume cap authority is a scarce resource, and the results in table 6 support this idea. However, we might expect to see differences in the allocation processes in states with tight caps versus states with generous caps. To investigate this, I start by averaging the per capita cap of each state over the entire period. Then I identify the median of the averages and sort each state above or below. I do not allow states to switch groups, so all the panels are complete. In broad terms, I expect that the economic or political factors will drive the allocation of borrowing to high-priority uses in industrial development and utilities. This reflects the state officials allocating authority to economically important sectors or politically influential

[25] I explored the possibility that competition for borrowing authority would induce campaign contributions, leading to a negative relationship between the two. I did not find evidence that states with more intense competition for authority saw more contributions. Using a similar model, it was evident that states with more political competition (measured by the partisan ratio in their legislatures) did have higher levels of contributions.

interests. In states with generous caps, the economic measures will still matter for high-priority borrowing purposes, but the remainder of the de facto subsidy will be directed to lower-priority uses in mortgage revenue bonds and student loans. In these sectors, the borrowing will be linked to the volume cap.

Looking at tables 16 and 17, we can see that the cap's association with borrowing in the low-cap states is different than in the pooled estimates. The only significant or jointly significant coefficients on the caps are negative (keep in mind, there is very little variance in the per capita cap between these larger states). The economic and political variables, on the other hand, are predictive, especially for industrial and utilities borrowing. The gross state product in manufacturing and utilities has a significant positive relationship with borrowing for those purposes. The relative share of wage earners in manufacturing also has a positive, significant relationship with industrial development borrowing. Campaign contributions from higher education affiliates are positively related to student loan borrowing in every low-cap specification. The union membership variable has its only significant coefficients in the models estimated on the low-cap states before and after 2000. Controlling for the share of households with a manufacturing wage earner, higher union membership in the population results in lower industrial development borrowing after 2000. Before 2000, union membership in higher education is negatively associated with student loan borrowing.

In the estimates for high-cap states (tables 18 and 19), the link between GSP and utilities borrowing is consistently positive and significant. In these subsamples the strong negative relationship between utilities contributions and utilities borrowing is evident (it was not evident in low-cap states), even when the data are split in two reporting periods. The positive connection between the cap and mortgage revenue bonds is visible in the high-cap estimates. It is strongest in the second reporting period. The cap is positively related to student loan lending in both decades.

6 Policy Implications

To assess the impact implied by the models, I calculate predicted values over all data points with a 10% increase in the volume cap. A 10% increase in the caps is a change of less than one eight of their standard deviation. When Congress has changed the cap, as in 1986 and 2000, it has taken the form of a percentage change. I am assuming there are no general equilibrium effects with increased bond offerings driving up credit costs. The estimates can be found in table 20. In the model of total borrowing, the 10% increase suggests an additional $6.24 per capita of borrowing in the average state and year. Aggregated to the national level, this would suggest an additional $844.7 million in borrowing, a 5.8% increase. In the individual category models, a 10% cap increase implies an additional $550.6 million for student loans, $363.6 for mortgage revenue bonds, and $143.8 million for industrial development. As a percentage, the student loan increase is by far the largest, at 28%.[26]

[26]The calculations for the predicted values are as follows. C_{it} is the per capita cap for state i in year t. β^* is the coefficient on the cap. P is population. $\mathbf{B}$ is the vector of other parameter estimates. $\mathbf{X}$ is the vector of control variables and fixed effect indicators. N is the number of states and Q is the number of years.

$$Mean\_PC\_Borrow = \frac{1}{NQ}\sum[1.1C_{it}\beta^* + \mathbf{X}'_{it}\mathbf{B}] \quad (13)$$

$$Mean\_Borrow = \frac{1}{NQ}\sum P_{it}[1.1C_{it}\beta^* + \mathbf{X}'_{it}\mathbf{B}] \quad (14)$$

$$Annual\_Total\_Borrow = \frac{1}{Q}\sum P_{it}[1.1C_{it}\beta^* + \mathbf{X}'_{it}\mathbf{B}] \quad (15)$$

The changes in the mean borrowing and annual national borrowing are a smaller percentage of the actual than 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.

7 Conclusions

The analysis that follows the theoretical discussion in this paper establishes that the private-activity volume cap is a binding constraint on most states, and that it is possible to identify some political and economic factors that influence its allocation. For each additional dollar per capita of private-activity volume cap, the average state is observed to borrow an additional $0.80 per capita per year. Some uses of private-activity bonds are more responsive to differences in the cap than others. Specifically, an additional dollar per capita of authority is associated with an additional $0.42 per capita of mortgage revenue bond borrowing and an additional $0.21 per capita of student loan borrowing. The models suggest that if the private-activity volume caps were 10% higher, there would be 28% more student loan bonds issued and just under 8% more mortgage revenue bonds issued. Total private-activity borrowing would be a little less than 6% higher, or $844 million, beyond the observed $14.6 billion per year.

The empirical findings support the theory that the allocation of private activity borrowing authority is a prioritized process. Borrowing for utilities exhibits a positive relationship with the utilities GSP in states with tight per capita borrowing limits and those with loose limits. Likewise, the relative size of the work force in manufacturing seems to drive borrowing for industrial development even when controlling for the manufacturing GSP. Regardless of the cap, utilities and manufacturing interests receive authorization if they need it or want it. In models of student loan and mortgage revenue borrowing, borrowing is strongly connected to the cap, especially in states with a generous per capita allowance. These categories seem to be absorbing the available borrowing authority. Explicit political activity only appears to raise authorizations in one instance. Controlling for productivity and employment in post-secondary education, higher shares of the campaign contributions raise allocations of borrowing authority to student loans.

A Measurement Error Bias

This appendix presents a consideration of the measurement error caused by the carryforward authorization. I will show that using the observed borrowing data and the issuing year's cap involves a measurement error. In each year, a decision is made (by state officials, local officials, and private entities) to issue an amount of private-activity debt and carry forward an amount. At the end of a calendar year, a state can submit a form to the IRS indicating that it plans to carry forward borrowing authority from the current year, if it has not exhausted its limit. This means that borrowing that occurs in year t could be authorized in the current year, any of the previous three years, or even a combination of these.

Let the borrowing per capita be represented by A. Let V represent the private-activity volume authorization per capita. The subscripts will indicate the year the bonds are issued, and the year the authority to issue them originates, with t as the current or reference year.

$$A_{issue\ year,\ authority\ year} \qquad V_{issue\ year,\ authority\ year} \tag{16}$$

Let s indicate the state observations. I will not include the s subscript, only show when I am summing over it.

If a state is unconstrained, the volume cap is unrelated to the amount of borrowing, so all of these calculations only hold assuming the state is constrained. This assumption of a binding constraint, along with the regulation, makes equation 17 hold. If I were to regress the borrowing on the volume caps, as in equation 18, I would have a coefficient of 1.

$$A_{t,t} + A_{t+1,t} + A_{t+2,t} + A_{t+3,t} = V_{t,t} + V_{t+1,t} + V_{t+2,t} + V_{t+3,t} \tag{17}$$

$$\sum_{i=0}^{3} A_{t+i,t} = \beta(\sum_{i=0}^{3} V_{t+i,t}) + \epsilon \tag{18}$$

$$b = \frac{\sum_s (\sum_{i=0}^{3} A_{t+i,t})(\sum_{i=0}^{3} V_{t+i,t})}{\sum_s (\sum_{i=0}^{3} V_{t+i,t})^2} \tag{19}$$

$$b = 1 \tag{20}$$

If, instead of the current year borrowing and the carryforward borrowing that will happen, I had an accurate carryforward figure, then the regression would appear as:

$$A_{t,t} + A_{t,t-1} + A_{t,t-2} + A_{t,t-3} = V_{t,t} + V_{t,t-1} + V_{t,t-2} + V_{t,t-3} \tag{21}$$

$$\sum_{i=0}^{3} A_{t,t-i} = \beta(\sum_{i=0}^{3} V_{t,t-i}) + \epsilon \tag{22}$$

$$b = \frac{\sum_s (\sum_{i=0}^{3} A_{t,t-i})(\sum_{i=0}^{3} V_{t,t-i})}{\sum_s (\sum_{i=0}^{3} V_{t,t-i})^2} \tag{23}$$

$$b = 1. \tag{24}$$

What is actually reported in the *Bond Buyer* survey before 2000 is

$$A_{t,t} \quad \text{and} \quad \sum_{i=0}^{3} V_{t+i,t}. \tag{25}$$

To simplify the following calculations, without changing their implications, I will assume that all carryforward is used in the first year after its authorization year. Let $V_{.,t} = V_{t,t} + V_{t+1,t}$, $A_{.,t} = A_{t,t} + A_{t+1,t}$ and $A_{.,t} = V_{.,t}$. If I run a regression on the 1990s data, I obtain:

$$A_{t,t} = \beta V_{.,t} + \epsilon \tag{26}$$

$$b = \frac{\sum_s (A_{t,t} V_{.,t})}{\sum_s V_{.,t}^2} \tag{27}$$

$$b = \frac{\frac{1}{N}\sum_s (V_{t,t} V_{.,t})}{\frac{1}{N}\sum_s V_{.,t}^2} \tag{28}$$

$$\text{plim } b = \frac{\sigma_{V_{t,t},V_{.,t}}}{\sigma^2_{V_{.,t}}} \tag{29}$$

$$\text{plim } b = 1 + \frac{\sigma_{V_{t,t},V_{.,t}} - \sigma^2_{V_{.,t}}}{\sigma^2_{V_{.,t}}}. \tag{30}$$

The coefficient captures the ratio of the covariance between the current year borrowing and the cap relative to the variance in the cap. We would not expect this to be one, but rather equal to the portion of the cap that it used in its originating year.

If I run a regression on the 2000s data, I get the following:

$$A_{t,t} + A_{t,t-1} = \beta V_{.,t} + \epsilon \tag{31}$$

$$
\begin{aligned}
b &= \frac{\sum_s (A_{t,t} V_{.,t} + A_{t,t-1} V_{.,t})}{\sum_s V_{.,t}^2} && (32)\\
b &= \frac{\frac{1}{N}\sum_s (V_{t,t} V_{,t} + A_{t,t-1} V_{.,t})}{\frac{1}{N}\sum_s V_{.,t}^2} && (33)\\
\text{plim } b &= \frac{\sigma_{V_{t,t},V_{.,t}} + \sigma_{A_{t,t-1},V_{.,t}}}{\sigma^2_{V_{.,t}}} && (34)\\
&= 1 + \frac{\sigma_{V_{t,t},V_{.,t}} + \sigma_{A_{t,t-1},V_{.,t}} - \sigma^2_{V_{.,t}}}{\sigma^2_{V_{.,t}}}. && (35)
\end{aligned}
$$

If the process was the same each year, and $A_{t,t-1} = V_{t+1,t}$, then the coefficient is one. The more likely relationship is that $A_{t,t-1}$ is drawn from a related, but slightly lower cap, due to population growth and the legislated cap increases. That is $A_{t,t-1} \sim F((1-\rho)V_{.,t}, (1-\rho)^2 \sigma^2_{V_{t,t}})$.

This problem can be reformulated as a measurement error problem. Let $A_{t,t-1} = A_{t+1,t} - \Delta$. Following through the derivation, we have a coefficient of one minus a bias term. As long as the difference between carryforwards is positively related to the cap, which seems likely, I expect a coefficient below one.

$$
\begin{aligned}
A_{t,t} + A_{t+1,t} - \Delta &= \beta(V_{.,t}) + \epsilon && (36)\\
b &= \frac{\sum_s (A_{.,t} V_{.,t} - \Delta V_{.,t})}{\sum_s V_{.,t}^2} && (37)\\
b &= \frac{\frac{1}{N}\sum_s (V_{.,t}^2 - \Delta V_{.,t})}{\frac{1}{N}\sum_s V_{.,t}^2} && (38)\\
\text{plim } b &= \frac{\sigma^2_{V_{.,t}} - \sigma_{\Delta V_{.,t}}}{\sigma^2_{V_{.,t}}} && (39)\\
\text{plim } b &= 1 - \frac{\sigma_{\Delta V_{.,t}}}{\sigma^2_{V_{.,t}}} && (40)
\end{aligned}
$$

B Standard Errors

This appendix reviews the standard error corrections that are used in the empirical analyses. To establish the notation, I am estimating:

$$
\mathbf{y} = \mathbf{X}\beta + \mathbf{u}. \quad (41)
$$

using

$$\mathbf{b} = (\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\mathbf{y}. \tag{42}$$

If the errors are homoskedastic, the variance-covariance matrix relating the values of $\mathbf{u}$ in all observations is $\sigma\mathbf{I}$ were $\mathbf{I}$ is the identity matrix.

To allow correct inferences in the presence of heteroskedasticity, the Huber-White procedure changes the estimate of the standard error using the residuals e_i.

$$\widehat{var(\mathbf{b})} = (\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\sigma^2\mathbf{\Omega}\mathbf{X}(\mathbf{X}'\mathbf{X})^{-1} \tag{43}$$

$$\sigma^2\mathbf{\Omega} = diag(e_1^2,\ e_2^2, ...) \tag{44}$$

In stata, an OLS regression covariance matrix is estimated as:

$$s^2 = \frac{1}{N-k}\sum_{i=1}^{N} e_i^2 \tag{45}$$

$$var(\mathbf{b}_{OLS}) = s^2(\mathbf{X}'\mathbf{X})^{-1}. \tag{46}$$

The robust option down-weights observations with larger errors by employing a calculation that is the equivalent of estimating an s_i for each observation.

$$s_i^2 = \frac{n}{n-k}(e_i)^2 \tag{47}$$

$$var(\mathbf{b}_{Robust}) = (\mathbf{X}'\mathbf{X})^{-1}[\sum_{i=1}^{N} e_i^2\mathbf{x}_i](\mathbf{X}'\mathbf{X})^{-1} \tag{48}$$

Clustering is a variation of robust estimation in which individual $\mathbf{e}_i\mathbf{x}_i$ are replaced with the sum in a cluster. Clusters are groups identified in the data that are likely to have similar errors for some reason. In this analysis, all observations are clustered by state. Let $\mathbf{x}_i$ be a row vector of predictors. n_c is the number of clusters.

$$var(\mathbf{b}_{Cluster}) = (\mathbf{X}'\mathbf{X})^{-1}[\sum_{j=1}^{n_c} \mathbf{u}_j'\mathbf{u}_j](\mathbf{X}'\mathbf{X})^{-1} \tag{49}$$

$$\mathbf{u}_j = \sum_j e_i * \mathbf{x}_i \tag{50}$$

The Bhargava procedure consists of calculating a correlation coefficient (ρ) for the residuals in relation to the residuals just before them within the panels. All independent variables and the dependent variable are adjusted by subtracting the product of ρ and the immediate preceding value. The first observation of each panel is adjusted differently to avoid losing it. Finally, the regression is rerun on the adjusted data. Calculation of ρ and the adjustment of the variables is as follows:

$$\rho = 1 - \frac{\sum_i \sum_t (\epsilon_{it} - e_{i,t-1})^2}{2 \sum_i \sum_t e_{it}^2} \tag{51}$$

$$Y'_{it} = Y_{it} - \rho Y_{i,t-1} \tag{52}$$

$$X'_{it} = X_{it} - \rho X_{i,t-1} \tag{53}$$

$$Y'_{i1} = \sqrt{(1-\rho^2)} Y_{i1} \tag{54}$$

$$X'_{i1} = \sqrt{(1-\rho^2)} X_{i1}. \tag{55}$$

The Bhargava procedure differs from the Cochrane-Orcutt procedure in the calculation of ρ. $e'_{it} e_{i,t-1}$ is replaced with $(e_{it} - e_{i,t-1})^2$, as in the Durbin-Watson statistic. Bhargava, Franzini, and Narendrathan showed that this is locally most powerful when ρ is near zero.

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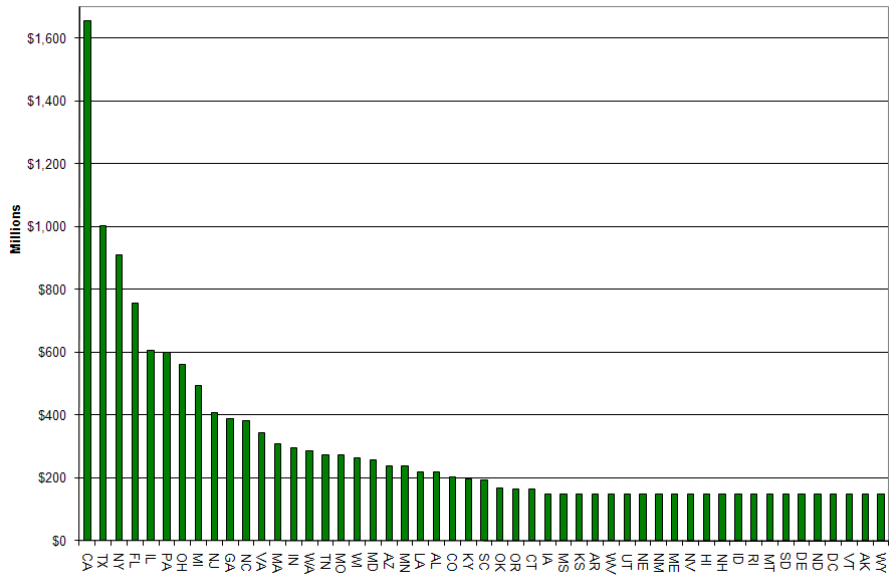

Figure 1: Private Activity Volume Caps in 2000. Data source: *The Bond Buyer Yearbook*.

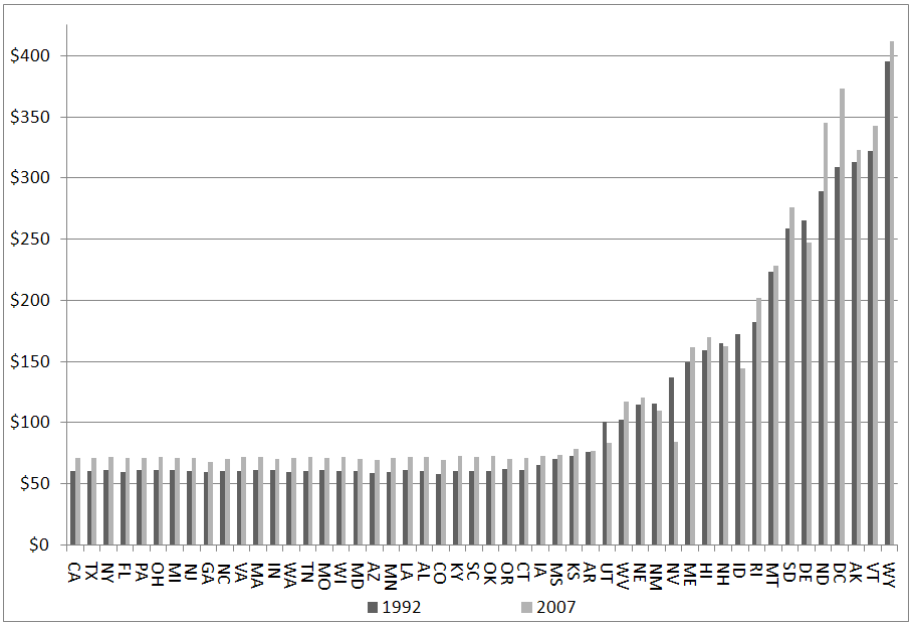

Figure 2: Per Capita Private Activity Volume Caps in 1992 and 2007. Data source: *The Bond Buyer Yearbook*.

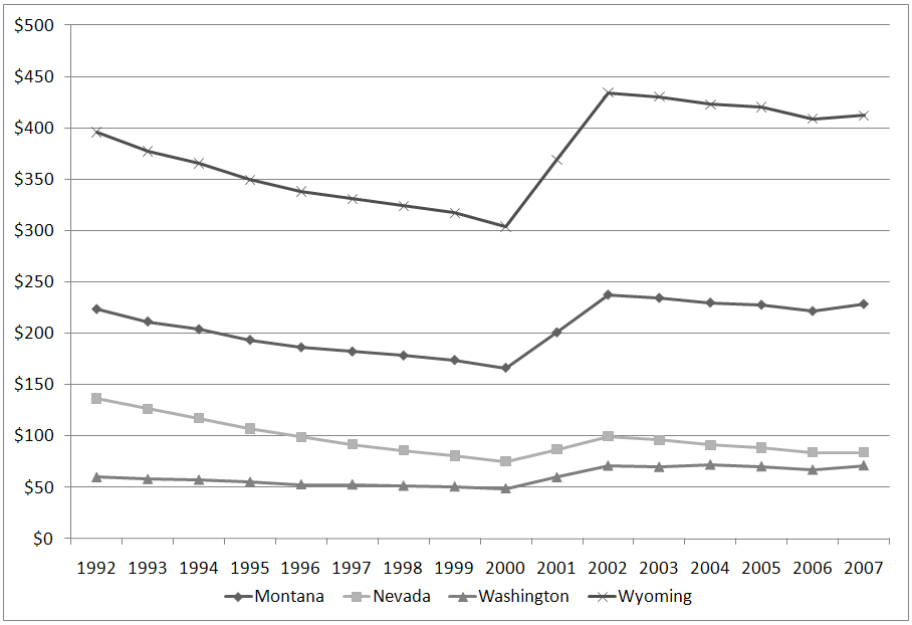

Figure 3: Per Capita Private Activity Volume Caps, Time Trends in Four States

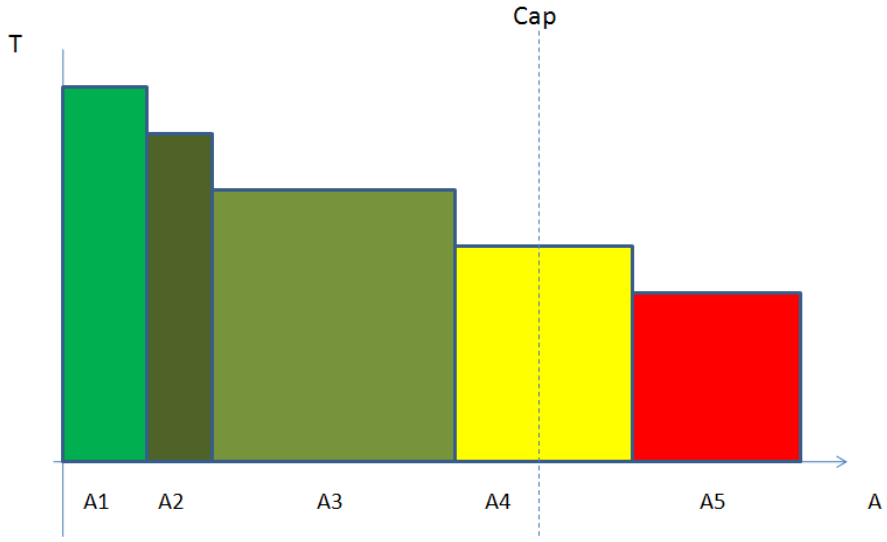

Figure 4: Prioritization in the Allocation of Private-Activity Borrowing Authority. T is the total utility the public official obtains from allocating a dollar of private-activity borrowing authority. The width of the rectangles is determined by the requests made by the private-activity borrowers. The 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. Category 5 receives no borrowing authority. The volume cap is exhausted in this state and year.

	1992-1999 Current Borrowing/Cap Ratio				
Variable	Median	Mean	SD	Minimum	Maximum
Ratio	0.76	0.65	0.34	0.00	1.00
Ratio > .85	0.00	0.40	0.49	0.00	1.00
Ratio = 1	0.00	0.13	0.34	0.00	1.00
	2000-2007 Current and Carryforward Borrowing/Cap Ratio				
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	0.35	0.47	0.00	1.00

Table 1: Descriptive Statistics: Private-Activity Borrowing/Cap Ratios. The calculations are based on the *Bond Buyer* survey data. N=400 in each reporting period.

	1992-1999			
Per Capita Borrowing	*Mean*	*SD*	*Min*	*Max*
Total	54.642	49.398	0	323.531
Industrial	10.749	13.202	0	118.604
Utilities	11.380	23.646	0	246.831
Mortgage	13.354	24.885	0	196.980
Multifamily	10.246	23.977	0	216.405
Student	7.575	19.669	0	196.980
Other	1.338	4.270	0	38.168
	2000-2007			
	Mean	*SD*	*Min*	*Max*
Total	99.672	94.205	0	613.794
Industrial	7.580	26.384	0	427.359
Utilities	7.935	22.217	0	357.526
Mortgage	43.892	64.954	0	526.724
Multifamily	19.880	34.636	0	291.207
Student	19.045	38.766	0	311.497
Other	1.340	5.051	0	52.216
Per Capita Cap	112.580	87.295	47.996	442.367
Borrowing Imputed	0.014	0.117	0	1

Table 2: Descriptive Statistics: Private-Activity Borrowing by Purpose. The units are year 2000 dollars per capita. The data are from the *Bond Buyer* survey. Borrowing using carryforward authorization is included after 1999. N=400 in each reporting period.

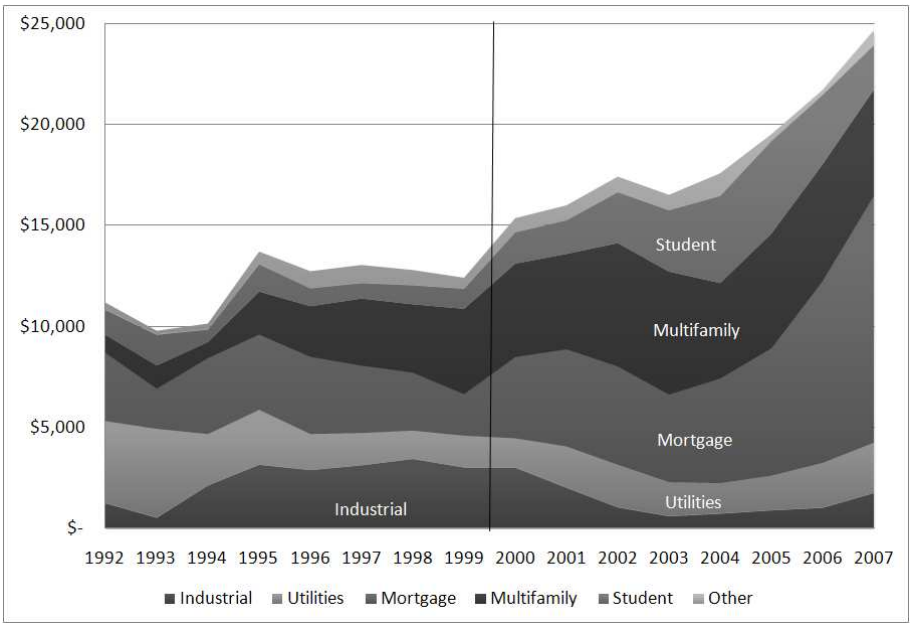

Figure 5: National Total Private-Activity Borrowing. Figures are in millions of 2000 dollars. The data are from the *Bond Buyer* survey. Borrowing using carryforward authorization is included after 1999.

	Per Capita Borrowing				
Average Volume Cap	Industrial	Utilities	Mortgage	Multifamily	Student
Below Median	8.096	7.480	16.190	11.602	6.066
	(9.288)	(8.282)	(17.333)	(12.172)	(9.074)
Above Median	10.233	11.835	41.056	18.524	20.554
	(28.052)	(31.314)	(68.522)	(40.607)	(42.048)

Table 3: Private-Activity Borrowing by Purpose and Volume Cap Level. The units are per capita year 2000 dollars. The states were divided into two categories based on their average per capita volume cap between 1992 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 data are from the *Bond Buyer* survey. N=400 in each group of states.

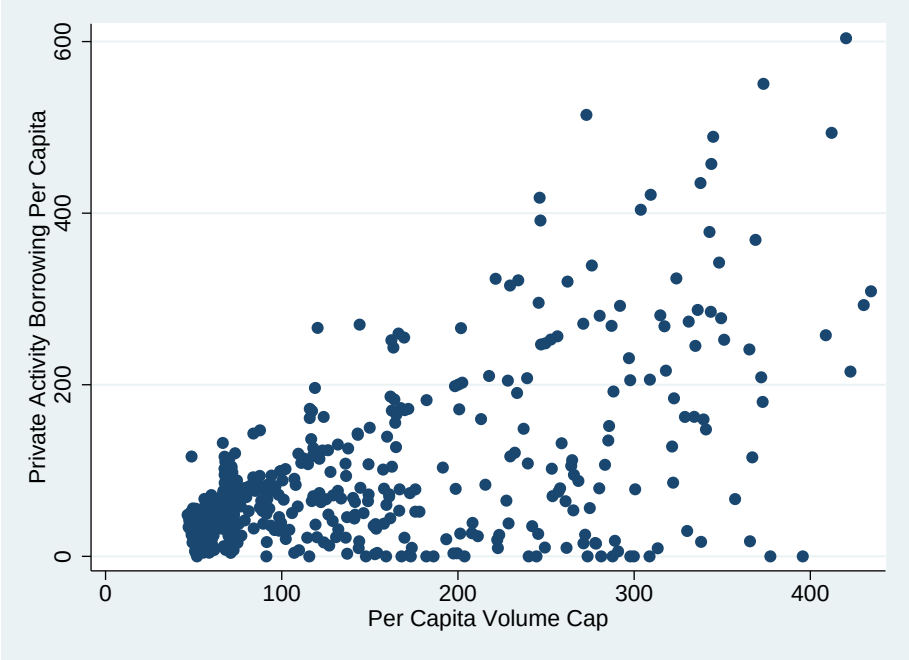

Figure 6: Total Private-Activity Borrowing Per Capita vs. the Per Capita Volume Cap. The observations are state-year figures. The data are from the *Bond Buyer* survey. Borrowing using carryforward authorization is included after 1999.

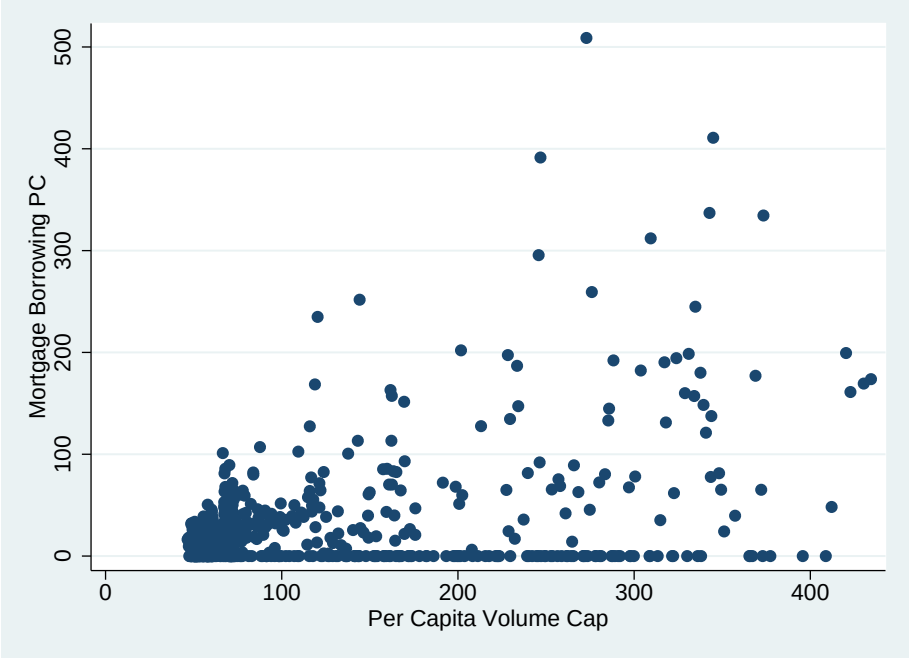

Figure 7: Mortgage Bond Borrowing Per Capita vs. the Per Capita Volume Cap. The observations are state-year figures. The data are from the *Bond Buyer* survey. Borrowing using carryforward authorization is included after 1999.

Variable	Mean	Std. Dev.	Min	Max
Northeast	0.18	0.38	0.00	1.00
South	0.34	0.47	0.00	1.00
West	0.26	0.44	0.00	1.00
Urban	69.26	22.01	17.03	100.00
GSP (all industries)	34.84	13.12	19.99	138.88
Taxes	2.89	0.76	1.67	6.97
Unemployment	5.02	1.38	2.26	11.29
College Graduates	24.79	5.60	11.37	49.95
College Growth	0.43	1.06	-3.29	4.92
Low Income	21.99	5.38	10.55	41.01
Low Income Growth	-0.08	1.35	-5.38	4.58
Population $<$ 1.8M	0.34	0.47	0.00	1.00
Population $>$ 5.3M	0.32	0.47	0.00	1.00
Additional Controls added in Robustness Checks				
College Enrollment	0.06	0.02	0.04	0.20
First-time Home Buyers	0.01	0.00	0.01	0.02
Public Debt Burden Per Capita	5.40	3.43	0.54	66.67
Private Activity Debt Burden Per Capita	1.70	1.14	0.24	12.71
Debt Burden Data Imputed	0.25	0.43	0.00	1.00

Table 4: Descriptive Statistics: Control Variables. The units for GSP and $Taxes$ are logs of year 2000 dollars per capita. Tax figures include all local and state taxes except severance taxes. All other units are percentages or indicators. N=800.

	Gross State Product Per Capita			
Category	Mean	SD	Min	Max
Manufacturing (Industrial)	4.610	2.006	0.289	9.815
Utilities	0.802	0.293	0.126	2.316
Real Estate (Mortgage)	3.833	1.679	1.261	14.256
Construction (Multifamily)	1.510	0.454	0.657	4.086
Education (Student Loan)	0.312	0.435	0.046	3.650
	Share of Constituent Wage Earners			
Category	Mean	SD	Min	Max
Manufacturing (Industrial)	46.837	11.919	16.063	70.771
Utilities	4.378	2.266	0.000	18.352
Real Estate (Mortgage)	6.256	3.541	0.540	26.600
Construction (Multifamily)	29.083	9.016	8.906	57.636
Education (Student Loan)	13.446	5.158	3.912	41.090
	Share of Constituent Contributions			
Category	Mean	SD	Min	Max
Manufacturing (Industrial)	13.891	10.351	0.000	99.281
Utilities	16.730	11.396	0.000	100.000
Real Estate (Mortgage)	31.591	12.186	0.000	100.000
Construction (Multifamily)	32.859	11.040	0.000	68.533
Education (Student Loan)	4.929	3.809	-0.163	21.128
Contribution Imputed	0.315	0.465	0.000	1.000
	Share of Constituent Union Members			
Category	Mean	SD	Min	Max
Manufacturing (Industrial)	43.710	30.774	0.000	100.000
Utilities	10.000	14.700	0.000	100.000
Real Estate (Mortgage)	1.193	4.263	0.000	47.812
Construction (Multifamily)	30.583	26.644	0.000	100.000
Education (Student Loan)	12.514	17.353	0.000	100.000

Table 5: Descriptive Statistics: Political and Economic Variables. The contribution data are in year 2000 dollars per capita. The contribution data are from the National Institute on Money in State Politics. The GSP data are from the Bureau of Economic Analysis calculations based on the Survey of Current Business. The GSP units are thousands of year 2000 dollars per capita. The union member and wage earner 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. N=800.

	I	II	III	IV
Cap PC	0.206***	0.216***	0.238 * *	−0.752
	(0.068)	(0.075)	(0.106)	(0.483)
Report	−21.531***			
	(6.257)			
Cap*Report	0.546***	0.553***	0.563***	0.710***
	(0.086)	(0.093)	(0.101)	(0.133)
Northeast			14.163*	233.663
			(8.384)	(143.200)
South			−2.719	240.669*
			(6.681)	(129.313)
West			4.871	−127.606
			(10.179)	(91.843)
Urbanization			−0.151	0.177
			(0.189)	(0.663)
GSP PC			−0.129	−3.074 * *
			(0.460)	(1.262)
Taxes PC			−11.707 * *	8.364
			(5.454)	(11.907)
Unemployment			4.531*	1.979
			(2.379)	(3.386)
College			0.249	0.956
			(0.929)	(2.293)
College Growth			−3.559	−3.567
			(2.362)	(3.284)
Low Income			−0.779	−0.076
			(0.616)	(1.698)
Low Income Growth			−0.699	−1.963
			(2.049)	(2.269)
Population < 1.8M			−8.168	148.458
			(9.286)	(108.882)
Population > 5.3M			−1.708	−245.623 * *
			(3.267)	(104.743)
Quality Controls	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes
State FE				Yes
Constant	24.034***	−11.111	62.792***	115.072
	(3.500)	(7.456)	(19.588)	(77.237)
R^2	0.382	0.441	0.473	0.553
F test - Cap Variables	53.80	52.78	32.56	15.37
p	0.000	0.000	0.000	0.000

Table 6: Regression Results: Total Per Capita Borrowing—Per Capita Cap. The dependent variable is the observed total per capita private-activity borrowing. Additional, extensive notes relevant to all regression tables appear in note 24. N=800. The F tests evaluate the joint significance of *Cap* and $Cap * Report$. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	V	VI	VII
Cap	0.005	0.276 ∗ ∗	0.777∗∗∗
	(0.218)	(0.115)	(0.091)
Report			
Cap*Report	1.001∗∗∗		
	(0.223)		
Northeast	0.253	4.991	24.812 ∗ ∗
	(0.156)	(13.090)	(10.215)
South	−0.246 ∗ ∗	−12.628	2.815
	(0.115)	(9.429)	(9.043)
West	−0.142	−2.832	10.360
	(0.141)	(13.362)	(12.887)
Urbanization	0.001	0.154	−0.614 ∗ ∗
	(0.003)	(0.239)	(0.264)
GSP PC	0.007	1.017	−0.853∗
	(0.008)	(0.745)	(0.471)
Taxes PC	−0.343 ∗ ∗	−28.689∗∗∗	−3.359
	(0.137)	(7.872)	(8.163)
Unemployment	0.081	8.615 ∗ ∗	2.683
	(0.049)	(3.322)	(3.775)
College	−0.014	−1.704	1.836
	(0.016)	(1.292)	(1.194)
College Growth	−0.067	−4.070	−2.492
	(0.048)	(3.150)	(2.470)
Low Income	−0.011	−1.765∗	−0.184
	(0.010)	(0.881)	(1.007)
Low Income Growth	−0.031	0.486	−2.015
	(0.027)	(1.778)	(3.553)
Population < 1.8M	−0.320	−17.981∗	−9.938
	(0.206)	(9.781)	(12.375)
Population > 5.3M	−0.093	−11.410 ∗ ∗	3.070
	(0.089)	(5.425)	(4.350)
Quality Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Constant	0.465	94.320∗∗∗	2.689
	(0.830)	(20.576)	(29.126)
R^2	0.225	0.198	0.560
N	800	400	400
F test - Cap Variables	14.36		
p	0.000		

Table 7: Regression Results: Total Per Capita Borrowing—Per Capita Cap. The dependent variable is the observed total per capita private-activity borrowing. Additional, extensive notes relevant to all regression tables appear in note 24. The F tests evaluate the joint significance of *Cap* and *Cap* ∗ *Report*. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
Cap	0.046	0.058	0.074	−0.045	0.099 ∗ ∗
	(0.031)	(0.041)	(0.077)	(0.075)	(0.048)
Cap*Report	0.064	−0.007	0.342∗∗∗	0.078	0.114
	(0.043)	(0.018)	(0.101)	(0.087)	(0.075)
Northeast	5.375	1.089	−17.126∗∗∗	2.402	21.695∗∗∗
	(5.259)	(3.418)	(5.696)	(4.304)	(7.823)
South	5.056	8.645∗∗∗	−15.723∗∗∗	−1.626	2.617
	(3.545)	(2.717)	(5.302)	(3.500)	(4.843)
West	7.714	7.589	−19.879∗∗∗	0.337	7.625
	(7.587)	(4.641)	(5.692)	(4.945)	(6.493)
Urbanization	−0.153	0.034	0.257	−0.079	−0.188
	(0.099)	(0.066)	(0.179)	(0.152)	(0.144)
GSP PC	0.248	−0.009	−0.668∗	0.716∗∗∗	−0.513
	(0.256)	(0.148)	(0.357)	(0.236)	(0.385)
Taxes PC	2.121	1.143	−6.362	−4.493	−5.458 ∗ ∗
	(2.832)	(2.889)	(3.942)	(4.602)	(2.471)
Unemployment	−0.636	1.604	−0.123	2.882	1.043
	(1.144)	(1.127)	(2.411)	(2.107)	(1.053)
College	−1.306	−1.277∗∗∗	1.389 ∗ ∗	0.673	1.068
	(0.908)	(0.475)	(0.642)	(0.498)	(0.845)
College Growth	0.055	2.067∗∗∗	−2.013	−2.294	−2.076
	(0.625)	(0.733)	(1.589)	(1.495)	(1.456)
Low Income	−0.771∗	−0.888∗∗∗	0.671	−0.188	0.276
	(0.392)	(0.267)	(0.685)	(0.538)	(0.426)
Low Income Growth	0.706	1.070	−0.022	−1.842	−0.536
	(0.680)	(0.747)	(1.286)	(1.127)	(0.515)
Population < 1.8M	−14.020∗	0.639	9.202	8.826	−9.604∗
	(8.021)	(6.507)	(5.847)	(5.894)	(5.545)
Population > 5.3M	−0.012	2.245	−6.660 ∗ ∗	2.901	0.957
	(2.058)	(1.888)	(3.292)	(2.660)	(2.578)
Quality Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Constant	26.653 ∗ ∗	32.911∗∗∗	−1.153	−9.441	3.594
	(11.757)	(11.232)	(14.841)	(9.162)	(10.811)
R^2	0.104	0.121	0.303	0.122	0.215
F test - Cap Variables	1.54	1.09	19.96	0.43	3.12
p	0.2250	0.3459	0.000	0.6547	0.0531

Table 8: Regression Results: Per Capita Borrowing by Purpose—Per Capita Cap. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. Additional, extensive notes relevant to all regression tables appear in note 24. N=800. The F tests evaluate the joint significance of Cap and $Cap * Report$. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
			State Fixed Effects		
Cap	−0.265∗	0.063	−0.065	−0.197	−0.199
	(0.152)	(0.148)	(0.222)	(0.303)	(0.121)
Cap*Report	0.086∗	0.001	0.385∗∗∗	0.093	0.141
	(0.047)	(0.028)	(0.084)	(0.101)	(0.087)
			Logs		
Cap	−0.418 ∗ ∗	−0.345	−0.340	−0.699 ∗ ∗	0.838∗
	(0.194)	(0.410)	(0.525)	(0.346)	(0.495)
Cap*Report	0.305	0.093	1.238∗∗∗	0.090	0.336
	(0.227)	(0.179)	(0.359)	(0.331)	(0.294)
			1992-1999		
Cap	0.005	0.060	0.107	0.010	0.111∗∗∗
	(0.015)	(0.038)	(0.087)	(0.063)	(0.040)
			2000-2007		
Cap	0.127 ∗ ∗	0.042	0.388∗∗∗	0.034	0.196 ∗ ∗
	(0.051)	(0.041)	(0.081)	(0.044)	(0.075)
			Trimmed Data		
Cap	−0.016	−0.009	−0.034	−0.059∗∗∗	0.058∗
	(0.016)	(0.018)	(0.039)	(0.022)	(0.032)
Cap*Report	0.018	0.006	0.341∗∗∗	0.026	0.075 ∗ ∗
	(0.016)	(0.010)	(0.039)	(0.024)	(0.029)
			Middle States		
Cap	0.021	0.000	−0.119 ∗ ∗	0.121	0.116∗∗∗
	(0.025)	(0.051)	(0.046)	(0.077)	(0.041)
Cap*Report	−0.027	−0.028	0.537∗∗∗	−0.024	0.059
	(0.024)	(0.041)	(0.075)	(0.102)	(0.108)
			No Correction for Serial Correlation		
Cap	0.035	0.058	0.089	−0.032	0.129 ∗ ∗
	(0.024)	(0.041)	(0.083)	(0.059)	(0.059)
Cap*Report	0.048	−0.007	0.327∗∗∗	0.057	0.099
	(0.038)	(0.018)	(0.094)	(0.062)	(0.071)
			No Controls		
Cap	0.013	0.041	0.064	0.035	0.046 ∗ ∗
	(0.024)	(0.025)	(0.039)	(0.047)	(0.020)
Cap*Report	0.074	−0.006	0.326∗∗∗	0.086	0.115
	(0.050)	(0.020)	(0.103)	(0.096)	(0.076)

Table 9: Robustness Checks: Per Capita Borrowing by Purpose—Per Capita Cap. The dependent variable is the observed per capita private-activity borrowing. Additional, extensive notes relevant to all regression tables appear in note 24. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
Cap	0.053	0.023	0.080	−0.047	0.105 ∗ ∗
	(0.032)	(0.021)	(0.086)	(0.078)	(0.045)
Cap*Report	0.054	−0.014	0.341∗∗∗	0.087	0.116
	(0.041)	(0.023)	(0.104)	(0.091)	(0.075)
Sector GSP PC	−0.640	19.570∗∗∗	2.379	1.310	15.887
	(0.733)	(2.387)	(4.094)	(3.535)	(13.767)
Wage Earners	0.228 ∗ ∗	0.904∗	−0.031	0.356	−0.232
	(0.091)	(0.507)	(0.773)	(0.402)	(0.343)
Contributions	−0.003	−0.181∗∗∗	−0.032	0.014	0.764∗
	(0.080)	(0.047)	(0.161)	(0.105)	(0.441)
Union Members	−0.010	0.016	0.236	0.033	0.016
	(0.017)	(0.029)	(0.437)	(0.042)	(0.036)
Northeast	4.065	−2.556	−18.818∗∗∗	3.859	14.820 ∗ ∗
	(4.938)	(2.249)	(6.589)	(4.331)	(6.166)
South	4.462	4.643 ∗ ∗	−16.993∗∗∗	−2.662	4.468
	(3.001)	(1.876)	(5.100)	(3.658)	(4.634)
West	6.965	6.566∗∗∗	−22.082∗∗∗	−0.330	9.875
	(6.461)	(2.262)	(6.208)	(4.977)	(6.129)
Urbanization	−0.151	−0.001	0.223	−0.092	−0.175
	(0.097)	(0.041)	(0.196)	(0.172)	(0.128)
Total GSP PC	0.262	0.043	−0.777∗	0.783∗∗∗	−1.020
	(0.275)	(0.130)	(0.435)	(0.275)	(0.659)
Taxes PC	2.126	0.107	−7.890	−4.696	−3.175
	(2.596)	(2.031)	(4.748)	(4.778)	(2.682)
Unemployment	−0.294	0.927	−0.105	2.253	0.808
	(1.043)	(0.693)	(2.410)	(1.740)	(1.130)
College	−1.256	−0.991∗∗∗	1.265∗	0.653	0.837
	(0.967)	(0.268)	(0.668)	(0.476)	(0.812)
College Growth	−0.049	2.126∗∗∗	−1.878	−2.140	−1.916
	(0.639)	(0.700)	(1.539)	(1.398)	(1.395)
Low Income	−0.759∗	−0.766∗∗∗	0.744	−0.085	−0.040
	(0.416)	(0.197)	(0.671)	(0.535)	(0.394)
Low Income Growth	0.652	0.939	−0.158	−1.879∗	−0.292
	(0.688)	(0.661)	(1.382)	(1.095)	(0.513)
Population < 1.8M	−14.125	0.858	7.525	7.373	−8.804
	(8.729)	(2.778)	(6.569)	(6.397)	(6.141)
Population > 5.3M	−0.298	2.706 ∗ ∗	−7.499 ∗ ∗	3.272	2.072
	(1.954)	(1.287)	(3.395)	(2.809)	(2.556)
Quality Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Constant	21.315	17.443∗∗∗	2.113	−25.193 ∗ ∗	5.229
	(15.211)	(5.961)	(14.730)	(10.286)	(14.869)
R^2	0.109	0.191	0.304	0.132	0.231
F test - Cap Variables	1.59	0.61	21.99	0.49	3.51
p	0.214	0.545	0.000	0.613	0.038
F test - P&E Variables	3.10	21.10	0.24	0.61	1.76
p	0.024	0.000	0.912	0.660	0.153

Table 10: Regression Results: Per Capita Borrowing by Purpose—Cap and Political and Economic Variables. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. Additional, extensive notes relevant to all regression tables appear in note 24. N=800. The first row of F tests evaluate the joint significance of *Cap* and $Cap * Report$. The second row of F tests evaluate the joint significance of the GSP, wage earner, contributions and union member variables. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
	State Fixed Effects				
Cap	−0.248	0.063	−0.057	−0.218	−0.246∗
	(0.151)	(0.149)	(0.232)	(0.309)	(0.130)
Cap*Report	0.074	0.002	0.397∗∗∗	0.102	0.149
	(0.047)	(0.029)	(0.085)	(0.105)	(0.093)
Sector GSP PC	−0.149	−2.476	6.333	3.227	6.563
	(0.761)	(10.516)	(9.087)	(5.457)	(25.628)
Wage Earners	0.253 ∗ ∗	0.075	0.277	0.606	−0.105
	(0.112)	(0.879)	(1.069)	(0.410)	(0.221)
Contributions	0.020	−0.145 ∗ ∗	−0.077	−0.120	1.700 ∗ ∗
	(0.094)	(0.064)	(0.199)	(0.132)	(0.716)
Union Members	−0.014	0.020	0.218	0.021	−0.010
	(0.017)	(0.036)	(0.516)	(0.041)	(0.044)
	Logs				
Cap	−0.186	−0.550	−0.300	−0.661 ∗ ∗	0.884∗
	(0.201)	(0.358)	(0.531)	(0.290)	(0.497)
Cap*Report	0.205	0.043	1.269∗∗∗	0.059	0.307
	(0.236)	(0.176)	(0.356)	(0.317)	(0.302)
Sector GSP PC	0.252	1.792∗∗∗	1.159	1.742∗∗∗	1.141
	(0.178)	(0.393)	(0.935)	(0.647)	(1.127)
Wage Earners	0.019∗∗∗	0.006	0.012	0.003	−0.017
	(0.004)	(0.030)	(0.031)	(0.012)	(0.019)
Contributions	−0.002	−0.006	−0.004	−0.002	0.059∗∗∗
	(0.005)	(0.005)	(0.006)	(0.005)	(0.019)
Union Members	−0.001	0.002	−0.006	0.000	−0.002
	(0.001)	(0.004)	(0.012)	(0.003)	(0.003)
	1992-1999				
Cap	0.011	0.036	0.116	0.026	0.141∗∗∗
	(0.016)	(0.024)	(0.092)	(0.068)	(0.041)
Sector GSP PC	−0.018	14.459∗∗∗	1.590	3.539	1.890
	(0.649)	(3.257)	(2.981)	(5.306)	(12.614)
Wage Earners	0.239 ∗ ∗	0.181	0.062	0.117	−0.751∗
	(0.118)	(0.500)	(0.793)	(0.307)	(0.429)
Contributions	−0.019	−0.162∗∗∗	−0.141	0.067	0.342
	(0.062)	(0.057)	(0.094)	(0.112)	(0.329)
Union Members	−0.020	0.062	−0.121	0.051	−0.050
	(0.029)	(0.067)	(0.090)	(0.089)	(0.068)
	2000-2007				
Cap	0.123 ∗ ∗	−0.019	0.386∗∗∗	0.044	0.189 ∗ ∗
	(0.051)	(0.018)	(0.082)	(0.048)	(0.076)
Sector GSP PC	−0.805	24.605∗∗∗	5.503	−0.905	17.949
	(1.113)	(3.504)	(6.444)	(4.454)	(13.655)
Wage Earners	0.135	2.336∗	−1.323	0.631	0.822
	(0.081)	(1.187)	(1.525)	(0.731)	(0.586)
Contributions	0.010	−0.206 ∗ ∗	0.009	0.089	1.073
	(0.190)	(0.081)	(0.325)	(0.197)	(0.910)
Union Members	0.004	0.022	0.281	0.069	0.033
	(0.031)	(0.050)	(0.668)	(0.073)	(0.061)

Table 11: Robustness Checks: Per Capita Borrowing by Purpose —Cap and Political and Economic Variables. The dependent variable is the observed per capita private-activity borrowing. Additional, extensive notes relevant to all regression tables appear in note 24. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
			Trimmed Data		
Cap	−0.012	−0.020	−0.050	−0.057 ∗ ∗	0.069
	(0.016)	(0.016)	(0.033)	(0.023)	(0.043)
Cap*Report	0.018	0.006	0.373∗∗∗	0.033	0.067∗
	(0.015)	(0.011)	(0.039)	(0.024)	(0.033)
Sector GSP PC	0.252	12.799∗∗∗	−2.928	3.479	13.765 ∗ ∗
	(0.386)	(2.313)	(1.757)	(2.134)	(6.342)
Wage Earners	0.150∗∗∗	0.438∗	0.592∗	0.171	−0.130
	(0.037)	(0.240)	(0.348)	(0.105)	(0.191)
Contributions	0.020	−0.045	0.021	−0.027	0.491∗
	(0.044)	(0.036)	(0.077)	(0.061)	(0.274)
Union Members	−0.010	0.027	0.196	−0.006	−0.008
	(0.011)	(0.027)	(0.197)	(0.023)	(0.025)
			Middle States		
Cap	0.020	0.014	−0.116 ∗ ∗	0.164 ∗ ∗	0.090∗
	(0.020)	(0.048)	(0.050)	(0.062)	(0.047)
Cap*Report	−0.032	−0.036	0.539∗∗∗	−0.023	0.066
	(0.023)	(0.044)	(0.075)	(0.098)	(0.111)
Sector GSP PC	0.586	14.194∗∗∗	−3.943	14.588∗∗∗	7.672
	(0.391)	(4.106)	(3.016)	(2.368)	(11.849)
Wage Earners	0.172∗∗∗	−0.114	0.271	0.007	0.272
	(0.052)	(0.328)	(0.548)	(0.174)	(0.235)
Contributions	0.049	−0.203∗	0.035	0.063	0.503
	(0.058)	(0.106)	(0.153)	(0.085)	(0.353)
Union Members	−0.015	0.043	0.033	−0.006	0.017
	(0.012)	(0.050)	(0.262)	(0.045)	(0.036)
			No Controls		
Cap	0.032	0.008	0.070	0.033	0.054 ∗ ∗
	(0.027)	(0.022)	(0.042)	(0.038)	(0.023)
Cap*Report	0.064	−0.005	0.330∗∗∗	0.087	0.120
	(0.050)	(0.027)	(0.103)	(0.093)	(0.073)
Sector GSP PC	0.551	17.973∗∗∗	−3.052∗	4.350	−10.333∗
	(0.562)	(4.084)	(1.586)	(3.056)	(5.204)
Wage Earners	0.246 ∗ ∗	1.586∗∗∗	0.006	0.288	−0.018
	(0.107)	(0.588)	(0.755)	(0.400)	(0.300)
Contributions	−0.075	−0.162∗∗∗	−0.010	0.080	1.573∗∗∗
	(0.129)	(0.059)	(0.135)	(0.116)	(0.475)
Union Members	−0.005	0.026	0.215	0.026	0.049
	(0.017)	(0.039)	(0.454)	(0.041)	(0.046)

Table 12: Robustness Checks: Per Capita Borrowing by Purpose —Cap and Political and Economic Variables. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. Additional, extensive notes relevant to all regression tables appear in note 24. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
	Prais Winston Corretion for Serial Correlation				
Cap	0.054	0.025	0.081	−0.046	0.106 ∗ ∗
	(0.033)	(0.022)	(0.086)	(0.076)	(0.045)
Cap*Report	0.055	−0.016	0.341∗∗∗	0.084	0.115
	(0.042)	(0.023)	(0.103)	(0.087)	(0.074)
Sector GSP PC	−0.666	19.765∗∗∗	2.148	1.652	15.968
	(0.733)	(2.421)	(3.978)	(3.484)	(13.795)
Wage Earners	0.226 ∗ ∗	0.914∗	−0.022	0.368	−0.241
	(0.090)	(0.496)	(0.729)	(0.398)	(0.345)
Contributions	−0.000	−0.184∗∗∗	−0.046	0.005	0.757∗
	(0.081)	(0.048)	(0.164)	(0.104)	(0.438)
Union Members	−0.010	0.010	0.224	0.031	0.016
	(0.017)	(0.029)	(0.435)	(0.043)	(0.036)
	Wage Earner, Contribution and Union Data in Levels				
Cap	0.047	0.011	0.082	−0.038	0.105 ∗ ∗
	(0.031)	(0.022)	(0.081)	(0.078)	(0.045)
Report	0.000	6.988	0.000	0.000	0.000
	(0.000)	(4.637)	(0.000)	(0.000)	(0.000)
Cap*Report	0.059	−0.008	0.339∗∗∗	0.081	0.117
	(0.044)	(0.023)	(0.104)	(0.091)	(0.076)
Sector GSP PC	−0.622	20.252∗∗∗	3.489	1.665	17.829
	(0.641)	(2.296)	(4.321)	(3.419)	(13.433)
Wage Earners	0.090∗	0.348	0.232	0.266	−0.035
	(0.048)	(0.428)	(0.718)	(0.248)	(0.271)
Contributions	−3.155	−7.751∗∗∗	−6.450	4.026	22.241
	(7.171)	(2.012)	(4.466)	(6.410)	(22.108)
Union Members	−0.031	0.279	0.844	−0.298∗	−0.627
	(0.065)	(0.318)	(1.112)	(0.176)	(0.391)
	Tobit Specification				
Cap	−0.412∗	0.006	−0.192	−0.318	−0.553∗∗∗
	(0.229)	(0.226)	(0.366)	(0.339)	(0.194)
Cap*Report	0.096∗	−0.004	0.553∗∗∗	0.135	0.206
	(0.056)	(0.052)	(0.100)	(0.113)	(0.128)
Sector GSP PC	0.252	−10.688	7.832	6.555	−26.728
	(1.450)	(13.315)	(11.805)	(8.146)	(53.044)
Wage Earners	0.297∗	−0.288	0.315	0.882∗	−0.919
	(0.156)	(1.136)	(1.245)	(0.454)	(0.702)
Contributions	−0.009	−0.234∗	−0.317	−0.292	2.862∗∗∗
	(0.108)	(0.131)	(0.306)	(0.179)	(1.053)
Union Members	−0.035	0.071	−0.250	−0.022	−0.078
	(0.032)	(0.092)	(0.657)	(0.060)	(0.089)

Table 13: Robustness Checks. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. Additional, extensive notes relevant to all regression tables appear in note 24. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
	Controlling for the Debt Burden				
Cap	0.056	0.022	0.106	−0.094	0.103∗
	(0.041)	(0.022)	(0.079)	(0.074)	(0.053)
Cap*Report	0.053	−0.014	0.335∗∗∗	0.094	0.116
	(0.040)	(0.023)	(0.103)	(0.086)	(0.072)
Sector GSP PC	−0.595	19.639∗∗∗	1.020	0.847	16.348
	(0.701)	(2.328)	(4.629)	(4.679)	(11.895)
Wage Earners	0.224 ∗ ∗	0.892	−0.123	0.332	−0.239
	(0.086)	(0.534)	(0.783)	(0.383)	(0.329)
Contributions	−0.006	−0.179∗∗∗	−0.002	−0.009	0.748∗
	(0.081)	(0.052)	(0.167)	(0.095)	(0.410)
Union Members	−0.010	0.016	0.225	0.035	0.017
	(0.017)	(0.029)	(0.442)	(0.042)	(0.036)
Pub Act Debt	−0.309	0.010	−0.573	−0.208	−0.013
	(0.235)	(0.144)	(0.378)	(0.372)	(0.261)
Priv Act Debt	−0.171	0.116	−2.803	5.374∗∗∗	0.268
	(1.426)	(1.078)	(1.945)	(1.105)	(2.413)
Debt Data Missing	−1.481	6.804∗∗∗	0.735	−8.866	−9.774 ∗ ∗
	(2.714)	(1.921)	(8.998)	(5.980)	(3.668)
	Controlling for Regulated Utility Rate Changes				
Cap	0.051	0.023	0.080	−0.049	0.102 ∗ ∗
	(0.031)	(0.022)	(0.086)	(0.079)	(0.045)
Cap*Report	0.053	−0.014	0.343∗∗∗	0.086	0.116
	(0.041)	(0.023)	(0.105)	(0.090)	(0.074)
Sector GSP PC	−0.676	19.552∗∗∗	1.917	1.331	16.077
	(0.738)	(2.391)	(4.110)	(3.518)	(13.566)
Wage Earners	0.228 ∗ ∗	0.911∗	−0.072	0.350	−0.217
	(0.090)	(0.504)	(0.765)	(0.400)	(0.337)
Contributions	−0.003	−0.181∗∗∗	−0.033	0.015	0.774∗
	(0.079)	(0.047)	(0.162)	(0.102)	(0.444)
Union Members	−0.010	0.017	0.247	0.034	0.016
	(0.017)	(0.029)	(0.432)	(0.043)	(0.037)
Elec Rate Change	−16.190	5.154	29.486	−23.919	−18.787
	(11.305)	(11.664)	(48.140)	(24.151)	(19.927)
Gas Rate Change	−0.658	−0.482	6.040	6.744	6.991
	(3.299)	(4.527)	(10.258)	(12.586)	(13.603)

Table 14: Robustness Checks. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. Additional, extensive notes relevant to all regression tables appear in note 24. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
	Controlling for College Enrollment				
Cap	0.048	0.019	0.016	0.039	0.097 ∗ ∗
	(0.031)	(0.030)	(0.087)	(0.052)	(0.040)
Cap*Report	0.044	−0.013	0.404∗∗∗	−0.006	0.136
	(0.052)	(0.029)	(0.108)	(0.039)	(0.083)
Sector GSP PC	−1.074	19.831∗∗∗	0.465	4.636	32.081
	(1.020)	(2.188)	(3.272)	(3.341)	(22.233)
Wage Earners	0.253 ∗ ∗	0.962∗	0.803	0.238	−0.217
	(0.095)	(0.537)	(0.679)	(0.392)	(0.355)
Contributions	0.023	−0.193∗∗∗	−0.070	0.056	0.765∗
	(0.075)	(0.062)	(0.155)	(0.109)	(0.442)
Union Members	−0.019	0.019	−0.203	0.033	0.005
	(0.016)	(0.032)	(0.408)	(0.044)	(0.037)
Col Enroll PC	19.081	96.816	246.022	−79.639	−161.975
	(117.268)	(94.605)	(319.243)	(340.661)	(158.460)
	Controlling for First Time Home Buyers				
Cap	0.049	0.023	0.078	−0.047	0.106 ∗ ∗
	(0.030)	(0.021)	(0.091)	(0.078)	(0.046)
Cap*Report	0.053	−0.014	0.335∗∗∗	0.088	0.117
	(0.041)	(0.023)	(0.104)	(0.091)	(0.076)
Sector GSP PC	−0.809	19.575∗∗∗	3.961	1.255	16.296
	(0.874)	(2.382)	(3.531)	(3.514)	(14.489)
Wage Earners	0.223 ∗ ∗	0.907∗	0.228	0.352	−0.238
	(0.086)	(0.512)	(0.892)	(0.398)	(0.354)
Contributions	−0.009	−0.182∗∗∗	−0.021	0.007	0.760∗
	(0.082)	(0.047)	(0.161)	(0.109)	(0.444)
Union Members	−0.011	0.017	0.250	0.032	0.015
	(0.017)	(0.030)	(0.443)	(0.042)	(0.036)
FT Home Buyer	8.356	0.562	36.685	−4.716	−6.377
	(11.694)	(7.238)	(27.741)	(19.111)	(19.383)
	Alternative Measures of Demand for Financing				
Cap	0.096	0.042	0.102	−0.047	0.170 ∗ ∗
	(0.058)	(0.029)	(0.093)	(0.080)	(0.073)
Cap*Report	0.030	−0.002	0.313∗∗∗	0.088	0.000
	(0.037)	(0.022)	(0.111)	(0.090)	(0.000)
Borrowing Measure	2.925	−8.278	−1.383	6.680	25.007
	(4.328)	(9.186)	(0.953)	(22.365)	(23.061)
Wage Earners	0.156∗	1.582∗	0.135	0.362	0.934
	(0.079)	(0.848)	(0.978)	(0.396)	(0.597)
Contributions	0.044	−0.087	0.001	0.013	1.125
	(0.170)	(0.071)	(0.196)	(0.106)	(0.921)
Union Members	0.000	0.029	0.228	0.032	0.032
	(0.024)	(0.032)	(0.471)	(0.042)	(0.061)
N	550	800	700	800	400

Table 15: Robustness Checks. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. Additional, extensive notes relevant to all regression tables appear in note 24. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
			Main Specification		
Cap	−0.450	0.846	0.693	−0.975∗	0.319
	(0.482)	(0.624)	(0.779)	(0.476)	(0.435)
Cap*Report	0.428	−1.634 ∗ ∗	0.322	0.126	−0.203
	(0.545)	(0.687)	(0.959)	(0.555)	(0.520)
Sector GSP PC	1.824∗∗∗	8.307∗∗∗	−0.465	1.090	−6.227
	(0.477)	(2.667)	(2.724)	(3.634)	(6.187)
Wage Earners	0.240∗∗∗	−0.250	0.345	0.042	0.092
	(0.072)	(0.407)	(0.505)	(0.088)	(0.293)
Contributions	0.031	0.006	−0.048	−0.079	0.403 ∗ ∗
	(0.049)	(0.086)	(0.138)	(0.063)	(0.147)
Union Members	−0.025∗	−0.034	−0.127	0.002	−0.002
	(0.014)	(0.024)	(0.151)	(0.022)	(0.023)
F test - Cap Variables	0.47	4.36	1.27	2.95	0.29
p	0.633	0.024	0.298	0.072	0.753
F test - P&E Variables	6.06	3.24	0.25	0.46	2.09
p	0.002	0.030	0.904	0.764	0.113
			State Fixed Effects		
Cap	−0.419	0.931	0.565	−0.940∗	0.342
	(0.461)	(0.611)	(0.775)	(0.480)	(0.420)
Cap*Report	0.456	−1.668 ∗ ∗	0.492	0.090	−0.273
	(0.524)	(0.679)	(0.989)	(0.568)	(0.530)
Sector GSP PC	1.823∗∗∗	8.724∗∗∗	−0.643	1.422	−7.137
	(0.477)	(2.506)	(2.749)	(3.422)	(6.292)
Wage Earners	0.247∗∗∗	−0.261	0.573	0.044	0.121
	(0.078)	(0.380)	(0.515)	(0.093)	(0.297)
Contributions	0.026	0.009	−0.058	−0.080	0.430∗∗∗
	(0.053)	(0.091)	(0.141)	(0.065)	(0.152)
Union Members	−0.025∗	−0.035	−0.165	−0.004	−0.001
	(0.014)	(0.024)	(0.152)	(0.023)	(0.028)

Table 16: Regression Results: Low Cap States. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. Additional, extensive notes relevant to all regression tables appear in note 24. N=400. The first row of F tests evaluate the joint significance of Cap and $Cap*Report$. The second row of F tests evaluate the joint significance of the GSP, wage earner, contributions and union member variables. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
			Logs		
Cap	−5.281	4.003	3.438	−2.395	3.539
	(3.112)	(4.306)	(4.317)	(2.997)	(4.125)
Cap*Report	5.681	−8.743∗	−2.747	−1.606	−1.207
	(3.544)	(4.983)	(5.494)	(3.427)	(5.488)
Sector GSP PC	0.724 ∗ ∗	1.915 ∗ ∗	0.417	1.681 ∗ ∗	−2.775 ∗ ∗
	(0.343)	(0.718)	(1.363)	(0.604)	(1.245)
Wage Earners	0.022∗∗∗	−0.040	0.072	−0.000	0.030
	(0.008)	(0.048)	(0.046)	(0.008)	(0.036)
Contributions	0.001	−0.017	−0.001	−0.006	0.073∗∗∗
	(0.003)	(0.011)	(0.011)	(0.005)	(0.020)
Union Members	−0.004 ∗ ∗	−0.007	−0.006	−0.000	−0.002
	(0.002)	(0.005)	(0.011)	(0.002)	(0.003)
			1992-1999		
Cap	−0.370	0.965	0.861	−0.693	0.355
	(0.463)	(0.674)	(0.686)	(0.473)	(0.384)
Sector GSP PC	1.378	6.211	2.402	−3.774	−5.675∗
	(0.951)	(4.388)	(2.710)	(5.160)	(3.232)
Wage Earners	0.436∗∗∗	−0.655	0.388	0.034	0.022
	(0.138)	(0.577)	(0.439)	(0.202)	(0.220)
Contributions	−0.010	0.127	−0.036	0.006	0.489∗∗∗
	(0.041)	(0.113)	(0.124)	(0.051)	(0.100)
Union Members	−0.038	−0.027	0.021	−0.032	−0.055 ∗ ∗
	(0.028)	(0.064)	(0.116)	(0.024)	(0.023)
			2000-2007		
Cap	−0.030	−0.582∗	0.381	−0.537	−0.078
	(0.227)	(0.290)	(0.775)	(0.565)	(0.426)
Sector GSP PC	1.813 ∗ ∗	11.986∗∗∗	−1.374	−1.097	−8.445
	(0.722)	(2.291)	(4.398)	(4.066)	(9.059)
Wage Earners	0.173∗∗∗	0.157	0.452	0.104	0.294
	(0.061)	(0.542)	(0.748)	(0.109)	(0.508)
Contributions	0.162	−0.101	−0.005	−0.057	0.458 ∗ ∗
	(0.128)	(0.087)	(0.203)	(0.117)	(0.217)
Union Members	−0.035∗	−0.005	−0.275	0.021	0.011
	(0.018)	(0.022)	(0.258)	(0.035)	(0.037)

Table 17: Robustness Checks: Low Cap States. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. Additional, extensive notes relevant to all regression tables appear in note 24. N=400 in the log models. N=200 in the reporting group models. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
			Main Specification		
Cap	0.039	0.014	0.130	−0.056	0.102∗
	(0.032)	(0.024)	(0.121)	(0.092)	(0.051)
Cap*Report	0.071	0.000	0.310 ∗ ∗	0.098	0.112
	(0.044)	(0.026)	(0.125)	(0.109)	(0.091)
Sector GSP PC	−0.849	22.756∗∗∗	4.149	−0.816	5.822
	(1.011)	(2.526)	(6.424)	(5.652)	(17.211)
Wage Earners	0.262	1.060	0.278	0.580	0.017
	(0.163)	(0.769)	(1.129)	(0.566)	(0.365)
Contributions	−0.078	−0.195∗∗∗	−0.051	0.197	1.238
	(0.235)	(0.067)	(0.227)	(0.222)	(0.790)
Union Members	−0.020	0.049	0.306	0.039	−0.026
	(0.035)	(0.042)	(0.553)	(0.071)	(0.055)
F test - Cap Variables	2.08	0.42	20.23	0.42	3.58
p	0.148	0.663	0.000	0.661	0.044
F test - P&E Variables	0.89	32.48	0.43	0.45	1.01
p	0.484	0.000	0.783	0.768	0.421
			State Fixed Effects		
Cap	0.039	0.015	0.127	−0.052	0.124 ∗ ∗
	(0.031)	(0.024)	(0.120)	(0.085)	(0.053)
Cap*Report	0.068	−0.001	0.309 ∗ ∗	0.089	0.100
	(0.044)	(0.026)	(0.122)	(0.097)	(0.090)
Sector GSP PC	−0.585	22.924∗∗∗	3.617	−0.671	5.065
	(0.995)	(2.529)	(6.022)	(5.856)	(18.056)
Wage Earners	0.272	1.057	0.185	0.650	−0.091
	(0.166)	(0.760)	(0.984)	(0.558)	(0.422)
Contributions	−0.082	−0.196∗∗∗	−0.115	0.149	1.038
	(0.226)	(0.067)	(0.238)	(0.212)	(0.734)
Union Members	−0.021	0.044	0.261	0.038	−0.027
	(0.034)	(0.042)	(0.560)	(0.076)	(0.062)

Table 18: Regression Results: High Cap States. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. Additional, extensive notes relevant to all regression tables appear in note 24. N=400. The first row of F tests evaluate the joint significance of Cap and $Cap*Report$. The second row of F tests evaluate the joint significance of the GSP, wage earner, contributions and union member variables. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

	Industry	Utilities	Mortgage	Multifamily	Student
			Logs		
Cap	−0.159	−0.818∗	−0.446	−0.753∗	0.717
	(0.273)	(0.403)	(0.600)	(0.409)	(0.453)
Cap*Report	0.302	0.348	1.344∗∗∗	0.050	0.409
	(0.303)	(0.250)	(0.477)	(0.420)	(0.403)
Sector GSP PC	0.403	2.217∗∗∗	0.780	1.791∗	1.800
	(0.295)	(0.518)	(1.316)	(0.981)	(1.588)
Wage Earners	0.017 ∗ ∗	0.010	0.020	0.014	−0.023
	(0.007)	(0.041)	(0.039)	(0.018)	(0.026)
Contributions	−0.011	−0.003	−0.009	0.007	0.047∗
	(0.015)	(0.005)	(0.007)	(0.009)	(0.027)
Union Members	0.000	0.009∗	−0.008	−0.000	−0.003
	(0.002)	(0.004)	(0.015)	(0.004)	(0.004)
			1992-1999		
Cap	−0.009	0.036	0.147	0.018	0.157∗∗∗
	(0.014)	(0.027)	(0.101)	(0.079)	(0.039)
Sector GSP PC	−0.821	16.243∗∗∗	0.405	6.718	−8.107
	(1.104)	(5.196)	(3.952)	(10.017)	(14.391)
Wage Earners	0.304∗	−0.403	0.222	0.087	−0.953
	(0.167)	(0.673)	(1.230)	(0.610)	(0.569)
Contributions	−0.198	−0.248∗∗∗	−0.206	0.212	−0.003
	(0.213)	(0.071)	(0.129)	(0.277)	(0.871)
Union Members	0.010	0.140	−0.059	0.051	−0.003
	(0.046)	(0.117)	(0.116)	(0.119)	(0.092)
			2000-2007		
Cap	0.108 ∗ ∗	−0.026	0.386∗∗∗	0.044	0.164 ∗ ∗
	(0.048)	(0.031)	(0.080)	(0.053)	(0.078)
Sector GSP PC	−1.140	26.176∗∗∗	8.321	−7.818	3.944
	(1.688)	(3.923)	(8.871)	(9.284)	(22.974)
Wage Earners	0.239	3.698	−1.933	1.017	2.261∗
	(0.203)	(2.364)	(1.995)	(1.093)	(1.150)
Contributions	−0.083	−0.204 ∗ ∗	−0.263	0.251	1.180
	(0.258)	(0.089)	(0.619)	(0.373)	(1.920)
Union Members	0.008	0.093	0.687	0.088	−0.061
	(0.064)	(0.103)	(0.883)	(0.127)	(0.103)

Table 19: Robustness Checks: High Cap States. The dependent variable is the observed per capita private-activity borrowing, for the indicated purpose. Additional, extensive notes relevant to all regression tables appear in note 24. N=400 in the log models. N=200 in the reporting group models. Standard errors, in parentheses, are clustered by state and corrected for serial correlation. *** p<0.01, ** p<0.05, * p<0.1.

Total	Actual	Predicted	Difference
Mean Per Capita Borrowing	77.16	83.39	6.24
Mean Borrowing	292.3	309.1	16.9
Annual Total Borrowing	14,612.6	15,457.4	844.7
Industrial	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	9.16	9.85	0.68
Mean Borrowing	36.3	39.2	2.9
Annual Total Borrowing	1,816.5	1,960.3	143.8
Utilities	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	9.66	10.27	0.61
Mean Borrowing	43.7	44.2	0.5
Annual Total Borrowing	2,183.0	2,209.7	26.7
Mortgage	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	28.62	31.59	2.97
Mean Borrowing	93.1	100.3	7.3
Annual Total Borrowing	4,653.4	5,016.9	363.6
Multifamily	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	15.06	15.05	-0.01
Mean Borrowing	74.9	69.9	-5.0
Annual Total Borrowing	3,743.5	3,494.3	-249.1
Student Loans	**Actual**	**Predicted**	**Difference**
Mean Per Capita Borrowing	13.31	15.36	2.05
Mean Borrowing	39.0	50.0	11.0
Annual Total Borrowing	1,949.3	2,499.9	550.6

Table 20: Private-Activity Borrowing with a 10% Increase in the Volume Cap. After running the OLS models displayed in table 8, I replace the actual volume caps with 110% of their values, and predicted borrowing with the full set of covariates. 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 figures are in year 2000 dollars.