What Did the Earmark Ban Do? The Impact of Earmark Reforms on the Distribution of Intergovernmental Grants

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I. Introduction

"It [the earmark ban] gives us a lot more credibility on fiscal restraint."

–Jack Kingston, (R-GA) [1]

"I'll be making more phone calls, writing more letters, arranging more meetings and doing whatever I possibly can. That's the way it's going to be done...now that they have eliminated these earmarks."

–Maurice Hinchey, (D-NY) [2]

Since 2011, Congress has observed a ban on earmarking. Beginning with a one year earmark moratorium in 2007, a series of reforms in both the House and the Senate culminated in a ban that persists as of the 114th Congress. While public opinion continues to support the ban on earmarks (Egger, 2016), critics in the media and elsewhere have commonly argued that it has merely exacerbated the lack of budgetary transparency in Washington by allowing legislators to direct federal funds to their home districts in ways that are impossible to track ((Lipton and Nixon, 2010), (Nixon, 2012), (Cuellar, 2012), (Gold, 2015), (Dawson and Kleiner, 2015), (Strand and Butcaru, 2016)). During a recent hearing by the House Rules Subcommittee, proposals to reverse the ban enjoyed bi-partisan support (C-SPAN, 2016). For state and local governments, my results suggest that the outcome of the current debate may impact the geographic distribution of federal grants in a non-trivial way.

In 2009, earmarks in competitive grant programs were only 5.6 and 1.5 percent of federal grants to state and local governments respectively.[3] Yet, because earmarking reallocates funds often already intended to be awarded elsewhere (Office of the Inspector General, 2007), (Savage, 2009), these totals add up to a significantly altered distribution of federal funds ($1.1 billion for state and $212 million for local governments).[4]

Figure 1 displays data from the government watchdog group, Citizens Against Government Waste (CAGW), that document a rapid decline of earmarks to zero in 2011, and persistently low levels to date. However, it is highly possible that this drop was only the result of a superficial adherence to the House and Senate ban, and that in actuality, the distribution of federal funds has remained unchanged. If legislators

[1] See Alarkon (2010).

[2] See Hernandez (2011).

[3] As discussed below, these numbers exclude earmarks and grants that were part of the ARRA, and that were awarded to state-controlled institutions of higher education.

[4] Additionally, sometimes agencies refuse to fund earmark requests. Evidence of this can be found in the recently released report on unobligated balances of earmarks for Department of Transportation funds to states. See: (AASHTO, 2012) and (AASHTO, 2016).

merely shifted into other means of directing budgetary resources to their home districts, then this change will not have had any impact on the actual distribution of federal funds.

A roadblock to studying the reaction of legislators to earmark reforms is the difficulty of matching earmarks to geographic areas.[5] Thus, there has been no empirical test of the earmark ban or its reforms on either the saliency of those reforms or their distributional consequences. This paper intends to fill that gap in the literature by analyzing federal grants to state and local governments over the 2000 to 2014 year period. I use variation in the percentage of each state and district's federal competitive grants that was earmarked prior to the earmark ban as a measure of "treatment." I also use differences in earmarks across demographic groups to determine whether earmarking (and thus the ban) impacted the equality of the distribution of intergovernmental grants.

I find that the 2011 earmark ban did impact the distribution of federal competitive grants to state governments, but not to local governments. My evidence suggests that it was the transparency reform of 2009, not the 2011 ban, that impacted local government grants.[6] Contrary to anecdotal evidence regarding the ability for legislators to circumvent the ban (Hernandez, 2011), I find a statistically and economically significant decline in federal grants to state governments as a result of the ban: 3.4 percent in grants over 2 years for every additional 1 percentage point in grants earmarked in 2009. For local governments, I find that while the 2011 ban had no effect, the reforms of 2009 had a large effect: a decline of over 8 percent in grants over two years for an additional 1 percentage point in grants earmarked. A possible reason for this finding is that the 2009 transparency reforms placed an initial restraint on the House that they did not place on the Senate (Doyle, 2011a). Interestingly, these results hold for the House Appropriations Committee (HAC) and Senate Appropriations Committee (SAC) members.

I find that the earmark reform of 2009 reduced intergovernmental funding to wealthy congressional districts relative to poor congressional districts, and I find no evidence that it disadvantaged other demographic groups such as high poverty districts, high female districts, high unemployment districts, elderly districts, or black districts. This evidence contrasts with the argument often vocalized by legislators that they can do a better job of determining what their districts need than agency officials, at least from the perspective

[5] Knight (2005) matches earmarks to congressional districts by the project descriptions in transportation authorization bills.

[6] As explained in more detail below, I focus on competitive grants as opposed to formula grants because these programs are most commonly earmarked. I analyze intergovernmental grants because governments can be pinpointed to a fairly precise geographic area, while firms and non-profits often have operations in locations remote from their headquarters.

of equality between high and low income groups.[7] It appears that an unanticipated consequence of the incentive for legislators to funnel grants to their home districts was to benefit rich districts at the expense of poor districts. One policy goal of intergovernmental grant programs is often to encourage a more equal distribution of public infrastructure projects. Since rich districts have larger tax bases and can more easily fund public goods than poor districts, earmarking runs counter to this policy objective.

Despite the pervasiveness of earmarking from the early '90s up until the time of the ban, little is known about their distribution. The exception is a literature that examines their distribution in connection with legislator attributes, such as committee appointments and party affiliation (Knight, 2005), (Clemens et al., 2015),

A larger literature on the distributional implications of legislator bargaining predicts that legislators with seniority, affiliation with the majority party, or appointment to important committees will enjoy an advantage over their peers in terms of increased budgetary shares, both theoretically (Weingast, 1979), (Baron and Ferejohn, 1989), (Knight, 2005), (Albouy, 2013), and empirically (Balla et al., 2002), (Knight, 2005), (Knight, 2008), (Berry et al., 2010), and (Albouy, 2013).

Knight (2005) finds that members of the Transportation authorization committee were able to successfully earmark projects to their home districts to a greater extent than non-members. His work specifically utilizes the practice of earmarking to identify measurable benefits accrued to powerful legislators. Other work has shown correlations in the size and number of earmarks and legislator characteristics such as party affiliation and seniority, electoral vulnerability, and committee appointments (Crespin et al. (2009), Engstrom and Vanberg (2010)). Although a large number of members often receive at least one earmark,[8] members of the House Appropriations Committee (HAC) and Senate Appropriations Committee (SAC) have direct control over the process and are able to direct considerable influence (De Figueiredo and Silverman (2006), Clemens et al. (2015)).

In light of the existing work on distributive politics, a relevant question then becomes whether representatives appointed to the HAC and SAC have been able to more easily subvert the earmark ban than others. My results indicate that they have not.

[7] Consider Senator Dick Durbin's (D-Ill.) comment: "I think that what we need to do is have the Obama administration say, 'We are looking for local impact, local input on projects and we will give great weight or at least weight to these recommendations.' And I think that only makes sense. Because, to think that somebody sitting at a desk in Washington, D.C., can appreciate that opportunity down in the Metro East area- I'm not sure they could," See: Stein (2014).

[8] For example, Knight (2005), in an examination of transportation authorization bills from 1991 and 1998 found that 46 percent of districts received earmarks in 1991, and 337 members of the House voted against stripping the 1998 bill of earmarks. He uses both as measures of the "size of the coalition."

Section II. describes the background on the earmark reforms and ban, and the data, Section III. presents the theoretical model, Section IV. presents the empirical model, including results, while Section V. concludes.

II. The Impact of the 2011 Earmark Ban

II.A. Background

Central to the serious debate over the value of earmarks is the question of whether legislators are more incentivized to have their constituents' interests at heart than the executive branch. Before the 2011 ban, earmarks were used by legislators in both the House and the Senate to override the geographic allocation of federal funds made by agencies.[9]

A large empirical and theoretical literature estimates the benefits derived from membership, seniority, and affiliation with the majority party, and finds varying estimates of the value of these attributes (Levitt and Snyder Jr, 1995), (Levitt and Poterba, 1999), (Balla et al., 2002), (Knight, 2005), (Boyle and Matheson, 2009), (Berry et al., 2010), (Albouy, 2013), (Alexander et al., 2016). Given that the ban and the transparency reforms leading up to it were self-imposed, the 2011 earmark ban presents a conundrum for the theoretical and empirical literature on distributive politics. A plausible explanation is that the ban was a move to placate public unrest, fomented by increased budget deficits (White, 2014).

To date, there has been no work documenting whether the ban actually restricted legislators' ability to direct funds toward their home districts. Additionally, the literature does not address the demographic equality outcomes related to earmarking apart from the excess advantages enjoyed by well-positioned legislators.

Over the period of 2006 to 2010, both the House and the Senate enacted a series of reforms aimed at providing a greater degree of transparency to the earmarking process. Most notable were the 2009 committee-led reforms of the HAC and SAC that required earmark requests, not just approved earmarks, be posted on members' websites as opposed to committees' websites. The HAC reforms were more stringent than the SAC reforms because they mandated that all requested earmark information be tabulated by subcommittee bill. The HAC also imposed an additional requirement that agencies be given 20 days to review earmark

[9]The term "pork" is often used to refer to earmarks. I refrain from this term as it assumes a judgment that congressional priorities are de facto more wasteful than agency priorities. The topic of whether or not earmarks resulted in a "good" or "bad" distribution of grants is beyond the scope of this paper. I claim only to provide evidence of whether the distribution under earmarks appeared to meet generalized objectives of equality in the distribution of federal grants.

requests in order to "to check that the proposed earmark is eligible for funding and meets goals established in law."[10] [11]

The earmark ban differed from the transparency reforms in the key way that it was enforced informally, and not included in either the House or Senate rules.[12] The reversal of the earmark ban has been the topic of much debate, most recently by the House Rules Committee. While it is clear that some politicians used banning earmarks as a campaign platform such as Senator McCain,[13] an obvious question would be to ask why legislators would give up their earmarking power in the first place, especially in light of the fact that this ability had allowed the Legislative branch an advantage over the Executive branch.[14] Legal scholars have suggested that the ban came as a result of a shift in public opinion, heightened by the worry over increased deficits, and the popular though factually incorrect view that earmarks had been responsible for large budget deficits (White, 2014). Interestingly, the ban was never codified into law or even House or Senate rules.

My paper tests the saliency of the earmark ban. Although government watchdog groups such as Citizens Against Government Waste (CAGW) have documented large declines in earmarks by their definition as a result of the ban,[15] there are several reasons why the ban might not be salient. Legislators who used earmarks before the ban may have found alternative ways to allocate funding to their home districts after the ban. Without data on other practices which are known to have increased since the ban, such as "lettermarking", it cannot be known a priori whether the ban had any affect.[16] Additionally, it is highly possible that the ban would have a heterogenous impact. Members of the House Appropriations Committee (HAC) may have ways of getting around the ban that other members might not. Also, it is possible that authorization committees have since enjoyed more power, and that earmarks could be written into the law through authorizations for programs heavily slanted toward particular types of spending that favor particular districts.

[10] See: Congress (2009).

[11] See (Doyle, 2011a) for a description of the earmark reforms over the 2006-2010 period.

[12] White (2014) describes how the ban is enforced by peer pressure among legislators.

[13] See Doyle (2011a).

[14] Earmarking has been practiced by both the legislative and executive branches, thus the earmark reform can be seen as a shift in the balance of power towards the executive branch.

[15] See (CAGW, 2012).

[16] Lettermarking operates in much the same spirit as earmarking; it is a threat to the agencies to fund particular projects by a legislator. Since earmarks were generally not written into law but in the accompanying appropriations conference reports, they were technically not legally binding, but threats to agencies who would deny the at risk of having their budgets cut the following fiscal year. See: Dawson and Kleiner (2015).

II.B. Data

In order to test the saliency of the earmark ban, I use data on federal project (competitive) grants to state and local governments over the years 2000 to 2014. I exclude grant types other than project grants, such as formula grants, since these are generally not earmarked. The website USAspending.gov is a clearinghouse that records the transfer of grants, contracts, and other assistance between the Federal government and recipients as categorized by type, including for profit, non profit, and governmental.

I focus on state and local governments because they can be located to a particular geographic area. Including nonprofit and for profit firms would be misleading as they are often headquartered in different areas than where their operations are carried out. The data also have a flag for whether the grant was part of the American Recovery and Reinvestment Act (ARRA) of 2009. I exclude project grant amounts that are labeled as being part of the ARRA since these amounts were spent only right before the ban, not after. My concern is that my results might be biased from the mechanical effect of the ARRA stimulus taking place only during the pre-period. Furthermore, as tables 1 and 2 show, the ARRA included a significant number of earmarks.[17] The decrease in funding from ARRA earmarks following 2011 would thus be due to the one-time nature of the stimulus, not the ban.

I use data on earmarked grants for 2009 from the Office of Management and Budget's earmark database. These data are available for a number of years (2005, 2008-2010), but recipient geographic information is available only for years prior to 2010. The OMB data are advantageous over nonprofit groups' earmark databases since they relied on agency reports regarding the location of the actual recipients of the funds, as opposed to relying on project descriptions in bill texts. As shown in figure 1, the OMB and CAGW earmark definitions vary. An additional advantage of the OMB data is that they rely on a more stringent standard than the CAGW.[18] A shortfall of the OMB data is that the database was never updated to reflect the recipient information for fiscal year 2010 earmarks, which forces me to use the 2009 data. Also, while the OMB

[17] I have identified these "suspected" earmarks as funded by the ARRA by looking for district-agency observations where there were earmarks and the only funding was from the ARRA. This is somewhat surprising due to the fact that the Obama Administration proclaimed the ARRA to be free of earmarks (Obama, 2009). To my knowledge, I am the first to document this number of suspected ARRA earmarks.

[18] The CAGW definition is requires that a request be categorized as an earmark if it is "Requested by only one chamber of Congress; Not specifically authorized; Not competitively awarded; Not requested by the President; Greatly exceeds the President's budget request or the previous year's funding; Not the subject of congressional hearings; or Serves only a local or special interest." (CAGW, 2012). The OMB defines an earmark as: "funds provided by the Congress for projects, programs, or grants where the purported congressional direction (whether in statutory text, report language, or other communication) circumvents otherwise applicable merit-based or competitive allocation processes, or specifies the location or recipient, or otherwise curtails the ability of the executive branch to manage its statutory and constitutional responsibilities pertaining to the funds allocation process."(OMB, 2009). For a thorough description of various datasets on earmarks, see: Doyle (2011a).

earmark data provides the agency, bureau, and account information for each earmark, along with a short description, it does not provide the specific grant program that the earmark came from. Unless the account title happens to be similar enough to the program title, such as the DOT FTA "Capital Investment Grants" program, then there is no systematic way to determine the earmarked program. However, virtually all earmarked grants are for competitive grant programs, since formula grant programs generally do not deviate from the formulas prescribed in the authorization bill.[19] For this reason, I match the earmarked grants with competitive grants only from the USAspending.gov data.

I match federal grants and earmarks together by the listed recipient's city, and then match them to congressional districts. Approximately a third of earmarks in the data for local governments were either not funded in 2009 or were never funded, and therefore cannot be matched.[20] Where cities were split between more than one district, I weighted the grants and earmarks by population and split them into the different districts.[21]

The 2009 Omnibus Appropriations Act was not signed into law until March 11th, 2009. It passed the house with a 57 percent majority, split largely along party lines. Just over 51 percent of Democratic-represented districts received earmarks, while less than 34 percent of Republican represented districts received earmarks, reflecting the difference in majority party advantage. Splitting the data in terms of membership on the HAC, just over 41 percent of non-HAC districts received earmarks, while just over 51 percent of HAC represented districts received earmarks. This portrays the HAC as not having much power relative to being a member of the majority party. However, when the data are disaggregated to district-agency observations, more distinct differences emerge.

For the House (State) analysis, I disaggregate data into district-agency (state-agency) observations. I use the top 16 agencies in terms of funding to local (state) governments in the year 2009 which captures over 90 percent of the grants to local (state) governments. I then match each subcommittee of the HAC (SAC) with the agencies under its jurisdiction and split each district (state) observation into district-agency (state-agency) observations. I then compute the percentage of each district or state-agency funding amount

[19] For examples of this, see: Kirk et al. (2011).

[20] This number is not surprising considering that earmarks often override agency preferences. An example of this is the recently released data on unobligated earmarks for transportation funding to states (AASHTO, 2016).

[21] This approach differs from that of Berry et al. (2010) and Alexander et al. (2016), who rely on the congressional district listed in the data to match federal grants to districts. Since the congressional district codes are generated by zip codes, relying on the provided congressional district is inappropriate given that the recipient may spill over into multiple congressional districts. See the data description below for more information.

that was earmarked in 2009.[22]

Tables 3 and 4 display summary statistics for the congressional district and state-agency observations respectively. Districts with earmarks tended to receive more federal grants, be slightly larger in population, have higher unemployment rates and poverty rates, in addition to slightly higher levels of personal income. The average percent of federal grants from earmarks for those that received earmarks was over 30 percent, a significant amount. In terms of the congressional variables, it is not surprising to see that districts that received earmarks also had longer tenured Democrats in both the House and the Senate, and were twice as likely to have membership on the relevant HAC subcommittee. Just under 10 percent of district-agency observations received earmarks, however most districts (371) received at least 1 earmark from some agency. This implies a large coalition, and the possibility of vote buying, where members of the HAC give earmarks to non-members in exchange for support (Alexander et al. (2016)).[24]

For the state-agency data, the differences are less distinct due to the higher level of aggregation. The earmark group contained larger states in terms of population, income per capita, and gross state product (GSP), in addition to higher unemployment rates and lower poverty rates. The average state-agency that received earmarks received just over 23 percent of grants from earmarks, significantly less than congressional district earmark recipients. There are similar differences for the congressional variables as with the House, where the earmark receiving states were more likely to have longer tenured Democrats than Republicans, reflecting the Democrat majority in the Senate for 2007-2014. The SAC subcommittee varies by a lesser amount between the no earmark and earmark groups than the HAC subcommittee variable did for the congressional district data.

It is important to note that earmarks were reallocations, not extra amounts of funds. The process of earmarking was controlled entirely by members of the HAC and SAC, who must must abide by the 302(a) allocations that result from the spending caps set in place by each year's congressional budget resolution. Instead of simply increasing the amount of funding to programs they favor, they had to reallocate funds. Thus, when appropriators earmarked funds in competitive grant programs, they were effectively re-ordering agency priorities. To the extent that earmarks actually did conflict with agency priorities,[25] an agency would

[22]For the local government data approximately 13 percent of the positive earmarked observations were in excess of 100 percent. I attribute this to either the earmark not being funded, or the earmark being funded.[23] Only 1 earmark at the state level was greater than 100 percent of the federal grants for that observation. I drop the district-agency and state-agency observations that have percentages earmarked greater than 100 percent.

[24]Knight (2005) uses a similar interpretation of districts receiving earmarked transportation projects vs. those receiving none.

[25]The inspector general's office studied earmarks in 2006 for the DOT. Among various findings they determined that 9 out of the 10 earmarked projects in the FAA would not have been funded without the earmark, and therefore added to the backlog of projects

have been limited in its ability to prioritize funding in line with grant program objectives.

Despite the fact that in 2009, earmarks were only 1.5 and 5.6 percent of the total amount of non-ARRA project (competitive) grants awarded to local and state governments respectively, there is significant variation in the concentration of earmarks across agencies. Table 1 shows that the average district-agency observation received 2.9 percent of its grants from earmarks when averaging across agencies, and that those earmarks were spread across less than 10 percent of all districts for the average agency. Given the overall averages, earmarking in most agencies was not widespread. However, this average masks wide variation when examining the data agency by agency.

The Department of Justice's grants to local governments were earmarked on average 40 percent for the average district, and over half of districts received earmarks by that agency. In contrast, earmarks in HUD and DOT programs were also highly spread around, with nearly 1 in 4 districts receiving an earmark from them, but they represented smaller proportions of the total grants to each district; on average around 2 percent each. Earmarks in the Department of Commerce went to only 4 districts, and were on average only .2 percent of the DOC's funding to each district. However, as table 1 shows, most districts got at least some earmarks from some agencies.

Table 1 also shows the share of grants that were part of the ARRA and the number of earmarks that appeared to be part of the ARRA. The majority of DHS earmarks appeared to be from the ARRA, the majority of which were administered by the Federal Emergency Management Agency (FEMA) to local governments for port and transit security, and for fire station construction. Including these earmarks in the analysis will bias the results towards the ban having an effect, as virtually all of the ARRA funding had been obligated by the end of FY2010.

Table 2 displays the agency breakdown for the state data. The average agency had earmarks for grants to state governments in over 14 percent of states, which was mainly driven by the fact that the DOJ earmarks at the state level were spread among 32 states. Not surprisingly, the DOT had the highest average for the percent of grants earmarked at 45.6 percent, spread among 29 states. Both tables 1 and 2 reveal that although in aggregate most states and most districts got at least 1 earmark from some agency, breaking out the data by agency reveals significant variation in the distribution of earmarks.

Several important changes took place from the 111th to 112th Congresses that may influence the analysis. The first was that the majority party in the House switched to Republican. This shifted power to

waiting to be funded. See: Office of the Inspector General (2007).

Republican representatives in the House. Controlling for party affiliation of House Representatives will be important. The second is that there was a major reauthorization bill (MAP-21) which reauthorized grant programs for the DOT. This act distributed more funds through formula programs and fewer funds through competitive grant programs (Kirk et al., 2012). I will control for the passage of MAP-21 with DOT-year interacted dummy variables to ensure that I am not capturing mechanical changes from the new authorization legislation. Lastly, as mentioned above, the American Recovery and Reinvestment Act (ARRA) had allocated most of its funding by the end of 2010.[26] This act funded approximately 13 percent of competitive grants to local governments in 2009. A concern would be that this would lead to a mechanical drop in funding that would bias the effect of the ban, showing an artificial effect around year 2011. I have excluded ARRA grants and suspected ARRA earmarks from the analysis.

A relevant question then is to ask whether correlations between earmarks and legislator characteristics, which the existing literature has demonstrated, have resulted in a skewed distribution of federal grants that favors one demographic group over another. Table 5 indicates that there are statistically significant differences in the share of grants earmarked across demographic groups. Most notably, the top 5 percent wealthiest districts in terms of the share of Federal grants earmarked is much larger for the wealthiest 5 percent of districts, even though their differences in grants per capita are not statistically significant. This indicates that the earmark ban, if it is binding, will impact the richest districts and aid, in a relative sense, poor districts.

III. Legislative Bargaining Model With Institutional Constraints

The Baron and Ferejohn (1989) model forms the foundation for many empirical and theoretical studies (Knight, 2005), (Knight, 2008), (Albouy, 2013). The simplest version of the model assumes a closed rule legislative process over a finite horizon where a legislature of N >3 legislators each representing districts indexed by d, bargain in a 2-period game. Each period, a randomly selected proposer (probability 1/N) must propose a distribution of the budget ($g_1, g_2, ..g_N$), and a simple majority is required to pass the distribution. If the proposer's proposal is rejected, then the game advances to the second period where another proposer is chosen, and the budgetary shares are discounted by $\delta \in [0, 1]$. If the second distribution proposal fails to pass, all members receive $g_d^L = 0$. In this simplest case of the Baron and Ferejohn (1989) model, the

[26] See figure 2 for the changes in funding amounts over time.

equilibrium predicts that the proposer will be able to take a larger share of the budget (normalized to 1) for their own districts than their peers by offering a minimal amount of the budget ($\frac{\delta}{N}$) to exactly half of the remaining members of the legislature- the "coalition" of $\frac{N-1}{2}$ members, and taking the rest for themselves. This leaves the "non-coalition" with zero.

I propose a model where N legislators compete in a similarly conceived 2-stage, non-cooperative game, with several important additions. First, I add a parameter ($\alpha \in [1, \alpha^*]$) to model a change in institutional restraints that limits the size of the budget that the proposer may allocate. This restricts the budget that the proposer may allocate to a fraction of the total budget ($1/\alpha$). This implies an altered equilibrium so that:

$$g_p^L = \frac{1}{\alpha}\left[1 - \frac{\delta}{N}\left(\frac{N-1}{2}\right)\right] \tag{1}$$

$$g_c^L = \frac{\delta}{\alpha N} \tag{2}$$

$$g_{-c}^L = 1 - g_p^L - g_c^L\left(\frac{N-1}{2}\right) = 1 - \frac{1}{\alpha} \tag{3}$$

Where g_p^L is the proposer's share, g_c^L is the coalition's share, and g_{-c}^L is the non-coalition's share. Notice that the proposer's share is decreasing in α, as is the coalition's share, while the non-coalition's share is increasing in α. This result implies that some districts will see increases in funding while others will see decreases in funding as a result of a change in the institutional restrictions on the size of the budget that the proposer may allocate.

In order to capture the fact that utility maximizing (vote maximizing) legislators care not only about the share of the budget they bring to their home districts (as is generally assumed), but also about "non-budget" resources such as ideological positions, I define legislator utility to be Cobb-Douglas such that:

$$U_L(g_d^L, s_d^L, t) = \delta^t (g_d^L)^{1-\gamma_d} (s_d^L)^{\gamma_d} \tag{4}$$

Where s_d^L is the level of "non-budget" resources for the legislator in district d. $\gamma_d \in [0, 1]$ is exogenously given and represents voter sentiment in districts d regarding budget vs. non-budget resources. An increase in γ_d leads to an increase in the marginal utility of non-budget resources and a decrease in the marginal utility of budget resources, as it can be shown that $\frac{\partial^2 U_L}{\partial s_d^L \partial \gamma_d} > 0$ and $\frac{\partial^2 U_L}{\partial g_d^L \partial \gamma_d} < 0$. This implies that for an exogenous increase in γ_d, legislators will value additional units of non-budgetary resources more relative to additional units of budgetary resources. The result of this in terms of the distribution of federal funds can be seen by

assuming that the shift in γ_d translates into a possible shift of the institutional parameter, α, if it shifts in enough districts. Specifically, I assume that α is determined in the following way:

$$\alpha(\gamma_d) = 1 \qquad if: \frac{1}{N}\sum_{d=1}^{N}\gamma_d < \frac{1}{N}\sum_{d=1}^{N}(1-\gamma_d) \tag{5}$$

$$\alpha(\gamma_d) > 1 \qquad if: \frac{1}{N}\sum_{d=1}^{N}\gamma_d > \frac{1}{N}\sum_{d=1}^{N}(1-\gamma_d) \tag{6}$$

$$\alpha(\gamma_d) = \alpha^* \qquad if: \frac{1}{N}\sum_{d=1}^{N}\gamma_d = 1 \tag{7}$$

This models a vote over institutional changes, and assumes that a simple majority must hold for a change in institutions.[27] Note that if γ_d =1, then α must equal 1, and the result becomes identical to the Baron and Ferejohn (1989) equilibrium where the proposer gets all of the budget except for what he must give to the coalition, and the non-coalition gets nothing. In 2011, all but 3 members of the House voted to ban earmarks. This would imply an α close to α^*,[28] the point at which every district receives $1/N$, or perfect equality. I assume that any amount in excess of 1/N that a district receives is an earmark.

Assuming that agencie's priorities are such that g_d = 1/N for all districts, the implication is that a shift in γ_d leads to an allocation of government grants that more closely matches agency priorities. This takes place through an exogenous shift in constituent preferences (γ_d) that incentivizes legislators to impose an institutional constraint on themselves (α), thus altering the geographic distribution of federal grants to be in line with agency priorities.

IV. Empirical Analysis

In order to investigate the impact of the earmark ban, I take advantage of wide geographic variation in the extent of earmarking across districts, states, and agencies, as measured by the percent of federal grants earmarked in the 2009 Omnibus Appropriations Act.

The strength of the House analysis is that it allows me to capture the cross sectional variation that occurs due to earmarking by members of the U.S. House of Representatives.[29] The State analysis allows me to

[27] I assume that a legislator "votes" the value of his district's γ_d.

[28] α^* is a cubic function, monotonically increasing in δ, and can be approximated numerically, but analytical solutions give complex roots.

[29] Among earmarks to local governments, 75 percent had at least 1 House member as a sponsor, while just over 60 percent had at least 1 Senate member as a sponsor.

capture longitudinal variation that the House analysis cannot, due to redistricting changes that took effect in 2013. For the House analysis, the grants and earmarks analyzed are for local goverment recipients, while for the state analysis, they are for state governments only, excluding state-controlled institutions of higher education.[30]

The percent of grants earmarked is not randomly distributed across districts and states, but is correlated with both measurable variables (congressional variables such as party, tenure, committee appointments) and is the result of unmeasurable variables (logrolling, vote buying, local conditions). Due to the reforms that lead up to the 2011 ban, a shift may have occurred earlier than 2011. Interacting my treatment variable ($\%earmarked$) with year dummies allows me to observe changes in any year. I thus look for a change in the pre-2011 ban trend in the relative grant levels between earmarked districts and non-earmarked districts. The identifying assumption is that without the ban, *trends* in relative grant levels would have continued unchanged.[31] The year-interacted trend approach is preferable to a simple differences-in-differences approach because it allows me to avoid making any ex ante assumptions about when a change might occur. For example, the reforms before the ban might have had more of an impact than the actual ban, and the actual ban may have only been a superficial change itself. By looking for a change in the trend around the 2011 earmark ban, I am looking for any reversal in an existing time-varying relationship. A simple differences-in-differences analysis would most likely only capture the tendency for earmarked districts to change in grants more than non-earmarked districts.

Due to the fact that the practice of earmarking did not add to the overall budget deficit as is commonly believed (Crespin et al., 2009), but in actuality redirected funds away from agency priorities (Office of the Inspector General, 2007), (Savage, 2009), (Kirk et al., 2011), I also test for the consequences of the ban on the distribution of Federal grants to various demographic groups. To date, no research has examined the distribution of earmarks with respect to demographic groups. While I am not able to observe differences between legislator and agency priorities, I hypothesize that because intergovernmental competitive grant programs are generally intended to redistribute funds across geographic areas in ways that are correlated with demographic characteristics,[32] there should be inequalities in the allocation of funds that result from

[30] I exclude public higher education because these recipients are located in single congressional districts, and thus would be more likely to be funded by members of the House.

[31] This is analogous to the approach taken by Finkelstein (2007) and Finkelstein and McKnight (2008), who estimate the impact of the introduction of Medicare on various health outcomes using pre-existing geographic variation in elderly insurance rates.

[32] At least part of the objectives of many competitive grant programs is some form of "economic development" or "geographic equality."

earmarking and, conditional on being effective, the ban should therefore disproportionately impact demographic groups. In other words, I expect that earmarks were distributed inefficiently from a social welfare maximizing perspective due to the "common-pool" problem of legislators funding local projects with federal grants.[33] I hypothesize that if the trend continues from before the ban to after, then the ban had no effect. If the trend becomes statistically insignificant, then the ban had a full effect (or if the trend is in the same direction, but lessens, then the ban had a partial effect). A reversal in the trend will imply that there was an opportunity cost, i.e. that the districts that received earmarks were not only not ones that the agencies would have funded, but that they also received funding meant for other districts.

House Analysis

I estimate the following equation to test for the impact of the earmark ban on Federal grant receipts by local governments:

$$\begin{aligned}\ln(grants)_{adt} = \alpha_{ad} \times 1(district_d \times agency_a) + \delta_t \times 1(year_t) \\ + \sum_{t=2003}^{2012} \lambda_t \%earmarked_{ad} \times 1(Year_t) \\ + \sum_{t=2003}^{2012} \rho_{dt} 1(DOJ) \times 1(Year_t) + X_{adt}\beta + \epsilon_{adt} \end{aligned} \tag{8}$$

The dependent variable is the log of total Federal grants to local governments by agency a, in district d, and year t. I use the log of Federal grants as opposed to the level, since using the level would constrain the effect on grants to be the same within each year. This would not be appropriate considering the large variation in grant amounts across districts. The district-agency effects ($1(district_d \times agency_a)$) control for the cross-sectional differences in grants to districts by agencies.[34] The year effects ($1(year_t)$) capture the variation in large, national changes in grants. I am limited to the 2003-2012 period due to congressional redistricting that took effect in 2003 and 2013.

The coefficients of interest are the λ_t's which measure the interaction of the year effects with $\%earmarked_{ad}$.

[33] Knight (2004) measures the welfare loss associated with the incentive for legislators to use federal grants (revenue) to fund local projects. He finds over provision of public goods in districts with politically power legislators, and under-provision of public goods in districts outside the coalition.

[34] The fixed effects are important in controlling for time-invariant differences such as the fact that virtually all transit grants go to urban areas, and that particular programs are targeted to particular socioeconomic groups.

Their trend shows the time-varying differences in grants between districts where the ban had more of an effect versus areas where it had less of an effect. If the ban had no impact, then the trend in the λ_t's should be the same before and after 2011. Due to the reforms of 2008 and 2009, it is highly possible that breaks may occur in other years. Estimating the impact of the ban by restricting the pre and post period would not allow the data to reveal if prior reforms caused breaks instead of the ban.

I also include in the analysis X_{adt}, a vector of legislator attributes including tenure-party interactions for both the House and the Senate, and whether the district is in a state with a senator on the Senate Appropriations Committee (SAC). These variables are lagged one period to reflect the difference between calendar and federal government fiscal years.[35] [36]

I also include year dummy-agency interactions for the Department of Justice ($\sum_{t=2003}^{2012} \rho_{dt} 1(DOJ) \times 1(Year_t)$). As table 1 shows, the DOJ is an outlier in terms of earmark distribution. Estimations of equation 8 without the DOJ yield similar coefficients as they do with including the DOJ, except that the λ_t for 2007 is negative instead of zero. The reason for this is because despite the 2007 earmark moratorium, some earmarks from FY2006 were funded again in FY2007.[37] An Office of Justice Programs data search shows $21.8 million in earmarks for FY2007, over $4 million of which were carry overs from FY2006.[38] [39] Thus, since the DOJ is the most heavily earmarked agency in my data, I control for the disproportionate impact it has on the coefficients by including a set of year×DOJ dummies. The only thing that changes is the coefficient for the treatment interacted with year 2007.

The results are displayed in figure 3. Table 6 displays results for equations 8 and 11 (discussed below) estimated by OLS, along with the computed values for the changes in trends.

The trend appears to have been reversed in 2009, not in 2011, suggesting that it was the 2009 transparency reform, not the 2011 earmark ban that influenced the relative distribution of Federal grants between the earmarked and non-earmarked districts. Prior to 2009, funding levels in earmarked districts relative to non-earmarked districts were increasing, and then after 2009 this trend reverses. Again, based on figure 3,

[35] Berry et al. (2010) and Alexander et al. (2016) follow a similar approach for their analysis of the impact of legislative variables on Federal grants.

[36] Albouy (2013) shows that states with Republican representation receive more in defense and transportation spending, while those represented by Democrats receive more in education and urban development.

[37] (Sec. 112) "Declares that any language specifying an earmark in a committee report or statement of managers accompanying an appropriations Act for FY2006 shall have no legal effect with respect to funds appropriated by this Continuing Resolution" (Congress, 2007). Evidently, this did not prevent all earmarks, even those in FY2007 appropriations bills enacted after the earmark moratorium.

[38] See: Department of Justice Programs (2007).

[39] I have also experimented with including year×agency sets of dummy variables for each agency individually, and the only agency that makes a difference is DOJ.

a simple differences-in-differences approach would have found that there was a strong negative impact that the ban had on earmarks. This is easy to see in the graph in that by defining the pre-period to be 2009-2010 and the post period to be 2011-2012, for example, I would have found that the ban had a strong negative impact equal to the average of λ_{2009} and λ_{2010} − the average of λ_{2011} and λ_{2012}. My analysis reveals that it was the reforms in 2009 that had an impact, not the ban.

I also perform statistical tests to corroborate visual impressions from the graphs. Formally, I test whether the change before 2011 is equal to the change after in the coefficients (λ_t's) is statistically significant from zero:

$$\Delta_{1,2011} = (\lambda_{2012} - \lambda_{2011}) - (\lambda_{2011} - \lambda_{2010})) \tag{9}$$

The test fails to reject the null hypothesis that the 1 year change in λ_t before and after the ban is statistically significant from zero.

Of more interest, in light of the findings, are statistical tests of the change in trend around the 2009 reforms. I test the 2 year impact of the 2009 reforms in an analogous way as equation 9:

$$\Delta_{2,2009} = (\lambda_{2011} - \lambda_{2009}) - (\lambda_{2009} - \lambda_{2007})) \tag{10}$$

This change was -0.085 with a p-value of 0.000 for the 2009 transparency reform. This reform was a committee led reform in both the House and the Senate appropriations committees. Both chambers' committees required that members post earmark requests on their websites, although the execution of this in practice was spotty (Doyle, 2011a). It is not likely that the increase in transparency requirements is what was responsible for the decline, since the purpose of earmarks, in part, was for them to be noticed publicly, at least by constituents. However, the HAC instituted an additional reform. They required that agencies have 20 days to review each earmark request and "check that the proposed earmark is eligible for funding and meets goals established in law."[40] It is possible that it was this reform that changed the trend in the coefficients. Regardless, the downward trend existed prior to the 2011 ban, and so I conclude that for the House, the earmark ban had no effect on the distribution of grants to local governments.

If members of the HAC were able to subvert the earmark ban somehow due to their power over agency appropriations, then the impact of the ban may differ for them. I interact dummies for district-agency ob-

[40]See: Congress, House, Committee on Appropriations, Press Release: Pelosi, Hoyer, and Obey Announce Further Earmark Reforms, March 11, 2009.

servations having a representative on the agency-relevant HAC subcommittee with year dummies, and then add an interaction term with the $\%earmarked_{ad}$ variable. Since I am using the lag of HAC subcommittee membership, I lose 2003 due to differences in congressional district boundaries before and after 2003. This specification is:

$$\begin{aligned}\ln(grants)_{adt} = \alpha_{ad} \times 1(district_d \times agency_a) + \delta_t \times 1(year_t) \\ + \sum_{t=2004}^{2012} \lambda_t \%earmarked_{ad} \times 1(Year_t) + \sum_{t=2004}^{2012} \gamma_t \times HACsubcom \times 1(Year_t) \\ + \sum_{t=2004}^{2012} \psi_t \%earmarked_{ad} \times HACsubcom \times 1(Year_t) \\ + \sum_{t=2004}^{2012} \rho_{dt} 1(DOJ) \times 1(Year_t) + X_{adt}\beta + \epsilon_{adt} \end{aligned} \tag{11}$$

Figure 4 shows that the HAC subcommittee group does not differ from the average overall. This is not surprising, considering that the chairmen of the HAC and SAC led the reforms before the earmark ban in 2011.

The results are virtually unchanged without the inclusion of the control variables (lags of SAC and party-tenure interactions for both the House and the Senate). An F-test for joint significance indicates that these variables are jointly significantly different from zero. The coefficient on the lagged dummy for SAC representation is barely significant at the 90 percent level, and negative, most likely the result of lack of variation in the SAC variable over time. The Senate tenure variable for Democrats is also significant at the 90 percent level, and positive, while the House tenure variable for Republicans is significant and positive at the 95 percent level.

Senate Analysis

Aggregating to the state-agency level allows me to look farther beyond the earmark ban for an impact. I estimate a similar specification as before:

$$\begin{aligned}\ln(grants)_{ast} = \alpha_{as} \times 1(district_s \times agency_a) + \delta_1 t \times 1(year_t) \\ + \sum_{t=2000}^{2014} \lambda_t \%earmarked_{as} \times 1(Year_t) \\ + \sum_{t=2000}^{2014} \rho_t 1(DOT) \times 1(Year_t) + X_{ast}\beta + \epsilon_{ast} \end{aligned} \tag{12}$$

The dependent variable is the log of total Federal grants to state governments by agency a, in state s, and year t. I include state-agency effects ($1(state_s \times agency_a)$) and year effects ($1(year_t)$), in addition to a vector of control variables ($X_{ast}\beta$) containing the tenure-party interactions for the senate, tenure-party interactions for the average House members within each state, and the percent of a state's representatives in the House on the HAC. I also include state level measures of state GSP, population, the unemployment rate, the poverty rate, and personal income per capita. I include similar year-agency interaction variables as with the House analysis, except for the Department of Transportation. This is to control for the impact of MAP-21, an authorization bill that shifted funding away from competitive grant programs and towards formula grant programs for FY2013-FY2014 (Kirk et al., 2012). As expected, the coefficients for the 2013 and 2014 DOT interactions (ρ_{2013} and ρ_{2014}) are negative and statistically significant at the 90 percent and 99 percent levels respectively.

I estimate equation 12 by OLS. Results are displayed in figure 5 and table 7. These results suggest that the earmark ban did have an impact. From 2008, after the 2007 earmark moratorium, to 2011, funding in earmarked districts was growing at a faster rate than funding in non-earmarked districts, but after 2011 this trend reversed. I test for differences in the 2 year and 3 year changes around the 2011 earmark ban. The two year change is -0.033 with a p-value of 0.005 , while the three year change for the 2011 earmark ban is -0.035 with a p-value of 0.005 . These results suggest that the earmark ban did have an effect on federal grants to state governments. For a 1 percentage point increase in $\%earmarked_{as}$, Federal grants fell by 3.4 percent over a 2 year window, or 3.6 percent over a 3 year window. Because of different reference points,

these numbers are not directly comparable. In order to compare them, the calculation must be:

$$\Delta_{2,3,2011} = (\lambda_{2014} - \lambda_{2011}) - (\lambda_{2011} - \lambda_{2009})) \tag{13}$$

Which yields a change of slightly less: -0.028 with a p-value of 0.001 . Regardless, these results indicate an overcorrection, which suggests that agencies may have allocated funds away from previously earmarked states.

I also include an interacted term for the SAC subcommittee. The coefficients for the interaction terms are plotted in figure 6. As with the HAC subcommittee interactions, the statistics are not significantly different from zero, with the exception of the coefficient for year 2013. Regardless, there is no trend to the data, and so I conclude that members of the SAC subcommittee did not evade the earmark ban.

Distributional Effects of the Earmark Reforms

The geographic distribution of Federal grants can largely be interpreted as an unintended consequence of the political process; i.e. the primary purpose of earmarking is not to favor one demographic group over the other as it is actually used to favor one legislator over another, ceterus paribus. These differences can be attributed largely as an unintended consequence of the vote maximizing politician. I tested interaction terms for all of the demographic groups with the earmark ban in an analogous way to testing for the HAC subcommittee effect. Finding no statistically significant differences between the interacted effect and zero, I can thus use the estimated 2 year change resulting from the 2009 earmark reform to calculate the average relative changes in local government grants to various demographic groups.

Table 5 displays the means across demographic groups split into the 95^{th} and 5^{th} percentiles for each group. The district level analysis makes this possible, providing extensive cross-sectional variation in earmarks and federal grants. T-tests for the equivalence of means show statistically significant differences in the means of the share of grants from earmarks ("Earmarked (%)") only for the income per capita group. The top 5 percent of districts in terms of income per capita received 1.79 percentage points more in earmarks as a share of total grants than the bottom 5 percent.

Having found that the earmark transparency reform had a strong, -0.085 percent change on federal grants for each 1 percent increase in federal grants earmarked to local governments from the House analysis, I can apply this result to demographic differences displayed in table 5. Given that the top 5 percent

wealthiest districts in terms of income per capita received an additional 1.79 percentage points in earmarks as a share of federal grants over the poorest 5 percent of districts, and given that this difference is statistically significant from zero at the 95 percent level, I can apply the result from the House analysis to answer the question: "who was hurt relatively more by the earmark reform of 2009?" The results indicate that the earmark reform led to the top 5 percent wealthiest districts losing 14.4 percent ($\sim$ exp(-0.085 $\times$ 1.83) -1)) in federal grants to local governments, relative to the bottom 5 percent per capita income group. Given that average grants to local governments in the top 5 percent wealthiest districts was $418 million in 2009, this suggests an average relative loss of $60 million per district over the 2007-2011 period.

This implies that earmarking benefited the rich relative to the poor, which makes sense considering that rich districts are more likely to have wealthy donors who may be willing to trade campaign contributions for specific projects.[41] [42]This points to the earmarking system having the side effect of distorting the Federal Government's distributional goals in increasing an equal distribution of federal funds, which is the underlying motivation for federal grants to local governments. Thus, I conclude that while the earmark ban had no impact on the distribution of Federal grants to local governments, the 2009 earmark reform helped to increase equality in the distribution of federal grants, on net.

The $60 million per district relative loss for rich districts, implies that poor districts received more funding as a result of the transparency reform in 2009. This implies that agencies were reallocating funds to districts that did not receive them before the reform.

V. Conclusion

I have found evidence that the earmark ban of 2011 did, in fact, "bite" for legislators in the Senate in terms of reduced federal grants to state governments. For legislators in the House, the earmark reform of 2009 had a large impact, but I have found no evidence that the 2011 ban had any impact. This is possibly the result of an additional restriction placed on House legislators by the OMB that required them to give agencies 20 days to review earmark requests and ensure that they conformed to law. Given that earmarks typically redistributed agency appropriations as opposed to adding to them, it should not be surprising that the effects that I find are larger than 1 to 1. Earmarking represented an opportunity cost to agencies that, once the reform of 2009 and the ban of 2011 had taken place, allowed them to correct. This correction

[41] Alexander et al. (2016) shows that voters closer to the "middle" in terms of ideology engage in more vote buying.
[42] Rich districts may also be more likely to be able to afford to hire lobbyists.

resulted in a narrowing of the gap between the rich and poor districts in terms of intergovernmental grants. Thus, without intending to, members of the House and Senate, in reforming and banning earmarks, allowed for a more equal distribution of Federal funds.

For members of the House Rules Committee debating a reversal of the earmark ban today, a consideration of the interaction between agencies and legislators should be given thought.

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Figures and Tables

Figure 1: Historical Trend in Earmarks According to CAGW

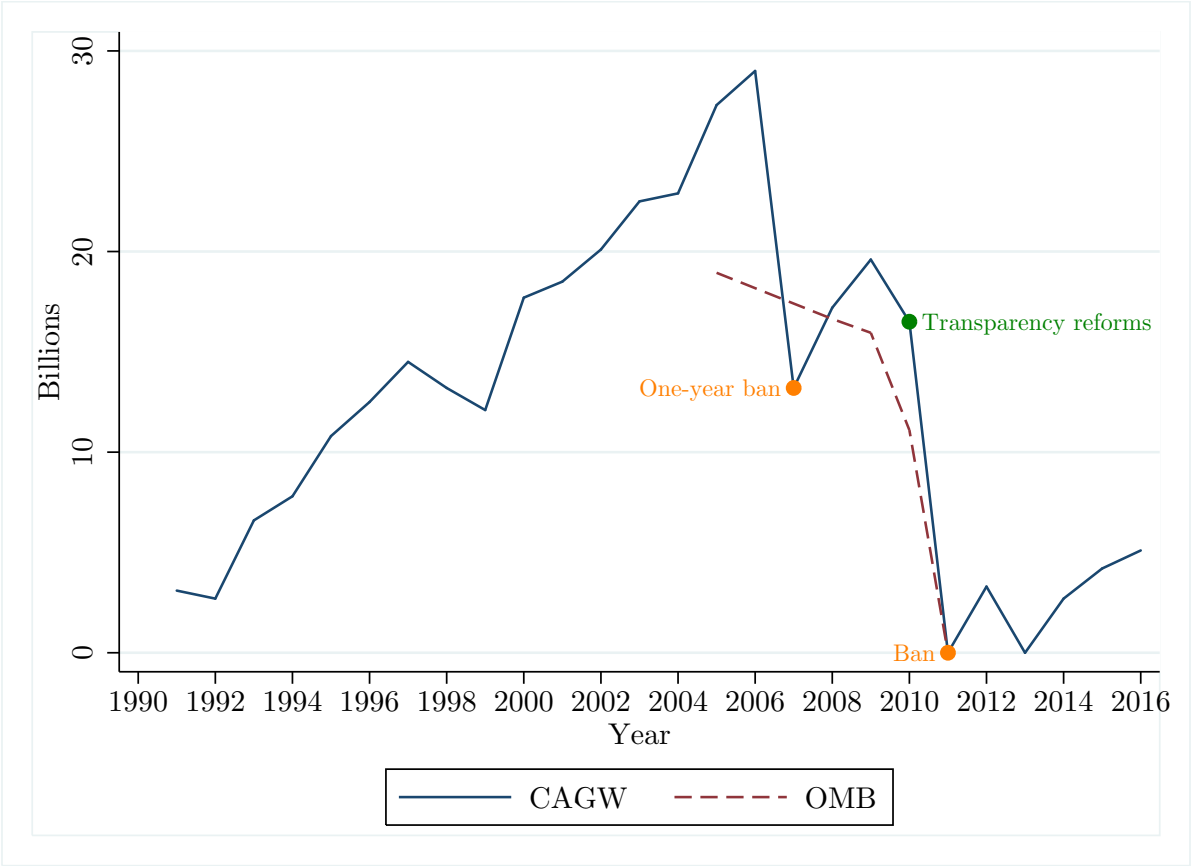

Figure 2: Federal Project Grants to Local Governments: The Impact of ARRA

Table 1: Federal Grants to Local Governments Earmarked by Agency, Fiscal Year 2009

6,804 Congressional District-Agency Observations

	Non-ARRA		ARRA	
	Earmarked (%)	Earmarked districts (total)	Earmarked (%)	Earmarked districts (total)
NEH	0.0	0	0.0	0
	(0.0)		(0.0)	
CNCS	0.0	0	1.3	0
	(0.0)		(8.3)	
NEA	0.0	0	0.0	0
	(0.0)		(0.0)	
DOL	0.0	0	1.5	0
	(0.0)		(11.7)	
NSF	0.0	0	4.0	0
	(0.0)		(16.3)	
DHS	0.2	6	39.1	22
	(1.6)		(45.1)	
DOD	0.2	1	0.0	0
	(4.5)		(0.0)	
DOC	0.2	4	7.4	0
	(3.6)		(23.9)	
ED	0.2	42	0.0	0
	(1.4)		(0.0)	
HHS	0.9	50	5.6	0
	(6.3)		(11.4)	
DOE	2.2	15	91.1	19
	(12.4)		(26.0)	
HUD	1.5	115	0.0	0
	(6.2)		(0.0)	
DOA	1.8	17	19.2	0
	(12.2)		(30.0)	
DOT	2.5	112	0.0	0
	(7.8)		(0.0)	
EPA	3.1	35	7.5	0
	(13.6)		(21.8)	
DOJ	40.0	264	63.9	3
	(37.0)		(31.9)	
Overall average	2.9	41.3	15.0	2.8

Note: Sample means for percent earmarked, districts earmarked are counts. Standard deviations in parentheses.

Table 2: Federal Grants to State Governments Earmarked by Agency, Fiscal Year 2009

761 State-Agency Observations

	Non-ARRA		ARRA	
	Earmarked (%)	Earmarked states (total)	Earmarked (%)	Earmarked states (total)
NEA	0.0	0	0.0	0
	(0.0)		(0.0)	
DOE	0.0	0	82.3	30
	(0.0)		(31.5)	
DOL	0.0	0	12.5	0
	(0.0)		(15.0)	
NARA	0.0	0	0.0	0
	(0.0)		(0.0)	
CNCS	0.0	0	26.6	0
	(0.0)		(17.4)	
DOD	0.0	0	0.0	0
	(0.0)		(0.0)	
HUD	0.0	0	0.0	0
	(0.0)		(0.0)	
EPA	0.1	1	100.0	9
	(1.0)		(0.0)	
HHS	0.2	4	2.4	0
	(0.6)		(4.8)	
DOI	0.5	6	0.3	0
	(1.5)		(2.0)	
DHS	1.4	5	1.3	0
	(5.9)		(3.4)	
ED	1.7	5	0.0	0
	(8.0)		(0.0)	
DOJ	5.5	32	95.9	31
	(8.2)		(9.3)	
DOC	9.1	12	2.8	0
	(23.6)		(15.1)	
DOA	9.8	21	30.2	3
	(17.7)		(29.5)	
DOT	45.6	29	0.0	0
	(29.1)		(0.0)	
Overall average	3.5	7.2	22.1	4.6

Note: Sample means for percent earmarked, states earmarked are counts. Standard deviations in parentheses.

Table 3: Summary Statistics, FY2009

6,804 Congressional District-Agency Observations

Variable	No earmarks	Earmarks
Federal Grants (millions)	2.40	6.62
	(9.16)	(10.99)
Earmarked (%)	0.00	30.34
	(0.00)	(34.05)
House Tenure, Democrat	3.58	4.03
	(4.83)	(5.29)
House Tenure, Republican	2.35	2.42
	(3.83)	(4.16)
Senate Tenure, Democrat	13.21	14.33
	(15.82)	(15.74)
Senate Tenure, Republican	8.22	8.06
	(11.33)	(11.47)
House Appropriations Committee	0.14	0.15
	(0.34)	(0.36)
House Appropriations Sub-Committee	0.02	0.04
	(0.15)	(0.19)
Senate Appropriations Committee	0.58	0.60
	(0.49)	(0.49)
Population (thousands)	708.20	711.87
	(76.93)	(82.90)
Unemployment Rate (%)	8.00	8.15
	(2.13)	(2.45)
Poverty rate (%)	10.29	10.57
	(4.82)	(5.05)
Personal income, per capita (thousands)	27.26	27.43
	(7.38)	(7.81)
Observations	6,143	661

Note: Sample means. Standard deviations in parentheses. Federal grants are in 2009 dollars. Population, poverty rate, income per capita, and unemployment figures are from the 2010 Decennial Census.

Table 4: Summary Statistics, FY2009

761 State-Agency Observations

Variable	No earmarks	Earmarks
Federal Grants (millions)	25.68	29.50
	(113.20)	(54.20)
Earmarked (%)	0.00	23.37
	(0.00)	(26.47)
Avg. House Tenure, Democrat	4.66	4.53
	(3.22)	(2.83)
Avg. House Tenure, Republican	4.30	4.94
	(3.55)	(4.35)
Senate Tenure, Democrat	13.72	15.12
	(17.74)	(17.68)
Senate Tenure, Republican	9.47	7.76
	(12.36)	(11.43)
House Appropriations Committee, avg.	0.14	0.13
	(0.17)	(0.15)
Senate Appropriations Sub-Committee	0.31	0.43
	(0.46)	(0.50)
Senate Appropriations Committee	0.59	0.63
	(0.49)	(0.49)
Population (millions)	6.06	6.44
	(6.47)	(7.89)
Unemployment Rate (%)	8.45	8.57
	(1.97)	(1.95)
Gross State Product (millions)	0.28	0.31
	(0.33)	(0.41)
Poverty rate (%)	13.57	13.09
	(3.27)	(3.34)
Personal Income, per capita (thousands)	38.40	39.59
	(5.53)	(5.71)
Observations	646	115

Note: Sample means. Standard deviations in parentheses. All dollar amounts are in terms of 2009 dollars. Population and poverty rate numbers are from the Census, personal income percapita and state GSP are from the BEA, while the unemployment rate is from the BLS.

Table 5: Equivalence of Means T-tests by Demographic Group, Fiscal Year 2009

435 Congressional Districts

	Top 5%				Bottom 5%			
	Earmarks	Grants	Earmarked (%)	N	Earmarks	Grants	Earmarked (%)	N
Government workers	0.89	102.87**	2.99	23	0.97	46.12**	3.13	22
	(1.13)	(95.71)	(3.12)		(2.44)	(47.51)	(3.35)	
Senior citizens	0.78	38.83*	2.14	22	0.62	73.23*	2.25	26
	(0.90)	(26.92)	(2.56)		(0.80)	(90.92)	(2.61)	
Female	0.68	119.85	2.12	22	1.52	120.24	2.22	23
	(0.96)	(69.28)	(3.48)		(3.35)	(104.95)	(2.63)	
Black	1.07	102.83	2.77	22	1.49	91.73	2.77	25
	(1.46)	(66.62)	(3.68)		(1.38)	(66.16)	(2.72)	
Income	1.75	73.91	4.02**	22	1.03	92.33	2.19**	22
	(3.49)	(93.29)	(2.92)		(1.24)	(70.33)	(2.29)	
Unemployment rate	1.23	99.36**	2.76	23	0.83	60.17**	3.30	25
	(1.46)	(59.20)	(3.12)		(1.02)	(58.05)	(3.35)	

Note: *** denotes 99 percent confidence level, ** denotes 95 percent confidence level, * denotes 90 percent confidence level in rejecting the null that the difference in the means for each group is zero against the alternative hypothesis that the Top 5% group is different than the Bottom 5% group. Demographic groups are defined by using the 2010 Decennial Census data for congressional districts. Sample means. Standard deviations in parentheses. Earmarks and Grants in 2009 dollars per capita. Government workers is the share of workers employed by the government.

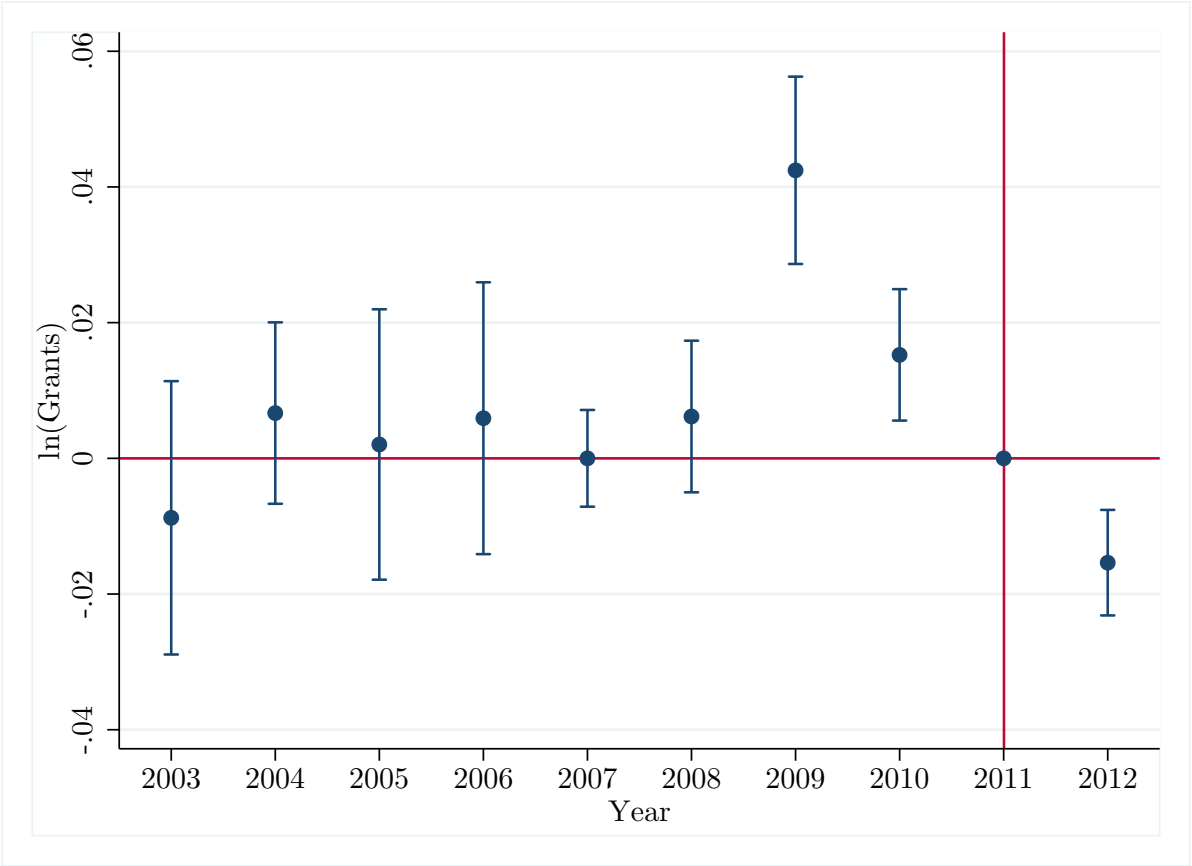

Figure 3:
Congressional District-Agency Specification

Figure 3 displays the time pattern in the coefficients of log grants on $earmarked\%$ (λ_t). The reference point of the graph is set to zero in 2011, the year the ban took effect. The bars show 95 percent confidence intervals for each coefficient. Control variables include lagged House and Senate tenure-party interactions and a dummy variable for membership on the SAC.

Table 6: District-agency level data, 2003-2012

Dependent variable: Log of federal grants

	Specification (1)	Specification (2)		
Year interacted	% earmarked	% earmarked	HAC Subcom.	HAC Subcom. × % earmarked
2003	−0.009	0.000	0.000	0.000
	(0.010)	(.)	(.)	(.)
2004	0.007	0.006	0.820**	−0.001
	(0.007)	(0.007)	(0.338)	(0.014)
2005	0.002	0.002	0.638*	−0.014
	(0.010)	(0.010)	(0.373)	(0.027)
2006	0.006	0.004	0.233	0.025**
	(0.010)	(0.010)	(0.298)	(0.009)
2007	0.000	−0.002	−0.591	0.034*
	(0.004)	(0.004)	(0.421)	(0.019)
2008	0.006	0.006	−0.318	−0.011
	(0.006)	(0.006)	(0.415)	(0.022)
2009	0.042***	0.042***	0.520	−0.003
	(0.007)	(0.007)	(0.333)	(0.013)
2010	0.015***	0.014***	0.798**	−0.002
	(0.005)	(0.005)	(0.304)	(0.009)
2011	0.000	0.000	1.118***	−0.025
	(.)	(.)	(0.377)	(0.016)
2012	−0.015***	−0.015***	0.941**	−0.026
	(0.004)	(0.004)	(0.356)	(0.019)
Obs.	67,802	61,217	61,217	61,217
District-Agencies	6,804	6,804	6,804	6,804
$\Delta_{1,2011}$	-0.000	-0.001		
	(0.99)	(0.88)		
$\Delta_{2,2009}$	-0.085	-0.085		
	(0.00)	(0.00)		

— *Note*: *** denotes 99 percent confidence level, ** denotes 95 percent confidence level, * denotes 90 percent confidence level. Standard errors in parentheses. Standard errors clustered at the state level. Specification (1) is the OLS estimation of equation 8, while Specification (2) is the OLS estimation of equation 11. Control variables include lagged House and Senate tenure-party interactions and a dummy variable for membership on the SAC. $\Delta_{1,2011}$ and $\Delta_{2,2009}$ are the 1 and 2 year computed changes in trends in the coefficients around years 2011 and 2009 respectively. P-values are in parentheses. FY2003 not available for Specification (2) (equation 11) due to redistricting effective in 2003.

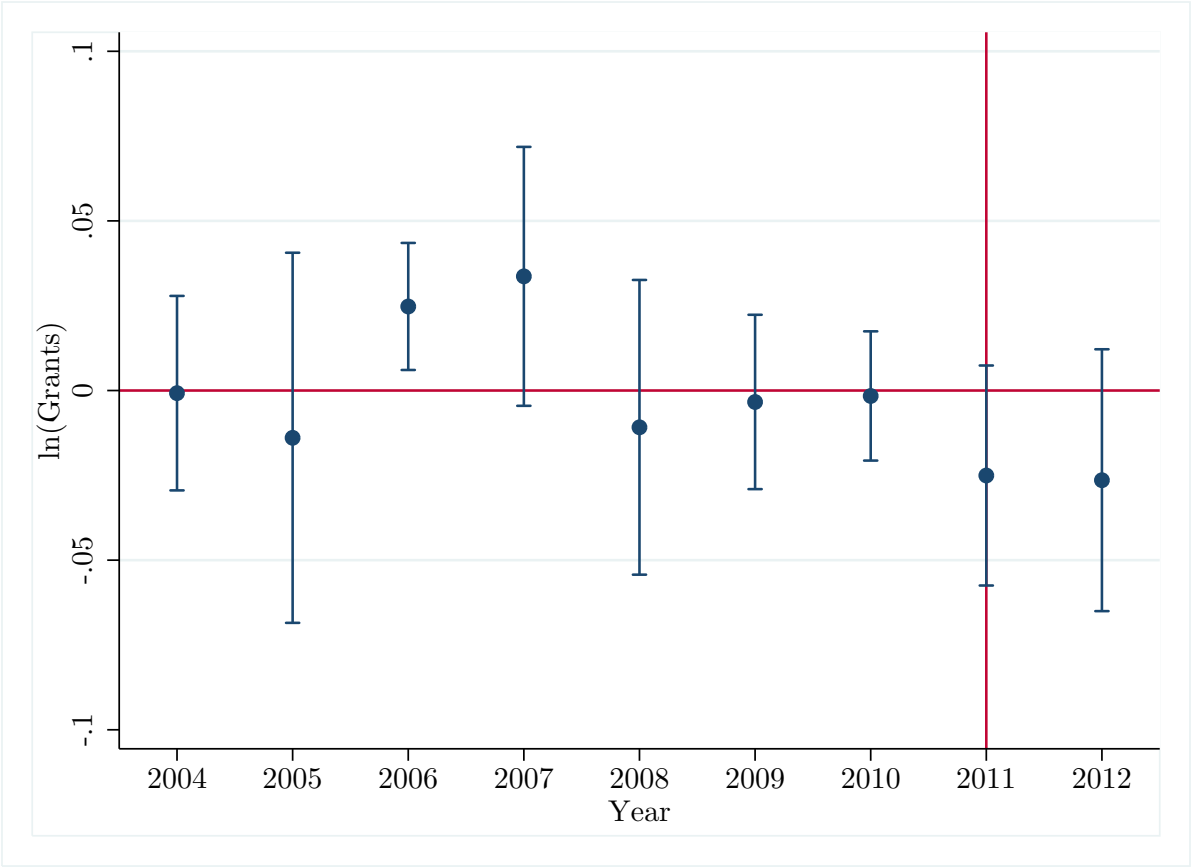

Figure 4:
Congressional District-Agency Specification
Figure 4 displays the time pattern in the coefficients of log grants on $earmarked\%$ (λ_t) interacted with dummy variables indicating membership on the HAC subcommittee presiding over each agency's appropriations. The reference point of the graph is set to zero in 2011, the year the ban took effect. The bars show 95 percent confidence intervals for each coefficient. Control variables include lagged House and Senate tenure-party interactions and a dummy variable for membership on the SAC.

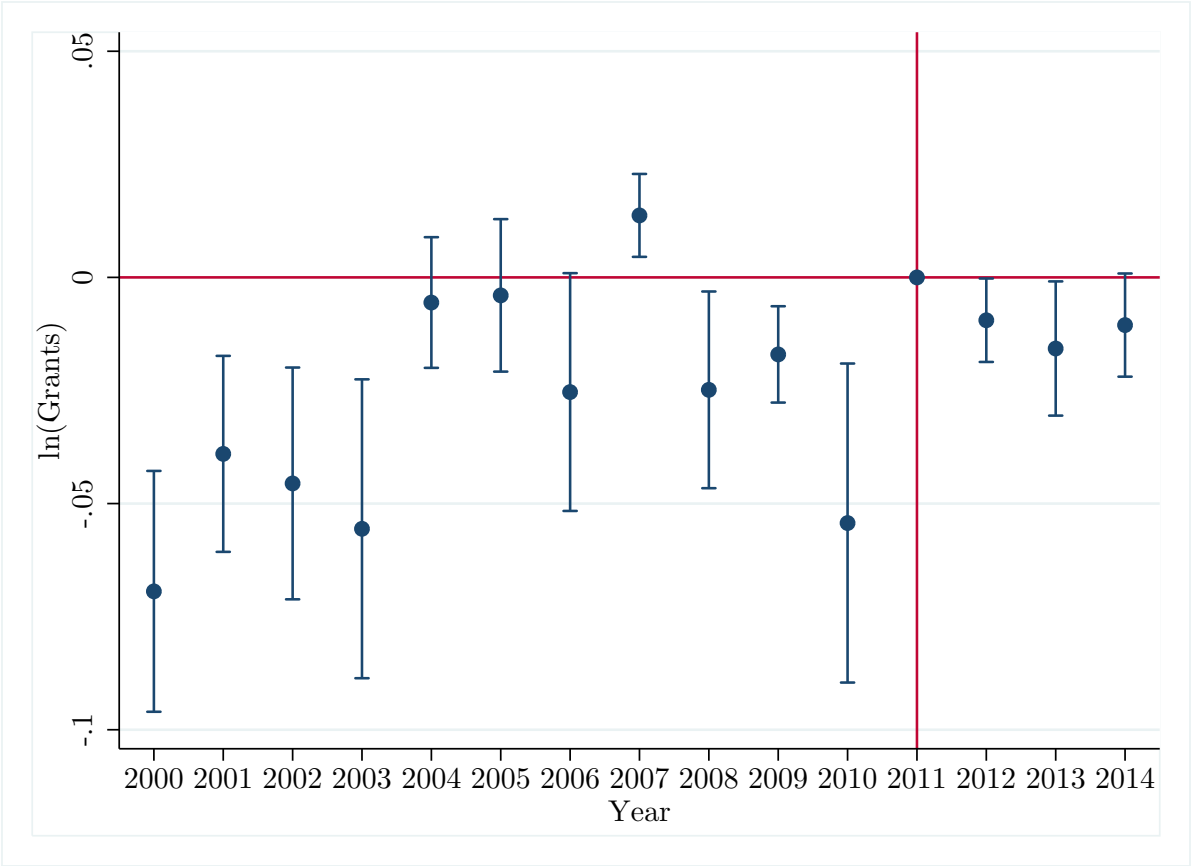

Figure 5:
State-Agency Specification

Figure 5 displays the time pattern in the coefficients of log grants on $earmarked\%$ (λ_t). The reference point of the graph is set to zero in 2011, the year the ban took effect. The bars show 95 percent confidence intervals for each coefficient. Control variables include lagged House and Senate tenure-party interactions and a dummy variable for membership on the SAC.

Table 7: State-agency level data, 2000-2014

Dependent variable: Log of federal grants

	Specification (1)	Specification (2)		
Year interacted	% earmarked	% earmarked	SAC Subcom.	SAC Subcom. × % earmarked
2000	−0.069***	−0.065***	0.304	−0.025
	(0.013)	(0.015)	(0.254)	(0.026)
2001	−0.039***	−0.037***	0.172	−0.009
	(0.011)	(0.013)	(0.252)	(0.014)
2002	−0.046***	−0.051***	0.693***	0.012
	(0.013)	(0.019)	(0.230)	(0.020)
2003	−0.056***	−0.068***	0.502**	0.031
	(0.016)	(0.024)	(0.243)	(0.024)
2004	−0.006	−0.011	−0.186	0.015
	(0.007)	(0.011)	(0.347)	(0.013)
2005	−0.004	−0.019	−0.079	0.038**
	(0.008)	(0.012)	(0.421)	(0.016)
2006	−0.025*	−0.027	0.468*	0.002
	(0.013)	(0.018)	(0.262)	(0.014)
2007	0.014***	0.007	−0.149	0.017
	(0.005)	(0.007)	(0.403)	(0.013)
2008	−0.025**	−0.035**	0.142	0.021
	(0.011)	(0.017)	(0.385)	(0.020)
2009	−0.017***	−0.022***	0.262	0.009
	(0.005)	(0.006)	(0.278)	(0.011)
2010	−0.054***	−0.052**	0.454	−0.007
	(0.018)	(0.022)	(0.303)	(0.028)
2011	0.000	0.000	−0.250	0.002
	(.)	(.)	(0.413)	(0.013)
2012	−0.009**	−0.003	−0.065	−0.011
	(0.005)	(0.007)	(0.322)	(0.009)
2013	−0.016**	−0.010	−0.218	−0.008
	(0.007)	(0.009)	(0.221)	(0.013)
2014	−0.011*	−0.012	−0.124	0.005
	(0.006)	(0.009)	(0.302)	(0.010)
Obs.	11,415	11,415	11,415	11,415
State-Agencies	761	761	761	761
$\Delta_{2,2011}$	-0.033	-0.032		
	(0.00)	(0.02)		
$\Delta_{3,2011}$	-0.035	-0.047		
	(0.01)	(0.03)		
$\Delta_{2,3,2011}$	-0.028	-0.034		
	(0.00)	(0.01)		

– *Note*: *** denotes 99 percent confidence level, ** denotes 95 percent confidence level, * denotes 90 percent confidence level. Standard errors in parentheses. Standard errors clustered at the state level. Specification (1) is the OLS estimation of equation 12, while Specification (2) is the OLS estimation of equation 12 with SAC interactions. Control variables include lagged House (average in state) and Senate tenure-party interactions and a dummy variable for average House membership on the HAC. $\Delta_{2,2011}$, $\Delta_{3,2011}$, and $\Delta_{2,3,2011}$ are the computed changes in trends in the coefficients around year 2011. P-values are in parentheses.

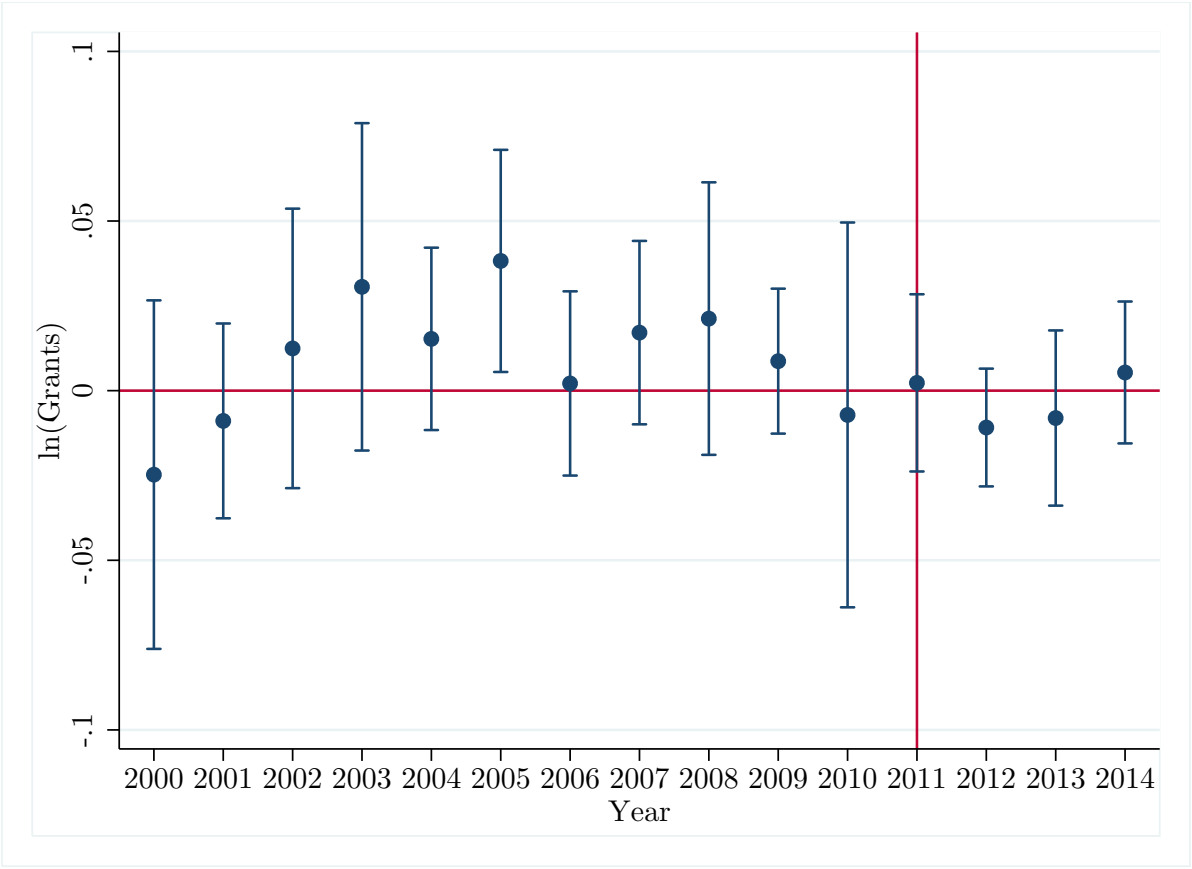

Figure 6:
State-Agency Specification
Figure 6 graphs the time pattern in the coefficients of log grants on $earmarked\%$ (λ_t) interacted with dummy variables indicating membership on the SAC subcommittee presiding over each agency's appropriations. The reference point is arbitrary, and is set to 2011.

Data Description

Federal competitive grants

The source for data on competitive grants come from USAspending.gov, the new source for all data on government grants, contracts, and other assistance.[43] This is the official data source that provides data downloads going back to FY2000, and originated from the Federal Funding Accountability and Transparency Act of 2006, which mandated a replacement for the Census Bureau's Federal Aid to States (FAS) and Consolidated Federal Funds Report (CFFR). The data can be easily downloaded and sorted by organizational type, including local governments and state governments through the use of included flags. The advantage of matching earmarks to grants first is that it reduces the likelihood of matching one but not the other, leading to the incorrect conclusion that there were unfunded earmarks or no earmarks but grants. Geographic data fields are also included which allows the researcher to match grants to geographic location using state, city, and zipcode. Unfortunately, I found many observations with errors in one or more of the geographic fields. Additionally, many local governments did not have the flag marked correctly identifying them as such. These errors were significant, and resulted in a mismatch between the earmark data and grant data. A report by the Government Accountability Office (GAO) in 2014 (GOA, 2014) estimated the "consistency" rates of the various data fields from the data by comparing the data from USAspending.gov with agency data, when possible. They found that the data were consistent 83-90 percent of the time when it came to the recipient city and 88-94 percent consistent for the award amount, along with 90-95 consistent for the recipient state, and 88-94 percent consistent for the unique identifier (DUNS number) for the recipient. These discrepancies thus explain a similar percentage of my percent earmarked variable that were over 100 percent (13 percent). Additionally, the report found that agencies did not report grant data in a timely manner. I do not use 2015 data, because at the time of this writing, it appeared that many agencies had not yet reported grant awards yet for FY2015. While discrepancies of any kind are not ideal, the ones in the USAspending.gov data appear to be random, and will thus only decrease the precision of my estimates, not induce bias.

As a result of the errors, upon initially matching the grant and earmark data together by the city name provided in both, approximately 30 percent of earmarked grants could not be matched. This was due to both the incorrect city and state names in the grant data, and due to the fact that many local governments had not been marked as such by the flag. I subsequently used the provided Dun and Bradstreet (DUNS)

[43] See Gerli (2015) for a description of the data source.

number in the grant data to match to geographic information found in the System for Award Management (SAM) database. The SAM database provides geographic and other information by DUNS number. The geographic information in the USAspending.gov data files were updated, and the majority of earmarks were able to be matched. Future researchers using the data files from USAspending.gov should be cautioned in naively assuming that the provided geographic information is correct.

Earmarks

In 2007, earmark reform began, ending with a ban on earmarks taking effective fiscal year 2011 (Doyle (2011b)). Before the ban took place, an Obama administration executive order (Executive order 13457) directed the Office of Management and Budget (OMB) to keep track of Congressional earmarks contained in appropriations bills in order to improve transparency (Executive order 13457).[44] This was to "establish a clear benchmark for measuring progress." [45] The OMB defines earmarks as "funds provided by the Congress for projects, programs, or grants where the purported congressional direction (whether in statutory text, report language, or other communication) circumvents otherwise applicable merit-based or competitive allocation processes, or specifies the location or recipient, or otherwise curtails the ability of the executive branch to manage its statutory and constitutional responsibilities pertaining to the funds allocation process."

The advantage of the OMB earmark data over other earmark databases, such as those collected by nonprofit groups Taxpayers for Common Sense (TCS) and Citizens Against Government Waste (CAGW), is that the OMB required Federal agencies to send in reports to them detailing their expenditures in relation to each earmark, listing the recipients of these funds. The CAGW data do not list recipients, and the TCS data match earmarks to recipients by searching for the *intended* recipient in news releases by each earmark sponsor. For my purposes, the TCS data would be highly misleading, since the intended recipient of each earmark is often only one of many recipients of the actual funds. However, the OMB 2010 data do not include the recipients, and the data prior to 2009 did not include an indicator for whether the earmark was a grant or contract.

Using the city of the recipient as reported in the OMB data, I matched earmarks with the city listed in

[44] See https://www.gpo.gov/fdsys/pkg/FR-2008-02-01/pdf/08-483.pdf See also: https://www.whitehouse.gov/the-press-office/remarks-president-earmark-reform

[45] OMB, Press Release: New Features Added to Earmarks Database; available from: http://www.whitehouse.gov/sites/default/files/omb/assets/omb/pubpress/2007/07: accessed 10 July 2007.

the USA spending data.

Congressional variables

The Congressional variables come from Charles Stewart's Congressional Data Page.[46] For the 109th Congress (2005-2006 data years), the Republicans outnumbered the Democrats 233 (25 freshmen) seats to 201 (16 freshmen) seats in the House, and 55 (7 freshmen) seats to 44 (2 freshmen) seats in the Senate. This reversed with the 110th Congress (2007-2008 data years) where Democrats had 233 (41 freshmen) and Republicans had 202 (13 freshmen) seats in the House and a tie at 49 (8 freshman Democrat, 1 freshman Republican, 1 freshman Independent) seats per party in the Senate.[47]

In terms of committee membership, the House Appropriations Committee (HAC) chairman was Jerry Lewis (R, CA) for the 109th Congress, and David R. Obey (D, WI) for the 110th Congress. The HAC was reorganized in 2007, increasing the number of subcommittees to 12, which gave each house an identical committee structure. The shift in party majority in the House in Senate was reflected in the party composition of the HAC; for the 109th Congress Republicans outnumbered Democrats 38 to 29, while during the 110th Congress, Democrats outnumbered Republicans 37 to 30.

For the Senate Appropriations Committee (SAC), the chair during the 109th Congress was Thad Cochran (R, MS), which changed to Robert C. Byrd (D, WV) during the 110th Congress. During the 109th Congress there were 15 Republicans and 13 Democrats, while during the 110th Congress there were 15 Democrats and 14 Republicans.

[46] See: http://web.mit.edu/cstewart/www/data/codebook.txt

[47] The lone independent was Bernie Sanders of Vermont.