3-2017

The Returns to Lobbying: Evidence from Local Governments in the "Age of Earmarks"

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March 2017

Institute for the Study of Free Enterprise
Working Paper 12

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I. Introduction

"The reality of the situation is that federal monies are currently available to cities who choose to utilize them... If they do, I hope they would use these funds in a financially responsible way that benefits taxpayers in Texas the most."

–Randy Neugebauer, (R-Texas) on the use of lobbying by local governments[1]

The federal government transfers considerable sums to local governments in the form of intergovernmental grants.[2] With the exception of health and welfare programs, most intergovernmental grants to local governments are classified as discretionary spending. In its annual appropriations process, Congress decides how funding for discretionary spending will be broken up among the various agencies, but more detailed decisions about specific uses of funds are left to the executive branch.

Prior to the earmark ban of 2011, members of Congress frequently intervened with the funding decisions of agencies by earmarking federal funds for particular projects.[3] To those in favor of the practice, earmarking represented an assertion of Congress's power of the purse over bureaucratic objectives. To those opposed to earmarking, it represented little short of corruption. Regardless, earmarks have been awarded to local governments for a wide variety of purposes.

In order to secure earmarks, local governments have often employed lobbyists. In 2003, the city of Treasure Island, Florida, in need of a new bridge, considered issuing bonds, increasing property taxes, and levying higher tolls. Instead, it paid lobbying firm Alcade & Fay $5,000 per month, which resulted in a request for a $50 million earmark by C. W. Bill Young, the Representative of Florida's 10th Congressional District and the chairman of the House Appropriations Committee at the time. That $5,000 per month turned into earmarks for sewer and public infrastructure repairs that totaled more than $1.5 million. Alcade & Fay also represented the cities of North Miami Beach and Homestead, who together received a total of $13 million in earmarks, while other, similarly sized Florida cities without lobbyists on retainer received none. These stories were documented in a 2006 New York Times article (Pilhofer, 2006) that calculated an average

[1] See Tribune (2010).

[2] In 2014 (the latest Census of Governments data), total intergovernmental aid to local governments was nearly $67 billion.

[3] While the earmark ban of 2011 purported to end the practice, legislators have employed other means to direct funds to their home districts, namely through processes known as "lettermarking" or "'phonemarking" (Lipton and Nixon, 2010), (Nixon, 2012), (Cuellar, 2012), (Gold, 2015), (Dawson and Kleiner, 2015), (Strand and Butcaru, 2016).

return of $18.41 for every $1 spent on lobbying for 44 local government clients of Alcade & Fay from 2001 to 2006.

The academic literature measuring the returns to lobbying is sparse. De Figueiredo and Silverman (2006) is currently the only study that provides an estimate of the rate of return to lobbying.[4] This paper intends to fill that gap in the literature by estimating the rate of return to lobbying for local governments. I utilize the boom and bust variation in housing prices that took place over the mid-2000s as a source of exogenous variation to predict lobbying expenditures of local governments. My results indicate that the average local government that lobbied received $5 more in federal earmarks for each additional $1 spent in lobbying. This finding implies that local governments were leaving money on the table in their decision to lobby along the intensive margin. However, I also find that for an additional 1 percent of lobbying, or $1,527 on average, the probability of receiving an earmark increased by just 0.06 percent; an expected value of roughly $964. This seemingly implies that local governments were lobbying too much along the extensive margin. More likely, however, are the presence of cost prohibitive barriers to entry into lobbying that governments must incur before returns are to be made.

I focus on local governments for several reasons. First, they can be identified geographically, and are banned from forming political action committees or mobilizing their employees politically. This limits their tools of influence over the federal government to lobbying, thus avoiding the difficulty of measuring other means of influence. Second, lobbying by local governments before the earmark ban in 2011 was almost entirely targeted at earmarks, with the exception of the largest local governments that may have also lobbied for policy changes.[5] [6] Private firms frequently lobby for policy changes, which are difficult to quantify. Conversations with lobbyists indicated that before the moratorium on earmarks, local governments routinely hired lobbyists one to two years ahead of the signing of appropriations bills in order to strategically plan for earmarked appropriations.[7] Earmarks to local governments represent quantifiable benefits to local governments, thus allowing for the returns to lobbying to be measured.

Data on earmarks to local governments reveal several key facts. Earmarks tend to be for a wide range

[4] They estimate the rate of return to lobbying for institutions of higher education.

[5] With the ban on earmarks, lobbying by local governments still continues. For an example, see: Mirror (2015). Kirk et al. (2011) describes how some earmarks are written with the conditional phrase "notwithstanding any other provision of law," which amounts to a law written to circumvent another law.

[6] As a robustness check, I drop the top fifth percentile in terms of population size of local governments and re-estimate all specifications.

[7] De Figueiredo and Silverman (2006) stressed that lobbying by universities was carried out on a strictly annual basis. I interviewed 5 lobbyists who generally confirmed that local governments took a slightly longer view.

of dollar amounts that are economically significant sums to local governments and serve to fund many local projects of different types. These facts follow from the fiscal reality of constrained revenue creation for many local governments.

In 2009, earmarks among county, municipal, and township governments ranged from small amounts, such as $4,000 to Ransom County, North Dakota for "leafy spurge eradication," and $19,000 for "freshwater mussel recovery" in Randolph County, Arkansas, to the $29.4 million awarded to the city of Sault Sainte Marie, Michigan for the St. Mary's River project. A closer look at the data confirms the impression of wide variation in the size of earmarks relative to local government budgets. Figure 1 shows the distribution of earmarks by year as a percent of 2007 local government own-source revenues for county, town, and municipal governments aggregated to the county geographic area. The highest percentage was a $9.6 million earmark in 2009 for the operation and maintenance of Wappapello Lake in Missouri that represented 184 percent of county total, own-source revenues. Separating out the data into population quartiles shows that less populous counties experienced the most variation in the ratio of earmarks to own-source revenues. The variation increased dramatically, especially from 2008 to 2009 for counties in the bottom two population quartiles, as Table 1 indicates.

As a stylized fact, local governments are heavily reliant on the property tax.[8] This reliance has a stabilizing benefit such that sharp downswings in property values do not immediately translate into lost revenues for local governments (Alm et al., 2011), (Doerner and Ihlanfeldt, 2011), (Ihlanfeldt, 2011). Despite the stability of property tax revenues in relation to the direct effect of declining housing prices during the Great Recession, local governments were impacted by decreases in intergovernmental aid (Chernick et al., 2011), (Jonas, 2012), declines in job and residential growth (Hoene and Pagano, 2010), (Lutz et al., 2011), (Strauss, 2013), and increases in liabilities (Chapman, 2008), (Shoag, 2013).

The Great Recession placed local governments in a constrained position in terms of revenue creation, but the nature of multilevel government in the United States also makes it difficult for local governments to raise revenues due to state mandates such as Proposition 13 (Joyce and Mullins, 1991). Additionally, the fiscal federalism literature predicts the under-provision of public goods at the local level as a result of decentralization. Beginning with Oates et al. (1972), this literature models the way in which local governments compete for investment dollars by decreasing tax rates, which in turn hampers the production of

[8] As of the 2007 Census of Governments, property tax revenues made up 45 percent of general, own-source revenues for local governments. See also Alm et al. (2011).

public goods to sub-optimal levels.[9]

In the mid-2000s, with the Great Recession impacting employment, consumption, and the demand for services, local governments were in a difficult position in terms of generating revenues in the face of rising expenditures. For example, all of the Florida cities detailed in the 2006 New York Times article saw slowdowns in residential growth as a result of the Great Recession. Thus it would seem that for them, lobbying was a highly prudent investment as opposed to increasing tax rates or issuing debt. However, between 2001 and 2014, county and municipal governments in only 19 percent of all county areas lobbied. This raises the question: Why so little lobbying? One possible answer to this question is the fact that lobbying requires high initial costs before returns can be made (Kerr et al., 2014).

Data on federal earmarks from the Office of Management and Budget (OMB) show that from 2005 to 2010, the total number of earmarks decreased by 31.9 percent, while the total dollar amount dropped by 41.3 percent.[10] However, Federal earmarks to local governments increased dramatically both in number and in monetary value over a similar time period. Figure 2 shows that the number of earmarks to local governments increased in number by 51.8 percent and in monetary value by 68.8 percent from 2005 to 2009.

Over the same time period that local government earmarks increased relative to total earmarks, local government lobbying increased at a faster rate than total lobbying.[11] Figure 3 shows that while lobbying expenditures grew in general from 2001 to 2010, lobbying by local governments increased sharply from 2005 to 2006, before the Great Recession, while total lobbying spiked in 2008, after the beginning of the Great Recession.

The longer panel dataset on local government lobbying from 2001 to 2014 allows me to uncover several relevant facts characterizing counties that engaged in lobbying activity: a subset of large counties that lobby every year expend the majority of total lobbying expenditures incurred by local governments. Given that a county lobbied in the previous year, the unconditional likelihood of lobbying in the current year is 82 percent. While lobbying counties have larger populations than the full sample, counties that lobbied every year from 2001 to 2014 were much larger; on average, over 1.2 million in population. Figure 4 displays the average share of total annual lobbying by the total number of years that the county engaged in lobbying over 2001-2014. The positive correlation between total years lobbied and the average share of lobbying indicates

[9] See Wilson (1999) for an overview of the tax competition literature.

[10] Doyle (2011a) attributes this decline to various reforms.

[11] Total lobbying includes all lobbying at the federal level, whether from private firms, nonprofit organizations, or other government institutions, in addition to local governments. At an average amount of $26.6 million per year from 2001 to 2014, local government lobbying made up a small fraction of total lobbying which averaged $3.8 billion per year.

that for the average year, the majority of lobbying expenditures incurred by local governments came from the counties that lobby every year.

The high degree of persistence, and the local government lobbying market being dominated by large counties, resembles the market for lobbying by private firms and similarly points to barriers to entry in lobbying as described by Kerr et al. (2014). It is highly possible that in order to engage in lobbying a government must invest in buying lobbying services that do not pay off immediately, i.e. there are increasing returns to "experience" in lobbying.

While local governments allow for quantifiable costs and benefits of lobbying to be measured and located geographically, an additional challenge to measuring the returns to lobbying is the possibility of endogeneity between lobbying and federal earmarks (De Figueiredo and Silverman, 2006). For at least two reasons, OLS estimates of the returns to lobbying may be biased. First, local governments may be more likely to lobby if they have been awarded an earmark in the past. Second, they may have information regarding the probability of their success in obtaining an earmark.

A final characteristic of local government lobbying presents housing prices as a potential instrumental variable. Due to the reliance of local governments on property taxes for generating revenues, housing prices before and during the Great Recession appear to be a useful proxy for the size of the (future) tax base for local governments.[12]

While scholars have offered a range of explanations as to the cause of the rapid build up and consequent crash in housing prices that characterized the mid-2000s (Glaeser et al., 2008), (Glaeser et al., 2012), (Shiller, 2015), this variation was largely unanticipated and thus should not be correlated with the error term for an empirical model that estimates the returns to lobbying. Figure 5 documents the rapid increase in average county housing prices that peaked in 2007 and then began to decline.

The data show that local governments that experienced decreases in housing prices lobbied more, ostensibly as an alternative means to generating revenue. Figure 6 displays lobbying expenditures for two groups of counties: those with positive growth rates in housing prices and those with negative growth rates in housing prices. For the years 2003 to 2006, the two groups lobbied roughly the same amount. Following 2006, however, the growth rate in housing prices predicts distinct differences in lobbying expenditures between the two. On average, counties with decreasing growth increased their lobbying expenditures by roughly 700

[12]Despite the stability of property taxes as a result of the lag between fluctuations in the value of the existing tax base and its assessed value, changes in housing prices translate directly into lost future revenues for local governments.

percent from 2006 to 2007, while counties with increasing growth decreased their lobbying expenditures over the same time period. This variation indicates that local governments responded to decreases in housing prices, or future revenue, by lobbying more. The data suggest that local governments lobby to buffer against the consequences of slowing growth in their tax bases.

The theoretical lobbying literature predicts that when interest groups compete in lobbying expenditures, inefficient economic outcomes result. Krueger (1974) models rent seeking for import licenses and shows that competition creates a welfare loss. Becker (1983) provides a theoretical model of how interest groups alter their levels of political pressure in an effort to maximize the total income of their members. Building off of Becker (1983), Hoyt and Toma (1989) show how state mandates regarding local government activities lead to competitive lobbying at both the state and local level, and Hoyt and Toma (1993) provide a related model of interest group competition in the context of public education. Lobbying by local governments for Federal earmarks exemplifies the dynamic of "concentrated benefits and diffuse costs," since earmarks can be large to individual local governments, but are insignificant from the perspective of taxpayers.[13][14]

The distributive politics literature often characterizes earmarks as an input in the political bargaining process (Balla et al., 2002), (Lee, 2003), (Evans, 2004). The literature predicts that interest groups more closely aligned with key policy makers will reap larger returns than those who are not (Helpman and Persson, 2001), which implies that congressional representation impacts the returns to lobbying. More precisely, relevant literature in economics and political science predicts the salience of particular aspects of political representation.[15]

One model of legislator behavior, the partisan model of budget allocation, predicts that Congressional representatives will further their own self-interests by serving their parties' interest (Cox and McCubbins, 2007). For example, Congressional representatives may be more likely to funnel resources to districts where the majority party has a smaller advantage (Lee, 2003).[16]

The distributive model of budget allocation implies that variables measuring the influence and position of individual legislators should matter more than partisan affiliation, whether through seniority or committee appointments. Knight (2005), for example, found that districts with representation on the House transportation committee were awarded more project grants than those without. However, due to the lack of clear

[13] See Olson (2009).

[14] To the extent that Federal dollars would have been distributed via earmarks regardless of lobbying, local government lobbying could be seen as welfare enhancing in the sense that it might lead to a more efficient distribution of earmarked funds.

[15] Shepsle and Weingast (1994) provide a survey of this literature.

[16] Alignment with the party of the President is another related theory (Larcinese et al., 2006).

direction in the literature as to which attributes of political representation dominate others, I take an agnostic approach and include variables that capture both partisan and distributive model predictions regarding budget allocation.[17] Given the inclusion of fixed effects in my specifications and the lack of variation in congressional variables over the sample period, less significance is predicted for them.

The remainder of this paper is organized as follows: section II provides the theoretical model, section III, the empirical model, section IV, a discussion of the data and summary statistics, section V, the results and robustness checks, while section VI concludes.

II. Theory

To illustrate the logic that connects changes in revenues with lobbying, I propose a simple model of a local government's decision to lobby with the objective of realizing earmark gains. The model presented here motivates the use of the dollar size of earmarks as the dependent variable in the empirical specifications and aims to capture the returns to lobbying along the intensive margin of earmark distribution. An analogous model presented in the Appendix motivates the use of earmarks as a binary variable for the dependent variable that allows for analysis of the extensive margin of the returns to lobbying.[18] Regardless of the approach, the implication that risk-averse local governments will respond to shocks in own-source revenues (R_i) by lobbying more, is the same.

Assuming that lobbying has an impact on earmarks by increasing the size of the earmark (E_i), I define earmarks as a function of lobbying such that:

$$E_i = Z_i L_i \epsilon_i \tag{1}$$

Where for local government i, E_i is the dollar amount of the earmark received, Z_i is a series of observable and unobservable variables characterizing local government i, ϵ_i is the error term, and L_i is the lobbying expenditure incurred. Estimation of (1) will suffer from omitted variable bias because L_i is likely correlated with unobservable elements in Z_i that are contained in the error term, ϵ_i.

[17] As Levitt and Poterba (1999) point out: "the complex institutional structure of Congress, and the possibility of log-rolling and other types of coalition formation, make it difficult to identify influential members based solely on committee assignments" (page 187).

[18] In the alternative approach, the earmark amount (E) is random, and lobbying serves only to increase the probability of receiving the earmark.

Instrumental variables methods are used identify the empirical model. An instrument must be correlated with lobbying expenditures (L_i) but uncorrelated with the omitted variables that are contained in the error term. In order to derive an instrument, I assume that local governments seek to maximize their total income,[19] and that tax rates are set exogenously. Revenue comes from two sources: earmarks (E_i) and own-source revenues which are a function of changes in the tax base: $R_i = \Delta B_i$.[20] Substituting in from (1), the maximization problem for local government i becomes:

$$\max_{L_i}\{\pi_i\} = \{(B_i + Z_i L_i)^{\beta} - cL_i\} \tag{2}$$

where the utility function is of the form $U(\cdot)^{\beta}$, where $\beta \in (0, 1)$, and c is a constant marginal cost to lobbying. Differentiating with respect to L_i yields the first order condition:

$$\frac{\partial \pi_i}{\partial L_i} = \beta(B_i + Z_i L_i)^{\beta-1} - c = 0 \tag{3}$$

Which is satisfied by L_i^*, the optimal amount of lobbying. In order to determine the impact of a change in the tax base (B_i) on lobbying (L_i), I totally differentiate (3) with respect to B_i to obtain:

$$\frac{dL_i^*}{dB_i} = -\frac{\frac{\partial^2 \pi_i}{\partial L_i \partial B_i}}{\frac{\partial^2 \pi_i}{\partial L_i^2}} \tag{4}$$

Then:

$$sign\left[\frac{dL_i^*}{dB_i}\right] = sign\left[\frac{\partial^2 \pi_i}{\partial L_i \partial B_i}\right] \tag{5}$$

since by the second order condition $\frac{\partial^2 \pi_i}{\partial L_i^2} < 0$.[21]

Because:

$$\frac{\partial^2 \pi_i}{\partial L_i \partial B_i} = \beta(\beta - 1)(B_i + Z_i L_i)^{\beta-2} < 0 \tag{6}$$

[19] This can be generalized to show that local governments maximize the utility of the representative citizen.

[20] In this model, I abstract from local governments choosing tax rates. However, the model could be generalized to allow for this without a change in result.

[21] See the Appendix for the second order condition.

Therefore:

$$\frac{dL_i^*}{dB_i} < 0 \tag{7}$$

The comparative static result in (7) shows that the optimal amount of lobbying expenditures is decreasing in response to positive shocks in the tax base (ΔB_i).

The intuition behind this last result is that local governments, when faced with a shortfall in own-source revenues, will pay a cost (c) to lobby for earmarks (E_i). (7) thus implies a viable instrument in shocks to tax base growth, as ΔB_i is predicted to be correlated (inversely) with lobbying, but not with the error term from estimations of Equation (1).

III. Empirical Model and Identification Strategy

For the empirical model, the panel data aspect of the sample is utilized. Because there are many variables that cannot be observed on an annual frequency at the county level, all panel data models include fixed effects, unless otherwise noted.

In terms of timing, all congressional variables are lagged by one period from the date of the enactment of the earmark. For earmarks enacted in 2005, congressional variables from 2004 are used. Lobbying expenditures are also lagged. Where lobbying is interacted with earmarks, the lobbying amount is always from the year prior to the earmark amount. The main empirical model for modeling the rate of returns to lobbying is:

$$Earmark_{it} = c + \beta_L Lobbying_{it-1} + \beta_{X_k} X_{kit} + \beta_{Cm} Cm_{it-1} + \beta_A A_{st-1} + \eta_i + \tau_t + \epsilon_{it} \tag{8}$$

where i indexes counties, while t indexes the enactment year of the earmark. $Earmark_{it}$ is defined in two different ways: the logarithm of the dollar amount of the earmark and a binary variable taking on 0 if an earmark is received and 1 if not.[22] In addition to the theoretical argument for defining earmarks as a binary variable, an empirical argument can be made in that since only 22.5 percent of county-year observations

[22]While I would like to be able to use ΔE_i as an additional dependent variable, the short panel length of my data makes this unfeasible.

actually received an earmark, there will be a large number of zeros on the left hand side of the regressions. Defining earmarks as a continuous variable allows me to test the impact of lobbying along the intensive margin of earmarks, while defining earmarks as a binary variable and utilizing a linear probability model tests the impact of lobbying along the extensive margin.

$Lobbying_{it}$ is the logarithm of lobbying expenditures. The X_{kit} are k control variables that include the growth rate and level of personal income per capita, the change in the unemployment rate, and the growth rate and level of county population. The C_{mit-1} are m political variables, lagged one period. A_{st-1} is the lagged log of state to local government aid, indexed by state s and time t. While this variable is only available on an annual basis at the state aggregated level, it is still included to control for changes in state aid to local governments. The η_i are the fixed effects, and the τ_t are the year effects.

To deal with the possibility of an endogenous relationship between earmarks and lobbying (De Figueiredo and Silverman, 2006), I use instrumental variables methods. Motivated by the theoretical model, my strategy is to search for a proxy for changes in the tax base of local governments. While the property tax has been a stable source of revenue for local governments during the Great Recession due to lags in assessment (Doerner and Ihlanfeldt, 2011), (Alm et al., 2011), (Ihlanfeldt, 2011), declines in property values represent future losses in tax revenues. Since the majority of local government own-source revenues are related to residential property values (Lutz et al., 2011), (Chernick et al., 2011), (Jonas, 2012), the growth rate of housing prices at the county level ($\Delta HousingPrices_{it}$), provides a measurement of ΔB_i, and is not predicted to be contained in the error term.

For the instrumental variables models, the equation becomes:

$$Earmark_{it} = c + \beta_{\widehat{L}} \widehat{Lobbying}_{it-1} + \beta_{X_k} X_{kit} + \beta_{C_m} C_{mit-1} + \beta_A A_{st-1} + \eta_i + \tau_t + \epsilon_{it} \tag{9}$$

where $\widehat{Lobbying}_{it-1}$ is the predicted value from the first stage equation:

$$\begin{aligned} Lobbying_{it-1} = c + \beta_{hp} \delta HousingPrices_{it-1} + \beta_{X_k} X_{kit} + \beta_{C_m} C_{mit-1} + \beta_A A_{st-1} \\ + \eta_i + \tau_t + \upsilon_{it} \end{aligned} \tag{10}$$

The instrumental variables equation is estimated using 2-Stage Least Squares (2SLS).

IV. Data

Unit of observation

All numbers for earmarks and lobbying are for county and municipal (city, town, village, etc.) governments which make up roughly 63 percent of total local government lobbying expenditures and over 86 percent of total local government earmarks, the remainder attributed to special districts and school districts.[23] The data were aggregated to the county geographic level and matched with data from the other sources. What results is a three-year panel on earmarks for 3,079 counties, virtually every single county in the lower forty-eight states.[24] The few earmark and lobbying expenditure observations that took place in municipalities split across county lines were divided up and weighted by population across each of the overlapping counties. The lobbying, BEA, BLS, and congressional data sources are all available for a long enough period of time to match the appropriate lagged values with the earmark data.

My decision to limit the analysis to local governments categorized as county, municipal, or township comes from the fact that these "general purpose" governments are easily defined geographically. Any earmark or lobbying expenditure whose recipient or client was noted as multiple jurisdictions was dropped.[25] Data on the precise geographic boundaries of special purpose and school district governments are not available. See the Data Description below for more information.

For the remainder of the analysis, I use the term "local government" and "county" interchangeably in reference to observations.

Earmarks

There are several commonly used criteria for an appropriation to be considered an earmark, including 1) the inclusion of a specific recipient, 2) the lack of a competitive allocation process, and 3) being written into law (Porter and Walsh, 2008). As a result of a series of transparency reforms, in 2008 the OMB began collecting information on earmarks in appropriation bills under a single definition.[26] The OMB required

[23]The fact that special districts and school districts lobby a greater share of total lobbying than the share of total earmarks they received points to the possibility that special district and school district governments may be more interested in lobbying for policies, for example, as opposed to earmarks.

[24]In keeping with the BEA's practice, the independent cities of Virginia were added together with their adjacent counties into one single county-city area. Alaska and Hawaii were eliminated from the analysis in keeping with much literature on public finance. Also, Alaska is an extreme outlier, receiving a disproportionate number of earmarks on a per capita basis.

[25]This follows a similar practice as Knight (2005) in his analysis of transportation earmarks across congressional districts.

[26]The OMB definition is: "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

Federal agencies to submit the details of their spending related to earmarks within a specified time period of receiving the earmark request. This highlights the advantage of using the OMB database over other non-governmental organizations' earmark databases.[27] I am able to observe every earmark that was included in each of the three different consolidated or omnibus appropriations bills: the 2005 Consolidated Appropriations Act signed into law on December 8th, 2004, the 2008 Consolidated Appropriations Act signed into law December 27th, 2007, and the 2009 Omnibus Appropriations Act signed into law March 11th, 2009.

The OMB chose 2005 as its base year and did not collect data for 2006 or 2007. This may have been motivated by the fact that 2005 came before the earmark reforms began in 2006 (Doyle, 2011b). Although there were no consolidated appropriations bills for 2006 or 2007, earmarks were signed into law in 2006. However, in 2007 a large number of earmarks were blocked by a one-time earmark moratorium that was championed by the House Appropriations Committee (HAC) and the Senate Appropriations Committee (SAC) as the majority party shifted from Republican to Democrat beginning with the 110th Congress. Beginning in fiscal year 2008, however, earmarks were required to be reported in a timely fashion, with more transparency regarding the sponsor and recipient (Doyle, 2011b). However, effective as of 2011, the Republican-controlled House banned earmarks, a moratorium that persists to this day (Politifact, 2013).

I assign each earmark to the year it was enacted, which is the year after it was signed into law for the 2005 and 2008 data. For the 2009 earmarks, the timing is slightly different, since the 2009 Omnibus Appropriations Act was not signed into law until March 11th, 2009. However, no attempt is made to account for the difference in timing, since it is unlikely that early 2009 lobbying would have been directed towards 2009 enacted earmarks given that local governments tend to begin lobbying for the next year's appropriations bills a year in advance.[28] These laws represent virtually all of the earmarks enacted during those years, as they are comprehensive by nature.[29]

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."

[27]Two other organizations, Citizens Against Government Waste (CAGW) and Taxpayers for Common Sense (TCS) both keep track of earmarks. However, CAGW does not classify them by recipient, and TCS classifies them only by the intended recipient. Because the recipient portion of the data are generated by reports submitted by the agencies actually spending the money, the OMB data provide actual amounts based on where they were actually spent. This is vital for my estimations, since local governments are not always the intended recipients but may be a part of a larger group including private and nonprofit entities.

[28]A reason to adjust for the difference in timing would be the extent to which unobserved factors enter into the error term. For example, it is possible that the earmarks signed into law on March 11th, 2009 were influenced by changes in congressional representation, as the 111th Congress was sworn in on January 6th, 2009. Freshman representatives may have been less able to defend their predecessors' earmarks, for example.

[29]The Department of Defense Appropriations Act of 2008 had three earmarks included in the analysis as well, and were all around $75,000. For 2009, the only other appropriations bill was the Consolidated Security, Disaster Assistance, and Continuing Appropriations Act of 2009 signed September 30th, 2008. There were several earmarks from this bill, and they were dropped from the analysis.

I analyze earmarks only to recipients that were county, municipal, or township governments. Only earmarks whose recipient was a single government were included in the sample. This leaves out coalitions of governments, special district governments, and school districts.[30] I match each earmark to a particular county, my unit of observation, using the recipient information provided by the OMB.

Lobbying

The lobbying data come from the 1995 Lobbying Disclosure Act, which mandated that federal lobbyists disclose information to the Senate Office of Public Records (SOPR), including their client and the amount they were paid. These data are available semi-annually prior to 2008, and quarterly afterwards.[31] Approximately one third of local government lobbying in both number of records and amounts were from special districts. A similar approach was followed in matching the lobbying data to counties as with the earmark data. Records were matched to county areas based on the client name. Manually matching the clients to counties by name limited the potential for measurement error.[32] The lobbying data allows me to identify annual amounts paid by clients to lobbyists for lobbying services as defined by SOPR guidelines.[33]

Congressional variables

For U.S. House congressional variables, I take a different approach than previous literature that allows me to measure congressional variables in a more realistic way. In their well cited paper on the distribution of Federal spending, Berry et al. (2010) group counties by congressional districts for their county-level analysis, which naturally represents a problem for counties that overlap with more than one congressional district. To be able to assign variables for congressional representation, they simply drop all such counties, noting the probable impact that this would make on their analysis due to the fact that these observations are highly urbanized areas. In my analysis, the counties that are split by congressional districts typically expend greater amounts on lobbying and receive larger earmarks, thus excluding them from the sample would bias the results.

[30] This excludes about 20 percent of local government earmarks in terms of the dollar amount, and just over 13 percent in terms of the number of those that went to special district governments or coalitions of governments.

[31] The Honest Leadership and Open Government Act of 2007 required the quarterly submission of electronic records. Prior to this law change, several different submission methods were used. Due to this change, there is some concern for measurement error in the data before 2008. However, the variables of interest are only the time period, lobbying expenditure amount, and client name. In analyzing the lobbying reports, the greatest chances for measurement error purport to be in the description of the lobbying activity.

[32] For example, some lobbying firms listed their clients as being located in Virginia, even though they were clearly not located in that state based on the client name.

[33] See: SOPR, 2013

Typically, a simple 0 or 1 is assigned to an observation to represent membership on a committee or party membership, or an integer is assigned for the number of terms or rank of the representative (Knight, 2005), (De Figueiredo and Silverman, 2006), (Berry et al., 2010). However, in the context of my analysis, which involves the interaction between local government-hired lobbyists and congressional representatives, a simple 0 or 1 does not capture the variation between counties' representation by a congressional representative *within* that representative's congressional district. Counties that form a larger part of the population (constituents) of congressional districts should have a larger sway over their representative than counties that make up a smaller percentage of that representative's constituents. I thus normalize each House variable by the share of that congressional district that falls into that particular county.

Formally, I define a constituent-weighted House Congressional variable (C_{it}) at the county i level, based on congressional representative variables (y_{jt}) at the congressional district j level in the following way:

$$C_{it} = \sum_{j=1}^{435} y_{jt}\alpha_{ij}$$

Where i indexes counties, j indexes 435 congressional districts, t indexes the year, and α_{ij} represents the constituent weight given to each county. For every congressional district j, split by H counties, $\sum_{i=1}^{H} \alpha_{ij} = 1$. y_{jt} represents each of the House variables as commonly defined: 0 or 1 for HAC representation, and the number of terms served in the House, by political party. The resulting House variables (HAC, $HouseD.$, $HouseR.$) are weighted according to my method. The Senate variables are, of course, not weighted.

For example, Kansas's 4th Congressional District was represented by Republican Todd Tiahrt from 1995 to 2011. The fact that Tiahrt served on the HAC implies that the counties within his congressional district should receive positive values for the HAC variable. However, as Figure 7 shows, the 4th Congressional District varied greatly in terms of its population distribution across the counties it contains. Sedgwick County, which includes the city of Wichita, contains the majority of the district's population. Thus, to assign a dummy variable of 1 for all eleven counties in the 4th district would be misleading, assuming that a representative cares most about the welfare of the areas where the most of his or her constituents are located. The numbers in Figure 7 are the constituent-weighted HAC variable values.

My method of constituent-weighting congressional variables proves especially valuable for more complicated scenarios. The highest HAC value over the sample period is for Los Angles County, which is split

by 18 congressional districts, not all of which are perfectly contained within the county lines. It receives a 2 for the HAC variable, since during the years 2007 to 2010 it had two members whose districts were completely contained within its borders: Lucille Roybal-Allard (D, CA, 34) and Adam Schiff (D, CA, 29). Again, to give Los Angeles County a HAC value of 1 would downplay the level of access the county has to representation on the HAC.

Information on congressional committee appointments to the House and Senate Appropriations Committees (HAC and SAC respectively) and member tenure by term length and party ($HouseD.$, $HouseR.$, $SenateD.$, and $SenateR.$) come from Charles Stewart's database.[34]

One additional political control variable available at the county level is the absolute value of the deviation of the county percent Democrat vote in the last presidential election compared to the national average ($Votegap$). This follows the Levitt and Poterba (1999) approach to measuring politically "competitive" regions.[35]

Other variables

Until recently, measuring housing prices at the county level was not possible. Using repeat sales data, Bogin et al. (2016) develop a housing price index at the zip code level for 1975 to 2015. I constructed county-level averages of the Bogin et al. (2016) data by weighting each zip code by percent of county population.

The Bureau of Economic Analysis (BEA) regional statistics series provides data by NAICS industry code on the wages and employments of every county in the United States from 1969 to 2014. Additionally, they provide the level of personal income and population. The Bureau of Labor Statistics Local Area Unemployment Survey (LAUS) is used for unemployment rate data by county.

I also use the state level aggregated total of state-to-local government aid from the Census Bureau. This series is used from year 2004 onward, and represents the state level aggregate funding supplied to local governments from their states.[36] The level of state intergovernmental aid is likely to impact the fiscal condition of local governments and their decision to lobby for earmarks. Unfortunately, there are no annual series at the county or local government level.

[34] See: Stewart (2011)

[35] The data for the $Votegap$ variable come from the CQ electoral database.

[36] Although there are earlier years available, the data are not available for 2002 to 2003 because the Census Bureau did not conduct a local government survey in those years. Rather than impute 2002 and 2003, I simply begin using these data in 2004.

Summary Statistics

Table 2 highlights the summary statistics for the data for the year 2009. Only 19 percent of the county-year observations lobbied at some point over the period of 2001 to 2014, and the differences are apparent. For the lobbying group of counties, the average number of earmarks was higher in both dollars and occurrences; they received almost seven times as many earmarks as non-lobbying counties both in number and dollar amount. They were also more likely to have HAC representation and longer tenured representatives in the House. Interestingly, the differences are not present for Senate controls, suggesting that the local governmental allocation of federal earmarks depends on the House but not the Senate variables. Lobbying counties also tended to be more politically competitive as measured by the gap in the Democratic vote between the county and the national average in the 2008 presidential election (Vote gap), had slightly higher unemployment rates, larger populations, were less farm- and manufacturing-based in industry, and had larger levels of personal income per capita. In other words, lobbying counties tended to be more urban.[37] They also received more total federal grants, and experienced larger decreases in their housing price growth rates.

Table 3 shows that the correlations are as expected. All of the House variables are strongly correlated with earmarks, while the Senate variables are not. The strongest correlation is between lobbying and earmarks. The constituent weighted HAC, $HouseD.$, and $HouseR.$ (terms of tenure for House Democrats and Republicans, respectively), are correlated strongly with both earmarks and with lobbying.

Figure 8 shows the relationship between the amount of lobbying expenditures and the number of earmarks received. Each data point is a county, and is indexed by state, congressional district, and the last digit of the year that the earmark was enacted, matched with the lagged year that the lobbying took place. A detectable aggregate pattern exists between lagged lobbying expenditures and earmarks. There are some counties that exhibit a strong upward correlation where lobbying and earmarks are positively correlated over time. For example, Los Angeles County, (CA, 27) shows a strong, upward trend, spending $1.22 million, $2.23 million, and $2.64 million in 2004, 2007, and 2008 respectively, and receiving 32, 50, and 41 earmarks in 2005, 2008, and 2009 respectively.[38] However, there are some places with very little or no lobbying that do receive earmarks, such as Westchester, NY (NY, 18) which spent just over $80,000 in each of the years prior to receiving 16 earmarks in 2008 and 17 in 2009.

[37] This corroborates with the findings of Chernick et al. (2011), in that more urban local governments tend to be less reliant on the property tax. They would be more likely to be hit by the direct effects of the Great Recession, and therefore more likely to lobby.

[38] For the purposes of illustration, counties here are assigned to the congressional district that contains the most of their population. Los Angeles County is thus labeled as belonging to the 27th congressional district, even though it contains 18 congressional districts.

V. Results

For each of the tables, column (1) is a pooled cross section OLS model with no control variables. Columns (2) and (3) include fixed effects and several control variables that are likely to be important explaining earmarks. Given that there are many institutional differences across the United States in terms of local governments, the fixed effects will be important in order to avoid bias in estimating the rate of returns to lobbying.

Another potential concern would be the possibility for earmarks funded by the American Recovery and Reinvestment Act (ARRA) of 2009 to be correlated with housing prices. If earmarks were funded by the ARRA, then it is possible that they might be correlated with the instrument for lobbying, thus violating a key assumption of instrumental variables. However, the ARRA was claimed to be earmark free (Adair, 2009), and while it is possible that it funded some earmarks, scholarly work on the ARRA has noted that the law, for the most part, used pre-existing formulas and did not target funds to areas with higher than average unemployment rates (Wilson, 2012), (Young and Sobel, 2013), (Dupor et al., 2014). This makes it highly unlikely that housing price changes in 2008 (the instrument for lobbying in 2008 used to calculate the rate of returns to lobbying for 2009 earmarks) would be correlated with earmarks in 2009. Note, that throughout the results, missing BEA data decreases the number of observations as more variables are included in the specifications.[39]

The results for specifications where earmarks are defined as the log of the dollar amount are displayed in Table 4. Column (1) is a pooled cross section with no control variables. For a 1 percent increase in lobbying expenditures, earmarks increase by 0.56 percent, significant at the 99 percent level. The inclusion of control variables in columns (2) and (3) drop the coefficient further to 0.23 percent with the same level of statistical significance.

Table 5 displays results for earmarks as a binary variable in order to show the impact of lobbying on earmarks along the extensive margin. Column (1) implies that for a 1 percent increase in lobbying, the probability of receiving an earmark increases by 0.04 percentage points.

Column (2) shows that the elasticity has fallen to a 0.015 percentage point increase in the probability of receiving an earmark for a 1 percent increase in lobbying expenditures.

Of the congressional variables, only the coefficient on tenure for membership on the SAC and years of

[39] See the Data Description for information on missing observations.

tenure for Senators in the Democratic party are statistically significant. At first glance this may seem puzzling, since the correlation coefficients showed a strong relationship and theory predicts that the constituent-weighted House variables should matter more than the Senate variables. However, as the data description below notes, there was only one change in majority party over the sample period, so the fixed effects most likely will pick up most of the variation on the congressional variables.[40]

Instrumental Variables

The decision to lobby may be endogenous to receiving an earmark. For example, if a local government is more or less likely to lobby based on their expectations about their chance of success, then the point estimates of the elasticity of earmarks to lobbying will be biased. To address this, I use instrumental variables methods.

I instrument for lobbying expenditures with the growth rate of the housing price index. Column (5) of Table 4 shows the first stage results from the instrumental variables regressions with fixed effects.

The dependent variable is the lagged logarithm of lobbying. It is strongly correlated with the instrument which is significant at the 99 percent level with a coefficient of -0.046. This negative correlation implies that a 1 percentage point increase in the growth rate of the housing price index is associated with a decrease in lobbying of 4.6 percent. The time period of the analysis (2005, 2008-2009) captures the before and after variation in housing prices that occurred before and during the Great Recession. The rest of the coefficients demonstrate that governments that lobby are more politically competitive, have decreasing growth in personal income per capita, and experience positive changes in unemployment rates.

The second stage instrumental variables results are shown in column (4) of Tables 4 and 5. The first stage F test statistic of the excluded instrument is 56.69, indicating a strong correlation between housing prices and lobbying.

For the specification with earmarks defined as the log dollar amount (Table 4), the point estimate jumps to 0.486, however it is significant at the 90 percent level. Using this point estimate as an elasticity, I find that for an additional $1 in lobbying expenditures among local governments that lobby, there is an increase in the size of earmarks of $5.11.

Table 5 also displays a large jump in the point estimate for lobbying to 0.06 and is statistically signif-

[40]The same specifications were estimated with random effects instead of fixed effects, and all of the House congressional variables proved statistically significant and large in magnitude. This corroborates De Figueiredo and Silverman (2006).

icant at the 95 percent level. An additional 1 percent of lobbying increases the probability of receiving an earmark by 0.006 percentage points, which implies that among local governments that lobby, an additional $1 in lobbying expenditures leads to an increase of $0.63 in expected value of earmarks.

The results indicate that counties appear to be lobbying too little along the intensive margin, but too much along the extensive margin. Taken together, these findings point to barriers to receiving earmarks in terms of lobbying expenditures. Counties that wish to improve their probability of receiving an earmark must overspend on lobbying relative to what is sensible in terms of expected value. This may perhaps be why there is so little lobbying, and why the returns to lobbying along the extensive margin appear to be so profitable; more is actually required than just an additional $1 in lobbying in order to get that additional $5 in earmarks. In other words, going from 0 to positive amounts of earmarks is more costly than going from some positive amount of earmarks to a larger amount. This phenomenon is described by Kerr et al. (2014) in the context of private firms' lobbying activities as "increasing returns to experience."

Robustness Checks

Due to the possibility that larger local governments may be more likely to lobby for something other than earmarks, such as policy changes, I have re-estimated all of the models after dropping the largest 5th percentile of counties in terms of population. These results are noted in the table titles as "(dropped large counties)" (Tables 6 and 7).

In both cases, the instrumental variables coefficient is not statistically significant. Also, the F statistic drops to below 6, causing concern over the strength of housing prices as an instrument. These results corroborate the fact that local government lobbying is dominated by large counties.

VI. Conclusion

This paper contributes to the economic literature on lobbying by providing an estimate of the rate of returns to lobbying. I find economically and statistically significant returns to lobbying along both the intensive and extensive margins of earmark distribution, but the estimated rate of returns in each case point to different conclusions regarding the optimal level of lobbying expenditures: additional lobbying is not likely to be profitable in securing an earmark, while it is highly likely to be profitable in securing a larger earmark. This difference may explain why relatively few counties lobbied (19 percent) or received earmarks (22.5

percent), and why the majority of local government lobbying is done year after year by highly populated counties. Most local governments cannot count on receiving an earmark, and thus most places simply do not bother lobbying for them.

Several other more nuanced explanations of the relative lack of lobbying may also be relevant. Local governments that wish to lobby may be deterred from doing so due to financially prohibitive initial costs that do not payoff until years later. Additionally, some lobbying is carried out by national associations such as the National League of Cities. Local governments with fewer resources may be more likely to opt for representation through such an organization, or through partnerships with private companies.[41]

A final explanation of the dearth of lobbying relates to the potential spillover effects of earmarks and lobbying. If earmarks tend to benefit neighboring counties as well as the receiving county, then local governments may be less likely to lobby. Also, to the extent that local governments are aware of their neighbors' propensity to lobby, they may be less likely to engage in the costly investment themselves, given that they stand to benefit if their neighbor lobbies. Future work may be needed to model this interaction in a game-theoretic way, and using spatial econometric methods.

Given the ban on earmarks that went into effect in 2011, the situation today is significantly altered. Local governments no longer have access to the same opportunities.[42] How lobbying has changed since the end of the "Age of Earmarks," remains to be seen.

[41] A conversation with one lobbyist indicated that local governments without the funds to hire lobbyists frequently join with other interested parties.

[42] See: Times (2012).

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Figures and Tables

Figure 1: Earmarks As Percent of 2007 Own-Source Revenues

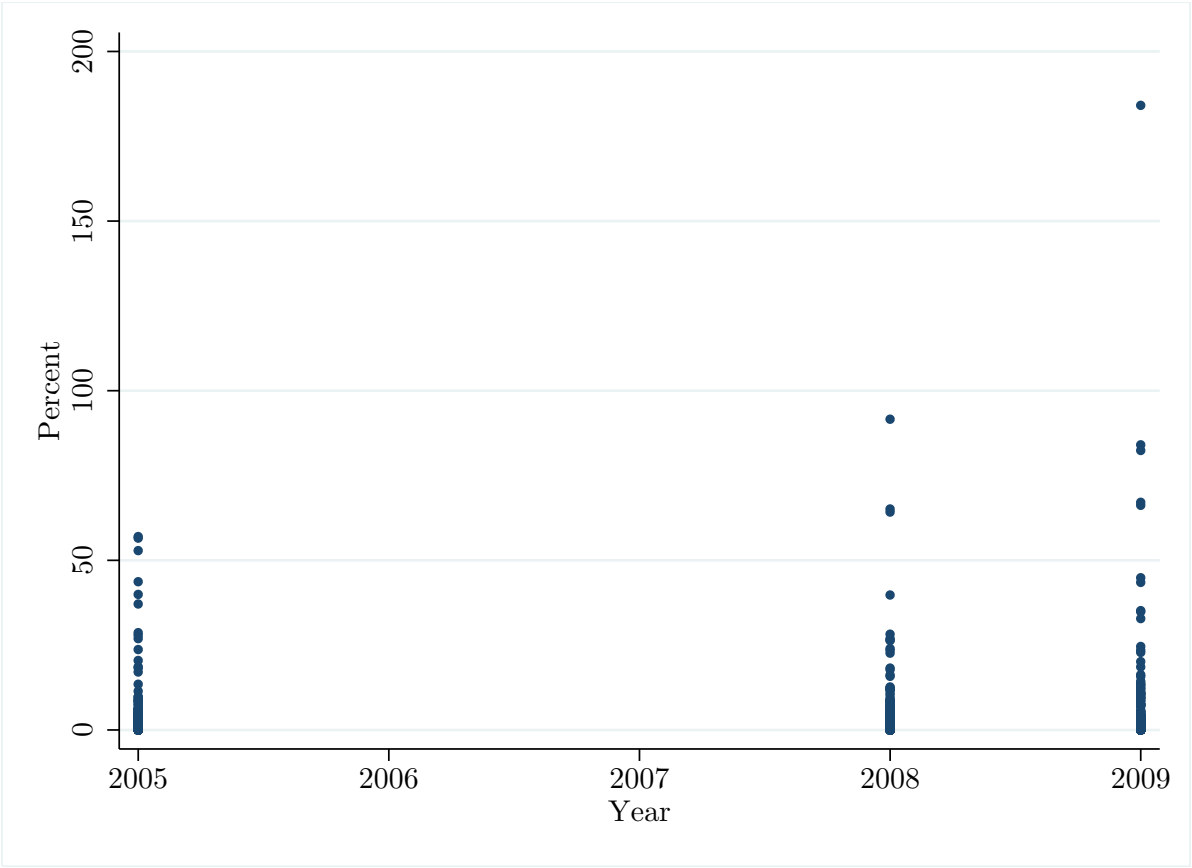


Figure 2: Number of Earmarks

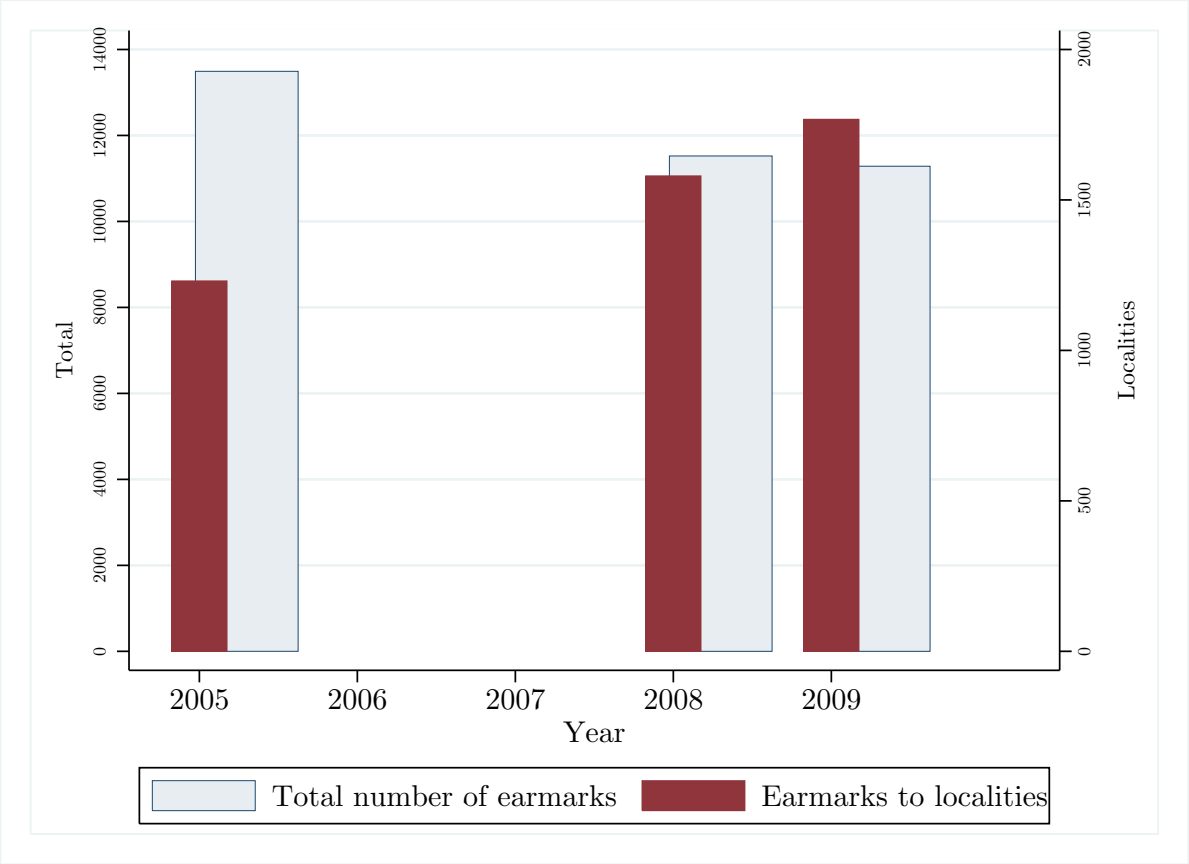
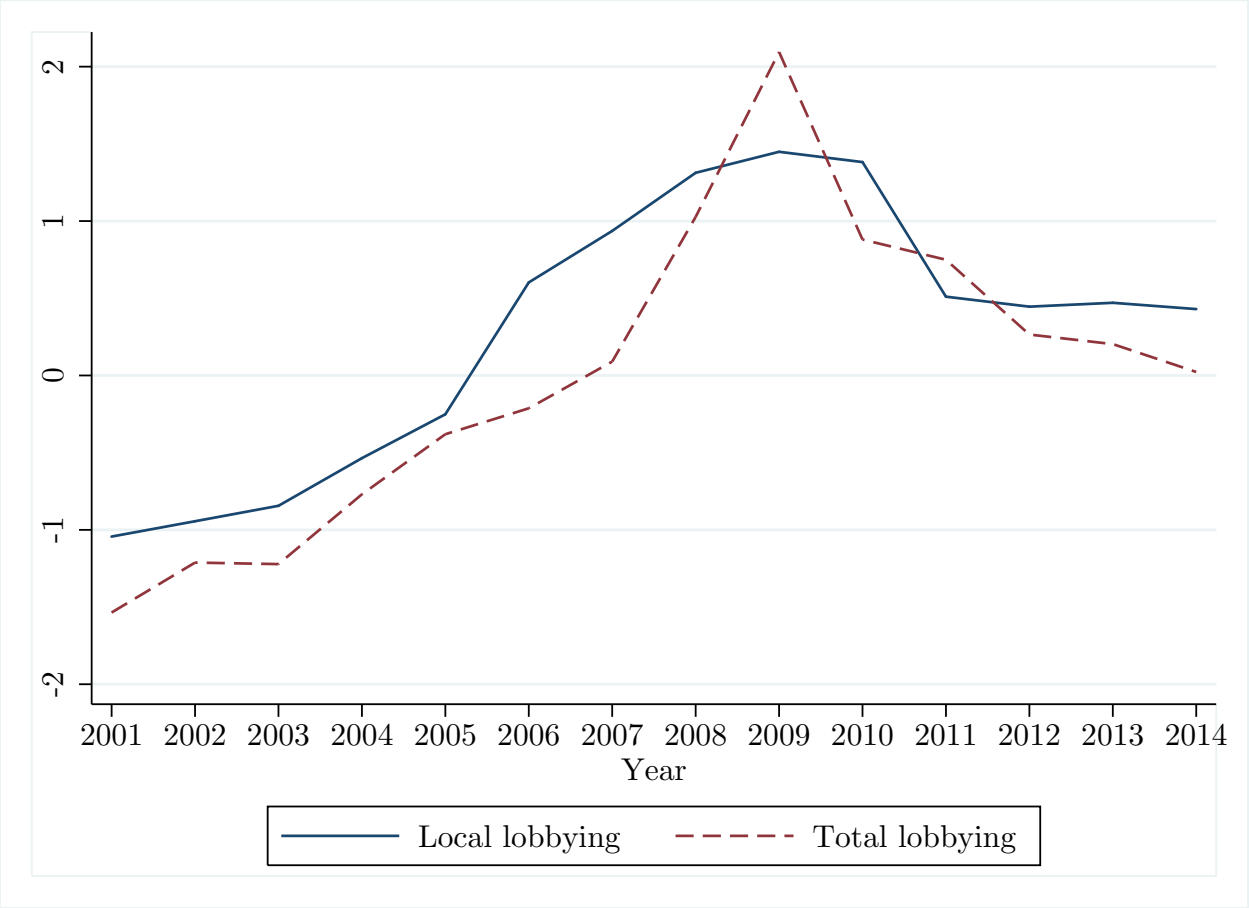
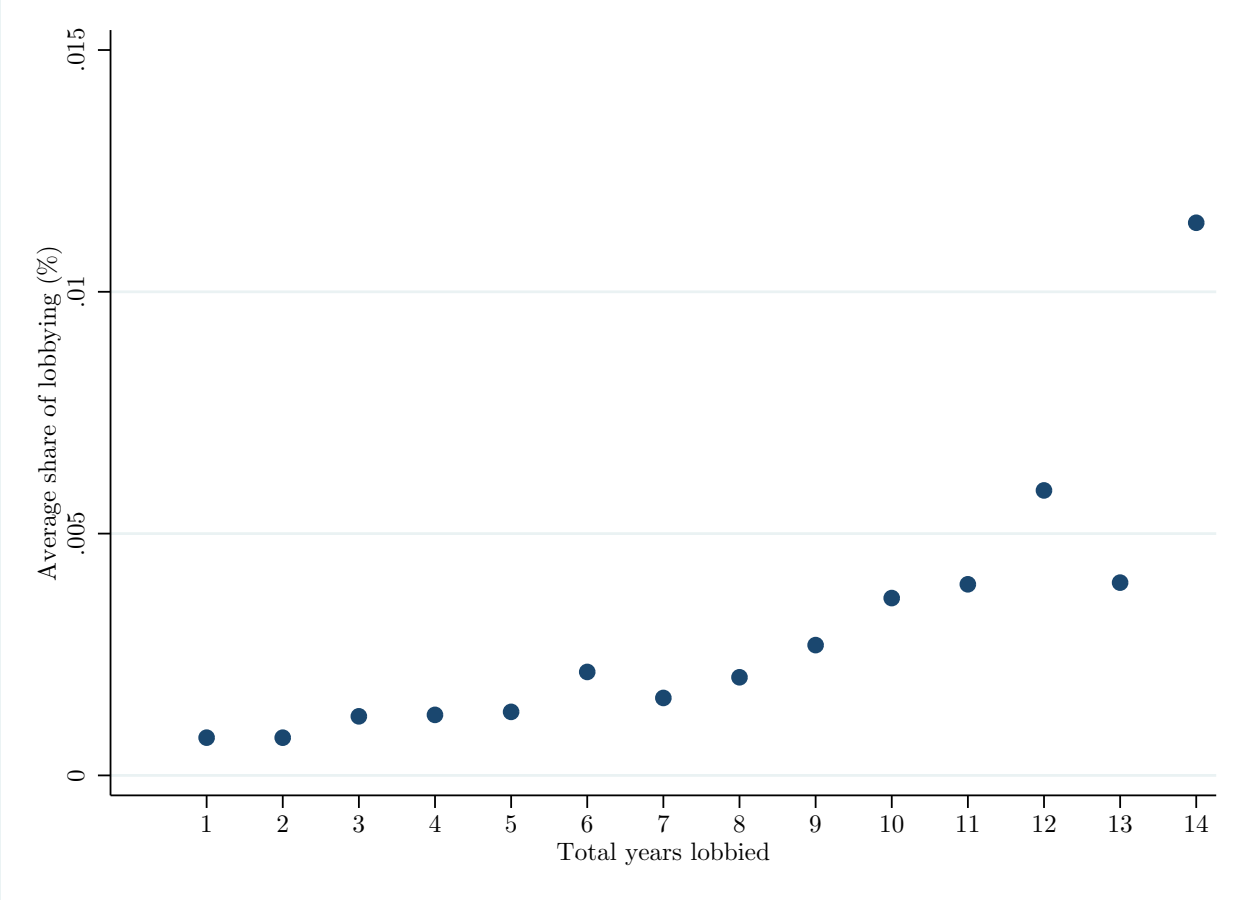


Figure 3: Standardized Lobbying Expenditures



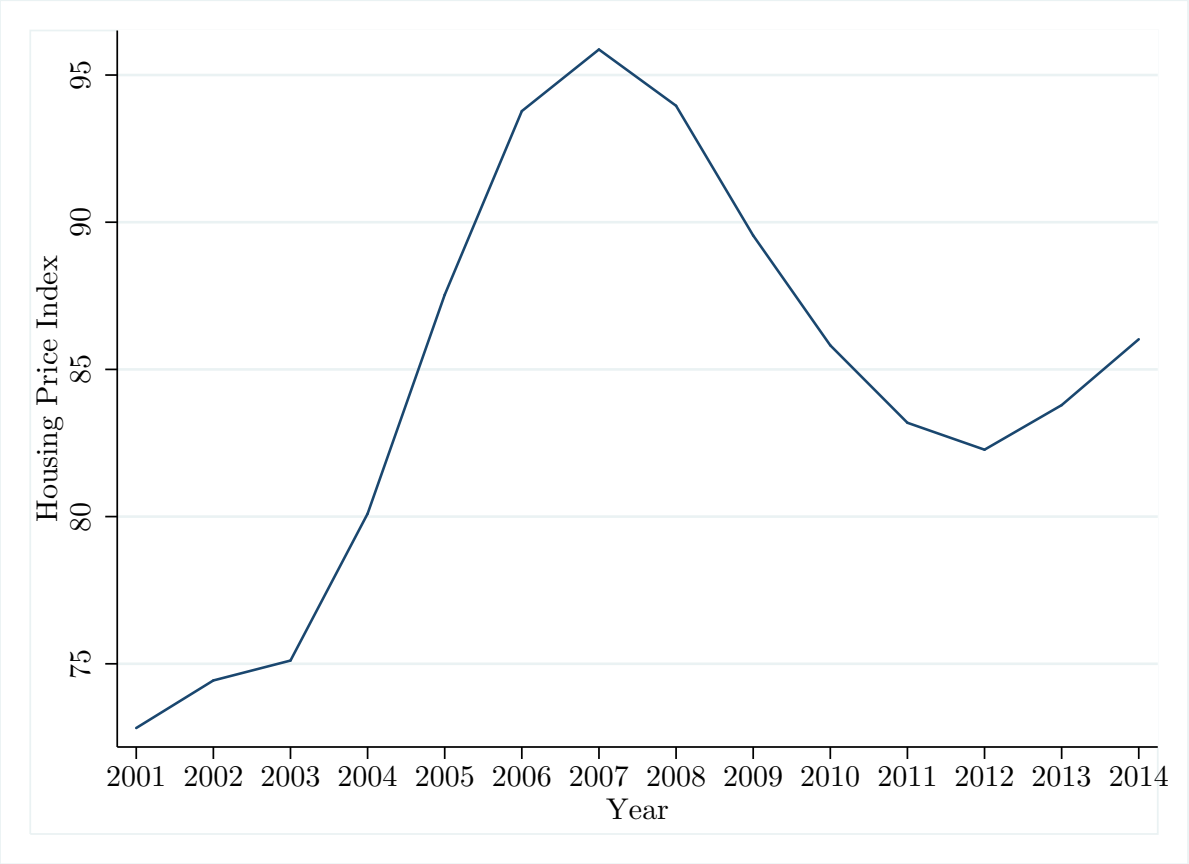
Note: Lobbying expenditures are standardized to have a mean of 0 and standard deviation of 1 for both series in order to show the relative trends.

Figure 4: Average Lobbying by Total Years Lobbied



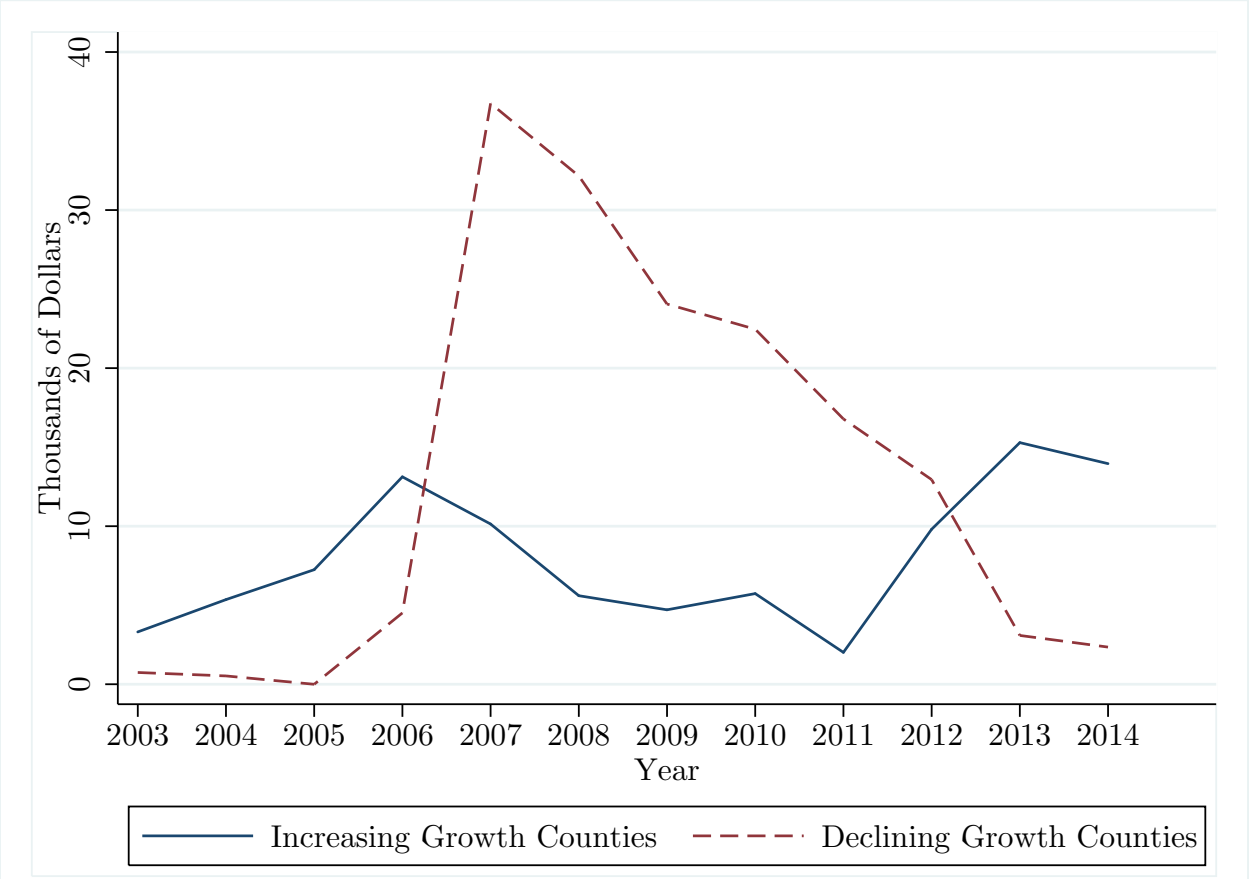
Note: Average share of lobbying (%) represents the percentage of total lobbying a county expends in the average year. Total Years Lobbied is the total number of years a county lobbied from 2001 to 2014.

Figure 5: Housing Price Index



Note: The base year for the housing price index is 2000. The data come from (Bogin et al., 2016).

Figure 6: Average Lobbying Expenditures by Housing Price Growth Rates



Note: Each annual data point represents the average lobbying expenditures for counties based on the growth rate of housing prices. For each year, counties are assigned into one of two groups based on whether their growth rate in housing prices was positive or negative. Average lobbying expenditures are in thousands of 2009 dollars.

Figure 7: The 4th Congressional District of Kansas

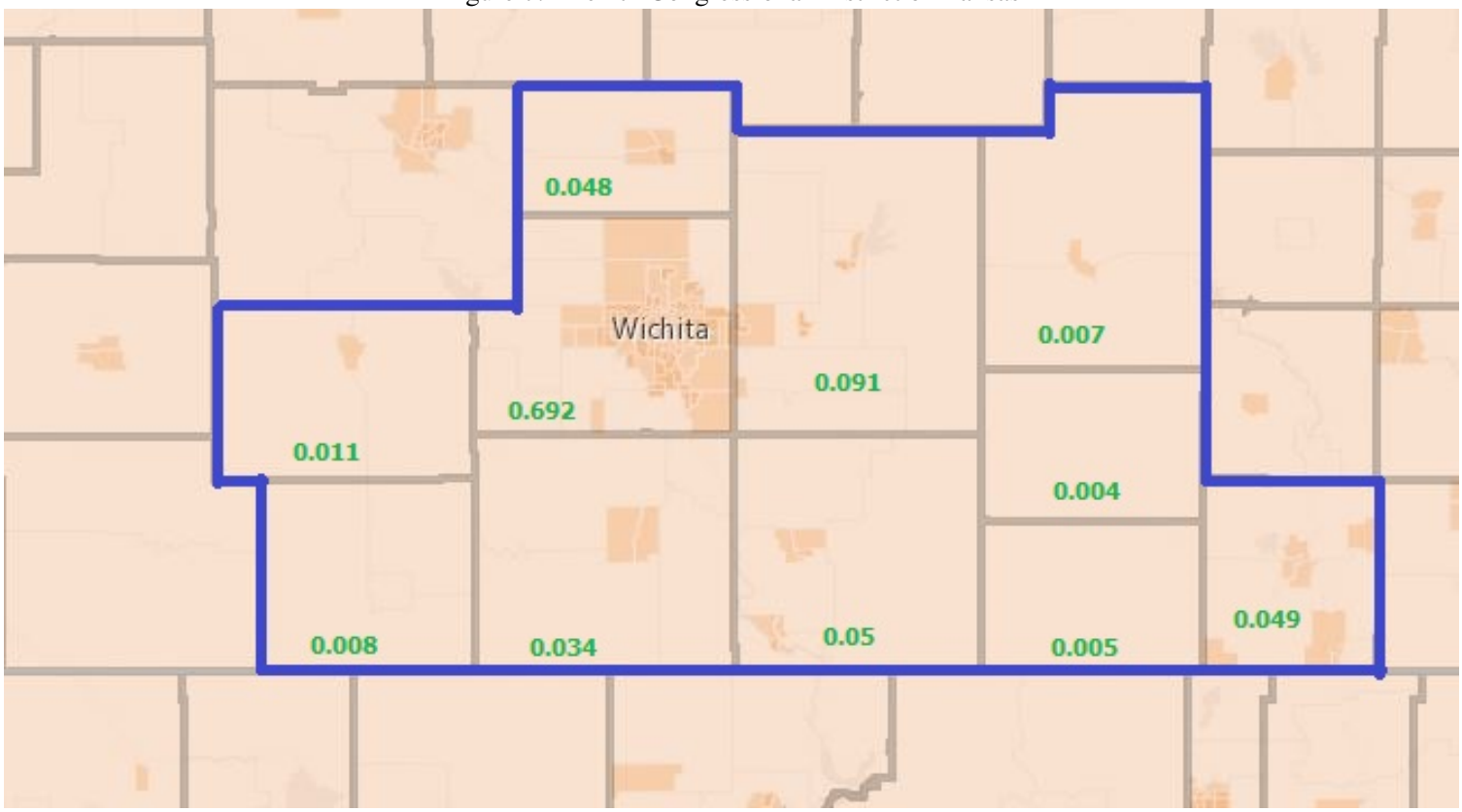
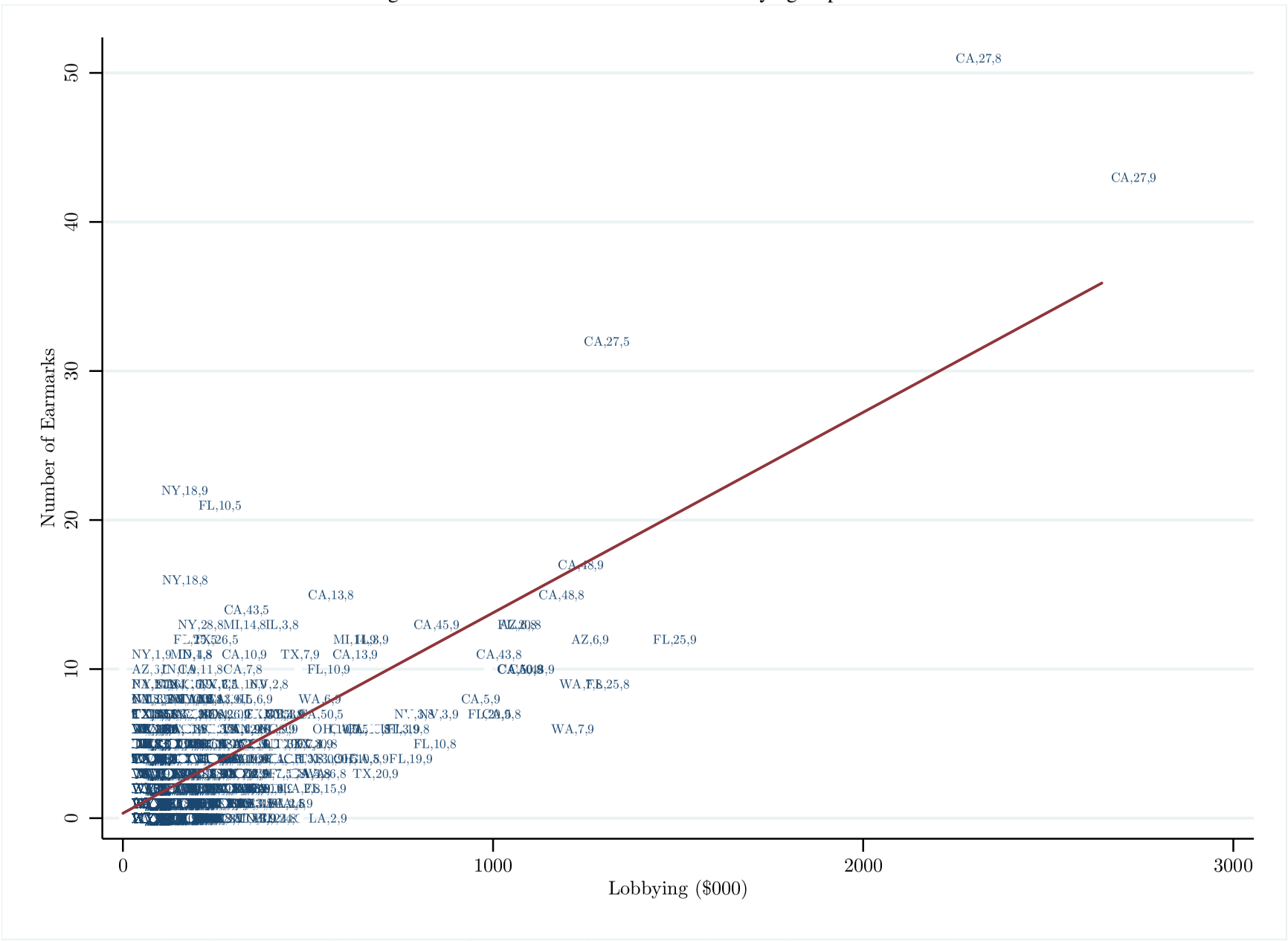


Figure 8: Distribution of Earmarks and Lobbying Expenditures



Note: State, congressional district, and last digit of year noted for each county in graph. Lobbying expenditures are lagged, and in thousands of 2009 dollars.

Table 1: Earmarks As Percentages of Own-Source Revenues
By Population Quartiles

	Mean	SD	N
Q1			
2005	5.00	10.23	155
2008	3.82	8.25	202
2009	6.05	17.18	176
Q2			
2005	0.93	1.11	151
2008	1.81	7.00	196
2009	1.98	7.98	186
Q3			
2005	0.41	0.96	151
2008	0.50	1.55	181
2009	0.50	1.23	201
Q4			
2005	0.13	0.21	143
2008	0.23	0.65	187
2009	0.16	0.21	192

NOTE: All values are in percent terms in relation to local government own-source revenues for county, municipal, and township governments from the 2007 Census of Governments.

Table 2: County Descriptive Statistics, 2009

	Never lobbied (N = 2589)		Lobbied (N = 490)	
	Mean	SD	Mean	SD
1				
Earmarks (number)	0.30	0.82	2.02	3.31
Earmark amounts (thousands)	171	1,257	1,204	2,696
Lobbying amounts (thousands)	0	0	109	211
HAC	0.01	0.06	0.07	0.22
SAC	0.62	0.49	0.50	0.50
Tenure (House Dem.)	0.23	1.26	1.69	5.42
Tenure (House Repub.)	0.20	0.58	1.26	2.85
Tenure (Senate Dem.)	10.07	15.82	9.86	12.92
Tenure (Senate Repub.)	14.46	12.94	13.72	13.70
Vote gap	15.52	10.01	11.99	8.80
Unemployment Rate	8.16	3.98	8.78	3.52
Personal Income, Per Capita (thousands)	32	7	36	9
Federal Grants (millions)	99	693	832	1,919
Population (thousands)	49	119	362	679
Farm Employment, Share	0.0856	0.0728	0.0225	0.0288
Construction Employment, Share	0.0641	0.0276	0.0607	0.0211
Manufacturing Employment, Share	0.0927	0.0682	0.0742	0.0484
Housing Price Index, $\%\Delta$	-2.2603	3.6422	-6.3079	7.3478

NOTE: Counties are categorized as either or based on whether at any point during 2001 to 2014.

Table 3: Cross Correlations

	Earmarks	Lobbying	HAC	SAC	House D.	House R.	Senate D.	Senate R.	Vote gap
Earmarks	1.00								
Lobbying	0.67	1.00							
HAC	0.53	0.42	1.00						
SAC	0.02	−0.01	−0.02	1.00					
House D.	0.65	0.56	0.54	−0.02	1.00				
House R.	0.51	0.54	0.45	−0.02	0.26	1.00			
Senate D.	0.10	0.04	0.04	0.10	0.11	0.04	1.00		
Senate R.	−0.06	−0.06	−0.05	0.22	−0.10	−0.07	−0.48	1.00	
Vote gap	−0.09	−0.05	−0.06	0.14	−0.01	−0.11	−0.22	0.19	1.00

NOTE: Earmark is defined here as the number of earmarks each county received. Each of the House and Senate variables are the tenure variables by party.

Table 4: Rate of Returns to Lobbying
Dependent variable: Earmark Amount (logarithm of total dollar value)

	(1)	(2)	(3)	(4)	(5)
Lobbying	0.557^{***}	0.233^{***}	0.231^{***}	0.486^{*}	
	(0.017)	(0.041)	(0.040)	(0.266)	
PI per capita $(\%\Delta)$		2.758^{*}	2.866^{*}	3.106^{*}	-1.031^{*}
		(1.546)	(1.548)	(1.608)	(0.561)
Unemployment rate $(\%\Delta)$		0.019	0.017	0.013	0.015^{**}
		(0.021)	(0.021)	(0.021)	(0.006)
Population $(\%\Delta)$		16.395^{**}	16.141^{**}	16.520^{**}	3.594
		(7.762)	(7.783)	(7.661)	(3.585)
State-to-local aid		-1.490	-0.801	-0.786	0.096
		(1.867)	(2.063)	(2.076)	(0.706)
Log of population		-3.563	-3.788	-6.245^{*}	8.839^{***}
		(2.393)	(2.372)	(3.677)	(1.935)
Log of personal income percap		-2.112	-1.997	-1.938	0.473
		(1.476)	(1.438)	(1.473)	(0.730)
Vote gap			-0.054	-0.046	-0.021^{***}
			(0.035)	(0.037)	(0.008)
HAC			0.189	0.536	-1.624
			(1.527)	(1.631)	(1.077)
SAC			-0.604^{**}	-0.609^{**}	0.009
			(0.238)	(0.258)	(0.149)
House D.			-0.005	-0.053	0.142
			(0.130)	(0.130)	(0.146)
House R.			0.334^{*}	0.342^{*}	-0.013
			(0.199)	(0.207)	(0.112)
Senate D.			0.003	0.005	-0.005
			(0.011)	(0.011)	(0.007)
Senate R.			-0.022	-0.023	0.010
			(0.022)	(0.023)	(0.010)
Housing Price Index $(\%\Delta)$					-0.046^{***}
					(0.006)
Obs.	8,122	8,122	8,122	8,122	8,122
Counties		2,714	2,714	2,714	2,714
IV F Statistic				56.69	
Fixed Effects	No	Yes	Yes	Yes	Yes
Year Effects	No	Yes	Yes	Yes	Yes

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. I have left out the industry share variables because they are insignificant and limit the sample due to missing data.

Table 5: Rate of Returns to Lobbying
Dependent variable: Earmark Receipient (binary variable)

	(1)	(2)	(3)	(4)	(5)
Lobbying	0.044^{***}	0.015^{***}	0.015^{***}	0.060^{**}	
	(0.001)	(0.003)	(0.003)	(0.027)	
PI per capita $(\%\Delta)$		0.097	0.107	0.150	-1.031^{*}
		(0.134)	(0.129)	(0.140)	(0.561)
Unemployment rate $(\%\Delta)$		0.001	0.001	0.001	0.015^{**}
		(0.002)	(0.002)	(0.002)	(0.006)
Population $(\%\Delta)$		0.758	0.679	0.746	3.594
		(0.677)	(0.683)	(0.663)	(3.585)
State-to-local aid		-0.299	-0.148	-0.145	0.096
		(0.187)	(0.200)	(0.207)	(0.706)
Log of population		-0.430^{*}	-0.370	-0.808^{**}	8.839^{***}
		(0.225)	(0.227)	(0.334)	(1.935)
Log of personal income percap		-0.157	-0.160	-0.149	0.473
		(0.120)	(0.111)	(0.122)	(0.730)
Vote gap			-0.003	-0.002	-0.021^{***}
			(0.003)	(0.003)	(0.008)
HAC			-0.054	0.008	-1.624
			(0.094)	(0.118)	(1.077)
SAC			-0.029	-0.030^{*}	0.009
			(0.023)	(0.016)	(0.149)
House D.			0.000	-0.008	0.142
			(0.011)	(0.012)	(0.146)
House R.			0.002	0.003	-0.013
			(0.011)	(0.013)	(0.112)
Senate D.			0.004^{***}	0.004^{***}	-0.005
			(0.001)	(0.001)	(0.007)
Senate R.			-0.001	-0.001	0.010
			(0.002)	(0.002)	(0.010)
Housing Price Index $(\%\Delta)$, lagged					-0.046^{***}
					(0.006)
Obs.	8,122	8,122	8,122	8,122	8,122
Counties		2,714	2,714	2,714	2,714
IV F Statistic				56.69	
Fixed Effects	No	Yes	Yes	Yes	Yes
Year Effects	No	Yes	Yes	Yes	Yes

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. I have left out the industry share variables because they are insignificant and limit the sample due to missing data.

Table 6: Rate of Returns to Lobbying (dropped largest counties)
Dependent variable: Earmark Amount (logarithm of total dollar value)

	(1)	(2)	(3)	(4)	(5)
Lobbying	0.413***	0.280***	0.279***	0.438	
	(0.020)	(0.053)	(0.052)	(0.655)	
PI per capita (%Δ)		2.539*	2.682*	2.736*	−0.376
		(1.481)	(1.526)	(1.558)	(0.508)
Unemployment rate (%Δ)		0.019	0.017	0.015	0.013**
		(0.022)	(0.022)	(0.023)	(0.006)
Population (%Δ)		15.271**	14.904*	15.565*	−1.107
		(7.616)	(7.614)	(7.989)	(3.185)
State-to-local aid		−1.690	−0.947	−0.972	0.270
		(1.818)	(2.087)	(2.098)	(0.610)
Log of population		−4.366*	−4.443*	−5.931	8.878***
		(2.425)	(2.422)	(6.711)	(1.679)
Log of personal income percap		−2.165	−2.072	−2.100	0.441
		(1.419)	(1.430)	(1.436)	(0.619)
Vote gap			−0.048	−0.044	−0.022***
			(0.035)	(0.042)	(0.007)
HAC			6.864	7.238	−2.166
			(4.448)	(4.593)	(1.591)
SAC			−0.472**	−0.469*	−0.012
			(0.241)	(0.253)	(0.117)
House D.			0.149	0.054	0.466
			(0.620)	(0.787)	(0.658)
House R.			−0.037	−0.019	−0.130
			(0.380)	(0.369)	(0.304)
Senate D.			0.002	0.003	−0.009
			(0.012)	(0.013)	(0.007)
Senate R.			−0.025	−0.026	0.011
			(0.021)	(0.024)	(0.009)
Housing Price Index (%Δ)					−0.027**
					(0.011)
Obs.	7,642	7,642	7,642	7,642	7,642
Counties		2,554	2,554	2,554	2,554
IV F Statistic				5.57	
Fixed Effects	No	Yes	Yes	Yes	Yes
Year Effects	No	Yes	Yes	Yes	Yes

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. I have left out the industry share variables because they are insignificant and limit the sample due to missing data.

Table 7: Rate of Returns to Lobbying (dropped largest counties)
Dependent variable: Earmark Receipient (binary variable)

	(1)	(2)	(3)	(4)	(5)
Lobbying	0.035^{***}	0.017^{***}	0.017^{***}	0.080	
	(0.002)	(0.004)	(0.004)	(0.061)	
PI per capita ($\%\Delta$)		0.108	0.111	0.132	-0.376
		(0.132)	(0.127)	(0.141)	(0.508)
Unemployment rate ($\%\Delta$)		0.002	0.002	0.001	0.013^{**}
		(0.002)	(0.002)	(0.002)	(0.006)
Population ($\%\Delta$)		0.617	0.544	0.807	-1.107
		(0.665)	(0.663)	(0.687)	(3.185)
State-to-local aid		-0.285	-0.131	-0.141	0.270
		(0.194)	(0.202)	(0.207)	(0.610)
Log of population		-0.467^{*}	-0.405	-0.996	8.878^{***}
		(0.257)	(0.261)	(0.607)	(1.679)
Log of personal income percap		-0.192	-0.172	-0.183	0.441
		(0.122)	(0.114)	(0.125)	(0.619)
Vote gap			-0.002	-0.001	-0.022^{***}
			(0.003)	(0.003)	(0.007)
HAC			0.287	0.436	-2.166
			(0.286)	(0.318)	(1.591)
SAC			-0.041^{**}	-0.040^{***}	-0.012
			(0.017)	(0.015)	(0.117)
House D.			0.113^{*}	0.075	0.466
			(0.059)	(0.085)	(0.658)
House R.			-0.010	-0.003	-0.130
			(0.024)	(0.029)	(0.304)
Senate D.			0.004^{***}	0.005^{***}	-0.009
			(0.001)	(0.001)	(0.007)
Senate R.			-0.000	-0.001	0.011
			(0.002)	(0.002)	(0.009)
Housing Price Index ($\%\Delta$), lagged					-0.027^{**}
					(0.011)
Obs.	7,642	7,642	7,642	7,642	7,642
Counties		2,554	2,554	2,554	2,554
IV F Statistic				5.57	
Fixed Effects	No	Yes	Yes	Yes	Yes
Year Effects	No	Yes	Yes	Yes	Yes

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. I have left out the industry share variables because they are insignificant and limit the sample due to missing data.

Appendix

The second order condition for the theoretical model discussed above is:

$$\frac{\partial^2 \pi_i}{\partial L_i^2} = \beta Z_i(\beta - 1)(B_i + Z_i L_i)^{\beta - 2} < 0 \tag{11}$$

In the alternative model, I motivate the impact of lobbying on earmarks along the *extensive* margin of earmark distribution. The risk averse local government lobbies to maximize its expected utility, given that lobbying increases the probability of receiving an earmark:

$$\pi_i = Z_i + ln(L_i) \tag{12}$$

where $\pi_i \in [0, 1]$ is the probability of local government i recieving an earmark, and Z_i is a series of both observable and unobservable variables characterizing local government i, and L_i are the lobbying expenditures incurred by local government i. For the same reason as the previous model, estimation of Equation 12 will suffer from ommitted variable bias because L_i is correlated with unobserved elements of Z_i.

In order to derive an instrument, I follow a similar procedure as the previous model. Here, I assume that local governments seek to maximize their expected utility.

$$\max_{L_i} \{\pi_i U(W_1) + (1 - \pi_i) U(W_0) - cL_i\} \tag{13}$$

where the "good" state of the world is when the local government wins the earmark: $W_1 = R_i + E$, and the "bad" state of the world is when the local government has only its own-source revenues: $W_0 = R_i$. The utility function is of the form $U(\cdot)^\beta$, where $\beta \in (0, 1)$, and c is a constant marginal cost to lobbying. Substituting in from Equation 12, the local government's maximization problem becomes:

$$\max_{L_i} \{\big[Z_i + ln(L_i)\big](R_i + E)^\beta + (1 - \big[Z_i + ln(L_i)\big])(R_i)^\beta - cL_i\} \tag{14}$$

Differentiating with respect to L_i yields the first order condition:

$$\frac{(R_i + E)^\beta}{L_i} - \frac{(R_i)^\beta}{L_i} - c = 0 \tag{15}$$

Solving for L_i gives the optimal lobbying expenditure:

$$L_i^* = \frac{(R_i + E)^\beta - (R_i)^\beta}{c} \tag{16}$$

A comparative static exercise is then performed, giving:

$$\frac{\partial L_i^*}{\partial c} = -\Big[(R_i + E)^\beta - (R_i)^\beta\Big]c^{-2} < 0 \tag{17}$$

$$\frac{\partial L_i^*}{\partial E} = \frac{\beta}{c}(R_i + E)^{\beta-1} > 0 \tag{18}$$

$$\frac{\partial L_i^*}{\partial R_i} = \frac{\beta}{c}\left[\frac{1}{(R_i + E)^{1-\beta}} - \frac{1}{(R_i)^{1-\beta}}\right] < 0 \tag{19}$$

Equations 17 - 19 show that the optimal amount of lobbying expenditures (L_i^*) is decreasing in the cost of lobbying (c) and increasing in the size of the earmark lobbied for (E), while it is decreasing in the size of own-source revenues (R_i).

The intuition behind this last result is that local governments, when faced with a shortfall in own-source revenues, will pay a cost (c) to lobby for an earmark of uncertain size, E. Equation 19 thus implies a viable instrument in the size of own-source revenues, as R_i is predicted to be correlated (inversely) with lobbying, but not with the error term from Equation 12. As in the model above, assuming own-source revenues are a function of changes in the tax base ($R_i = \Delta B_i$) motivates my use of shocks to changes in the tax base as an instrument for lobbying expenditures (L_i).

Data Description

Lobbying expenditures

The data on lobbying expenditures come from the SOPR database. The Lobbying Disclosure Act of 1995 (LDA 1995) mandated that federal lobbyists semi-annually report their activities to the Secretary of the Senate and Clerk of the House of Representatives. All amounts lobbying revenues greater than $5,000 were to be reported by lobbying firms, and lobbying expenditures greater than $20,000 for organizations with in house lobbyists ("self-filers"). The law was later amended with the Honest Leadership and Open Government Act of 2007, which altered the monetary threshold and frequency of the reporting requirements. Under the amended law, the threshold was lowered to $2,500 for lobbying firms, and $10,000 for self-filers, and reports were required to be quarterly instead of semi-annually. Additionally, reports were required to be submitted through a single, electronic system through the SOPR. Prior to 2008, reports could be filed on paper, or through two different electronic reporting systems, one for the House and one for the Senate. This presents the possibility for measurement error to a greater extent before 2008.

LDA 1995 defines a lobbyist as "any individual who is employed or retained by a client for financial or other compensation for services that include more than one lobbying contact, other than an individual whose lobbying activities constitute less than 20 percent of the time engaged in the services provided by such individual to that client over a six-month period." Reports must be filed no later than 20 days after the lobbying-client relationship triggers one of several different requirements outlined by the law and must continue, regardless of the size of lobbying expenditures until the relationship is terminated.

The reports are assembled by SOPR staff into a database of records, where the name of the client, time period, and amount, in addition to other information, are recorded. I matched the client name with Census FIPS codes. In some cases, there were clear mistakes in the record that were easy to correct, such as misspelled names. In a few cases, the record was not able to be matched. Records with missing amounts were given the value of zero, although they could technically be any amount less than $5,000. Clients that were listed as multiple governments were dropped from the analysis.

Figure 9 shows that roughly 30 percent of lobbying expenditures were $50,000 or less.

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 directed the OMB to keep track of Congressional earmarks contained in appropriations bills in order to improve transparency (Executive order 13457). This was to "establish a clear benchmark for measuring progress."[43] 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."

For the years 2005, 2008, 2009, and 2010, information on the legislation citation, description, and amount of each earmark is available. Most importantly, the recipient of each earmark is also noted. 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 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, which is unfortunate as it prevents these data from being included in my analysis.

Using the name of the recipient as reported in the OMB data, I matched earmarks with county and municipal governments. The decision to include only county or municipal governments was based primarily on the goal of consistency in regard to geographic boundaries of each observation. Special purpose governments and school districts often overlap county lines, and boundaries of the former are not available. Also, any earmark that listed multiple recipients was dropped.

Figure 10 shows that nearly 80 percent of earmarks to county or municipal governments were $1 million or less, while figure 11 shows that over half of the counties that received earmarks received 1 or less.

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

Congressional variables

The Congressional variables come from Charles Stewart's Congressional Data Page.[44] 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.[45]

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.

I construct the "competition" variable in an analogous way to Levitt and Poterba (1999). It is simply the absolute value of the difference between the percent Democrat vote in each county and the national average in the last presidential election. Thus, for years 2004-2007, the number is the absolute difference from 48.3, and for years 2008 and on it is the absolute difference from 52.9.

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

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

Figure 9: Frequency of lobbying amounts

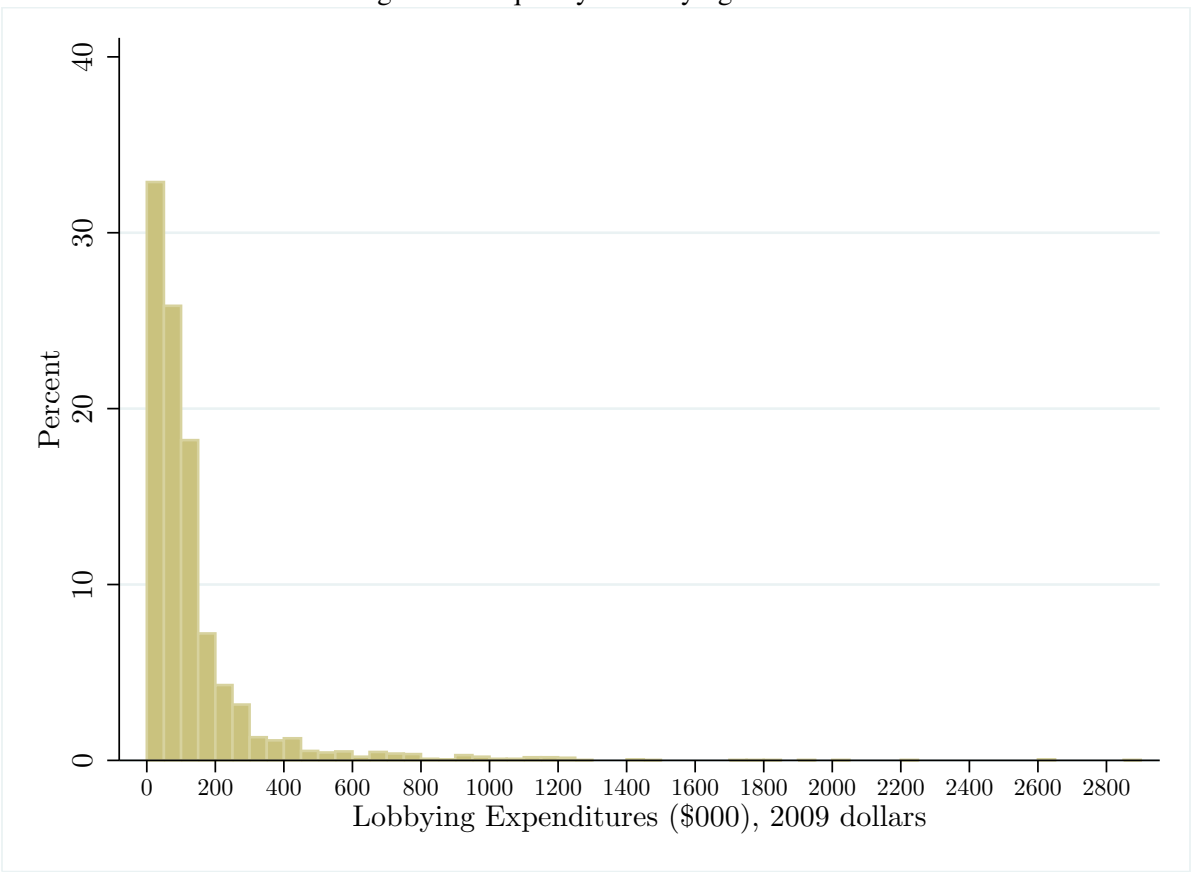


Figure 10: Frequency of earmark amounts

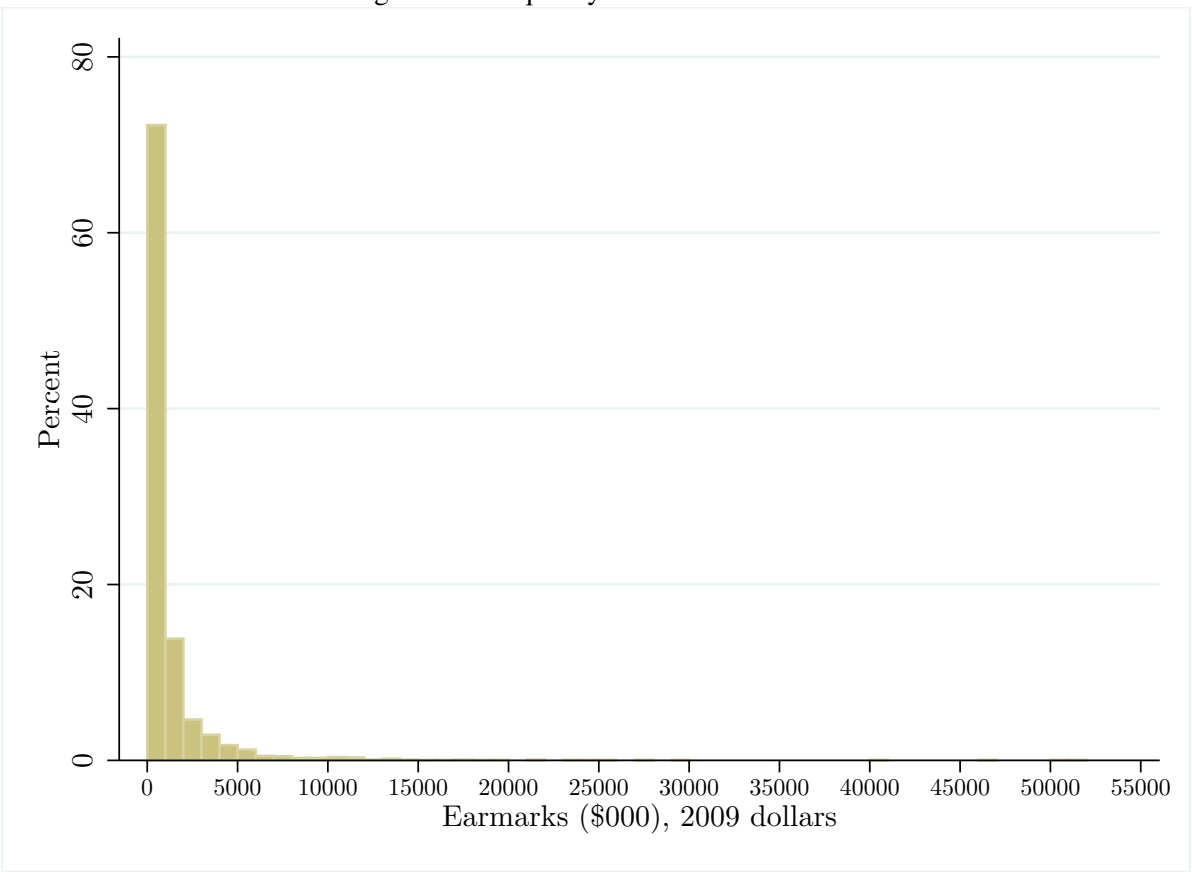


Figure 11: Frequency of Earmark Numbers