2022

Dead Money: Measuring the Influence of Representatives on Government Spending

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Submitted to
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for
Senior Thesis
Fall 2021 & Spring 2022
April 25th, 2022

Acknowledgments

Thank you to Professors Jeffrey Flory and Angela Vossmeyer for their support and guidance throughout the development and writing of this thesis. Your mentorship throughout this thesis has imbued me with a personal and professional fascination with economic research. I also thank Professor Cameron Shelton for drawing my attention to this topic and supporting the project in its early phases. I am indebted to Professors Richard Burdekin and Yong Kim for providing invaluable comments at various stages of the writing process. Additionally, I thank Professors David Bjerk, Adrienne Martin, and Aseema Sinha for teaching me to think critically and creatively about problems from different perspectives.

I also thank my peers who have shaped my learning in and out of the classroom throughout college. Your feedback, kind words, and friendship have made an indelible mark on my character and education. My time in college has been enriched by many the laughs, tears, and cherished memories we shared.

Finally, I thank my parents, grandparents, and brother for their steadfast commitment to education and for always setting a remarkable example to follow.

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Abstract

In line with popular criticisms of Congressional pork barrel spending, I find that that individual representatives do wield significant influence in securing government contracts for their districts. Using federal contract data organized at the congressional district level from FY 2001 – FY 2021, I estimate how individual members of the House of Representatives affect funding outcomes. My identification strategy leverages changes in contract funding that occur during exogenous vacancies occurring in the middle of a term. By comparing contract funding outcomes during vacant quarters to non-vacant quarters, I estimate the amount of individual influence exercised by representatives.

During vacant quarters, districts receive 6.68% less funding than they do in non-vacant quarters, suggesting that individual representatives play a significant role in securing contracts for their districts. Influence appears to be stronger in districts that have a high level of contracting activity, where vacancies are correlated with a 15.39% decrease in funding. These results are robust to several controls, including the party in control of the House of Representatives and the vacant representative's party. Thus, the evidence suggests that individual influence is significant and persists across party lines.

My findings imply that efforts to reduce pork barrel spending should focus on reducing the electoral benefits that individual representatives enjoy from funneling money to their districts. Public cost-benefit analyses for contracts might increase public scrutiny of inefficient projects and disincentivize representatives from leveraging excessive pork barrel spending to increase their odds of reelection.

I. Introduction

Much public outrage and media attention has been directed at pork barrel spending in recent years. This outrage is especially motivated by several high-profile cases of poorly managed projects.

To illustrate, in the early 1980s former Speaker of the House Tip O'Neill famously advocated for Boston's "Big Dig", a renovation of a 3.5 mile stretch of the Boston I-93 Highway. The Big Dig is one of the most well-known examples of contemporary pork barrel spending. Even before the project began, critics, including then-President Ronald Reagan were skeptical of its cost and feasibility. Yet, O'Neill leveraged his position and influence to ensure that the federal government would fund the project (Rimer 2009). Despite being vetoed by President Ronald Reagan, O'Neill managed to override the veto (Rimer 2009). The renovations began in 1982 and were scheduled to be completed in 1995 at a cost of $7.4 billion (National Research Council 2003).

However, the project was beset by delays, design flaws, poor construction, and the death of a motorist (Rimer 2009). The primary contractors, Bechtel and Parsons Brinckerhoff, were ordered to pay $407 million in restitution for using substandard materials and ignoring structural weaknesses (Lavoie 2008). It was completed in 2007 at a cost of $21.5 billion (adjusted for inflation to present value), or $6.1 billion per mile, with repairs ongoing to the present (Johnson 2006). Construction delays and ever-increasing costs angered both Boston residents and observers across the nation. Indeed,

the Big Dig highlights how one representative with influence can secure substantial federal funding for localized projects and government contracts.

While many representatives' pet projects fare better than the Big Dig, the evidence generally suggests that pork barrel spending is frequently inefficient because taxpayers across the nation foot the bill for projects they will never benefit from. Indeed, though pork barrel spending may create jobs and incentivize the provision of local public goods, it has also been shown to be systematically biased toward large and inefficient projects (Weingast, Shelsle, Johnsen 1981).

Understanding the forces that drive pork barrel spending is thus important for theories of political economy and for policymakers. This paper explores how individual influence in the House of Representatives affects the amount of government contract funding a district receives. In this context, influence refers to a representative's ability to affect contract funding outcomes in his or her district. I thus measure the influence of individual members of the House of Representatives by evaluating how funding changes when members are suddenly absent during their term. Using vacancies caused by death and resignation as an exogenous shock to the federal contracting and negotiation processes, I estimate the amount of funding lost during vacant quarters. Assuming that all else is fixed, I interpret differences in contract funding levels when seats are vacant and non-vacant, as a measure of individual influence. I draw on the methodology of Hirano's (2011) analysis of influence in the Japanese Diet to develop this identification strategy. Using recent data on government contracts from the Department of the Treasury, I introduce this methodology to ongoing debates about the role of individual and party

influence in the American context (Levitt and Snyder 1995; McCarthy, Poole, and Rosenthal 2001; Ashworth and Bueno de Mesquita 2006).

I find strong evidence that individual representatives influence contract funding. My main finding is that during a vacancy, contract funding falls by an average of 6.68% ($p = 0.00$), relative to non-vacant quarters. This negative effect suggests that individual representatives do have significant influence on the contracting process. These effects are stronger in districts that have substantial contracting activity, as measured by the number of organizations and agencies funding contracts in the district. In districts with high levels of contracting activity, the effect of a vacancy is estimated to be a 15.39% ($p = 0.00$) decline in contract funding. These findings suggest that more pork barrel spending may be available in these districts and is lost when the representative's seat is vacant. These results are robust to controlling for the majority party in the House of Representatives, suggesting that individual influence persists regardless of the party in control.

However, I also find evidence that party influence may affect funding outcomes. To evaluate party influence, I compare the effects of a vacancy under different scenarios. For example, the effect of a vacancy is much smaller when the vacant representative was not part of the majority party. Under a Democratic majority, if a Democratic seat becomes vacant, it will lose more funding on average than when a Republican seat becomes vacant. Similar behavior is observed during Republican majorities, with more funding going to vacant districts last controlled by the Democrats. I interpret this as evidence that while individual influence still affects funding, national parties may engage in pork barrel spending in efforts to flip contested districts.

The remainder of the paper is structured as follows. In Section II, I assess the literature surrounding political influence and vacancies, situating the contribution of the paper. Then, in Section III, I present the data and in Section IV I present the empirical strategy. In Section V, I present the results and discuss them in Section VI. Finally, I summarize my approach and findings in Section VII. All figures and tables are located in Section VIII.

II. Literature Review

Broadly, this paper is connected to debates about political influence in American federal spending. Theories of political rationality have long suggested that representatives direct spending to their own district as a means of increasing their odds of reelection. Pork barrel spending can be useful to generate both political and financial support from the electorate. Indeed, one estimate suggests that an additional $100 per capita spent in federal funds yields a 2% boost in the popular vote share for a seat in the House of Representatives (Levitt and Snyder 1997). Because federal funds raised by national taxpayers fund projects, representatives can secure large electoral benefits without placing the full cost on a single district's constituency (Weingast, Shepsle, and Johnsen 1981). Often, representatives trade pork barrel spending for votes on controversial bills, using their vote as a bargaining chip to secure contracts and other funding sources. (Weingast, Shepsle, and Johnsen 1981).

Yet, while representatives are incentivized to fund their own districts, national parties may have differing priorities (Primo & Snyder 2010). Parties can exert influence

by offering fundraising and institutional support to representatives that support the party agenda. If parties are sufficiently effective at improving the electoral chances of incumbents, they may be less inclined to engage in pork barrel spending. For example, national parties might be interested in allocating funds to other districts at risk of being lost to the opposing party. The question of whether individual or party influence dominates is important because each phenomenon carries differing implications for the distribution of federal funds. If individual representatives exert more influence, we would expect that all districts receive some pork barrel spending, leading to higher overall government expenditure (Primo & Snyder 2010). On the other hand, party dominance might mean that a few high-priority regions receive a higher share of contracts and funding, leading to lower overall government spending (Primo & Snyder 2010). These competing hypotheses thus offer useful explanations to understand which groups are responsible for inefficient government spending.

The literature is mixed on whether party or individual influence is dominant in American federal spending. I begin by describing the literature in favor of party influence. Levitt and Snyder (1995) find that parties, rather than individual representatives, play a substantial role in determining where funds are allocated to. For example, their analysis finds that allocations to federal welfare programs are associated with increases in the number of Democratic voters in a region. Yet, they find no relationship between a local representative's party affiliation and the funds allocated to a district. This evidence supports a theory of "strong parties": that parties can encourage representatives to be disciplined and follow the party agenda. Ashworth and Bueno de Mesquita (2006) further find that party cohesion has increased as party officials and

organizers increasingly put forth their own policy agendas. If parties develop cohesive goals and election support mechanisms, individual representatives may be willing to forego pork barrel spending and instead abide by the party's goals in exchange for a better chance of reelection (Primo & Snyder 2010; Keefer and Khemani 2009).

While few studies argue in favor of the weak parties theory, some evidence does suggest that individual representatives wield more influence than expected. For example, a 2006 Congressional Research Service report observes that the size of earmarked federal appropriations increased dramatically from 1995 - 2004. Earmarks allow representatives to propose spending bills that have already allocated money to certain districts, making them a choice mechanism for individual representatives to initiative pork barrel projects. Moreover, McCarty, Poole, and Rosenthal (2001) argue that other studies overestimate the effect of parties on individual representatives' behavior. They find that the party affiliation has, at best, a marginal impact on a representative's voting record. Only when someone changes parties do their voting habits change substantively. This does not necessarily imply that the party is exerting influence, however. Instead, it might demonstrate that the preferences of that particular representative have shifted. Moreover, groups other than national parties might drive representatives' actions, such as interest groups, lobbying firms, and political action committees. These private groups can provide representatives with funds and publicity to support electoral efforts in exchange for pork barrel spending. Thus, rather than catering to party demands, representatives might follow directives from other groups to bring more pork barrel spending to the district.

Hirano (2011) contributes an interesting analysis to the debate on individual and

party influence by leveraging vacancies resulting from death to estimate the influence of individual representatives in the Japanese National Diet, the lower house of the country's bicameral legislature. I pay special attention to this paper since I draw on its methodology to develop my identification strategy, which uses changes in spending during vacant[1] quarters to estimate the degree of individual influence of members in the House of Representatives. Because the methodologies are quite similar, differences between my results and those of Hirano (2011) offer comparative insights between the political economy of Japan and the United States. Hirano finds limited evidence of individual influence. Using data from 1977 to 1992, he examines effects on three types of funding: aggregate government transfers, treasury disbursements, and tax-adjusted treasury disbursements. Contrary to expectations, deaths among members of the Diet were not correlated with any statistically significant change in funding levels to their districts. However, he does find evidence of party influence. Appropriations in districts where the incumbent won by a small margin were 17 to 25% higher relative to districts won by a comfortable margin. Hirano thus concludes that the national party drives pork barrel spending toward districts that are contested.

Finally, I assess the literature related to my empirical strategy of using vacancies as an exogenous shock. Most of these papers use vacancies to evaluate politicians' relationships with corporate interests, often by measuring changes in stock prices. The most well-known example is found in Roberts (1990), who identifies evidence of individual influence, albeit in the Senate. Roberts finds that stock prices of various

[1] I consider vacancies stemming from both deaths and resignation, while Hirano only considers deaths. I justify this approach in Section IV.

corporations related to the interests of high-ranking Senator Henry "Scoop" Jackson fell following his death. Stock prices rose for companies related to the interests of his replacements on key Senate committees. Roberts interprets this as evidence that senior officials exert individual influence. More recent studies, such as Brogaard, Denes, and Duchin (2021) utilize a similar identification strategy to my own, as they consider both death and resignation to be exogenous shocks in the federal contracting process. They find that politically-connected firms leverage their relationships with elected officials to renegotiate contracts and make them more lucrative. When a representative dies or resigns, however, firms connected to that representative are less successful at renegotiating contracts. In addition, Faccio and Parsley (2009) show that the valuations and sales of firms based in a politician's hometown fall when that politician suffers an unexpected death. Each of these studies suggests that individual representatives have strong ties to corporations, which suffer when they lose access to the political capital provided by an elected official. Rather than interrogate relationships to the private sector, I contribute a new perspective to the American context by using this methodology to evaluate relationships between individual and party influence on federal contracts.

III. Data

A. Data Discussion

The data span FY 2001 – FY 2021 (October 1st, 2000 – September 30th, 2021) with observations of each congressional district on a quarterly basis. The dataset includes observations on 447 congressional districts. While only 435 districts exist at any point in time, some districts are added or subtracted due to the redistricting process every ten

years. During the 2010 redistricting cycle, twelve districts were discontinued, with a separate set of twelve taking their place in different states or regions. Thus, twelve districts from the 2000 cycle are only measured until FY 2011 and another set of twelve from the 2010 cycle are measured from FY 2012 – FY 2021. In all, the dataset contains 36,540 total observations.

I use data on federal contracts from the United States Department of the Treasury's online database of federal expenditures (available online at USASpending.gov). The repository contains various data primarily on federal contracts and grants. I focus on federal contracts rather than grants because contracts offer several advantages for measuring the individual influence of representatives.

First, contracts have a strict set of regulations that govern sub-awarding, the process by which an awardee designates another organization to carry out tasks or prepare deliverables. Title 48 of the Code of Federal Regulations, the Federal Acquisition Regulations (FAR) prevents sub-awarding for federal contracts. While contractors may submit procurements or create subcontracts, these requests must be approved along with the overall "parent" contract. By contrast, grants may be passed through to other entities without federal approval. Thus, substantial amounts of grant funding may leave the geographic bounds of the district without record. Because contracts restrict and document subcontracting, it is possible to track the flow of funds into different locations and allocate those funds properly. This allows for a cleaner matching of federal funds to congressional districts.

Second, contracts also provide an advantage with respect to the consistency of funding. Grants are often provided to states in response to a shock, such as a natural disaster. This creates an environment ill-suited to measure the individual influence of a representative. Natural disasters, such as Hurricane Katrina or Hurricane Sandy, typically command national attention and districts may receive substantial funding even if their Representative is absent. By contrast, businesses and organizations are consistently competing for government contracts. This allows one to more easily make the key assumption that non-vacant and vacant quarters are similar, but for the absence of the representative.

To measure the value of each contract, I use the total "promised award amount." This figure includes the base value of the contract and the value of any additional options that may be exercised. Options are paid only if the contractors' performance meets certain standards. Thus, the stated value of the contract provides an upper bound of the funding actually received by districts. Nonetheless, it seems reasonable to analyze the "sticker price" involved in these arrangements given that this amount is allocated to contracts and is the amount perceived by negotiators. The "place of performance," the location where contract will be fulfilled, is coded to the appropriate congressional district, given the year of the contract's approval. I then calculated the total funding for all districts across each quarters during the twenty year sample. I also introduced control variables such as the number of awarding organizations. Contract funds are adjusted for inflation to the end of FY 2021, or the end of September 2021, and then log-transformed.

Then, I identified all vacancies in the House of Representatives from FY 2001 –

FY 2021, the same period for which data on spending were collected. Over the course of the sample, seats are vacant for 300 quarters out of the total 36,540 observations. Data on the representative, party, state, district, vacancy length, and reason for vacancy were obtained from the Online United States House of Representatives Archives. The start and end dates of each vacancy were then matched to the correct year-quarter combinations. The vacancy data were then merged with the spending data to form the dataset.

I include vacancies throughout the year, as there does not seem to be a single "negotiation period" during which all contract decisions are made. If negotiations for most contracts occurred during a specific portion of the year, then it would be reasonable to only include vacant quarters where representatives have a chance to secure contract funding. However, in interviews conducted with the office of Rep. Norma J. Torres, a member of the House Appropriations Committee, contracts are negotiated on throughout the year as new solicitations are made by government agencies. Additionally, daily-level contract data suggest that contracts are regularly approved throughout the year. Thus, I include vacancies that occur throughout the fiscal year to ensure that the effect captures any and all missed opportunities for funding.

From FY 2001 – FY 2021, 36 states had at least one district with a vacant quarter. Figure 1 geographically presents the number of vacant quarters experienced by each state during the sampled period. Table 1 presents data on the ten states with the highest number of vacant quarters during the sample. In Table 1, I denote the occurrence of a vacancy as a "vacancy event", while "vacant quarters" refers to the total number of quarters the vacancies lasted. Generally, states with more representatives have more

vacancies and vacant quarters. However, there are exceptions: Ohio had nearly twice as many vacancies and vacant quarters as Texas, despite the latter having twice as many representatives. Texas simply appears to be an outlier for its size, as it experienced just five total vacancy events during the entire period, while California and New York experienced seventeen and nine vacancy events respectively. I regard Texas as an outlier because the structural factors associated with filling a vacancy are largely the same for all states. The Constitution requires that all vacancies in the House of Representatives be filled by a special election. States typically wait for an upcoming election at "the district, state or local level" to hold the special election, so there may be some variance in timing, but special elections frequently coincide with the general election (Gaddie, Bullock, and Buchanan 1999). States may only avoid calling a special election if there are fewer than six months between the vacancy and the end of the Congress. In this case, some state governments leave the seat vacant until the next general election (Gaddie, Bullock, and Buchanan 1999). Given the timing of the vacancy and the representative's state, the length of a vacancy may thus vary, but not by much. Indeed, for the states in Table 1, the average length for which a seat stays vacant only ranges between 1.8 and 3 quarters.

B. Data Concerns

I now turn to three key concerns with the data and discuss my approach to resolving these issues. For the first two concerns, I perform robustness checks on my baseline estimate in Section V, while I resolve the third concern using a statistical test discussed within this section.

First, the panel is not balanced due to the redistricting process, which generates

new districts every ten years. These districts are typically only used in elections one to two years after they are created. For example, districts created in 2010 were first contested in the 2012 elections. Recall that the House of Representatives should have 435 representatives and districts at any time. Twelve districts exit the sample at the end FY 2011 and are replaced by a separate set of twelve districts starting in FY 2012 due to the redistricting process. By comparison, all other districts appear in the sample for a total of eighty-four quarters (twenty-one years, four quarters each). It is possible that because a portion of the districts appear for only half the sample, they bias the results. For example, because contract funding seems to increase over the sample, districts only present for the first 10 years may drive average funding levels down. I conduct a robustness check on my baseline regression by restricting my sample to only those districts present throughout the sample, a fully balanced panel. I find that the estimate using the balanced panel is almost identical to the baseline estimate and both are statistically significant. Both models estimate that quarterly funding falls between 6.54% (balanced) to 6.68% (baseline), suggesting that there is not a meaningful difference between including and excluding those only present for a portion of the period. These results are discussed in detail in Section V.

Second, 767 observations out of the 36,540 total observations are recorded as having no funding. Figure 2 plots the number of these "zeros" for FY 2001 – FY 2021. Interestingly, 691 (~90%) of these observations occur during FY 2001 and FY 2002. It is likely that these data are missing. FY 2001 was the first year of collection for the Department of the Treasury's online database, so perhaps data collection methods were incomplete at the time resulting in limited observations for that year and portions of

subsequent years. Moreover, all of the districts missing values existed prior to the 2000 redistricting cycle, so all of them were contested and were eligible for funding in FY 2001 and FY 2002. While it is possible that these districts actually received no funding, the frequency of zeros gradually decreases over time, not just across fiscal years, but within FY 2001 as well. In Figure 3, I plot the number of "zeros" observed only in FY 2001, finding that each subsequent quarter has fewer seemingly missing observations. It seems unlikely that these districts were ineligible for funding during a portion of FY 2001, but suddenly became eligible for every subsequent period. As a result, it seems reasonable to assume that these data are missing, rather than being zeros.

However, because there are an outsized number of missing values in just a few years, it is possible that estimates of funding using these years are biased. Perhaps including these years with fewer and smaller values biases funding estimates downward. I perform a robustness check on my baseline estimate by excluding both FY 2001 and FY 2002. While the baseline model estimates that quarterly funding falls by 6.68% during a vacancy, the post-2002 model estimates that during vacant quarters, funding falls by 5.41%. The effect thus does fall by one percentage point but does not seem to be entirely attributable to lower funding levels in the earlier years. The post-2002 estimate of the effect of vacancies is also not statistically significant, though it is close to marginal significance ($p = 0.108$). It is possible that the change in statistical significance is attributable to the exclusion of vacancies which occurred during the first two years of the sample. There are eighteen vacant quarters during the first two years of the sample, or 6% of all vacant quarters. Excluding these quarters thus renders vacancies rarer and the statistical power of estimates weaker. In subsequent analyses, I include both FY 2001 and

FY 2002, as these years do not seem to drive the entire effect observed during vacant quarters. These results are discussed in greater detail in Section V.

Third, a key consideration is balance in funding levels between districts that ever experience a vacancy during the period observed and those that do not. Even when not actively vacant, are the districts that end up with a vacant seat different than those that do not? In order to estimate the effect of a vacancy, we must assume that, on average, the two would receive similar levels of the funding in the absence of the vacancy. Otherwise, differences might be attributed to vacancies when they are actually driven by underlying disparities between the two groups in other factors which affect funding. Thus, I perform a t-test by comparing the districts that experience a vacancy between FY 2001 and FY 2021 with those that do not during entire period. I restrict the sample to quarters where a vacancy did not occur for either group. The distributions of quarterly funding going to districts with and without at least one vacancy during the period are quite similar; the variance ratio of sometimes-vacant district funding to never-vacant district funding is 1.05. The variance ratio between the groups is sufficiently low to justify using an independent t-test of the two samples to measure differences in funding levels. I present the results of this test in Table 2. The test reveals that during non-vacant quarters, sometimes-vacant districts receive just 2.29% (t-statistic = 1.25) less funding than those that do not. This difference is small and not statistically significant ($p = 0.21$), so underlying differences are not driving changes in funding during vacancies.

IV. Model

A. Empirical Strategy

The identification strategy uses vacancies as an exogenous shock to estimate the influence of an individual representative on government contracts awarded to his or her district. In the sample, vacancies arise for two reasons: either death or resignation. The analysis treats both of these cases as exogenous. For both death and resignation, skeptics may argue that funding in quarters just prior to the vacancy might be biased downward if it is well-known among other legislators and bureaucrats that a representative will not be in office much longer. I present arguments for why this downward bias is unlikely.

I begin by discussing vacancies caused by death. All of deaths that occur while a representative is in office are due to either natural causes or diseases correlated with old age, such as cancer. One might think that bureaucratic agencies and fellow representatives would not be interested in working with a representative who might pass away soon, biasing funding levels downward. However, many representatives who pass away in office are already diagnosed with their eventually-fatal disease when they win their final term. This seems to suggest that many representatives, despite their ailments, remain involved in the political process and may have reason to continue securing pork barrel funds to appease the electorate. Moreover, the House of Representatives is already rather old. The average age of Congressional representatives overall has steadily increased from 1992 onwards. In the current 117th Congress, more than 50% are over the age of sixty and nearly 25% are over the age of 70. The average age at the time of death for representatives who passed away in office from FY 2001 – FY 2021 is 70.15 years.

Thus, one might expect that simply being of advanced age prior to death would not hinder a representative's ability to work with other parties in the contracting process. Indeed, most evidence suggests that representatives are more effective as they age because of connections and experience either in or out of the legislative arena. Thus, it is not obvious that the factors leading to deaths in the House of Representatives would be associated lower individual influence on securing government contracts.

I now similarly argue that resignations can be treated as exogenous shocks. For the vacancies occurring from FY 2001 – FY 2021, resignations occur because representatives either enter new positions or experience a scandal. I focus on scandal in this discussion because election or appointment to a more desirable position indicates a high level of influence and popularity. Public scandals might motivate bureaucrats and other representatives to avoid working with troubled representatives. This could cause funding levels to fall in the periods prior to the start of the vacancy, biasing funding levels downward. However, most scandals, especially sex scandals, lend themselves quite nicely to use as an exogenous shock. These scandals typically are not preempted by Congress, voters, or businesses. Moreover, they typically result in quick resignations, often within the month. As a result, we would not expect these scandals to influence funding allocations prior to when the stories enter the headlines. That being said, I admit other scandals may simmer for some time before they result in a resignation. For example, while it is not included in the sample, the example of Newt Gingrich is instructive. In 1997, Speaker of the House Newt Gingrich was the subject of an ethics probe and a public party mutiny. However, only after a poor showing by the Republicans in the 1998 Congressional elections did Gingrich actually resign. In this case, the build-

up in scandals might have limited Gingrich's ability to secure contracts, potentially making an analysis of influence more complex. While the scandals present in the sample do not have a year's worth of build-up, I acknowledge some variance in the exogeneity of these scandals.

B. Model Specification

I employ a linear regression model to estimate the influence of individual representatives. I use the following specification:

$$y_{itq} = \alpha_i + \eta_t + \gamma_q + \beta * 1[vacancy_{itq}] + \epsilon_i ,$$

where the independent variable y_{itq} is the log-transformed value of all contract funding allocated to a district i in fiscal year t during quarter q. The fixed effect for each congressional district i is represented by α_i . I also include a fixed effect for each fiscal year t as η_t and for each quarter q as γ_q. The variable of interest is a dummy variable indicating the presence of a vacancy in district i during fiscal year t and quarter q. The coefficient β captures the effect of a vacancy on quarterly funding levels. I interpret a negative value for β as evidence that individual representatives influence policy and the flow of funds into their districts. If individual representatives did not have influence over funding, one would expect that their absence would not affect funding in their district because another force, like national party interests, drive the agenda instead. Finally, I calculate robust standard errors ϵ_i clustered at the district-level. By clustering at the district level, I correct for heteroskedasticity across different districts, which have varying levels of industry and resources. This step, along with the panel structure of the data,

permits the analysis to track changes in individual districts across time. This specification serves as the baseline model used to estimate the effect of exogenous vacancies.

I subsequently introduce a number of control variables, using the alternative specification:

$$y_{itq} = \alpha_i + \eta_t + \gamma_q + \beta * 1[vacancy_{itq}] + \Omega * X_{itq} + \epsilon_i ,$$

where X_{itq} is a matrix of control variables and Ω is the corresponding vector of coefficients. The controls include: the number funding organizations as a proxy for activity within the district, which party has political control of the house, and the political orientation of the vacant and replacement representatives.

V. Results

I begin by presenting the baseline model, regressing funding levels on the vacancy status of a district. The baseline model in Column 1 of Table 3 estimates that, holding all else fixed, contract funding falls by 6.68% (p =0.06) when a vacancy occurs relative to non-vacant quarters. This decrease in funding offers preliminary support for a weak parties hypothesis: that individual representatives do have influence on government policy and affect funding levels. Without those representatives present to advocate for funding, it appears that that some contracts are lost. This lost funding can be understood as pork barrel spending driven to the district by the influence and efforts of the representatives.

Next, I perform two robustness checks on this baseline estimate, each of which I motivate in Section III. First, in Column 2 of Table 3, I estimate the effect of a vacancy

using a perfectly balanced panel. Recall that while only 435 congressional districts may exist at any single point in time, new districts are created while others are consolidated each redistricting cycle. Because twelve districts present after the 2000 redistricting cycle were eliminated and replaced with a new set of twelve districts in the 2010 cycle, a total of twenty-four districts are only observed for either the first or second half of the time period studied. I drop districts which are not present in the panel for all eighty-four possible quarters, across twenty-one years with four quarters each. I aim to demonstrate that the results are not biased by the inclusion of districts that only appear in the first or second half of the time period studied.

When restricting the sample to a perfectly balanced panel, I find that the results do not change substantially. Relative to non-vacant quarters, vacant quarters in districts that appear throughout the entire sample are associated with a statistically significant 6.54% ($p = 0.07$) decrease in funding. The results thus survive this robustness check, and the estimate is not very different from the 6.68% decrease in funding estimated in the baseline regression. Thus, it appears that there is not substantial bias from the inclusion of districts that only appear for a portion of the sample.

Second, I perform a robustness check on years with missing data. In Column 3 of Table 3, I estimate the effect of a vacancy after dropping FY 2001 and FY 2002 due a high number of missing values in those years. When excluding them, the estimated effect of a vacancy reduces quarterly funding by 5.41% ($p = 0.11$). Though just beyond the bounds of marginal significance, the magnitude and sign of this estimate are similar to the 6.68% decrease predicted in the baseline regression. It is possible that the smaller sample size of vacancies is responsible for the estimate's larger p-value. Indeed, 6% of all

vacant quarters occur from FY 2001 – FY 2002. Because vacancies are already a rare event, removing these values from the sample limits the model's statistical power. Given that the estimate remains similar to the baseline estimate at least in magnitude and size, going forward I include these years in order to analyze as many vacant quarters as possible.

Next, I introduce a measure of contracting activity to evaluate if the effects of a vacancy are exacerbated in highly-active districts. One might think that in districts with the right qualities for many contracts (i.e., industry, resources, talent), representatives would be incentivized to include more pork barrel spending as well. To proxy how active a district is in government contracting, I measure the number of funding organizations supporting contracts to a district in any period. I measure the effect in two ways, as a continuous measure of organizations and as a dummy variable for if a district had more than 25 funding organizations during the quarter. I set 25 as a threshold because the mean number of funding organizations is 24.6; thus, districts with more funding organizations are interpreted as more active than average.

Columns 1 and 2 of Panel A in Table 4, I measure activity along a continuous scale. In Column 1, I do not interact the number of organizations with vacancy status. Here, the effect of a vacancy, regardless of the number of organizations, is estimated at a 6.16% ($p = 0.08$) decrease in contract funding relative to non-vacant districts. Funding increases by 1.8% ($p = 0.00$) for each additional funding organization regardless of vacancy status. After interacting vacancies with organizations in Column 2, the effect of vacancies, regardless of the number of organizations, changes sign to a 4.09% ($p = 0.65$) increase but is no longer statistically significant. The interaction between the number of

funding organizations and vacant districts is estimated at a 0.4% ($p = 0.13$) decrease in funding, though this effect is not statistically significant either.

In Columns 3 and 4, I estimate the same model but now introduce the binary treatment of contracting activity. In Column 3, I do not interact vacancies with the indicator for high activity. Highly active districts bring in 19.5% ($p = 0.00$) more contract funding than less active districts, which is expected. The effect of a vacancy is estimated at a 6.37% ($p = 0.06$) decrease. In Column 4, I interact these terms, finding that funding levels in high-activity districts are much more sensitive to vacancies than low-activity districts. In low-activity districts, vacancies are estimated to have a very small, positive effect on funding, though this effect is not statistically significant ($p = 0.99$). In Panel B of the same table, I calculate the sum of coefficients for the effect of a vacancy for a high-activity district. In these districts, vacancies are correlated with a 15.39% ($p = 0.00$) decline in contract funds. This might suggest that highly-active districts have the qualities conducive to securing more contracts, creating greater opportunities possibilities for pork barrel spending. As a result, the absence of representatives in these districts seems to have a larger effect on the level of total contract funds.

Given that the district's activity level exacerbates the effect of vacancies, I now examine if these effects are long-lived. Even in highly-active districts, perhaps newly-elected representatives need time to acclimate to the role and build the connections necessary to direct spending toward the district. This step is also methodologically important because estimates of funding in non-vacant quarters may be biased downward if vacancies have long-lived effects that affect funding levels even after a vacancy is resolved.

In Table 5, I examine funding levels in the two quarters after a vacancy is resolved. In Panel A Column 1, I regress funding levels on indicators for if a district is vacant in the current period or was vacant either one or two quarters ago. There are no statistically significant effects in the first or second quarters after a vacancy. However, both effects are negative, with an estimated 7.20% ($p = 0.14$) decrease in funding during the first quarter after a vacancy and a 1.55% ($p = 0.80$) decrease during the second quarter after a vacancy. Perhaps these results offer weak evidence that it takes time for representatives to acclimate to their new environments and garner influence.

In Column 2, I interact each of the indicators of current or prior vacancy status with the indicator for high contracting activity. In Panel B, I sum the appropriate coefficients to calculate the estimated effect for high-activity districts one and two quarters after a vacancy. Again, I find that the predicted negative changes in funding levels one and two quarters after a vacancy are not statistically significant. During the quarter after a vacancy, funding in high-activity districts are correlated with an 11.78% ($p = 0.14$) decrease in funding relative to other non-vacant quarters; two quarters after a vacancy, these same districts are correlated with 1.08% ($p = 0.95$) less funding. Meanwhile, the effects on funding levels for low-activity districts are also both statistically insignificant. However, the magnitude of these effects are quite similar at an estimated 2.57% ($p =0.73$) decrease in funding one quarter after a vacancy and 2.19% ($p = 0.75$) less funding after two quarters. This again seems to suggest, albeit weakly, that newly-elected representatives may take time to garner influence and access. Moreover, it highlights that effects in high-activity districts may be exacerbated, as there are more opportunities for experienced representatives to engage in pork barrel spending.

Next, I examine how vacancy effects vary by national political conditions, with results presented in Table 6. In doing so, I attempt to uncover if individual influence increases when a certain party is in control. I use an indicator for the party in control of the House of Representatives. In Panel A Column 1, I regress the level of funding on vacancy status, high contracting activity status, and the majority party in the House of Representatives. I find that vacant quarters were associated with a 6.61% ($p = 0.07$) decrease in funding levels relative to non-vacant quarters. Regardless of vacancy status, when Democrats were in control districts received 10.3% ($p = 0.00$) more funding than when Republicans were in control.

In Column 2, I regress funding levels on the same three variable, in addition to the interactions between them. I use this model to understand how the effects of a vacancy on funding might vary both by the district's contracting activity and the party in control of the House. The interaction coefficients involving vacancies are not statistically significant. However, the effect of a vacancy in high-activity districts is significant under both Democratic and Republican control. I present the appropriate sums of coefficients for these effects in Panel B Column 2. When Democrats are in control of the House, high-activity districts with a vacant seat are correlated with a 18.06% ($p = 0.00$) decrease in funding levels, relative to non-vacant quarters. Meanwhile, when Republicans are in control of the House, funding in high-activity vacant districts declines by 12.85% ($p = 0.07$). These declines in funding offer strong support for the presence of substantial individual influence, though it is interesting that the effects are greater under Democratic majorities compared to Republican majorities. One way to understand these results might be that Democrats are more likely to authorize spending bills and increase funding for

government programs. This might create more opportunities for pork barrel spending that are not as frequently available under Republicans. Thus, under a Democratic majority, high-activity districts have more to lose when their representative is absent and unable to advocate for the district.

In low-activity districts, vacancies remain a poor predictor of funding changes, suggesting that individual influence is not as prominent in these districts. When low-activity districts are vacant during a Democratic majority, they are associated with a 0.03% ($p = 1.00$) decline in funding relative to non-vacant quarters. During a Republican majority, funding in low-activity districts with vacant seats increases by 0.05% ($p = 0.99$) compared to non-vacant quarters. Not only are these effect statistically insignificant, but the effects are quite small.

In addition to national politics, the party affiliation of a district's representative may affect the dynamic between individual and party power. Once a vacancy occurs, national parties might perceive the special election as an opportunity gain a seat in the House and to send a signal to the rest of the country about the resonance of the party's platform. In Table 7, I regress the level of contract funding on the most-recent representative's party affiliation, vacancy status, and other controls. In Column 1 of Panel A, I only include affiliation of the most-recent representative and interact this variable with the district's vacancy status. In Column 2, I interact the representative's party and the district's vacancy status with the indicator for high-activity districts. Finally, in Column 3, I interact vacancy status, the most-recent representative's party affiliation, the activity level of the district and the majority party in the House. Interestingly, I find in all three of these models that the interaction between a Democratic representative and a

vacant district is negative and statistically significant. This offers an early indication that party affiliation may matter for the effect of a vacancy.

To truly assess the effect of individual party affiliation, I sum coefficients to analyze how funding levels change depending on alignment between the vacant representative's party and the majority party in the House. A negative effect of vacancies on funding still indicates some degree of individual influence. However, if national parties are interested in winning upcoming special elections, one might expect that parties would target certain "battleground" districts for additional funding. This additional funding may moderate the vacancy effect, conditional on representative's party and the majority party. Given the earlier results that high-activity districts seem more sensitive to changes in funding, I focus on those districts in this discussion. I find that vacant, high-activity districts controlled by the majority party suffer more during vacancies than vacant districts controlled by the minority party. I present these findings in Panel B of Table 7.

The results in Panel B suggest that a difference between the vacant representative's party and the majority party does affect the magnitude of a vacancy's effect on funding levels. First, I consider the cases where Democrats hold the majority in the House. During vacant quarters in high-activity districts that were represented by Democrats during a Democratic majority, contract funding falls by 22.60% ($p = 0.00$) relative to non-vacant quarters. Meanwhile, vacancies in high-activity districts represented by Republicans during a Democratic majority are associated with just a 1.45% ($p = 0.00$) decline in contract funding. While the negative effect of vacancies in both cases suggests that individual representatives are unable to allocate pork barrel

funds, the difference between the two effects, when conditioned by the party of the district's representative is substantial. Perhaps Democratic majorities, seeing a district that will soon be in competition, allocate funds to districts they hope to flip.

I find similar evidence of pork barrel spending going to minority-held districts when Republicans are in the majority. That is, under a Republican majority, the effect of a Democratic vacancy on funding is less severe than the effect of a Republican vacancy. Relative to non-vacant quarters, vacancies during Republican majorities in high-activity districts last represented by a Democrat are associated with a 6.4% ($p = 0.00$) decrease in funding. However, when a previously-Republican seat is vacant in a high-activity district during a Republican majority, vacancies are associated with a 21.3% ($p = 0.00$) decrease in funding. Thus, for both Democratic and Republican majorities, the effects of a vacancy are not as severe when the vacant representative is of the opposite party.

It is puzzling that party majorities would be associated with relative benefits for districts last controlled by the opposing party. One explanation for these results might be that parties are interested in flipping valuable districts with substantial economic capacity. In order to generate goodwill with voters and businesses, they might funnel money into those districts (Primo and Snyder 2010). Without a representative to advocate for the district's interests, districts of the same party are deprioritized in favor of battleground districts and the national agenda.

To extend on this initial evidence of party influence, I examine how funding levels change after districts flip during the special election to fill a vacancy. A district "flips" when voters elect a representative from another party. For example, after Rep. Katie Hill (D) resigned from California's 25th District in 2020, Rep. Mike Garcia (R)

won the special election, thus flipping the district. Such scenarios offer an interesting case study because it is quite rare that districts flip during a special election (Gaddie, Bullock, and Buchanan 1999). Thus, a special election flip might indicate that the district is truly contentious. Thus, these districts are prime candidates for party-driven pork barrel spending. Across the twenty-year sample, just nineteen districts "flip" in this way after a vacancy. Of these, fourteen districts go from Republican to Democrat, while five go from Democrat to Republican. This small sample size means that the results I present are suggestive at best, but do not offer a sufficient sample from which to draw generalized conclusions.

In Table 8, I regress funding levels on vacancy status, if there was a vacancy in the previous quarter, if the district flipped, and several controls. I focus this discussion on the effects observed in Panel B, where I calculate the effect of a district flipping, relative to not flipping. Importantly, I measure funding in the quarters just after a vacancy is filled. I limit the scope of these calculations to high activity districts, so the effects are conditional on the majority party and the new/old representatives' parties.

Interestingly, Democratic majorities are associated with higher investment in districts that flip toward them, while Republican majorities invest in districts that flip away from them. Relative to other quarters just after a vacancy, a previously-vacant district flipping from Democratic to Republican under a Democratic majority (away from the majority) is associated with a 2.59% ($p = 0.00$) increase in contract funding that quarter. Under otherwise identical conditions, the effect of a district flipping from Republican to Democratic under a Democratic majority (toward the majority) is estimated at a 48.93% ($p = 0.02$) rise in funding that quarter. This result might indicate

that in the observed instances, Democrats prioritize protecting newly-Democratic districts from flipping again in the general election.

Meanwhile, when Republicans are in control, districts that flip from Democrat to Republican (toward the majority) in a special election are associated with a statistically significant 64.31% ($p = 0.00$) decline in funding that quarter, relative to districts that do not flip. On the other hand, districts that flip from Republican to Democrat under a Republican majority (away from the majority) bring in 34.91% ($p = 0.25$) less funding that quarter. However, this effect is not statistically significant from other quarters after a special election. Thus, there are substantial funding losses in districts that flip toward the Republican majority, relative to when districts don't flip. By comparison, losses are not as substantial when districts flip away from the Republicans. This indicates a more "offensive" approach, as Republicans seem to be interested in flipping back districts they lost in special elections.

These findings highlight a difference in the ways that the two parties exercise their influence in battleground states. Republicans prioritize districts they could regain, while Democrats prioritize safeguarding districts they recently won. Of course, the small sample of flipped districts means that these results are driven by just a few observations. Therefore, while these results offer an interesting case study of special elections, the results may not be generalizable to overall party behavior.

VI. Discussion

In this section, I attempt to situate my findings within the broader literature, before turning to implications for policymakers and voters.

I find compelling evidence that individual representatives do exert influence on the contracting process Contract funding falls by about 6.68% (p =0.06) in vacant quarters relative to non-vacant quarters. I extend these results in by controlling for various factors related to the contracting process, including how active the district is in contracting, the party of the vacant representative, and the majority party, among others. Notably, high-activity districts, defined as having an above-average number of contracting organizations in a given quarter, are more sensitive to the effect of vacancies. Relative to non-vacant quarters in high-activity districts, the effect of a vacancy is estimated at a 15.39% (p =0.00) decrease in contract funding, while there are no statistically significant effects for vacancies in low-activity districts. These results offer strong evidence that federal contracting is sensitive to the influence of representatives, especially in districts that can support many types of projects.

This evidence of individual influence is consistent with a political model of weak parties, which suggests that individual representatives drive decisions. Importantly, my results only indicate that contract funding falls during vacant quarters, but do not identify the mechanism by which districts lose funding. One mechanism might be that politically-connected firms are no longer able to negotiate for larger sums (Brogaard, Denes, and Duchin 2021). Without their political contact, these firms lose out on contracts, bringing contract funding levels down.

Interestingly, parties may sometimes moderate the effect of a vacancy. In Panel B of Table 7, when a Democrat's seat becomes vacant under a Democratic majority, the effect of a vacancy is estimated at a 22.6% (p =0.00) decline in contract funding

compared to non-vacant quarters. By comparison, when a Democrat's seat becomes vacant under a Republican majority, contract funding falls by just 1.45% (p =0.00) compared to non-vacant quarters. A similar effect is observed under Republican majorities, where the effect of a vacancy is larger for previously-Republican seats than in previously-Democratic seats.

I interpret this as evidence of national party agendas influencing the flow of funds into battleground districts that the majority party may hope to flip. But critically, there is still a decrease in funding for each case examined in Panel B of Table 7. While all vacant districts lose the benefit of representative-driven spending, some may receive benefits from party-driven pork barrel spending. This is an important finding because theories of weak or strong party behavior are often discussed as mutually exclusive, but my evidence refutes that approach. Instead, particular circumstances, such as those explored in Tables 7 and 8 might incentivize parties to act differently. Thus, weak and strong party dynamics are not mutually exclusive, but instead may be present in the same district at the same time

I now turn to a comparison of my findings with those of Hirano (2011). My results, especially those on individual influence, contrast sharply with Hirano's, demonstrating a difference in the political economies of Japan and the United States. Contrary to his finding that vacancies from death are uncorrelated with a statistically significant change in funding for Japanese districts, in American districts, vacant quarters are correlated with 6.68% lower funding than non-vacant quarters. While I include vacancies stemming from both deaths and resignations, an important methodological

distinction from Hirano's focus on solely deaths, I assume that both are exogenous shocks and can therefore be similarly leveraged to assess individual influence. My findings thus seem to suggest that the American appropriations process may be more sensitive to individual representatives than the Japanese process.

Key legal and political differences between Japan and the United States might explain why I find larger, statistically significant results in the American context. First, Japan's politics have been dominated by the Liberal Democratic Party (LDP) party since 1955, unlike the United States, which features a competitive two-party system (Hirano 2011). Two party systems theoretically should incentivize candidates to cultivate strong personal reputations with voters under conditions of political polarization (Carey and Shugart 1995). As American politics have grown increasingly polarized over the last decade, one might thus expect representatives to engage in greater pork barrel spending to distinguish themselves from the party and cultivate a distinct reputation with voters.

Moreover, Japan's districts feature a multi-member district system, wherein more than one member represents each district. Typically, multiple candidates in a district will all be from the same party. Once elected, multi-member district representatives develop policy outlines and compromise to form an agenda that may outlast the loss of any single member. It is thus possible that other members from the same district are able to make up for the lost influence of their deceased peer. This may confound Hirano's results and account for why the death of just one member results in a statistically insignificant change. By contrast, each congressional district in the United States is won by a single representative and may therefore be more sensitive to a vacancy than multi-member

districts. When a representative leave office in the middle of his or her term, the seat is left vacant until a special election can be called. This leaves no one to advocate for the district in funding negotiations. Thus, one might expect the effect of a vacancy to be greater in the American context than in Japan. My evidence offers support for this theory as American congressional districts do receive less contract funding during vacant quarters.

Next, I address the implications of the paper for policymakers and voters. While it is well-known that pork barrel spending is common in the United States, the paper demonstrates that districts with high contracting activity are more likely to include some measure of pork than low-activity districts. Since these contracts are financed with federal dollars, projects in high-activity districts impose a cost on citizens in low-activity districts who benefit less, if at all, from those projects. This problem is made worse in light of evidence that pork barrel projects are systemically biased toward large and inefficient efforts (Weingast, Shelsle, Johnsen 1981). A common policy proposal to limit unnecessary pork barrel spending is the requirement that all contract proposals include a public cost-benefit analysis. Introducing such measures might increase public scrutiny of inefficient projects and reduce the perverse incentive from electoral benefits received through pork barrel projects. I acknowledge that this imposes a regulatory burden on the government and may slow the contracting process. If not required for all contracts, then given that high-activity districts seemingly receive higher levels of pork barrel spending, regulations could be targeted at contracts in these districts.

My findings also have implications for voter behavior. Because districts receive

less contract funding during vacant quarters stemming from the death or resignation of the representative, rational voters should, in theory, favor younger and healthier candidates without a history of corruption or scandal. I evaluate if this implication is empirically true.

With respect to scandals and resignation, it does seem that voters prefer candidates they perceive to be morally upstanding. While this pattern might not be driven by funding considerations, it still suggests that voter behavior minimizes the risk of vacancies stemming from scandal. Lab experiments indicate that marital infidelity and financial scandals are both correlated with lower overall evaluations of candidate competence (Funk 1996). This evidence is useful since it finds similar effects both financial and interpersonal impropriety, suggesting that the scandal type might not matter significantly in the eyes of voters. More recent data also confirms that voters are responsive to scandals. Incumbents facing a scandal lose, on average, about five percent of vote share relative to the previous election (Basinger 2013). Moreover, politicians facing scandals lose their re-election campaigns 40% of the time (Basinger 2013).

On the other hand, while studies indicate that voters do not prefer older candidates, a majority of representatives in the House of Representatives are over the age of sixty and nearly a quarter are over seventy. This is puzzling, given that a rational voter should recognize that, all else equal, older candidates are at greater risk of death, and therefore a vacancy. And indeed, multiple studies find that relative to younger, similarly-qualified candidates, voters do not prefer older representatives. (Sigelman and Sigelman 1982; McLean and Ono 2020). Studies of age-based discrimination in candidate

evaluation even suggest that ageism is more common than race or sex-based discrimination (Sigelman and Sigelman 1982). Then why are so many representatives older than the average American? One explanation for the dominance of older candidates is that few young people run (Lawless and Fox 2015; Shames 2017). Thus, voters may only be able to choose between older candidates. Another explanation might be that older candidates are more qualified. On one hand, it is well-known that incumbents enjoy an electoral boost in vote share relative to political newcomers (King 1991; Carson, Sievert, and Williamson 2019). Thus, even if an incumbent is advanced in age, the value of their experience may outweigh the risks of disease or death. More generally, older candidates may have more experience in business leadership or community involvement that grant relevant skills, useful networks, and a track record within the district. These same attributes, pertaining to a candidate's network and past actions, are often cited as the reasons why incumbents receive an electoral boost when seeking reelection (Carson, Sievert, and Williamson 2019). Perhaps a similar effect to the incumbency advantage exists for candidates perceived, in general, as being more experienced. Thus, it may be plausible that in spite of the risks associated with older representatives, voters prefer to elect an experienced candidate.

VII. Conclusion

In this paper, I offer a new look at influence within American politics through the lens of federal contracts, finding clear evidence of individual influence on funding outcomes. I leverage vacancies in the House of Representatives from FY2001 - FY2021 as an exogenous shock to the contracting and appropriations process. When a

representative is absent during a vacancy, while all other factors remain the same, she cannot advocate for certain public works projects or meet with federal bureaucrats. Thus, vacant districts would be expected to be funded at lower levels, relative to when the district seat is filled.

The central results of this paper suggest that during vacant quarters, districts experience a 6.68% decrease in funding, relative to non-vacant quarters. After controlling for contract activity levels, vacant quarters in high-activity districts are associated with a 15.39% decrease in contract funding. These results indicate that representatives do wield substantial individual influence on the contracting process, especially in districts suited to hosting contracts. These results are robust to various controls, including the majority party in the House of Representatives. Party influence reveals itself when examining vacancies that occur in districts not controlled by the majority party. In these scenarios, parties seem interested in directing funds toward competitive districts with the potential to be flipped.

I conclude by discussing the limitations of this paper and areas for future work. Importantly, I do not analyze the impact of corporate lobbying. It is possible that parties and individual representatives are acting on behalf of lobbyist interests such that the influence of external actors might drive a portion of pork barrel spending. Bertrand et al. (2011) find evidence that lobbyists do follow congressional representatives, changing their industry focus as their contacts move between appointments and chairs. Perhaps when representatives leave office, lobbyists target other districts, increasing pork barrel spending in other districts. While this issue is outside the scope of this paper, this seems

to be a fertile avenue for further work.

Another limitation of this paper is that I only analyze contract funding in the House of Representatives. It is possible that different or exaggerated patterns emerge in the Senate where officials are responsible for entire states, rather than districts. While sparsely populated states such as Alaska have just one congressional district, most other states have several small districts, often containing just a few cities. Senators thus have a greater range of locations where they might direct pork barrel spending compared to members of the House of Representatives. Measuring individual influence in the Senate may require a different methodology than the one applied here, as there were fewer than thirty vacancies from the 2000 to the present. Moreover, because vacancies are often filled via appointment in the Senate, they do not last as long as they do in the House, where special elections must be held to determine a replacement. Still, analysis of statewide offices may vary drastically from district-level analyses. Continued work in this area can further illuminate the political dynamics shaping the economy.

VIII. Figures and Tables

Figure 1: Total Vacant Quarters for States from FY 2001 – FY 2021

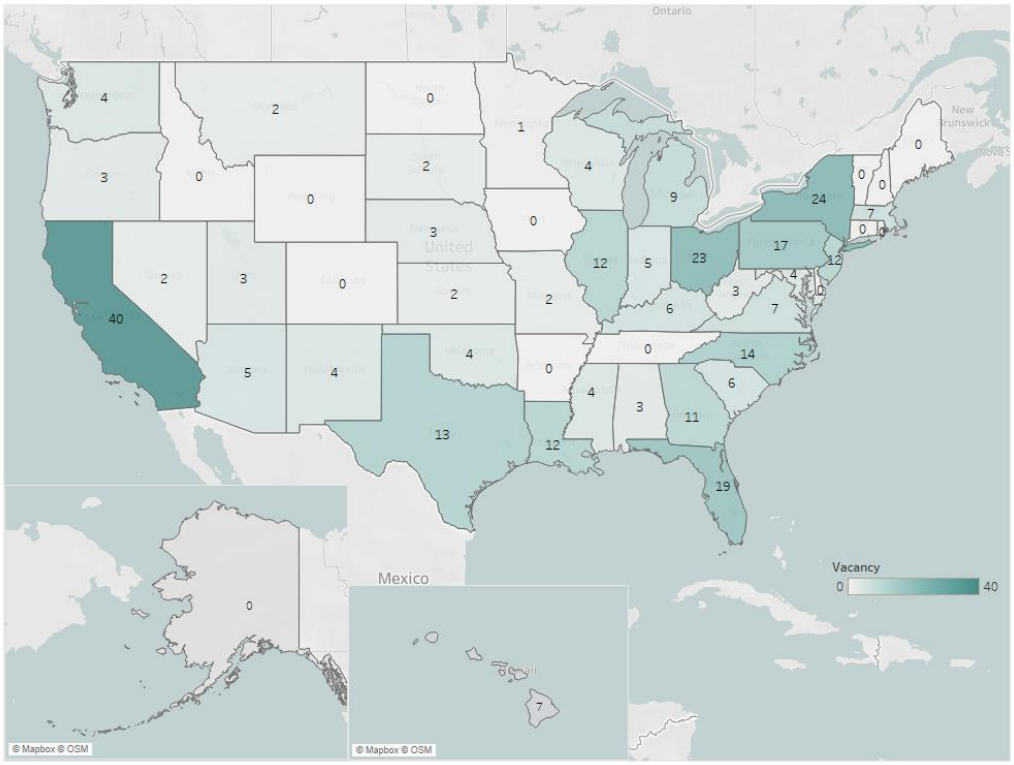

Figure 1 Source: Author's Data

Figure 2: Missing Funding Values for FY 2001 – FY 2021

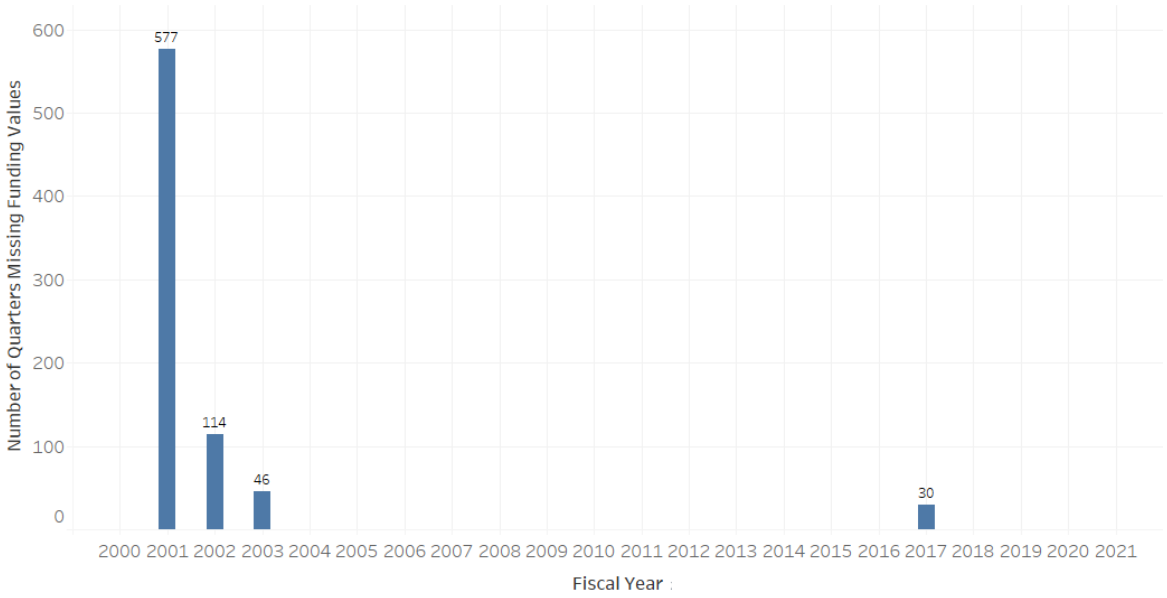

Figure 2 Source: Author's Data

Figure 3: Missing Funding Values for FY 2001

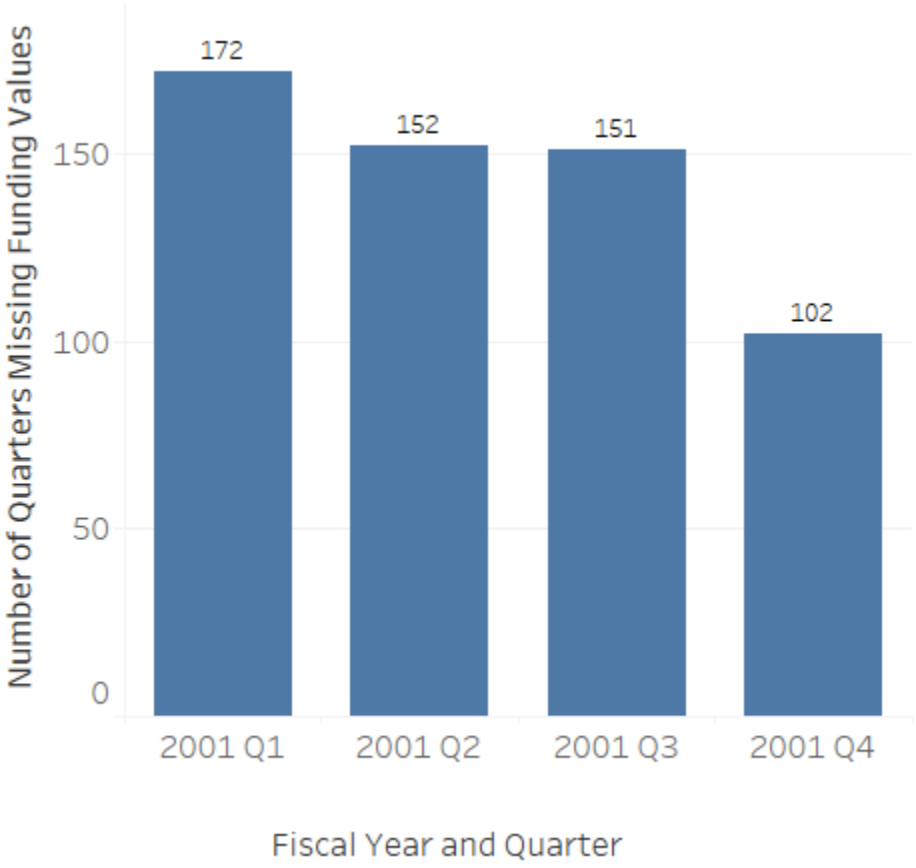

Figure 3 Source: Author's Data

Table 1

State Code	Maximum Representatives	Vacant Quarters	Vacancy Events	Mean Vacant Quarters per Event
CA	53	40	17	2.35
NY	29	24	9	2.66
OH	18	23	9	2.55
FL	27	19	8	2.375
PA	19	17	7	2.42
NC	13	14	5	2.80
TX	36	13	5	2.60
IL	19	12	6	2
LA	7	12	6	2
GA	14	11	6	1.83
MI	15	9	3	3

Table 2

Group	Observations	Mean	Std. Error	Std. Dev.
Sometimes Vacant	8,864	7.9028	0.0162	1.5334
Never Vacant	27,651	7.8798	0.0089	1.4937
Difference	36,515	0.0229	0.0184	
T-Statistic & P-values				
t-statistic =	1.24			
Degrees of Freedom =	36513			
Pr (Difference != 0) =	0.2117			
Pr (Difference < 0) =	0.8941			
Pr (Difference > 0) =	0.1059			

Table 3

	(1) Baseline	(2) Balanced	(3) Post-2002
Vacancy	-0.0668*	-0.0654*	-0.0541
	(0.0352)	(0.0363)	(0.0336)
Constant	5.681***	5.695***	5.661***
	(0.0486)	(0.0494)	(0.0497)
District-Year-Quarter FE	Yes	Yes	Yes
Observations	35,748	34,806	32,974
R-squared	0.533	0.541	0.507
Number of Districts	447	423	447

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4

	(1) Continuous Orgs.	(2) Interactions	(3) Binary Orgs.	(4) Interactions
Panel A				
Vacancy	-0.0616*	0.0409	-0.0676*	0.0009
	(0.0355)	(0.0901)	(0.0357)	(0.0518)
Number of Orgs.	0.0180***	0.0180***	-	-
	(0.0017)	(0.00168)	-	-
Vacancy X Number of Orgs.	-	-0.0042	-	-
	-	(0.0028)	-	-
25+ Orgs.	-	-	0.1930***	0.1950***
	-	-	(0.0204)	(0.0205)
Vacancy X 25+ Orgs.	-	-	-	-0.1530**
	-	-	-	(0.0628)
Constant	5.763***	5.762***	5.727***	5.727***
District-Year-Quarter FE	Yes	Yes	Yes	Yes
	(0.0510)	(0.0510)	(0.0495)	(0.0495)
Observations	35,748	35,748	35,748	35,748
R-squared	0.551	0.551	0.539	0.539
Number of Districts	447	447	447	447
Panel B[1]				
Vacancies in Districts with > 25 Orgs.				-0.1539***
[F-test p-value]				[0.0009]

1. In Panel B, I calculate the sum of coefficients and perform F-tests. I sum the effects for (i) *Vacancy* and *Vacancy X 25+ Orgs.*

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5

	(1) Post-Vacancy Analysis	(2) Interactions
Panel A		
Vacancy	-0.0681*	0.0000
	(0.0359)	(0.0524)
1 Quarter Post-Vacancy	-0.0720	-0.0257
	(0.0491)	(0.0733)
2 Quarters Post-Vacancy	-0.0155	-0.0219
	(0.0605)	(0.0685)
25+ Organizations	-	0.1950***
	-	(0.0205)
25+ Organizations X Vacancy	-	-0.1540**
	-	(0.0631)
25+ Organizations X 1 Quarter Post-Vacancy	-	-0.0921
	-	(0.0956)
25+ Organizations X 2 Quarters Post-Vacancy	-	0.0111
	-	(0.125)
Constant	5.681***	5.727***
	(0.0486)	(0.0494)
District-Year-Quarter FE	Yes	Yes
Observations	35,748	35,748
R-squared	0.534	0.539
Number of Districts	447	447
Panel B[1]		
Vacancies in Districts with > 25 Orgs.		-0.1540***
[F-test p-value]		[0.0009]
1 Quarter After Vacancies with > 25 Orgs.		-0.1178
[F-test p-value]		[0.1396]
2 Quarter After Vacancies with > 25 Orgs.		-0.0108
[F-test p-value]		[0.9450]

1. In Panel B, I calculate the sum of coefficients and perform F-tests. I sum the effects for (i) *Vacancy, 25+ Orgs, and Vacancy X 25+ Orgs* (ii) *1Q after Vacancy, 25+ Orgs, and 1Q after Vacancy X 25+ Orgs* (iii) *2Q after Vacancy, 25+ Orgs, and 2Q after Vacancy X 25+ Orgs*

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6

	(1) Majority Party Analysis	(2) Interactions
Panel A		
Vacancy	-0.0661*	0.0005
	(0.0357)	(0.0757)
25+ Organizations	0.1940***	0.2230***
	(0.0204)	(0.0217)
Democratic Majority	0.1030***	0.1400***
	(0.0104)	(0.0127)
25+ Organizations X Democratic Majority	-	-0.0763***
	-	(0.0161)
Vacancy X 25+ Organizations	-	-0.1290
	-	(0.0932)
Vacancy X Democratic Majority	-	-0.0008
	-	(0.0909)
Vacancy X 25+ Organizations X Democratic Majority	-	-0.0513
	-	(0.117)
Constant	5.731***	5.731***
	(0.0494)	(0.0494)
District-Year-Quarter FE	Yes	Yes
Observations	35,748	35,748
R-squared	0.540	0.540
Number of Districts	447	447
Panel B[1]		
Vacancy During Dem. Majority with > 25 Orgs.	-	-0.1806***
[F-test p-value]	-	[0.0040]
Vacancy During Republican Majority with > 25 Orgs.	-	-0.1285*
[F-test p-value]	-	[0.0736]
Vacancy During Democratic Majority with < 25 Orgs.	-	-0.0003
[F-test p-value]	-	[1.000]

1. In Panel B, I calculate the sum of coefficients and perform F-tests. I sum the effects for: (i) *All coefficients involving the Vacancy term* (ii) *Vacancy and Vacancy X 25+ Orgs.* (iii) *Vacancy and Vacancy X Dem. Majority*

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7[1]

	(1) Representative Party Analysis	(2) Interaction with Orgs.	(3) Interactions with Orgs. & Majority
Panel A			
Vacancy	-0.0094	0.0807	0.123
	(0.0480)	(0.0632)	(0.0928)
Dem. Representative	0.0795***	0.0654**	0.0613*
	(0.0305)	(0.0327)	(0.0348)
25+ Orgs.	-	0.180***	0.198***
	-	(0.0220)	(0.0232)
Dem. Majority	-	-	0.130***
	-	-	(0.0187)
Vacancy X Dem. Representative	-0.1200*	-0.2110**	-0.3170**
	(0.0665)	(0.0987)	(0.141)
Vacancy X 25+ Orgs.	-	-0.254***	-0.3360***
	-	(0.0810)	(0.108)
25+ Orgs. X Dem. Representative	-	-0.0008	0.0115
	-	(0.0295)	(0.0338)
Vacancy X 25+ Orgs. X Dem. Representative	-	0.2510**	0.5040***
	-	(0.120)	(0.177)
Vacancy X Dem. Majority	-	-	-0.1120
	-	-	(0.114)
Dem. Representative X Dem. Majority	-	-	-0.0043
	-	-	(0.0287)
25+ Orgs. X Dem. Majority	-	-	-0.0542**
	-	-	(0.0247)
Vacancy X Dem. Representative X Dem. Majority	-	-	0.316*
	-	-	(0.169)
Vacancy X 25+ Orgs. X Dem. Majority	-	-	0.2610
	-	-	(0.160)
25+ Orgs. X Dem. Representative X Dem. Majority	-	-	-0.0144
	-	-	(0.0377)
Vacancy X 25+ Orgs. X Dem. Representative X Dem. Majority	-	-	-0.6650***
	-	-	(0.225)
Constant	5.645***	5.694***	5.701***
District-Year-Quarter FE	Yes	Yes	Yes
	(0.0530)	(0.0547)	(0.0550)
Observations	35,605	35,605	35,605
R-squared	0.540	0.545	0.546
Number of Districts	447	447	447

[1]Panel B on next page.

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7 Panel B[1]			
Vacancy for Dem. with 25+ Orgs. under Dem. Majority	-	-	-0.2260***
[F-test p-value]	-	-	[0.0000]
Vacancy for Dem. with 25+ Orgs. under Rep. Majority	-	-	-0.0145***
[F-test p-value]	-	-	[0.0004]
Vacancy for Rep. with 25+ Orgs. under Dem. Majority	-	-	-0.0640***
[F-test p-value]	-	-	[0.0016]
Vacancy for Rep. with 25+ Orgs. under Rep. Majority	-	-	-0.2130***
[F-test p-value]	-	-	[0.0002]

1. In Panel B, I calculate the sum of coefficients and perform F-tests. I sum the effects for: (i) *All coefficients involving the Vacancy term* (ii) *All coefficients involving the Vacancy term, but not the Dem. Majority term* (iii) *All coefficients involving the Vacancy term, but not the Dem. Representative term* (iv) *Vacancy and Vacancy X 25+ Organizations*

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8

	(1) Flipped District Analysis	(2) Interaction with Orgs.	(3) Interactions with Orgs. & Majority
Panel A			
Flip After Vacancy	-0.1290	-0.0605	0.0579
	(0.1310)	(0.1730)	(0.1990)
Flip After Vacancy X Prior Representative = Dem.	-0.3530	-0.5430	-1.053**
	(0.2550)	(0.3700)	(0.4380)
Flip After Vacancy X 25+ Orgs.	-	-0.0135	-0.4070
	-	(0.251)	(0.2880)
Flip After Vacancy X Prior Representative = Dem. X 25+ Orgs.	-	0.3480	0.7590
	-	(0.4460)	(0.5060)
Flip After Vacancy X Dem. Majority	-	-	-0.1630
	-	-	(0.3440)
Flip After Vacancy X Prior Representative = Dem. X Dem. Majority	-	-	1.2020**
	-	-	(0.5420)
Flip After Vacancy X 25+ Orgs. X Dem. Majority	-	-	0.9960**
	-	-	(0.4300)
Flip After Vacancy X Prior Representative = Dem. X 25+ Orgs. X Dem. Majority	-	-	-1.3660**
	-	-	(0.628)
Constant	5.646***	5.695***	5.702***
	(0.0530)	(0.0547)	(0.0550)
District-Year-Quarter FE	Yes	Yes	Yes
Control for Orgs., Prior Representative, and House Majority	Yes	Yes	Yes
Control for Vacant Quarters	Yes	Yes	Yes
Control for Districts That Do Not Flip After Vacancy	Yes	Yes	Yes
Observations	35,580	35,580	35,580
R-squared	0.540	0.545	0.546
Number of Districts	447	447	447
Panel B[1]			
1Q After Flip D → R; Dem. Majority; 25+ Orgs.			0.0259***
[F-test p-value]			[0.0000]
1Q After Flip R → D; Dem. Majority; 25+ Orgs.			0.4839**
[F-test p-value]			[0.0197]
1Q After Flip D → R; Rep. Majority; 25+ Orgs.			-0.6431***
[F-test p-value]			[0.0000]
1Q After Flip R → D; Rep. Majority; 25+ Orgs.			-0.3491
[F-test p-value]			[0.2503]

1. In Panel B, I calculate the sum of coefficients and perform F-tests. I sum the effects for: (i) *All coefficients involving the Flip After Vacancy term* (ii) *All coefficients involving the Flip After Vacancy term, but not the Prior Representative = Dem term* (iii) *All coefficients involving the Flip After Vacancy term, but not the Dem. Majority term (*iv) *Flip After Vacancy and Flip After Vacancy X 25+ Organizations*

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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