Measuring the Influence of Political Actors on the Federal Budget

Online Appendix

Ben Hammond* and Leah Rosenstiel†

December 5, 2019

*Ph.D. candidate, Department of Politics, Princeton University, blh2@princeton.edu
†Ph.D. candidate, Department of Politics, Princeton University, leahsr@princeton.edu

Obligation and Outlay Rates

Table A.1 shows the obligation and outlay rates for fiscal year (FY) 2009 military construction appropriations accounts. The percentages shown signify estimates of obligations/outlays from new budget authority in a given year, excluding obligations/outlays originating from prior-year budget authority. We have divided all military construction accounts between those that legislators historically earmarked and those they did not. Obligation rates are estimated by the Department of Defense in May 2009, and outlay rates are estimated by the Congressional Budget Office in January 2009. Military construction appropriations have a period of availability of five years, after which unobligated appropriations are returned to the Treasury. Thus no entries are provided for obligations beyond the fifth year. Appropriations may outlay for an additional five years after obligation, so the cumulative totals for outlays may not add to 100%. Obligation rates are not available for defense-wide family housing accounts.

Table A.1: Obligation and Outlay Rates for FY2009 Military Construction Appropriations

		% Appropriations Spent by Fiscal Year						
Pork accounts		**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Military Construction, Army	*Obligations*	84.0	8.0	4.0	3.0	1.0		
	Outlays	1.0	41.0	38.0	13.0	5.0	1.0	0.3
Military Construction, Navy and Marines	*Obligations*	80.0	16.0	2.0	1.15	0.85		
	Outlays	12.0	43.0	32.0	8.5	2.0	0.6	0.3
Military Construction, Air Force	*Obligations*	86.0	7.0	4.0	2.0	1.0		
	Outlays	12.0	43.0	32.0	8.0	2.5	1.0	0.2
Military Construction, Defense-wide	*Obligations*	65.0	19.0	9.0	4.0	3.0		
	Outlays	8.0	41.5	26.5	10.0	7.0	3.5	1.0
Military Construction, Army National Guard	*Obligations*	68.0	13.0	10.0	6.0	3.0		
	Outlays	5.0	38.0	30.0	15.0	7.0	3.0	1.5
Military Construction, Air National Guard	*Obligations*	75.0	15.0	5.0	3.0	2.0		
	Outlays	5.0	51.0	34.5	6.5	2.0	0.5	0.0
Military Construction, Army Reserve	*Obligations*	70.0	23.0	4.0	2.0	1.0		
	Outlays	10.0	45.0	30.0	11.0	2.0	0.7	0.3
Military Construction, Naval Reserve	*Obligations*	80.0	16.0	2.5	1.0	0.5		
	Outlays	4.0	49.0	35.0	6.0	2.0	1.0	0.5
Military Construction, Air Force Reserve	*Obligations*	88.0	6.0	4.0	1.31	0.69		
	Outlays	10.0	46.0	31.0	5.5	3.0	1.0	0.5
Chemical Demilitarization	*Obligations*	76.19	9.16	7.63	3.82	3.2		
	Outlays	11.0	26.0	30.0	20.0	5.0	5.0	0.00

Non-pork accounts		**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
NATO Security Investment Program	*Obligations*	87.0	5.0	4.0	3.0	1.0		
	Outlays	25.0	25.0	25.0	15.0	10.0	0.0	0.0
Family Housing Operations, Army	*Obligations*	100.0	0.0	0.0	0.0	0.0		
	Outlays	73.0	19.0	5.0	1.0	0.8	0.2	0.5
Family Housing Operations, Navy	*Obligations*	100.0	0.0	0.0	0.0	0.0		
	Outlays	65.0	27.0	3.5	1.0	0.1	0.0	0.0
Family Housing Operations, Air Force	*Obligations*	100.0	0.0	0.0	0.0	0.0		
	Outlays	67.0	24.5	4.0	1.0	0.5	0.1	0.0
Family Housing Operations, Defense-wide	*Outlays*	67.0	23.0	3.0	0.0	0.0	0.0	0.0
Family Housing Construction, Army	*Obligations*	71.0	13.0	9.2	4.8	2.0		
	Outlays	9.0	35.0	38.0	12.0	3.0	2.0	0.5
Family Housing Construction, Navy	*Obligations*	51.85	29.82	11.5	5.33	1.5		
	Outlays	4.0	30.0	34.0	18.0	10.0	2.5	0.5
Family Housing Construction, Air Force	*Obligations*	77.0	14.49	4.6	3.05	0.86		
	Outlays	6.0	25.0	32.0	23.0	7.5	5.0	1.0
Family Housing Construction, Defense-wide	*Outlays*	6.5	34.0	33.0	15.0	7.0	3.0	1.0
Family Housing Improvement Fund	*Obligations*	100.0	0.0	0.0	0.0	0.0		
	Outlays	60.0	19.0	9.6	4.2	3.2	2.5	0.0
Homeowners Assistance Fund	*Obligations*	26.8	45.0	28.2	0.0	0.0		
	Outlays	60.0	20.0	10.0	5.0	4.0	1.0	0.0
Base Realignment and Closure, 1990	*Obligations*	100.0	0.0	0.0	0.0	0.0		
	Outlays	40.2	37.8	12.7	4.1	3.2	1.6	0.0
Base Realignment and Closure, 2005	*Obligations*	100.0	0.0	0.0	0.0	0.0		
	Outlays	20.0	30.0	25.0	10.0	5.0	2.0	2.0

In addition, to give a sense of the difference between appropriations and outlays across all federal programs, we compile the estimated outlay rates for FY2019 House-reported appropriations bills in Table A.2. The percentages shown signify how much new budget authority provided in each of the 12 annual appropriations bills is projected to outlay in a given year, excluding outlays originating from prior-year budget authority. Outlay projections are estimated by the Congressional Budget Office and exclude Overseas Contingency Operations. Note that the Financial Services totals include repayments to the Treasury, thus their negative outlays in certain years. Less than three-quarters of all regular discretionary budget authority provided in FY2019 House-reported bills is projected to outlay in the first year it is made available, and in no bill do outlays mirror the appropriations that originated them.

Table A.2: Projection of Outlays in FY2019 House-Reported Appropriations Bills

	% Appropriations Outlaid by Year				
Appropriations Bill	**2019**	**2020**	**2021**	**2022**	**2023+**
Agriculture	82.5	12.3	2.8	1.5	0.9
Commerce, Justice, Science	64.3	21.0	6.2	1.9	6.5
Defense	59.1	23.4	9.2	4.8	3.6
Energy and Water Development	58.7	28.3	9.6	2.1	1.2
Financial Services and General Government	103.5	9.5	-0.2	-1.4	-11.4
Homeland Security	55.3	17.3	13.2	4.6	9.6
Interior	66.1	21.4	8.7	2.9	0.8
Labor, Health, Education	86.4	10.2	2.8	0.5	0.1
Legislative Branch	86.0	11.9	1.5	0.6	0.0
Military Construction and Veterans Affairs	86.7	4.1	4.0	2.5	2.7
State and Foreign Operations	34.9	22.4	18.5	10.4	13.8
Transportation and Housing	35.2	33.9	13.8	6.6	10.4
All Appropriations	72.6	16.2	6.2	2.6	2.4

Measurement Error and Bias

This section provides a more detailed discussion of the measurement error due to missingness in the FAADS data. By definition, the measurement error in the spending data is the difference between actual spending, whether obligations or outlays, and what is observed in the data. Specifically, let u_{it} denote the measurement error for congressional district/state i in year t such that

$$u_{it} = ObservedSpending_{it} - Spending_{it}. \tag{1}$$

When estimating the effect of committee membership on military construction spending, we use a two-way fixed effects model of the following form:

$$Spending_{it} = \beta CommitteeMember_{it} + \alpha X_{it} + \gamma_i + \delta_t + \epsilon_{it}. \tag{2}$$

When there is missingness in the spending data, the model is

$$ObservedSpending_{it} = \beta CommitteeMember_{it} + \alpha X_{it} + \gamma_i + \delta_t + \epsilon_{it} + u_{it}. \tag{3}$$

As previously discussed, the difference between actual spending and observed spending is a function of the missingness in the spending data such that $Missing_{it} = -u_{it}$.

If the measurement error were random, then it would lead to larger standard errors and imprecise estimates; however, it would not produce inconsistent or biased estimates (Wooldridge 2012, 318). If the measurement error were correlated with committee membership, then the estimates would be biased. With a single covariate, this bias would be the result of regressing measurement error on committee membership (Wooldridge 2012, 88–91).

Formally, we denote

$$Bias(\hat{\beta}) = \mathbb{E}(\hat{\beta}) - \beta = \frac{Cov(CommitteeMember_{it}, u_{it})}{Var(CommitteeMember_{it})}. \tag{4}$$

To give a sense of the direction of the bias, if distributive theory were correct, then we would expect committee members to receive more pork than non-committee members. In this case, observed spending would underestimate actual spending to a greater extent when legislators are on a committee. This negative correlation would result in a downward-biased estimate of the committee effect.

When the effect of committee membership is estimated with a two-way fixed effects model (equation 3), the bias will be

$$\frac{Cov(\widetilde{CommitteeMember}_{it}, \tilde{u_{it}})}{Var(\widetilde{CommitteeMember}_{it})} \tag{5}$$

where $\widetilde{CommitteeMember}$ and $\tilde{u}$ are the residuals from regressing committee membership and the measurement error, respectively, on the other covariates included in the regression: state/district fixed effects, year fixed effects, seniority, and majority party.[1] As in the simplified setting, the bias in the estimator depends on the relationship between the measurement error and committee membership.

Data Collection

This section provides a detailed explanation of our military construction appropriations data. These data are compiled from Title I of the Military Construction, Veterans Affairs, and Related Agencies appropriations bill, which provides budget authority for construction projects at military installations around the world.[2] The conference report, joint explanatory statement, or statement of managers that accompanies each enacted appropriations bill includes state tables that delineate funding for each individual project. The conference report also designates which projects were included in the President's budget request for that year and which were not. We aggregate these project-level data by military installation by year for both presidentially requested and congressionally directed appropriations.

We consider appropriations to be presidentially requested if it was included in presidential budget requests to Congress. We allow for Congress to vary the funding source of a project from what was originally submitted in the request, but we require the project itself to remain unchanged. For example, if the President requests a Navy hospital to be constructed in State X and to be funded out of the Navy's budget account, but Congress funds the hospital in State X out of the Defense-wide account, then we count the project as presidentially requested. We consider funding to be congressionally directed if it was not included in the

1. As in the simplified setting, the bias will be the result of regressing the measurement error on committee membership. However, for multiple regression, the bias will also be a function of the other covariates. For notational convenience, we characterize the bias using residual regression (Frisch and Waugh 1933).

2. Appropriations subcommittees were reorganized in FY2006. Before FY2006, Military Construction was a stand-alone appropriations bill.

President's budget request. For projects that were funded in excess of the the President's request, we treat the additional amount as congressionally directed funding.[3]

For the House analysis, we aggregate military installations by congressional district by year, and treat each congressional district-year as an observation. We then match the congressional district total with legislative organization for the year in which the appropriations bill was enacted into law. To match military installations to their respective congressional districts, we use the Simple Features for R package to overlay military installations with congressional districts. Shapefiles for congressional districts are from Lewis, Pitcher, and Martis (2013), and shapefiles for military installations are from the U.S. Census Bureau. For the Senate analysis, we aggregate military installations by state by year and treat each state-year as an observation. We then match the state totals with legislative organization for the year in which the appropriations bill was enacted into law.

We focus our data collection on appropriations accounts that Congress regularly earmarked from FY1984 to FY2010. Thus our analysis comprehensively covers domestic construction projects for the Army, Navy, Air Force, and Department of Defense, as well as Guard and Reserve components. Our analysis does not include projects in the U.S. territories or abroad, since these areas do not having voting representatives in Congress. Nor does our analysis include military construction projects within the family housing construction, family housing operations and maintenance, base realignment and closure, and the North Atlantic Treaty Organization security investment program accounts. Since legislators did not direct funding within these accounts during this period, we expect to find no variation of pork within them. Finally, our analysis does not include the full-year continuing resolution in FY2007.[4] We exclude this year for two reasons. First, Congress does not systematically distribute pork under full-year continuing resolutions. Second, as a general rule, "new starts" for construction projects are prohibited by bill language carried in the front matter of the resolutions themselves.

Parallel Trends Assumption

In this section, we examine whether the parallel trends assumption holds. For both the House and Senate analyses, provided that different legislators follow parallel trends over time, β represents the average effect of committee position on pork. The parallel trends assumption holds if legislators who switch on or off committee would have, on average, followed the same trend as those who do not change committee position. As Berry and Fowler point out, this assumption would be violated if, for example, "legislators systematically join Appropriations as their constituents demand more pork" (2016, 696). If this were the case, then this model would overestimate the effect of committee position. However, changes in committee membership are generally caused by factors outside of a legislator's

3. This categorization of the data assumes that presidential budget requests are sincere.

4. In addition to FY2007, state tables are not included in the FY1986 Military Construction appropriations conference report, as the conference committee for that year reported amendments in disagreement. To recreate the state tables for FY1986, we started by using the House-passed state tables as a base and then updated them to reflect the numbered amendments agreed to by both chambers in conference. Finally, for each the amendments reported in disagreement from the conference committee, we located the final agreement in the Congressional Record and updated the state tables accordingly.

control (e.g., change from minority to majority party, retirements, or transfers of other legislators). Thus, the parallel trends assumption seems reasonable. Furthermore, the model includes covariates for majority party and seniority, which generally coincide with changes in committee membership.

To further examine the parallel trends assumption, Figure A.1 shows average military construction spending for states before, during, and after committee membership compared to states that were never represented by a member of the committee. To make the figure easier to read, the data have been re-centered so all states represented by members of the subcommittee join in the same year. Note that we do not do this re-centering for the analysis included in the paper. Figure A.2 shows the same for military construction appropriations. Looking at Figures A.1 and A.2, we see that the parallel trends assumption appears to hold.

Figure A.1: Average State Military Construction Spending by Years Before, During, and After Senate Appropriations Subcommittee Membership

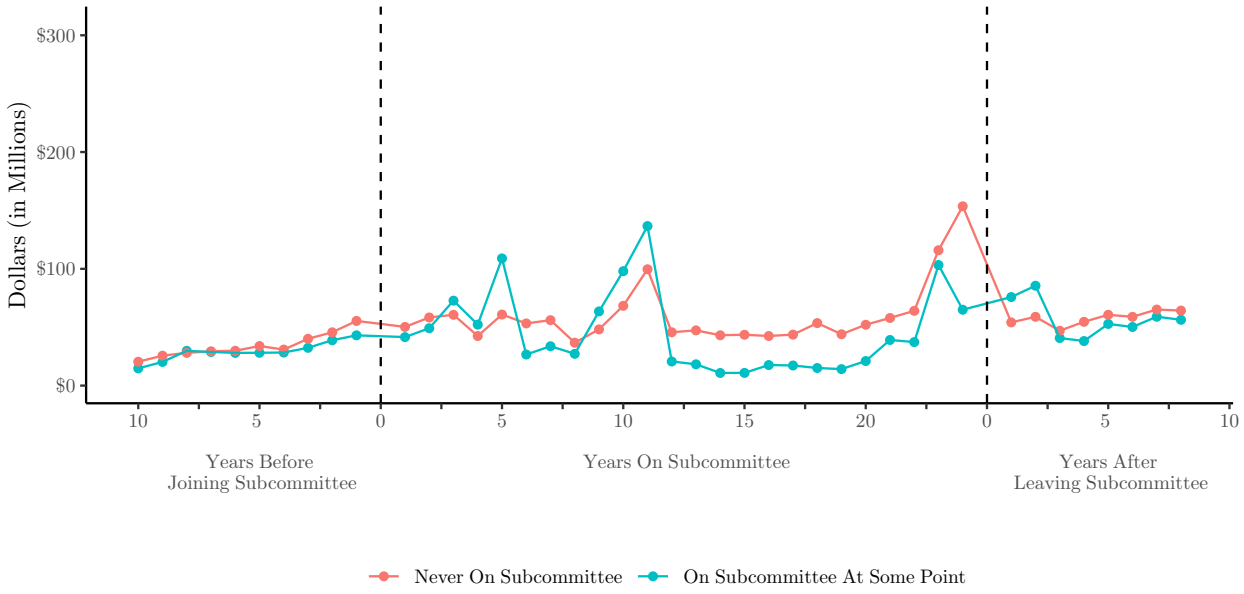
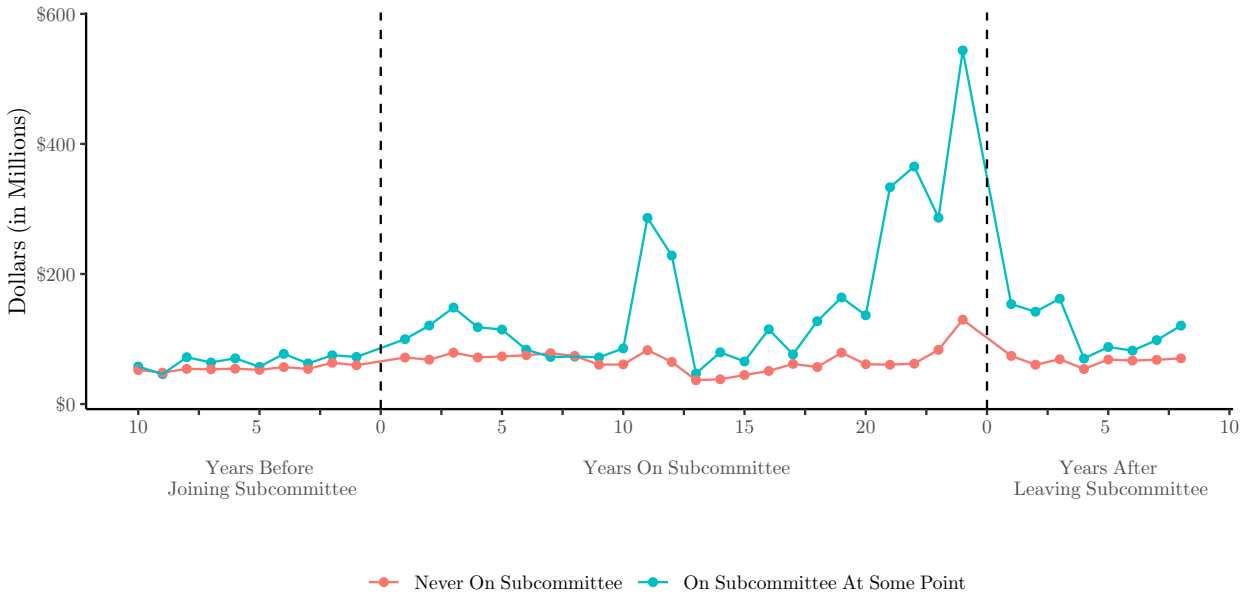


Figure A.2: Average State Military Construction Appropriations by Years Before, During, and After Senate Appropriations Subcommittee Membership



Alternate Model Specifications and Placebo Tests

In this section, we conduct a committee position analysis, re-estimate the model using share of funding instead of dollars, re-estimate the Senate model at the Senator level instead of the state level, and run placebo tests.

Committee Position Analysis

Berry and Fowler (2016) provide some evidence that the appropriations subcommittee chairs are able to procure additional pork for their districts or states. We also examine the effect of committee position (chair, ranking member, majority member, minority member) on military construction appropriations. Evidence that appropriations subcommittee members direct a disproportionate share of appropriations to their districts or states is particularly strong for the House, and to a lesser extent the Senate majority. We do not find that individual positions are significantly different from one another. However, some of the analyses are likely underpowered for certain committee positions, and we encourage scholars to view our null findings with skepticism.

Table A.3 shows the effect of appropriations subcommittee status on military construction spending, appropriations, and earmarks. The first column of Table A.3 replicates the regression for military construction spending included in Table 6 of Berry and Fowler (2016). The second and third columns show the same analysis using appropriations and earmarks, respectively. Unlike Berry and Fowler's findings, our analysis demonstrates that appropriations subcommittee membership affects a legislator's ability to procure pork for her district.

Table A.3: The Effect of House Committee Position on Spending, Appropriations, and Earmarks

	Dependent Variable: Log Dollars		
	Spending	Appropriations	Earmarks
Min. Appropriations Member	−0.026	0.519	0.211
	(0.026)	(0.808)	(0.571)
Maj. Appropriations Member	0.012	0.782	0.013
	(0.033)	(0.800)	(0.639)
Min. MilCon Member	−0.018	3.718***	3.920**
	(0.054)	(0.968)	(1.220)
Maj. MilCon Member	0.041	2.480**	2.614**
	(0.045)	(0.768)	(0.988)
MilCon Ranking Member	−0.039	0.983	5.034**
	(0.059)	(1.769)	(1.850)
MilCon Chair	0.112	1.741	5.007*
	(0.110)	(1.062)	(2.050)
Legislator & Year Fixed Effects	✓	✓	✓
Observations	10,498	10,108	10,108
Adjusted R^2	0.998	0.601	0.475
Note:			*p<0.05; **p<0.01; ***p<0.001
			Standard errors clustered by state

Table A.4 shows a similar analysis for the Senate at the state level. We disaggregate a state's committee membership into committee position and show the effect of a state's committee position on military construction appropriations. It may be the case that these disaggregated analyses are underpowered. One possible explanation is a lack of variation in the data. In both the House and Senate, the chair and ranking member represent a very small proportion of districts and states. Additionally, the Senate Appropriations Committee and the Senate Armed Services Committee are two of the largest committees in the Senate. Since they are both 'A' committees, Republicans and Democrats have conference rules that limit membership on the two committees. Roughly half of all states are represented on the Senate Appropriations Committee in any given Congress, and the vast majority of remaining states are represented on the Senate Armed Services Committee. Put together, a handful of states are represented on both committees, the vast majority of states are represented on one of the committees, and a handful of states—and typically the same ones over time—are not represented on either. If we expect legislators to receive pork from being on either or both of these committees, then this pork would be reflected for most states.

Table A.4: The Effect of Senate Committee Position on Spending, Appropriations, and Earmarks at the State Level

	Dependent Variable: Log Dollars		
	Spending	Appropriations	Earmarks
Min. Appropriations Member	0.250	0.087	−0.616
	(0.138)	(0.210)	(0.582)
Maj. Appropriations Member	0.206	0.531*	0.112
	(0.141)	(0.240)	(0.617)
Min. MilCon Member	0.246*	0.496	0.724
	(0.100)	(0.286)	(0.780)
Maj. MilCon Member	0.146	0.526	1.397
	(0.143)	(0.308)	(0.754)
MilCon Ranking Member	0.363	0.653	1.182
	(0.233)	(0.355)	(1.589)
MilCon Chair	0.104	1.102**	2.183
	(0.213)	(0.378)	(1.249)
State Fixed Effects	✓	✓	✓
Year Fixed Effects	✓	✓	✓
Observations	1,295	1,300	1,300
Adjusted R^2	0.835	0.315	0.429
Note:			*p<0.05; **p<0.01; ***p<0.001
			Standard errors clustered by state

Share of Funding

As a robustness check, we perform the same analysis using the share of total military construction appropriations instead of log dollars. The results for the House and Senate are shown in Tables A.5 and A.6, respectively. For the Senate, we find a significant effect of appropriations subcommittee membership on earmarks and not spending. For the House we find an effect of subcommittee membership on earmarks, significant at the 0.1 level.

Table A.5: Effect of House Military Construction Appropriations Subcommittee Membership on Share of Spending, Appropriations, and Earmarks

	Dependent Variable: Share of Total		
	Spending	Appropriations	Earmarks
Appropriations Subcommittee	0.00003	−0.00001	0.002
	(0.0001)	(0.001)	(0.001)
Legislator & Year Fixed Effects	✓	✓	✓
Observations	10,498	10,108	10,108
Adjusted R^2	0.983	0.242	0.135
Note:			*p<0.05; **p<0.01; ***p<0.001
			Standard errors clustered by state

Table A.6: Effect of Senate Military Construction Appropriations Subcommittee Membership on Share of Spending, Appropriations, and Earmarks

	Dependent Variable: Share of Total		
	Spending	Appropriations	Earmarks
Appropriations Subcommittee	0.003	0.001	0.005***
	(0.002)	(0.001)	(0.001)
State & Year Fixed Effects	✓	✓	✓
Observations	1,295	1,300	1,300
Adjusted R^2	0.582	0.772	0.324
Note:			*p<0.05; **p<0.01; ***p<0.001
			Standard errors clustered by state

Senate Estimated at the Senator Level

As an additional robustness check, we re-estimate the Senate analysis at the Senator level instead of the state level. We also re-estimate the analysis at the state level using senator-pair fixed effects rather than state fixed effects. For the latter, this will compare within a state in years when it is represented by the same Senators. Both analyses show a positive, but not statistically significant, effect of appropriations subcommittee membership on military construction funding. One reason that the state-level analysis with state fixed effects produces significant results, and these analyses do not, is that the state-level fixed effects use up fewer degrees of freedom than the the Senator-level fixed effects.

Table A.7: The Effect of Senate Committee Membership on Spending, Appropriations, and Earmarks

	Dependent Variable: Log Dollars					
	Spending		Appropriations		Earmarks	
Authorizing Committee	−0.178		−0.044		−1.492**	
	(0.170)		(0.196)		(0.573)	
Appropriations Subcommittee		−0.006		0.455		0.836
		(0.100)		(0.268)		(0.596)
Senator & Year Fixed Effects	✓	✓	✓	✓	✓	✓
Observations	2,602	2,602	2,613	2,613	2,613	2,613
Adjusted R^2	0.848	0.848	0.329	0.330	0.459	0.459
Note:						*p<0.05; **p<0.01; ***p<0.001
						Standard errors clustered by state

Table A.8: The Effect of Senate Committee Membership on Spending, Appropriations, and Earmarks

	Dependent Variable: Log Dollars					
	Spending		Appropriations		Earmarks	
Authorizing Committee	−0.289		−0.069		−0.567	
	(0.214)		(0.296)		(0.711)	
Appropriations Subcommittee		0.030		0.657		1.219
		(0.077)		(0.430)		(0.773)
Senator Pair & Year Fixed Effects	✓	✓	✓	✓	✓	✓
Observations	1,295	1,295	1,300	1,300	1,300	1,300
Adjusted R^2	0.856	0.856	0.354	0.356	0.472	0.474
Note:						*p<0.05; **p<0.01; ***p<0.001
						Standard errors clustered by state

Placebo Tests

We conduct two placebo tests. The first conducts the same analysis for the House and Senate for a subcommittee unrelated to military construction: Agriculture. Specifically, we regress military construction spending, appropriations, and earmarks on membership on the Agriculture appropriations subcommittee. Tables A.9 and A.10 show the results for the House and Senate, respectively. As expected, we find no effect of Agriculture appropriations subcommittee membership on military construction spending, appropriations, or earmarks.

Table A.9: Effect of House Agriculture Appropriations Subcommittee Membership on Spending, Appropriations, and Earmarks

	Dependent Variable: Log Dollars		
	Spending	Appropriations	Earmarks
Appropriations Subcommittee	−0.013	0.666	0.438
	(0.019)	(1.565)	(0.955)
Legislator & Year Fixed Effects	✓	✓	✓
Observations	10,498	10,108	10,108
Adjusted R^2	0.998	0.600	0.472
Note:			*p<0.05; **p<0.01; ***p<0.001
			Standard errors clustered by state

Table A.10: Effect of Senate Agriculture Appropriations Subcommittee Membership on Spending, Appropriations, and Earmarks

	Dependent Variable: Log Dollars		
	Spending	Appropriations	Earmarks
Appropriations Subcommittee	0.240	0.402	0.758
	(0.123)	(0.211)	(0.728)
State & Year Fixed Effects	✓	✓	✓
Observations	1,295	1,300	1,300
Adjusted R^2	0.836	0.314	0.427
Note:			*p<0.05; **p<0.01; ***p<0.001
			Standard errors clustered by state

The second placebo test conducts a similar analysis using prior committee membership. Specifically, we regress military construction spending, appropriations, and earmarks on committee membership in the previous Congress. The results of this analysis are shown in Table A.11 for the House and in Table A.12 for the Senate.

Table A.11: Effect of Lagged House Military Construction Appropriations Subcommittee Membership on Spending, Appropriations, and Earmarks

	Dependent Variable: Log Dollars		
	Spending	Appropriations	Earmarks
Appropriations Subcommittee (Prior Congress)	0.029	−0.750	−0.119
	(0.033)	(0.726)	(1.041)
Legislator & Fixed Effects	✓	✓	✓
Observations	6,431	6,076	6,076
Adjusted R^2	0.998	0.605	0.471
Note:			*p<0.05; **p<0.01; ***p<0.001
			Standard errors clustered by state

Table A.12: Effect of Lagged Senate Military Construction Appropriations Subcommittee Membership on Spending, Appropriations, and Earmarks

	Dependent Variable: Log Dollars		
	Spending	Appropriations	Earmarks
Appropriations Subcommittee (Prior Congress)	0.122	0.232	0.251
	(0.100)	(0.281)	(0.541)
State & Year Fixed Effects	✓	✓	✓
Observations	1,196	1,200	1,200
Adjusted R^2	0.834	0.303	0.421
Note:			*p<0.05; **p<0.01; ***p<0.001
			Standard errors clustered by state

References

Berry, Christopher R., and Anthony Fowler. 2016. "Cardinals or Clerics? Congressional Committees and the Distribution of Pork." *American Journal of Political Science* 60 (3): 692–708.

Frisch, Ragnar, and Frederick V. Waugh. 1933. "Partial Time Regressions as Compared with Individual Trends." *Econometrica* 1, no. 4 (October): 387–401.

Lewis, Jeffrey B., Lincoln Pitcher, and Kenneth C. Martis. 2013. "Digital Boundary Definitions of United States Congressional Districts, 1789-2012." Accessed February 16, 2018. `http://cdmaps.polisci.ucla.edu`.

Pebesma, Edzer. 2018. "Simple Features for R: Standardized Support for Spatial Vector Data." *The R Journal* 10 (1): 439–446.

Wooldridge, Jeffrey M. 2012. *Introductory Econometrics: A Modern Approach.*