

Appendix C: Politicization of Awards

There is concern that government grants may be politicized; that is, members of Congress who control the DOE purse may seek to have projects in their districts funded. Previous literature has found that political power in Congress can be used as an instrument for spending. This literature has focused on spending allocated on a state-by-state basis by Congress itself. Knight (2002)'s pioneering study on Federal Highway Grants and Feyrer and Sacerdote (2011)'s estimation of the employment impacts of the ARRA, for example, both use congressional delegation seniority as an instrument for funding to a given state. However, in the case of the SBIR program, decision-making is located in the executive branch. It is also highly dispersed and bureaucratized, conditions that Lerner (2002) suggests should lead to fewer opportunities for capture. My prior is that Congressional political power is unlikely to have an impact on the geography of funding.

I try to predict spending to both the Congressional District (each of which sends one representative to the House) and state (each of which sends two representatives to the Senate). A Congressman's tenure of service determines her rank, both in the overall chamber and in specific committees on which she sits. Following the political science literature, I use this measure of "seniority," which is the number of terms served in the House and the number of years served in the Senate.

Four congressional committees in each chamber have jurisdiction over the SBIR program. In the House the two primary committees are the Science & Technology and Small Business Committees, but the Energy and Commerce and perhaps most importantly the Appropriations committee are also involved. In the Senate the Small Business Committee has primary jurisdiction, but the Appropriations Committee, the Commerce, Science, and Transportation Committee, and the Energy and Natural Resources Committee are also involved.

I use these four committees and each chamber to develop my committee metrics. Member and committee data is from Charles Stewart III and Jonathan Woon at MIT. This is only available from 1993-2012, so my analysis is limited to this time period.¹ Specifically, the House chamber delegation seniority metrics are for each state ($H_Sr_g^{State}$) and district ($H_Sr_g^{District}$). The House committee seniority metrics are $H_C_Sr_g^{District}$ and $H_C_Sr_g^{State}$, where seniority is summed over the four committees. For the state variables, seniority is averaged across all representatives from the district. The senate chamber measure is $S_Sr_g^{State}$

¹Available on Stewart's home page: http://web.mit.edu/17.251/www/data_page.html#2

and the committee measure is $S_C_Sr_g^{State}$.

Using full addresses, I geocoded applicant firms by congressional district, and matched congressional districts and application years to the relevant congressional data. The metrics, calculated for a given congress g (where for example the 103rd congress was from January 1993-January 1995) are described in Table B1.

I estimate the following OLS regressions to see whether these metrics are predictive of the total number of annual Phase $x \in [1, 2]$ awards to a given state or congressional district.

$$\begin{aligned} PhxAwards_t^{State} = & \alpha + \beta_1 S_Sr_g^{State} + \beta_2 H_Sr_g^{State} \\ & + \beta_3 S_C_Sr_g^{State} + \beta_4 H_C_Sr_g^{State} + \delta_{state} [\mathbf{1} \mid State = State] \end{aligned}$$

$$PhxAwards_t^{District} = \alpha + \beta_1 H_Sr_g^{District} + \beta_2 H_C_Sr_g^{District} + \delta_{district} [\mathbf{1} \mid District = District]$$

Columns I and III of Table B2 suggest that at the state level the strongest predictor of funding is the Senate committee seniority metric. The coefficient implies that an increased year of committee seniority in the Senate yields 0.031 increase in Phase 1 and 0.013 increase in Phase 2 awards to the state. This magnitude is small, as the mean Phase 1 awards to a state is 1.66. Overall House seniority at the state level has a larger, albeit less significant, positive effect of 0.11 for Phase 1 awards, but no apparent effect for Phase 2. The final two variables seem to have no effect.

Columns II and IV show the district level regressions, which support the importance of committee from the state level. While House chamber seniority at the district level has essentially no effect, the average committee seniority for districts' representatives has a positive significant coefficient of 0.0096 for Phase 1 and 0.0053 for Phase 2. Again, the magnitude is quite small. A doubling of mean committee seniority among house representatives yields 0.001 more Phase 1 awards to a district from an average of 0.279.

In sum, I do find surprising positive and significant effects of political power on funding, but the levels are very small. I have no reason to believe that these congressional effects impact my estimates of financial, commercial, and innovation outcomes. In the case of the SBIR program, the grants appear to be too small and the award process too dispersed and bureaucratized to garner substantial lobbying effort, but capture is nonetheless a possibility.

These results are somewhat inconsistent with the previous literature. Knight (2002) and Feyrer and Sacerdote (2011) find that the best variable for predicting spending is mean chamber delegation seniority. However, both use committee metrics that are different from

Table 1: Congressional Data Summary Statistics, 103-112 Congresses (1993-2012)

Variable Name	Variable Meaning	N	Mean*	Std. Dev.
$S_Sr_g^{\text{State}}$	Mean chamber seniority among senators from given state	893	12.06	7.45
$H_Sr_g^{\text{State}}$	Mean chamber seniority among House representatives from given state	804	4.64	2.03
$H_Sr_g^{\text{District}}$	Chamber seniority of House representative from given district	4472	5.54	4.24
$S_C_Sr_g^{\text{State}}$	Sum of committee seniority among senators from given state in four committees with SBIR jurisdiction	893	14.16	17.24
$H_C_Sr_g^{\text{State}}$	Mean committee seniority among House representatives from given state in four committees with SBIR jurisdiction	804	1.15	1.02
$H_C_Sr_g^{\text{District}}$	Sum of committee seniority among House representatives from given district in four committees with SBIR jurisdiction	4472	2.02	3.57
$Ph1Awards_t^{\text{State}}$	Number of EERE/FE Phase 1 awards in year t to given state	893	1.66	3.05
$Ph1Awards_t^{\text{District}}$	Number of EERE/FE Phase 1 awards in year t to given district	4472	0.279	0.621
$Ph2Awards_t^{\text{State}}$	Number of EERE/FE Phase 2 awards in year t to given state	893	0.792	1.61
$Ph2Awards_t^{\text{District}}$	Number of EERE/FE Phase 2 awards in year t to given district	4472	0.123	0.449

*Note: The mean and std. dev. are across state-years or district-years. Of 10,182 applicants between 1993 and 2012, I have state for state for 10,120, and matched 8,799 to congressional districts. Where mean is indicated, the denominator is either the number of senators (2) or the number of congressional districts in a state.

mine (Knight uses proportion of a state's delegation sitting on the transportation committee, and Feyrer and Sacerdote use the number of committee chairs held by the House and Senate delegations). Both also study only the state level whereas I can also exploit Congressional District information.

Table 2: Predictive Power of Congressional Status on Phase 1 and 2 Awards by State and Congressional District

Dep. Var:	I. $Ph1Awards_t^{State}$	II. $Ph1Awards_t^{District}$	III. $Ph2Awards_t^{State}$	IV. $Ph2Awards_t^{District}$
$S_{Sr_g}^{State}$	-0.0317* (0.0190)		-0.0147 (0.0106)	
$H_{Sr_g}^{State}$	0.116** (0.0557)		0.0258 (0.0310)	
$S_{C_{Sr_g}}^{State}$	0.0312*** (0.00941)		0.0133** (0.00523)	
$H_{C_{Sr_g}}^{State}$	0.0114 (0.126)		0.00188 (0.0701)	
$H_{Sr_g}^{District}$		0.00417* (0.00253)		-0.000437 (0.00185)
$H_{C_{Sr_g}}^{District}$		0.00962*** (0.00301)		0.00526** (0.00220)
State f.e.	Y	N	Y	N
District f.e.	N	Y	N	Y
N	804	4472	804	4472
R^2	0.608	0.041	0.537	0.025

Note: This table uses all applicant data to predict funding by congressional power at the state level (columns I and III) and at the congressional district level (columns II and IV) using both House and Senate seniority metrics. C indicates seniority on committees with SBIR/DOE authority. $Year \geq 1993$.