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Essays on the Economics of Public Procurement

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by

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ABSTRACT OF THE DISSERTATION

Essays on the Economics of Public Procurement

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United States federal procurement constitutes 25% of government spending and 6% of Gross Domestic Product. This dissertation addresses three questions in public economics: (Chapter 1) Are there economically relevant spillovers from federal procurement spending into local labor markets? (Chapter 2) Do voters respond to changes in federal procurement spending in their districts? (Chapter 3) Can legislators influence the spatial distribution of federal procurement spending?

Chapter 1

Instant Gratification, Persistent Pain: The Employment Effects of Sequester-Induced Federal Procurement Cuts

Abstract: I estimate the city-level jobs multiplier associated with reductions in federal procurement spending from the 2013 U.S. federal budget sequester—a sudden, dramatic, and permanent decrease in government spending. The sequester budget reduction formula disfavored local labor markets with high exposure to Department of Defense (DoD) procurement contracts. Using the interaction of the formula with pre-existing procurement structure as an instrument, I estimate the employment multiplier of government spending. The same-year multiplier is 2.2 jobs lost per $1,000,000 in spending cuts, which rises to 5 jobs lost after three years. This persistence is consistent with the perceived permanent nature of the sequester budget reduction, which leaves crowd-in of private sector activity as the only source of recovery—a potentially slow process for the relatively specific products that the DoD procures. Additional results suggest that federal agencies cut capital in greater proportions than labor in order to achieve sequester reduction targets, illuminating the response mechanisms of public good providers to

unanticipated budget cuts.

1.1 Introduction

Fiscal stimulus motivates most research on the economic effects of government spending: can we use government spending as a tool to manipulate economic conditions? Existing research estimates the fiscal multiplier under a variety of conditions, but the mechanisms by which government spending affect the economy remain poorly understood. At the same time, the primary purpose of government spending is not business cycle manipulation, but the production of public goods. Shifting national priorities in public goods provision might induce incidental economic changes with implications that are not fully captured by the fiscal multiplier. So for both the fiscal multiplier and the public goods literatures, there are high returns to improving understanding of the mechanisms through which changes in government spending affect the economy.

In this paper, I estimate the city-level jobs multiplier associated with reductions in federal procurement spending from the 2013 U.S. federal budget sequester—a sudden, dramatic, and permanent decrease in government spending motivated by deficit reduction. Instrumenting for spending changes using the sequester budget reduction formula, I estimate that the sequester cost cities 2.2 jobs per million dollars of spending cuts in the first year, which is comparable to jobs multipliers estimated in the existing literature. However, job losses rose to 5 per million dollars in the third year, indicating that the labor market effects of the sequester are far more persistent than those of the more transitory shocks studied in the existing literature. Because sequester cuts are permanent, equilibrating market adjustments must come through private sector activity: that is, through the reversal of crowding out. The speed of private sector adjustment depends critically upon parameters driving price elasticities, including the substitutability of

resources between government and civilian uses. Furthermore, results suggest that the politics of budget cuts matter to achieving deficit reduction. Policy uncertainty surrounding the 2013 sequester seems to have led to disproportionate cuts to investment in future capital rather than cuts to current labor. If the goal of deficit reduction is to maximize public goods production subject to a deficit reduction target, such distortions to the government's choice over productive inputs could reduce welfare relative to budget cuts allowing greater reoptimization over factors of production.

The 2013 sequester was an initial, $84 billion tranche of cuts imposed by the 2011 Budget Control Act, which mandates a $2.3 trillion ten year budget reduction. It reduced the budget for all federal discretionary programs in an across-the-board manner, leaving agencies little room to protect high-priority programs. Chaotic political circumstances surrounded implementation of the sequester, creating enormous uncertainty regarding whether sequestration would occur, how big the cuts would be, and how any cuts would be distributed across agencies. Ultimately, it came into effect mid-way through fiscal year 2013, leaving agencies just six months to execute the required spending reductions. In stark contrast to other spending shocks studied in the fiscal multiplier literature, the 2013 sequester cuts were permanent. Despite the uncertainty surrounding their implementation, it was clear that since the cuts were part of a ten year deficit reduction plan, reversing them would require a major and unlikely legislative policy shift. Procurement contracts were the most significant category of spending affected by the cuts. The location of contract performance likely is endogenous to local economic conditions. First, vendor bids reflect the cost of underlying factors of production. Second, Congress could appropriate procurement funding intending to affect local economic conditions. Therefore, I instrument for local spending changes using the sequester budget reduction formula; I predict a city's 2013 level of procurement spending as the 2012 level of spending minus the sequester-mandated program-level budget reduction rate of 8.6%

for defense contracts and 5.3% for non-defense contracts.

The fiscal multiplier literature seeks to understand the extent to which, and under what conditions, changes in government spending affect the business cycle. Theory provides ambiguous predictions, since there are a number of mechanisms by which government spending might displace, or crowd out, more economically productive private-sector activity. Shifts of the government's demand for goods change prices and factor utilization in the markets for those goods, with effects cascading through other markets over time to achieve general equilibrium effects. Then the persistence and overall magnitude of aggregate effects depends upon the speed of firm and labor adjustment, which vary by the markets hit by government spending changes. As a result, the extent of crowding out, and thus the value of the fiscal multiplier, depends critically upon the point of entry of government spending changes into the economy. For example, the multiplier may vary depending upon whether spending changes come through transfers to individuals, employment of government personnel, procurement of commercial commodities, or procurement of specialized military equipment, since price elasticities might differ considerably across these markets. Similarly, the fiscal multiplier might vary by the slackness of the underlying economy and the direction of the spending shock. In sum, there is not one fiscal multiplier, but potentially a variety of multipliers depending upon the circumstances of government spending changes. The challenge the fiscal multiplier literature faces is estimating reduced form fiscal multipliers under a variety of conditions, or estimating deeper parameters facilitating a structural approach to deducing externally valid fiscal multipliers.

Estimating aggregate fiscal multipliers and underlying parameters is difficult due to limited identifiable exogenous variation in government spending.[1] Two primary approaches include, first, employing structural vector autoregressions, and second, mea-

[1] See Ramey (2011*a*) for a more comprehensive discussion of the fiscal multiplier literature.

suring the multiplier from increases in spending associated with military buildups under the identifying assumption that the international concerns driving such build-ups are uncorrelated with contemporaneous national economic conditions. However, there remain conditions under which no identified aggregate exogenous variation currently exists with which to estimate the desired multipliers. A supplemental approach exploits cross sectional variation in the distribution of government spending changes to estimate subnational relative fiscal multipliers. As discussed at length in Nakamura and Steinsson (2014), subnational fiscal multipliers do not directly inform aggregate fiscal multipliers, since they are necessarily partial equilibrium. In particular, for most papers in this literature, local areas receiving relative spending do not pay commensurately more for that spending through tax increases. Moreover, data limitations restrict the potential for subnational fiscal multiplier studies to fully capture spillovers between observational units. However, subnational fiscal multipliers are still helpful for understanding the extent to which fiscal multipliers might vary by context (akin to a messy comparative statics approach), abstracting away from the effects of Ricardian equivalence, monetary policy, and spillovers. Considering the full scope of fiscal multiplier literature, there are still gaps in coverage of the reduced form approach, and enormous gains from empirical strategies illuminating the underlying structural mechanisms by which government spending changes affect the economy.

The magnitude of the sequester job market impact is comparable to that found in the existing subnational fiscal multiplier literature.*A priori*, there are many reasons to have expected this paper to find a different value for the multiplier. First, most existing studies focus on changes to transfers rather than procurement. Second, most existing papers focus on fiscal stimulus in response to a recession, while the sequester was a budget cut implemented during economic recovery. Third, the city-level multiplier captures fewer spillovers than the state-level estimates do. Under an empirically supported assumption

of limited short-run labor mobility, such accounting for spillovers would increase the sequester jobs multiplier. In future extensions of this paper, I will estimate the state-level sequester jobs multiplier and explore interactions between the multiplier and city pre-sequester economic condition to improve understanding of the contribution of these mechanisms to fiscal multiplier magnitudes.

Job losses from the 2013 sequester are far more persistent than the job market effects of shocks studied in the existing fiscal multiplier literature. It is an over-simplification to consider estimation of a single jobs multiplier for a given spending shock, since the multiplier changes as the economy responds over time. Ideally, researchers would present multiplier impulse response functions. In a U.S. time-series analysis of military procurement spending, Ramey (2011*b*) shows that spending takes 3 to 4 quarters to have measurable impact on economy following the news shock announcing spending changes, and the maximal impact is between 1 and 1.5 years after the shock. Chodorow-Reich et al. (2012), Feyrer and Sacerdote (2011), and Wilson (2012) explicitly examine multiplier time dynamics in their studies of the American Reinvestment and Recovery Act, and Shoag (2010) examines the time dynamics of multipliers from state pension return windfalls. These papers find maximum economic effects between one and two years after the initial shock. Nakamura and Steinsson (2014) measure economic effects two years out, explaining that their unreported analysis suggests that the two year horizon capture the bulk of the dynamics.

In contrast to spending shocks studied in the existing literature, the sequester spending shock was permanent. This isolates private sector activity as the source of recovery, making the sequester shock an unusually valuable context in which to study crowding-out. The speed with which private sector adjustments lead to employment recovery depends upon a number of factors, including price stickiness, elasticities, and the mobility of labor and capital. Some potential sources include the underlying

economic state in 2013 of weak recovery from a deep recession, downward sticky prices, policy uncertainty preceding the shock, and most interestingly, the mix of industries and geographies hit by the particular types of spending cut by the 2013 sequester. For example, there is heterogeneity in the extent to which resources used to produce government goods can be converted to civilian use; lower substitutability leads slows recovery. If the fiscal multiplier varies predictably according to observable characteristics of labor markets directly hit by changes in government spending, then fiscal policy could potentially target spending types to minimize crowding-out.

Analysis of the 2013 sequester also facilitates evaluation of deficit reduction policy implementation. One possible framing of the deficit reduction problem Congress faces is to maximize the production of public goods subject to a budget constraint that embeds the deficit reduction target. Analysis of the relative changes of discretionary spending types between 2012 and 2013 provides some evidence that the uncertainty and abruptness of the sequester implementation inhibited the ability of agencies to optimize their choice of productive inputs to maximize public goods production. In particular, agencies cut capital-acquiring contracts by dramatically more than they cut personnel. Given the permanence and moderate magnitude of the sequester cuts, this almost certainly represents a deviation from the optimal capital to labor ratio. Several features of government employment, such as relatively high union representation, likely make labor more difficult to cut than contracts in the short time-frame in which the sequester legislation afforded agencies to make the required cuts. This strongly suggests that the politically-induced chaos surrounding the sequester introduced inefficiency into the production of public goods. Future work will further analyze the types of contracts that agencies chose to forgo in order to meet budget reduction targets. In particular, initial analysis suggests long-term development contracts might have been hit disproportionately, with implications for the government's investment in technology and capital, and hence

future capacity. Thus not just present, but future government capacity might have been dramatically affected by the politics of the sequester.

The remainder of the paper is organized as follows. Section 2 provides background information on the federal appropriations process and the context of the 2013 Sequester. Section 3 describes the data, section 4 presents my empirical approach, and section 5 presents my results. Section 6 addresses robustness and threats to identification, and section 7 concludes.

1.2 U.S. Federal Appropriations and the 2013 Sequester

Design and implementation of the 2013 sequester, and therefore its economic impacts, depend upon institutional features of the federal budgeting process. The U.S. Constitution requires that all federal spending be approved by Congress. There are two distinct approval processes partitioning federal activities into two categories, mandatory and discretionary. Congress indirectly approves funding for mandatory programs, such as Social Security, by establishing criteria determining recipient eligibility for program benefits. In order for Congress to change mandatory program spending levels, it must change the underlying program legislation. In contrast, Congress directly controls discretionary program funding through annual appropriations legislation that is distinct from program legislation. While mandatory spending typically transfers money to individuals, discretionary spending pays for labor and capital necessary for the conduct of government activities. The 2013 sequester primarily cut discretionary spending.

1.2.1 Discretionary Appropriations

There are three types of discretionary appropriations legislation: regular, continuing resolution, and supplemental. Regular appropriations provide agencies with annual

funding. If for some reason Congress fails to pass regular appropriations before the start of the fiscal year.[2] it can avoid the shutdown of the now-unfunded federal programs by passing a continuing resolution. A continuing resolution authorizes covered federal activities to continue spending at the previous fiscal year's spending levels for a specified time period (e.g., until regular appropriations are passed). Finally, Congress can pass Supplemental Appropriations during the fiscal year to fund responses to unanticipated emergencies, such as natural disasters.

Agencies must use appropriated funds for the purpose and within the time-period specified by Congress through the appropriations legislation. Some appropriations lines leave agencies with significant latitude regarding how to spend funds. For example, fiscal year 2014 defense appropriations legislation provided the Army $31 billion for operations and maintenance funding, which the Army could use for a wide variety of expenditures, from the purchase of uniforms to janitorial services. Other appropriations lines are extremely specific. For example, the fiscal year 2014 defense appropriations legislation provides $5.1 billion for the procurement of 29 F-35 Joint Strike Fighter aircraft. Finally, funding appropriated during a given fiscal year varies categorically in the amount of time agencies have to spend the money. Agencies must spend operations and maintenance and personnel funds by the end of the same fiscal year in which it is appropriated. However, agencies have several years after the initial appropriating legislation to spend certain types of procurement, research and development, and construction funds.

1.2.2 The 2013 Federal Budget Sequester

In the 2010 Congressional elections, a fiscally conservative branch of the Republican Party gained control of the U.S. House of Representatives. These House republicans

[2]For most years during the last decade, Congress has failed to pass at least one regular appropriations bill prior to the start of the fiscal year. See McCarty (2014) for a detailed time-line of recent appropriations legislation.

made what is normally a routine legislative increase of the debt ceiling contingent upon passage of a deficit reduction plan dominated by spending cuts. On August 2, 2011—hours before the U.S. would enter into sovereign default without a debt ceiling increase—Congress and the President signed the Budget Control Act of 2011 (BCA). The BCA increased the debt ceiling and enacted a deficit reduction plan that would eventually lead to the 2013 federal budget sequester.

The BCA immediately increased the debt ceiling by $900 billion in exchange for budget caps reducing spending by $917 billion over ten years. Also, it tied the next debt ceiling increase to the passage of legislation cutting an another $1.5 trillion over ten years. Without the next debt ceiling increase, the U.S. was projected to enter into sovereign default on January 2, 2013. The BCA established a punitive budget sequester that would be triggered on January 1, 2013 if no legislation was passed. Under the sequester, the $1.5 trillion in budget cuts would be achieved in an across-the-board manner that required all programs within broad categories to be cut by the same percentage, thus explicitly prohibiting funding re-optimization or the protection of high-priority programs. To incentivize bipartisan negotiation, the BCA mandated that under the sequester, half of the the $1.5 trillion in spending cuts would come from defense programs, which republican legislators tended to support, and half would come from non-defense programs, which democratic legislators tended to support.

Despite bipartisan agreement that the sequester would inflict severe damage to U.S. interests by preventing funding reallocation according to program priority, Congress failed to negotiate alternative budget cuts by the January 2, 2013 deadline. There were several legislative proposals between the passage of the BCA and the deadline, the final of which[3] failed on January 1, 2013. Additionally, there were legislative and executive changes to the value of the sequester that would be imposed in fiscal year 2013, and to the

[3]The House Republican's proposed amendments to the 2012 American Taxpayer Relief Act

types of spending subject to sequestration. These changes and other proposed changes generated enormous uncertainty over how large 2013 cuts would be, which defense and non-defense resources would be subject to cuts,[4] and whether sequestration would even occur in 2013. Ultimately, the sequester was triggered on January 2 and agencies had to implement cuts starting March 1. Defense programs had to be cut by 8.6% below 2012 levels, and non-defense programs had to be cut by 5.3%. Since the entire federal government was funded by continuing resolution for fiscal year 2013, agencies had spent at fiscal year 2012 rates from October through February, so had to impose dramatic and rapid cuts in the final six months of the fiscal year in order to achieve the required 2013 spending reductions.

1.3 Data

I obtain city-level[5] grant and contract spending data from USASpending.gov, a publicly accessible database of all unclassified grants and procurement contracts above $3,500 from fiscal year 2005 through 2015. I associate spending from each grant and contract to the city in which the predominant amount of work occurred. I associate spending to the date on which the grant or contract was signed. Grants and contracts are signed after associated appropriations legislation is passed, but before the recipient receives payment. USASpending.gov contract data includes vendor identification and demographic information, the location and agency of the government ordering office, a basic description of the purchased product, contract procurement methods, and records of contract renegotiations.

I build the outcome variable, per capita change in city employment level, using the Bureau of Labor Statistics Local Area Unemployment Statistics (LAUS) series. I

[4] For example, in 2012, executive order exempted military personnel from any sequester budget cuts.
[5] Metropolitan Statistical Area

calculate sectoral contribution to city GDP using the Bureau of Economic Analysis Regional Economic Accounts. I calculate city and state-level federal employment using the Office of Personnel's Fedscope database. I normalize spending and employment by 2010 city population, which I obtain from the U.S. Census Bureau. Finally, in ancillary analyses of the U.S. Federal budget, I use supplemental Object Class Analysis tables 1 and 2 and historical tables 5.1 through 5.6 from the official U.S. federal budget published by the Office of Management and Budget.

1.4 Empirical Specification

The sequester shock's perceived permanence is one of its most useful features relative to other shocks studied in the fiscal multiplier literature. Because the government spending cut by the sequester was not expected to return, the sequester offers an opportunity to examine the time dynamics of crowding-in: the private sector's increase in economic activity resulting from its absorption of the labor and capital released by government spending reductions. To measure the time profile of employment response to the sequester, I employ the local projection method of Jordà (2005) to estimate the employment impulse response function over a three-year horizon (the third year, 2015, being the most recent year for which employment data is available). Specifically, my baseline estimating equation is:

$$y_{i,2013+h} - y_{i,2012} = \alpha + \delta \Delta g_{i2013} + \beta \mathbf{W}_i + \upsilon_{i2013} \tag{1.1}$$

where y_{it} is employment per capita in city i in September (the last month) of fiscal year t, $\Delta g_{i2013} = g_{i2013} - g_{i2012}$ is the change in federal government procurement spending per capita in city i from fiscal year 2012 to fiscal year 2013, and W_i is a matrix of city-specific covariates. In alternative specifications, I estimate a panel version using data from 2007

through 2013 to incorporate city and year fixed effects:

$$y_{i,t+h} - y_{i,t-1} = \alpha_i + \delta \Delta g_{it} + \beta_1 \mathbf{W}_i + \beta_2 \mathbf{X}_{it} + \lambda_t + \upsilon_{it} \tag{1.2}$$

Relative changes in spending across cities are likely correlated with the residual υ_{i2013} for at least two reasons. First, for competitive contracts, bid prices are an important factor in determining which vendors win contracts. Bid prices reflect underlying costs of factors of production, so the auction result—and thus final contract price—depends upon relative economic conditions across the cities in which competing vendors would perform the work. Second, Congress might anticipate the eventual recipient location for some types of procurement spending and subsequently select associated funding levels intending to affect city economic conditions. To purge Δg_{i2013} of such endogenous factors, I instrument for government spending with the budget reduction rule imposed by the 2013 Sequester.

In 2013, Congress's last-minute failure to pass funding legislation complying with the 2011 Budget Control Act triggered the 2013 Sequester, reducing every Department of Defense program's funding by 8.6%, and every non-Department of Defense program's funding by 5.3% below 2012 levels.[6] I use these program-level reductions to predict the 2012 to 2013 change in procurement spending in an city as -8.6% times the 2012 value of procurement spending from defense contracts in that city plus -5.3% times the 2012 value of procurement spending from non-defense contracts. I estimate equations (1.1) and (1.2) instrumenting for Δg_{it} with:

$$z_{it} = \begin{cases} -0.086\gamma^D_{i2012} - 0.053\gamma^N_{i2012} & \text{if } t = 2013 \\ 0 & \text{otherwise} \end{cases} \tag{1.3}$$

[6] excluding the Veteran's Administration and non-DOD overseas contingency operation funding

where γ^{k}_{i2012} is the level of 2012 procurement spending in city i from defense ($k = D$) and non-defense ($k = N$) contracts.

There is annual persistence in city contract spending. Many contracts extend over multiple years, but single-year contracts also exhibit persistence; agencies' procurement needs do not change dramatically from year to year, and a firm that wins a contract in one year likely retains a comparative advantage leading it to win similar contracts in future years. In a given year, city-level spending would be well modeled as a random walk if appropriations levels remained constant. The differential defense and non-defense 2013 sequester cuts introduce cross-sectional variation enabling separation of government spending changes from autoregressive city economic processes to allow identification of the causal effects of spending.

The identifying assumption for the sequester instrument is that city federal procurement spending changes predicted by the 2013 sequester budget reduction formula are uncorrelated with contemporaneous and future changes in city employment levels except through federal procurement spending changes, conditional on model covariates. Under the identifying assumption, by locking city spending at a function of 2012 spending, the sequester instrument purges endogeneity from the procurement auction process by removing spending changes from shifts in contract award location that might be driven by the effect of changes in relative economic conditions on vendor bids. Similarly, the instrument breaks endogeneity from Congressional Appropriations by removing any economically-motivated redistribution of funding across programs.

The identifying assumption requires that the sequester budget reduction formula did not disproportionately reduce procurement spending in cities that would have had worsening employment conditions in any case. Such endogeity through formula construction would imply that in 2011, Congress knew that cities with relatively greater exposure to defense contracts would experience worse 2013 economic conditions, and would imply

that Congress intentionally responded to this information by cutting spending in those already hard-hit cities. This is unlikely for many reasons. The sequester budget reduction formula has two elements: (1) splitting the total budget reduction equally by dollar value total cuts across defense and non-defense programs, and (2) cutting all programs within the same defense/non-defense category equally by percentage. This second element is standard sequestration policy that dates from at least 1985 and that has been implemented in several past sequesters. It is the first element that generates disproportionate defense cuts. This novel sequester innovation was most likely a simple and transparent rule of thumb intended to engage both parties in negotiations, rather than a clever means of achieving targeted defense spending reductions. It does not appear that Congress intended the sequester to be implemented; there were legislative proposals to prevent the sequester through its March 1, 2013 implementation. Around that same time, republican and democratic party leaders released numerous separate statements claiming that they never wanted the sequester to go into effect, in particular due to its deleterious national security ramifications. The federal agency responsible for calculating program-level budget cuts for the sequester, the Office of Management and Budget, included a statement to the same effect in their March 1 report to Congress. Finally, it is unlikely that Congress would have a political incentive to intentionally cut defense spending so dramatically, given the wide geographic representation of defense spending, its strong lobby, and extent of public concerns for undermining national defense capacity.

Even if Congress' construction of the sequester budget reduction formula did not intentionally target spending cuts based on cross-sectional differences in economic conditions, the formula could still be incidentally endogenous. The sequester instrument's identifying variation comes from the 2012 *level* of total procurement spending in each city, as well as variation across cities in the *ratio* of defense to non-defense spending. Incidental threats to identification come from unmodeled correlation between

economic outcomes and characteristics of cities with high procurement exposure, possible anticipatory spending changes, and confounding economically relevant events with the same cross-sectional variation as the sequester instrument. The inclusion of lags in the preferred specification accounts for endogeneity through these channels as long as pre-existing city characteristics, anticipatory spending changes, and confounding economic events pre-dating the sequester start to impact city employment prior to 2013. As an alternative, but less parsimonious, means of addressing these threats, I estimate a panel specification with city and fiscal year fixed effects. Finally, I estimate a model that includes initial period (2006) city characteristics to explicitly address the possibility that such characteristics generate a time-varying path of employment changes not captured by simple lags or city fixed effects. Section 6 provides additional robustness check and further evidence of instrument validity.

1.5 Results

The main result of this paper is the impulse response of city employment per capita to sequester-induced reductions in federal procurement spending per capita, shown in figure 1.1 and discussed in detail below. The impulse response function derives from 2 staged least squares estimation of equations (1.1) and (1.2) at horizons h =0, 1, and 2 (that is, at the end of fiscal years 2013, 2014, and 2015, respectively), instrumenting for spending changes using the sequester budget reduction rule as defined in equation (1.3). Table 1.1 shows first stage results from the horizon $h = 0$ estimation.[7] Tables 1.2, 1.3, and 1.4 show second stage results for employment changes at each horizon.

In first and second stage regression tables, columns 1-3 show results from variants of the cross-sectional specification in equation (1.1) above. Heteroscedasticity robust

[7] First stage results at horizons 1 and 2 are very similar.

standard errors are reported in parentheses below each point estimate[8] Columns 4 and 5 show results from the alternative panel specification in equation (1.2) above. In these panel specifications, standard errors clustered at the city level are shown in parentheses below each point estimate.[9]

Kleibergen-Paap F-statistics, which are heteroscedasticity and cluster robust, are shown for each specification. Olea and Pflueger (2013) shows that in the presence of heteroscedasticity or autocorrelation, the critical values provided by Stock and Yogo (2005) for rejecting the null of a weak instrument are too low. Using the critical values from Olea and Pflueger (2013), the sequester instrument is at risk of being weak if the F-statistic is less than 23. Since the instrument is marginally weak by this standard, as an alternative means of evaluating the statistical significance of second stage results, below the F-Statistics in the second stage tables, I report p-values from the Anderson-Rubin two-sided test of the null hypothesis that the coefficient on instrumented spending is zero. This test is robust to weak instruments in the presence of non-i.i.d. errors and autocorrelation.[10]

First stage results in table 1.1 suggests that the sequester instrument is relevant and unconfounded by cross-sectional variation in city features. The coefficient value ranges from 1 to 3 across the models, with 1.7 being both the modal value and the value for the preferred specification, which is model (2). The stability of the coefficient across models suggests that 2012-2013 federal procurement spending changes are well modeled by the sequester instrument and that city features do not predict deviations between actual and predicted spending. This is evidence of broad compliance with the sequester budget

[8]Results are robust to clustering on State. For Metropolitan Statistical Areas (MSA) extending into multiple states, I randomly assign the MSA to one of the encompassing states.

[9]Results are robust to clustering on State and multiway by city and state-by-year. For Metropolitan Statistical Areas (MSA) extending into multiple states, I randomly assign the MSA to one of the encompassing states.

[10]Reported p-values are from Anderson-Rubin statistics calculated using the Legrange Multiplier methodology of Kleibergen (2002). Results are similar if the statistics are calculated using the Minimum Distance methodology of Magnusson (2010).

reduction mandate, compliance does not vary predictably with city characteristics.

The value of the first stage coefficient shown in table 1.1, 1.7, indicates that actual procurement spending reductions exceeded the program-level reduction rate required by the sequester by a factor of almost two. The BCA required agencies to cut all programs by an equal percent, but left agencies discretion regarding which resources to cut within programs. Figure 1.2 decomposes 2012-2013 spending changes by major program resource category: procurement, grants, and personnel. Both defense and non-defense programs cut procurement spending by disproportionately more than other resource types.

The first stage coefficients in columns 1 and 2 of table 1.1 are nearly identical. Column 1 includes only the sequester instrument, and column 2 includes the sequester instrument and employment lags. Deviations between actual spending and predicted spending changes are not a function of 2012 city employment trends. This result illuminates a feature of endogenous procurement contract award. Actual 2013 spending did not respond to 2012 employment trends, as might be expected according to the proposed mechanical endogeneity between city economic features and procurement auction results. Wages might not respond quickly enough to employment changes to feed through to bid prices by the next year. This is an interesting finding amenable to further analysis in future work.

Column 3 of table 1.1 includes the 2006 defense and non-defense federal procurement shares of city gross product. Since city procurement spending is persistent, these covariates are highly correlated with the sequester instrument. Thus, standard errors on the instrument coefficient are much higher than those in the other specifications. Column 4 includes city fixed effects in the panel version of the estimating equation. The coefficient on the instrument is 50% greater than in models with time-varying covariates, suggesting that the path of employment over time contains information relevant to

predicting deviations between the sequester formula and actual spending.

Tables 1.2, 1.3, and 1.4 show second stage results for employment changes at the end of fiscal years 2013, 2014, and 2015, respectively. The estimated coefficient on instrumented procurement spending changes is stable across the five models that I estimate at each horizon. This suggests that there is low correlation between the sequester instrument and city characteristics. Column 1 shows results of the simple regression with spending changes as the only regressor. Column 2, the preferred specification, adds one lag of the second stage dependent variable, annual changes in employment per capita[11] and the level of employment per capita in the period before the earliest lag, in this case from two years prior. Column 3 adds initial city characteristics including labor market features such as GDP per capita, population, and labor force participation rate. I include 2006 shares of city product to the construction, finance, manufacturing, and services sectors, and I include public procurement characteristics including share of GDP to state and local government spending, defense spending, and non-defense federal spending. Column 4 shows results of the simple panel regression with the city and fiscal year fixed effects. Column 5 shows the results of the panel specification with one lag of changes in employment, and a two year lag of the employment level.

The sequester cost cities 2.2 jobs per million dollars in spending cuts by the end of fiscal year 2013, which rose to 5.5 jobs by the end of fiscal year 2015. The implied jobs multiplier of between $182,000 and $450,000 per job is consistent with the results of other papers estimating subnational jobs multipliers. Chodorow-Reich et al. (2012) estimated the highest multiplier of $25k per job, and Feyrer and Sacerdote (2011) estimate the lowest multiplier of $400k per job. That the sequester multiplier is at the low end of this range might reflect that other papers estimate multipliers for larger geographic units that capture greater spillovers between cities. Future planned work will estimate

[11] I choose to include one lag following the GM sequential testing procedure outlined in Han, Phillips and Sul (2016) for lag selection in panels.

the extent of spillovers to better understand the mechanisms through which procurement spending affects local labor markets. Further, future work will interact spending with lagged city employment levels of in order to assess whether the jobs multiplier varies with the state of the underlying local economy. There are two important open questions for interpreting these results on which further work is needed. First, are the job losses caused by the sequester significant to the local areas? Second, do these job losses represent net national job losses, or shifts of jobs away from cities with high federal procurement spending to other areas providing goods and services to non-federal customers?

1.5.1 Time dynamics of City Employment Response

Figure 1.1 shows the impulse response of city employment per capita to sequester-induced procurement spending reductions—that is, the coefficients on spending from tables 1.2, 1.3, and 1.4. Job losses from the 2013 sequester are far more persistent than the job market effects of other shocks studied in the fiscal multiplier literature. It is an over-simplification to consider estimation of a single jobs multiplier for a given spending shock, since the multiplier changes as the economy responds over time. Ideally, researchers would present multiplier impulse response functions. In a U.S. time-series analysis of military procurement spending, Ramey (2011*b*) shows that spending takes 3 to 4 quarters to have measurable impact on economy following the news shock announcing spending changes, and the maximal impact is between 1 and 1.5 years after the shock. Cross-sectional studies often face study design limitations on consistent estimation of impulse response function, and instead base their choice of estimation horizon on policy relevance. Since the efficacy of fiscal stimulus motivates most fiscal multiplier research, most estimates are calculated one to two years after the spending shock. Chodorow-Reich et al. (2012), Feyrer and Sacerdote (2011), and Wilson (2012) explicitly examine multiplier time dynamics in their studies of the American Reinvestment and Recovery

Act, and Shoag (2010) examines the time dynamics of multipliers from state pension return windfalls. These papers find maximum economic effects between one and two years after the initial shock. Nakamura and Steinsson (2014) measure economic effects two years out, explaining that their unreported analysis suggests that the two year horizon capture the bulk of the dynamics. The continued increase of sequester labor market effects effects after three years is notable.

In contrast to spending shocks studied in the existing literature, the sequester spending shock was permanent. This means that the private sector had to soak up slack labor (and also capital) from decreased government demand. This makes the sequester shock an unusually valuable context in which to study crowding out, since any recovery comes from the reversal of crowding out. The speed with which private sector adjustments lead to employment recovery depends upon a number of factors, including price stickiness, elasticities, and the mobility of labor and capital. Some potential sources include the underlying economic state in 2013 of weak recovery from a deep recession, downward sticky prices, policy uncertainty preceding the shock, and most interestingly, the mix of industries and geographies hit by the particular types of spending cut by the 2013 sequester. For example, there is heterogeneity in the extent to which resources used to produce government goods can be converted to civilian use; lower substitutability leads to slower recovery. If the fiscal multiplier varies predictably in magnitude and persistence according to observable characteristics of labor markets directly hit by changes in government spending, then spending potentially could be targeted to minimize crowding out.

Because the sequester shock is identified at the labor market level, further analysis using the empirical framework presented in this paper has the potential to more precisely identify sources of slow recovery from the sequester and thus uncover the mechanics of crowd out. One policy-relevant question is whether job losses come from the industries

directly hit by sequester cuts, or from the broader set of upstream and downstream industries in the same labor market. In future work, I will address this question by scaling the sequester shock to the industry-by-labor market level. I will estimate direct local industry shocks using the 2012 level of local industry spending less the sequester-mandated changes, and indirect shocks by multiplying these values by inter-industry linkage coefficients provided by the Bureau of Economic Analysis input-output tables. Job losses concentrated in directly-shocked industries would implicate a different set of frictions slowing recovery than job losses across a broad base of industries within the same labor market.

1.5.2 Comparison of IV and OLS Results

Table 1.5 compares IV with OLS results for the horizon $h = 0$ estimates. For all specifications, IV estimates exceed OLS estimates. This is consistent with comparisons found in the existing subnational fiscal multiplier literature. Furthermore, this is consistent with the hypothesis concerning endogeneity of procurement spending with city economic conditions. The sequester disproportionately reduced spending in areas with relatively better economic conditions. This could reflect endogeneity through political channels, in which the government maintained spending in cities with relatively worse economies in order to avoid exacerbating economic conditions. Alternatively, it could reflect the procurement process awarding contracts to cities with lower factor prices.

1.6 Robustness

The sequester instrument could incidentally be correlated with employment outcomes through routes other than contemporaneous spending if the 2012 level of procurement spending or ratio of defense to non-defense spending is correlated with economic

features driving employment. In particular, as discussed above, threats to identification come from unmodeled correlation between economic outcomes and characteristics of cities with high procurement exposure, possible anticipatory spending changes, and confounding economically relevant events with the same cross-sectional variation as the sequester instrument.

Most threats in these categories would have a footprint in pre-2013 employment trends. To test for this possibility, I regress 2011 to 2012 changes in city employment per capita on the 2013 sequester instrument. As shown in table table 1.6, the sequester does not predict prior employment changes. Any confounding factors introducing endogeneity into the main results do not cause measurable employment changes in 2012, which considerably narrows the range of possible threats. In particular, this is strong evidence against endogenous anticipatory spending changes.

To test for a broader set of unobservable confounding factors that might not have been detectable in 2012, I run a series of placebo instrumental variable regressions. If the sequester instrument construction is a strong instrument for spending changes in any year other than 2013, there could be structural cross-sectional correlation between the instrument and spending changes derived from a source other than the sequester. Table 1.7 shows results of this series of placebo regressions. In each column, I instrument for changes in spending for the year indicated at the top of the column by applying the 2013 Sequester budget reduction formula to spending in the prior year. In other words, I estimate equation (1.1) for year t, instrumenting for spending with:

$$z_{it} = -0.086\gamma^{D}_{it-1} - 0.053\gamma^{N}_{it-1} \tag{1.4}$$

The coefficient estimates vary wildly for the years 2009 through 2015, from -69.8 in 2010 to 6.56 in 2014. Standard errors on all of these placebo regressions are large

relative to the coefficient. The first stage F-Statistic is 6 or lower for all years. Since the Sequester budget reduction rule predicts greater defense than non-defense reductions, the statistically significant first stages could result from any year in which defense spending increased by less than (or decreased by more than) non-defense spending. These placebo regression results provide evidence against the concern that the sequester's cross-sectional variation mirrors another economically relevant feature.

1.7 Conclusion

I estimate city-level job losses associated with cuts to federal procurement spending from the 2013 U.S. federal budget sequester. Instrumenting for spending changes using the sequester budget reduction formula, I find that the sequester cost cities 2.2 jobs per $1 million in procurement cuts in the first year, which rises to 5 jobs per $1 million by the third year after the sequester. While the magnitude of the sequester's job market impact is similar to that of other spending shocks studied in the fiscal multiplier literature, the sequester's effects are particularly persistent. This persistence reflects the permanence of the sequester cuts, which limited sources of job market recovery to private sector crowd-in. Results also suggest that policy uncertainty surrounding the sequester's implementation led agencies to cut capital disproportionately to labor.

Chapter 1, in part, is currently being prepared for submission for publication of the material. Roer, Elizabeth A. The dissertation author was the sole investigator and author of this material.

1.8 Appendix A: Figures

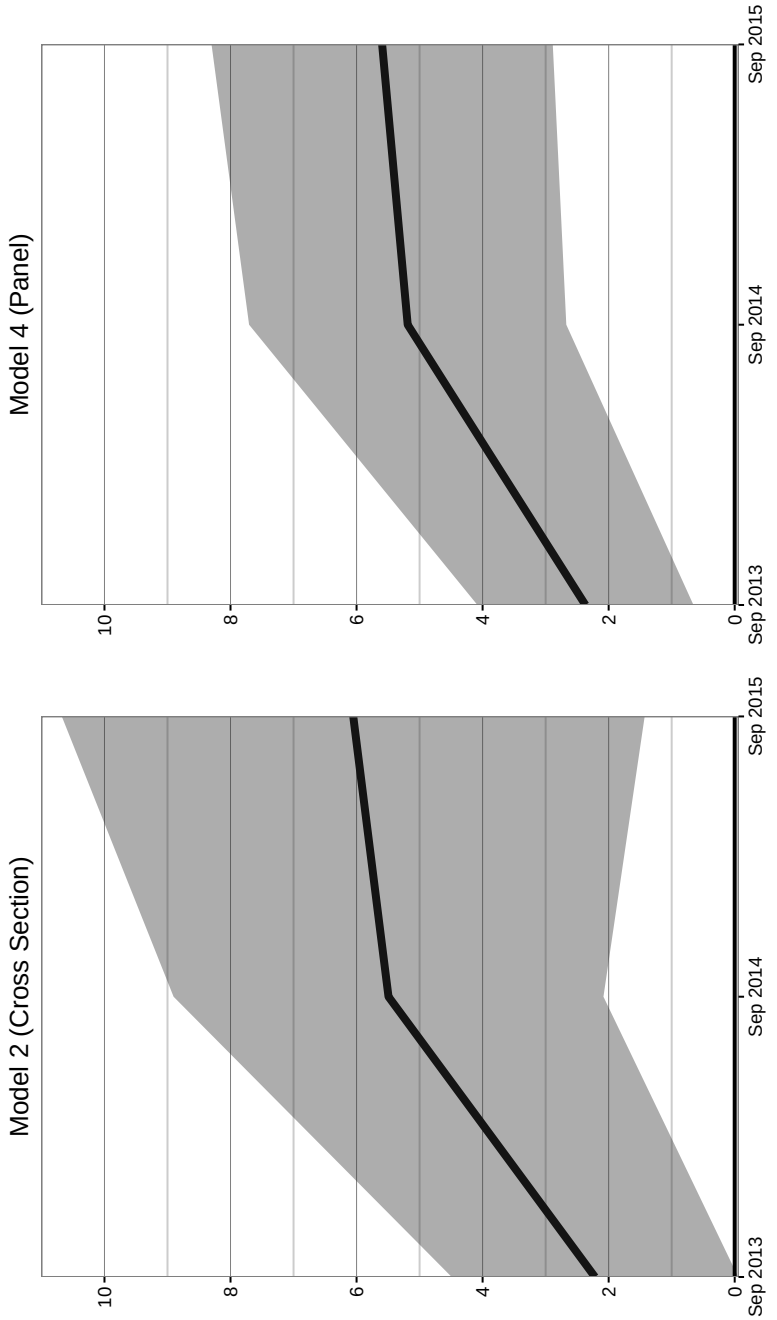

Figure 1.1: Jordá Impulse Response Function of Employment per Capita to 2012-2013 Spending Change (IV)

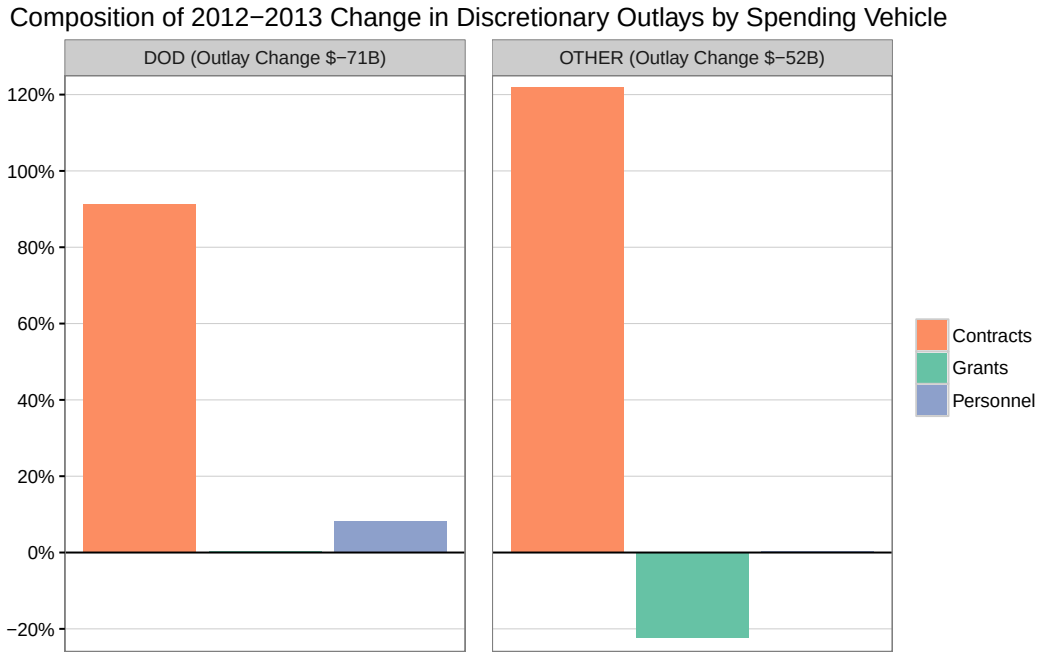

Figure 1.2: Decomposition of 2012-2013 spending changes by program resource type

1.9 Appendix B: Tables

Table 1.1: First Stage, horizon h=0

Change in Spending per Capita	2013 Cross Section			2007-2015 Panel	
	(1)	(2)	(3)	(4)	(5)
2013 Sequester Instrument ($1 Million per Capita)	1.835***	1.833***	1.084**	2.957***	1.825***
	(.4189)	(.4145)	(.4811)	(.4541)	(.4212)
Employment per Capita (2-year Lag)		.0003189	-.001835		-.0000422
		(.0003869)	(.001577)		(.0001566)
Change in Employment per Capita (1-year Lag)		.002207	.002463		.00223
		(.00275)	(.002765)		(.001462)
2006 MSA GDP per Capita ($10,000)			5.03e-09		
			(3.46e-09)		
2010 MSA population (Millions)			-5.43e-12		
			(1.42e-11)		
2010 MSA labor force participation			.0007525		
			(.001884)		
Construction share of 2006 MSA GDP			-.0006236		
			(.001155)		
Finance share of 2006 MSA GDP			.0007397		
			(.00141)		
Manufacturing share of 2006 MSA GDP			.0004899		
			(.0004532)		
Services share of 2006 MSA GDP			.0008162		
			(.0005042)		
State and local government spending share of 2006 MSA GDP			.001208**		
			(.0005182)		
Defense procurement spending share of 2006 MSA GDP			-.00997*		
			(.005338)		
Non-defense procurement spending share of 2006 MSA GDP			.002757**		
			(.001215)		
Year Fixed Effects				Yes	Yes
MSA Fixed Effects				Yes	No
F Statistic	19	20	5	42	19
N. of Obs.	360	360	330	3,236	3,236

In columns 1-3, heteroscedasticity-robust standard errors are in parentheses below each point estimate. Results in columns 1-3 are robust to clustering at the state level and to weighting observations by the 2010 MSA population. In columns 4 and 5, standard errors clustered at the Metropolitan Statistical Area (MSA) level are in parentheses below each point estimate. Results in columns 4 and 5 are robust to clustering at the state level, to multi-way clustering by MSA and state-by-year, and to weighting observations by the 2010 MSA population. The reported F-statistic is heteroscedasticity- and cluster- robust. In columns 1-3, the dependent variable is changes in spending from 2012 to 2013, and the 2013 Sequester Instrument is the reduction in spending from 2012 to 2013 predicted by the Sequester budget reduction formula, as further described in the text. The sample in columns 1-3 include one observation for each of the 360 MSAs for which complete model data is available. In columns 4 and 5, the dependent variable is annual changes in spending each year from 2007 to 2015. The 2013 Sequester Instrument is set to 0 for every year except 2013, so that only 2013 spending is instrumented. The instrument is described in further detail in the text. The sample in columns 4 and 5 contain one observation per year from 2007 to 2015 for each of the 360 MSAs for which complete model data is available. All models include a constant that is not shown.

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 1.2: Second Stage, horizon h=0; 2012—2013 ΔEmployment per Capita

Change in Employment per Capita	2013 Cross Section			2007-2015 Panel	
	(1)	(2)	(3)	(4)	(5)
Change in Spending per Capita ($1 Million)	2.608*	2.217*	1.924	2.368***	2.502*
	(1.338)	(1.16)	(2.773)	(.8745)	(1.327)
Employment per Capita (2-year Lag)		.03036***	.01199		-.002135
		(.009378)	(.0354)		(.005289)
Change in Employment per Capita (1-year Lag)		.3303***	.2631***		.03324*
		(.05524)	(.05684)		(.01888)
2006 MSA GDP per Capita ($10,000)			6.01e-08		
			(4.78e-08)		
2010 MSA population (Millions)			2.12e-10		
			(2.55e-10)		
2010 MSA labor force participation			.01415		
			(.03649)		
Construction share of 2006 MSA GDP			.08265***		
			(.01608)		
Finance share of 2006 MSA GDP			.0874***		
			(.02759)		
Manufacturing share of 2006 MSA GDP			.0003342		
			(.007396)		
Services share of 2006 MSA GDP			-.008723		
			(.006473)		
State and local government spending share of 2006 MSA GDP			.01175		
			(.009882)		
Defense procurement spending share of 2006 MSA GDP			.005535		
			(.03848)		
Non-defense procurement spending share of 2006 MSA GDP			.01081		
			(.01482)		
Year Fixed Effects				Yes	Yes
MSA Fixed Effects				Yes	No
Adj R-squared	0.010	0.143	0.234	-0.178	-0.042
F Statistic	19	20	5	42	19
Anderson-Rubin p-value	0.035	0.049	0.464	0.002	0.042
N. of Obs.	360	360	330	3,236	3,236

In columns 1-3, heteroscedasticity-robust standard errors are in parentheses below each point estimate. Results in columns 1-3 are robust to clustering at the state level and to weighting observations by the 2010 MSA population. In columns 4 and 5, standard errors clustered at the Metropolitan Statistical Area (MSA) level are in parentheses below each point estimate. Results in columns 4 and 5 are robust to clustering at the state level, to multi-way clustering by MSA and state-by-year, and to weighting observations by the 2010 MSA population. The reported F-statistic is heteroscedasticity- and cluster- robust. The reported Anderson-Rubin p-value is robust to weak instruments in the presence of non-i.i.d. errors and autocorrelation. In columns 1-3, the dependent variable is changes in employment from 2012 to 2013, and the 2013 Sequester Instrument is the reduction in spending from 2012 to 2013 predicted by the Sequester budget reduction formula, as further described in the text. The sample in columns 1-3 include one observation for each of the 360 MSAs for which complete model data is available. In columns 4 and 5, the dependent variable is annual changes in spending each year from 2007 to 2015. The 2013 Sequester Instrument is set to 0 for every year except 2013, so that the resulting coefficient is the effect of changes in spending on changes in employment in 2013. The instrument is described in further detail in the text. The sample in columns 4 and 5 contain one observation per year from 2007 to 2015 for each of the 360 MSAs for which complete model data is available. All models include a constant that is not shown.

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 1.3: Second Stage, horizon h=1; 2012—2014 ΔEmployment per Capita

Change in Employment per Capita	2013 Cross Section			2007-2015 Panel	
	(1)	(2)	(3)	(4)	(5)
Change in Spending per Capita ($1 Million)	6.501***	5.493***	8.722*	5.189***	6.324***
	(2.154)	(1.74)	(5.014)	(1.284)	(2.154)
Employment per Capita (2-year Lag)		.05206***	-.04626		-.007557
		(.01443)	(.05342)		(.01163)
Change in Employment per Capita (1-year Lag)		.7106***	.5814***		.03474
		(.1074)	(.1148)		(.03671)
2006 MSA GDP per Capita ($10,000)			9.78e-08		
			(9.84e-08)		
2010 MSA population (Millions)			4.67e-10		
			(4.29e-10)		
2010 MSA labor force participation			.127**		
			(.05752)		
Construction share of 2006 MSA GDP			.1904***		
			(.02953)		
Finance share of 2006 MSA GDP			.1284***		
			(.04917)		
Manufacturing share of 2006 MSA GDP			-.00136		
			(.01215)		
Services share of 2006 MSA GDP			-.0297***		
			(.01041)		
State and local government spending share of 2006 MSA GDP			-.0001479		
			(.01484)		
Defense procurement spending share of 2006 MSA GDP			.06567		
			(.08007)		
Non-defense procurement spending share of 2006 MSA GDP			.03576		
			(.02806)		
Year Fixed Effects				Yes	Yes
MSA Fixed Effects				Yes	No
Adj R-squared	0.004	0.190	0.320	-0.297	-0.142
F Statistic	19	20	5	39	19
Anderson-Rubin p-value	0.002	0.004	0.072	0.000	0.003
N. of Obs.	360	360	330	2,877	2,877

In columns 1-3, heteroscedasticity-robust standard errors are in parentheses below each point estimate. Results in columns 1-3 are robust to clustering at the state level and to weighting observations by the 2010 MSA population. In columns 4 and 5, standard errors clustered at the Metropolitan Statistical Area (MSA) level are in parentheses below each point estimate. Results in columns 4 and 5 are robust to clustering at the state level, to multi-way clustering by MSA and state-by-year, and to weighting observations by the 2010 MSA population. The reported F-statistic is heteroscedasticity- and cluster- robust. The reported Anderson-Rubin p-value is robust to weak instruments in the presence of non-i.i.d. errors and autocorrelation. In columns 1-3, the dependent variable is changes in employment from 2012 to 2013, and the 2013 Sequester Instrument is the reduction in spending from 2012 to 2013 predicted by the Sequester budget reduction formula, as further described in the text. The sample in columns 1-3 include one observation for each of the 360 MSAs for which complete model data is available. In columns 4 and 5, the dependent variable is annual changes in spending each year from 2007 to 2015. The 2013 Sequester Instrument is set to 0 for every year except 2013, so that the resulting coefficient is the effect of changes in spending on changes in employment in 2013. The instrument is described in further detail in the text. The sample in columns 4 and 5 contain one observation per year from 2007 to 2015 for each of the 360 MSAs for which complete model data is available. All models include a constant that is not shown.

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 1.4: Second Stage, horizon h=2; 2012—2015 ΔEmployment per Capita

Change in Employment per Capita	2013 Cross Section			2007-2015 Panel	
	(1)	(2)	(3)	(4)	(5)
Change in Spending per Capita ($1 Million)	7.276***	6.053**	6.991	5.594***	7.005***
	(2.602)	(2.359)	(5.633)	(1.381)	(2.67)
Employment per Capita (2-year Lag)		.06235***	-.1766**		-.02216
		(.01755)	(.06872)		(.01847)
Change in Employment per Capita (1-year Lag)		.8578***	.7384***		-.004314
		(.1151)	(.1266)		(.05091)
2006 MSA GDP per Capita ($10,000)			2.25e-07		
			(1.40e-07)		
2010 MSA population (Millions)			6.07e-10		
			(5.38e-10)		
2010 MSA labor force participation			.2543***		
			(.07582)		
Construction share of 2006 MSA GDP			.2193***		
			(.03641)		
Finance share of 2006 MSA GDP			.1956***		
			(.05649)		
Manufacturing share of 2006 MSA GDP			.0294**		
			(.01441)		
Services share of 2006 MSA GDP			-.01738		
			(.01338)		
State and local government spending share of 2006 MSA GDP			.02414		
			(.01824)		
Defense procurement spending share of 2006 MSA GDP			.02443		
			(.09667)		
Non-defense procurement spending share of 2006 MSA GDP			.1227***		
			(.03279)		
Year Fixed Effects				Yes	Yes
MSA Fixed Effects				Yes	No
Adj R-squared	0.011	0.184	0.375	-0.307	-0.105
F Statistic	19	20	5	48	19
Anderson-Rubin p-value	0.013	0.035	0.242	0.002	0.019
N. of Obs.	360	360	330	2,518	2,518

In columns 1-3, heteroscedasticity-robust standard errors are in parentheses below each point estimate. Results in columns 1-3 are robust to clustering at the state level and to weighting observations by the 2010 MSA population. In columns 4 and 5, standard errors clustered at the Metropolitan Statistical Area (MSA) level are in parentheses below each point estimate. Results in columns 4 and 5 are robust to clustering at the state level, to multi-way clustering by MSA and state-by-year, and to weighting observations by the 2010 MSA population. The reported F-statistic is heteroscedasticity- and cluster- robust. The reported Anderson-Rubin p-value is robust to weak instruments in the presence of non-i.i.d. errors and autocorrelation. In columns 1-3, the dependent variable is changes in employment from 2012 to 2013, and the 2013 Sequester Instrument is the reduction in spending from 2012 to 2013 predicted by the Sequester budget reduction formula, as further described in the text. The sample in columns 1-3 include one observation for each of the 360 MSAs for which complete model data is available. In columns 4 and 5, the dependent variable is annual changes in spending each year from 2007 to 2015. The 2013 Sequester Instrument is set to 0 for every year except 2013, so that the resulting coefficient is the effect of changes in spending on changes in employment in 2013. The instrument is described in further detail in the text. The sample in columns 4 and 5 contain one observation per year from 2007 to 2015 for each of the 360 MSAs for which complete model data is available. All models include a constant that is not shown.

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 1.5: OLS vs IV, horizon h=2; 2012—2015 ΔEmployment per Capita

Change in Employment per Capita	(1)		(2)		(3)		(4)		(5)	
	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS
Change in Spending per Capita ($1 Million)	3.241**	1.921***	2.819**	1.074**	4.075	.4724	3.65**	.3536	3.047**	.2928
	(1.56)	(.709)	(1.217)	(.5313)	(3.302)	(.8664)	(1.496)	(.2478)	(1.438)	(.1782)
Employment per Capita (2-year Lag)			.025***	.0247***	.01232	.007066			.000375	-.3053***
			(.007868)	(.00799)	(.02825)	(.02878)			(.004969)	(.0209)
Change in Employment per Capita (1-year Lag)			.5289***	.5417***	.4765***	.4918***			.1473***	-.1984***
			(.05027)	(.0506)	(.05699)	(.05598)			(.02235)	(.02588)
2006 MSA GDP per Capita ($10,000)					.0000583	.0001945				
					(.0004584)	(.0004493)				
2010 MSA population (Millions)					.0000609	2.17e-06				
					(.0001773)	(.0001719)				
2010 MSA labor force participation					.01977	.01905				
					(.03067)	(.03156)				
Construction share of 2006 MSA GDP					.05731***	.05423***				
					(.0148)	(.01454)				
Finance share of 2006 MSA GDP					.06942***	.07545***				
					(.0266)	(.02537)				
Manufacturing share of 2006 MSA GDP					.004678	.007719				
					(.006824)	(.006041)				
Services share of 2006 MSA GDP					-.0109*	-.006528				
					(.005943)	(.004537)				
State and local government spending share of 2006 MSA GDP					.004246	.01044				
					(.009803)	(.008808)				
Defense procurement spending share of 2006 MSA GDP					.03454	-.01923				
					(.05862)	(.04188)				
Non-defense procurement spending share of 2006 MSA GDP					.02682*	.02827**				
					(.0141)	(.01396)				
Year Fixed Effects							Yes	Yes	Yes	Yes
MSA Fixed Effects							Yes	Yes	No	No
Adj R-squared	0.006	0.013	0.318	0.331	0.342	0.381	-0.270	0.384	-0.045	0.516
N. of Obs.	360	360	360	360	330	330	2,880	2,880	2,520	2,520

In columns 1 and 2, heteroscedasticity-robust standard errors are in parentheses below each point estimate. In columns 4 and 5, standard errors clustered at the Metropolitan Statistical Area (MSA) level are in parentheses below each point estimate. In each paired column, the estimating equation is the same as that in the column with the matching column number in Table (1.2). The left column of each paired column shows results from the IV estimation, and the right column shows the results of the same equation estimated by OLS. All models include a constant that is not shown.

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 1.6: 2013 Sequester Instrument as a Predictor of 2011-2012 Change in Employment

Prior Year Change in Employment per Capita	2013 Cross Section			2007-2015 Panel	
	(1)	(2)	(3)	(4)	(5)
Change in Spending per Capita ($1 Million)	1.344	.3528	-1.201	2.493*	.9335
	(1.453)	(1.247)	(3.031)	(1.349)	(1.35)
Employment per Capita (3-year Lag)		.01364*	-.009612		-.001568
		(.007402)	(.02725)		(.005894)
Change in Employment per Capita (2-year Lag)		.4937***	.4627***		.1624***
		(.06287)	(.06318)		(.02323)
2006 MSA GDP per Capita ($10,000)			.0009974**		
			(.0004758)		
2010 MSA population (Millions)			.0002277		
			(.0002461)		
2010 MSA labor force participation			.008239		
			(.03039)		
Construction share of 2006 MSA GDP			.05727***		
			(.01268)		
Finance share of 2006 MSA GDP			.03657*		
			(.02038)		
Manufacturing share of 2006 MSA GDP			-.008783		
			(.006007)		
Services share of 2006 MSA GDP			.0005678		
			(.005655)		
State and local government spending share of 2006 MSA GDP			.006288		
			(.008954)		
Defense procurement spending share of 2006 MSA GDP			-.02748		
			(.05254)		
Non-defense procurement spending share of 2006 MSA GDP			-.01856*		
			(.01094)		
Year Fixed Effects				Yes	Yes
MSA Fixed Effects				Yes	No
Adj R-squared	0.008	0.238	0.316	-0.201	0.022
F-Statistic	19	19	4	14	18
N. of Obs.	360	360	330	2,880	2,160

In columns 1-3, heteroscedasticity-robust standard errors are in parentheses below each point estimate. In columns 4 and 5, standard errors clustered at the Metropolitan Statistical Area (MSA) level are in parentheses below each point estimate. The reported F-statistic is heteroscedasticity- and cluster- robust. In columns 1-3, the dependent variable is changes in employment from 2011 to 2012, and the 2013 Sequester Instrument is the reduction in spending from 2012 to 2013 predicted by the Sequester budget reduction formula, as further described in the text. The sample in columns 1-3 include one observation for each of the 360 MSAs for which complete model data is available. In columns 4 and 5, the dependent variable is annual changes in spending each year from 2006 to 2014. The 2013 Sequester Instrument is set to 0 for every year except 2013, so that the resulting coefficient is the predictive power of changes in spending from 2012 to 2013 on changes in employment from 2011 to 2012. The instrument is described in further detail in the text. The sample in columns 4 and 5 contain one observation per year from 2007 to 2015 for each of the 360 MSAs for which complete model data is available. All models include a constant that is not shown.

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 1.7: Placebo Regressions

	(1) 2013 (Benchmark)	(2) 2009	(3) 2010	(4) 2011	(5) 2012	(6) 2014	(7) 2015
Change in Spending per Capita ($1 Million)	2.819**	2.782	-69.79	.8805	.2245	6.566	-15.88
	(1.217)	(2.382)	(2,048)	(.7995)	(.3693)	(10.76)	(141)
Employment per Capita (2-year Lag)	.025***	-.04747***	-.01356	.01085	.01375*	.01794*	.02647
	(.007868)	(.01325)	(2.273)	(.008348)	(.007469)	(.009735)	(.08377)
Change in Employment per Capita (1-year Lag)	.5289***	.2599***	-.467	.05965***	.4956***	.4764***	.1259
	(.05027)	(.07034)	(6.21)	(.02095)	(.06301)	(.06792)	(.6577)
Adj R-squared	0.318	-0.016	-6.917	0.012	0.236	0.023	-1.807
F Statistic	19	1	0	6	4	1	0
Anderson-Rubin p-value	0.010	0.055	0.466	0.051	0.506	0.045	0.591
N. of Obs.	360	360	360	360	360	360	360

In columns 1-3, heteroscedasticity-robust standard errors are in parentheses below each point estimate. In columns 4 and 5, standard errors clustered at the Metropolitan Statistical Area (MSA) level are in parentheses below each point estimate. The reported F-statistic is heteroscedasticity- and cluster- robust. The reported Anderson-Rubin p-value is robust to weak instruments in the presence of non-i.i.d. errors and autocorrelation. Each column estimates the preferred specification, model (2) from Table (1.2), for years 2008 through 2015. The dependent variable in each column is the change in employment between the year indicated at the top of the column and the previous year. The regressor of interest is changes in spending between the year indicated at the top of the column and the previous year, instrumenting for spending by applying the 2013 Sequester budget reduction rule to spending for the year indicated at the top of the column: -8.6% defense spending the prior year -5.3% non-defense spending the prior year. All models include a constant that is not shown.

$^{*}p < 0.10, ^{**}p < 0.05, ^{***}p < 0.01$

Chapter 2

Do Voters Punish Politicians for Lost Federal Procurement Spending?

Abstract: Despite the widespread belief that federal procurement contracts are susceptible to political influence, it is unclear how this would occur given the extensive regulatory infrastructure governing procurement spending, making it *ex-ante* more difficult to capture relative to the types of federal spending typically studied in the literature. In this paper, we first establish that high ranking House Appropriations subcommittee members exert political influence over procurement spending and propose two channels through which this may occur: direct influence, suggesting a breakdown of regulatory institutions, and legislator influence through choice over funded public goods. We develop a novel method to empirically test the relative importance of each channel, finding both are important. Furthermore, which mechanism dominates varies across subcommittees; this finding is particularly important given that each mechanism has differential implications for efficiency.

2.1 Introduction

A core challenge democracies face is fostering electoral institutions that communicate voter preferences over the government's provision of public goods and subsequently incentivize politicians to respond to those preferences. The public finance literature often assumes that U.S. voters reward representatives for bringing home federal funding, and that representatives are concerned—above all else—with increasing their vote share. However, there are reasons to challenge the universal applicability of these assumptions, particularly in the case of federal procurement spending. In this paper, we ask: how do U.S. voters and their House representatives respond to changes in federal procurement spending?

To examine the effects of changes in federal procurement spending on U.S. House electoral outcomes, we instrument for district-level changes in federal procurement spending using the empirical strategy of Hastings (2016). We derive a Bartik-like share shifter instrument that predicts local spending changes using the formula by which federal agencies' budgets were cut during the 2013 federal sequester. We examine how these exogenous spending changes affect three outcomes: whether the incumbent runs for reelection, whether the incumbent wins, and the margin of victory. Finally, in order to better understand the response of the political system to these spending changes, we explore heterogeneity by district competitiveness, incumbent seniority, and incumbent party affiliation.

We find no effect of reductions in spending on incumbents' likelihood of victory. We estimate these zeros quite precisely: the effect of a $1,000 per capita decrease in procurement spending on an incumbent's reelection chances has 95% confidence intervals of +0.6 and -1.4 percentage points (from a base of 86.7%). The size of the procurement spending shock to an incumbent's district affects neither an incumbent's decision to

run, nor her margin of victory conditional on running. We find no differential effects by interacting the spending shock with the incumbent's party or the district's competitiveness. We do, however, find that seniority seems to matter: incumbents who have served at least 5 terms in the house (the median) are 3 percentage points less likely to win reelection than their junior colleagues when hit with a procurement spending cut of $1,000 per capita.

Several papers in public finance and political science suggest that under a variety of circumstances, voters reward legislators for increasing their district's receipt of centralized funding. Levitt and Snyder (1997), the paper most closely related to ours, finds that voters reward their representatives for increases in federal grant spending. They estimate that incumbents gain two percent of the popular vote share for each $100 per capita increase in spending. However, they also find that voters do not respond to changes in transfers to individuals, such as entitlement spending. That nuanced finding is a common theme in this literature: there is evidence of a more complex relationship between electoral outcomes and government spending than is typically assumed.

In fact, surprisingly little is known about some basic questions: what information do voters have about politicians? What are voter preferences over spending? What do politicians believe about voters? What do politicians optimize? The difficulty of answering these questions is illustrated by a small but growing literature attempting to disentangle voter information from preferences. Manacorda, Miguel and Vigorito (2011), for example, find that beneficiaries just barely meeting the qualification threshold for a conditional cash transfer program in Uruguay are far more likely to support the incumbent than voters just outside the qualification threshold. They propose that one way to interpret this result is as evidence for pocketbook voting – improvements in voters' economic well-being makes them more content with the powers that be. But they point out that it is also possible that voters reciprocate the government's largess by supporting

the incumbent. Yet a third proposed explanation is a story about information: voters who are program beneficiaries are more likely to learn that the program exists, and to interpret it as a signal that politicians are competent and share recipient voters' distributional preferences. Any or all of these channels could be operative.

Voter preferences over public goods depend on who benefits from the goods in question. In a field experiment in Benin, Wantchekon (2003) finds that voters responded more positively to incumbent campaign messages advertising redistributional spending policies than policies improving public infrastructure. However, messages advertising public infrastructure were more effective where voters trusted incumbents, and also were more effective for women (the direct users of the public infrastructure) than for men (the direct recipients of redistributional transfers). Several papers provide strong evidence that ideology, organized by party affiliation in the U.S., plays an important role in voter preferences over public goods. Albouy (2013) finds that when all of a U.S. state's federal delegates are Republican, that state receives more spending for defense and transportation. When all of a state's federal delagates are Democrats, that state receives more spending for education and urban development. Sellers (1997) finds that in U.S. congressional elections, fiscally liberal incumbents perform better in districts receiving more spending, while fiscally conservative incumbents perform better in low-spending districts. Kriner and Reeves (2012) find that liberal and moderate U.S. voters reward presidents for federal spending at higher rates than conservatives do. While these papers provide evidence that voter ideology matters, we are not aware of any papers documenting a case where voters face direct tradeoffs between their ideology and their own immediate economic self-interest.

Several papers indicate that politicians' spending policies respond to voter information and the complexity of voter preferences. Stromberg (2004) shows that U.S. counties with more radio listeners received more per capita federal relief funding during

the great depression. Dahlberg and Johansson (2002) find that in Sweden, incumbents direct more funding to areas with more swing voters.[1] Besley et al. (2004) find that politicians in India distribute high-spillover goods (roads, for example) based on geography, but distribute low-spillover goods (such as individual transfers) to voters sharing the politician's caste membership. Similarly, Borck and Owings (2003) find that in California, county receipt of state grants is decreasing in county "political distance" (as measured in part by co-partisanship with the governor and state legislative majorities) to the capital, but that the effect is substantially lower when grants fund high-spillover public goods.

Spending policies may also affect electoral outcomes through channels other than votes. For example, spending policies might affect donor campaign contributions, the composition of candidates challenging the incumbent, or an incumbent's decision to contest the election. There is a dearth of papers examining the relationship of government spending with political outcomes other than vote shares. Bickers and Stein (1996) is the only paper we are aware of that does so, finding that the probability of an incumbent U.S. House representative facing challengers in an upcoming election is decreasing in that district's receipt of federal spending early in the incumbent's term.

Insofar as researchers have examined the direct effect of U.S. federal spending on electoral outcomes, they have focused almost exclusively on grant and transfer spending. Federal procurement is substantially different, and has been completely ignored by the existing literature, despite its huge scale – in 2012 it constituted 63% of all federal discretionary spending and 4% of GDP.[2] Hastings and Johnson (2017) suggest that federal legislators manipulate the location of federal procurement spending. This current paper looks for evidence on why they do so.

[1] Although other studies have found that in other circumstances, incumbents tend to direct spending to core areas

[2] No doubt this is largely because until recently this data was almost impossible to access

Federal procurement spending affects voters differently than the grants and transfers studied in the current literature. Grants tend to create local public goods in the location in which spending occurs. For example, grants fund local public employees such as teachers and police, local transportation and other infrastructure development, and local spending on medical services. By and large, these are visible, salient goods consumed at the local level. Transfers are even more direct forms of spending on individuals in communities. In contrast, federal procurement tends to create public goods whose benefits are more diffuse. Purchases include goods and services to fund activities at the national level, such as national security and the federal bureaucracy. Compared to grants and transfers, voters in districts receiving federal procurement contracts are far less likely to directly observe the resulting public goods, and are far less likely to benefit from the public good itself disproportionately more than voters in other districts. This has two broad implications for the question at hand. First, because the spending is less visible to voters, we might not expect to see the same magnitude of voter response as in the case of grants. Second, any voter response (or lack thereof) can plausibly be attributed to the local economic benefits of the *spending* rather than the benefits of the good itself, under the assumption that voter preferences over national public goods are not highly spatially correlated with procurement spending changes. Further, heterogeneity in response by voter party affiliation could identify ideological voting that is at odds with voter economic interest, under the assumption that changes in a voter's economic benefits from procurement spending are uncorrelated with that voter's party affiliation. Under plausible assumptions, procurement spending offers a route to tease out the extent to which votes reflect economic self-interest versus ideology—something the existing literature struggles to achieve.

Federal procurement spending motivates the inclusion of another set of political actors less relevant in the case of grant and transfer spending: private firms, which are the

most direct recipients of federal procurement contracts, and which can donate to political campaigns. Procurement spending offers a natural and data-rich environment in which to study the political activity of firms with interests in government spending policies. In particular, firms' donation activities are likely to affect election dynamics at points prior to elections, such as during the selection of race candidates. This motivates an expanded definition of politicians' objective functions to incorporate politically relevant payoffs beyond vote shares, such as campaign contributions and warding off challengers.

This paper makes the following contributions: it is the first well-identified study of the electoral effects of procurement spending, and it is one of the first papers to look at the effect of spending on politicians' decision of whether to run for reelection. The combination of these two innovations opens the door to a better understanding voter preferences and political dynamics beyond the basic effect of government spending on general election vote shares. While such analyses are beyond the scope of the present paper, we plan to examine these dimensions of electoral dynamics in future work.

The remainder of this paper proceeds as follows: section 2.2 discusses our empirical framework and identification strategy, and section 2.3 describes our data. We present our results in section 2.4, and discuss the implications of our findings in section 2.5. Section 2.6 concludes with a discussion of potential future work.

2.2 Empirical Framework

2.2.1 Estimating Equations

We estimate the effects of 2012 to 2013 changes in federal procurement spending received by congressional districts on 2014 congressional election outcomes by estimating the equation:

$$outcome_{i,2014} = \alpha + \delta \Delta g_{i,2013} + \beta_1 outcome_{i,2012} + \beta_2 W_i + \varepsilon_{i,2014} \quad (2.1)$$

where $outcome_{i,t}$ is the election outcome in congressional district i in either the 2012 or 2014, $\Delta g_{i,2013} = g_{i,2013} - g_{i,2012}$ is the change in federal procurement spending per capita in congressional district i from fiscal year 2012 to fiscal year 2013, and W_i is a matrix of congressional district covariates. We describe the covariates in more detail below.

Our primary election outcome of interest is the probability of the incumbent winning reelection in 2014. In this baseline specification, the variable $outcome_{i,t}$ takes the value 1 if district i's incumbent is reelected in year t, and 0 otherwise. To better understand where in the election cycle the effects of procurement spending changes manifest, we subsequently consider two additional election outcome variables. First, we look at whether the incumbent runs for reelection. We create a variable that equals 1 if the incumbent runs in either a primary or the general election in year t and equals 0 otherwise. Then, we look at the incumbent's margin of victory in the general election, conditional on the incumbent running in the general election. For this outcome variable, we define the election margin as the difference between the incumbent's voteshare and the voteshare of the best-performing challenger in the general election.[3]

After estimating the effects of changes in procurement spending on overall election outcomes, we test for heterogeneous effects along three margins: district competitiveness, representative seniority, and representative party affiliation. For each of these margins, we construct binary assignment variables as described below and estimate the following equation:

[3]We also use the incumbent's raw voteshare as an outcome in specifications reported in the appendix. Results are similar for voteshare and margin. Since the margin measure contains more information, we omit voteshare results from the body of the paper.

$$outcome_{i,2014} = \alpha + \delta_1 Group_{i,2014} + \delta_2 \Delta g_{i,2013} + \delta_3 Group_{i,2014} \times \Delta g_{i,2013} + \beta_1 outcome_{i,2012} + \beta_2 W_i + \varepsilon_{i,2014} \tag{2.2}$$

where $Group_{i,2014}$ is a binary variable defined for each of the three dimensions we study as follows:

District Competitiveness: $Group_{i,2014} = 1$ if district i's 2014 Cook's Partisan Voting Index (PVI) value falls between the 25th and 75th percentile, and 0 otherwise. The PVI measures the extent to which a district's presidential vote has been more Republican or more Democratic than the national average during the previous two presidential election cycles. Our measure of competitiveness thus indexes districts by competitiveness between parties, rather than competitiveness between candidates.

Representative Seniority: $Group_{i,2014} = 1$ if district i's incumbent representative has served in the U.S. House at least five years—median representative seniority—by 2014, and 0 otherwise.

Representative Party Affiliation: $Group_{i,2014} = 1$ if district i's incumbent representative identifies as a Republican, and 0 otherwise.

2.2.2 Instrument

The change in federal procurement spending received by a congressional district from 2012 to 2013, $\Delta g_{i,2013}$, might be correlated with the residual ε_{i2014} in equations (2.1) and (2.2) for several reasons. For example, legislators facing tough elections might work harder to direct procurement spending to their districts. On the other hand, legislators in safe districts might be able to attain more powerful positions within the House, and thus have greater ability to direct spending to their districts. Endogeneity might also

arise from conditions outside of politics. If voters take local economic conditions into consideration, changes in economic conditions might affect both electoral support for the incumbent and a district's ability to win procurement contracts. The direction of bias is ambiguous, given the multitude of potential sources.

To purge $\Delta g_{i,2013}$ of endogeneity, we follow the empirical strategy of Hastings (2016) and construct an instrument for district procurement spending changes from 2012 to 2013 based on the formula by which budgets were cut during the 2013 federal sequester. As explained in more detail in Hastings (2016), the 2013 federal sequester was an unexpected, sudden, and drastic reduction in federal discretionary spending. Sequester budget cuts were distributed across federal agencies according to a coarse measure motivated by concerns exogenous to immediate electoral considerations. This formula mandated an 8.6% reduction in the budget of every Department of Defense (DOD) program relative to 2012 funding levels, and a 5.3% reduction in the budget of every non-DOD federal program. We use these program-level reductions to predict the 2012 to 2013 change in procurement spending in a district as -8.6% times the 2012 value of procurement spending from defense contracts in that district plus -5.3% times the 2012 value of procurement spending from non-defense contracts. In our analysis, we estimate equations (2.1) and (2.2) instrumenting for Δg_{it} with:

$$z_{i,2013} = -0.086\gamma^{D}_{i2012} - 0.053\gamma^{N}_{i2012} \tag{2.3}$$

where γ^{k}_{i2012} is the level of 2012 procurement spending in congressional district i from defense ($k = D$) and non-defense ($k = N$) contracts.

Equation (2.3) provides a valid instrument for spending changes if the predicted spending change, $z_{i,2013}$, is only correlated with 2014 election outcomes through changes in $\Delta g_{i,2013}$. Since the instrument predicts larger spending reductions for districts with greater exposure to federal procurement, and especially with proportionally greater

exposure to defense than non-defense procurement, the exclusion restriction requires that district characteristics predicting electoral outcomes don't also predict district exposure to procurement. We provide evidence on this in section 2.4. Additionally, we ensure the robustness of results to the inclusion of control variables intended to account for two clear threats to the exclusion restriction.

First, correlation between district political orientation and exposure to defense and non-defense federal procurement could threaten identification. To account for this, we include 2012 and 2014 district and state Cook's Partisan Voting Indices. Inclusion of these four controls help capture the local and regional levels and time trends in district partisan leanings. Second, a district's economic characteristics might introduce endogeneity, since economic conditions might drive both electoral outcomes and the amount of federal procurement spending in a district. We include the 3-year lagged level and 2-year lagged change in district employment to capture economic trends, and we include congressional district economic characteristics from 2006 to capture industry structure and labor market features that might drive the evolution of district economies over time.[4] These features include 2010 census population, 2006 values of district personal income per capita, and the share of personal income to construction, finance, manufacturing, services, and state and local governments. Ideally, we would also include defense and non-defense procurement spending per capita from 2006. However, congressional redistricting implemented in 2012 complicates the assignment of federal procurement contracts issued prior to 2012 to districts in our analysis. Instead, we include the share of each district's 2006 personal income to defense and non-defense total spending.

[4]We use 2006 levels in order to capture pre-recession economic structure. We intend the employment lags to capture relevant cyclical variation in economic trends, and use pre-recession economic structure to capture variation from structural features.

2.3 Data

We obtain U.S. federal contract data from the U.S. government's public-access spending database, USASpending.gov.[5] USASpending.gov contains the universe of approximately 46 million unclassified federal contract actions over $3,000 signed since 2007. This data identifies the agency funding each contract. We assign contract actions to congressional districts according to the vendor's identification of the congressional district of predominant contract performance. Our 2012 and 2014 federal election outcome variables come from the Federal Election Commission.[6] We obtain House and Senate membership and legislator demographic data from Charles Stewart's Congressional Data Page and Keith Poole's Interuniversity Consortium for Political and Social Research (ICPSR) weg page.

We generate congressional district population and economic control variables by aggregating county-level data from the Bureau of Economic Analysis (BEA). Legislative redistricting implemented in 2012 means that in order to incorporate pre-2012 controls, we have to map data from time-invariant geographic units (counties) to the congressional districts established in 2012. We use the Missouri Census Data Center's MABLE Geographic Correspondence Engine to generate a crosswalk between counties and 2012 congressional districts. This crosswalk table includes a factor allocation variable identifying the share of district population residing in each of the districts constituent counties, which we use to aggregate county data to congressional districts. We obtain personal income and 2010 census population from BEA table CA1, employment from table CA25N, and spending by industry and government entities from table CA5N.

[5] https://www.usaspending.gov/

[6] http://www.fec.gov/pubrec/electionresults.shtml

2.4 Results

2.4.1 Baseline Results: Overall Election Outcomes

We estimate equation (2.1) via two staged least squares, instrumenting for changes in federal procurement spending with spending changes predicted by the 2013 federal sequester budget reduction formula, as defined in equation (2.3). We want to know how reductions in federal procurement spending received by congressional districts in 2013 affected the probability of an incumbent U.S. House member winning reelection in 2014.

Figure 2.1 plots spending changes predicted by the instrument against actual spending changes. While there are some outliers, the instrument is valid for a broad range of congressional districts. Virginia's eighth district (the point "VA08" in figure 2.1), which includes the cities of Alexandria and Arlington just outside of Washington, D.C., is an extreme outlier in terms of both actual and predicted sequester-induced spending reductions, due to its high exposure to federal procurement. Inclusion of this district radically alters second stage results of our analysis, so we drop this observation from our analysis.[7]

Table 2.1 shows summary statistics for 2014 election outcomes, actual and instrumented spending changes, model covariates, and incumbent characteristics.[8] Incumbents win reelection in 87% of congressional districts, with an average margin of victory of 38%. Congressional districts suffered a $760 per capita reduction in federal procurement spending, on average, from 2012 to 2013, and receive an average of $4,500 per capita in federal procurement spending in 2013. Fifty-six percent of incumbents are Republicans,

[7] More specifically, including this observation creates relatively large and precisely estimated coefficients for most of our second stage regressions. For more detail on this decision, see the "Robustness" section below.

[8] There are 435 congressional districts, but we only have 421 observations. For this version of the paper, we have dropped congressional districts created by the 2012 redistricting process, and we have dropped Virginia's eighth district. We are in the process of correcting our data processing procedure so that we can add these districts to future versions of our analysis.

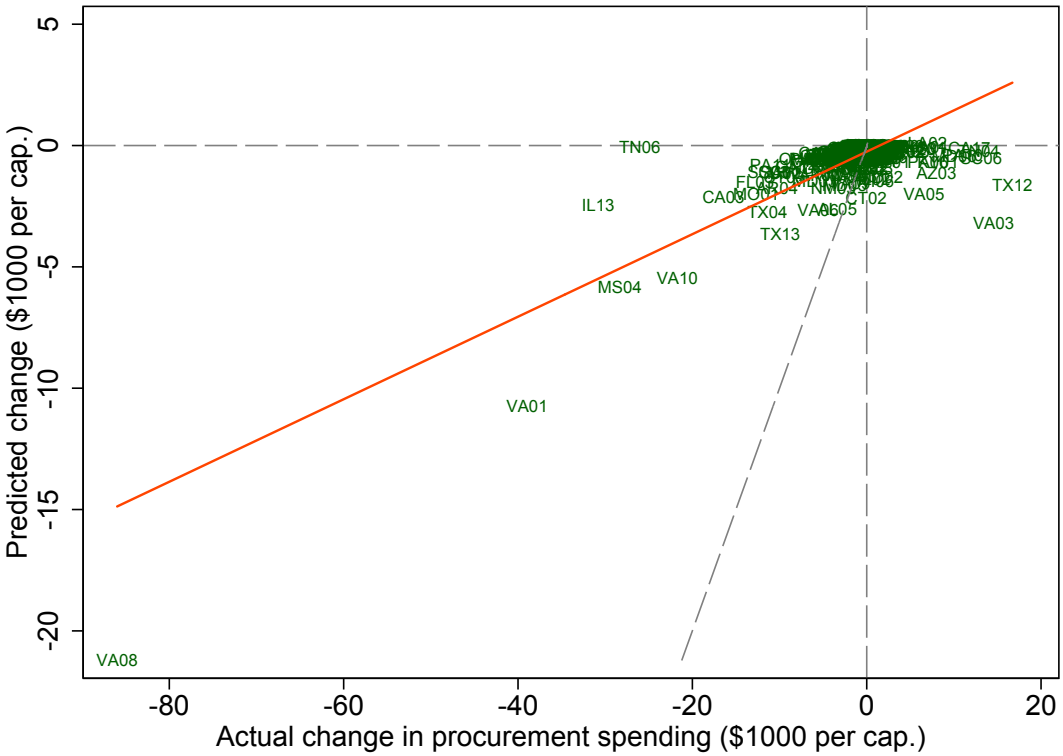

Figure 2.1: Scatter plot of spending changes predicted by the instrument against actual spending changes

and the mean seniority for U.S. house members in 2014 is 5.7 terms. The average congressional district's competitiveness score on the Cook Partisan Voter Index is close to zero.[9]

Table 2.1: Summary Statistics – CDs in 2013

	mean	sd	min	max
Incumbent won general election	.87	.34	0	1
Incumbent ran in primary or general	.9	.29	0	1
Margin of victory for incumbent	.38	.27	-.55	1
Vote share for incumbent	.68	.14	.0056	1
Number of primary candidates	5.4	2.4	3	19
Δ spending (USD 1000 per cap.)	-.76	4.5	-39	17
Sequester instrument	-.37	.79	-11	.12
Procurement spending (USD 1000 per cap.)	4.5	8.5	.02	99
CD 2010 population	310,004	218078	12,615	723,171
2006 personal income per capita	106,389	120198	24,310	815,673
2006 share of income from construction	.053	.016	.00042	.11
” finance	.053	.049	.0064	.52
” manufacturing	.087	.047	.0024	.29
” services	.32	.097	.11	.72
” TO state/local gov. spending	.097	.034	.025	.29
” TO defense spending	.011	.024	.00064	.24
” TO non-defense fed. spending	.021	.016	.0027	.12
GOP incumbent in 2014	.55	.5	0	1
Margin of victory (1st - 2nd pct)	.37	.25	0	1
CD competitiveness, 2014	-.26	15	-43	32
Incumbent's num. of terms in House	5.4	4.7	1	30

We show five specifications in all second stage tables: three instrumental variable specifications, Ordinary Least Squares (OLS) results, and Reduced Form (RF) results. In column (1), the sequester instrument is the only regressor. In column (2), we include congressional district controls. In column (3), we include congressional district controls and state fixed effects. We estimate the OLS and RF models, columns (4) and (5)

[9]The mean competitiveness score is close to zero because the PVI is based on how far a district's presidential vote is from the national average. See section 2.2.2 for a discussion of Congressional District competitiveness, which is based on Cook's PVI.

respectively, with district controls and state fixed effects.[10]

Table 2.2 shows the first stage of our baseline analysis, regressing 2012-2013 changes in federal procurement spending received by a district on the change predicted by the sequester instrument. The first stage coefficient is stable and precisely estimated in all three models. The coefficient is 4.5 in the preferred specification, column (3), suggesting that actual federal procurement spending drops 4.5 times more than the sequester instrument predicts.[11] A description of the types of discretionary spending cut by federal agencies from 2012 to 2013 in Hastings (2016) shows that procurement bore the brunt of 2013 sequester cuts, which is consistent with finding a first stage coefficient greater than one. The heteroskedasticity-robust F-statistic ranges from 60 to 74 across the three estimated models.

Table 2.3 shows our baseline results—the effect of sequester-induced procurement cuts on the probability that the incumbent wins reelection in 2014. The coefficient is an imprecisely measured 0.004 in the preferred specification, with similar imprecise estimates in the remaining IV and OLS specification. Reductions in federal procurement spending received by a district from 2012 to 2013 do not substantially affect the incumbent's probability of winning reelection in 2014. In table 2.4 , we look at the electoral margin, which is a more comparable outcome measure to what is typically used in the literature. It would have been possible to find an effect on the election margin even without finding an effect on the probability of winning, since most incumbents win by a landslide (the average margin of victory in 2014 was 37 percentage points). However, we find null effects of changes in procurement spending on incumbents' margin of victory. Finally, table 2.5 shows the effects of procurement spending reductions on whether the

[10] See section 2.2.2 for a description of the controls.

[11] This is of the same magnitude as the first stage coefficient at the city level found in Hastings (2016), which was about 2.6. The slightly higher coefficient in the current paper might be driven by a combination of non-uniform cuts across industries, the fact that congressional districts are usually smaller than cities, and the fact that the current paper includes non-urban areas in the sample.

incumbent decides to enter the race for reelection. We obtain a coefficient of 0.006, significant at the 10% level in our preferred specification. Columns (1) and (2) show smaller coefficients with substantially larger standard errors. The result of this analysis provides very weak evidence that sequester-related reductions in procurement spending might have reduced the probability of incumbents running for reelection; in any case, the effect is very small.

Table 2.2: First stage: Δ spending (USD 1000 per cap.)

	IV		
	(1)	(2)	(3)
Sequester instrument	3.488***	3.827***	4.472***
	(.4045)	(.4738)	(.5776)
DV Mean	-0.757	-0.757	
F-stat	74.35	65.23	59.96
N	421	421	421
Controls		X	X
State FE			X

First stage from IV regression on Incumbent won general election. Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.3: Incumbent won general election

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.003	0.002	0.004	0.002	
	(0.004)	(0.004)	(0.005)	(0.003)	
Sequester instrument					0.018
					(0.022)
DV Mean	0.867	0.867	0.867	0.867	0.867
Adj. R^2	-0.002	-0.031	-0.150	0.030	0.030
1S F-stat	74.35	65.23	59.96		
N	421	421	421	421	421
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.4: Margin of victory for incumbent

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.000	-0.001	0.001	-0.002	
	(0.003)	(0.003)	(0.002)	(0.003)	
Sequester instrument					0.003
					(0.009)
DV Mean	0.377	0.377	0.377	0.377	0.377
Adj. R^2	-0.003	0.349	0.133	0.371	0.371
1S F-stat	46.71	43.02	44.23		
N	378	378	378	378	378
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.5: Incumbent ran in primary or general

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.002	0.002	0.006*	0.001	
	(0.004)	(0.004)	(0.003)	(0.003)	
Sequester instrument					0.026
					(0.016)
DV Mean	0.905	0.905	0.905	0.905	0.905
Adj. R^2	-0.002	-0.026	-0.140	0.057	0.060
1S F-stat	74.35	65.56	60.24		
N	421	421	421	421	421
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

2.4.2 Heterogeneity

Next, we examine the effects of sequester-induced spending reductions on election outcomes through more complicated channels by testing for treatment effects of heterogeneous subgroups along three dimensions: district competitiveness, representative party affiliation, and representative seniority. For each of these dimensions, we define a binary assignment variable as described in section 2.2. We then estimate equation (2.2) via two-stage least squares, instrumenting for spending changes as above.[12][13]

Table 2.6 shows heterogeneity of treatment effects by district competitiveness. Here, our point estimate suggests that a $1,000 per capita reduction in spending hurts incumbents in competitive districts less than those in safe distrcits, but the coefficients are small, imprecisely estimated, and inconsistent across specifications. We conclude that there is no heterogeneity in the effects of procurement spending on outcomes by district competitiveness, as we've defined it.

Table 2.7 shows heterogeneity of treatment effect by incumbent party affiliation. Republican (GOP) incumbents are 1.4 percentage points more likely to win reelection in 2014 than Democrats are. Standard errors on the coefficient estimates for the interaction of spending changes with party affiliation are relatively large and the coefficient values are unstable across specifications. The effects of spending changes on election outcomes do not appear to vary by incumbent party affiliation.

Table 2.8 shows heterogeneity by incumbent representative's seniority in the U.S. House. Incumbents with above-median seniority (five years or more in the House) are seven percentage points less likely to win reelection overall (without conditioning on whether they choose to run). For incumbents with below-median seniority, a $1,000 per capita reduction in spending increases the probability of reelection by an imprecise

[12] See the appendix for associated first stage results.

[13] The first stage F-Statistic on these regression drops precipitously. In future versions of this paper, we will include weak-IV robust Anderson-Rubin p-values for second stage results.

Table 2.6: Competitiveness: Incumbent won general election

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.003	-0.002	0.007	0.008	
	(0.011)	(0.009)	(0.010)	(0.005)	
Comp. * Δ spend	-0.001	0.006	-0.005	-0.010	
	(0.011)	(0.010)	(0.010)	(0.007)	
Competitive (between 25 and 75 p'tile of PVI)	-0.060*	-0.070**	-0.070**	-0.072*	-0.070*
	(0.034)	(0.035)	(0.035)	(0.037)	(0.039)
Sequester instrument					0.028
					(0.039)
Comp. * Instrument					-0.015
					(0.037)
DV Mean	0.867	0.871	0.871	0.871	0.871
Adj. R^2	0.001	-0.010	-0.123	0.054	0.049
1S F-stat	3.79	5.81	6.60		
N	421	418	418	418	418
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.7: Party: Incumbent won general election

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	-0.020	-0.030	-0.015	0.002	
	(0.029)	(0.029)	(0.020)	(0.010)	
GOP * Δ spend	0.025	0.035	0.022	0.001	
	(0.029)	(0.030)	(0.020)	(0.011)	
GOP Incumbent	0.006	0.119	0.136*	0.121	0.135
	(0.032)	(0.073)	(0.078)	(0.082)	(0.085)
Sequester instrument					-0.035
					(0.044)
GOP * Instrument					0.058
					(0.044)
DV Mean	0.871	0.871	0.871	0.871	0.871
Adj. R^2	-0.027	-0.046	-0.144	0.049	0.051
1S F-stat	0.36	0.70	0.65		
N	418	418	418	418	418
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

0.3 percentage points. In contrast, senior incumbents are a statistically significant four percentage points (0.043 - 0.003) less likely to be reelected for every $1,000 per capita in spending cuts.

In tables 2.9 and 2.10 we seek to identify the point in the election cycle at which this reduced probability of winning for senior representatives is introduced. Table 2.9 shows that incumbents with seniority are a precisely estimated 3.7 percentage points less likely to run for reelection for every $1,000 per capita in spending cuts. On the other hand, table 2.10 shows that conditional on running, senior incumbents face no reduction in election margin relative to junior incumbents (and perhaps face an increased margin). We conclude that spending reductions induce senior representatives to "retire" earlier than they might otherwise have.

Investigating the result on seniority further, table 2.11 shows the effect of spending changes and seniority on the probability that a congressional district elected a representative of a different party in the incumbent. As explained further in the discussion, we might expect voters to punish both the incumbent and the party if voters were driving the decision by senior representatives in hard-hit districts to retire. However, we find no indication that this is the case. In tables 2.12 and 2.13 , we list Democratic and Republican incumbents, respectively, who did not run in the general election in 2014. We list the district, incumbent name, the number of terms served by the incumbent, the district's change in federal procurement spending, whether the incumbent lost their party's primary, the party of the candidate who won the 2014 election, and we indicate whether the congressional district elected a candidate of a different party from the outgoing incumbent. The overwhelming majority of these incumbents did not run at all; very few lost their party's primary. Far more Democrats than Republicans were replaced by members of the opposite party.[14]

[14] In future versions of the paper, we will also indicate whether retiring senior incumbents held leadership positions in the House.

Table 2.8: Seniority: Incumbent won general election

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	-0.003	-0.004	-0.003	-0.000	
	(0.002)	(0.003)	(0.003)	(0.003)	
Senior * Δ spend	0.031**	0.030**	0.043***	0.011	
	(0.014)	(0.013)	(0.013)	(0.009)	
Senior (5+ years in House)	-0.068**	-0.079**	-0.070**	-0.082**	-0.047
	(0.031)	(0.032)	(0.031)	(0.034)	(0.035)
Sequester instrument					-0.007
					(0.013)
Senior * Instrument					0.102***
					(0.029)
DV Mean	0.867	0.871	0.871	0.871	0.871
Adj. R^2	-0.001	-0.012	-0.169	0.054	0.062
1S F-stat	31.54	25.90	15.97		
N	421	418	418	418	418
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.9: Seniority: Incumbent ran in primary or general

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	-0.001	-0.002	-0.001	0.001	
	(0.002)	(0.003)	(0.002)	(0.003)	
Senior * Δ spend	0.020	0.021	0.038**	0.004	
	(0.019)	(0.017)	(0.017)	(0.010)	
Senior (5+ years in House)	-0.075***	-0.071**	-0.055*	-0.066*	-0.035
	(0.029)	(0.030)	(0.031)	(0.033)	(0.035)
Sequester instrument					0.005
					(0.013)
Senior * Instrument					0.086*
					(0.048)
DV Mean	0.905	0.909	0.909	0.909	0.909
Adj. R^2	0.004	-0.025	-0.213	0.056	0.070
1S F-stat	31.54	25.97	16.02		
N	421	418	418	418	418
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.10: Seniority: Margin of victory for incumbent

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.001	-0.001	0.002	-0.001	
	(0.002)	(0.002)	(0.003)	(0.002)	
Senior * Δ spend	-0.032	-0.010	-0.034	-0.001	
	(0.103)	(0.046)	(0.050)	(0.005)	
Senior (5+ years in House)	0.097***	-0.005	-0.009	0.001	-0.011
	(0.026)	(0.020)	(0.022)	(0.020)	(0.023)
Sequester instrument					0.003
					(0.010)
Senior * Instrument					-0.035
					(0.036)
DV Mean	0.377	0.377	0.377	0.377	0.377
Adj. R^2	-0.040	0.395	0.154	0.437	0.438
1S F-stat	0.21	0.61	0.70		
N	378	377	377	377	377
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.11: Seniority: CD changed parties in 2014

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.001	0.002*	0.002	0.002	
	(0.001)	(0.001)	(0.001)	(0.002)	
Senior * Δ spend	0.008**	0.009	0.006	-0.005	
	(0.004)	(0.006)	(0.006)	(0.004)	
Senior (5+ years in House)	-0.003	0.017	0.011	0.008	0.015
	(0.018)	(0.020)	(0.021)	(0.023)	(0.024)
Sequester instrument					0.009
					(0.009)
Senior * Instrument					0.011
					(0.011)
DV Mean	0.038	0.038	0.038	0.038	0.038
Adj. R^2	-0.021	0.074	-0.074	0.118	0.117
1S F-stat	31.54	26.04	16.05		
N	421	418	418	418	418
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.12: Dem. incumbents not on general ballot, 2014

District	Incumbent	Terms	Δ spend	Pri loss	'14 winner	Δ Party
NC12	(Vacant)		-.2908917		D	
NJ01	(Vacant)		-.0370342		D	
AZ07	Pastor, Ed	12	-5.09492		D	
CA11	Miller, George	20	.0857238		D	
CA33	Waxman, Henry A.	20	4.232075		D	
CA35	Negrete Mcleod, Gloria	1	.414858		D	
HI01	Hanabusa, Colleen	2	-.4528626		D	
IA01	Braley, Bruce	4	7.436555		R	X
MA06	Tierney, John F.	9	.5763901	X	D	
ME02	Michaud, Michael H.	6	-.4318845		R	X
MI12	Dingell, John D.	30	.5582582		D	
MI14	Peters, Gary	3	.2506137		D	
NC07	Mcintyre, Mike	9	-.6293618		R	X
NJ12	Holt, Rush D.	8	-2.561635		D	
NY04	Mccarthy, Carolyn	9	.0907343		D	
NY21	Owens, Bill	3	-.383949		R	X
PA13	Schwartz, Allyson Y.	4	-6.531051		D	
UT04	Matheson, Jim	7			R	X
VA08	Moran, James P.	12	-85.98177		D	

Table 2.13: GOP incumbents not on general ballot, 2014

District	Incumbent	Terms	Δ spend	Pri loss	'14 winner	ΔParty
AL06	Bachus, Spencer	11	-.4471795		R	
AR02	Griffin, Tim	2	.0244293		R	
AR04	Cotton, Tom	1	-10.26979		R	
CA25		11	-1.139296		R	
CA31	Miller, Gary G.	8	.2373345		D	X
CA45	Campbell, John	4	.4112505		R	
CO04	Gardner, Cory	2	-.620358		R	
GA01	Kingston, Jack	11	.1462104		R	
GA10	Broun, Paul	4	-6.321099		R	
GA11	Gingrey, Phil	6	1.856055		R	
IA03	Latham, Tom	10	-.1196965		R	
LA06	Cassidy, Bill	3	-1.911186		R	
MI04	Camp, Dave	12	1.02098		R	
MI08	Rogers, Mike	7	-2.015597		R	
MN06	Bachmann, Michele	4	.4782018		R	
MT00	Daines, Steve	1	-1.958986		R	
NC06	Coble, Howard	15	.0719359		R	
NJ03	Runyan, Jon	2	-.4462612		R	
OK05	Lankford, James	2	.0139072		R	
PA06	Gerlach, Jim	6	7.040516		R	
TX04	Hall, Ralph M.	17	-11.37979	X	R	
TX36	Stockman, Steve	2			R	
VA07	Cantor, Eric	7	-.6883425	X	R	
VA10	Wolf, Frank R.	17	-21.72011		R	
WA04	Hastings, Doc	10	-2.36674		R	
WI06	Petri, Thomas E.	18	.9094883		R	
WV02	Capito, Shelley Moore	7	-.0010723		R	

2.4.3 Robustness

In this section we show that our results are robust to the exclusion of outliers and weighting each congressional district by population. We also report the results of a placebo test to check the conditions under which the 2013 sequester spending instrument predicts political outcomes in 2012.

Outliers

First, we clarify our decision to drop one outlier from the sample we use in our main analysis. As can be seen in Figure 2.1, there are a small number of districts with federal procurement spending far above average, and which consequently suffer spending reductions an order of magnitude (or two!) above the mean. The aforementioned Virginia 8th district, in an extreme example, experienced changes in procurement spending more than twice as big as the district with the second-biggest absolute change. An earlier version of our analysis included the Virginia 8th district, and showed robustly significant effects of a change in spending on an incumbent's likelihood of running and winning (see table 2.14), though not on an incumbent's margin of victory. We drop this extreme observation from our analysis in order to derive results applicable to a broader range of congressional districts.

To provide an intuitive confirmation of the plausibility of the hypothesis that the original full-sample results is driven by an outlier, 2.2 plots changes in spending against predicted changes in spending, differentiating each datapoint's color by whether the incumbent did (black) or did not (red) run in the 2014 election. The red datapoint labeled "VA08" at the extreme bottom left corner of the plot represents the decision of 11-term Democratic congressman Jim Moran not to seek reelection in 2014 (Pershing, 2014). Because his district had such a huge change in procurement spending, his decision

Table 2.14: Incumbent won general election (Full sample – including outliers)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.008***	0.007***	0.008**	0.005*	
	(0.002)	(0.003)	(0.003)	(0.003)	
Sequester instrument					0.036**
					(0.015)
DV Mean	0.865	0.865	0.865	0.865	0.865
Adj. R^2	0.006	-0.023	-0.142	0.040	0.043
1S F-stat	1106.16	399.20	240.42		
N	422	422	422	422	422
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

carried immense weight in our initial analysis. We conclude that while we do not think the data is faulty, it would be misleading to report effects influenced so heavily by one congressional district; this motivates our decision to drop Virginia's 8th district from the full analysis.

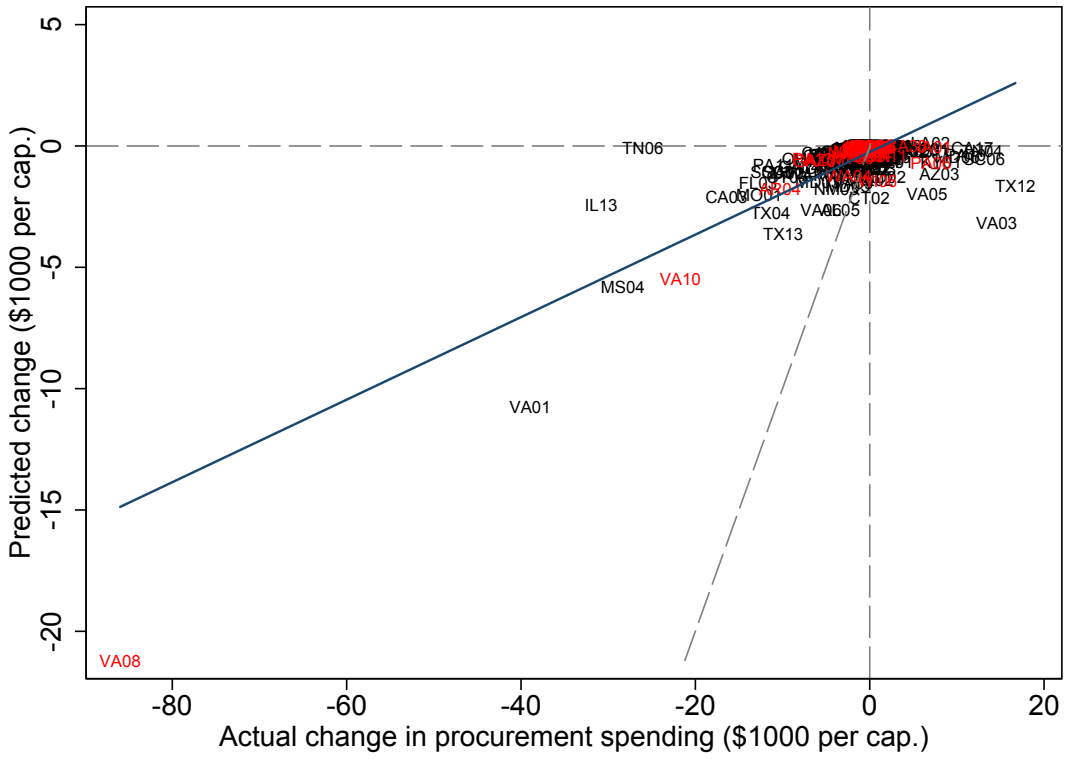

Figure 2.2: Scatter plot of predicted and actual spending changes, divided by whether incumbent ran in 2014.

Now, we test sensitivity of the results we achieve *after* dropping Virginia's 8th district (that is, the results provided in sections 2.4.1 and 2.4.2 above) to remaining outliers. Table 2.15 shows the results for our main outcome of interest, whether the incumbent won, dropping observations in the top and bottom 5% of actual or predicted spending changes.[15] Broadly, the results we see after dropping remaining outliers are

[15]The appendix includes results for other outcomes and for similar analyses which winsorize instead of dropping observations.

consistent with our main results – we find small, insignificant effects of changes in procurement spending on political outcomes.

Table 2.15: Incumbent won general election (Drop top/bottom 5%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Drop top/bottom 5%)	-0.006	-0.027	-0.029	0.001	
	(0.030)	(0.039)	(0.042)	(0.012)	
Sequester instrument (Drop top/bottom 5%)					-0.071
					(0.116)
DV Mean	0.866	0.866	0.866	0.871	0.868
Adj. R^2	-0.004	-0.052	-0.205	0.031	0.034
1S F-stat	22.62	19.82	16.03		
N	352	352	352	380	378
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – dropped at 5% high and low. Endogenous regressor and instrument built from these values after extremes have been dropped. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Correlation between sequester predictions and 2012 election outcomes

To check the validity of the sequester instrument, we test whether the 2013 spending changes predicted by the sequester instrument predict 2012 election outcomes. If they did, we would be concerned that our model fails to account for endogenous links

between electoral outcomes and procurement spending changes. Column (1) of table 2.16 shows that 2013 spending changes predicted by the sequester instrument do predict 2012 election outcomes. This is a cause for concern; future work will seek to illuminate the channels of this endogeneity and shore up our claim that our instrument overcomes it. However, we note that this predictive power diminishes when we add controls and state fixed effects and controls in column (3); column (3) is therefore our preferred specification in the main analyses we present. Further, controls in our analysis of 2014 election outcomes include lagged (2012) election outcomes for that district, which should further account for endogenous correlation between election outcomes and spending changes that evolve slowly over time. We cannot include lagged election outcomes in this placebo test, because redistricting in 2012 renders prior election results incomparable to 2012 and 2014 congressional districts.[16]

Weighting by population

To further test the interpretation of our results, we weight observations by congressional district population to examine the extent to which our results are driven by congressional districts with large populations. The results do not change substantially.[17]

2.5 Discussion

We examine the effects of 2013 sequester-induced reductions in federal procurement spending received by congressional districts on 2014 U.S. House election outcomes. We find that these spending reductions do not affect overall election outcomes when

[16] In future work we intend to control for lagged election outcomes in this placebo test by either restricting the sample to congressional districts less affected by redistricting, or by cross-walking congressional districts from 2010 to 2012.

[17] See tables in the appendix section for the results of these robustness checks.

Table 2.16: Incumbent won general election 2012

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	-0.010**	-0.009**	-0.007	-0.002	
	(0.004)	(0.004)	(0.005)	(0.004)	
Sequester instrument					-0.029
					(0.023)
DV Mean	0.819	0.819	0.819	0.819	0.819
Adj. R^2	-0.016	-0.003	-0.151	0.020	0.022
1S F-stat	74.35	63.44	60.00		
N	421	421	421	421	421
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 (using voting patterns from the previous two presidential elections, i.e. 2004 and 2008).

* $p < .10$, ** $p < .05$, *** $p < .01$

measured as the probability of the incumbent winning, the probability of the incumbent running for reelection, or the incumbent's election margin.[18]

Our failure to find an effect is somewhat surprising in light of existing results in related literature. Levitt and Snyder (1997) finds that a $100 per capita increase in federal grants received by congressional districts increases the incumbent representative's voteshare by 2 percent of the popular vote. The mean level of federal grant spending per capita in districts in Levitt and Snyder (1997) is $247, and the standard deviation is $242 per capita. The mean per capita spending shock induced by the 2013 sequester is approximately $1,400 per capita. Our spending shocks are substantially larger in dollar terms, and yet we do not see overall electoral outcomes change. This is consistent with our claim that federal procurement spending is a fundamentally different type of spending from the grants and transfers studied in the existing literature. In the case of grants and transfers, voters either directly receive the financial benefits, or they actually see the resulting local public goods. For federal procurement spending, the public goods are non-local in nature, so individuals in the vicinity of production to not value them more than voters in other districts. Additionally, procurement spending is directly received by firms rather than individuals. If voters respond to changes in federal procurement spending, it would be because spending is salient through less direct routes: through aggregate economic effects, or perhaps local news about procurement contracts awarded in the district. Hastings (2016) shows that the sequester induced measurable reductions in employment local to contract performance. The results of the current paper suggest that the magnitude of these effects are not sufficient to affect voter behavior.

Hastings and Johnson (2017) suggest that politicians holding powerful congressional positions can and do use their influence to change the location of federal procurement spending. Failure to find overall electoral effects suggests that—at least in the case

[18] or voteshare; see the appendix for results on this outcome.

of 2014 election—politicians should not have influenced federal procurement spending out of concern for voter punishment. Our results on heterogeneity suggest an alternative set of incumbent incentives. Sequester reductions induce senior representatives not to run for reelection. The open-seat districts are no more likely to elect a representative of a different party, which we might expect if voters were punishing incumbents for lost procurement spending. Instead, we propose that donors might be an important part of this story. Federal procurement spending creates an opportunity for firms to capture political rents, and firms might therefore use donations to motivate influential legislators to drive federal procurement spending in ways that benefit the firms. In other words, donors might be a much bigger part of the political economy of federal procurement spending than the political economy of other types of federal spending.

2.6 Conclusion

This paper provides evidence of important nuance to the current understanding of how different types of federal spending affect (or not) political outcomes. It provides the first well-identified study of the electoral effects of procurement spending, showing that this type of spending has much smaller direct electoral effects (if any) than other types of federal spending, at least in the context of U.S. House races. In general, we find that even a relatively large increase in spending of $1,000 per capita produces effects on the likelihood of an incumbent's reelection that are between -0.6 and +1.4 percentage points (from a base of 86.7%). The effect size on incumbents' electoral margins is between -0.3 and +0.5 percentage points. In contrast, Levitt and Snyder (1997) find that increasing grant spending by an order of magnitude less – $100 per capita – increases incumbent vote share by an order of magnitude more: 2 percentage points. We argue that this huge disparity suggests that procurement spending is much less salient to voters than

grant spending. Our general finding is robust to various alternate specifications, and also appears mostly to hold across seemingly important dimensions of heterogeneity (including district competitiveness and party affiliation).

This paper is also one of the first to examine the effect of spending on politicians' decisions to run for reelection. Indeed, the one group for which we uncover measurable effects is representatives who are in their fifth term or beyond, who seem to be 4 percentage points less likely than junior colleagues to contend an election when their district is hit with a $1,000 per capita procurement spending cut. In future work we plan to further illuminate the effects we identify on senior member of the House. Did the spending cuts galvanize voters, produce stronger challengers or increase voter turnout? Bickers and Stein (1996) shows that the probability of incumbents facing challenger decreases with in-district federal spending. Were senior members of Congress more likely to have powerful committee positions, worrying they would be blamed for the spending cuts? Also, do we see voters attribute blame for the cuts to other politicians such as senators, governors, or the president (a la Cole, Healy and Werker (2012) or Besley et al. (2004))?

Our findings also point toward other potentially fruitful avenues of new research. Federal procurement, unlike grant spending, has been almost unexamined by economists. However, we argue that idiosyncrasies of this type of spending mean it offers a more direct way to study the phenomenon of "pocketbook voting" than grant spending does. Grant spending typically produces locally-consumed public goods: things like roads, teachers, and police. By contrast, procurement spending typically produces public goods the benefits of which are diffused nationally: national defense, a functioning federal bureaucracy, and the like. Studies of the impact of grant spending on voter responses thus can only uncover the combined effect of federal spending itself and the public goods it produces, which may be more visible. Under reasonable assumptions, procurement

offers a way to separate the electoral effects of federal spending *per se* from the effects of the public goods produced by it. Hastings (2016) shows that procurement does indeed produce job growth in the areas where the spending happens, so there is clear evidence for the potential of pocketbook voting in response to the local economic effects of federal procurement spending. However, our analysis finds that any possible electoral returns to increased spending are vanishingly small. This is a valuable contribution to the ongoing debate over pocketbook voting.

The instrument we rely on for this paper was a one-time shock that necessarily limits our analysis to the 2014 election. However, detailed federal procurement spending data is available as far back as 2007. We plan to develop an annual Bartik-style share-shifter instrument against which to compare the results we present here, and to extend the analysis to other years. We also intend to extend the analysis of Levitt and Snyder (1997) over the same time period, to provide a more direct way to compare our results on procurement spending with their results on grant spending.

The first stage in our main analyses is very robust, and we hope to use this strong instrument to study other outcomes. Procurement spending is less salient and less visible to the average voter than grant spending, which might help explain why we see no effect on voting outcomes. However, these very qualities might mean that procurement spending can enter into politicians' objective functions in different ways. Procurement is notoriously susceptible to various forms of rent capture. Our future work will examine whether the campaign contributions of procurement contract recipients respond to shocks to procurement spending.

Chapter 2, in part, is currently being prepared for submission for publication of the material. Roer, Elizabeth A; Sandholtz, Wayne A. The dissertation author was the primary investigator and author of this material.

2.7 Tables Appendix A: First Stage Tables

Table 2.17: First stage: Δ spending (USD 1000 per cap.)

	IV		
	(1)	(2)	(3)
Sequester instrument	3.488***	3.82***	4.463***
	(.4045)	(.4717)	(.5751)
DV Mean	-0.757	-0.757	
F-stat	74.35	65.56	60.24
N	421	421	421
Controls		X	X
State FE			X

First stage from IV regression on Incumbent ran in primary or general. Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.18: First stage: Δ spending (USD 1000 per cap.)

	IV		
	(1)	(2)	(3)
Sequester instrument	3.391***	3.825***	4.582***
	(.4961)	(.5831)	(.689)
DV Mean	-0.705	-0.705	
F-stat	46.71	43.02	44.23
N	378	378	378
Controls		X	X
State FE			X

First stage from IV regression on Margin of victory for incumbent. Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.19: First stage: Δ spending (USD 1000 per cap.)

	IV		
	(1)	(2)	(3)
Sequester instrument	3.391***	3.825***	4.584***
	(.4961)	(.5844)	(.6891)
DV Mean	-0.705	-0.705	
F-stat	46.71	42.84	44.25
N	378	378	378
Controls		X	X
State FE			X

First stage from IV regression on Vote share for incumbent. Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

2.8 Tables Appendix B: Heterogeneity Supplemental Tables

Table 2.20: Competitiveness: Incumbent ran in primary or general

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	-0.004	-0.005	0.005	0.005	
	(0.008)	(0.008)	(0.007)	(0.004)	
Comp. * Δ spend	0.009	0.010	0.001	-0.005	
	(0.008)	(0.008)	(0.008)	(0.007)	
Competitive (between 25 and 75 p'tile of PVI)	0.001	0.005	0.013	0.010	0.017
	(0.024)	(0.029)	(0.029)	(0.030)	(0.032)
Sequester instrument					0.022
					(0.030)
Comp. * Instrument					0.007
					(0.028)
DV Mean	0.905	0.909	0.909	0.909	0.909
Adj. R^2	-0.016	-0.027	-0.138	0.056	0.057
1S F-stat	3.79	5.81	6.61		
N	421	418	418	418	418
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.21: Competitiveness: Margin of victory for incumbent

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.002	-0.007	-0.007	-0.003	
	(0.010)	(0.008)	(0.007)	(0.004)	
Comp. * Δ spend	-0.002	0.007	0.009	0.003	
	(0.010)	(0.008)	(0.008)	(0.004)	
Competitive (between 25 and 75 p'tile of PVI)	-0.246***	-0.123***	-0.140***	-0.144***	-0.137***
	(0.036)	(0.028)	(0.031)	(0.034)	(0.036)
Sequester instrument					-0.022
					(0.024)
Comp. * Instrument					0.030
					(0.026)
DV Mean	0.377	0.377	0.377	0.377	0.377
Adj. R^2	0.202	0.400	0.222	0.438	0.438
1S F-stat	2.49	3.97	4.30		
N	378	377	377	377	377
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.22: Party: Incumbent ran in primary or general

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	-0.022	-0.023	-0.012	-0.002	
	(0.024)	(0.022)	(0.013)	(0.008)	
GOP * Δ spend	0.026	0.027	0.020	0.005	
	(0.025)	(0.022)	(0.014)	(0.010)	
GOP Incumbent	-0.021	-0.016	0.015	0.006	0.016
	(0.025)	(0.050)	(0.055)	(0.058)	(0.062)
Sequester instrument					-0.024
					(0.036)
GOP * Instrument					0.056
					(0.037)
DV Mean	0.909	0.909	0.909	0.909	0.909
Adj. R^2	-0.034	-0.047	-0.145	0.056	0.060
1S F-stat	0.36	0.71	0.65		
N	418	418	418	418	418
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.23: Party: Margin of victory for incumbent

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.033	0.004	-0.004	0.003	
	(0.034)	(0.018)	(0.019)	(0.006)	
GOP * Δ spend	-0.036	-0.007	0.005	-0.005	
	(0.034)	(0.020)	(0.022)	(0.006)	
GOP Incumbent	-0.023	0.154***	0.189***	0.183***	0.189***
	(0.033)	(0.047)	(0.049)	(0.053)	(0.055)
Sequester instrument					-0.011
					(0.045)
GOP * Instrument					0.010
					(0.052)
DV Mean	0.377	0.377	0.377	0.377	0.377
Adj. R^2	-0.058	0.403	0.220	0.439	0.437
1S F-stat	0.30	0.63	0.57		
N	377	377	377	377	377
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

2.9 Tables Appendix C: Main outcomes, weighted by population

Table 2.24: Incumbent won general election

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.003	-0.001	0.006	0.001	
	(0.009)	(0.010)	(0.008)	(0.005)	
Sequester instrument					0.025
					(0.032)
DV Mean	0.874	0.874	0.874	0.874	0.874
Adj. R^2	-0.003	-0.011	0.050	0.052	0.053
1S F-stat	18.74	17.21	11.49		
N	421	421	421	421	421
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.25: Margin of victory for incumbent

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.009	0.002	0.002	-0.001	
	(0.008)	(0.006)	(0.004)	(0.003)	
Sequester instrument					0.007
					(0.016)
DV Mean	0.398	0.398	0.398	0.398	0.398
Adj. R^2	-0.016	0.437	0.468	0.469	0.469
1S F-stat	10.04	9.69	6.75		
N	378	378	378	378	378
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.26: Incumbent ran in primary or general

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.003	-0.000	0.008	-0.000	
	(0.009)	(0.010)	(0.010)	(0.005)	
Sequester instrument					0.030
					(0.040)
DV Mean	0.907	0.907	0.907	0.907	0.907
Adj. R^2	-0.003	-0.003	0.059	0.066	0.068
1S F-stat	18.74	17.07	11.38		
N	421	421	421	421	421
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

2.10 Tables Appendix D: Placebo – Main outcomes from 2012, predicted by 2013 sequester

Table 2.27: Incumbent ran in primary or general election 2012

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	-0.009***	-0.009**	-0.008*	-0.004**	
	(0.003)	(0.004)	(0.005)	(0.002)	
Sequester instrument					-0.037
					(0.023)
DV Mean	0.886	0.886	0.886	0.886	0.886
Adj. R^2	-0.012	-0.013	-0.152	-0.005	-0.003
1S F-stat	74.35	63.44	60.00		
N	421	421	421	421	421
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 (using voting patterns from the previous two presidential elections, i.e. 2004 and 2008).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.28: Margin of victory for incumbent 2012

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.)	0.001	-0.000	-0.003	-0.002	
	(0.003)	(0.005)	(0.004)	(0.003)	
Sequester instrument					-0.015
					(0.017)
DV Mean	0.340	0.340	0.340	0.340	0.340
Adj. R^2	-0.003	0.170	0.038	0.192	0.192
1S F-stat	74.35	63.44	60.00		
N	421	421	421	421	421
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 (using voting patterns from the previous two presidential elections, i.e. 2004 and 2008).

* $p < .10$, ** $p < .05$, *** $p < .01$

2.11 Tables Appendix E: Outliers

Table 2.29: Incumbent won general election (Winsor top/bottom 1%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Winsor top/bottom 1%)	0.004	0.003	0.008	0.003	
	(0.007)	(0.007)	(0.008)	(0.004)	
Sequester instrument (Winsor top/bottom 1%)					0.042
					(0.038)
DV Mean	0.867	0.867	0.867	0.867	0.867
Adj. R^2	-0.002	-0.031	-0.153	0.030	0.032
1S F-stat	37.36	34.60	23.75		
N	421	421	421	421	421
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – winsorized at 1% high and low. Endogenous regressor and instrument built from these values after extremes have been winsorized. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.30: First stage: Δ spending (USD 1000 per cap.)
(Winsor top/bottom 1%)

	IV		
	(1)	(2)	(3)
Sequester instrument (Winsor top/bottom 1%)	3.814***	4.421***	5.16***
	(.624)	(.7516)	(1.059)
DV Mean	-0.733	-0.733	
F-stat	37.36	34.60	23.75
N	421	421	421
Controls		X	X
State FE			X

First stage from IV regression on Incumbent won general election. Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – winsorized at 1% high and low. Endogenous regressor and instrument built from these values after extremes have been winsorized. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.31: Margin of victory for incumbent (Winsor top/bottom 1%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Winsor top/bottom 1%)	-0.001	-0.002	-0.001	-0.002	
	(0.006)	(0.005)	(0.003)	(0.003)	
Sequester instrument (Winsor top/bottom 1%)					-0.004
					(0.020)
DV Mean	0.377	0.377	0.377	0.377	0.377
Adj. R^2	-0.002	0.349	0.135	0.372	0.371
1S F-stat	16.89	18.30	15.98		
N	378	378	378	378	378
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – winsorized at 1% high and low. Endogenous regressor and instrument built from these values after extremes have been winsorized. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.32: Incumbent ran in primary or general (Winsor top/bottom 1%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Winsor top/bottom 1%)	0.003	0.002	0.010	0.002	
	(0.006)	(0.007)	(0.007)	(0.003)	
Sequester instrument (Winsor top/bottom 1%)					0.050
					(0.039)
DV Mean	0.905	0.905	0.905	0.905	0.905
Adj. R^2	-0.002	-0.026	-0.148	0.057	0.062
1S F-stat	37.36	34.33	23.54		
N	421	421	421	421	421
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – winsorized at 1% high and low. Endogenous regressor and instrument built from these values after extremes have been winsorized. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.33: Incumbent won general election (Drop top/bottom 1%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Drop top/bottom 1%)	0.003	-0.000	0.010	0.007	
	(0.014)	(0.013)	(0.013)	(0.007)	
Sequester instrument (Drop top/bottom 1%)					0.030
					(0.050)
DV Mean	0.865	0.865	0.865	0.864	0.867
Adj. R^2	-0.003	-0.034	-0.165	0.029	0.029
1S F-stat	25.31	24.10	28.08		
N	407	407	407	412	414
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – dropped at 1% high and low. Endogenous regressor and instrument built from these values after extremes have been dropped. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.34: Incumbent won general election (Drop top/bottom 1%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Drop top/bottom 1%)	0.003	-0.000	0.010	0.007	
	(0.014)	(0.013)	(0.013)	(0.007)	
Sequester instrument (Drop top/bottom 1%)					0.030
					(0.050)
DV Mean	0.865	0.865	0.865	0.864	0.867
Adj. R^2	-0.003	-0.034	-0.165	0.029	0.029
1S F-stat	25.31	24.10	28.08		
N	407	407	407	412	414
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – dropped at 1% high and low. Endogenous regressor and instrument built from these values after extremes have been dropped. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.35: First stage: Δ spending (USD 1000 per cap.)
(Drop top/bottom 1%)

	IV		
	(1)	(2)	(3)
Sequester instrument			
(Drop top/bottom 1%)	3.157***	3.59***	4.1***
	(.6275)	(.7313)	(.7737)
DV Mean	-0.613	-0.613	
F-stat	25.31	24.10	28.08
N	407	407	407
Controls		X	X
State FE			X

First stage from IV regression on Incumbent won general election. Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – dropped at 1% high and low. Endogenous regressor and instrument built from these values after extremes have been dropped. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.36: Margin of victory for incumbent (Drop top/bottom 1%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Drop top/bottom 1%)	0.004	0.001	0.000	-0.004	
	(0.007)	(0.007)	(0.006)	(0.005)	
Sequester instrument (Drop top/bottom 1%)					-0.006
					(0.027)
DV Mean	0.374	0.374	0.374	0.377	0.375
Adj. R^2	-0.009	0.335	0.123	0.374	0.361
1S F-stat	18.36	15.88	19.45		
N	365	365	365	369	372
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – dropped at 1% high and low. Endogenous regressor and instrument built from these values after extremes have been dropped. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.37: Incumbent ran in primary or general (Drop top/bottom 1%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Drop top/bottom 1%)	-0.002	-0.002	0.008	0.005	
	(0.010)	(0.010)	(0.010)	(0.007)	
Sequester instrument (Drop top/bottom 1%)					0.035
					(0.040)
DV Mean	0.904	0.904	0.904	0.903	0.906
Adj. R^2	-0.002	-0.030	-0.155	0.054	0.059
1S F-stat	25.31	24.06	28.20		
N	407	407	407	412	414
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – dropped at 1% high and low. Endogenous regressor and instrument built from these values after extremes have been dropped. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.38: Incumbent won general election (Drop top/bottom 5%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Drop top/bottom 5%)	-0.006	-0.027	-0.029	0.001	
	(0.030)	(0.039)	(0.042)	(0.012)	
Sequester instrument (Drop top/bottom 5%)					-0.071
					(0.116)
DV Mean	0.866	0.866	0.866	0.871	0.868
Adj. R^2	-0.004	-0.052	-0.205	0.031	0.034
1S F-stat	22.62	19.82	16.03		
N	352	352	352	380	378
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – dropped at 5% high and low. Endogenous regressor and instrument built from these values after extremes have been dropped. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.39: First stage: Δ spending (USD 1000 per cap.)
(Drop top/bottom 5%)

	IV		
	(1)	(2)	(3)
Sequester instrument (Drop top/bottom 5%)	2.627***	2.941***	3.196***
	(.5525)	(.6607)	(.7982)
DV Mean	-0.485	-0.485	
F-stat	22.62	19.82	16.03
N	352	352	352
Controls		X	X
State FE			X

First stage from IV regression on Incumbent won general election. Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – dropped at 5% high and low. Endogenous regressor and instrument built from these values after extremes have been dropped. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.40: Margin of victory for incumbent (Drop top/bottom 5%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Drop top/bottom 5%)	0.025	0.011	0.014	0.002	
	(0.017)	(0.023)	(0.023)	(0.015)	
Sequester instrument (Drop top/bottom 5%)					0.004
					(0.069)
DV Mean	0.368	0.368	0.368	0.377	0.367
Adj. R^2	-0.026	0.356	0.119	0.397	0.346
1S F-stat	18.25	14.25	11.38		
N	318	318	318	344	341
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – dropped at 5% high and low. Endogenous regressor and instrument built from these values after extremes have been dropped. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 2.41: Incumbent ran in primary or general (Drop top/bottom 5%)

	IV			OLS	RF
	(1)	(2)	(3)	(4)	(5)
Δ spending (USD 1000 per cap.) (Drop top/bottom 5%)	-0.007	-0.022	-0.012	0.005	
	(0.026)	(0.037)	(0.037)	(0.011)	
Sequester instrument (Drop top/bottom 5%)					-0.036
					(0.105)
DV Mean	0.909	0.909	0.909	0.911	0.907
Adj. R^2	-0.008	-0.046	-0.173	0.046	0.054
1S F-stat	22.62	19.87	16.16		
N	352	352	352	380	378
Controls		X	X	X	X
State FE			X	X	X

Standard errors clustered at the state level are included in parentheses. All components of per-capita federal spending in the district – defense and non-defense – dropped at 5% high and low. Endogenous regressor and instrument built from these values after extremes have been dropped. The reported first stage F-statistic is heteroskedasticity robust. Controls at the level of the congressional district include the lagged dependent variable from the 2012 U.S. elections, the 2-year lag of employment and the 1-year lag of changes in employment; 2006 personal income per capita; 2010 population and 2010 employment-to-population ratio; 2006 share of personal income from construction, finance, manufacturing and services; and the share of personal income to state and local government spending, to defense, and to non-defense federal spending in 2006. Controls also include Cook Partisan Voting indices at the state and district level constructed in 2012 and 2014 (each using voting patterns from the previous two presidential elections, i.e. 2004 and 2008, and 2008 and 2012, respectively).

* $p < .10$, ** $p < .05$, *** $p < .01$

Chapter 3

Procuring Pork: The Role of Contract Characteristics

Abstract: Despite the widespread belief that federal procurement contracts are susceptible to political influence, it is unclear how this would occur given the extensive regulatory infrastructure governing procurement spending, making it *ex-ante* more difficult to capture relative to the types of federal spending typically studied in the literature. In this paper, we first establish that high ranking House Appropriations subcommittee members exert political influence over procurement spending and propose two channels through which this may occur: direct influence, suggesting a breakdown of regulatory institutions, and legislator influence through choice over funded public goods. We develop a novel method to empirically test the relative importance of each channel, finding both are important. Furthermore, which mechanism dominates varies across subcommittees; this finding is particularly important given that each mechanism has differential implications for efficiency.

3.1 Introduction

U.S. federal procurement spending differs substantially from other types of federal spending both in terms of the nature of its interactions with the private sector economy, and in terms of the institutional features through which spending decisions are made. While non-procurement discretionary spending such as grants, loans, and personnel spending primarily crowd-out private sector activity, procurement spending also introduces positive externalities such as technology creation and scale production. At the same time, despite wide-spread perceptions that politicians influence which firms receive federal procurement contracts, in fact, U.S. legislators have far less control over how procurement funds are spent, compared to non-procurement expenditures. These two features of procurement spending motivate a distinct treatment of the political economy of procurement spending. In this paper, we seek to quantify the scope of political influence over federal procurement spending and illuminate the mechanisms through which political influence occurs.

First, we investigate the extent of political influence over the spatial distribution of federal procurement spending. For this part of our analysis, we follow the difference-in-differences empirical strategy of Berry and Fowler (2016), who measure congressional influence over federal non-procurement spending. We estimate the effects of gaining powerful Congressional positions, in particular committee membership and committee leadership positions, on procurement spending and the number of procurement contracts received by legislators' districts. The political science literature identifies authorizing committees and appropriations subcommittees as especially influential, since members of these committees negotiate annual federal budgets. To test the effects of gaining authorizing committee and appropriations subcommittee positions on district procurement spending, we create—by hand—a novel dataset mapping the universe of

unclassified federal procurement contracts signed between 2007 and 2015 to House and Senate authorizing committees and Appropriations subcommittees.[1] We find that gaining specific Appropriations subcommittee leadership positions dramatically changes federal procurement spending in that legislator's district.

Having established that powerful legislators influence the spatial distribution of federal procurement spending, we turn our attention to understanding the mechanisms through which they exercise this influence. U.S. federal legislators do not directly control which firms receive federal procurement contracts. Instead, Congress passes legislation funding programs that federal agencies subsequently execute. In particular, agencies retain exclusive responsibility for awarding procurement contracts through a highly-regulated vendor selection process that precludes direct political influence. We propose that if legislators cannot directly control where federal procurement spending occurs through vendor selection, they instead exert influence through their legislative prerogative over which programs to fund. In other words, if legislators gaining powerful positions are able to influence the location of contract performance for a fixed pool of contracts, this suggests a failure of the institutions designed to prevent political interference in the federal procurement process. On the other hand, if legislators influence the location of contract performance through their choices over which programs to fund, then political institutions distort the government's selection of public goods.

We develop a method to diagnose the channel of legislative influence over the location of procurement spending: do powerful legislators influence which vendors win contracts associated with a fixed pool of funded programs, or do they selectively fund programs based on the anticipated location of subsequent contract performance? Our differential diagnosis relies on a fundamental difference in how these channels operate.

[1] Mapping contracts to Appropriations subcommittees incidentally links individual contracts to specific appropriations legislation. This linkage could prove useful for other research purposes, such as exploring the economic effects of appropriations legislation timing.

In the first case, which we call type I influence, a contract for a particular good or service *will* be awarded, and the question is *where* the contract will land. In the conduct of type I influence, the greater the number of locations in which the contract can be performed, the greater the scope for political influence. In the second case, which we call type II influence, legislators cannot control *where* a given contract occurs, so instead control *whether* that contract exists by basing program funding decisions on the likely performance location of associated contracts. In the conduct of type II influence, the more precisely legislators can predict contract performance location, the greater the scope for political influence.

To make the distinction between these two types of congressional influence more concrete, consider two federal programs: the Army Operations and Maintenance program and the Navy Virginia-class Submarine program. To meet Operations and Maintenance program goals, the Army purchases a variety of commercial products, such as office supplies and uniforms, that could potentially be sold by vendors across a variety of locations. In contrast, there are only two vendors in the United States capable of building a nuclear-powered Virginia-class submarine—General Dynamics Electric Boat in Groton, Connecticut and Newport News Shipbuilding in Newport News, Virginia. If powerful legislators influence the Army's choice of vendors for office supplies and uniforms, this is type I political influence. If powerful legislators increase the budget for purchasing Virginia class submarines in order to increase spending in Groton and Newport News, this is type II influence.

We want our diagnostic method to classify the Army's contracts for office supplies and uniforms as type I contracts, and the Navy's contracts for nuclear-powered submarines as type II contracts. An observable difference between type I and type II contracts is the size of the pool of legislative districts in which a given contract could potentially be performed: type I contracts could be performed in many districts, while type II contracts

could be performed in few districts. We exploit this fact to index each federal contract according to the predicted size of the pool of districts that could potentially perform the contract, as measured by the Herfindahl index. Type I contracts occupy the low-concentration end of the index, and type II contracts occupy the high-concentration end. We then test whether the effect of powerful legislators on procurement spending is driven by type I or type II contracts.

We find that the effect of powerful legislators on procurement spending differs for type I and type II contracts, but the nature of the difference varies across Appropriations subcommittees. For some subcommittees, type I contracts drive the overall effect, and for other subcommittees, type II contracts drive the overall effect. We propose three possible sources of this heterogeneity across subcommittees. First, federal agencies in different Appropriations subcommittees' jurisdictions may vary in their susceptibility to type I versus type II influence. Second, the political use of a powerful legislator's influence over spending location might vary across subcommittees. For example, powerful legislators from some subcommittees might use their influence to redistribute spending from their districts to other districts to reward donors or other legislators. Third, our index might not adequately separate contracts into distinct "markets," and therefore under-predict market concentration for contract categories that are especially relevant for some subcommittees. This could result in our mis-attributing the source of political influence to type I contracts for those subcommittees.

Several papers in the public economics literature provide theoretical and empirical assessments of U.S. distributive politics. Weingast, Shepsle and Johnsen (1981) model the common pool problem arising from distributive politics: a political system in which the tax burden is spread broadly but the benefits of spending accrue locally tends towards spending levels exceeding the social optimum. Knight (2004) presents empirical evidence that U.S. legislators respond to common pool incentives, finding that the probability of a

legislator's support for a 1998 transportation bill is increasing in own-district receipt of project funds and decreasing in own-district tax burden. Aidt and Shvets (2012) extends the common pool theoretical model to examine the interaction of electoral incentives with distributive politics. They then empirically confirm the model's predictions: electoral incentives can exacerbate the extent of overspending from the common pool problem.

Our paper contributes to the literature by estimating the effects of powerful legislators on the spatial distribution of procurement spending, and by parsing out the mechanisms by which U.S. legislators exert this influence. We establish the susceptibility of federal procurement spending to influence by Appropriations subcommittee leadership, a result mirroring findings in Berry and Fowler (2016) of legislator influence over other types of federal spending. This result is surprising given institutional restrictions on the ability of legislators to directly control the location of federal procurement contract performance. We propose two channels through which legislators might exercise power: first, through influencing agencies' contracting choices, and second, through basing program funding decisions on the anticipated location of subsequent contract performance. We develop a novel method to test the importance of these channels, and find that both channels are relevant. We are not the first to propose that institutional features of the federal appropriations process might distort Congress's choice over public goods. Rogerson (1990) presents a principal-agent model of federal agencies' choice over budget requests to Congress, predicting a bias towards excessive investment in technologically advanced purchases. However, to the best of our knowledge, we are the first to find empirical evidence of such distortions.

Our finding that distributive politics affect Congress's program funding decisions implicates a form of inefficiency distinct from the common pool problem emphasized in the existing literature. In common pool models of distributive politics, Congress chooses inefficiently high levels of government spending. Our finding that legislators influence

agencies' contracting choices suggests that federal procurement contracting does suffer from this form of inefficiency; however, these common pool models still imply that regardless of the total level of spending, Congress funds programs with the highest net social marginal benefit. In contrast, politicized spending through program selection—for which we find evidence—implies that Congress's preference ranking of programs changes. Powerful legislators value the potential to influence contract performance location, so overweight the benefits of production spillovers from type II contracts. The inefficiency imposed by this type of politicized spending is not just a level shift of total spending, but a change in the relative ranking of programs. This distorts Congress's selection of public goods away from the social optimum in ways that are complicated, and potentially far more costly than simple level shifts of government spending.

3.2 Background

One way of viewing this paper is as measuring whether legislators influence the spatial distribution of federal procurement spending through their control over legislation establishing federal budgets, or by exerting pressure on agencies' vendor selection process. In this section, we present institutional knowledge to facilitate understanding of how these two channels would operate. We also clarify the distinctions between congressional control over federal procurement spending and other types of discretionary spending—a distinction motivating our specialized treatment of the political economy of federal procurement contracts.

3.2.1 The Appropriations Process

Congress must approve all federal spending, per the U.S. Constitution. Federal spending falls into two distinct categories—mandatory and discretionary spending—

according to the process by which congressional approval occurs. For discretionary spending programs, including programs resulting in procurement, grant, and personnel expenditures, congressional approval occurs through a two-step process that provides Congress annual control over the overall level of discretionary spending and the distribution of spending across discretionary programs.[2] This two-step process requires Congress to pass initial legislation authorizing the execution of discretionary programs, and subsequent annual legislation funding discretionary programs. This legislative process funds all federal procurement contracts, and thus represents Congress's most direct control over procurement spending.

The legislative process and sources of legislative power. Legislation originates in the House, and becomes law if the House and Senate both approve the legislation by majority vote, and if the President signs it. All proposed legislation is assigned to House and Senate committees for study, debate, and amendment prior to chamber-wide voting on the legislation. As discussed extensively in the political science literature on U.S. federalism, heterogeneity across legislators in political power derive in part from committee positions. Some committees are considered to be more powerful than others based on the importance of the legislative matters under their jurisdiction. Within committees, the committee chair and ranking minority party members hold additional power due to their control over committee agendas and processes. Committee membership and leadership are determined within each of the two major parties, based primarily on seniority within each party and seniority on each committee. Committee membership and leadership generally changes after elections, particularly when the parties change majority/minority status.

[2]For mandatory programs, spending is approved in the same legislation that creates the program, and Congress must change program legislation in order to change spending levels associated with the program. Most mandatory programs are transfers from the federal government to individuals, for example, social security. Annual spending levels are only indirectly controlled by Congress, since the government is obligated to fund benefits for all eligible recipients. Mandatory programs constitute approximately 55% of the total federal budget.

Authorizations and Appropriations. Congressional approval of U.S. discretionary programs is a two-step process. First, Congress passes legislation creating—that is, authorizing the existence of—a program. Many types of federal legislation can authorize programs, and authorizing legislation can emanate from a variety of congressional committees. Second, Congress passes appropriations legislation budgeting specific funding levels for authorized programs. Unlike program authorizations which can be scattered throughout different types of bills, only specific appropriations legislation can fund programs. Furthermore, while program authorization need not occur annually, program funding does occur through annual appropriations legislation. In addition to annual appropriations legislation, Congress might pass supplemental appropriation bills funding, for example, responses to unanticipated emergencies.

In contrast to authorizing bills, annual appropriations legislation conforms to a standardized structure. Federal government operations are partitioned across twelve separate appropriations bills, allowing separate negotiation and passage of budgets for different parts of the federal government. The House and Senate each have an Appropriations committee responsible for appropriations legislation, and these committees are divided into 12 subcommittees matching the appropriations bills. See the data appendix for Appropriations subcommittee jurisdictions across federal programs.

The appropriations process. The President submits a budget proposal to Congress by early February each year, which is based on an aggregation of agency budget requests as well as the President's policy priorities. Based on the President's proposal, the House and Senate jointly publish a budget resolution by April 15th specifying spending targets for each of the 12 appropriations categories. Appropriations committees and subcommittees in the House and Senate separately negotiate budget proposals, which the committees then submit to their respective chambers for passage by June. The chambers then negotiate reconciliation of the proposed House and Senate legislation, ideally submitting a

single piece of legislation for the president to sign by October 1st, the start of the fiscal year. More commonly, at least one of the 12 appropriations bills is not signed by October 1st, and Congress passes stop-gap funding legislation—a Continuing Resolution—to avoid the shut-down of unfunded operations. See Saturno and Lynch (2016) for a detailed description of the appropriations process.

Heterogeneity across appropriations lines in agency discretion. Appropriations legislation provides agencies budgets with which to execute authorized programs. The legislation specifies funding levels for each program, and these program appropriations line-items vary substantially in the discretion they grant agencies to determine how to spend program funding. For example, the 2014 Army Operations and Maintenance program appropriations line item, shown in figure 3.3 in the appendix, provides a $31 billion budget which the Army can spend on any expenses supporting 2014 Army Operations and Maintenance, as defined by the associated authorizing legislation. On the other hand, the 2014 Navy Shipbuilding and Conversion program appropriations line-item, shown in figure 3.4 in the appendix, budgets $3.1 billion specifically for the acquisition of Virginia class submarines, leaving agencies virtually no discretion over the expenditure of these funds. Finally, the 2014 National Parks Service appropriations line item, shown in figure 3.5 in the appendix, provides the agency an intermediate level of discretion, budgeting $2.2 billion for general expenses, $1 billion of which must be spend on Everglades restoration. In general, large research and development, systems procurement, and construction programs are funded by specific line items leaving agencies little discretion, while personnel and operating funds are provided through less restrictive line items.

3.2.2 The Federal Procurement Process

The existing theoretical and empirical literature on distributive politics applies less to the case of federal procurement contracts than it does to other types of federal spending due to distinct features of the federal procurement spending process. These features result in legislators having the incentive to capture procurement spending, but limited avenues through which to achieve this capture. In this section, we describe the institutional features of the federal procurement process relative to other types of federal spending that generate federal procurement's distinct political economy.

Types of discretionary spending. Within the category of federal discretionary spending are four sub-types of spending: procurement (40% of discretionary spending), grants (40% of discretionary spending), personnel (15% of discretionary spending), and other types of spending such as loans (5% of discretionary spending). Grants and loans are explicitly redistributive types of spending: the federal government provides local governments, individuals, and other public institutions, often funding local public goods (quintessential "pork"), such as the transportation projects studied in Aidt and Shvets (2012), or constitute direct transfers to individuals. From the perspective of the federal government, the spending associated with grants and loans *is* the public good. In contrast, goods and services purchased through the federal procurement process and personnel hired by the government are inputs into the production of public goods achieved through federal government operations (*e.g.* national defense). Economic spillovers associated with procurement and personnel spending are incidental to the acquisition of productive inputs, rather than being the central purpose of the spending.

Overview of spending processes for spending types. Reflecting the redistributive nature of grant and loan spending, Congress retains far more control over agencies' choice of recipients for spending in these categories. In the case of programs such as the transportation grants studied by Aidt and Shvets (2012), Congress specified the

location of the final public good funded by the grants—transportation infrastructure—and therefore specified the necessary location of spending. For other types of redistributive programs, Congress targets spending recipients by specifying beneficiary eligibility criteria. Critically, there are few statutory restraints on Congress' ability to target locations or recipient populations, as long as such targeting is categorical (and Constitutional) instead of personal.

Extensive regulatory infrastructure limits Congress's ability to direct procurement and personnel spending beyond Congress's choice over program budgets. These regulations intend to promote the economical acquisition of production inputs, with little regard to the spatial distribution of spending. We discuss the procurement regulatory process below. In the case of personnel spending, regulations promote an open hiring process, for example by requiring agencies to post vacancies to a publicly accessible website. Furthermore, salaries are fixed within narrow bands according to a position's occupational designation and an individual's tenure and experience level. This constraint on personnel salaries limits rents, so that personnel spending is likely a less ideal target for politicized spending.

The Federal Procurement Spending Process. Federal agencies manage procurements funded from their budgets according to a uniform federal procurement process specified by Federal Acquisition Regulation (FAR). The FAR aims to ensure the purchase of goods and services for the "best value to the government," and to this end, requires agencies to use procedures that promote competition and transparency. The FAR requires agencies to seek competitive vendor bids. Exceptions to these competition requirements must be justified and approved through a specific procedure. Agencies must announce unclassified procurements exceeding $25,000 to a centralized, publicly accessible web page. In the case of non-competed contracts, announcements identify recipient vendors. Bid solicitation documentation must clearly describe contract performance requirements

and bid evaluation considerations. Communication between government procurement officials and bidders are tightly regulated to ensure no vendor is advantaged with additional information. Losing bidders can request justification for their non-selection, and can appeal ("protest") the award decision to an agency-independent federal arbitrator. The federal government maintains a rigorous record-keeping and audit infrastructure to ensure agency compliance with federal procurement procedures. The government personnel signing contracts can be held criminally and financially liable for deviations from procurement regulations.

The stringency of federal procurement regulations severely limit the scope for powerful legislators to control the location of procurement contract performance through direct influence over agencies' vendor selection procedures.[3] Consequently, evidence of such influence suggests a systematic failure of procurement institutions to operate in accordance with their states goals.

3.3 Empirical Framework

3.3.1 Baseline Specification

We estimate the effects of committee membership and committee position on both the level of procurement spending in and number of contracts awarded to a given legislator's district. Our baseline specification mirrors that in Berry and Fowler (2016) and is given by

$$Proc_{it} = \beta \times CommitteePosition_{it} + \gamma_i + \delta_t + maj_{it} + sen_{it} + \varepsilon_{it}, \tag{3.1}$$

[3] In future work, we are interested in exploring potential vendor influence through reducing favored vendors costs through the use of state and local tax incentives as an alternative mechanism through which legislators might influence type I influence.

where $Proc_{it}$ is either log procurement spending per-capita or the number of contracts per-capita associated with legislator i's district in fiscal year t.[4] The $CommitteePosition_{it}$ variable takes a value of one if legislator i is on a given committee (or has a particular position within a committee, as explained below) in fiscal year t and zero otherwise; γ_i and δ_t are legislator and year fixed effects, respectively.[5] The variable maj_{it} controls for majority party status, while sen_{it} controls for the effects of seniority on contract spending in a district. *Ex-ante* these are important controls to include, particularly because changes in these variables often happen concurrently with changes in committee membership, though our results are quite similar with or without these controls. Standard errors are clustered at the state level.

This is a fairly straightforward difference-in-differences specification. Estimating (1) amounts to comparing changes in procurement spending in the districts of legislators who switch committee positions over time to changes in spending for those who do not change position.[6] Since we are employing a difference-in-differences approach, we require a parallel trends assumption. Here, that assumption is that legislators who change committee positions would have followed the same trend in procurement spending as those who did not change positions, had they not changed positions themselves. Our identification depends crucially on the validity of this assumption. We would not have grounds to interpret our estimates as representing a causal relationship if, for instance, changes in committee position were correlated with changes in procurement spending independent of the effect of gaining or losing that position. To use the example cited in Berry and Fowler (2016), our assumption would be violated if legislators systematically

[4] In specifications where the number of contracts per-capita is the dependent variable, we scale this variable by 100 to avoid the estimation problems associated with having variables that predominantly take values close to zero.

[5] The legislator fixed effects variable, γ_i, is reset if a the land mass of a legislator's district changes by more than 30% from one year to the next, *e.g.,* following the 2010 Census.

[6] This avoids the pitfalls of simply comparing legislators on and off various committees; see Berry and Fowler (2016) for further discussion.

join the Appropriations committee when their constituents begin demanding higher levels of spending. However, changes in committee position typically arise for reasons outside the direct control of individual legislators. This is particularly true for ranking minority members and chairs of Appropriations subcommittees, who often acquire these positions as the House majority party changes or those currently in power leave for various external reasons.[7]

Presuming the validity of the parallel trends assumption, in regressions where the log of per-capita procurement spending serves as the dependent variable, $\beta \times 100$ represents the percentage increase in per-capita procurement spending in a district caused by joining a given committee or acquiring a certain position within that committee. In those where the outcome variable is the number of contracts per-capita, β signifies the increase in contracts per-capita caused by joining a given committee or acquiring a certain position within that committee.[8] While the latter coefficients are a bit more difficult to interpret on their own, examining them in conjunction with statistics on congressional district populations allows for straightforward inference. As mentioned previously, we not only examine the effects of joining a congressional committee but also the effects of holding a particular position within a committee. Specifically, we look at the role of committee position for the various Appropriations subcommittees and accordingly, in these regressions the $CommitteePosition_{it}$ variable expands to a set of committee position variables, $CommitteePosition_{ijt}$, $j = 1 \ldots 6$, where the j subscript indexes the following committee position dummy variables: minority party Appropriations member, majority Appropriations member, minority subcommittee member, majority subcommittee member, ranking minority member and subcommittee chair.

[7] We are currently working on an event study in order to justify our assumption on empirical grounds.

[8] Recall that this variable will have already been scaled by 100 for technical reasons.

3.3.2 Contract Concentration Index

After establishing whether powerful legislators influence the location of federal procurement spending, we estimate the extent to which this political influence occurs through each of two possible channels. We design and build a contract concentration index to empirically answer the question: do powerful legislators influence which vendors win contracts associated with a fixed pool of funded programs (type I influence), or do they selectively funding programs based on the anticipated location of subsequent contract performance (type II influence)? To exert type I influence, the greater the number of locations in which a given contract can be performed, the greater the scope for political influence. To exert type II influence, the more precisely legislators can predict contract performance location, the greater the scope for political influence. Consequently, the size of the pool of legislative districts that could potentially perform a given contract provides a differential diagnosis for contract susceptibility to type I and type II political influence.

We partition the sample of federal contracts into cells based on contract characteristics representing program-level features that would have been knowable to Congress during the appropriations process, and that we think explain variation in the the size of the pool of districts that could potentially perform the contract. We then calculate the Herfindahl index for each cell,[9] so that cells with low index values are more likely to contain type I contracts, and cells with high concentration values are more likely to contain type II contracts.[10] Finally, as explained in the next section, we assess the extent to which political influence over federal procurement spending is driven by contracts in

[9] We drop cells containing fewer than ten contracts

[10] This approach complements an alternative approach we are developing, which interprets the timing of stock-price movement for government contractors as an indication of whether news about appropriations legislation or contract award announcements carry more information regarding the identity of eventual contract recipients. The two indexes distinguish between the same two potential mechanism of political influence over procurement spending, so should provide similar results for contracts falling within both samples. A benefit of the Herfindahl index approach presented in this paper is that it covers a wider variety of contracts than the stock-based approach.

the lowest or highest extremes of our concentration index—that is, by type I or type II contracts.

We partition contracts based on characteristics that we think generate heterogeneity in the extent to which the location producing the purchased good or service is *ex ante* predictable using information conceivably available to Congress during the appropriations process.[11] The contract characteristics we incorporate are: (1) whether the contract is for a commercial item; (2) whether the contract is competed or sole-sourced, and if sole-sourced, the justification for sole-sourcing; (3) The anticipated contract value, split into 3 bins: between $0 and $500,000, between $500,000 and $5,000,000, and above $5,000,000;[12] and (4) a proxy for the type of appropriation legislation funding contracts: regular annual, supplemental for war, and supplemental for emergency response. The interaction of these categories generates 144 cells. See the data appendix for a description of each cell, the number of contracts, and the Herfindahl index for in each cell. Finally, we treat contracts for construction, real estate, and utilities separately, because these contracts typically derive from line-item appropriations, and location of contract performance is identified in the funding appropriations legislation. In other words, these are quintessential type II contracts, but finding contract characteristics to isolate these contracts into distinct cells is an extremely labor intensive task. We treat these contracts as a 145th cell which we manually assign the highest value of our concentration index.

By several measures, our contract concentration index achieves its intended goals. First, our cell partitioning provides a reasonably dispersed distribution over Herfindahl index values. Figure 3.1 shows the distribution of cells across congressional district-level Herfindahl index values, and figure 3.2 shows the distribution at the state level. Both distributions skew left, but there is support up to a maximum value of .38 for

[11] In this version of the paper, we manually select contract characteristics to generate the desired heterogeneity. We are developing a data-driven characteristic selection method.

[12] Value bin endpoints are approximate dollar thresholds across which procurement regulations relevant to vendor selection vary.

congressional districts and .66 for states. Second, correlations between cell's index values and characteristics accord with our economic-based intuition: table 3.1 shows the summary statistics across cells for the contract features distinguishing cell types, and table 3.2 shows how Herfindahl values vary with these distinguishing contract features. Concentration is lower for competed cells than sole-sourced cells, lower for cells with contracts purchasing commercial items rather than custom items (conditional on contract value), and lower for low valued contracts. These results suggest that contract features knowable prior to contract award predict the size of the pool of districts that could potentially perform a contract—a pre-requisit for type II influence—and we have assigned contracts to cells based on useful contract characteristics.

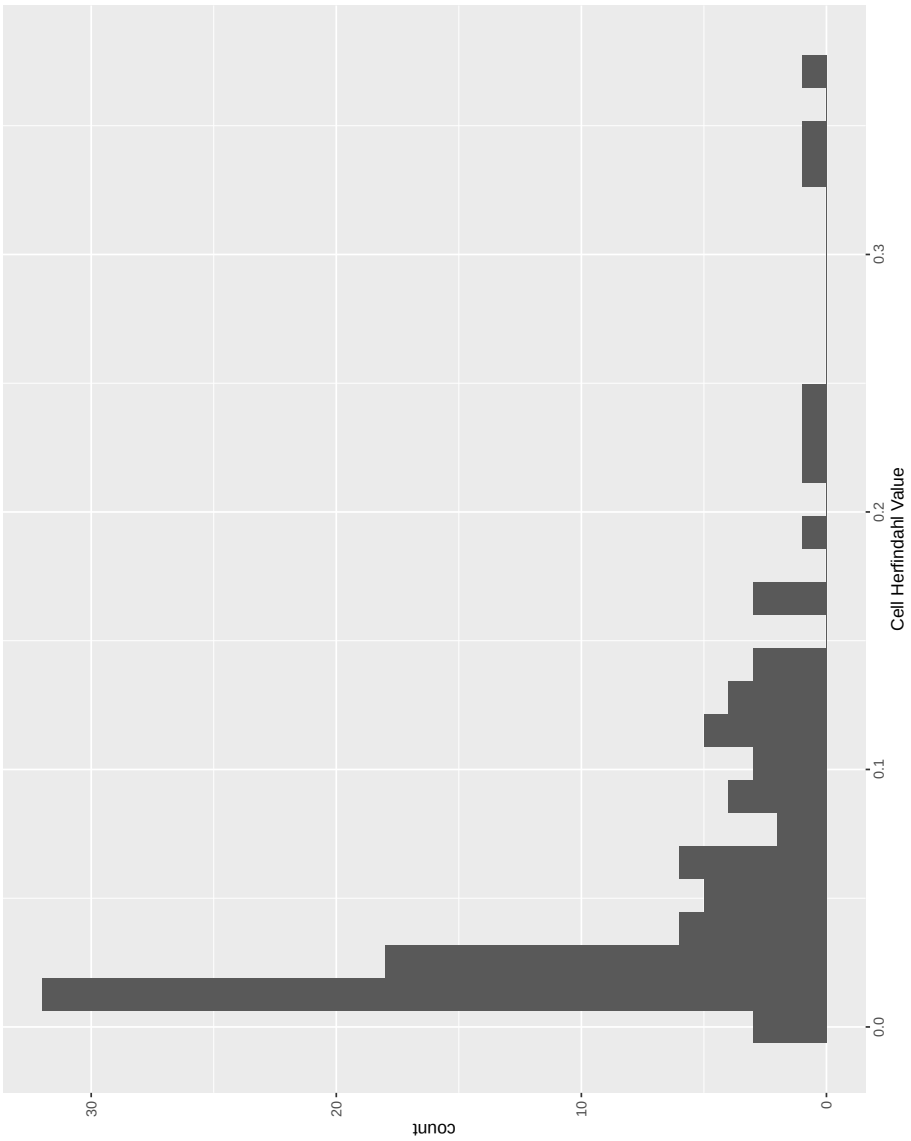

Figure 3.1: Distribution of Cell Concentration of Congressional Districts

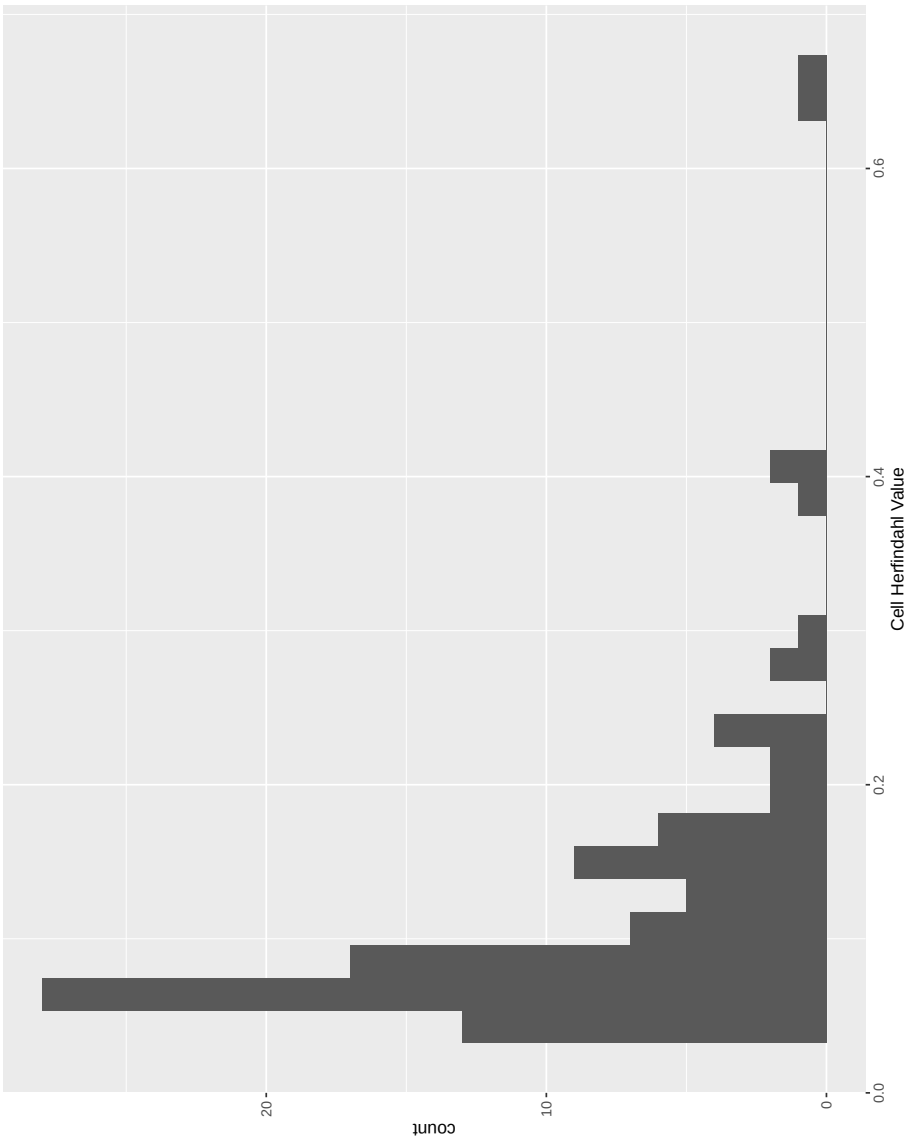

Figure 3.2: Distribution of Cell Concentration of States

Table 3.1: Herfindahl Index Summary Statistics

	mean	sd	min	max
House Herfindahl	.064	.074	.0039	.38
Senate Herfindahl	.12	.11	.04	.66
Cell Size	237,656	1,262,319	12	9,587,132
Low Spending Bin (below $500,000)	.41	.49	0	1
High Spending Bin (above $5 million)	.21	.41	0	1
Competed	.32	.47	0	1
Commercial Item	.5	.5	0	1
Regular Annual Appropriation	.46	.5	0	1
Supplemental Appropriation for Overseas Military	.26	.44	0	1
Observations	101			

Table 3.2: Assessment of Herfindahl Index

	House			Senate		
	(1)	(2)	(3)	(4)	(5)	(6)
Cell Size	-6.68e-09***			-1.02e-08***		
	(1.44e-09)			(2.17e-09)		
Low Spending Bin (below $500,000)		-.0524***			-.0543***	
		(.0123)			(.0194)	
Competed		-.0333***			-.0263	
		(.0117)			(.0199)	
Commercial Item		.00899	-.0000949		-.00351	-.0132
		(.0122)	(.0166)		(.019)	(.025)
Regular Annual Appropriation		-.0763***			-.099***	
		(.0126)			(.0191)	
High Spending Bin (above $5 million)			.00165			.00293
			(.0194)			(.0288)
Commercial Item, High Spending Bin			.0338			.0359
			(.0376)			(.0483)
Constant	.0652***	.126***	.06***	.127***	.202***	.127***
	(.0076)	(.0151)	(.0102)	(.011)	(.0264)	(.0183)
Adj R-squared	.0029	.34	-.01	.0044	.22	-.019
N. of Obs.	101	101	101	101	101	101

Heteroskedasticity Robust Standard Errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

3.3.3 Testing for Heterogeneous Effects

By augmenting our baseline specification slightly so as to incorporate the findings from our contract concentration index, we are able to test for differential effects by contract type. To reiterate a point made above, this exercise is motivated by two things. First, it is reasonable to suppose that not all spending is capturable. If we wish to know whether or not committee position affects spending, the relevant question is whether or not committee position *affects spending that is capturable.* Second, conditional on finding effects of committee position, it allows us to shed light on the mechanisms by which this is occurring—for example, whether or not program creation is the source of political influence (type II) or if instead, goods and services that would have been produced anyways in some other district now get relocated to a committee member's district (type I influence).

We use the index as follows. First, we rank contract cells by their Herfindahl index value, where higher numbers correspond to more concentrated contract types and lower numbers align with more widely distributed contract types. Lower values hence proxy for the types of contracts that *ex-ante* are more susceptible to type I influence, while higher values proxy for contracts more susceptible to type II influence. We then divide contract cells into terciles based on index values and re-construct the dependent variables in our baseline specification—procurement spending and number of contracts—by index tercile. Our estimating equation becomes

$$Proc_{ikt} = \beta_k \times CommitteePosition_{it} + \gamma_i + \delta_t + maj_{it} + sen_{it} + \varepsilon_{it}, \qquad (3.2)$$

where all variables are defined as before and $k = 1,2,3$ indexes the tercile of spending according to our index. The interpretation of β_k, the coefficient of interest, is the same as in the baseline specification, though now we allow this coefficient to differ across index

terciles.

Recall that we are interested in how our coefficient estimates change across the highest and lowest terciles of our index and if these coefficients are significantly different from each other. Thus, following estimation of the effect of committee position on procurement spending from the top and bottom index terciles, we combine our results into a Seemingly Unrelated Regression Equations (SURE) system, which enables us to calculate a robust covariance matrix capturing correlations across equations. This is then used to test cross-equation restrictions on the equality of parameters via simple Wald tests.

3.4 Data

We obtain U.S. federal contract data from the U.S. government's public-access spending database USASpending.gov.[13] USASpending.gov contains the universe of approximately 46 million unclassified federal contract actions over $3,000 signed since 2007. We map contracts to the congressional district and state the vendor reports as the location of predominant contract performance. We also use contract data fields in the construction of our contract concentration index. See the data appendix for more details. A novel contribution of our paper is our mapping of every posted contract action issued since 2007 to the Appropriations subcommittee and authorizing committee responsible for negotiating that contract's funding legislation. We accomplish this by matching contract agency and sub-agency identifiers to Appropriations subcommittee jurisdictions based on label similarity. See the data appendix for Appropriations subcommittee jurisdictions. In many cases, contract and subcommittee jurisdiction labels do not match *verbatim*. Therefore, we define three assignment variables based on our confidence in

[13] https://www.usaspending.gov/

match accuracy. The lowest level accepts only *verbatim* matches, but does not map all contracts to a subcommittee. The highest level matches all contracts but likely contains incorrect matches. In our analysis, we use the intermediate level, which assigns contracts based on *verbatim* or close to *verbatim* matches.[14] While Appropriations subcommittees have strictly defined jurisdictions over federal programs, authorizing committees do not. We assign a committee as the companion authorizing committee to an Appropriations subcommittee based on similarity of the committee description provided on official committee web pages with appropriations subcommittee jurisdictions. See the data appendix for our assignment of authorizing committees to Appropriations subcommittees. Finally, we identify contracts as construction, real estate, or utilities based on the six-digit NAICS code, and we classify a construction contract as "Milcon" (Military Construction), if it is a construction contract issued by the Department of Defense with a value exceeding $1 million (the highest value for which financial regulations permit the use of Operations and Maintenance funds for construction).

We obtain House and Senate membership, committee membership, committee leadership, and legislator demographic data from Charles Stewart's Congressional Data Page and Kieth Poole's Interuniversity Consortium for Political and Social Research (ICPSR) weg page. We hand code membership on Appropriations subcommittees and identify subcommittee chair and ranking members using official government data sources. For the Senate, we use Senate Committee and Subcommittee Assignments reports. For the House, we use the Standing Committees of the House report published with each Congress' Congressional Directory.[15] The Senate records are published at every change in subcommittee membership, and therefore we update our data with intra-Congress change. However, the House records are only published once per Congress. Therefore,

[14] Our contract-to-Appropriations subcommittee crosswalk table is available upon request.

[15] Both Senate and House data are available online through the Government Publishing Office, https://www.gpo.gov/

we do not account for all intra-Congress changes in House subcommittee assignments.

Because Congressional negotiations in a given year result in appropriations legislation funding contracts the next year, we link contracts performed in each district each year to the legislator representing that district the previous year. Furthermore, in order to arbitrate situations in which there is not a single unique district representitive due to events such as resignations and special elections, we assign legislators to committee positions they hold on April 1st of each year, since the legislative budgeting process starts in April.

Finally, we obtain annual state population data from U.S. Census Bureau 2000-2010 State Intercensal Tables and 2010-2016 State Population Estimates. We identify the number of congressional districts in each state each year using The U.S. Census Bureau Apportionment tables for 2000 and 2010. Federal law requires states to draw congressional district boundaries to ensure approximately equal population for all districts within a state. Therefore, we divide state population by the number of apportioned representatives to estimate annual congressional district populations. We use the Missouri Census Data Center's MABLE Geographic Correspondence Engine to generate a crosswalk between 111th and 113th congressional districts in order to determine whether congressional districts substantially change boundaries during post-2010 census redistricting.

3.5 Results

3.5.1 Baseline

This section presents results from estimating equation (1), where the dependent variable is either the log of procurement spending per-capita or the number of contracts

per-capita in district *i* associated with a particular Appropriations subcommittee. The subcommittees we examine are Agriculture, Commerce, Defense, Energy, Homeland Security, Housing, Interior, Labor, Military Construction and Transportation.[16] The committee position variables are as defined in the empirical framework section detailing our baseline specification. Restricting the analysis to subcommittee-specific outcome variables and this particular set of regressors is motivated by Berry and Fowler (2016), who find that the effects of committee position are concentrated among the ranking minority members and chairs of the various Appropriations subcommittees for the spending relevant to their respective subcommittees. We focus our attention on the House of Representatives for a number of reasons. First, doing so allows us to capitalize on the granularity of our procurement spending data. Second, doing so increases statistical precision due to the greater number of changes in committee position that occur in the House as a product of institutional differences with the Senate. Lastly, it is unclear how one would interpret Senate committee results on state spending when there are multiple legislators representing the same geographic area. In the appendix, we include corresponding results for the Senate as well as results on the effects of membership on a wide range of committees on total and committee-specific spending and number of contracts in a district or state for both the House and Senate. Consistent with Berry and Fowler (2016), we find largely no effects of committee membership in these specifications.[17]

Table 3 presents summary statistics, while tables 4 and 5 present results for spending and number of contracts, respectively. In these baseline results on spending, we find that becoming the ranking minority member or chair of an Appropriations

[16]We exclude the Financial Services and Foreign Operations subcommittees from our analysis since there is not much contract spending under the jurisdiction of these subcommittees that can be matched to individual congressional districts in our sample.

[17]Once more, this is somewhat surprising given how procurement spending differs from the spending examined in Berry and Fowler (2016). We do, however, find slightly different results than Berry and Fowler in Senate regressions analogous to what is reported here for the House; differences in the types of spending being studied across our two studies is a likely explanation.

subcommittee generally changes own-district spending. However, the direction and magnitude of these results vary by Appropriations subcommittee. Interestingly, most of the coefficients on gaining a chairmanship are positive, while most of the coefficients on gaining a minority ranking position are negative.

The statistically significant effects we find are economically substantial. For example, the coefficient of 1.374 found in table 4 for the chair of the Military Construction subcommittee implies that becoming the chair of that subcommittee induces a 137.4% increase in per-capita procurement spending in the chair's district relative to the counterfactual of that same legislator not having become the chair of the subcommittee. In interpreting our results for the number of contracts, it is useful to bring in congressional district population statistics. Average district population in our sample is 714,562; the minimum is 526,226 and the maximum is 1,032,073. These imply that the becoming the ranking minority member of the Military Construction subcommittee, which has a coefficient of 0.227, increases the number military construction-related contracts received by 1,622 for a district of average size, with the increase in the number of contracts ranging from 1,195 to 2,342 depending on district population.[18]

[18]These numbers seem unreasonably large and may be driven by outliers; in subsequent versions of this paper we will estimate this specification by taking logs of the dependent variable. We did not do that here due to concerns arising from this variable taking values close to zero.

Table 3.3: Summary Statistics

Subcommittee	Spending (mean)	Spending (SD)	Contracts (mean)	Contracts (SD)
Agriculture	15.36	43.11	0.00900	0.0140
Commerce	70.00	285.8	0.0360	0.0870
Defense	881.1	2671	0.490	1.616
Energy	78.10	432.9	0.00300	0.00900
Financial	37.17	141.6	0.0620	0.312
Homeland Security	34.62	161.2	0.0130	0.0220
Interior	17.99	41.42	0.0230	0.0490
Labor	74.92	329.5	0.0130	0.0710
Military Construction	128.4	1994	0.0960	0.331
Transportation	17.80	76.04	0.00300	0.00700
Total	1386.298	2457.259	0.0075859	.0176543

All variables are per-capita.

Table 3.4: House Appropriations Committees and Outlays

Subcommittee	Minority Appropriations Member	Majority Appropriations Member	Minority Subcommittee Member	Majority Subcommittee Member	Ranking Minority Member	Subcommittee Chair
Agriculture	-.012 (.265)	-.488 (.277)	-.382 (.411)	-.161 (.285)	-.730 (.265)**	-1.716 (.783)*
Commerce	-.023 (.204)	.062 (.177)	-.559 (.421)	.412 (.293)	-.095 (.200)	.211 (.236)
Defense	.034 (.124)	.093 (.132)	-.107 (.138)	.050 (.159)	-.098 (.115)	.499 (.321)
Energy	.335 (.385)	.629 (.372)	.590 (.406)	.609 (.403)	-.999 (1.372)	.921 (.394)*
Financial	.245 (.236)	.073 (.181)	.264 (.426)	-.021 (.272)	.976 (.278)**	.237 (.251)
Homeland Security	.249 (.318)	.176 (.307)	.462 (.451)	-.292 (.402)	-.060 (.595)	1.088 (.322)**
Interior	.365 (.218)	.374 (.178)*	.062 (.126)	.539 (.213)*	-.297 (.399)	.407 (.184)*
Labor	-.071 (.220)	-.088 (.210)	-.678 (.489)	-.013 (.223)	-.343 (.346)	-.388 (.629)
Military Construction	.206 (.259)	-.066 (.220)	.125 (.397)	.085 (.354)	-1.054 (.539)	1.374 (.502)**
Transportation	-.314 (.319)	-.178 (.298)	.134 (.448)	.037 (.494)	.685 (.463)	-1.101 (.515)*
Pooled	.098 (.099)	.048 (.104)	-.010 (.142)	.136 (.113)	-.180 (.217)	-.056 (.318)

Clustered standard errors in parentheses. ** and * indicate coefficients statistically different from zero at the 0.05 and 0.10 levels, respectively.

Table 3.5: House Appropriations Committees and Number of Contracts

Subcommittee	Minority Appropriations Member	Majority Appropriations Member	Minority Subcommittee Member	Majority Subcommittee Member	Ranking Minority Member	Subcommittee Chair
Agriculture	.000 (.001)	.000 (.001)	.006 (.003)	-.001 (.001)	-.001 (.001)	.000 (.001)
Commerce	-.004 (.009)	-.001 (.004)	-.005 (.006)	.000 (.006)	-.029 (.034)	.004 (.044)
Defense	.094 (.123)	.058 (.124)	-.031 (.322)	.061 (.168)	-.138 (.185)	2.815 (2.089)
Energy	-.001 (.000)	.000 (.001)	.000 (.001)	-.001 (.000)	.000 (.001)	.003 (.002)
Financial	.014 (.025)	-.010 (.022)	.021 (.035)	.007 (.015)	.033 (.028)	-.019 (.017)
Homeland Security	-.001 (.003)	.000 (.002)	.000 (.002)	.001 (.002)	-.002 (.002)	.007 (.003)*
Interior	.004 (.004)	.001 (.002)	-.001 (.002)	.009 (.009)	-.040 (.044)	.003 (.003)
Labor	-.003 (.004)	-.004 (.005)	-.007 (.004)	.003 (.008)	-.001 (.004)	-.004 (.005)
Military Construction	.100 (.031)**	.009 (.039)	-.047 (.081)	-.028 (.062)	.227 (.079)**	.133 (.064)*
Transportation	.000 (.001)	.000 (.001)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.001)
Pooled	.022 (.011)	.005 (.016)	-.006 (.046)	.005 (.018)	.002 (.027)	.185 (.192)

Clustered standard errors in parentheses. ** and * indicate coefficients statistically different from zero at the 0.05 and 0.10 levels, respectively.

Overall, then, we find that serving as the ranking minority member or chair of an Appropriations subcommittee can have significant effects on spending and contracts, but this effect is not universal across ranking members and chairs, nor does it extend to general membership of the committee. There are a few items worth highlighting before we move to the next section of the paper. First, finding significantly negative results here is plausible for a number of reasons. It is often implicitly assumed that, all else equal, legislators want to bring more money to their districts—but there may be political considerations that push this in the opposite direction. For example, legislators may want to reward past campaign donors or entice potential future contributors with rents from procurement contracts, and these entities may lie in districts outside the legislator's own. Similarly, own-district procurement spending could be used as a bargaining chip in intra-Congress negotiations in a variety of ways. Second, and more importantly, these findings motivate our contract concentration index in a couple of key ways. One is that, conditional on finding significant effects here, we seek to identify the mechanisms by which these effects are occurring. Incorporating the index will allow us to get a sense of whether the production of a fixed set of goods and services is being relocated, or, whether these effects are coming via program selection. Our results for the number of contracts will be useful in providing auxiliary evidence on this point. Another is that any null results we find here do not imply that there are no effects of committee position on certain *types* of contracts. If a substantial portion of spending in our sample includes noise stemming from contracts not subject to capture, we may find null results here that mask true underlying effects on the subset of contracts relatively more susceptible to capture. We want to know whether or not this is the case, and if it is, what types of contracts are relatively more capturable.

3.5.2 Heterogeneity Across Contract Types

We now turn to the results we obtain when we incorporate our contract concentration index into the empirical model. These results, displayed in tables 6 and 7, stem from estimating equation (2) above for the first and third terciles of concentration according to our index. While the regression equations estimated here are the same as those reported in the baseline results section—albeit estimated separately for spending and contracts in the top and bottom terciles—the manner in which we report these results differs from the previous section. Here, we include coefficient estimates only for the ranking minority member and chair of each Appropriations subcommittee, as these are the empirically relevant positions of power. (L) denotes estimates from contracts comprising the lowest tercile of the index, while (H) indicates those from contracts in the highest tercile. Columns containing p-values refer to the p-values obtained from Wald tests of coefficient equality across the top and bottom terciles; (R) represents test results for ranking minority member coefficients and (C) signifies the corresponding tests for subcommittee chair coefficients.[19] Full results across all committee positions are included in the appendix.

Our findings for spending and the number of contracts are included in tables 6 and 7, respectively. We organize the discussion of these results according to the two statements from the previous section motivating our use of the index; we begin with the first of these statements: conditional on finding significant results in the baseline analysis, the index allows us to parse out whether the results we find accord more closely with type I or type II influence. In our set of baseline results, we found a significant positive effect of being the chair of the Military Construction subcommittee on procurement spending. Examining table 6, we see that this effect is coming predominantly via concentrated contracts, which is suggestive of program creation—type II influence—occurring. This

[19] Prior to running the Wald tests, we combine our regression results into a SURE system in order to calculate a robust covariance matrix used in executing these tests.

conclusion is bolstered by the corresponding result in table 7, which shows that it is indeed the case that the chair of this subcommittee receives a significantly higher number of concentrated contracts.[20] We also found earlier that becoming the chair of the Homeland Security subcommittee leads to higher corresponding procurement spending in that representative's district. The spending results in table 6, with a coefficient of 1.67 for the bottom tercile and 0.7 for the top tercile suggest that this effect is coming primarily through less-concentrated (type I) contracts. Table 7 allows us to infer that it is not being driven by an increase in the number of contracts awarded to vendors in these districts. This leaves us with the conclusion that the average value of less-concentrated contracts must be increasing in the Homeland Security subcommittee chair's district upon becoming chair—the type I mechanism. Our earlier result for the Agricultural subcommittee seems to be driven by both more- and less-concentrated contracts, suggesting both mechanisms operate within this subcommittee.[21,22]

Finally, we address the second motive for our use of the contract concentration index, which was that any null results we find in the baseline model do not imply that there are no effects of committee position on particular types of contracts if there are substantial amounts of noise introduced into our sample by uncapturable contracts. In the preceding section we found no significant procurement spending effects of attaining the position of ranking minority member on either the Energy or Homeland Security subcommittees. Presently, we find significant effects on less-concentrated (type I) contract

[20] It is worth noting that the effect on the number of less-concentrated contracts is greater than and statistically different from the effect on more-concentrated contracts, though this effect is not statistically significant on its own.

[21] As discussed above, finding a significantly negative effect on spending is plausible for a number of reasons.

[22] Analyzing the mechanisms underlying the Financial subcommittee result proves more difficult. The increase in spending accompanying becoming the ranking minority member of the subcommittee does not seem to be particularly driven by spending associated with more-or less-concentrated contracts, nor in increases in the number of either of these types of contracts. The baseline finding could be driven by moderately concentrated contracts—those occupying the second tercile of our index—and results for this tercile are not included in this analysis.

spending for both, neither of which are driven by a corresponding shift in the number of less-concentrated contracts awarded to each district. This tells us that the average value of less-concentrated contracts changes, on average, upon becoming the ranking minority member of these subcommittees. We also find significantly differential effects on more-concentrated (type II) and less-concentrated contracts for the ranking minority members of the Commerce, Military Construction and Transportation subcommittees and for the chairs of the Defense and Transportation subcommittees. The significant increase in the number of less-concentrated contracts for the chair of the Defense committee is particularly notable due to defense spending comprising approximately half of all federal procurement spending.[23] Once more, any negative effects are tenable for several reasons we mention above; disentangling which of these forces are driving the negative results we observe is outside the scope of this paper, but is a promising area for future research. What we want to emphasize is that prior work finding an absence of effects of committee position on spending may have failed to identify the significant influence exerted over the portions of spending susceptible to capture.

[23] In our baseline results, the coefficient for the chair of the Defense subcommittee in the number of contracts specification was large in magnitude, though imprecisely estimated.

Table 3.6: House Appropriations Committees and Outlays: Lowest vs. Highest Terciles

Subcommittee	Ranking (L)	Ranking (H)	p-value (R)	Chair (L)	Chair (H)	p-value (C)
Agriculture	-.906 (.305)**	-.905 (.360)*	0.997	-1.332 (1.027)	-.972 (.376)*	0.682
Commerce	-.560 (.302)	.656 (.369)	0.003	.383 (.411)	.799 (.426)	0.485
Defense	-.413 (.180)*	-.156 (.637)	0.688	.385 (.405)	.373 (.327)	0.973
Energy	-1.062 (.248)**	.000 (.000)	0.000	.575 (.322)	.396 (.769)	0.783
Financial	.461 (.241)	.788 (.399)	0.400	.582 (.286)*	.008 (.305)	0.103
Homeland Security	1.948 (.581)**	-.394 (.442)	0.001	1.674 (.519)**	.773 (1.038)	0.435
Interior	-.722 (.242)**	-.220 (.582)	0.258	.139 (.196)	.221 (.342)	0.816
Labor	-1.189 (.554)*	-1.108 (.728)	0.936	-.778 (.796)	-.177 (.487)	0.523
Military Construction	.638 (.291)*	-.723 (.530)	0.008	.123 (.366)	2.972 (.404)**	0.000*
Transportation	-.328 (.915)	1.800 (.790)*	0.008	-.857 (.426)*	.092 (.434)	0.017

Clustered standard errors in parentheses. ** and * indicate coefficients statistically different from zero at the 0.05 and 0.10 levels, respectively.

Table 3.7: House Appropriations Committees and Number of Contracts: Lowest vs. Highest Terciles

Subcommittee	Ranking (L)	Ranking (H)	p-value (R)	Chair (L)	Chair (H)	p-value (C)
Agriculture	.000 (.001)	.000 (.001)	0.622	.000 (.001)	.000 (.001)	0.805
Commerce	-.006 (.011)	.001 (.001)	0.381	-.001 (.024)	.004 (.002)	0.769
Defense	.013 (.114)	.015 (.022)	0.981	.870 (.485)	-.006 (.018)	0.031
Energy	.000 (.000)	.000 (.000)	0.724	.000 (.001)	.000 (.000)	0.411
Financial	.016 (.020)	.015 (.018)	0.927	.009 (.013)	-.015 (.011)	0.145
Homeland Security	-.002 (.002)	.000 (.001)	0.358	.004 (.003)	.000 (.000)	0.138
Interior	-.021 (.018)	.001 (.005)	0.055	.000 (.001)	.004 (.001)**	0.000
Labor	.000 (.002)	.000 (.001)	0.444	-.001 (.002)	-.001 (.001)	0.601
Military Construction	.234 (.085)**	.000 (.001)	0.001	.143 (.070)*	.002 (.000)**	0.018
Transportation	.000 (.001)	.000 (.000)	0.963	.000 (.000)	.000 (.000)	0.012

Clustered standard errors in parentheses. ** and * indicate coefficients statistically different from zero at the 0.05 and 0.10 levels, respectively.

3.6 Conclusion

In this paper, we seek to understand the political economy of federal procurement spending. Procurement spending differs from other types of discretionary federal government spending studied in prior work—grants, loans and personnel—in important ways. Furthermore, we propose that legislator influence over procurement spending—if it were to occur—would take on one of two forms. Assuming proper contracting protocol is being followed, legislators may strategically guide the types of programs funded by the federal government towards those likely to land in their own districts. We refer to this as type II influence. Alternatively, there could be a breakdown in the contracting process that results in the production location of a fixed set of goods and services systematically moving to the districts of powerful committee members. Assuming a fixed budget constraint, this would imply substitution in production across districts; we call this type I influence.

Guided by the prior literature, we begin our analysis by testing for the effects of joining the Appropriations committee and attaining positions of influence in its various subcommittees on procurement spending in and the number of contracts awarded to districts governed by these legislators. Next, we construct a contract concentration index to test for differential effects across contract types. Less-concentrated contract types reflect goods and services that can be produced in a wide range of locations, while more highly-concentrated contracts reflect projects whose production locations are more likely to be known *ex-ante*, conditional on funding. The former set of contracts are more susceptible to type I influence, while latter are more susceptible to type II influence.

Consistent with prior work examining federal non-procurement spending, we find significant effects on procurement spending of becoming either the ranking minority member or chair of select Appropriations subcommittees, though these effects are not

pervasive across all subcommittees. This is surprising, given the institutional differences between the procurement spending we study and the other types of federal government spending that serve as the focus of related work. However, the bulk of our contribution lies in answering the following two questions. First, given our finding that procurement contracts are susceptible to political influence, what is the mechanism by which powerful legislators exert this influence? Second, does our index more precisely target contracts susceptible to political influence and allow us to identify capture not otherwise measurable?

The answer to the first of these questions is that both type I and type II influence are present, and the relative dominance of one over the other differs across subcommittees. To take one of our findings, we show that the significantly higher level of procurement spending that accompanies becoming the chair of the Military Construction subcommittee is driven by an increase in concentrated contract spending via greater numbers of these contracts being awarded to the chair's district—type II influence. Regarding the second question, we document that it is indeed the case that noise in the spending data hides the influence of subcommittee position on capture of a subset of contracts for a number of subcommittees, though we still find no effects for the majority of subcommittees. We believe that this complication may underlie some of the null results in previous literature that finds largely no effects of committee membership and position on pork.

There remain a number questions yet to be answered. While we find different mechanisms at work in different subcommittees, we have not uncovered why this is so. We proposed several possible explanations for the negative and significant effects we find for certain Appropriations subcommittees; distinguishing between these hypotheses would prove a valuable contribution to the understanding of these political economy phenomena. Lastly, as we mentioned at the beginning of the paper, the implications of type I and type II influence for efficiency loss differ starkly. In the presence of type I

influence, the production of goods and services does not take place where marginal costs are lowest; however, due to potential differences in the marginal benefits of procurement spending across districts, the effects on welfare are ambiguous. Under type II influence, however, goods and services are produced that otherwise would not have been. So long as all districts cannot produce all goods and services—and in particular, those that have the highest marginal benefits—there will be deadweight loss. Quantifying the welfare effects of observed levels of type I and II influence would be a fruitful avenue for future research.

Chapter 3, in part, is currently being prepared for submission for publication of the material. Roer, Elizabeth A; Johnson, Grant E. The dissertation author was the primary investigator and author of this material.

3.7 Appendix A: Additional House Regressions

Table 3.8: House Committees and Pork

Committee	Spend	Count
Agriculture	-.004 (.077)	-.057 (.089)
Appropriations	.109 (.117)	.091 (.135)
Armed Services	-.127 (.095)	-.049 (.095)
Benghazi	.001 (.118)	.188 (.190)
Budget	-.134 (.055)*	.014 (.071)
Deficit	.411 (.187)*	.473 (.139)**
Economic	.177 (.122)	.211 (.383)
Energy	.026 (.108)	-.091 (.074)
Ethics	.001 (.128)	.155 (.103)
Financial	-.033 (.095)	-.146 (.107)
Foreign	-.078 (.116)	-.022 (.114)
Global Warming	.100 (.095)	-.006 (.191)
Homeland Security	.080 (.060)	-.125 (.107)
House Administration	-.205 (.103)	-.065 (.374)
Intelligence	.016 (.074)	-.045 (.058)
Judiciary	-.186 (.095)	-.077 (.084)
Labor	.081 (.073)	.133 (.191)
Library	-.112 (.107)	-.209 (.163)
Natural Resources	-.008 (.062)	.037 (.070)
Oversight	.034 (.099)	.089 (.149)
Printing	-.031 (.106)	-.117 (.277)
Rules	-.001 (.136)	.034 (.177)
Science	-.083 (.104)	-.127 (.157)
Small	.049 (.162)	-.031 (.107)
Standards	.123 (.192)	-.106 (.144)
Taxation	-.190 (.243)	1.095 (1.060)
Transportation	.113 (.129)	-.169 (.061)**
Veterans' Affairs	-.055 (.081)	.070 (.142)
Voting	-.071 (.111)	-.235 (.196)
Ways and Means	-.099 (.095)	.120 (.060)*

Table 3.9: House Approp. Committees and Pork Across Policy Domains

Subcommittee	Dollars (SD)	Spend	Count
Agriculture	15.4 (43.1)	-.214 (.273)	.002 (.002)
Commerce	70.0 (285.8)	.127 (.117)	-.002 (.005)
Defense	881.1 (2670.8)	-.059 (.078)	.060 (.131)
Energy	78.1 (432.9)	.081 (.317)	.000 (.000)
Financial	37.2 (141.6)	.031 (.130)	.011 (.010)
Homeland Security	34.6 (161.2)	-.152 (.193)	.002 (.002)
Interior	18.0 (41.4)	.033 (.121)	-.001 (.005)
Labor	74.9 (329.5)	-.149 (.169)	.003 (.006)
Military Construction	128.4 (1994.0)	.077 (.247)	-.041 (.041)
Transportation	17.8 (76.0)	.223 (.273)	.000 (.000)
Pooled		.000 (.058)	.006 (.016)
Naive		.501 (.195)*	.052 (.050)

Table 3.10: House Auth. Committees and Pork Across Policy Domains

Committee	Dollars (SD)	Spend	Count
Agriculture	15.4 (43.1)	.055 (.159)	.001 (.001)
Commerce	70.0 (285.8)	-.061 (.097)	-.001 (.002)
Defense	881.1 (2670.8)	-.189 (.093)*	-.109 (.076)
Energy	78.1 (432.9)	-.113 (.324)	.000 (.000)
Financial	37.2 (141.6)	-.071 (.236)	-.017 (.019)
Homeland Security	34.6 (161.2)	.269 (.264)	-.001 (.001)
Interior	18.0 (41.4)	.055 (.098)	.001 (.003)
Labor	74.9 (329.5)	.137 (.124)	-.002 (.001)
Military Construction	128.4 (1994.0)	.058 (.159)	.008 (.062)
Transportation	17.8 (76.0)	-.038 (.278)	.000 (.000)
Pooled		.014 (.067)	-.009 (.010)
Naive		.413 (.053)**	.006 (.009)

3.8 Appendix B: Senate Regressions

Table 3.11: Senate Committees and Pork

Committee	Spend	Count
Aging	-.065 (.056)	.075 (.076)
Agriculture	-.034 (.136)	.071 (.103)
Appropriations	.012 (.059)	-.075 (.079)
Armed Services	-.011 (.046)	.006 (.051)
Banking	-.038 (.067)	-.021 (.069)
Budget	.022 (.054)	-.033 (.168)
Commerce	.002 (.078)	-.163 (.134)
Economic	-.084 (.078)	-.302 (.183)
Energy	-.005 (.049)	-.074 (.078)
Environment	-.067 (.091)	.002 (.054)
Ethics	-.077 (.082)	.177 (.159)
Finance	-.002 (.044)	.138 (.186)
Foreign Affairs	.034 (.054)	-.081 (.153)
Governmental Affairs	-.050 (.025)*	-.056 (.062)
Health	.005 (.049)	.054 (.087)
Indian Affairs	.027 (.073)	-.077 (.062)
Intelligence	.053 (.038)	.055 (.042)
Judiciary	-.001 (.108)	.236 (.228)
Library	-.044 (.106)	-.071 (.045)
Printing	-.050 (.049)	-.045 (.066)
Rules	-.016 (.152)	-.020 (.071)
Small Business	-.061 (.058)	.091 (.062)
Veterans' Affairs	.107 (.045)*	-.072 (.082)

Table 3.12: Senate Approp. Committees and Pork Across Policy Domains

Subcommittee	Dollars (SD)	Spend	Count
Agriculture	17.8 (23.2)	-.234 (.153)	.000 (.001)
Commerce	61.0 (107.9)	-.065 (.085)	-.004 (.002)
Defense	839.3 (1197.9)	-.169 (.075)*	-.064 (.059)
Energy	119.2 (360.3)	.286 (.264)	.002 (.002)
Financial	41.2 (78.7)	.019 (.148)	-.008 (.013)
Homeland Security	38.1 (75.9)	-.182 (.140)	-.006 (.006)
Interior	33.6 (47.4)	.045 (.079)	-.023 (.010)*
Labor	70.9 (165.4)	.202 (.122)	.003 (.002)
Military Construction	142.7 (826.9)	-.149 (.136)	-.036 (.026)
Transportation	20.3 (35.4)	-.073 (.197)	.000 (.000)
Pooled		-.031 (.044)	-.013 (.007)
Naive		.308 (.098)**	.017 (.008)*

Table 3.13: Senate Auth. Committees and Pork Across Policy Domains

Committee	Dollars (SD)	Spend	Count
Agriculture	17.8 (23.2)	-.306 (.237)	-.001 (.001)
Commerce	61.0 (107.9)	.027 (.072)	.001 (.001)
Defense	839.3 (1197.9)	-.039 (.073)	-.033 (.030)
Energy	119.2 (360.3)	.012 (.150)	-.001 (.002)
Financial	41.2 (78.7)	-.007 (.093)	-.026 (.044)
Homeland Security	38.1 (75.9)	-.007 (.145)	.000 (.001)
Interior	33.6 (47.4)	.000 (.053)	.004 (.006)
Labor	70.9 (165.4)	.050 (.101)	.000 (.001)
Military Construction	142.7 (826.9)	.111 (.153)	.028 (.040)
Transportation	20.3 (35.4)	.019 (.101)	.000 (.000)
Pooled		.013 (.039)	-.004 (.007)
Naive		.268 (.087)**	.007 (.006)

Table 3.14: Senate Appropriations Committees and Outlays

Subcommittee	Min.Mem	Maj.Mem	Min.SubMem	Maj.SubMem	RankMinMem	Chair
Agriculture	.352 (.221)	.308 (.207)	.064 (.168)	-.130 (.199)	-.086 (.255)	-.274 (.258)
Commerce	.039 (.112)	.058 (.143)	-.035 (.086)	-.060 (.091)	-.176 (.094)	.029 (.150)
Defense	.121 (.129)	.043 (.066)	-.113 (.111)	-.116 (.101)	-.161 (.127)	-.065 (.162)
Energy	-.159 (.258)	.150 (.247)	.112 (.330)	.496 (.317)	.234 (.331)	.595 (.311)
Financial	-.101 (.138)	-.109 (.120)	-.317 (.193)	.125 (.197)	.080 (.294)	-.318 (.120)*
Homeland Security	.066 (.177)	-.012 (.268)	.123 (.195)	-.309 (.238)	-.367 (.164)*	-.131 (.604)
Interior	.159 (.087)	.036 (.057)	.070 (.109)	.109 (.083)	.025 (.211)	.024 (.097)
Labor	-.383 (.138)**	-.170 (.169)	.146 (.190)	.072 (.166)	.318 (.204)	-.426 (.170)*
Military Construction	-.041 (.252)	.061 (.342)	-.274 (.230)	-.044 (.189)	.140 (.453)	.559 (.469)
Transportation	-.181 (.219)	.065 (.180)	-.174 (.252)	-.031 (.232)	-.224 (.509)	-1.013 (.838)
Pooled	.001 (.041)	.035 (.054)	-.031 (.062)	-.003 (.057)	-.038 (.074)	-.129 (.118)

Table 3.15: Senate Appropriations Committees and Number of Contracts

Subcommittee	Min.Mem	Maj.Mem	Min.SubMem	Maj.SubMem	RankMinMem	Chair
Agriculture	.004 (.003)	.002 (.001)	.003 (.002)	.000 (.001)	.004 (.003)	.005 (.005)
Commerce	.002 (.003)	.000 (.004)	-.003 (.003)	-.006 (.004)	-.013 (.006)*	.047 (.042)
Defense	-.150 (.124)	.049 (.073)	-.089 (.087)	-.067 (.106)	1.012 (.946)	.990 (.491)*
Energy	-.001 (.001)	.002 (.003)	.001 (.002)	.004 (.004)	.004 (.004)	.007 (.007)
Financial	.015 (.024)	.021 (.027)	-.001 (.025)	.003 (.018)	.020 (.013)	-.013 (.026)
Homeland Security	-.004 (.004)	-.003 (.004)	-.017 (.015)	-.003 (.004)	-.007 (.008)	-.011 (.003)**
Interior	-.005 (.005)	-.005 (.005)	-.020 (.010)	-.025 (.010)*	-.036 (.012)**	-.033 (.016)*
Labor	.000 (.001)	-.004 (.002)	.002 (.001)	.002 (.002)	.001 (.001)	-.001 (.001)
Military Construction	-.002 (.015)	-.007 (.020)	-.024 (.020)	-.048 (.039)	-.068 (.020)**	-.075 (.025)**
Transportation	-.001 (.001)	-.002 (.001)	-.001 (.001)	-.001 (.001)	-.001 (.000)*	-.001 (.001)
Pooled	-.012 (.012)	.004 (.007)	-.017 (.010)	-.023 (.020)	.040 (.063)	.050 (.053)

3.9 Appendix C: Contract Concentration Index Regressions

Table 3.16: Senate Committees and Pork (Low)

Committee	Spend	Count
Aging	.043 (.083)	.030 (.039)
Agriculture	-.137 (.365)	.088 (.110)
Appropriations	.061 (.072)	-.040 (.040)
Armed Services	-.012 (.102)	.034 (.041)
Banking	-.072 (.092)	-.043 (.059)
Budget	-.030 (.076)	-.059 (.085)
Commerce	-.057 (.077)	-.082 (.065)
Economic	-.216 (.101)*	-.200 (.156)
Energy	-.018 (.051)	-.066 (.054)
Environment	.110 (.158)	.021 (.034)
Ethics	-.064 (.060)	.155 (.141)
Finance	.014 (.060)	.120 (.128)
Foreign Affairs	-.003 (.080)	-.124 (.130)
Governmental Affairs	.047 (.090)	-.007 (.051)
Health	.061 (.086)	.066 (.073)
Indian Affairs	.181 (.139)	-.027 (.039)
Intelligence	-.096 (.079)	.015 (.031)
Judiciary	-.044 (.079)	.074 (.099)
Library	-.091 (.157)	-.016 (.041)
Printing	-.044 (.095)	-.049 (.044)
Rules	-.220 (.126)	-.021 (.040)
Small Business	-.024 (.057)	.064 (.046)
Veterans' Affairs	-.020 (.175)	-.072 (.065)

Table 3.17: Senate Committees and Pork (High)

Committee	Spend	Count
Aging	-.020 (.064)	.000 (.002)
Agriculture	-.112 (.051)*	-.005 (.006)
Appropriations	.017 (.062)	-.017 (.019)
Armed Services	.120 (.092)	.008 (.006)
Banking	-.028 (.057)	.004 (.004)
Budget	-.005 (.137)	-.012 (.009)
Commerce	-.041 (.075)	-.002 (.003)
Economic	-.113 (.159)	-.007 (.005)
Energy	.032 (.056)	.002 (.006)
Environment	-.007 (.073)	-.005 (.004)
Ethics	.078 (.390)	.002 (.005)
Finance	-.093 (.084)	.002 (.005)
Foreign Affairs	-.091 (.060)	.009 (.012)
Governmental Affairs	-.171 (.076)*	-.019 (.014)
Health	.079 (.054)	-.003 (.004)
Indian Affairs	.014 (.033)	-.020 (.011)
Intelligence	.057 (.037)	-.010 (.004)*
Judiciary	-.009 (.095)	.006 (.006)
Library	-.122 (.091)	.003 (.006)
Printing	-.078 (.064)	.004 (.005)
Rules	-.167 (.089)	.000 (.006)
Small Business	-.124 (.092)	.003 (.007)
Veterans' Affairs	.310 (.208)	-.008 (.005)

Table 3.18: House Committees and Pork (Low)

Committee	Spend	Count
Agriculture	.009 (.075)	-.029 (.037)
Appropriations	-.093 (.108)	.105 (.109)
Armed Services	-.091 (.111)	.019 (.071)
Benghazi	-.087 (.120)	-.052 (.062)
Budget	-.076 (.064)	.026 (.051)
Deficit	.554 (.197)**	.188 (.070)*
Economic	.219 (.124)	.239 (.333)
Energy	.027 (.083)	-.193 (.167)
Ethics	-.231 (.154)	.086 (.039)*
Financial	.058 (.081)	-.023 (.084)
Foreign	-.187 (.155)	-.001 (.086)
Global Warming	.075 (.105)	.024 (.194)
Homeland Security	-.016 (.125)	-.101 (.078)
House Administration	-.148 (.201)	-.098 (.134)
Intelligence	.054 (.087)	-.021 (.045)
Judiciary	-.102 (.096)	-.016 (.069)
Labor	-.011 (.085)	.239 (.244)
Library	-.170 (.123)	-.021 (.067)
Natural Resources	.040 (.069)	.006 (.046)
Oversight	.028 (.104)	.208 (.213)
Printing	.009 (.131)	.033 (.095)
Rules	.081 (.173)	.087 (.123)
Science	.040 (.086)	-.096 (.102)
Small	.152 (.118)	.002 (.083)
Standards	.369 (.194)	-.098 (.128)
Taxation	-.314 (.142)*	.686 (.684)
Transportation	.090 (.164)	-.078 (.046)
Veterans' Affairs	-.130 (.186)	.019 (.131)
Voting	-.147 (.069)*	-.240 (.087)**
Ways and Means	-.055 (.086)	.008 (.065)

Table 3.19: House Committees and Pork (High)

Committee	Spend	Count
Agriculture	-.022 (.101)	.000 (.012)
Appropriations	.318 (.223)	.002 (.020)
Armed Services	-.090 (.116)	.003 (.016)
Benghazi	-.177 (.258)	.014 (.019)
Budget	-.043 (.100)	-.027 (.021)
Deficit	.389 (.423)	.031 (.027)
Economic	.003 (.179)	-.020 (.024)
Energy	.012 (.122)	.020 (.019)
Ethics	.066 (.257)	.012 (.024)
Financial	-.022 (.223)	-.026 (.020)
Foreign	.203 (.089)*	-.027 (.030)
Global Warming	-.192 (.201)	-.020 (.061)
Homeland Security	-.109 (.119)	-.032 (.032)
House Administration	-.244 (.298)	-.045 (.030)
Intelligence	-.078 (.183)	-.007 (.013)
Judiciary	-.342 (.256)	-.028 (.025)
Labor	.054 (.096)	-.006 (.020)
Library	.221 (.246)	-.010 (.026)
Natural Resources	-.061 (.088)	-.012 (.013)
Oversight	.102 (.144)	-.015 (.019)
Printing	-.168 (.131)	-.024 (.022)
Rules	-.115 (.148)	-.021 (.031)
Science	-.012 (.094)	-.023 (.025)
Small	.242 (.205)	-.023 (.034)
Standards	.194 (.125)	-.018 (.032)
Taxation	.480 (.346)	-.052 (.051)
Transportation	.097 (.175)	-.012 (.012)
Veterans' Affairs	.076 (.265)	-.003 (.021)
Voting	-.245 (.214)	-.020 (.017)
Ways and Means	-.173 (.118)	-.004 (.009)

Table 3.20: Senate Approp. Committees and Pork Across Policy Domains (Low)

Subcommittee	Dollars (SD)	Spend	Count
Agriculture	13.5 (18.3)	-.287 (.153)	.000 (.000)
Commerce	14.0 (25.9)	-.014 (.081)	.000 (.001)
Defense	303.3 (303.7)	-.126 (.123)	-.014 (.032)
Energy	2.2 (6.7)	.266 (.258)	.001 (.001)
Financial	19.5 (62.3)	-.266 (.178)	-.010 (.007)
Homeland Security	13.5 (30.3)	-.216 (.183)	-.005 (.005)
Interior	10.7 (15.8)	.012 (.046)	-.014 (.008)
Labor	17.0 (44.6)	-.091 (.205)	-.001 (.001)
Military Construction	28.5 (40.1)	-.113 (.137)	-.029 (.026)
Transportation	3.2 (5.8)	-.198 (.297)	.000 (.000)
Pooled		-.099 (.064)	-.007 (.004)
Naive		.189 (.090)*	.005 (.004)

Table 3.21: Senate Approp. Committees and Pork Across Policy Domains (High)

Subcommittee	Dollars (SD)	Spend	Count
Agriculture	0.7 (1.5)	.355 (.273)	.000 (.001)
Commerce	3.3 (10.0)	-.121 (.161)	.000 (.000)
Defense	34.4 (51.0)	.039 (.117)	-.003 (.004)
Energy	1.4 (3.8)	.048 (.573)	.000 (.000)
Financial	7.4 (11.8)	.033 (.211)	.003 (.004)
Homeland Security	3.1 (8.4)	-.302 (.392)	.000 (.000)
Interior	7.1 (16.1)	-.097 (.219)	-.003 (.002)
Labor	1.8 (8.3)	-.067 (.272)	-.001 (.001)
Military Construction	46.2 (70.3)	-.239 (.119)	.000 (.000)
Transportation	5.2 (11.6)	.130 (.267)	.000 (.000)
Pooled		-.019 (.094)	-.001 (.001)
Naive		.278 (.133)*	.001 (.001)

Table 3.22: Senate Auth. Committees and Pork Across Policy Domains (Low)

Committee	Dollars (SD)	Spend	Count
Agriculture	13.5 (18.3)	-.335 (.281)	-.001 (.001)
Commerce	14.0 (25.9)	.154 (.079)	-.001 (.001)
Defense	303.3 (303.7)	.053 (.114)	.000 (.019)
Energy	2.2 (6.7)	-.035 (.181)	-.001 (.001)
Financial	19.5 (62.3)	.092 (.156)	-.012 (.022)
Homeland Security	13.5 (30.3)	-.311 (.235)	.000 (.000)
Interior	10.7 (15.8)	.046 (.072)	.003 (.004)
Labor	17.0 (44.6)	-.097 (.162)	.000 (.000)
Military Construction	28.5 (40.1)	-.009 (.104)	.027 (.039)
Transportation	3.2 (5.8)	-.169 (.185)	.000 (.000)
Pooled		-.014 (.043)	.002 (.005)
Naive		.233 (.078)**	.003 (.003)

Table 3.23: Senate Auth. Committees and Pork Across Policy Domains (High)

Committee	Dollars (SD)	Spend	Count
Agriculture	0.7 (1.5)	.244 (.238)	.000 (.001)
Commerce	3.3 (10.0)	.063 (.280)	.000 (.000)
Defense	34.4 (51.0)	.082 (.114)	.001 (.001)
Energy	1.4 (3.8)	-.150 (.354)	.000 (.000)
Financial	7.4 (11.8)	.035 (.077)	.001 (.004)
Homeland Security	3.1 (8.4)	-.347 (.370)	.000 (.000)*
Interior	7.1 (16.1)	-.064 (.094)	.000 (.001)
Labor	1.8 (8.3)	.170 (.417)	.000 (.000)
Military Construction	46.2 (70.3)	.191 (.198)	.000 (.000)
Transportation	5.2 (11.6)	-.046 (.144)	.000 (.000)
Pooled		-.015 (.073)	.000 (.001)
Naive		.296 (.090)**	.001 (.000)*

Table 3.24: House Approp. Committees and Pork Across Policy Domains (Low)

Subcommittee	Dollars (SD)	Spend	Count
Agriculture	11.2 (28.5)	-.327 (.267)	.002 (.001)
Commerce	13.6 (47.5)	.117 (.228)	.000 (.003)
Defense	295.0 (582.5)	-.082 (.105)	.069 (.082)
Energy	1.3 (8.8)	.348 (.305)	.000 (.000)
Financial	15.5 (87.2)	.047 (.373)	.017 (.012)
Homeland Security	12.9 (69.7)	.061 (.371)	.000 (.001)
Interior	5.4 (14.1)	-.046 (.127)	-.002 (.003)
Labor	18.5 (89.5)	-.261 (.274)	.001 (.002)
Military Construction	32.4 (175.3)	-.079 (.191)	-.042 (.045)
Transportation	3.0 (11.2)	-.219 (.291)	.000 (.000)
Pooled		-.056 (.069)	.007 (.010)
Naive		.459 (.161)**	.027 (.019)

Table 3.25: House Approp. Committees and Pork Across Policy Domains (High)

Subcommittee	Dollars (SD)	Spend	Count
Agriculture	0.5 (2.4)	.168 (.309)	.001 (.000)
Commerce	2.9 (13.3)	.049 (.252)	.000 (.000)
Defense	26.1 (52.5)	-.011 (.153)	.007 (.008)
Energy	0.7 (4.2)	-.117 (.613)	.000 (.000)
Financial	6.9 (25.4)	-.214 (.186)	.001 (.006)
Homeland Security	2.0 (9.5)	-.722 (.311)*	.000 (.000)
Interior	3.1 (10.0)	-.349 (.227)	.000 (.001)
Labor	1.8 (20.4)	-.613 (.320)	.001 (.001)
Military Construction	37.9 (312.9)	.351 (.434)	.001 (.001)
Transportation	2.2 (8.2)	-.545 (.677)	.000 (.000)
Pooled		-.204 (.113)	.001 (.001)
Naive		.561 (.170)**	.001 (.002)

Table 3.26: House Auth. Committees and Pork Across Policy Domains (Low)

Committee	Dollars (SD)	Spend	Count
Agriculture	11.2 (28.5)	-.044 (.226)	.000 (.001)
Commerce	13.6 (47.5)	-.019 (.079)	-.001 (.001)
Defense	295.0 (582.5)	-.136 (.124)	-.014 (.052)
Energy	1.3 (8.8)	.112 (.310)	.000 (.000)
Financial	15.5 (87.2)	.061 (.243)	-.006 (.012)
Homeland Security	12.9 (69.7)	.191 (.319)	-.001 (.001)
Interior	5.4 (14.1)	.024 (.129)	.002 (.001)
Labor	18.5 (89.5)	.050 (.277)	-.002 (.002)
Military Construction	32.4 (175.3)	.108 (.203)	.006 (.062)
Transportation	3.0 (11.2)	-.040 (.394)	.000 (.000)
Pooled		.025 (.073)	-.002 (.008)
Naive		.249 (.049)**	.007 (.006)

Table 3.27: House Auth. Committees and Pork Across Policy Domains (High)

Committee	Dollars (SD)	Spend	Count
Agriculture	0.5 (2.4)	.209 (.355)	.000 (.001)
Commerce	2.9 (13.3)	.033 (.194)	.000 (.000)
Defense	26.1 (52.5)	-.255 (.264)	-.003 (.011)
Energy	0.7 (4.2)	1.304 (.859)	.000 (.000)
Financial	6.9 (25.4)	-.197 (.279)	-.009 (.010)
Homeland Security	2.0 (9.5)	.340 (.258)	.000 (.000)
Interior	3.1 (10.0)	.112 (.170)	-.001 (.001)
Labor	1.8 (20.4)	.376 (.288)	.000 (.001)
Military Construction	37.9 (312.9)	.197 (.260)	.001 (.000)*
Transportation	2.2 (8.2)	.264 (.359)	.000 (.000)
Pooled		.149 (.100)	-.001 (.001)
Naive		.599 (.065)**	.004 (.002)

Table 3.28: Senate Appropriations Committees and Outlays (Low)

Subcommittee	Min.Mem	Maj.Mem	Min.SubMem	Maj.SubMem	RankMinMem	Chair
Agriculture	.276 (.325)	.198 (.299)	-.080 (.194)	-.195 (.237)	-.212 (.257)	-.411 (.234)
Commerce	.038 (.124)	-.008 (.093)	-.001 (.099)	-.018 (.101)	.033 (.232)	.197 (.202)
Defense	.298 (.161)	.094 (.108)	-.024 (.134)	.052 (.119)	.204 (.209)	.309 (.495)
Energy	.276 (.268)	.293 (.205)	.339 (.258)	.502 (.327)	.500 (.358)	.429 (.503)
Financial	.005 (.164)	.281 (.207)	-.438 (.188)*	.166 (.268)	.004 (.329)	-.934 (.283)**
Homeland Security	.141 (.199)	-.026 (.264)	-.282 (.301)	-.039 (.203)	-.304 (.304)	-.901 (.600)
Interior	.175 (.102)	.156 (.069)*	.007 (.091)	.062 (.078)	.354 (.222)	-.386 (.168)*
Labor	-.729 (.228)**	-.644 (.227)**	-.274 (.316)	-.516 (.267)	-.117 (.340)	-.344 (.265)
Military Construction	-.213 (.257)	-.210 (.266)	-.290 (.181)	-.097 (.207)	-.153 (.193)	.264 (.227)
Transportation	-.026 (.401)	-.274 (.327)	-.243 (.431)	-.351 (.368)	.072 (.501)	-.307 (.671)
Pooled	.033 (.069)	.011 (.060)	-.092 (.074)	-.069 (.072)	.000 (.108)	-.420 (.134)**

Table 3.29: Senate Appropriations Committees and Outlays (High)

Subcommittee	Min.Mem	Maj.Mem	Min.SubMem	Maj.SubMem	RankMinMem	Chair
Agriculture	.157 (.297)	-.337 (.266)	.264 (.326)	.151 (.377)	.950 (.621)	.629 (.523)
Commerce	-.404 (.302)	-.360 (.230)	-.357 (.233)	-.172 (.204)	-.627 (.248)*	-.394 (.311)
Defense	-.094 (.164)	-.021 (.136)	.046 (.136)	-.087 (.245)	-.543 (.512)	-.699 (.480)
Energy	-.268 (.582)	-1.057 (.561)	-.955 (.713)	.052 (.543)	-.030 (.706)	.128 (.989)
Financial	.122 (.167)	.135 (.170)	.259 (.199)	-.115 (.597)	.400 (.207)	.022 (.301)
Homeland Security	.150 (.317)	.124 (.361)	-.191 (.519)	-.211 (.536)	.179 (.466)	-1.246 (.486)*
Interior	.030 (.247)	.201 (.189)	.017 (.343)	-.082 (.203)	-.076 (.371)	-.413 (.284)
Labor	.459 (.332)	.824 (.374)*	.092 (.366)	.348 (.329)	1.097 (.662)	1.415 (.466)**
Military Construction	.075 (.185)	.027 (.138)	-.334 (.167)	-.131 (.167)	.208 (.665)	.711 (.708)
Transportation	.052 (.244)	.027 (.179)	.106 (.323)	.331 (.296)	-.276 (.785)	-1.532 (1.335)
Pooled	.041 (.107)	-.024 (.078)	-.089 (.106)	.026 (.127)	.227 (.175)	-.085 (.209)

Table 3.30: Senate Appropriations Committees and Number of Contracts (Low)

Subcommittee	Min.Mem	Maj.Mem	Min.SubMem	Maj.SubMem	RankMinMem	Chair
Agriculture	.001 (.001)	.001 (.001)*	.001 (.001)	.000 (.001)	.001 (.001)	.003 (.002)
Commerce	.002 (.001)	.001 (.001)	.001 (.001)	.000 (.002)	-.001 (.002)	.017 (.014)
Defense	-.069 (.038)	-.005 (.032)	-.048 (.049)	-.022 (.043)	.040 (.107)	.015 (.131)
Energy	-.001 (.001)	.001 (.002)	.000 (.001)	.002 (.002)	.001 (.002)	.004 (.004)
Financial	.016 (.010)	.020 (.014)	.006 (.012)	.001 (.009)	.006 (.007)	-.008 (.012)
Homeland Security	-.003 (.003)	-.002 (.003)	-.014 (.012)	-.003 (.003)	-.005 (.007)	-.005 (.002)*
Interior	-.001 (.003)	-.003 (.004)	-.011 (.008)	-.019 (.011)	-.005 (.008)	-.026 (.014)
Labor	.001 (.001)	.001 (.002)	.000 (.000)	.000 (.001)	.000 (.001)	.001 (.001)
Military Construction	.003 (.015)	-.006 (.019)	-.012 (.021)	-.044 (.039)	-.054 (.021)*	-.062 (.024)*
Transportation	-.001 (.001)	-.001 (.000)	-.001 (.001)	.000 (.000)	-.001 (.000)	-.001 (.000)
Pooled	-.006 (.004)	.001 (.004)	-.006 (.006)	-.009 (.006)	-.003 (.008)	-.006 (.009)

Table 3.31: Senate Appropriations Committees and Number of Contracts (High)

Subcommittee	Min.Mem	Maj.Mem	Min.SubMem	Maj.SubMem	RankMinMem	Chair
Agriculture	.002 (.001)	.001 (.001)	.001 (.001)	.000 (.001)	.002 (.002)	.002 (.002)
Commerce	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	-.001 (.000)	.000 (.000)
Defense	-.003 (.003)	-.003 (.003)	-.005 (.006)	-.004 (.005)	-.005 (.006)	-.003 (.005)
Energy	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
Financial	-.016 (.016)	-.012 (.013)	-.015 (.015)	-.002 (.013)	-.006 (.010)	-.008 (.009)
Homeland Security	.000 (.000)	.000 (.000)	-.001 (.001)	.000 (.000)	.000 (.000)	-.002 (.000)**
Interior	-.001 (.001)	-.001 (.001)	-.002 (.001)	-.004 (.002)	-.009 (.004)*	-.005 (.004)
Labor	.000 (.001)	.001 (.001)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.001)
Military Construction	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	-.001 (.000)*	-.001 (.000)**
Transportation	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
Pooled	-.002 (.002)	-.002 (.002)	-.002 (.002)	-.001 (.001)	-.002 (.002)	-.002 (.002)

Table 3.32: House Appropriations Committees and Outlays (Low)

Subcommittee	Min.Mem	Maj.Mem	Min.SubMem	Maj.SubMem	RankMinMem	Chair
Agriculture	.118 (.334)	-.281 (.342)	-.221 (.388)	-.272 (.339)	-.906 (.305)**	-1.332 (1.027)
Commerce	-.167 (.264)	-.045 (.213)	-.693 (.471)	.350 (.450)	-.560 (.302)	.383 (.411)
Defense	-.219 (.147)	-.085 (.121)	-.316 (.176)	-.180 (.204)	-.413 (.180)*	.385 (.405)
Energy	.250 (.243)	-.033 (.302)	.560 (.405)	.465 (.373)	-1.062 (.248)**	.575 (.322)
Financial	-.074 (.375)	-.477 (.250)	-.225 (.473)	-.454 (.659)	.461 (.241)	.582 (.286)*
Homeland Security	.388 (.479)	.369 (.404)	.940 (.861)	-.238 (.547)	1.948 (.581)**	1.674 (.519)**
Interior	-.149 (.225)	-.004 (.187)	-.323 (.240)	.143 (.168)	-.722 (.242)**	.139 (.196)
Labor	-.422 (.259)	-.415 (.276)	-.501 (.455)	-.565 (.480)	-1.189 (.554)*	-.778 (.796)
Military Construction	.131 (.273)	-.009 (.237)	-.213 (.291)	-.065 (.351)	.638 (.291)*	.123 (.366)
Transportation	-.289 (.404)	-.428 (.397)	-.343 (.773)	-.590 (.513)	-.328 (.915)	-.857 (.426)*
Pooled	-.049 (.127)	-.137 (.110)	-.161 (.172)	-.130 (.108)	-.225 (.315)	-.093 (.334)

Table 3.33: House Appropriations Committees and Outlays (High)

Subcommittee	Min.Mem	Maj.Mem	Min.SubMem	Maj.SubMem	RankMinMem	Chair
Agriculture	-.181 (.414)	-.176 (.343)	.622 (.570)	-.245 (.399)	-.905 (.360)*	-.972 (.376)*
Commerce	.540 (.359)	.384 (.303)	-.038 (.271)	.420 (.486)	.656 (.369)	.799 (.426)
Defense	.235 (.278)	.441 (.286)	.334 (.238)	.384 (.360)	-.156 (.637)	.373 (.327)
Energy	-.274 (.759)	.682 (.522)	.413 (1.315)	-.141 (.763)	.000 (.000)	.396 (.769)
Financial	.197 (.354)	.100 (.334)	-.261 (.534)	-.159 (.345)	.788 (.399)	.008 (.305)
Homeland Security	.042 (.369)	.085 (.277)	-.399 (.479)	-1.059 (.313)**	-.394 (.442)	.773 (1.038)
Interior	.423 (.366)	.354 (.362)	-.202 (.282)	-.010 (.378)	-.220 (.582)	.221 (.342)
Labor	.219 (.438)	-.127 (.417)	-1.164 (.906)	-.370 (.512)	-1.108 (.728)	-.177 (.487)
Military Construction	.502 (.387)	-.026 (.318)	.192 (.543)	.482 (.577)	-.723 (.530)	2.972 (.404)**
Transportation	-.262 (.492)	.235 (.323)	-1.863 (1.120)	.042 (.827)	1.800 (.790)*	.092 (.434)
Pooled	.216 (.141)	.163 (.128)	-.154 (.243)	-.039 (.205)	-.154 (.311)	.481 (.463)

Table 3.34: House Appropriations Committees and Number of Contracts (Low)

Subcommittee	Min.Mem	Maj.Mem	Min.SubMem	Maj.SubMem	RankMinMem	Chair
Agriculture	.000 (.001)	.000 (.001)	.004 (.003)	.000 (.001)	.000 (.001)	.000 (.001)
Commerce	-.007 (.007)	-.001 (.005)	-.007 (.004)	-.001 (.005)	-.006 (.011)	-.001 (.024)
Defense	.065 (.105)	.076 (.094)	.137 (.303)	.100 (.115)	.013 (.114)	.870 (.485)
Energy	.000 (.000)	.000 (.000)	.000 (.001)	.000 (.000)	.000 (.000)	.000 (.001)
Financial	-.005 (.012)	.000 (.009)	.004 (.021)	.021 (.010)*	.016 (.020)	.009 (.013)
Homeland Security	-.001 (.002)	.000 (.001)	.000 (.002)	-.001 (.002)	-.002 (.002)	.004 (.003)
Interior	.002 (.002)	.000 (.001)	.000 (.001)	.002 (.003)	-.021 (.018)	.000 (.001)
Labor	-.002 (.002)	-.002 (.003)	-.003 (.002)	.000 (.003)	.000 (.002)	-.001 (.002)
Military Construction	.094 (.029)**	.011 (.038)	-.079 (.083)	-.019 (.065)	.234 (.085)**	.143 (.070)*
Transportation	.000 (.000)	.000 (.000)	-.001 (.001)	.000 (.000)	.000 (.001)	.000 (.000)
Pooled	.015 (.009)	.008 (.011)	.013 (.041)	.010 (.011)	.019 (.016)	.070 (.050)

Table 3.35: House Appropriations Committees and Number of Contracts (High)

Subcommittee	Min.Mem	Maj.Mem	Min.SubMem	Maj.SubMem	RankMinMem	Chair
Agriculture	.000 (.001)	.000 (.000)	.002 (.001)*	.000 (.000)	.000 (.001)	.000 (.001)
Commerce	.001 (.001)	.001 (.001)	.002 (.002)	.001 (.001)	.001 (.001)	.004 (.002)
Defense	.026 (.022)	-.007 (.020)	.013 (.033)	.014 (.022)	.015 (.022)	-.006 (.018)
Energy	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
Financial	.010 (.016)	-.007 (.013)	.018 (.028)	-.007 (.009)	.015 (.018)	-.015 (.011)
Homeland Security	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.001)	.000 (.000)
Interior	.001 (.001)	.000 (.001)	.000 (.001)	.000 (.002)	.001 (.005)	.004 (.001)**
Labor	-.001 (.001)	-.001 (.001)	-.001 (.001)	.001 (.002)	.000 (.001)	-.001 (.001)
Military Construction	.000 (.001)	-.001 (.001)	.002 (.001)*	.000 (.001)	.000 (.001)	.002 (.000)**
Transportation	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
Pooled	.004 (.004)	-.002 (.003)	.003 (.006)	.001 (.003)	.003 (.004)	-.002 (.003)

3.10 Appendix D: Contract Concentration Index Parameter Tests

Table 3.36: Senate Approp. Committees and Pork Across Policy Domains (Low vs. High)

Subcommittee	Spend	Count
Agriculture	0.043*	0.782
Commerce	0.521	0.895
Defense	0.243	0.705
Energy	0.676	0.461
Financial	0.051	0.045*
Homeland Security	0.809	0.199
Interior	0.604	0.112
Labor	0.946	0.824
Military Construction	0.470	0.222
Transportation	0.397	0.966

* means $H > L$, † means $L > H$

Table 3.37: Senate Auth. Committees and Pork Across Policy Domains (Low vs. High)

Committee	Spend	Count
Agriculture	0.176	0.015*
Commerce	0.718	0.120
Defense	0.852	0.982
Energy	0.745	0.528
Financial	0.694	0.484
Homeland Security	0.932	0.626
Interior	0.326	0.472
Labor	0.513	0.335
Military Construction	0.323	0.452
Transportation	0.592	0.495

* means $H > L$, † means $L > H$

Table 3.38: House Approp. Committees and Pork Across Policy Domains (Low vs. High)

Subcommittee	Spend	Count
Agriculture	0.125	0.343
Commerce	0.805	0.811
Defense	0.652	0.378
Energy	0.409	0.675
Financial	0.491	0.168
Homeland Security	0.101	0.990
Interior	0.157	0.422
Labor	0.341	0.961
Military Construction	0.314	0.265
Transportation	0.519	0.346

* means $H > L$, † means $L > H$

Table 3.39: House Auth. Committees and Pork Across Policy Domains (Low vs. High)

Committee	Spend	Count
Agriculture	0.464	0.983
Commerce	0.749	0.178
Defense	0.554	0.818
Energy	0.050*	0.252
Financial	0.331	0.819
Homeland Security	0.647	0.484
Interior	0.503	$0.010^{\dagger}$
Labor	0.270	0.399
Military Construction	0.752	0.923
Transportation	0.433	0.534

* means $H > L$, † means $L > H$

Table 3.40: Senate Appropriations Committees and Outlays (Low vs. High)

Subcommittee	Ranking Minority Member	Chair
Agriculture	0.030*	0.032*
Commerce	0.047†	0.119
Defense	0.039†	0.000†
Energy	0.464	0.800
Financial	0.271	0.003*
Homeland Security	0.441	0.651
Interior	0.122	0.942
Labor	0.089	0.000*
Military Construction	0.514	0.448
Transportation	0.749	0.149

* means $H > L$, † means $L > H$

Table 3.41: Senate Appropriations Committees and Number of Contracts (Low vs. High)

Subcommittee	Ranking Minority Member	Chair
Agriculture	0.659	0.013†
Commerce	0.855	0.164
Defense	0.637	0.873
Energy	0.374	0.307
Financial	0.240	0.976
Homeland Security	0.356	0.140
Interior	0.673	0.028*
Labor	0.803	0.080
Military Construction	0.004*	0.005*
Transportation	0.090	0.184

* means $H > L$, † means $L > H$

Table 3.42: House Appropriations Committees and Outlays (Low vs. High)

Subcommittee	Ranking Minority Member	Chair
Agriculture	0.997	0.682
Commerce	0.003*	0.485
Defense	0.688	0.973
Energy	0.000*	0.783
Financial	0.400	0.103
Homeland Security	0.001†	0.435
Interior	0.258	0.816
Labor	0.936	0.523
Military Construction	0.008†	0.000*
Transportation	0.008*	0.017*

* means $H > L$, † means $L > H$

Table 3.43: House Appropriations Committees and Number of Contracts (Low vs. High)

Subcommittee	Ranking Minority Member	Chair
Agriculture	0.622	0.805
Commerce	0.381	0.769
Defense	0.981	0.031†
Energy	0.724	0.411
Financial	0.927	0.145
Homeland Security	0.358	0.138
Interior	0.055	0.000*
Labor	0.444	0.601
Military Construction	0.001†	0.018†
Transportation	0.963	0.012*

* means $H > L$, † means $L > H$

3.11 Appendix E: Data Appendix

3.11.1 Data Appendix A: USASpending.gov Fields used in Directability Index

"dollarsobligated": We exclude from the directability index contract actions obligating no funds or negative funds. We bin remaining contract actions according to their obligation value: $0 to $500,000 (the approximate Simplified Acquisition Threshold for non-commercial items), $500,001 to $5,000,000 (the approximate Simplified Acquisition Threshold for commercial items), and above $5,000,000.

"modnumber": We exclude from the index contract modifications, keeping only actions with modification number equal to zero.

"commercialitemacquisitionprocedures": We categorize contracts as *commercial* if commercial item acquisition procedures are used (response "A:"), and *non-commercial* otherwise.

"nationalinterestactioncode": We use this field to proxy for whether a contract is associated with a regular annual appropriations bill, a supplemental bill funding overseas military operations, or a supplemental bill funding emergency response. We categorize a contract as funded by an overseas military operation if the nationalinterestactioncode field is O12F, O14F, O14S, or O15F, which cover operations in Iraq, Afghanistan, and Syria. Contract actions assigned any other code are categorized as supporting emergencies. The remaining contracts are categorized as funded by regular annual appropriations bills.

"extentcompeted": We code a contract as sole-sourced if this field is assigned "B: Not available for Competition", "C: Not Competed", "E: Follow on to competed action", "G: Not competed under Simplified Acquisitions Procedures", "NDO: Non-Competitive Delivery Order". All other contracts are coded as Competed.

"typeofsetaside": Among competed contracts, we use this field to distinguish

between contracts competed using full and open competition from those competed among a subset of firms that are certified by the Small Business Administration as being eligible to compete for various types of set-aside contracts (Small Business, Women-owned small business, Veteran-owned small business, etc.).

"reasonnotcompeted": Among sole-sourced (non-competed) contracts, we use this field to distinguish the statutory justification for sole-sourcing, according to Federal Acquisitions Regulations (FAR) Subpart 6.3. The distinctions include: (1) sole-source set-asides for firms qualifying under the following sole-source programs: 8(a) Alaskan Native Owned Firms, Buy Indian program, HUBZONE program, Woman Owned Small Business program, and Disabled Veteran Owned Small Business Program; (2) Brand Name purchases ("BND"); (3) Follow on to competed actions ("FOC", "FOO", "NDO", and "STD" codings in USASpending.gov data; (4) Public Interest due to Mobilization and Essential Researcha nd Development, National Security, Public Interest, and Urgency justifications ("MES", "NS", "PI", "URG"); (5) only one source available, private data rights, unique source, unsolicited research proposal, and utilities ("ONE", "PDR", "UNQ", "UR", "UT"), (6) all other sole-sourced contracts.

3.11.2 Data Appendix B: U.S. House and Senate Appropriations Subcommittee Jurisdictions

We obtain the below jurisdictions from each Senate Appropriations Subcommittee webpage in March 2017. (House jurisdictions are identical, as listed on the corresponding house webpages):

Table 3.44: Appropriations Subcommittee Jurisdictions

Subcommittee	Listed Function
Agriculture	U.S. Department of Agriculture
	Except Forest Service
	Agricultural Credit Insurance Fund (USDA)
	Agricultural Marketing Service (USDA)
	Agricultural Research Service (USDA)
	Buildings and Facilities (USDA)
	Agriculture Buildings and Facilities (USDA)
	Animal and Plant Health Inspection Service (USDA)
	Buildings and Facilities (USDA)
	Child Nutrition Programs (USDA)
	Commodity Assistance Program (USDA)
	Commodity Credit Corporation (USDA)
	Conservation Operations (USDA)
	Dairy Indemnity Program (USDA)
	Departmental Administration (USDA)
	Distance Learning and Telemedicine Program (USDA)
	Economic Research Service (USDA)
	Emergency Conservation Program (USDA)
	Emergency Forest Restoration Program (USDA)
	Emergency Watershed Protection Program (USDA)
	Export Loans Program (USDA)
	Farm Credit Administration
	Farm Labor Housing Program (USDA)
	Farm Service Agency (USDA)
	Federal Crop Insurance Corporation (USDA)
	Food and Drug Administration (HHS)
	Food and Drug Administration Buildings and Facilities (HHS)
	Food and Nutrition Service (USDA)
	Food Safety and Inspection Service (USDA)
	Foreign Agricultural Service (USDA)
	Funds for Strengthening Markets, Income, and Supply (section 32) (USDA)
	Grain Inspection, Packers, and Stockyards Administration (USDA)
	Grassroots Source Water Protection Program (USDA)
	Hazardous Materials Management (USDA)
	Inspection and Weighing Services (USDA)
	McGovern-Dole International Food for Education Program (USDA)
	Multi-Family Housing Revitalization Program (USDA)
	Mutual and Self-Help Housing Grants (USDA)
	National Agricultural Statistics Service (USDA)
	National Appeals Division (USDA)
	National Institute of Food and Agriculture [NIFA] (USDA)
	Native American Institutions Endowment Fund (USDA)
	Natural Resources Conservation Service (USDA)
	Nutrition Program Administration (USDA)
	Office of Advocacy and Outreach (USDA)
	Office of Budget and Program Analysis (USDA)
	Office of Civil Rights (USDA)
	Office of Communications (USDA)
	Office of Ethics (USDA)
	Office of Homeland Security and Emergency Coordination (USDA)
	Office of the Assistant Secretary for Administration (USDA)
	Office of the Assistant Secretary for Civil Rights (USDA)
	Office of the Assistant Secretary for Congressional Relations (USDA)
	Office of the Chief Economist (USDA)
	Office of the Chief Financial Officer (USDA)
	Office of the Chief Information Officer (USDA)
	Office of the General Counsel (USDA)
	Office of the Inspector General (USDA)

Table 3.45: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Agriculture (Cont.)	Office of the Secretary (USDA)
	Office of the Under Secretary for Farm and Foreign Agricultural Services (USDA)
	Office of the Under Secretary for Food, Nutrition and Consumer Services (USDA)
	Office of the Under Secretary for Food Safety (USDA)
	Office of the Under Secretary for Marketing and Regulatory Programs (USDA)
	Office of the Under Secretary for Natural Resources and Environment (USDA)
	Office of the Under Secretary for Research, Education, and Economics (USDA)
	Office of the Under Secretary for Rural Development (USDA)
	Office of Tribal Relations (USDA)
	Outreach for Socially Disadvantaged Farmers (USDA)
	Public Law 480 Program (USDA)
	Rental Assistance Program (USDA)
	Risk Management Agency (USDA)
	Rural Business-Cooperative Service (USDA)
	Rural Community Advancement Program (USDA)
	Rural Cooperative Development Grants (USDA)
	Rural Development Loan Fund (USDA)
	Rural Development Salaries and Expenses (USDA)
	Rural Economic Development Loans (USDA)
	Rural Electrification and Telecommunications Loans Program (USDA)
	Rural Housing Assistance Grants (USDA)
	Rural Housing Insurance Fund (USDA)
	Rural Housing Service (USDA)
	Rural Utilities Service (USDA)
	Rural Water and Waste Disposal Program (USDA)
	Special Supplemental Nutrition Program for Women, Infants, and Children [WIC] (USDA)
	State Mediation Grants (USDA)
	Supplemental Nutrition Assistance Program (USDA)
	Watershed Rehabilitation Program (USDA)
Commerce	Department of Commerce
	Department of Justice
	Bureau of Alcohol, Tobacco, Firearms and Explosives (Justice)
	Bureau of Economic and Statistical Analysis (Commerce)
	Bureau of Prisons (Justice)
	Bureau of the Census (Commerce)
	Commission on Civil Rights
	Drug Enforcement Administration (Justice)
	Economic and Statistical Analysis (Commerce)
	Economic Development Administration (Commerce)
	Equal Employment Opportunity Commission
	Federal Bureau of Investigation (Justice)
	Federal Prison Industries Incorporated (Justice)
	Foreign Claims Settlement Commission (Justice)
	International Trade Administration (Commerce)
	U.S. Foreign and Commercial Service (Commerce)
	International Trade Commission
	Justice Assistance/Research Evaluation and Statistics (Justice)
	Juvenile Justice and Delinquency Prevention (Justice)
	Legal Services Corporation
	Marine Mammal Commission
	Minority Business Development Agency (Commerce)
	National Aeronautics and Space Administration
	National Institute of Corrections (Justice)
	National Institute of Standards and Technology (Commerce)
	National Oceanic and Atmospheric Administration (Commerce)
	National Science Foundation

Table 3.46: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Commerce (Cont.)	National Technical Information Service (Commerce) National Telecommunications and Information Administration (Commerce) Office of Justice Programs (Justice) Office of Science and Technology Policy (Executive Office of the President) Office of the U.S. Trade Representative (Executive Office of the President) Patent and Trademark Office (Commerce) Public Telecommunications Facilities Fund (Commerce) State Justice Institute U.S. Attorneys (Justice) U.S. Marshal Service (Justice) U.S. Parole Commission (Justice)
Energy	Department of Energy (DOE) Advanced Research Projects Agency—Energy ARPA–E (DOE) Advanced Technology Vehicles Manufacturing Loans Program (DOE) Appalachian Regional Commission/Appalachian Development Highway System *(See also Transportation and Housing and Urban Development, and Related Agencies)* Bonneville Power Administration (DOE) Bureau of Reclamation (Interior) Central Utah Project Completion Account (Interior) Corps of Engineers—Civil Department of Defense—Civil: Department of the Army: *See* Corps of Engineers—Civil Defense Environmental Cleanup Defense Nuclear Facilities Safety Board Delta Regional Authority Denali Commission Electricity Delivery and Energy Reliability (DOE) Energy Efficiency and Renewable Energy (DOE) Energy Information Administration (DOE) Falcon and Amistad Operating and Maintenance Fund (DOE) Federal Energy Regulatory Commission (DOE) Fossil Energy Research and Development (DOE) Innovative Technology Loan Guarantee Program (DOE) National Nuclear Security Administration (DOE) Naval Petroleum and Oil Shale Reserves (DOE) Non-Defense Environmental Cleanup Northeast Home Heating Oil Reserve Northern Border Regional Commission Nuclear Energy (DOE) Nuclear Regulatory Commission Nuclear Waste Disposal Nuclear Waste Technical Review Board Office of Science (DOE) Office of the Assistant Secretary of the Army (Civil Works) Office of the Federal Coordinator for Alaska Natural Gas Transportation Projects Office of the Inspector General (DOE) Other Defense Activities Southeast Crescent Regional Commission Southeastern Power Administration (DOE) Southwestern Power Administration (DOE) Strategic Petroleum Reserve (DOE) Uranium Enrichment Decontamination and Decommissioning
Defense	Air Force, Department of the (DOD) *(See also Military Construction, Veterans Affairs, and Related Agencies)*

Table 3.47: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Defense (Cont.)	Army, Department of the (DOD) *(See also Military Construction, Veterans Affairs, and Related Agencies)*
	Basic Allowance for Housing
	Central Intelligence Agency (Executive)
	Central Intelligence Agency Retirement and Disability System Fund
	Defense Advanced Research Projects Agency (DOD)
	Defense Agencies (DOD) *(See also Military Construction, Veterans Affairs, and Related Agencies)*
	Defense Finance and Accounting Service
	Defense Health
	Defense Intelligence Agency (DOD)
	Defense Investigative Service (DOD)
	Defense Logistics Agency (DOD)
	Defense Security and Cooperation Agency
	Department of Defense—Military *(See also Military Construction, Veterans Affairs, and Related Agencies)*
	Department of the Air Force
	Department of the Army
	Department of the Navy
	Marine Corps
	Office of the Secretary of Defense
	Environmental Restoration
	Facilities Sustainment
	Intelligence Community
	Missile Defense Agency (DOD)
	National Geospatial and Intelligence Agency (DOD)
	National Guard and Reserve Components (DOD)
	National Reconnaissance Office
	National Security Agency (DOD)
	Navy, Department of the (DOD) *(See also Military Construction, Veterans Affairs, and Related Agencies)*
	North Atlantic Treaty Organization [NATO]:
	Department of Defense
	Overseas Dependents Education (DOD)
	U.S. Court of Military Appeals (DOD)
	Uniformed Services University of the Health Services
Finance	Administrative Conference of the United States
	Administrative Office of the U.S. Courts (Judiciary)
	Alcohol and Tobacco Tax and Trade Bureau (Treasury)
	Allowances and Office Staff for Former Presidents (GSA)
	Bureau of the Public Debt (Treasury)
	Care of Supreme Court Building and Grounds (Architect of the Capitol)
	Christopher Columbus Fellowship Foundation
	Commodity Futures Trading Commission
	Community Development Financial Institutions Fund Program Account (Treasury)
	Compensation of the President (Executive Office of the President)
	Consumer Product Safety Commission
	Council of Economic Advisers (Executive Office of the President)
	Court Services and Offender Supervision Agency for the District of Columbia
	Courts of Appeals, District Courts, and Other Judicial Services (Judiciary)
	Disaster Loans Program (Small Business Administration)
	District of Columbia Courts
	District of Columbia Federal Funds
	District of Columbia Public Defender Service
	Election Assistance Commission
	Executive Office of the President
	Executive Residence at the White House (Executive Office of the President)

Table 3.48: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Finance (Cont.)	Federal Buildings Fund (GSA)
	Federal Citizen Services Fund (GSA)
	Federal Communications Commission
	Federal Deposit Insurance Corporation, Office of Inspector General
	Federal Election Commission
	Federal Judicial Center (Judiciary)
	Federal Labor Relations Authority
	Federal Trade Commission
	Financial Crimes Enforcement Network (Treasury)
	Financial Management Service (Treasury)
	Funds Appropriated to the President (Executive Office of the President)
	General Services Administration (GSA)
	Government-wide Management Councils (Executive Office of the President)
	Harry S Truman Scholarship Foundation
	High Intensity Drug Trafficking Areas (ONDCP)
	Internal Revenue Service (Treasury)
	Judiciary
	Merit Systems Protection Board
	Morris K. Udall and Stewart L. Udall Foundation
	National Archives and Records Administration
	National Credit Union Administration:
	Central Liquidity Facility
	Community Development Revolving Loan Fund
	National Historical Publications and Records Commission (NARA)
	National Security Council and Homeland Security Council (Executive Office of the President)
	Office of Administration (Executive Office of the President)
	Office of Government Ethics
	Office of Management and Budget (Executive Office of the President)
	Office of National Drug Control Policy (ONDCP)
	Office of Personnel Management
	Office of Special Counsel
	Official Residence of the Vice President (Executive Office of the President)
	Partnership Fund for Program Integrity Innovation
	Postal Regulatory Commission
	President's Commission on White House Fellows (OPM)
	Privacy and Civil Liberties Oversight Board
	Public Buildings Service (GSA)
	Real Property Management and Disposal Activities (GSA)
	Recovery Accountability and Transparency Board
	Resident Tuition Support (DC)
	Securities and Exchange Commission
	Selective Service System
	Small Business Administration
	Special Assistance to the President (Executive Office of the President)
	Special Inspector General for the Troubled Asset Relief Program
	Supreme Court of the United States (Judiciary)
	The White House (Executive Office of the President)
	Treasury, Department of the
	Treasury Forfeiture Fund
	U.S. Court of Appeals for the Federal Circuit (Judiciary)
	U.S. Court of International Trade (Judiciary)
	U.S. Mint (Treasury)
	U.S. Sentencing Commission (Judiciary)
	Unanticipated Needs (Executive Office of the President)
	United States Postal Service:
	Office of Inspector General
	Payment to the Postal Service Fund

Table 3.49: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Finance (Cont.)	United States Tax Court
	Vice Presidential Residence (DOD-Navy)
	White House Repair and Restoration (Executive Office of the President)
Military Construction	Air Force, Department of the (DOD) *(See also Defense)*
	American Battle Monuments Commission
	Armed Forces Retirement Home
	Army, Department of the (DOD) *(See also Defense)*
	Chemical Demilitarization Construction (DOD)
	Defense Base Closure Accounts (DOD)
	Department of Defense—Civil:
	Department of the Army:
	Cemeterial Expenses
	Department of Defense—Military (DOD): *(See also Defense)*
	Department of the Army
	Department of the Navy
	Department of the Air Force
	Defense Agencies
	Office of the Secretary of Defense
	Family Housing, Construction (DOD)
	Family Housing, Operation and Maintenance (DOD)
	Family Housing Improvement Fund (DOD)
	Homeowners Assistance Fund (DOD)
	North Atlantic Treaty Organization (NATO) Security Investment Program (DOD)
	Navy, Department of the (DOD) *(See also Defense)*
	U.S. Court of Appeals for Veterans Claims
	U.S. Special Operations Command (DOD) *(See also Defense)*
	Veterans Affairs, Department of
Foreign	American Institute in Taiwan
	Department of State:
	Buying Power Maintenance Account
	Capital Investment Fund
	Conflict Stabilization Operations
	Contributions to International Organizations
	Assessed Contributions, United Nations and Other Organizations
	Contributions for International Peacekeeping Activities
	Assessed Contributions, United Nations
	Democracy Fund
	Diplomatic and Consular Programs
	Economic Support Fund
	Educational and Cultural Exchange Programs
	Embassy Security, Construction, and Maintenance
	Emergencies in the Diplomatic and Consular Service
	Foreign Military Financing Program
	Global Health Programs:
	President's Emergency Plan for AIDS Relief [PEPFAR]
	International Military Education and Training
	International Narcotics Control and Law Enforcement
	International Organizations and Programs
	Voluntary Contributions, United Nations and Other Organizations
	Migration and Refugee Assistance
	Nonproliferation, Anti-terrorism, Demining and Related Programs
	Office of Inspector General
	Payment to the Foreign Service Retirement and Disability Fund
	Peacekeeping Operations
	Protection of Foreign Missions and Officials
	Repatriation Loans Program Account

Table 3.50: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Foreign (Cont.)	Representation Allowances
	United States Emergency Refugee and Migration Assistance Fund
	Department of the Treasury:
	International Affairs Technical Assistance
	International Financial Institutions:
	African Development Bank
	African Development Fund
	Asian Development Bank
	Asian Development Fund
	Clean Technology Fund
	Enterprise for the Americas Multilateral Investment Fund
	European Bank for Reconstruction and Development
	Global Agriculture and Food Security Program
	Global Environment Facility
	Inter-American Development Bank
	Inter-American Investment Corporation
	International Bank for Reconstruction and Development
	International Development Association
	International Finance Corporation
	International Fund for Agricultural Development
	International Monetary Fund
	Multilateral Investment Fund
	Strategic Climate Fund
	Export-Import Bank of the United States
	Inter-American Foundation
	International Commissions:
	American Sections, International Commissions
	International Boundary and Water Commission, United States and Mexico
	International Fisheries Commissions
	Millennium Challenge Corporation
	Overseas Private Investment Corporation
	Peace Corps
	Related Agencies and Programs and Other Commissions:
	The Asia Foundation
	Broadcasting Board of Governors
	Center for Middle Eastern-Western Dialogue Trust Fund
	Commission for the Preservation of America's Heritage Abroad
	Commission on Security and Cooperation in Europe (Helsinki Commission)
	Congressional-Executive Commission on the People's Republic of China
	East-West Center
	Eisenhower Exchange Fellowship Program
	Israeli Arab Scholarship Program
	National Endowment for Democracy
	United States-China Economic and Security Review Commission
	United States Commission on International Religious Freedom
	United States Institute of Peace
	Trade and Development Agency
	United States African Development Foundation
	United States Agency for International Development:
	Capital Investment Fund
	Civilian Stabilization Initiative
	Complex Crises Fund
	Development Assistance
	Development Credit Authority
	Global Health Programs
	International Disaster Assistance
	Office of Inspector General
	Operating Expenses

Table 3.51: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Foreign (Cont.)	Transition Initiatives
Homeland Security	Department of Homeland Security Analysis and Operations Biometric Identity Management, Office of [US-VISIT] Chief Financial Officer, Office of the Chief Information Officer, Office of the Disaster Assistance Direct Loan Program Disaster Relief Domestic Nuclear Detection Office Emergency Food and Shelter Emergency Management Performance Grants Federal Emergency Management Agency Federal Law Enforcement Training Center Federal Protective Service Firefighter Assistance Grants Flood Hazard Mapping Health Affairs, Office of Inspector General, Office of National Flood Insurance Fund National Protection and Programs Directorate Predisaster Mitigation Fund Science and Technology Secretary and Executive Management, Office of the State and Local Preparedness Grants Transportation Security Administration U.S. Citizenship and Immigration Services U.S. Coast Guard U.S. Customs and Border Protection U.S. Fire Administration U.S. Immigration and Customs Enforcement U.S. Secret Service Under Secretary for Management, Office of the Working Capital Fund
Interior	Department of the Interior *Except* the Bureau of Reclamation Advisory Council on Historic Preservation Agency for Toxic Substances and Disease Registry (HHS) Bureau of Indian Affairs (Interior) Bureau of Land Management (Interior) Bureau of Ocean Energy Management (Interior) Bureau of Safety and Environmental Enforcement (Interior) Chemical Safety and Hazard Investigation Board Commission on Fine Arts Council on Environmental Quality and Office of Environmental Quality (Executive Office of the President) Dwight D. Eisenhower Memorial Commission Environmental Protection Agency Historic Preservation Fund (Interior) Holocaust Memorial Museum Indian Health Service (HHS) Institute of American Indian and Alaska Native Culture and Arts Development Insular Affairs, Office of (Interior) John F. Kennedy Center for the Performing Arts Land and Water Conservation Fund National Capital Arts and Cultural Affairs National Capital Planning Commission

Table 3.52: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Interior (Cont.)	National Endowment for the Arts
	National Endowment for the Humanities
	National Foundation on the Arts and the Humanities
	National Gallery of Art
	National Indian Gaming Commission
	National Institute of Environmental Health Sciences (NIH) *(See also Labor, Health and Human Services, and Education, and Related Agencies)*
	National Park Service (Interior)
	Office of Navajo and Hopi Indian Relocation
	Office of Special Trustee for American Indians (Interior)
	Office of Surface Mining Reclamation and Enforcement (Interior)
	Smithsonian Institution
	U.S. Fish and Wildlife Service (Interior)
	U.S. Forest Service (USDA)
	U.S. Geological Survey (Interior)
	Woodrow Wilson International Center for Scholars
Labor	Department of Labor
	Department of Health and Human Services (HHS)
	Except:
	Food and Drug Administration
	Indian Health and Construction Activities
	Department of Education
	Administration for Children and Families (HHS)
	Administration for Community Living (HHS)
	Adolescent Pregnancy (HHS)
	Agency for Healthcare Research and Quality (HHS)
	Aging Programs (HHS)
	American Printing House for the Blind (Education)
	AmeriCorps (Related Agency)
	Bilingual and Immigrant Education (Education)
	Biomedical Advanced Research and Development Authority (HHS)
	Black Lung Benefits (Labor)
	Bureau of International Labor Affairs (Labor)
	Bureau of Labor Statistics (Labor)
	Center for Consumer Information and Insurance Oversight (HHS)
	Centers for Disease Control and Prevention (HHS)
	Centers for Medicare and Medicaid Services (HHS)
	Child Abuse Prevention and Treatment (HHS)
	Child Care and Development Block Grant (HHS)
	Child Support Enforcement (HHS)
	Child Welfare Services (HHS)
	Children and Family Services Programs (HHS)
	College Housing and Academic Facilities Loans (Education)
	Committee for Purchase From People Who Are Blind or Severely Disabled (Related Agency)
	Community Health Centers (HHS)
	Community Service Employment for Older Americans (Labor)
	Community Services Block Grant (HHS)
	Consumer Price Index (Labor)
	Corporation for National and Community Service (Related Agency):
	AmeriCorps
	Domestic Volunteer Service Programs
	Corporation for Public Broadcasting (Related Agency)
	Developmental Disabilities (HHS)
	Dislocated Worker Assistance (Labor)
	Education for the Disadvantaged—Title I (Education)
	Employee Benefits Security Administration (Labor)

Table 3.53: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Labor (Cont.)	Employment and Training Administration (Labor)
	English Language Acquisition (Education)
	Family Planning (HHS)
	Family Violence Prevention and Services (HHS)
	Federal Disability Insurance (SSA)
	Federal Mediation and Conciliation Service (Related Agency)
	Federal Mine Safety and Health Review Commission (Related Agency)
	Federal Old Age and Survivors Insurance (SSA)
	Federal Unemployment Benefits and Allowances (Labor)
	Foster Care/Adoption Assistance (HHS)
	Gallaudet University (Education)
	Global Health (HHS)
	Head Start (HHS)
	Health Professions Education (HHS)
	Health Resources and Services Administration (HHS)
	Health Services Research (HHS)
	Higher Education (Education)
	Howard University (Education)
	Impact Aid (Education)
	Indian Student Education (Education)
	Institute of Education Sciences (Education)
	Institute of Museum and Library Services (Related Agency):
	Office of Library Services
	Office of Museum Services
	International Education and Foreign Language Programs (Education)
	John E. Fogarty International Center for Advanced Study in the Health Sciences (NIH)
	Labor-Management Standards (Labor)
	Low-Income Home Energy Assistance Program (HHS)
	Maternal and Child Health Bureau (HHS)
	Medicaid/Medicare Contractors (HHS)
	Medicare Payment Advisory Commission (Related Agency)
	Migrant Education (Education)
	Migrant Health (HHS)
	Mine Health and Safety Academy (Labor)
	Mine Safety and Health Administration (Labor)
	National Cancer Institute (NIH)
	National Center for Advancing Translational Sciences (NIH)
	National Center for Complementary and Integrative Medicine (NIH)
	National Center for Health Statistics (HHS)
	National Council on Disability
	National Eye Institute (NIH)
	National Health Service Corps (HHS)
	National Heart, Lung, and Blood Institute (NIH)
	National Human Genome Research Institute (NIH)
	National Institute of Allergy and Infectious Diseases (NIH)
	National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIH)
	National Institute of Biomedical Imaging and Bioengineering (NIH)
	National Institute of Child Health and Human Development (NIH)
	National Institute of Dental and Craniofacial Research (NIH)
	National Institute of Diabetes and Digestive and Kidney Diseases (NIH)
	National Institute of Environmental Health Sciences (NIH) *(See also Interior, Environment, and Related Agencies)*
	National Institute of General Medical Sciences (NIH)
	National Institute of Mental Health (NIH)
	National Institute of Neurological Disorders and Stroke (NIH)
	National Institute of Nursing Research (NIH)
	National Institute on Aging (NIH)

Table 3.54: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Labor (Cont.)	National Institute on Alcoholism and Alcohol Abuse (NIH)
	National Institute on Deafness and Other Communication Disorders (NIH)
	National Institute on Drug Abuse (NIH)
	National Institute on Minority Health and Health Disparities (NIH)
	National Institute on Occupational Safety and Health (HHS)
	National Institutes of Health (HHS)
	National Labor Relations Board (Related Agency)
	National Library of Medicine (NIH)
	National Mediation Board (Related Agency)
	National Technical Institute for the Deaf (Education)
	Native American Programs (HHS) (Education) (Labor)
	Nursing Workforce Development (HHS)
	Occupational Safety and Health Administration (Labor)
	Occupational Safety and Health Review Commission
	Office for Civil Rights (HHS) (Education)
	Office of Apprenticeship (Labor)
	Office of Disability Employment Policy (Labor)
	Office of Elementary and Secondary Education (Education)
	Office of Federal Contract Compliance Programs (Labor)
	Office of Job Corps (Labor)
	Office of Innovation and Improvement (Education)
	Office of Refugee Resettlement (HHS)
	Office of Special Education and Rehabilitative Services (Education)
	Office of Workers' Compensation Programs (Labor)
	Pell Grants (Education)
	Pension Benefit Guaranty Corporation (Labor)
	President's Council on Physical Fitness (HHS)
	Public Health Service (HHS)
	Railroad Retirement Board (Related Agency)
	Rehabilitation Services and Disability Research (Education)
	Runaway and Homeless Youth (HHS)
	Ryan White HIV/AIDS Care Act (HHS)
	Safe and Drug-Free Schools (Education)
	School Improvement Programs (Education)
	Section 317 Immunization Program (HHS)
	Sexually Transmitted Infections Program (HHS)
	Social Security Administration (Related Agency)
	Social Services Block Grant (HHS)
	Special Benefits for Disabled Coal Miners (Labor)
	Special Education (Education)
	State Unemployment Insurance and Employment Service Operations (Labor)
	Student Aid Administration (Education)
	Student Financial Assistance (Education)
	Substance Abuse and Mental Health Services Administration (HHS)
	Supplemental Security Income (SSA)
	Temporary Assistance for Needy Families (HHS)
	Trade Adjustment Assistance/Workers (Labor)
	Veterans Employment and Training (Labor)
	Vocational and Adult Education (Education)
	Wage and Hour Division (Labor)
	Woman's Bureau (Labor)
	Workforce Innovation and Opportunity Act One-Stop Centers (Labor)
Transportation	Department of Transportation
	Department of Housing and Urban Development
	Access Board
	Amtrak Office of Inspector General

Table 3.55: Appropriations Subcommittee Jurisdictions, Continued

Subcommittee	Listed Function
Transportation (Cont.)	Appalachian Regional Commission/Appalachian Development Highway System *(See also Energy and Water Development)*
	Community Planning and Development (HUD)
	Fair Housing and Equal Opportunity (HUD)
	Federal Aviation Administration (Transportation)
	Federal Highway Administration (Transportation)
	Federal Housing Administration (HUD)
	Federal Maritime Commission
	Federal Motor Carrier Safety Administration (Transportation)
	Federal Railroad Administration (Transportation)
	Federal Transit Administration (Transportation)
	Government National Mortgage Association (HUD)
	Lead Hazard Control and Healthy Homes (HUD)
	Maritime Administration (Transportation)
	National Highway Traffic Safety Administration (Transportation)
	National Railroad Passenger Corporation (Amtrak)
	National Transportation Safety Board
	Neighborhood Reinvestment Corporation
	Office of Housing (HUD)
	Office of the Secretary of Transportation (Transportation)
	Pipeline and Hazardous Materials Safety Administration (Transportation)
	Policy Development and Research (HUD)
	Public and Indian Housing (HUD)
	St. Lawrence Seaway Development Corporation (Transportation)
	Surface Transportation Board
	U.S. Interagency Council on Homelessness
	Washington Metropolitan Area Transit Authority
Legislative	Architect of the Capitol
	Books for the Blind and Physically Handicapped (Library of Congress)
	Botanic Garden (Architect of the Capitol)
	Capitol Police
	Congressional Budget Office
	Congressional Research Service (Library of Congress)
	Copyright Office (Library of Congress)
	Government Accountability Office
	Government Publishing Office
	House of Representatives
	John C. Stennis Center for Public Service, Training, and Development
	Joint Committee on Taxation
	Joint Congressional Committee on Inaugural Ceremonies
	Joint Economic Committee
	Library of Congress
	Office of Compliance
	Office of Congressional Accessibility Services
	Office of the Attending Physician
	Open World Leadership Center Trust Fund
	Senate

3.11.3 Data Appendix C: Mapping Appropriations Subcommittees to Authorizing Committees

Table 3.56: Mapping Appropriations Subcommittees to Authorizing Committee

House

Appropriations Subcommittee	Authorizing Committee
Agriculture, Rural Development, Food and Drug Administration, and Related Agencies	Agriculture
Commerce, Justice, Science, and Related Agencies	Energy and Commerce; Judiciary; Science, Space and Technology; Small Business
Defense	Armed Services
Energy and Water Development, and Related Agencies	Energy and Commerce
Financial Services and General Government	Financial Services
Homeland Security	Homeland Security
Interior, Environment, and Related Agencies	Natural Resources
Labor, Health and Human Services, Education, and Related Agencies	Education and the Workforce
Legislative Branch	Rules
Military Construction, Veterans Affairs, and Related Agencies	Armed Services; Veterans Affiars
State, Foreign Operations, and Related Programs	Foreign Affairs
Transportation, Housing and Urban Development, and Related Agengies	Transportation and Infrastructure

Senate

Appropriations Subcommittee	Authorizing Committee
Agriculture, Rural Development, Food and Drug Administration, and Related Agencies	Agriculture, Nutrition, and Forestry
Commerce, Justice, Science, and Related Agencies	Commerce, Science and Transportation; Judiciary; Small Business and Entrepreneurship
Defense	Armed Services
Energy and Water Development, and Related Agencies	Energy and Natural Resources
Financial Services and General Government	Finance
Homeland Security	Homeland Security and Governmental Affairs
Interior, Environment, and Related Agencies	Environment and Public Works; Energy and Natural Resources
Labor, Health and Human Services, Education, and Related Agencies	Health, Education, Labor, and Pensions
Legislative Branch	Rules and Administration
Military Construction, Veterans Affairs, and Related Agencies	Armed Services and Veterans' Affairs
State, Foreign Operations, and Related Programs	Foreign Relations
Transportation, Housing and Urban Development, and Related Agengies	Banking, Housing, and Urban Affairs

3.11.4 Data Appendix D: Index Cells

Table 3.57: Contract Concentration Index Cells

Cell	No. Contracts	House Index Value	House Index Tertile	Senate Index Value	Senate Index Tertile
Spending Low X Sole Source Other X Commercial X Annual Appropriations	625,207.00	0.004	1	0.040	1
Spending Low X Competed Setaside X Commercial X Annual Appropriations	1,093,491.00	0.005	1	0.044	1
Spending Low X Sole Source Brand Name X Commercial X Annual Appropriations	4,969.00	0.006	1	0.051	1
Spending Low X Sole Source Public Interest X Commercial X Annual Appropriations	84,189.00	0.007	1	0.045	1
Spending Low X Sole Source Only One X Commercial X Annual Appropriations	680,828.00	0.008	1	0.044	1
Spending Medium X Sole Source Other X Commercial X Annual Appropriations	12,593.00	0.008	1	0.057	1
Spending Low X Sole Source Brand Name X Non Commercial X Annual Appropriations	918.00	0.008	1	0.047	1
Spending Low X Sole Source Only One X Non Commercial X Disaster Appropriations	758.00	0.008	1	0.046	1
Spending Low X Competed Full X Non Commercial X Annual Appropriations	9,587,132.00	0.008	1	0.045	1
Spending Low X Competed Full X Commercial X Disaster Appropriations	3,856.00	0.008	1	0.053	1
Spending Low X Competed Setaside X Non Commercial X Annual Appropriations	917,542.00	0.009	1	0.055	1
Spending Medium X Sole Source Only One X Non Commercial X Annual Appropriations	32,359.00	0.009	1	0.054	1
Spending Medium X Sole Source Public Interest X Commercial X Annual Appropriations	1,037.00	0.010	1	0.047	1
Spending Low X Sole Source Only One X Commercial X Disaster Appropriations	563.00	0.010	1	0.057	1
Spending Low X Sole Source Follow On X Commercial X Annual Appropriations	69,450.00	0.010	1	0.058	1
Spending Medium X Sole Source Only One X Commercial X Annual Appropriations	12,096.00	0.010	1	0.050	1
Spending Medium X Competed Setaside X Non Commercial X Annual Appropriations	34,984.00	0.011	1	0.068	1
Spending Low X Sole Source Public Interest X Non Commercial X Annual Appropriations	84,634.00	0.011	1	0.051	1
Spending Low X Competed Full X Non Commercial X Disaster Appropriations	5,107.00	0.012	1	0.061	1
Spending Medium X Competed Full X Commercial X Annual Appropriations	82,282.00	0.012	1	0.070	2
Spending Low X Competed Setaside X Commercial X Disaster Appropriations	1,423.00	0.012	1	0.063	1
Spending Low X Sole Source Other X Non Commercial X Disaster Appropriations	609.00	0.013	1	0.059	1
Spending Low X Sole Source Other X Commercial X Disaster Appropriations	516.00	0.013	1	0.065	1
Spending Medium X Competed Full X Non Commercial X Annual Appropriations	144,322.00	0.013	1	0.072	2
Spending High X Sole Source Only One X Non Commercial X Annual Appropriations	7,244.00	0.014	1	0.062	1
Spending High X Competed Full X Non Commercial X Annual Appropriations	18,324.00	0.014	1	0.069	1
Spending Low X Competed Setaside X Commercial X War Appropriations	207.00	0.015	1	0.055	1
Spending Medium X Sole Source Other X Non Commercial X Annual Appropriations	8,420.00	0.016	1	0.062	1
Spending High X Competed Full X Commercial X Annual Appropriations	9,580.00	0.016	1	0.076	2
Spending Medium X Competed Setaside X Commercial X Annual Appropriations	22,706.00	0.016	1	0.091	2
Spending High X Sole Source Other X Non Commercial X Annual Appropriations	1,142.00	0.017	1	0.058	1
Spending Medium X Sole Source Follow On X Non Commercial X Annual Appropriations	3,196.00	0.017	1	0.070	2
Spending High X Sole Source Follow On X Non Commercial X Annual Appropriations	590.00	0.018	1	0.076	2
Spending Low X Sole Source Other X Commercial X War Appropriations	333.00	0.018	1	0.057	1
Spending High X Sole Source Only One X Commercial X Annual Appropriations	1,519.00	0.019	2	0.050	1
Spending Medium X Competed Full X Commercial X Disaster Appropriations	134.00	0.020	2	0.072	2
Spending High X Competed Setaside X Non Commercial X Annual Appropriations	2,427.00	0.020	2	0.078	2
Spending Low X Sole Source Follow On X Non Commercial X Annual Appropriations	66,806.00	0.020	2	0.070	2
Spending Low X Competed Full X Commercial X War Appropriations	4,094.00	0.021	2	0.075	2
Spending Medium X Sole Source Brand Name X Commercial X Annual Appropriations	86.00	0.021	2	0.089	2
Spending Medium X Sole Source Follow On X Non Commercial X Annual Appropriations	7,686.00	0.021	2	0.088	2

Table 3.58: Contract Concentration Index Cells, Continued

Cell	No. Contracts	House Index Value	House Index Tertile	Senate Index Value	Senate Index Tertile
Spending Low X Competed Full X Non Commercial X War Appropriations	7,697.00	0.022	2	0.063	1
Spending High X Sole Source Other X Commercial X Annual Appropriations	1,751.00	0.023	2	0.063	1
Spending Low X Sole Source Only One X Commercial X War Appropriations	285.00	0.023	2	0.073	2
Spending Low X Competed Full X Commercial X Annual Appropriations	8,256,262.00	0.023	2	0.064	1
Spending Medium X Competed Full X Non Commercial X Disaster Appropriations	495.00	0.025	2	0.080	2
Spending Medium X Sole Source Follow On X Commercial X Annual Appropriations	763.00	0.025	2	0.087	2
Spending Low X Sole Source Only One X Non Commercial X Annual Appropriations	762,881.00	0.025	2	0.058	1
Spending Medium X Sole Source Follow On X Commercial X Annual Appropriations	7,642.00	0.026	2	0.098	2
Spending High X Sole Source Public Interest X Commercial X Annual Appropriations	164.00	0.028	2	0.073	2
Spending Medium X Sole Source Public Interest X Non Commercial X Annual Appropriations	5,586.00	0.028	2	0.080	2
Spending Low X Sole Source Follow On X Non Commercial X Annual Appropriations	81,337.00	0.031	2	0.066	1
Spending Low X Sole Source Follow On X Non Commercial X Disaster Appropriations	213.00	0.031	2	0.143	3
Spending High X Competed Setaside X Commercial X Annual Appropriations	1,471.00	0.033	2	0.151	3
Spending High X Sole Source Follow On X Commercial X Annual Appropriations	170.00	0.037	2	0.086	2
Spending Low X Sole Source Follow On X Commercial X Disaster Appropriations	50.00	0.038	2	0.090	2
Spending Medium X Competed Full X Non Commercial X War Appropriations	2,189.00	0.039	2	0.075	2
Spending Medium X Sole Source Only One X Non Commercial X Disaster Appropriations	40.00	0.040	2	0.090	2
Spending Low X Sole Source Public Interest X Commercial X Disaster Appropriations	559.00	0.043	2	0.172	3
Spending High X Sole Source Public Interest X Non Commercial X Annual Appropriations	1,358.00	0.049	2	0.114	2
Spending High X Sole Source Follow On X Non Commercial X Annual Appropriations	382.00	0.049	2	0.105	2
Spending Low X Competed Setaside X Non Commercial X War Appropriations	44.00	0.053	2	0.094	2
Spending Low X Sole Source Follow On X Commercial X Disaster Appropriations	161.00	0.055	2	0.169	3
Spending Medium X Competed Setaside X Non Commercial X Disaster Appropriations	71.00	0.057	2	0.154	3
Spending Low X Sole Source Other X Non Commercial X War Appropriations	911.00	0.059	2	0.078	2
Spending High X Competed Full X Non Commercial X Disaster Appropriations	107.00	0.063	2	0.155	3
Spending Medium X Sole Source Public Interest X Non Commercial X Disaster Appropriations	43.00	0.067	2	0.143	3
Spending Medium X Sole Source Brand Name X Non Commercial X Annual Appropriations	35.00	0.068	2	0.088	2
Spending Medium X Competed Full X Commercial X War Appropriations	491.00	0.069	3	0.138	3
Spending Medium X Sole Source Only One X Non Commercial X War Appropriations	26.00	0.070	3	0.102	2
Spending Low X Sole Source Follow On X Commercial X Annual Appropriations	32,694.00	0.078	3	0.101	2
Spending Low X Sole Source Public Interest X Non Commercial X Disaster Appropriations	832.00	0.082	3	0.304	3
Spending Medium X Sole Source Follow On X Non Commercial X Disaster Appropriations	22.00	0.087	3	0.163	3
Spending Medium X Sole Source Only One X Commercial X Disaster Appropriations	14.00	0.089	3	0.112	2
Spending Low X Competed Setaside X Non Commercial X Disaster Appropriations	2,230.00	0.090	3	0.410	3
Spending Medium X Sole Source Public Interest X Commercial X Disaster Appropriations	16.00	0.092	3	0.143	3
Spending Medium X Sole Source Follow On X Non Commercial X Disaster Appropriations	15.00	0.101	3	0.148	3
Spending Medium X Sole Source Only One X Commercial X War Appropriations	37.00	0.102	3	0.112	2
Spending Medium X Competed Setaside X Commercial X Disaster Appropriations	50.00	0.105	3	0.233	3
Spending High X Competed Full X Commercial X Disaster Appropriations	13.00	0.111	3	0.125	2
Spending Low X Sole Source Only One X Non Commercial X War Appropriations	108.00	0.111	3	0.215	3
Spending Low X Sole Source Public Interest X Commercial X War Appropriations	65.00	0.112	3	0.122	2

Table 3.59: Contract Concentration Index Cells, Continued

Cell	No. Contracts	House Index		Senate Index	
		Value	Tertile	Value	Tertile
Spending Low X Sole Source Public Interest X Non Commercial X War Appropriations	139.00	0.112	3	0.160	3
Spending Low X Sole Source Other X Non Commercial X Annual Appropriations	1,197,395.00	0.114	3	0.137	3
Spending Low X Sole Source Follow On X Commercial X War Appropriations	15.00	0.122	3	0.184	3
Spending Low X Sole Source Follow On X Non Commercial X Disaster Appropriations	250.00	0.123	3	0.243	3
Spending Medium X Sole Source Other X Non Commercial X Disaster Appropriations	14.00	0.124	3	0.140	3
Spending Medium X Sole Source Other X Commercial X Disaster Appropriations	15.00	0.124	3	0.136	2
Spending Medium X Competed Setaside X Non Commercial X War Appropriations	14.00	0.136	3	0.160	3
Spending High X Competed Full X Non Commercial X War Appropriations	270.00	0.136	3	0.210	3
Spending High X Sole Source Only One X Non Commercial X War Appropriations	24.00	0.138	3	0.270	3
Spending Medium X Sole Source Public Interest X Commercial X War Appropriations	23.00	0.160	3	0.160	3
Spending High X Sole Source Public Interest X Non Commercial X War Appropriations	22.00	0.160	3	0.235	3
Spending Medium X Competed Setaside X Commercial X War Appropriations	20.00	0.164	3	0.173	3
Spending Medium X Sole Source Public Interest X Non Commercial X War Appropriations	31.00	0.188	3	0.188	3
Spending High X Competed Full X Commercial X War Appropriations	156.00	0.219	3	0.396	3
Spending High X Sole Source Follow On X Commercial X Annual Appropriations	178.00	0.228	3	0.269	3
Spending High X Sole Source Only One X Commercial X War Appropriations	18.00	0.240	3	0.240	3
Spending Medium X Sole Source Follow On X Commercial X Disaster Appropriations	24.00	0.333	3	0.635	3
Spending Medium X Sole Source Follow On X Non Commercial X War Appropriations	12.00	0.340	3	0.660	3
Spending Medium X Sole Source Other X Commercial X War Appropriations	17.00	0.375	3	0.375	3
Spending High X Competed Setaside X Commercial X Disaster Appropriations	2.00				
Spending High X Competed Setaside X Commercial X War Appropriations	2.00				
Spending High X Competed Setaside X Non Commercial X Disaster Appropriations	2.00				
Spending High X Competed Setaside X Non Commercial X War Appropriations	6.00				
Spending High X Sole Source Brand Name X Commercial X Annual Appropriations	7.00				
Spending High X Sole Source Brand Name X Commercial X Disaster Appropriations	-				
Spending High X Sole Source Brand Name X Commercial X War Appropriations	-				
Spending High X Sole Source Brand Name X Non Commercial X Annual Appropriations	7.00				
Spending High X Sole Source Brand Name X Non Commercial X Disaster Appropriations	-				
Spending High X Sole Source Brand Name X Non Commercial X War Appropriations	-				
Spending High X Sole Source Follow On X Commercial X Disaster Appropriations	1.00				
Spending High X Sole Source Follow On X Commercial X War Appropriations	2.00				
Spending High X Sole Source Follow On X Non Commercial X Disaster Appropriations	3.00				
Spending High X Sole Source Follow On X Non Commercial X War Appropriations	-				
Spending High X Sole Source Only One X Commercial X Disaster Appropriations	-				
Spending High X Sole Source Only One X Non Commercial X Disaster Appropriations	7.00				
Spending High X Sole Source Other X Commercial X Disaster Appropriations	1.00				
Spending High X Sole Source Other X Commercial X War Appropriations	4.00				
Spending High X Sole Source Other X Non Commercial X Disaster Appropriations	1.00				
Spending High X Sole Source Other X Non Commercial X War Appropriations	7.00				
Spending High X Sole Source Public Interest X Commercial X Disaster Appropriations	2.00				
Spending High X Sole Source Public Interest X Commercial X War Appropriations	7.00				

Table 3.60: Contract Concentration Index Cells, Continued

Cell	No. Contracts	House Index Value	House Index Tertile	Senate Index Value	Senate Index Tertile
Spending High X Sole Source Public Interest X Non Commercial X Disaster Appropriations	6.00				
Spending High X Sole Source Follow On X Commercial X Disaster Appropriations	-				
Spending High X Sole Source Follow On X Commercial X War Appropriations	-				
Spending High X Sole Source Follow On X Non Commercial X Disaster Appropriations	2.00				
Spending High X Sole Source Follow On X Non Commercial X War Appropriations	-				
Spending Low X Sole Source Brand Name X Commercial X Disaster Appropriations	4.00				
Spending Low X Sole Source Brand Name X Commercial X War Appropriations	2.00				
Spending Low X Sole Source Brand Name X Non Commercial X Disaster Appropriations	1.00				
Spending Low X Sole Source Brand Name X Non Commercial X War Appropriations	1.00				
Spending Low X Sole Source Follow On X Commercial X War Appropriations	6.00				
Spending Low X Sole Source Follow On X Non Commercial X War Appropriations	4.00				
Spending Low X Sole Source Follow On X Non Commercial X War Appropriations	10.00				
Spending Medium X Sole Source Brand Name X Commercial X Disaster Appropriations	-				
Spending Medium X Sole Source Brand Name X Commercial X War Appropriations	-				
Spending Medium X Sole Source Brand Name X Non Commercial X Disaster Appropriations	-				
Spending Medium X Sole Source Brand Name X Non Commercial X War Appropriations	-				
Spending Medium X Sole Source Follow On X Commercial X Disaster Appropriations	2.00				
Spending Medium X Sole Source Follow On X Commercial X War Appropriations	2.00				
Spending Medium X Sole Source Follow On X Non Commercial X War Appropriations	1.00				
Spending Medium X Sole Source Other X Non Commercial X War Appropriations	10.00				
Spending Medium X Sole Source Follow On X Commercial X War Appropriations	3.00				
	-				

3.12 Appendix: Examples of Appropriations Lines

TITLE II

OPERATION AND MAINTENANCE

OPERATION AND MAINTENANCE, ARMY

For expenses, not otherwise provided for, necessary for the operation and maintenance of the Army, as authorized by law; and not to exceed $12,478,000 can be used for emergencies and extraordinary expenses, to be expended on the approval or authority of the Secretary of the Army, and payments may be made on his certificate of necessity for confidential military purposes, $31,072,902,000.

OPERATION AND MAINTENANCE, NAVY

For expenses, not otherwise provided for, necessary for the operation and maintenance of the Navy and the Marine Corps, as authorized by law; and not to exceed $14,804,000 can be used for emergencies and extraordinary expenses, to be expended on the approval or authority of the Secretary of the Navy, and payments may be made on his certificate of necessity for confidential military purposes, $38,120,821,000.

OPERATION AND MAINTENANCE, MARINE CORPS

For expenses, not otherwise provided for, necessary for the operation and maintenance of the Marine Corps, as authorized by law, $5,542,937,000.

Figure 3.3: Army Operations and Maintenance program 2014 appropriations line item

SHIPBUILDING AND CONVERSION, NAVY

For expenses necessary for the construction, acquisition, or conversion of vessels as authorized by law, including armor and armament thereof, plant equipment, appliances, and machine tools and installation thereof in public and private plants; reserve plant and Government and contractor-owned equipment layaway; procurement of critical, long lead time components and designs for vessels to be constructed or converted in the future; and expansion of public and private plants, including land necessary therefor, and such lands and interests therein, may be acquired, and construction prosecuted thereon prior to approval of title, as follows:

Carrier Replacement Program (AP), $554,798,000;
Virginia Class Submarine, $3,221,314,000;
Virginia Class Submarine (AP), $1,461,361,000;
CVN Refuelings (AP), $529,652,000;
DDG–1000 Program, $453,727,000;
DDG–51 Destroyer, $1,980,709,000;
DDG–51 Destroyer (AP), $100,723,000;
Littoral Combat Ship, $1,755,093,000;
LPD–17, $1,837,444,000;
LHA–Replacement, $1,999,191,000;
Joint High Speed Vessel, $372,332,000;
Oceanographic Ships, $89,000,000;
Moored Training Ship, $131,200,000;
LCAC Service Life Extension Program, $84,076,000;
Service Craft, $3,863,000; and

For outfitting, post delivery, conversions, and first destination transportation, $270,639,000.

Completion of Prior Year Shipbuilding Programs, $73,992,000.

In all: $14,919,114,000, to remain available for obligation until September 30, 2016: *Provided*, That additional obligations may be incurred after September 30, 2016, for engineering services, tests, evaluations, and other such budgeted work that must be performed in the final stage of ship construction: *Provided further*, That none of the funds provided under this heading for the construction or conversion of any naval vessel to be constructed in shipyards in the United States shall be expended in foreign facilities for the construction of major components of such vessel: *Provided further*, That none of the funds provided under this heading shall be used for the construction of any naval vessel in foreign shipyards.

Figure 3.4: Navy Virginia-class submarine program 2014 appropriations line item

NATIONAL PARK SERVICE

OPERATION OF THE NATIONAL PARK SYSTEM

For expenses necessary for the management, operation, and maintenance of areas and facilities administered by the National Park Service and for the general administration of the National Park Service, $2,240,152,000, of which $9,832,000 for planning and interagency coordination in support of Everglades restoration and $97,883,000 for maintenance, repair, or rehabilitation projects for constructed assets, operation of the National Park Service automated facility management software system, and comprehensive facility condition assessments shall remain available until September 30, 2013.

NATIONAL RECREATION AND PRESERVATION

For expenses necessary to carry out recreation programs, natural programs, cultural programs, heritage partnership programs, environmental compliance and review, international park affairs, and grant administration, not otherwise provided for, $59,975,000: *Provided,* That section 502(c) of the Chesapeake Bay Initiative Act of 1998 (16 U.S.C. 461 note; Public Law 105–312) is amended by striking "2011" and inserting "2013".

Figure 3.5: National Parks Service 2014 appropriations line item

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