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Federico Huneeus
In Song Kim

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Agustinas 1180, Santiago, Chile
Teléfono: (56-2) 3882475; Fax: (56-2) 3882231

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Federico Huneeus†
Central Bank of Chile

In Song Kim
MIT

Abstract

We study the effect of firms' lobbying activities on the misallocation of resources in the U.S. through the distortion of firm size. To quantify the macroeconomic consequences of corporate political influence, we develop a multi-sector heterogeneous firm model with endogenous lobbying. We estimate our model using a novel firm-level lobbying dataset, while leveraging the variation in the returns to lobbying expenditures through changes in the value of firms' connections to politicians. Finally, we structurally estimate the model and show that eliminating lobbying increases aggregate productivity in the U.S. by 6 percent..

Resumen

Estudiamos el efecto que el lobby de las empresas tiene sobre el tamaño de ellas mismas y, por medio de ello, su efecto en la ineficiencia de la asignación de recursos en los Estados Unidos. Para calcular los efectos macroeconómicos que tiene la influencia corporativa desarrollamos un modelo con múltiples sectores y firmas heterogéneas con decisión endógena de lobby. Utilizando una nueva base de datos de lobby a nivel de empresas identificamos las variaciones en los rendimientos de los gastos en lobby aprovechando los cambios que tiene el valor de las conexiones político-empresarial de la firma en el tiempo. Finalmente, estimamos estructuralmente nuestro modelo y mostramos que eliminando el lobby se incrementa la productividad agregada de los Estados Unidos en un 6 por ciento.

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Distortions in the allocation of resources across firms can reduce aggregate productivity in an economy (Restuccia and Rogerson, 2008; Hsieh and Klenow, 2009). Firms' decision-making can influence this misallocation in a number of ways. For instance, by charging prices above marginal costs, firms can produce less than efficiently (Baqaee and Farhi, 2020); by saving and thus accumulating capital, firms can avoid financial constraints (Moll, 2014); and by choosing different buyers, firms can influence the techniques other firms use to produce (Boehm and Oberfield, 2020). Yet, an important dimension of firms' decision-making that is often overlooked in studying misallocation is their capacity to influence policy-making directly by lobbying. Politically active firms may obtain policy benefits at the expense of other firms (Khwaja and Mian, 2005; Kang, 2015), which could allow them to survive and grow more than they would have in a perfectly efficient economy.

In this paper, we study the effect of corporate lobbying activities on the misallocation of resources by examining firms' influence on policies that affect firm size. The main goal is to quantify the aggregate productivity effect of economic distortions that are influenced by firm-level lobbying activity. To achieve this goal, we develop a model that characterizes the microfoundations as well as the macroeconomic implications of corporate political influence. Our framework features standard ingredients from firm-level models, including heterogeneity in productivity, selection into production, and endogenous entry. It also features endogenous lobbying activity: Firms self-select into lobbying by paying a fixed cost, an idea motivated by Melitz (2003). Given this selection, firms then choose how much to lobby in order to gain policy benefits that provide revenue gains. Finally, we provide a microfoundation for this self-selection process through a simple game between a policymaker and firms, in the spirit of Grossman and Helpman (1994).

Our model identifies the mechanisms through which lobbying may affect misallocation. Importantly, these effects do not all point in the same direction. On the one

hand, policy benefits create losses in aggregate productivity since they induce some firms to be too big relative to their size under optimal allocation. On the other hand, firms also face exogenous distortions when they lobby. This means they operate in a second-best world, making the effects of lobbying on aggregate productivity ambiguous *a priori* since lobbying might undo some of those exogenous distortions. The key parameters that discipline these forces are the correlations among the dimensions of firm heterogeneity, such as productivity in producing, productivity of lobbying, and exogenous distortions.

To resolve this uncertainty, we estimate our model to empirically evaluate the quantitative effects of lobbying on aggregate productivity. To estimate the parameters of our model, we construct a comprehensive dataset of firm-level lobbying covering all lobbying activities in the U.S. from 1999 to 2018 and establish a direct link between lobbying clients (i.e., firms) and the population of public firms. This dataset includes firms' lobbying expenses as well as which congressional committees the lobbying activity targeted. We do this by analyzing the textual descriptions from more than one million lobbying report filings since the 106th Congress to identify which bills were lobbied, and then we connect these bill to their originating committees.

Our modeling choices are then guided by key patterns that we identify from our firm-level lobbying dataset. First, we observe there is a strong selection into lobbying. Only around 12 percent of public firms lobby and these firms are significantly bigger than non-lobbying firms. Second, lobbying exhibits significant persistence in terms of the likelihood of entry into lobbying and exit from lobbying (i.e., the extensive margin) and also in terms of how much expenditure firms spend on lobbying (i.e., the intensive margin). Third, lobbying behavior seems to be more consistent with the hypothesis that returns to lobbying accrue to the specific firms that lobby and not to other firms in the same sector. Specifically, business orga-

nizations account for only a small fraction of total lobbying expenses while firms spend significantly larger amounts. Furthermore, the mean number of actors that lobby on any given bill in the last 20 years is just two. This suggests that concerns about free-riding and collective action are minimal. Finally, we find that firms tend to lobby congressional bills that are concerned with very narrow policy issues that directly affect them (e.g., a policy toward a specific product).

As noted, our model focuses on the extent to which lobbying affects misallocation by distorting firms' size. Therefore, we carefully estimate the parameter that captures the relationship between lobbying expenditure and firm size. Specifically, we build an instrumental variable (IV) to address the endogeneity between lobbying expenditure and firm size that is predicted by the model. Building upon Bertrand et al. (2020), we exploit exogenous variation in the value of firms' connections with politicians by tracing the assignment of those politicians to different congressional committees over time.[1] This variation will affect the returns to lobbying as firms are heterogeneously exposed to the jurisdictions of committees according to firms' characteristics, such as which products they produce. The identification assumption is that individual firms cannot influence committee membership. Thus, we follow the strategy of a standard *shift-share* design, in which the share is the importance of a committee for a firm, and the identification comes from the shift in committee membership of politicians who are connected to those firms. We measure a connection between a firm and a politician as the geographic proximity between the firm's headquarter location and politicians' electoral districts. We find that a 10 percent increase in lobbying expenditure contributes up to a 1.3 percent gain in firms' value-added. Furthermore, our IV estimates are an order of magnitude larger in absolute value than the OLS ones, highlighting the importance of addressing the

[1] As we show below, over 30% of legislators change their committee memberships across congressional sessions.

endogeneity in the relationship between lobbying expenses and firms' value-added. Furthermore, this bias can be rationalized through the lens of the model with the correlation between lobbying expenditure and lobbying productivity.

Finally, we perform counterfactual analyses to quantify the macroeconomic consequences of firms' lobbying activities. Specifically, we estimate the model with a simulated method of moments using the moments from firms' size distribution, firms' lobbying activities, and the estimates from the aforementioned instrumental variable analysis. We show that firms' lobbying expenses reduce aggregate productivity by 6 percent relative to an economy where the return to lobbying is set to zero. This reduction comes mainly from two sources. The first is that reducing lobbying leads to a decline in the dispersion of firms' marginal revenue product of inputs, which reflects an improved allocation of resources. The second is that, through a general equilibrium effect, wages decline so that entry becomes cheaper, increasing the number of firms in the economy. This indirect effect accounts for around 31 percent of the total effect, highlighting the importance of the model for understanding the general equilibrium and composition of the aggregate effect of firms' lobbying activities.

We contribute to two distinct literatures. First, we connect to the literature on the misallocation of resources across firms pioneered by Restuccia and Rogerson (2008) and Hsieh and Klenow (2009). This literature has studied different margins of firms' decision-making that influence the misallocation of resources, such as pricing decisions in output markets (Baqaee and Farhi, 2020), financial frictions in capital markets (Midrigan and Xu, 2014), contract enforcement in intermediate input markets (Boehm and Oberfield, 2020), and selection into production (Yang, 2020), to name a few. Nevertheless, this literature has missed an important dimension of firms' decision-making, namely, their influence on policy through lobbying activity. An exception to this is Arayavechkit, Saffie and Shin (2018), who con-

sider the effect of lobbying on capital misallocation, focusing specifically on the effect of lobbying on corporate taxation and distortion of capital intensity (which, in turn, can affect firm size). In contrast, we evaluate the overall macroeconomic consequences of lobbying through the distortion of firm size by developing a general equilibrium firm model that features endogenous lobbying.[2] To the best of our knowledge, our study provides the first quantitative evaluation of the overall aggregate effect of firms' lobbying activities on the misallocation of resources through firm size.

Next, we contribute to the political economy literature on corporate lobbying (Hansen and Mitchell, 2000; Ansolabehere, Jr and Tripathi, 2002). Specifically, our study explains why firms get bigger as a result of lobbying. This approach contrasts with the conventional focus on the opposite causal direction, whereby researchers investigate how firms of different sizes tend to have different propensities to engage in individual lobbying activities (Bombardini, 2008; Bombardini and Trebbi, 2012; Kim, 2017). To this literature, we make three contributions. First, we quantify not only the firm-level effects of lobbying but also its macroeconomic effects. We find significant private returns to lobbying, corroborating Richter, Samphantharak and Timmons (2009) and Kang (2015), while also documenting how politically connected firms may be responsible for inefficiencies in the U.S. economy.[3] Second, the model contributes to our understanding of the long-standing empirical puzzle of "why there is so little money in U.S. politics" (Ansolabehere, de Figueiredo and Snyder Jr, 2003). In particular, our model underscores the importance of the fixed cost of lobbying as well as firms' lobbying productivity in determining both the

[2]Note that, using our identification strategy, we do not find evidence for the effect of lobbying on the distortion of capital intensity.

[3]Callander, Foarta and Sugaya (2021) provide theoretical accounts of the relationship between market competition and political influence.

extensive and the intensive margins of lobbying. That is, there exists significant frictions in the political marketplace, as firms have to make significant investments to actively participate in lobbying (Kang, 2015). Finally, we build a novel dataset that contributes to the rapidly growing empirical literature that examines interest group lobbying (De Figueiredo and Richter, 2014; Bombardini and Trebbi, 2020). Our dataset covers the universe of lobbying activities since 1999 and is matched to activities of other political actors, including firms and politicians across various sectors and committees. We find that firm-level lobbying expenditures are significantly larger than those by sectoral-organizations.

The remainder of the paper is organized as follows. The next section describes the data and documents a set of stylized facts about firms' lobbying behavior. Section II presents the model, which is guided by the patterns identified from the data. Section III quantifies the effects of lobbying on misallocation based on the estimation of the model and counterfactual analysis. Section IV concludes.

I Data and Facts

We construct a novel database that connects firm-level economic activities with firm-level political behavior for all publicly traded firms in the U.S. from 1999 to 2018. The Lobbying Disclosure Act (LDA) of 1995 requires lobbyists to disclose their "lobbying activities"[4] on behalf of their clients.[5] We parse more than one million original filings available from the Senate Office of Public Records (SOPR) and the House of Representatives Legislative Resource Center (LRC). Each report contains information on the firm paying for the lobbying, the total amount the firm spent

[4]"Lobbying activities" are defined as "any oral or written communication (including an electronic communication) to a covered executive branch official or a covered legislative branch official that is made." The full list of the covered federal agency names is available from the Office of the Clerk, U.S. House of Representatives.

[5]If a firm has its own in-house lobbying department, it should register and file lobbying reports indicating that it is "self" filing. In our sample, about 85% of lobbying is outsourced.

on lobbying in the period covered by the report, a list of issues lobbied, whether lobbying activity was in-house or not, and lobbied legislative bills.[6]

Note that compliance with the LDA is closely monitored and enforced. Although the contents of lobbying reports as well as the incurred expenses are based on good-faith descriptions and estimates by lobbyists, the reports are audited annually by the Government Accountability Office (GAO). According to the 2014 audit report, 90% of lobbyists filed lobbying reports as required, and 93% could provide documentation related to the expenses.[7] As of 2015, any lobbyist who fails to comply with the legal reporting requirements may be subject to a $200,000 fine, up to 5 years of imprisonment, or both. Furthermore, lobbyists must immediately file an amendment to their original filing if they are notified of any error or they omitted any relevant information. Indeed, lobbying information in the LDA reports has become a reliable source for studying lobbying (e.g., Ansolabehere, Jr and Tripathi, 2002; Bombardini and Trebbi, 2012; Bertrand, Bombardini and Trebbi, 2014).

Our dataset is unique in two dimensions. First, we establish a direct link between lobbying clients (i.e., firms who hire lobbyists) and all public firms in the U.S., which means we can connect firms that lobby with a battery of economic information, such as firm size and profit in order to quantify the aggregate economic distortions due to firm-level lobbying activity. Indeed, the lack of standard company identifiers in the lobbying reports has been a major constraint for conducting firm-level analysis of political activities and their economic consequences. To the best of our knowledge, researchers have either studied firms and trade associations at the level of sectors (up to 4-digit Standard Industrial Classification) or focused primarily on a limited set of Fortune 500 and S&P 500 corporations (e.g., Bombardini and

[6]The LDA mandates that lobbyists disclose any congressional bill number, title, and section associated with the lobbying.

[7]The 2014 GAO report on lobbyists' compliance with disclosure requirements is available at http://www.gao.gov/products/GAO-15-310

Trebbi, 2012; Bertrand et al., 2020).[8] We overcome this limitation and study political behavior of all publicly traded firms from 1999 to 2018. Specifically, we utilize natural language processing, name entity matching algorithms, and manual matching to link 67,842 unique lobbying client names to the list of public firm names and their standardized company identifiers available from COMPUSTAT. Appendix I describes the details of this procedure. The lobbying database as well as the firm identifiers (GVKEY) are made publicly available at http://www.LobbyView.org.

Second, we measure the importance of each congressional committee for each individual firm i in year t by analyzing the complete list of bills that have been lobbied by the firm up to $t-k$. Specifically, we first identify the complete list of bills that have been lobbied by firm i. We then identify the committee c to which each bill is assigned, which gives us a comprehensive list of the committees with jurisdiction over bills of interest to firm i. Because we know how many bills that the firm lobbied were assigned to each committee, we also have a measure of the *degree of importance* of each committee to each firm across time, w_{ict}. Our approach differs from Bertrand, Bombardini and Trebbi (2014), who assign lobby issues[9] to each congressional committee *a priori*. For example, they link the Senate Finance committee to the following lobbying issues: Unemployment, Trade, Taxation, Welfare, Retirement, and Medicare/Medicaid.[10] Note that issues may be mapped to multiple committees with equal weights. They then consider the "issue overlap"

[8] See Kim (2017) for an exception based on which we make further improvements disambiguating more firm names covering the period up to 2018.

[9] Section 15 of each LDA report specifies the general issue areas of lobbying, such as TAX (`Taxation/Internal Revenue Code`) and TRD (`Trade (Domestic & Foreign)`). The full list of 79 issue codes is available from the Office of the Clerk, U.S. House of Representatives.

[10] For the complete list of mappings between congressional committees and issue codes used by Bertrand, Bombardini and Trebbi (2014), see `https://assets.aeaweb.org/assets/production/articles-attachments/aer/app/10412/20121147_app.pdf`

between firms and politicians based on lobbied issues and committee memberships. We improve upon this approach by exploiting the *direct* link between bills that are actually lobbied by individual firms and the committees with jurisdiction over those bills. We also have a measure of the degree of importance of each committee for each firm by incorporating the frequency with which the firm lobbies bills assigned to each committee. We provide further details about this measure in Section III.

A Stylized Facts

In this section, we document seven facts from our data about the relationship between firm economic characteristics and their lobbying activities. Although some of these facts have been documented in earlier studies (e.g., Kerr, Lincoln and Mishra, 2014; Arayavechkit, Saffie and Shin, 2018), we highlight that, to the best of our knowledge, no previous work has provided the following stylized facts at this scale encompassing lobbying and campaign donations by public and private firms, legislative activities, and federal government agencies between 1999 and 2018.

Fact 1 *Firm lobbying is relatively rare.* Lobbying Congress is a relatively rare firm activity. Of the 7,646 public firms operating in the United States in 2017, only 766 firms engaged in lobbying. In the period from 1999 to 2018, on average just 11.8 percent of public firms lobbied Congress. Table IV.1 in Appendix IV illustrates this point by looking at lobbing activity across two-digit NAICS sectors. We consistently find that lobbying is relatively rare. For example, only about 5 percent of firms in the Finance and Insurance sector (NAICS code 52) have reported that they engaged in lobbying on any policy issues. The most active sector appears to be Education Services (NAICS code 61), in which almost a quarter of firms lobbied—meaning a full three-quarters did not. The percent of firms with their own in-house lobbying department is even smaller, ranging from 0.8% (real estate, rental, and leasing) to 15.3% (utilities).

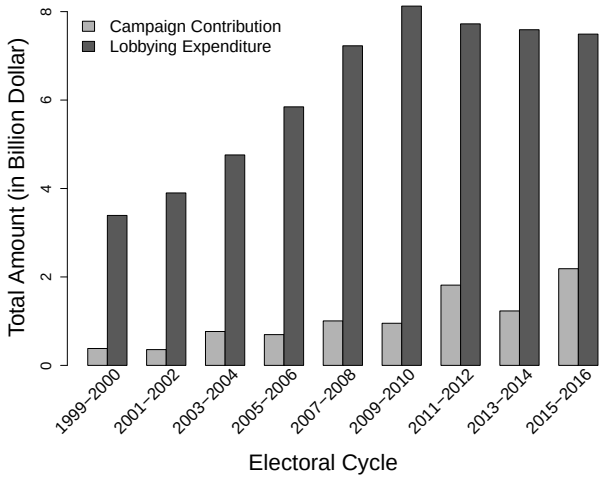


Figure 1: **Campaign Contributions vs. Lobbying Expenditures.** This figure compares total campaign contributions to total lobbying expenditures in each election cycle (from September in one year to August the next). We used data from the Federal Election Committee (available from `http://classic.fec.gov/finance/disclosure/ftpdet.shtml`) to calculate campaign contributions, which is the sum of "contribution or independent expenditure made by a PAC, party committee, candidate committee, or other federal committee to a candidate during the two-year election cycle." Note that we exclude individual contributions to facilitate the comparison with the lobbying expenditure.

Fact 2 *More money is spent on lobbying than on campaign contributions.* Tullock (1972) famously asked, "Why is there so little money in U.S. politics?" The so-called "Tullock's Puzzle" is based on the observation that campaign contributions in the 1970s came to only about $200 million, an amount significantly smaller than the hundreds of billions of dollars in public expenditures at the time. Researchers still find that campaign contributions are smaller than public spending by the government (Ansolabehere, de Figueiredo and Snyder Jr, 2003). In contrast, we find that lobbying expenditures are significantly larger than campaign contributions. To be sure, money spent on lobbying is still significantly smaller than the federal budget of about $4 trillion (as of 2016). However, as Figure 1 shows, we find that lobbying involves more money than campaign contributions made by all

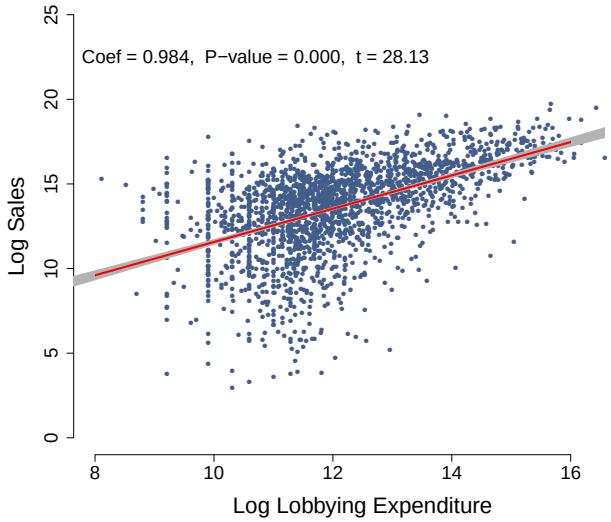
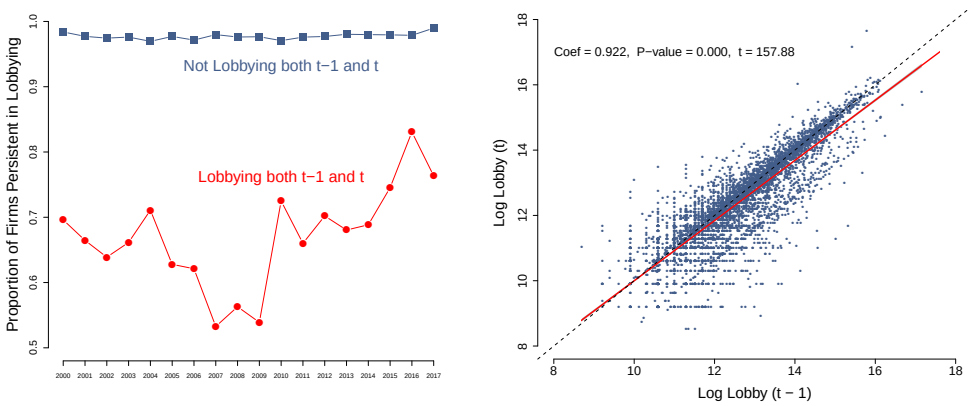


Figure 2: **Sales and Lobbying Expenditure.** This figure plots firm size, measured by a firm's sales, against lobbying expenses for the subset of public firms that engage in lobbying.

PACs (political action committees), party committees, candidate committees, and other federal committees combined. (Firms cannot themselves make contributions to candidates, meaning the two types of contributions are not entirely comparable, but firms can make contributions to PACs.)

Fact 3 *Firms' revenues and lobbying activity are positively and robustly correlated. This holds both in the extensive and intensive margin.* As observed in the literature, firms that engage in lobbying tend to be larger than politically inactive firms in the extensive margin (Kim and Osgood, 2019). Figure 2 shows that the positive correlation between firm size (measured by sales) and lobbying expenditure holds for the intensive margin as well. That is, conditional on lobbying, larger firms tend to spend more money on lobbying than smaller firms.

Fact 4 *Lobbying behavior is highly persistent. This holds both in the extensive and intensive margin.* Over time, lobbying activities are highly persistent. We ex-



(a) Extensive Margin (b) Intensive Margin

Figure 3: **Persistence of Lobbying in the Extensive and Intensive Margins.** We find that firm-level lobbying activities are persistent both at the extensive margin (lobbying or not) and intensive margin (expenditure amount conditional on lobbying).

amine this by tracking the lobbying activities of all public firms in two consecutive years. The left panel of Figure 3 shows that almost all firms that did not lobby in the previous year tend not to lobby in the next year. On the other hand, firms that engaged in lobbying continue their political activities. For example, more than 80% of firms that lobbied in 2016 continued lobbying in 2017. Note that this is a conservative measure of the persistence of lobbying as we focus exclusively on two consecutive years. In fact, we observe a significant drop in the sticky behavior during the financial crisis of 2007–2009, but the overall persistence becomes much higher as we allow for a wider window over time. The right panel shows that on the intensive margin, there exists a positive and robust correlation between a firm's lobbying expenses in year $t-1$ and year t conditional on lobbying in both years. Moreover, we find that the amounts firms spend on lobbying are also persistent in absolute value (indicated by the dotted 45 degree line). This is an important empir-

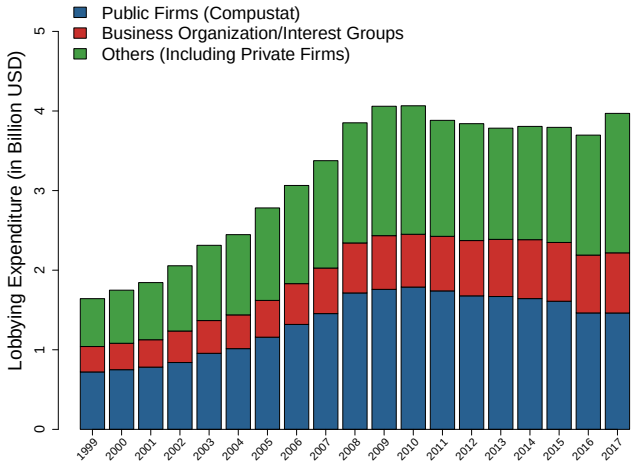


Figure 4: **Firm vs Sector Level Lobbying Expenditures.** This figure compares the total lobbying expenses by firms and sectoral organizations. We first identify all public firms from the COMPUSTAT database (blue). To identify sectoral organizations (red), we included all lobbying clients with NAICS code 813910 ("Business Associations") along with other entities whose legal name includes "associations" or "ASSN." All other entities, such as private firms and universities, are grouped as "Others" (green). We find that firm-level lobbying is significantly larger than sector-level lobbying.

ical fact that motivates our identification in Section III as we rely on the exogenous increases in the *value* of lobbying through political connections rather than a strategic response in the amount of lobbying expenses at the firm level when we evaluate the economic effect of their lobbying activities.

Fact 5 *Firm-level lobbying activities account for a significant portion of federal lobbying.* To date, empirical studies of special interest group politics have focused primarily on sector-level political spending (Goldberg and Maggi, 1999; Gawande and Bandyopadhyay, 2000). Although lobbying through sectoral associations is certainly important, we find that firms' individual lobbying activities are at least as prevalent as those by sectoral organizations. Figure 4 shows that firm-level lobbying expenses (blue) are in fact much larger than those by sectoral and business

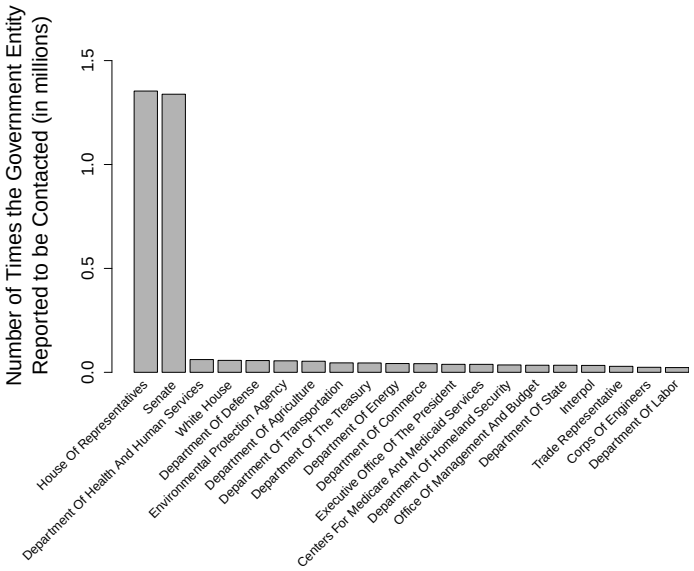


Figure 5: **Top 20 Contacted Government Entities.** This figure shows that the House of Representatives and the Senate are more likely to be contacted by lobbyists than other federal government agencies.

organizations combined (red). If lobbying expenses by all private firms (green) are added to those of public firms, the difference between firm and sectoral lobbying becomes even larger.

Fact 6 *Most lobbying activities target the Congress*. Lobbyists must disclose "the Houses of Congress and Federal agencies" they contacted during the reporting period for each lobbied issue. We identified 227 unique government entities that have been contacted across all lobbying reports after disambiguating their names (e.g., USTR and US Trade Representative). We find that most lobbying efforts target the House of Representatives and the Senate rather than federal government agencies. Indeed, 96.58% of reports that identify at least one contacted government entity reported contacting the House or Senate. Figure 5 displays the top 20 contacted government entities in terms of the number of times they were reported as a contacted entity in each issue, further highlighting the significance of the Congress

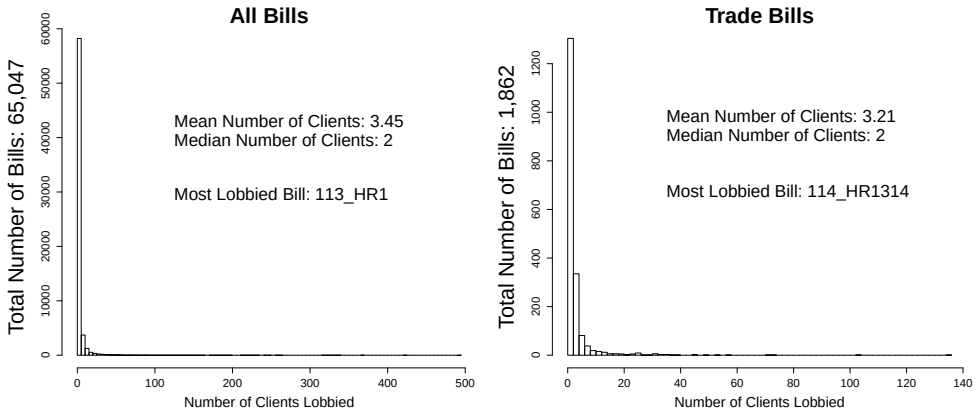


Figure 6: **Distribution of the Number of Lobbyists per Bill (106th–115th Congress).** This figure depicts the distribution of the number of lobbying clients that lobby each congressional bill. The left panel shows that the median number of clients that lobby on any given Senate or House bill is two (total number of bills: 65,047). The right panel shows a similar pattern for trade bills specifically (total number of bills: 1,862).

compared to other agencies when it comes to lobbying.[11]

Fact 7 *Most congressional bills are lobbied by only one or two interest groups.* According to the Lobbying Disclosure Act of 1995, interest groups are legally required to report any congressional bills that they have lobbied. For example, Bose Inc. reported that it lobbied Senate bill "A bill to reduce temporarily the duty on certain audio headphones achieving full-spectrum noise reduction" (S.2325) in the 109th Congress. This is a bill that reflects the highly specialized interests of a particular firm, and in fact Bose Inc. was the only firm that reported lobbying on the bill. Figure 6 shows that lobbying activities reflect narrow interests of political actors who tend to lobby individually. Specifically, we find a highly skewed distribution of the number of interest groups that lobby on any given bill, with a median of two. We find similar patterns across specific policy areas, such as trade bills, as shown by the right panel. Appendix IV shows the distribution across all 79 lobbying issues.

[11] Note that there can be multiple lobbied issues per report.

We now turn to our theoretical model which incorporates the significance of firm-level lobbying targeting narrow policy benefits. Guided by the aforementioned facts, the model includes key ingredients related to selection into lobbying (Fact 1), relationship between firm size and lobbying (Fact 3), lobbying Congress (and thus influencing bills) rather than lobbying other government agencies (Fact 6) and focusing in lobbying on firm-specific policies (Fact 7). Finally, we do not model (a) the dynamics since lobbying is highly persistent (Fact 4), (b) alternative political channels such as campaign contributions due to the dominance of lobbying (Fact 2), and (c) industry-level strategic interactions (and thus ignoring issues such as free-riding) given the prevalence of firm-level lobbying (Facts 5).

II A Theory of Firm-Level Lobbying

In this section, we develop a heterogeneous firm model with endogenous lobbying decisions to investigate the misallocation of resources across firms through the creation of distortions. We introduces a model that generalizes Hsieh and Klenow's (2009) framework along the lines of Melitz (2003) but for lobbying rather than international trade. Specifically, we incorporate a firm's decision about whether to lobby or not (the extensive margin) and how much to spend on lobbying activity (the intensive margin). In the baseline version of the model, the mapping between lobbying effort and distortions is taken as given, which facilitates our exposition of the misallocation of resources among firms. Appendix II presents a microfoundation for the mapping assumed in the baseline model. We accomplish this by incorporating a simplified version of Grossman and Helpman (1994)'s lobbying model.

Overview of the Model This model is an extension of Hsieh and Klenow's (2009) framework. It includes selection into production and lobbying and firm entry along

the lines of Melitz (2003). An important feature that we introduce is that firms choose endogenously whether to lobby as well as how much to spend on lobbying. Lobbying activity entails benefits and costs. The benefits are distortions that increase the firms' revenues beyond what they otherwise would be. The costs are the expenditures the firms make on lobbying (which include a variable and a fixed component). The fixed component of lobbying costs implies selection into lobbying since a subset of firms will have enough profits to cover these costs. Firms that lobby will obtain benefits through distortions at the cost of directly spending resources in lobbying and also indirectly through changes in aggregate misallocation. This is the main mechanism the model explores.

Setup The economy is populated by a representative household and a mass M of firms, distributed across sectors indexed by s. Each firm produces a unique variety ω of a differentiated good. Firms are heterogeneous over idiosyncratic states in production, lobbying, and exogenous wedges. These states are denoted by $\phi = (\phi^P, \phi^L, \phi^D)$, where ϕ^P, ϕ^L and ϕ^D is a Hicks-neutral productivity term, a lobbying productivity term, and an exogenous distortion term, respectively.[12] Given the setup of the model, firms are characterized by ϕ in the sense that all firms that produce varieties with the same ϕ behave in the same way. There is an exogenous probability function over firm states denoted by G, with density g, over $\phi^P \in (0, \infty)$, $\phi^L \in (0, \infty)$ and $\phi^D \in (0, \infty)$. Similarly, there is an endogenous probability function over firm states after firm selection into production, denoted by $\hat{G}_s$, with density $\hat{g}_s$.[13]

[12] We do not include a quality demand shifter because it is standard to show that in this class of models, and with the available data, one cannot separately identify the demand shifter from the Hicks-neutral productivity term.

[13] Note that while the exogenous probability is the same across sectors, the endogenous probability function over firm states varies across sectors because selection is heterogeneous across sectors.

Household The household inelastically supplies N units of labor while receiving firms' profits and revenues from government policies. It has nested preferences first over different sectors and second over firms' differentiated varieties within sectors:

$$Y = \prod_{s=1}^{S} Y_s^{\theta_s}, \text{ with } \sum_{s=1}^{S} \theta_s = 1 \tag{1}$$

$$Y_s = \left[\int_{\omega \in \Omega_s} c_s(\omega)^{\frac{\sigma-1}{\sigma}} d\omega \right]^{\frac{\sigma}{\sigma-1}}, \tag{2}$$

where S is the number of sectors, $\{\theta_s\}_{s=1}^{S}$ are the Cobb-Douglas shares, Ω_s is the endogenous set of varieties in s, and $c_s(\omega)$ is consumption of variety ω of sector s. Y_s is the aggregate demand for sector s with a constant elasticity of substitution (CES) across varieties ω within sector s, and M_s is the endogenous mass of firms in sector s. Each sector has the same elasticity of substitution, $\sigma > 1$. Households maximize their utility subject to their budget constraint.

Technology Each firm produces output of a differentiated variety by combining variable inputs and capital according to a Cobb-Douglas constant returns to scale (CRS) production function:

$$y_s(\phi) = \phi_s^P n_s(\phi)^{\alpha_s^N} k_s(\phi)^{\alpha_s^K}, \tag{3}$$

where $y_s(\phi)$, $n_s(\phi)$ and $k_s(\phi)$ are value-added, employment, and capital stock of firm ϕ in sector s, respectively, and $\{\alpha_s^i\}$ are the Cobb-Douglas weights in sector s, where CRS implies that $\alpha_s^N + \alpha_s^K = 1$ for every sector.[14] In order to produce, firms in each sector s have to spend $f_s^P \left(w^{\alpha_s^N} p_K^{\alpha_s^K} \right)$. As in Bernard, Redding and Schott (2007), in order not to distort selection relative to production decisions, f_s^P is paid in terms of a Cobb-Douglas bundle of capital and labor, with the same factor

[14] The model can be easily extended to include demand shifters and decreasing returns to scale in production. This might be important given the caveats of Hsieh and Klenow (2009)'s framework described in Haltiwanger, Kulick and Syverson (2018).

intensities as in production, α_s^N and α_s^K. The same logic will apply to the selection into lobbying and firm entry.

Market Structure The market structure of this economy is monopolistic competition. This is a standard assumption in the literature that implies that firms charge a constant markup over marginal costs.

Distortions Firms face output distortions $\tau_s(\cdot) \in (0, \infty)$.[15] These distortions can be seen as subsidies if $\tau_s(\phi) > 1$ or taxes if $\tau_s(\phi) < 1$, and they can come from regulations, such as sales taxes. For the purpose of this paper, we need not take a stand on the specific sources for these distortions. We assume these distortions are collected as revenue by the government and rebated back to the household via a lump-sum transfer, T, thus keeping a balanced budget. The wedges are defined by:

$$\tau_s(\phi) = \left(\phi^L l_s(\phi)\right)^{\delta_s} + \phi^D, \tag{4}$$

where $l_s(\phi)$ are the resources allocated towards lobbying activity (which could be zero), δ_s is a parameter that governs the curvature of the distortions-to-lobbying effort, and ϕ^D is the exogenous component of the distortions. Thus, there are two sources of distortions in this economy: An endogenous one that comes from lobbying activity and an exogenous one. We include an exogenous distortion to account for other possible sources of misallocation and thus not attribute all misallocation in the economy to lobbying activity. In Appendix II we provide a microfoundation for this mapping between lobbying effort and policy outcomes. We develop a game between the government and firms, which is a simple version of Grossman and Helpman (1994).

[15] The fact that $\tau_s(\cdot) \in (0, \infty)$ comes from the assumption that $\phi^L \in (0, \infty)$, $\phi^D \in (0, \infty)$ and $l_s(\cdot) > 0$. In Hsieh and Klenow (2009), $\tau_s(\cdot)$ are called wedges instead of distortions. We ignore distortions between labor and capital because empirically we find that lobbying does not seem to distort that margin, as described in Section III.

Lobbying Decision Firms can decide whether to spend resources on lobbying. In order to lobby, a firm ϕ in sector s has to spend $f_s^L \left(w^{\alpha_s^N} p_K^{\alpha_s^K} \right)$ as the fixed lobbying cost. This governs the extensive margin of lobbying activity. Conditional on lobbying, ϕ has to choose how much to spend on lobbying activity, $l_s(\phi)$. When making this decision, the firm compares the benefits from lobbying, which are given by the extra revenue provided by the distortion, to the variable cost of spending $l_s(\phi)$ resources on lobbying.

Market Clearing Conditions Market clearing conditions in this economy are characterized by firms' output, labor, intermediate inputs, and a government balanced budget constraint:

$$(5)\ y_s(\phi) \geq c_s(\phi), \ \forall s, \ \forall \phi$$

$$N \geq \sum_{s=1}^{S} \alpha_s^N M_s^E f_s^E$$

$$(6)\qquad + \sum_{s=1}^{S} \left(\int \left(n_s(\phi) + \alpha_s^N f_s^P + \mathbb{1}^L(\phi) \left(l_s(\phi) + \alpha_s^N f_s^L \right) \right) d\hat{G}_s(\phi) \right)$$

$$(7)\qquad T \equiv \sum_{s=1}^{S} \int \left(\tau_s(\phi) - 1 \right) r_s(\phi) d\hat{G}_s(\phi),$$

where $\mathbb{1}^L(\phi)$ is an indicator function set to one if firm ϕ chooses to lobby, M_s^E is the mass of firms entering sector s, f_s^E the cost to enter sector s, and $r_s(\phi)$ is firm ϕ's revenue. Note that we assume that the capital market is fully flexible, open, and that the United States is price-taker in international capital markets.

Zero-Profit Conditions Given the fixed production and lobbying costs, firms' production and lobbying extensive margin decisions are characterized by the following zero-profit conditions (ZPC):

$$(8)\qquad (\text{ZPC-PRODUCTION}) \quad \pi_s^{NL}(\phi_s^*) = 0$$

$$(9)\qquad (\text{ZPC-LOBBYING}) \quad \pi_s^{L}(\phi_s^{**}) = \pi_s^{NL}(\phi_s^{**}),$$

where $\pi_s^{NL}(\cdot)$ and $\pi_s^{L}(\cdot)$ are the profit functions if the firm does not lobby and does lobby, respectively. Equations (8) and (9) define the cutoff functions $\phi_s^{P*}(\phi^D)$ and $\phi_s^{P**}(\phi^D, \phi^L)$, which identify the levels of productivity above which firms produce and lobby, respectively. Note that the production cutoff depends on the distortion ϕ^D and the lobbying cutoff depends on (ϕ^D, ϕ^L). This implies that firms that have different distortions $\tau_s(\phi)$, given by either ϕ^D or ϕ^L, will need a different productivity cutoff to select into either production and lobbying.[16]

The zero-profit conditions imply that if a firm in sector s has $\phi^P = \phi_s^{P*}(\phi^D)$, then it will not lobby and its net profits from producing will be zero. Thus, since $\pi_s^{NL}(\cdot)$ is increasing in its arguments, firms with $\phi^P < \phi_s^{P*}(\phi^D)$ do not find it profitable to produce. Conversely, firms with $\phi^P \geq \phi_s^{P*}(\phi^D)$ do find it profitable to produce, but maybe not to lobby. Similarly, firms with $\phi^P = \phi_s^{P**}(\phi^D, \phi^L)$ choose to both produce and lobby, but they gain zero net profits. Firms with $\phi_s^{P*}(\phi^D) \leq \phi^P < \phi_s^{P**}(\phi^D, \phi^L)$ choose to produce but not lobby whereas those with $\phi^P \geq \phi_s^{P**}(\phi^D, \phi^L)$ choose to lobby. Thus, these ZPC imply cutoffs in firms' states that characterize firms' extensive margin decisions about production and lobbying activity.

The following proposition summarizes the forces in the model that interact in the selection into producing and lobbying.

Proposition 1. *The zero-profit conditions from Equations* (8) *and* (9) *imply the following selection rule into producing and lobbying:*

$$\frac{\phi_s^{P**}(\phi^D, \phi^L)}{\phi_s^{P*}(\phi^D)} = \left(\frac{(\phi^D)^\sigma}{\kappa_s^{**}(\phi^D, \phi^L) - (\phi^D)^\sigma} \frac{f_s^L}{f_s^P} \right)^{\frac{1}{\sigma-1}}, \tag{10}$$

where $\kappa_s^{**}(\phi^D, \phi^L)$ is a function that scales up profits relative to non-lobbying profits, evaluated at the selection cutoff into lobbying.

[16] More details on the derivation of these cutoffs and their implications can be found in Appendix II.

Proof. All proofs are in Appendix II. ■

Equation (10) shows that selection into lobbying is stronger relative to selection into production, i.e., $\phi_s^{P**}(\phi^D, \phi^L)/\phi_s^{P*}(\phi^D)$ increases, if either of two things happen. First, the fixed cost of lobbying is large relative to the fixed cost of producing. Second, the distortion ϕ^D the firm faces is large. This is so because higher distortions work as a subsidy, meaning that firms need a lower productivity in order to afford to pay for the fixed cost of producing, thereby reducing the cutoff into production $\phi_s^{P*}(\phi^D)$. Furthermore, keeping everything else constant, a higher ϕ^D reduces the relative benefit of lobbying since the firm will have a larger policy benefit even if it does not lobby. These insights will be useful when evaluating the implications of the model in Section III.

Free Entry Condition Firms have to pay an entry cost $f_s^E \left(w^{\alpha_s^N} p_K^{\alpha_s^K} \right)$ in order to have the option to take a draw of their state ϕ. The free entry (FE) condition is characterized by the following:

$$\text{(FE)} \quad V_s^E = 0, \tag{11}$$

where $V_s^E = \mathbb{E}\left[\bar{V}_s - f_s^E \left(w^{\alpha_s^N} p_K^{\alpha_s^K} \right)\right]$ and $\bar{V}_s$ are the expected net and gross value of entry in sector s, respectively.[17] More details about the full solution of the model can be found in Appendix II.

Lobbying and Revenues Given the setup of the model, Proposition 2 summarizes the relationship between lobbying expenditures and the value of lobbying.

Proposition 2. *Using the first order conditions, the relationship between lobbying expenditure and firms' value-added is the following:*

$$\log r_s(\phi) = \gamma_0 + (1 - \delta_s) \log l_s(\phi) - \delta_s \log \phi^L, \text{ if } \phi^P > \phi_s^{P**}(\phi^D, \phi^L). \tag{12}$$

[17] $\bar{V}_s = \sum_{t=0}^{\infty} (1-\eta)^t \bar{\pi}_{s,t}$, where η is the exogenous death rate of firms and $\bar{\pi}_{s,t}$ is the average profit of firms in sector s at time t.

The result comes from the first-order condition of firms' intensive margin decision on lobbying. It says that the relationship between lobbying expenditure and value-added is log linear, with a return of $1-\delta_s$. The residual of this relationship is firms' lobbying productivity, ϕ^L. Importantly, this proposition shows why running a simple ordinary least squares (OLS) between lobbying expenditure and firms' value-added would induce a biased estimate of $1-\delta_s$, since $corr(\log l_s(\phi), \log \phi^L) \neq 0$. The sign of this correlation will determine the direction of the bias. One conjecture is that firms that are more productive in producing are also more productive in lobbying. Under this conjecture, the OLS estimate would underestimate the true effect of lobbying on revenues. We revisit this issue in Section III, but for now we highlight that the model provides a clear interpretation of the positive relationship between firm size and lobbying, while revealing the limitations of the naive inference based on the correlation between these two observable characteristics.

Lobbying and Misallocation We now show how the relationship between lobbying, distortions, and firm outcomes influences aggregate productivity. Proposition 3 directly characterizes the connection, extending the aggregation result from Hsieh and Klenow (2009).

Proposition 3. *Aggregate output and sectoral productivity in this economy is given by the following:*

$$(13)\quad Y = \prod_{s=1}^{S} \left(\Phi_s^P N_s^{\alpha_s^N} K_s^{\alpha_s^K}\right)^{\theta_s}$$

$$(14)\quad \Phi_s^P = \underbrace{M_s^{\frac{1}{\sigma-1}}}_{Entry} \underbrace{\left(\frac{N_s^P}{N_s}\right)^{\alpha_s^N} \left(\frac{K_s^P}{K_s}\right)^{\alpha_s^K}}_{Entry\ \&\ Fixed\ Costs} \underbrace{\left[\int \left(\phi_s^P \frac{\overline{TFPR}_s}{TFPR_s(\phi)}\right)^{\sigma-1} d\hat{G}_s(\phi)\right]^{\frac{1}{\sigma-1}}}_{Aggregation\ of\ Firms'\ Productivity},$$

where Φ_s^P is aggregate productivity in sector s, N_s^P and K_s^P are the total labor and capital, respectively, used directly in production as opposed to paying for fixed costs, $\hat{g}_s(\cdot)$ is the equilibrium density of firms that produce in the economy, $TFPR_s(\phi)$

$= p_s(\phi)\phi^P$ is the revenue-productivity of firm ϕ in sector s, i.e., the market value of firms' productivities, and $\overline{TFPR}_s$ is the average revenue-productivity across firms within sector s. Equation (14) shows that aggregate productivity in this economy is determined by three forces: (1) the entry, (2) the use of fixed costs in the economy, and (3) how firms' productivity and quality are aggregated. It is in this last term that one can see the influence of distortions on aggregate productivity, as the distortions affect how much each firm is weighted in this aggregation.[18] Intuitively, in the absence of distortions, $TFPR_s(\phi) = \overline{TFPR}_s$, and thus firms are aggregated according to the weights given by the equilibrium density of firms, $\hat{g}_s(\cdot)$. In the presence of distortions, this is no longer the case. Firms that have a higher output distortion, $\tau_s(\phi)$, say because they lobby more, will have lower marginal revenue products, and thus a lower revenue-productivity, $TFPR_s(\phi)$, than the average firm from their sector. This implies that the productivity of firms with higher output distortions will influence aggregate productivity more than they would in the absence of distortions. This is the mechanism we explore quantitatively in Section III. Before doing that, we describe a microfoundation for the assumption made in Equation (4) about how firms' lobbying influences distortions and their revenues.

III Empirical and Quantitative Analysis

This section presents the main empirical and quantitative findings. First, we describe the instrumental variable (IV) approach we employ to estimate the key relationship identified in the model (see Proposition 2). Second, we take moments from the data and use them to estimate the parameters of the model. Finally, using these

[18] This is only a partial equilibrium analysis because changes in the distortions might also affect how many resources are used in fixed costs and how many firms enter. The general equilibrium effects of changes in lobbying and distortions are postponed until the quantitative analysis in Section III.

estimates, we present the main quantitative findings based on a series of counterfactual analyses to investigate how lobbying affects the misallocation of resources and aggregate productivity.

A Evidence of Lobbying Expenditures' Impact on Firm Size

Lobbying Instrument The relationship between lobbying expenditures and firm size is subject to endogeneity, which is shown explicitly in Proposition 2. The effect of lobbying expenditure on value-added needs to account for the potential confounding due to the productivity of lobbying. That is, for identification, one needs variation in lobbying expenditure that is exogenous to variation in firms' lobbying productivity, as lobbying is chosen as a function of its productivity. To address this, we propose an instrument that captures changes in the profitability of lobbying, holding constant firms' primitives. The instrument measures changes in the marginal value of firms' lobbying expenditures by exploiting (a) changes in politicians' committee membership in the U.S. Congress, (b) heterogeneity in firms' exposure to committee activity, and (c) firms' political connections. It follows a standard shift-share design. To begin, we follow Bertrand, Bombardini and Trebbi (2014) to measure shifts in the value of lobbying based on politicians' changes in committee membership in Congress, which affects firms heterogeneously because firms vary in their connections to politicians and in their exposure to different committees' activities. Formally, the instrument is defined as follows:

$$z_{it} = \sum_{j \in \Omega_i} \sum_c \underbrace{w_{ict-k}}_{Share} \underbrace{d_{jct}}_{Shift} \tag{15}$$

where i and t denote firms and years, Ω_i is the set of politicians in firm i's network, w_{ict-k} is the weight that firm i gives to committee c in period $t-k$, and d_{jct} is a dummy variable equal to one if politician j is assigned to committee c in period t. Thus, the instrument exploits three ingredients and their interactions: Ω_i, w_{ict-k},

and d_{jct}. We describe each in turn.

First, firm i's political connections, Ω_i, are defined by the co-location of i's headquarter and the politicians representing that district. Politicians who represent the state where i's headquarter is located belong to i's connections.[19] Second, committee weights, w_{ict-k}, represent how important a committee is for a firm by measuring how often the firm has lobbied bills assigned to that committee. Formally, the weights are defined as follows:

$$w_{ict-k} = \frac{b_{ict-k}}{\sum_h b_{iht-k}} \tag{16}$$

where b_{ict-k} is the number of bills assigned to committee c in year $t-k$ that i lobbied. Thus, w_{ict-k} measures the share of bills that firm i lobbied that are under the jurisdiction of committee c relative to all the bills lobbied by i considered in all committees. In order to calculate this, we searched all our entire lobbying reports to identify the bills that have been lobbied by each firm and the committee to which each bill was assigned.

Anecdotally, it does appear that firms target politicians in their network to lobby for narrow, firm-specific policy benefits. For example, Orasure Technologies, a medical device company located in Pennsylvania (PA) that produces a home HIV testing kit, lobbied S.1966, "HIV/AIDS Assistance Reauthorization Act of 2007," which was introduced in the 110th Congress. This bill was assigned to the Senate Committee on Foreign Relations. Senator Bob Casey (D-PA) joined the committee in the 110th Congress; he was the first senator from Pennsylvania to serve on the committee in more than 10 years. Although it is notoriously difficult to document direct ties between a firm and a politician, politicians tend to favor policy

[19] We confirm that firms tend to make significantly larger and more frequent campaign donations to the politicians representing the state where their headquarters are located. While it is possible to accommodate an alternative way of defining Ω_i, we will leave the challenge of measuring political connections more directly for future research.

outcomes that benefit firms in their districts, holding other factors constant. In fact, Senator Casey called for appropriating funding to deal with Zika virus when he visited Orasure Technologies (see the interview available here). The firm was later awarded $16.6 million in funding from the U.S. Department of Health and Human Services (HHS) to advance rapid Zika virus test. As another example, consider ConocoPhillips, an multinational energy firm located in Texas. John Cornyn, Republican senator from Texas, joined the Senate Committee on Finance in the 111th Congress. This committee has jurisdiction over bills relating to taxes. Compared to earlier congressional sessions, we observe about a five-fold increase in lobbying expenditures by ConocoPhillips on tax-related issues during the 111th Congress. Interestingly, the former Deputy Regional Director of Senator John Cornyn's office currently works at ConocoPhillips as a Directory of Public Policy.

To be sure, we do not claim that these examples provide direct proof of political connections and policy benefits tied to certain firms. However, our identification strategy allows us to exploit such variations from many cases to empirically examine whether potential increases in the value of lobbying lead to an increase in firm size consistent with the theory we developed in Section II.

Finally, d_{jct} measures how politicians move between committees.[20] This movement, or "shift," provides the identification for the instrument.[21] The key identifying assumption is that the movement of politicians between committees is exogenous to firms' characteristics and influence.[22]

[20]The committee assignment data is from Stewart and Woon (2011).

[21]Our approach contrasts with that of Goldsmith-Pinkham, Sorkin and Swift (2020), in which the *share* provides the identification in their shift-share design.

[22]Figure IV.1 in Appendix IV shows that politicians frequently change committees over time. Quantitatively, the probability that a senator will join at least one new committee in a new congressional term is around 30 percent. This number is relatively constant across Congresses, as Figure IV.3 in Appendix IV shows.

We discuss three potential challenges to the identification strategy, each one related to an ingredient of the instrument. The first issue is whether firms can directly influence the assignment of politicians into committees. We confirm that this is not the case because those decisions are determined by various factors exogenous to firms, including electoral outcomes, inter-party negotiations, parties' independent committees (e.g., Democrats' Steering and Outreach Committee), and seniority.[23]

Admittedly, firms may still indirectly influence committee assignments. That is, committee membership changes might be endogenous to firm characteristics and influence as politicians may select into certain committees in order to deliver targeted benefits to their politically connected firms. Although it is certainly true that a politician's committee "wish list," which reflects the interests of his/her constituents, plays an important role in the committee assignment process, we emphasize that our identification comes from *changes* in the lobbying value of committee assignments over time. For example, Montana senators have consistently served on the Committee on Agriculture, Nutrition, and Forestry, which might be endogenous to the importance of the agricultural sector for the state. However, in this case, such observations will not contribute to our estimation because there will be no variation in our instrument across time. Furthermore, firms cannot anticipate the *timing* of committee membership changes. In fact, politicians often have to represent heterogeneous interests of their constituencies, and therefore the churning of memberships that we presented in Figure IV.1 in Appendix IV cannot be perfectly predicted by interest groups, which makes it difficult for our firm- and time-specific instrument to be determined endogenously by specific firm's interests and politician's self-selection mechanism.

Second, the locational choices by firms and politicians could be endogenous

[23] See Schneider (2006) for further details about committee assignment process

to their political connections. If it were easy for either one to change locations, therefore, this would threaten the identification. For example, if firms can freely move to a different state whose representatives serve on committees that are relevant to them, then changes in committee membership would directly influence firms' location as well as their political connections, undermining the identification. This is highly unlikely, however, because firms' locations are usually fixed before the changes in committee membership that we exploit. Moreover, we do not see changes in firms' headquarter locations over time in our dataset. Similarly, the likelihood of a politician changing his/her district is less than 1 percent.

A final potential challenge to identification is that committee weights could reflect anticipated changes in committee membership. In particular, if firms anticipate changes in committee membership, then the timing of those changes will not be well identified. We test this by evaluating the cross-section correlation between weights in $t-k$ and changes in committee membership in t. We find a correlation near zero. We present further supporting facts for our identification strategy in Appendix IV.

Results Table 1 presents the empirical findings guided by the IV approach. Columns 1 and 3 show the simple OLS results on the effect of lobbying expenditure on firms' size (proxied by sales and value-added, respectively). As suggested by Figure 2, the correlation is statistically significant and robust with the inclusion of a set of firm, year, state-year, and sector-year fixed effects. Next, Columns 2 and 4 show the findings based on the IV in the second stage. As expected, the relationship is positive and substantively larger than the OLS estimates given the endogeneity issue we identified in Proposition 2. Looking at Column 4, which is our preferred estimate, it shows that a 10 percent increase in lobbying expenditures translates to a 1.3 percent

	Log Sales		Log VA		Log Profits		Log Capital-Payroll Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0484	0.216	0.0197	0.127	0.0401	0.201	0.0116	0.0434
	(0.0128)	(0.0459)	(0.0079)	(0.0457)	(0.0127)	(0.0607)	(0.0079)	(0.0362)
N	9180	9180	5851	5851	6284	6284	7572	7572
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Sample	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag		nBills, t-1		nBills, t-1		nBills, t-1		nBills, t-1
Mean DV	7.74	7.74	6.99	6.99	6.15	6.15	0.19	0.19
SD DV	2.27	2.27	1.87	1.87	1.91	1.91	1.65	1.65
SD IV	2.03	2.03	2.04	2.04	2.02	2.02	2.04	2.04

Table 1: **Firm Sales, Value Added, Profits, Capital-Payroll Ratio, and Lobbying:** This table presents the OLS and IV estimates of the effects of lobbying expenditures on firms' sales, value added, profits, and capital-payroll ratio. Profits are defined as sales minus wage bills, capital expenditures and intermediate input expenditures. All regressions have firm, year, sector-year and state-year fixed effects. The weights of the instrument are defined using the number of bills that a firm lobbied on committees at $t-1$. Standard errors are double clustered at firm and year level.

increase in value-added.[24] To put this estimate into perspective, the median annual lobbying expenditure by a public firm is about $200,000 and the median size of a firm in terms of valued-added is $49 million. Thus, spending an extra $2,000 adds $63,700 to the firm's value. Our finding is robust to using firms' profits as an outcome measure, which takes into account factor expenditures such as labor, capital, and intermediate inputs, as shown in Columns 5 and 6. Finally, Table 1 shows that our results do not hold when the outcome is capital-payroll ratio. This suggests that

[24] Table V.3 in Appendix V shows the details of the first stage, including the fact that the first stage is sufficiently strong as shown by the F-statistic.

lobbying activity does not influence the composition of factors of production.[25] In Appendix V, we conduct robustness checks of our findings with respect to using campaign donations as an alternative way of defining political connections, different timing for computing the weights, and alternative measurements of lobbying activities. Given the strong causal relationship between lobbying expenditure and value-added, we proceed to the structural estimation to evaluate how important this relationship is for the misallocation of resources and aggregate productivity.

B Structural Estimation

In this section, we present our main quantitative findings by structurally estimating the model that we developed in Section II. The estimation proceeds in three steps. First, we define a set of parameters exogenously. A second set of parameters are calibrated directly to analytical solutions of the model. Finally, the remaining parameters are estimated via a simulated method of moments (SMM) procedure. We describe each step in turn.

Exogenous Parameter Restrictions We exogenously set the values of several parameters in the model . First, because we do not have enough power to estimate heterogeneous values of δ_s, we set $\delta_s = \delta$ for all s. Second, we do not have sufficiently good data to estimate σ, so we set $\sigma = 4$, a value in the range of the values used in the literature (Hsieh and Klenow, 2009). Third, it is standard in this literature that, given the free entry condition, the entry costs can be normalized to one. Fourth, the death rate is taken from the literature and set to $\eta = 0.025$ (Bernard, Redding and Schott, 2007). Finally, we assume a joint log-normal distribution for G. For simplicity, we assume that this distribution is the same for all sectors. It is

[25] This finding is different from the one in Arayavechkit, Saffie and Shin (2018), in which lobbying distorts capital-labor ratios. Note however that they examine this question using a different identification strategy and a specific policy, such as corporate taxes.

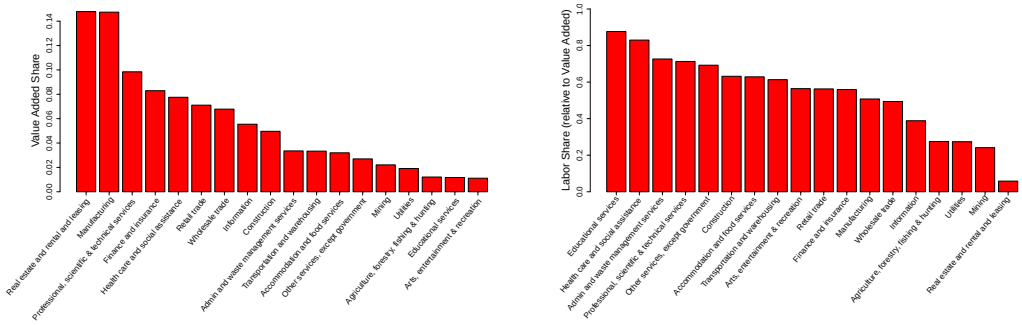


Figure 7: **Value Added Share**: This figure presents each sector's value added relative to total value added (left) and labor expenditures (right), averaged across the period 2000–2017. Own calculations using data from the BEA, corresponding to $\{\theta_s\}_{s=1}^S$ and $\{\alpha_s^N\}_{s=1}^S$ in the model, respectively.

straightforward to extend this to heterogeneous distributions across sectors.

Calibrated Parameters A set of parameters can be obtained directly from analytical solutions of the model. First, θ_s is the value added of sector s relative to total gross domestic product (GDP). Second, α_s^N is labor input costs relative to value-added. Finally, given the assumption of CRS, we have $\alpha_s^K = 1 - \alpha_s^N$. These moments can be directly extracted from the data using information from the Bureau of Economic Analysis (BEA). Both the data and the results of this calibration are standard in the literature (Hsieh and Klenow, 2009; Caliendo et al., 2018). The moments for the value-added shares of sectors and the Cobb-Douglas weights are shown in Figure 7.

Next, given the implications of the model, we can back out δ. From Equation (12) and the reduced-form results from Table 1, we can infer that $\delta = 0.87$. Note that Equation (12) has an omitted variable problem. As is standard in such situations, the bias between the consistent estimator and the bias is given by the correlation between the endogenous variable and the omitted one, $cov(\log l_s(\phi), \log \phi^L)$. Given the IV and OLS result from Table 1, we can thus infer that $cov(\log l_s(\phi), \log \phi^L) = 0.1$ In addition, we can back out firms' primitives using the following relationships

from the model:

$$\phi^P \propto \frac{r_s(\phi)^{\frac{\sigma}{\sigma-1}}}{n_s(\phi)^{\alpha_s^N} k_s(\phi)^{\alpha_s^K}} \tag{17}$$

$$\tau_s(\phi) \propto \frac{wn_s(\phi)}{\alpha_s^N r_s(\phi)} \tag{18}$$

$$\phi^L \propto \left(\frac{r_s(\phi)}{l_s(\phi)^{1-\delta}}\right)^{\frac{1}{\delta}}. \tag{19}$$

The intuition behind these expressions is straightforward. Equation (17) shows that productivity ϕ^P captures the gap between output and inputs. Since we do not observe prices, we use the structure of the model and the assumption of monopolistic competition in order to transform value-added into output. Equation (18) shows that distortions are measured as the gap between the observed wage bill and the efficient wage bill predicted by the model. Thus, if the firm is spending more in the wage bill it must be because there are distortions benefiting the firm. Finally, Equation (19) shows that lobbying productivity measures the gap between the benefits and the costs of lobbying.

Given values for $\{\sigma, \delta, \alpha_s^N, \alpha_s^K\}$ and observables $r_s(\cdot)$, $n_s(\cdot)$, $k_s(\cdot)$ and $l_s(\cdot)$, we can calculate firms' primitives from Equations (17)-(19). Figure VI.1 in Appendix VI shows that these primitives have log-normal marginal distributions. Thus, we assume that primitives follow a joint log-normal distribution with covariance matrix Ω^G. With the estimates of firms' primitives, we directly compute $\hat{\Omega}^G$ and obtain the following:

$$\hat{\Omega}^G = \begin{pmatrix} var(\phi^P) = 2.0 & & \\ cov(\phi^P, \phi^D) = -0.9 & var(\phi^D) = 0.9 & \\ cov(\phi^P, \phi^L) = -2.6 & cov(\phi^D, \phi^L) = 1.0 & var(\phi^L) = 5.8 \end{pmatrix} \tag{20}$$

Four relevant patterns emerge from this estimation. First, the dispersion in lobbying productivity is significantly larger than in production or residual distortion. Second, firms that are productive at producing have lower exogenous distortions.

This highlights the second-best world in which lobbying operates. Distortions are highest in low-productivity firms. Third, there is a negative correlation between production and lobbying productivity. This means that firms that are efficient at lobbying are less efficient at producing. Finally, firms that have high exogenous distortions are also productive at lobbying. These two last features suggests that lobbying might reduce misallocation because it complements other distortions (rather than reducing other distortions) and because less productive firms are the best ones at lobbying.

Simulated Method of Moments Given the parameters set exogenously and calibrated from analytical relationships in the model, the remaining parameters are estimated via a simulated method of moments (SMM). We use this method because the model does not have an analytical solution for some parameters as a function of the data, specifically the fixed costs of producing and lobbying, $\{f_s^P, f_s^L\}$. Thus, we estimate the following vector of parameters:

$$\Theta = \{f_s^P, f_s^L\}.$$

We follow a standard procedure to implement the SMM. The details are described in Appendix VI.

Moments Used and Related Parameters Two sets of moments are targeted in the data to estimate the parameters of the model. Although the SMM procedure estimates all parameters in Θ jointly, when presenting each set of moments we discuss the intuition for how each moment used is related to the estimated parameters. The first set involves the share of firms that lobby in each industry. These moments are related to the fixed cost of lobbying. The second set involves the distribution of the number of firms and firm size across sectors. These moments are related to the fixed cost of production. Both of these moments are reported in Table IV.1 in Appendix IV.

Estimation Result Appendix VI shows that the share of firms across sectors and the share of firms within sectors that lobby are well approximated by the estimated model.

Furthermore, the model provides a rationalization for the observation that there appears to be *little money in politics*—that is, the empirical regularity that the amount of money spent in the political marketplace is relatively small despite potentially high returns to lobbying in terms of economic gains (Ansolabehere, de Figueiredo and Snyder Jr, 2003). Our model replicates the empirical fact that relatively few firms choose to lobby. As shown in Proposition 1, the model has two forces that deter firms from lobbying, even though lobbying is profitable and does not involve a collective-action problem: First, lobbying entails a fixed cost; and second, there is dispersion in lobbying productivity and distortions. That is, firms with low levels of lobbying productivity or high levels of distortions will not find it profitable to pay the fixed cost of lobbying. Our study shows that both of these forces are central to understanding why only a small number of firms select into lobbying.

Counterfactual with No Lobbying Finally, we evaluate quantitatively how aggregate productivity changes with lobbying activity. To understand the effect of lobbying activity, we consider a counterfactual where $\delta = 0$, i.e., firms choose endogenously not to lobby. In this counterfactual, we find that aggregate productivity would be 6 percent higher than it is when firms obtain the return to lobbying that we estimate from the data.[26] There are two main forces behind the loss of productivity caused by lobbying activity. As Proposition 3 shows, the first mechanism is that lobbying directly affects firms' wedges, which affect the dispersion of TFPR and thus how firms' productivity is aggregated. This is the traditional channel stud-

[26]Note that, as is standard in this literature, we focus on aggregate productivity instead of aggregate output since our theory does not have anything relevant to say on the accumulation of physical or human capital.

ied in Hsieh and Klenow (2009). Of the total effect of 6 percent, this traditional channel represents around 61 percent. The second channel is that by changing the allocation of resources, demand for labor may change, which in turn changes factor prices and thus entry of firms. Changes in entry affect aggregate productivity since the household gets utility from variety. Of the aforementioned 6 percent loss, around 31 percent is due to changes in entry. This highlights that the effect of lobbying on changes in entry is an important margin to consider when evaluating its aggregate impact. The remaining 8 percent is accounted for by the resources used in paying for fixed costs (rather than used for production directly).

IV Conclusions

This paper examines whether firms' lobbying activity in the U.S. affects aggregate productivity by making some firms too big and thus misallocate resources across firms. To explore this important question, we developed a heterogeneous firm model with endogenous lobbying. One of the main contributions of this paper is that we estimate the model with unique data and quantify the macroeconomic implications of corporate political influence. We conduct the structural estimation with a simulated method of moments using the moments from firms' size distribution, firms' lobbying activity, and the estimates from the instrumental variable analysis, which accounts for the endogenous relationship between lobbying expenditures and firm size. We show that firms' lobbying activity decreases aggregate productivity by 6 percent relative to an economy without lobbying activity. The main mechanism behind this effect is changes to the distribution of the size of firms: because lobbying creates private benefits to the firms that lobby, some firms get bigger than they would otherwise. To the best of our knowledge, we are the first to evaluate quantitatively how lobbying activity affects the aggregate misallocation of resources by distorting firms' size.

The empirical evidence that we present in this paper has important normative implications. Our findings suggest that corporate political influence may introduce significant negative externalities. To be sure, our model does not explicitly account for positive externalities of lobbying that have been identified in the literature, such as efficient information gathering (Potters and Van Winden, 1992) and legislative subsidies for politicians, who are constrained by legislative resources (Hall and Deardorff, 2006). Our framework does allow lobbying to have positive efficiency effects given that it occurs in a second-best world, due to the exogenous distortions. What we do not allow for is the possibility that the distortions induced by lobbying endogenously influence (and maybe solve) other distortions, such as imperfect information in policymaking. These issues are left for future research. Nonetheless, our findings that only a few firms select into lobbying and that lobbying is concentrated on highly narrow policies in Congress do raise concerns about political representation and public goods provision in the legislative process.

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For Online Publication: Appendix of "The Effects of Firms' Lobbying on Resource Misallocation"

May 2021

I Construction of Lobbying Dataset

Firm's lobbying activity is built from public reports from the SOPR. These reports are required to be filled by any lobbyist in the US due to the Lobbying Disclosure Act of 1995. Lobbyists must file 3 types of reports depending on their activity, i.e., LD-1, LD-2 and LD-203.[1] The LD-1 form contains information about registrants, i.e., lobbyists, and clients such as their name, address, and principal place of business. The LD-203 form presents the disclosure of all political committees established or controlled by a lobbyist and all federal campaign contributions of $200 or more. Finally, the LD-2 form is the reporting form where registrants disclose their lobbying activities and related expenses. Dollar amounts of lobbying reported in section 12 and 13 are estimates of income (lobbyists) or expenses (in-house lobbying) spent in the reporting period rounded to the nearest $5,000. When total amount is less than $5,000, registrants should still file a report and include a statement indicating the fact.[2] In addition to the general issues categories, it is legally required that registrants report any congressional bills numbers they have lobbied as well as the description of their activities in section 16. An example LD-2 report can be found in Appendix A. We use lobbying information available from all LD-1 and LD-2 reports filed between 1999 and 2015 under the Lobbying Disclosure Act of 1995 (amended by the Honest Leadership and Open Government Act of 2007).

Since the reports are in documents that are not directly manageable to use for empirical research, there are several steps necessary to be able to use the information in them. We first directly parse the reports to build a report-level dataset. In doing so, each report is carefully examined whether there exists any amendments, and if so only the latest report is kept based on the date and time of filing. This is an important step because researchers will erroneously overweight firm's lobbying activity by duplicating multiple reports with essentially similar contents and lobbying expenses.[3]

[1] All filings are updated quarterly in a digitized compressed XML format. As of September 2015, there are more than 1 million LD-1 and LD-2 reports publicly available from http://www.senate.gov/legislative/Public_Disclosure/database_download.htm.

[2] We note that registrants were required to file reports biannually (instead of quarterly) prior to the Honest Leadership and Open Government Act of 2007 amendment. Before 2008, estimates of amounts in excess of $10,000 was rounded to the nearest $20,000. We address this difference by considering firm-year as the unit of analysis after aggregating quarterly or biannual reports for a given year.

[3] We note that no empirical study, using the lobbying reports either from SOPR or from http://www.opensecrets.org/, has discussed this problem to the best of our knowledge. Thus, we suspect that most of the existing studies might contain numerous duplicates by including both original filings and their amendments.

We then create a mapping from clients to their unique identifiers in databases such as COMPUSTAT and Orbis (Bureau van Dijk) allowing us to link firm's economic characteristics to their political behavior. Finding a unique firm identifier is challenging because the matching can be done only through client names (i.e., character strings) which tend to exist in many different formats even for the same firm. For example, Apple Inc. appears in 15 different client names: *APPLE INC*, *Apple, Inc.*, *Apple*, *Apple Inc.*, *Apple Inc*, *APPLE COMPUTER, INC.*, *APPLE*, *Apple, Inc*, *APPLE COMPUTERS*, *APPLE COMPUTER*, *APPLE COMPUTERS, INC*, *APPLE COMPUTER INC*, *APPLE INC.*, *APPLE COMPUTERS INC*, *APPLE COMPUTER, INC*. Although some of these can be easily addressed by removing dot and suffix, in many cases it is not straightforward to distinguish misspelled client names and abbreviations from their legal firm names. To address this problem, we employ four strategies. First, we use FuzzyWuzzy string matching algorithm comparing the full list of public firm names from COMPUSTAT against 61,478 unique client names.[4] Second, we use Bureau van Dijk server's Batch Search functionality to find each firm's ISIN and ticker symbol, which will then be used to find COMPUSTAT identifier code of clients.[5] Third, we use Center for Responsive Politics lobbying data to check whether any additional matching can be achieved by using their `Standardized client` variable. Finally, we randomly sample 5% of client names to verify whether any publicly trading firms were missed so that we can improve the matching algorithm from the first step. We update our matching algorithm quarterly each time a new set of reports become available. This process ends up with a database at the report level that has 972,005 observations. Each observation contains a report id, the id of the lobbyist, the total amount lobbied, whether lobbying activity was outsourced or not, all the issues lobbied, and the bill number if the information is available. For reports that are filled by COMPUSTAT firms, we have the unique identifier of COMPUSTAT firms and all the information given by COMPUSTAT.

[4] We use the following natural language processing module from Python programming language: https://pypi.python.org/pypi/fuzzywuzzy

[5] Unfortunately, the batch search can be conducted only on 1,000 firm names each time. Thus, we repeated the queries more than 60 times to get the full search results.

A LD-2 Report Example

Clerk of the House of Representatives	Secretary of the Senate
Legislative Resource Center	Office of Public Records
B-106 Cannon Building	232 Hart Building
Washington, DC 20515	Washington, DC 20510
http://lobbyingdisclosure.house.gov	http://www.senate.gov/lobby

LOBBYING REPORT

Lobbying Disclosure Act of 1995 (Section 5) - **All Filers Are Required to Complete This Page**

1. Registrant Name ☑ Organization/Lobbying Firm ☐ Self Employed Individual
Capitol Tax Partners, LLP

2. Address
Address1 101 Constitution Avenue, NW Suite 675 East Address2
City Washington State DC Zip Code 20001 Country USA

3. Principal place of business (if different than line 2)
City State Zip Code Country

4a. Contact Name: Mr. Christopher Javens
b. Telephone Number: 2022898700
c. E-mail: faddoul@capitoltax.com
5. Senate ID#: 65976-12

7. Client Name: Apple ☐ *Self* ☐ *Check if client is a state or local government or instrumentality*
6. House ID#: 356170002

TYPE OF REPORT 8. Year 2018 Q1 (1/1 - 3/31) ☑ Q2 (4/1 - 6/30) ☐ Q3 (7/1 - 9/30) ☐ Q4 (10/1 - 12/31) ☐

9. Check if this filing amends a previously filed version of this report ☐

10. Check if this is a Termination Report ☐ Termination Date 11. No Lobbying Issue Activity ☐

INCOME OR EXPENSES - YOU MUST complete either Line 12 or Line 13

12. Lobbying
INCOME relating to lobbying activities for this reporting period was:
Less than $5,000 ☐
$5,000 or more ☑ $ 90,000.00
Provide a good faith estimate, rounded to the nearest $10,000, of all lobbying related income from the client (including all payments to the registrant by any other entity for lobbying activities on behalf of the client).

13. Organizations
EXPENSE relating to lobbying activities for this reporting period were:
Less than $5,000 ☐
$5,000 or more ☐ $
14. REPORTING Check box to indicate expense accounting method. See instructions for description of options.
☐ **Method A.** Reporting amounts using LDA definitions only
☐ **Method B.** Reporting amounts under section 6033(b)(8) of the Internal Revenue Code
☐ **Method C.** Reporting amounts under section 162(e) of the Internal Revenue Code

Signature Digitally Signed By: Christopher Javens **Date** 4/19/2018 4:13:31 PM

LOBBYING ACTIVITY. Select as many codes as necessary to reflect the general issue areas in which the registrant engaged in lobbying on behalf of the client during the reporting period. Using a separate page for each code, provide information as requested. Add additional page(s) as needed.

15. General issue area code TAX

16. Specific lobbying issues

Matters dealing with International Taxation, and H.R. 1, Bill to provide for reconciliation pursuant to titles II and V of the concurrent resolution on the budget for fiscal year 2018 (bill formerly known as the Tax Cuts and Jobs Act).

17. House(s) of Congress and Federal agencies ☐ Check if None

U.S. SENATE, U.S. HOUSE OF REPRESENTATIVES, Treasury - Dept of, Executive Office of the President (EOP)

18. Name of each individual who acted as a lobbyist in this issue area

First Name	Last Name	Suffix	Covered Official Position (if applicable)	New
Jonathan	Talisman			☐
Christopher	Javens			☐

19. Interest of each foreign entity in the specific issues listed on line 16 above ☑ Check if None

Figure I.1: **Report by Apple Inc., first quarter in 2018**: A report filed by Apple Inc. shows that Capital Tax Partners, LLP lobbied on behalf of Apple Inc. to lobby on Taxation issue (Section 15). In particular, it lobbied on the House bill H.R.1 titled "An Act to provide for reconciliation pursuant to titles II and V of the concurrent resolution on the budget for fiscal year 2018" (Section 16).

II Model

This appendix presents detailed derivations of the model described in Section II.

A Model Derivations

The solution of the household problem is

$$c_s(\phi) = p_s(\phi)^{-\sigma} D_s, \tag{1}$$

where $D_s = E_s P_s^{\sigma-1}$, $P_s = \left[\int p_s(\phi)^{1-\sigma} M_s d\hat{G}_s(\phi)\right]^{\frac{1}{1-\sigma}}$ and $E_s = \theta_s E$ is the demand shifter, price index and total expenditure in sector s, respectively. Also, from sector-level optimization,

$$P = \Pi_{s=1}^{S} \left(\frac{P_s}{\theta_s}\right)^{\theta_s} \tag{2}$$

and E is the aggregate price index and aggregate expenditure, respectively. Given the solution in (1) and the fact that aggregate expenditures have to be equal to aggregate income, $E = I$, we get that sectoral output is

$$Y_s = \frac{E_s}{P_s} \tag{3}$$

where $E_s = \theta_s(wN + p_K K + T)$.

The solution to firms' optimization problem implies $p_s(\phi) = \frac{1}{\tau_s(\phi)} \frac{\mu}{\phi^P} q_s$, where

$$q_s = \left(\frac{w}{\alpha_s^N}\right)^{\alpha_s^N} \left(\frac{p_K}{\alpha_s^K}\right)^{\alpha_s^K},$$

and $\mu = \frac{\sigma}{\sigma-1}$ and $\alpha_s^K = 1 - \alpha_s^N$. Also, the revenue function is $r_s(\phi) = p_s(\phi)^{1-\sigma} D_s$ and thus $r_s(\phi) \propto (\tau_s(\phi)\phi^P)^{\sigma-1}$. Here one can see that the wedge acts in practice as a subsidy ($\tau_s(\phi) > 1$) or tax ($\tau_s(\phi) < 1$) to productivity as in Bai, Jin and Lu (2019).

Thus, the profit function is

$$\pi_s(\phi) = \begin{cases} \tau_s^{NL}(\phi)\frac{r_s(\phi)}{\sigma} - f_s^P q_s, \ if \ \phi \ produces \ without \ lobbying \\ \tau_s^{L}(\phi)\frac{r_s(\phi)}{\sigma} \left[1 - \underbrace{\sigma\delta_s \frac{\left(\phi_s^L l(\phi)\right)^{\delta_s}}{\tau_s^L(\phi)}}_{variable \ lob. \ cost}\right] - \left(f_s^P + \underbrace{f_s^L}_{fixed \ lob. \ cost}\right) q_s, \ if \ \phi \ lobbies. \end{cases}$$

Note that firms that produce without lobbying face an exogenous wedge of $\tau_s^{NL}(\phi) = \phi^D$. Relative to that, firms that produce and lobby face the wedge of $\tau_s^L(\phi) = (\phi^L l_s(\phi))^{\delta_s} + \phi^D$ and thus $\tau_s^L(\phi) > \tau_s^{NL}(\phi)$ since $\delta_s > 0$. Thus, when the firm is evaluating whether to lobby, it needs to compare the benefit given by the policy gain with both the variable and the fixed cost. This tradeoff is explicit when one evaluates the zero-profit conditions that defines selection into production and lobbying.

Firms' zero profit condition in (8) which governs selection into production imply that

$$\phi^D r_s^*(\phi^D) = \sigma f_s^P q_s \tag{4}$$

From (4) one can get a closed form solution of the productivity cutoff that selects firms into production, as a function of the exogenous component of wedges, $\phi_s^{P*}(\phi^D)$:

$$\phi_s^{P*}(\phi^D) = \left(\frac{1}{\phi^D}\right)^{\frac{\sigma}{\sigma-1}} \left(\frac{\sigma q f_s^P}{D_s}\right)^{\frac{1}{\sigma-1}} \mu q. \tag{5}$$

This expression is similar to the cutoff in a standard Melitz (2003) model.[6] It shows how the distortion ϕ^D implies that a firm with a high ϕ^D (a high subsidy), needs a lower productivity level in order to select into producing.

On the other hand, firms' zero profit condition in (9) which governs selection into lobbying imply that

$$\tau^{L**}\left(\phi^D,\phi^L\right) r^{L**}(\phi^D,\phi^L)\left[1-\sigma\delta_s\frac{\left(\phi^L l^{**}(\phi^D,\phi^L)\right)^{\delta_s}}{\tau^{L**}(\phi^D,\phi^L)}\right] - \phi^D r^{NL**}(\phi^D) = \sigma q_s f_s^L \tag{6}$$

where $\tau^{L**}\left(\phi^D,\phi^L\right) = \left(\phi^L l^{**}(\phi^D,\phi^L)\right)^{\delta_s} + \phi^D$ is the distortion, $l^{**}(\phi^D,\phi^L) = l(\phi_s^{P**}(\phi^D,\phi^L),\phi^D,\phi^L)$ is lobbying expenditure, $r^{L**}(\phi^D,\phi^L) = r^L(\phi_s^{P**}(\phi^D,\phi^L),\phi^D,\phi^L)$ is value-added when a firm lobbies and $r^{NL**}(\phi^D,\phi^L) = r(\phi_s^{P**}(\phi^D,\phi^L),\phi^D,\phi^L)$ is value-added when a firm does not lobby, all at the cutoff of selection into lobbying. One can see in (6) that selection into lobbying evaluates profits of lobbying against profits of producing without lobbying and compares it to the fixed cost of lobbying.

Define $\kappa_s(\phi) = \tau_s^L(\phi)^\sigma\left(1-\sigma\delta_s\frac{\left(\phi^L l(\phi)\right)^{\delta_s}}{\tau_s^L(\phi)}\right)$ to be the factor that scales up profits relative to non-lobbying profits, net of the variable cost of lobbying and gross of the fixed cost of lobbying. We will call this the output wedge from lobbying net of variable cost of lobbying. Then, the zero-profit condition in (6) can be written as

$$\phi_s^{P**}(\phi^D,\phi^L) = \left(\frac{1}{\kappa_s^{**}(\phi^D,\phi^L)-(\phi^D)^\sigma}\right)^{\frac{1}{\sigma-1}} \left(\frac{\sigma q_s f_s^L}{D_s}\right)^{\frac{1}{\sigma-1}} \mu q_s. \tag{7}$$

where $\kappa_s^{**}(\phi^D,\phi^L) = \kappa_s(\phi_s^{P**}(\phi^D,\phi^L),\phi^D,\phi^L)$.

The condition in Equation (7) is the selection-into-lobbying counterpart of Equation (5). It defines an implicit function between the productivity cutoff that selects firms into lobbying and (ϕ^D,ϕ^L), $\phi_s^{P**}(\phi^D,\phi^L)$. As in selection into production, selection into lobbying is distorted by ϕ^D. On top of that, selection into lobbying is distorted by ϕ^L. Firms that lobby will affect distortions $\tau_s(\phi)$ through expenditures in lobbying, $l_s(\phi)$, which in turn depends on how productive in lobbying is the firm. Thus, firms that are more productive in lobbying might lobby more, inducing higher $\tau_s(\phi)$ for those firms and thus, these firms might need a lower productivity in production in order to select into lobbying. But at the same time, these firms that lobby need to incur in greater costs. The trade-off between the benefits and direct costs of lobbying are captured in $\kappa_s(\cdot)$. These need to be compared against the indirect costs of lobbying, which is captured by ϕ^D in the right-hand side of Equation (7). Whether firms that are more productive in lobbying lobby more and get higher $\tau_s(\phi)$ depends on parameter values such as the correlation between primitives in ϕ.

[6] For comparison, take the solutions to cutoffs in Bai, Jin and Lu (2019).

Finally, combining (4) and (7), one has that the zero-profit condition of lobbying can be written as follows:

$$\frac{\phi_s^{P**}(\phi^D,\phi^L)}{\phi_s^{P*}(\phi^D)} = \left(\frac{(\phi^D)^\sigma}{\kappa_s^{**}(\phi^D,\phi^L)-(\phi^D)^\sigma}\frac{f_s^L}{f_s^P}\right)^{\frac{1}{\sigma-1}} \tag{8}$$

In other words, firms select endogenous up until the point in which (8) holds. This equation summarizes the two forces that affect selection into lobbying, relative to selection into production, $\phi_s^{P**}(\phi^D,\phi^L)/\phi_s^{P*}(\phi^D)$. First, as shown in the first term on the right-hand side of Equation (8), highlights that lobbying affects the output wedge (net of the variable lobbying cost), $\kappa_s(\cdot)$, that the firm receives relative to not lobbying, ϕ^D. Second, as shown in the second term of the right-hand side of (8), selection into lobbying relative to production is determined by the lobbying fixed cost relative to production fixed cost.

Using the zero-profit condition, one can write the value-added function as follows:

$$r_s(\phi) = \begin{cases} \left(\frac{\phi^P}{\phi^{P*}(\phi^D)}\right)^{\sigma-1}\frac{\sigma q_s f_s^P}{\phi^D}, \; if \; \phi_s^{P*}(\phi^D) \leq \phi^P < \phi_s^{P**}(\phi^D,\phi^L), \\ \left(\tau_s(\phi)\frac{\phi^P}{\phi^{P**}(\phi^D,\phi^L)}\right)^{\sigma-1}\frac{\sigma q_s f_s^L}{\kappa_s^{**}(\phi^D,\phi^L)-(\phi^D)^\sigma}, \; if \; \phi^P \geq \phi_s^{P**}(\phi^D,\phi^L), \end{cases} \tag{9}$$

Given this, one can write the profit function as follows:

$$\pi_s(\phi) = \begin{cases} \left[\left(\frac{\phi^P}{\phi_s^{P*}(\phi^D)}\right)^{\sigma-1}-1\right] q_s f_s^P, \; if \; \phi_s^{P*}(\phi^D) \leq \phi^P < \phi_s^{P**}(\phi^D,\phi^L), \\ \frac{\kappa_s(\phi)}{\kappa_s^{**}(\phi^D,\phi^L)-(\phi^D)^\sigma}\left(\frac{\phi^P}{\phi_s^{P**}(\phi^D,\phi^L)}\right)^{\sigma-1}-1\Big] q_s f_s^L - q_s f_s^P, \; if \; \phi^P \geq \phi_s^{P**}(\phi^D,\phi^L), \end{cases}$$

Note that, in order to evaluate the benefits of lobbying, the firm needs to compare the effect of $\kappa_s(\phi)$ and ϕ^D against the fixed cost. This is the only difference relative to the results in the closed economy version of the model in Melitz (2003).

Given selection into lobbying, average profits, conditional on successful entry can be expressed as:

$$\bar{\pi}_s = \left(1-\xi_s^L\right)\bar{\pi}_s^{NL} + \xi_s^L\bar{\pi}_s^L, \tag{10}$$

where

$$\begin{aligned} \bar{\pi}_s^{NL} &= \int_{\phi_s^*}^{\phi_s^{**}} \pi_s(\phi)\frac{dG(\phi)}{G(\phi_s^{**})-G(\phi_s^*)}, \\ \bar{\pi}_s^{L} &= \int_{\phi_s^{**}}^{\infty} \pi_s(\phi)\frac{dG(\phi)}{1-G(\phi_s^{**})}, \\ \xi_s^L &= \frac{1-G(\phi_s^{**})}{1-G(\phi_s^*)} \end{aligned} \tag{11}$$

where ξ_s^L is the probability of lobbying in sector s, $G(\phi_s^{**}) = \int\int\int_0^{\phi_s^{P**}(\phi^D,\phi^L)} g(\phi)d\phi^P d\phi^D d\phi^L$ is the mass of firms with productivity below $\phi_s^{P**}(\phi^D,\phi^L)$ and $G(\phi_s^*) = \int\int\int_0^{\phi_s^{P*}(\phi^D)} g(\phi)d\phi^P d\phi^D d\phi^L$ the mass of firms with productivity below $\phi_s^{P*}(\phi^D)$.[7] Average revenue, $\bar{r}_s$ can be defined similarly.

[7]We abuse notation in writing $\bar{\pi}_s^{NL}$ and $\bar{\pi}_s^L$. For example, the full correct expression for average profits of firms that produce without lobbying should be $\bar{\pi}_s^{NL} = \int\int\int_{\phi_s^{P*}(\phi^D)}^{\phi_s^{P**}(\phi^D,\phi^L)} \pi_s(\phi)\frac{g(\phi)}{G(\phi_s^{**})-G(\phi_s^*)}d\phi^P d\phi^D d\phi^L$. We use this abuse of notation throughout the paper to make notation easier.

Given selection into entry, the *ex-post* primitives distribution conditional on successful entry is:

$$\hat{G}_s(\phi) \quad = \quad \begin{cases} \frac{g(\phi)}{1-G(\phi_s^*)}, \ if \ \phi^P \geq \phi_s^{P*}(\phi^D), \\ 0, otherwise \end{cases}$$

The value of a firm is $v(\phi) = \max\left\{0, \frac{\pi_s(\phi)}{\eta}\right\}$. Thus, the free entry condition, $(1-G(\phi_s^*))\,\bar{\pi} = \eta q_s f_s^E$, can be written as follows:

$$\int_{\phi_s^*}^{\phi_s^{**}} \left[\left(\frac{\phi_s^P}{\phi_s^{P*}(\phi^D)}\right)^{\sigma-1} - 1\right] f_s^P dG(\phi) + \int_{\phi_s^{**}}^{\infty} \left[\left(\frac{\kappa_s(\phi)}{\kappa_s^{**}(\phi^D,\phi^L) - (\phi^D)^\sigma}\left(\frac{\phi^P}{\phi_s^{P**}(\phi^D,\phi^L)}\right)^{\sigma-1} - 1\right) f_s^L - f_s^P\right] dG(\phi) \quad = \quad \eta f_s^E \tag{12}$$

‘ In equilibrium, the mass of successful entrants equals the mass of exciting firms: $[1-G(\phi_s^*)]\,M_s^E = \eta M_s$, where M_s is total number of firms and M_s^E the constant mass of entering firms in sector s. Also, free entry implies that total payments to labor used in entry must equal aggregate profits, $N^E = M^E f_s^E = M\bar{\pi} = \Pi$. Finally, $R - \Pi = w(N^P + N^L) + p_K K$. Thus, labor market clearing condition implies that $N = N^P + N^L + N^E = R - p_K K$, where we set $w = 1$ as the numeraire.

The model has simple aggregation properties, as in Melitz (2003). The sectoral price index can be written as:

$$P_s \quad = \quad M_s^{\frac{1}{1-\sigma}} p_s(\tilde{\phi}_s), \tag{13}$$

where

$$p_s(\tilde{\phi}_s) \quad = \quad \frac{\mu}{\tilde{\phi}_s^P} q_s,$$

$$\tilde{\phi}_s^P \quad = \quad \left[\frac{M_s^{NL}}{M_s}\left(\tilde{\phi}_s^{P,NL}\right)^{\sigma-1} + \frac{M_s^L}{M_s}\left(\tilde{\phi}_s^{P,L}\right)^{\sigma-1}\right]^{\frac{1}{\sigma-1}}, \tag{14}$$

$$\tilde{\phi}_s^{P,NL} \quad = \quad \left[\int_{\phi_s^*}^{\phi_s^{**}} \left(\phi^D \phi^P\right)^{\sigma-1} \frac{dG(\phi)}{G(\phi_s^{**}) - G(\phi_s^*)}\right]^{\frac{1}{\sigma-1}}, \tag{15}$$

$$\tilde{\phi}_s^{P,L} \quad = \quad \left[\int_{\phi_s^{**}}^{\infty} \left(\tau_s(\phi)\phi^P\right)^{\sigma-1} \frac{dG(\phi)}{1 - G(\phi_s^{**})}\right]^{\frac{1}{\sigma-1}}, \tag{16}$$

where $M_s^{NL} = (1-\xi_s^L)M_s$ and $M_s^L = \xi_s^L M_s$ is the mass of successful entry firms that do not select and select into lobbying activity, respectively.

Given the first-order conditions of firms, we get that

$$N_s \quad = \quad \frac{\alpha_s^N}{\mu}\frac{R_s}{w},$$

$$K_s \quad = \quad \frac{\alpha_s^K}{\mu}\frac{R_s}{p_K}, \tag{17}$$

where $R_s = M_s \bar{r}_s$ is aggregate value-added of sector s.

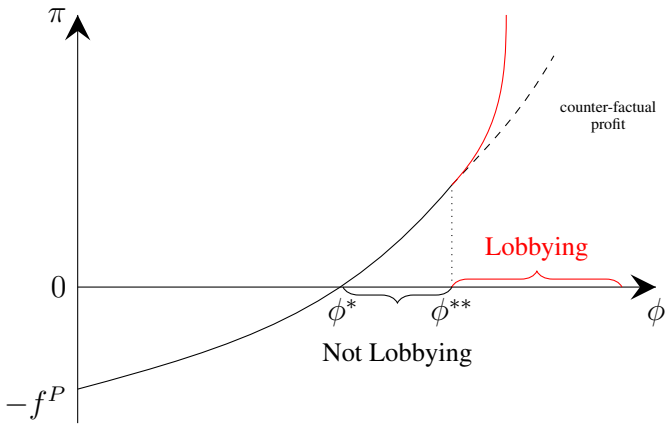

Figure II.1: Equilibrium Cutoffs and Profits

B Solution Algorithm of the Model

The steps taken to solve the model are the following:

1. Guess $\phi_s^{P*}(\phi^D)$, $\phi_s^{P**}(\phi^D, \phi^L)$ and $l(\cdot)$.
2. Compute $\kappa_s^{**}(\phi^D, \phi^L)$, $\tau(\phi)$, $r(\phi)$, $p(\phi)$, P, T and I using the equations from Section II.
3. Update $l(\cdot)$ from Equation (23).
4. Update $\phi^{P*}(\phi^D)$ and $\phi^{P**}(\phi^D, \phi^L)$ from the ZPC in (5) and (8).
5. Return to step (1) until convergence.

C A Microfoundation for Mapping Lobbying to Economic Distortions

Overview of the Model In Section II, we employed an exogenous mapping between firms' lobbying effort and distortions. In this section we propose one microfoundation for this mapping based on a game between the government and firms. The government cares about the household's utility, and thus about efficiency. However, it also values lobbying expenditures. Thus, in exchange for lobbying expenditures, the government is willing to give away efficiency by creating distortions. These distortions act as private benefits for firms, for which firms are willing to incur lobbying expenses. By endogeneizing the mapping between distortions and lobbying, this model proposes one microfoundation for the misallocation of resources across firms. By giving more benefits to firms that lobby more, the government introduces dispersion in the marginal revenue products of factors that firms spend on, and thus on revenue total factor productivity, $TFPR_s(\phi)$. Dispersion in this measure across firms within sectors represents misallocation in the economy.

Setup The game between the government and firms consists of three stages. In the first stage, firms choose whether to enter, whether to lobby, and how much to lobby. In the second stage, the government chooses distortions given firms' lobbying efforts. In the final stage, firms choose how much to produce given the government's policies and the household chooses its consumption. The final stage can be thought of as a regular firm model with distortions, similar to the one in Hsieh and Klenow (2009). The

difference here is that the distortions in our model are endogenous to firms' political activities in a game between firms and the government. Given perfect foresight and no uncertainty, we solve the model with backward induction.

Stage three of this game is a regular firm model and has the same structure as that described in Section II.[8] The only difference is that in stage three, there is no longer a lobbying decision. By this stage, firms have already made their lobbying decisions and distortions are already defined. Note that distortions are given at this stage.

In stage two, the government solves the following problem:

$$W = \max_{\tau_s(\cdot)} \quad V^C\left(\{p(\phi)\},\{\tau(\phi)\}\right) + a\underbrace{\left[\int \left(\phi^L l(\phi)\right)^{\frac{\sigma^L-1}{\sigma^L}} d\hat{G}(\phi)\right]^{\frac{\sigma^L}{\sigma^L-1}}}_{L} \tag{18}$$

$$s.t.$$

$$V^C\left(\{p(\phi)\},\{\tau(\phi)\}\right) = \frac{I-T}{P} \tag{19}$$

$$\frac{\partial y(\phi)}{\partial \tau(\phi)} = \sigma \frac{y(\phi)}{1+\tau(\phi)} \tag{20}$$

$$\frac{\partial l(\phi)}{\partial \tau(\phi)} = \frac{\partial \pi(\phi)}{\partial \tau(\phi)}, \tag{21}$$

where $V^C\left(\{p(\phi)\},\{\tau(\phi)\}\right)$ is the household's indirect utility, L is a CES aggregator of lobbyists' expenditures, and a is the weight given to the political rents. That is, government welfare is the sum of household's welfare and the welfare from lobbying activity. The government may care about lobbying activity for several reasons. The simplest one is that lobbyists can save government resources if they provide services that the government would otherwise have to spend on, such as preparing studies on the impact of bills or even writing congressional bills. For the purpose of our analysis, we do not take a stand on the source of this interest. We claim that an objective function like this can provide one analytical microfoundation for the relevant mapping between lobbying effort and wedges.[9] Equations (19) and (20) come from the household and firms' problems in stage 3. Equation (21) is a condition that says that firms are *truth-telling* in terms of how much they are willing to spend on lobbying the government in return for an extra revenue of wedges. Note that this condition is effectively using the optimality in the decision to lobby in the first stage of the game. This condition is important because it avoids coordination issues that could arise otherwise, which are beyond the scope of this paper.

Finally, in the first stage, firms choose whether to lobby and how much to spend conditional on lobbying, and whether to enter the market.

Proposition 1. *The solution to the problem stated in Equations* (18)-(21) *is the following:*

$$\frac{\tau(\phi)}{1+\tau(\phi)} = 1+\sigma+a\frac{\phi^L}{\sigma-1}\left(\phi^L\frac{l(\phi)}{L}\right)^{\frac{1}{\sigma^L}}\left(\frac{1-G(\phi^{P**}(\phi^D,\phi^L),\phi^D,\phi^L)}{1-G(\phi^{P*}(\phi^D),\phi^D)}\right) \tag{22}$$

[8] In order to simplify the exposition and develop the intuition of this model, we assume one sector and one factor of production (e.g., labor). Extending the model to a multi-sector and multi-factor environment is straightforward.

[9] This welfare function is a generalization of the one used in Grossman and Helpman (1994). In fact, in the limit $\sigma^L \to 1$, for all sectors, it becomes the same welfare function where the government aggregates lobbying effort linearly. Thus, our specification for the welfare function generalizes that in Grossman and Helpman (1994).

Proposition 1 provides an endogenous mapping from lobbying effort to economic distortions that is similar to the one used in the main text in Equation (3). This mapping depends on exogenous distortions given by σ and on lobbying expenditure and lobbying productivity up to an exponent, which is a function of σ^L. Furthermore, this proposition highlights three predictions of how the government allocates distortions in this game. First, if the government does not value firms' lobbying expenditures ($a = 0$), then $\tau(\phi)/(1+\tau(\phi)) = 1+\sigma$. That is, the government will still allocate a flat tax within sectors. Second, if the government does value lobbying ($a > 0$), then distortions are heterogeneous depending on how much lobbying firms engage in. How much distortions vary across firms depends crucially on σ^L, the elasticity of substitution of lobbying contributions. The higher σ^L, the easier the government substitutes lobbying expenditures between firms, and thus very few firms lobby. In other words, the higher σ^L, the less $\tau(\phi)$ varies with $l(\phi)$. In the limit, when lobbying expenditures are perfect substitutes ($\sigma^L \to \infty$), $\tau(\phi)$ is independent from $l(\phi)$.[10] The intuition behind these results is important. Why would the government appreciate a variety in the firms that engage in lobbying? One reason could be that lobbying entails political risks. Being subject to the influence of only one lobbyist could be politically costly for the government because the saliency will make it relatively easier for the household to identify the source of welfare loss. In contrast, if influence is dispersed across many lobbyists, it might be more difficult for the household to hold the government responsible for its political rent-seeking. Thus, the love for variety could arise due to the government's preference to reduce the political risk that comes if the household organizes political opposition to lobbying influence. This is how the model justifies heterogeneous distortions and lobbying expenditures at the firm level. The facts shown in Section I are consistent with this view of lobbying behavior, in particular Fact 7 that suggests that lobbying seem to be working as a private good that benefits specific firms. Finally, $\tau(\phi)/(1+\tau(\phi))$ increases with the mass of firms lobbying, $\frac{1-G(\phi^{P**}(\phi^D,\phi^L),\phi^D,\phi^L)}{1-G(\phi^{P*}(\phi^D),\phi^D)}$.

D Proofs

This subsection presents the main proofs of the propositions in the paper.

Proof of Proposition 1. As shown in Appendix A, the zero-profit condition of producing and lobbying imply Equations (5)-(7). Combining them implies Equation (10). ■

Proof of Proposition 2. The first order condition of firms' intensive margin lobbying decision is the following:

$$\delta_s(\phi^L l_s(\phi))^{\delta_s} r_s(\phi) = w l_s(\phi) \tag{23}$$

By taking logs and rearranging one arrives to Equation (12). ■

Proof of Proposition 3. Firms' first order conditions imply that the marginal revenue product of factors are the following:

$$MRPN_s(\phi) \equiv \frac{\partial r_s(\phi)}{\partial n_s(\phi)} = \frac{\sigma-1}{\sigma}\alpha_s^N \frac{r_s(\phi)}{n_s(\phi)} = \frac{w}{\tau_s(\phi)}$$
$$MRPK_s(\phi) \equiv \frac{\partial r_s(\phi)}{\partial k_s(\phi)} = \frac{\sigma-1}{\sigma}\alpha_s^K \frac{r_s(\phi)}{k_s(\phi)} = \frac{p_K}{\tau_s(\phi)}$$

[10] Note that in this case, one arrives at the specification of the government's welfare in Grossman and Helpman (1994).

Define aggregate labor used in variable costs at the sector level as $N_s^P = \int n_s(\phi) M_s d\hat{G}_s(\phi)$ and similar objects for capital and intermediate inputs. Define also the weighted average marginal revenue products of labor as $\overline{MRPN}_s = \frac{1}{\int MRPN_s(\phi)\frac{r_s(\phi)}{P_s Y_s} M_s d\hat{G}_s(\phi)}$, where the weights are value-added shares, and similar for capital. Using these relationships, the standard monopolistic competition pricing and the standard CES ideal price index, one has the following:

$$
\begin{aligned}
Y_s &= \Phi_s^P N_s^{\alpha_s^N} K_s^{\alpha_s^K} \\
\Phi_s^P &= \frac{M_s^{\frac{1}{\sigma-1}}}{\mu} \left(\frac{N_s^P}{N_s}\right)^{\alpha_s^N} \left(\frac{K_s^P}{K_s}\right)^{\alpha_s^K} \left(\frac{\overline{MRPN}_s}{\alpha_s^N}\right)^{\alpha_s^N} \left(\frac{\overline{MRPK}_s}{\alpha_s^K}\right)^{\alpha_s^K} \left[\int \left(\tau_s(\phi)\phi^P\right)^{\sigma-1} d\hat{G}_s(\phi)\right]^{\frac{1}{\sigma-1}}
\end{aligned}
$$

Finally, define TFPR at the firm and sector level, respectively, as $TFPR_s(\phi) = \mu \left(\frac{MRPN_s(\phi)}{\alpha_s^N}\right)^{\alpha_s^N} \left(\frac{MRPK_s(\phi)}{\alpha_s^K}\right)^{\alpha_s^K}$ and $\overline{TFPR}_s = \mu \left(\frac{\overline{MRPN}_s}{\alpha_s^N}\right)^{\alpha_s^N} \left(\frac{\overline{MRPK}_s}{\alpha_s^K}\right)^{\alpha_s^K}$, then one has the result:

$$
\Phi_s^P = M_s^{\frac{1}{\sigma-1}} \left(\frac{N_s^P}{N_s}\right)^{\alpha_s^N} \left(\frac{K_s^P}{K_s}\right)^{\alpha_s^K} \left[\int \left(\phi^P \frac{\overline{TFPR}_s}{TFPR_s(\phi)}\right)^{\sigma-1} d\hat{G}_s(\phi)\right]^{\frac{1}{\sigma-1}}
$$

■

Proof of Proposition 1. Using the first order conditions of the problem stated in Equations (18)-(21) and assuming that $w = 1$, one has the following:

$$
\frac{a}{P}\left[\frac{\partial T}{\partial \tau(\phi)} + \frac{\partial P}{\partial \tau(\phi)} Y\right] = \left(\phi^L\right)^{\frac{\sigma^L-1}{\sigma^L}} \left(\frac{l(\phi)}{L}\right)^{\frac{1}{\sigma^L}} \frac{\partial l(\phi)}{\partial \tau(\phi)} \hat{f}^L(\phi)
$$

This highlights that in setting $\tau(\phi)$, the government compares the benefit of obtaining more lobbying expenditures and affecting the household's welfare. The latter is a combination of affecting the household's income through changes in T and the price index P. Using the constraints in Equations (18)-(21) and rearranging, one arrives to the result of Equation (22)

■

III Illustration of the Instrument Variable

Figure III.1 shows the returns of lobbying to three firms when their own "connected" politicians change committee memberships in two periods.

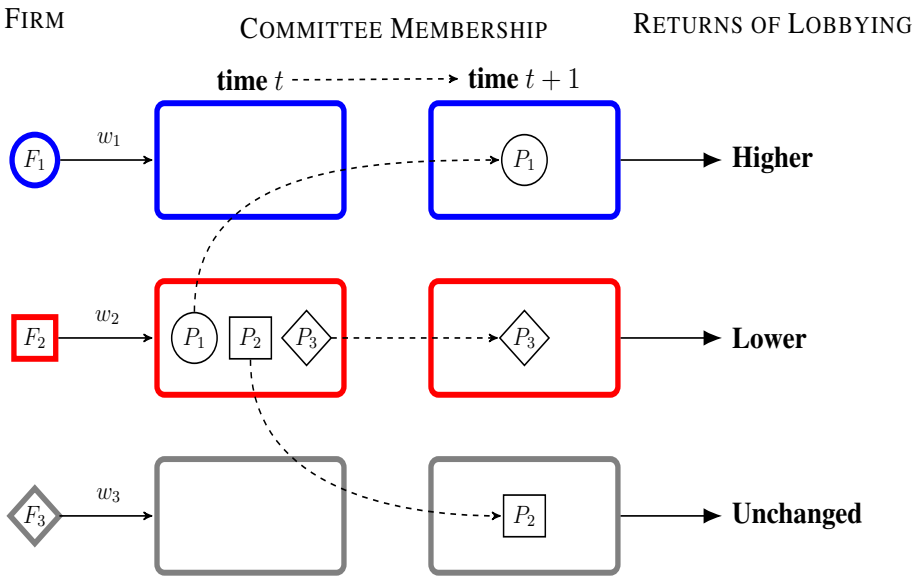

Figure III.1: **The Effects of Committee Membership Changes on Values of Lobbying**: This figure illustrates the identification strategy employed in the empirical analysis. It shows the returns of lobbying when three politicians (P_1, P_2, and P_3) who served in Red committee (middle) at time t change their committee memberships at $t+1$. Specifically, P_1 moves from Red (middle) to Blue (top) committee; P_2 changes her membership to Gray (bottom) committee; and P_3 stays in Red committee. The color of committee represents the most valuable committee for F_1, F_2 (red), and F_3 with the same boundary color. Firms and politicians with the same shape (e.g., F_1 and P_1) are assumed to be politically connected. We assume that the change of committee membership affects the value of lobbying. For example, F_1's lobbying is expected to have higher returns than before when the politician that it has a closer tie to (i.e., P_1) moves to the committee that it values. In contrast, the value of lobbying would decrease for F_2 when its connected politician leaves its most valuable red committee.

IV Supporting Facts

In this appendix we document a set of facts that support the analysis in the main text.

A Stylized Facts

NAICS	Code	# Firms	% Lobbied	% In-house	Median Expense	Example Firm
Agriculture, Forestry, Fishing/Hunting	11	26	20.4	7.6	$50,000	MONSANTO CO
Mining, Quarrying, and Oil/Gas Extraction	21	460	9.9	3.8	$40,000	RIO TINTO GROUP (GBR)
Utilities	22	289	22.7	15.3	$50,000	ENEL SPA
Construction	23	99	10.8	3.8	$30,000	FLUOR CORP
Manufacturing	31-33	2,930	15.8	6.5	$40,000	NESTLE SA/AG
Wholesale Trade	42	220	8.1	3.4	$40,000	MCKESSON CORP
Retail Trade	44-45	282	11.2	5.1	$60,000	CVS HEALTH CORP
Transportation and Warehousing	48-49	224	18.6	9.0	$45,000	ENI SPA
Information	51	964	11.9	4.8	$50,000	AT&T INC
Finance and Insurance	52	2,336	5.1	2.6	$50,000	UNITEDHEALTH GROUP INC
Real Estate and Rental and Leasing	53	353	6.5	0.8	$40,000	BROOKFIELD ASSET MANAGEMENT
Professional, Scientific, and Technical SVC	54	330	12.1	3.4	$40,000	ACCENTURE PLC
Admin/Waste Management/Remediation SVC	56	156	17.7	4.5	$40,000	MANPOWERGROUP
Educational Services	61	35	24.6	8.3	$40,000	GRAHAM HOLDINGS CO
Health Care and Social Assistance	62	130	21.9	6.8	$50,000	HUMANA INC
Arts, Entertainment, and Recreation	71	58	13.1	3.2	$30,000	LIVE NATION ENTERTAINMENT
Accommodation and Food Services	72	141	12.2	5.5	$50,000	SODEXO
Other Services (except Public Administration)	81	22	7.8	0.0	$40,000	SERVICE CORP INTERNATIONAL

Table IV.1: **Descriptive Statistics across NAICS 2-digit Sectors.** This table presents descriptive statistics of lobbying activities across all COMPUSTAT firms in 21 NAICS 2-digit sectors. The numbers are the averages from 1999 to 2017. For example, we see that, on average, there are about 2,930 firms in the manufacturing sector and 15.8% of them have lobbying expenditures, on average. Of these, about 6.5% have in-house lobbying departments. The median lobbying expenses of firms in each sector ranges from $30,000 to $60,000 per quarter. The last column presents an example of a firm from that sector who lobbied.

B Distribution of the Number of Lobbying Clients

Issues	Mean	Median	Minimum	Maximum	Total Number of Bills
Accounting	1.4	1	1	12	1,043
Advertising	5.2	4.5	1	27	82
Aerospace	2.6	2	1	15	76
Agriculture	2.6	2	1	195	1,082
Alcohol and Drug Abuse	2.1	1	1	10	200
Animals	2.1	2	1	11	412
Apparel Industry	1.5	1	1	7	140
Arts and Entertainment	1.9	1	1	7	42
Automotive Industry	3.8	2	1	37	319
Aviation	4.1	2	1	93	836
Bankruptcy	4.4	2	1	29	78
Banking	3.0	2	1	45	1,646
Beverage Industry	3.3	3	1	15	27
Budget Appropriations	8.2	2	1	421	2,577
Chemicals	4.8	2	1	83	124
Civil Rights	1.9	2	1	40	1,263
Clean Air and Water	5.7	2	1	104	1,289
Commodities	8.1	3	1	35	35
Communications	3.0	2	1	52	757
Computer Industry	4.1	2	1	24	255
Constitution	1.6	1	1	9	141
ConsumerIssues	5.5	2	1	73	825
Copyright	8.4	3	1	151	577
Defense	6.3	2	1	149	985
Disaster Planning	1.9	1	1	9	261
District of Columbia	1.9	2	1	9	29
Economics	2.1	1	1	18	191
Education	1.9	1	1	32	2,825
Energy Nuclear	6.0	3	1	328	2,780
Environment	3.0	2	1	190	1,117
Family Issues	1.6	2	1	15	726
Financial Institutions	4.2	2	1	338	1,404
Firearms	1.6	1	1	12	644
Food Industry	3.1	2	1	72	560
Foreign Relations	1.6	1	1	19	1,322
Fuel, Gas and Oil	3.1	2	1	20	264
Gambling	3.4	2	1	16	99
Government Issues	2.0	1	1	139	2,399
Health Issues	3.1	2	1	319	6,797
Homeland Security	8.2	2	1	158	816
Housing	2.2	2	1	35	722
Immigration	2.8	2	1	133	1,249
Indian Affairs	1.6	1	1	11	495
Insurance	4.0	2	1	82	931
Intelligence	4.0	3	1	17	58
Law Enforcement	1.8	1	1	30	1,172
Manufacturing	2.4	1.5	1	25	90
Marine and Boating	2.2	2	1	27	561
Media	3.1	2	1	17	53
Medical	1.7	1	1	7	209
Medicare	3.1	2	1	118	2,726
Minting Money	1.6	1	1	6	55
Natural Resources	2.1	2	1	41	1,661
Pharmacy	3.9	2	1	27	269
Postal	3.2	1	1	29	211
Railroads	6.2	3	1	56	307
Real Estate	1.6	1	1	5	502
Religion	1.3	1	1	3	93
Retirement	3.3	2	1	134	1,062
Roads and Highway	4	2	1	49	71
Science and Technology	2.7	2	1	30	400
Small Business	1.8	1	1	10	483
Sports and Athletics	1.7	1	1	6	59
Tariffs and Miscellaneous	1.7	1	1	30	1,655
Taxation	4.4	2	1	491	5,940
Telecommunications	4.8	3	1	77	1,219
Tobacco	3.6	3	1	24	222
Torts	5	2	1	64	237
Trade	3.2	2	1	135	1,862
Travel and Tourism	3.2	2	1	17	95
Trucking and Shipping	3.8	2	1	33	128
Unemployment	2.0	2	1	6	48
Urban Development	1.8	1	1	9	152
Utilities	3.8	2	1	29	185
Veterans	1.5	1	1	16	2,664
Waste	2.0	1	1	8	59
Welfare	1.5	1	1	7	97
Total	3.5	2	1	491	65,047

Table IV.2: This table shows that the skewed distribution that we observed in Figure 6 in Section I of the main text holds true for various other issues. We categorize each bill based on the frequency of the bill's appearance under particular issue codes across reports. Most bills are lobbied by one or two interest groups.

C Changes in Committee Membership

This subsection highlights in more detail how committee membership changes over time for politicians. Figure IV.2 shows the likelihood of switching committees, for each politician and each congress. Blue squares indicate that a politician did not change any committee membership between two congresses. As one can see, there are few politicians that never change their committee membership, i.e., politicians that have only blue squares in their corresponding row. To understand the quantitative meaning of this, Panel (a) of Figure IV.3 shows the likelihood of a politician changing a committee over time. It shows that this likelihood is on average 24 percent across Congress. Furthermore, it highlights that this number has been fairly constant over time.

Nevertheless, the instrument captures changes of the presence of a state (through the representatives from that state) in a committee. If a state has churning of politicians but those politicians serve in the same committee as the previous ones from that state, then the instrument would not change for firms located in that state. Thus, it is important to report the churning of committees at the state level. Panel (b) of Figure IV.3 reports an average churning of 17 percent across Congress. This means that in a particular Congress, the average state had a probability of having a representative in a new committee of 17 percent. As with the churning at the politician level, churning at the state level has been relatively stable over time.

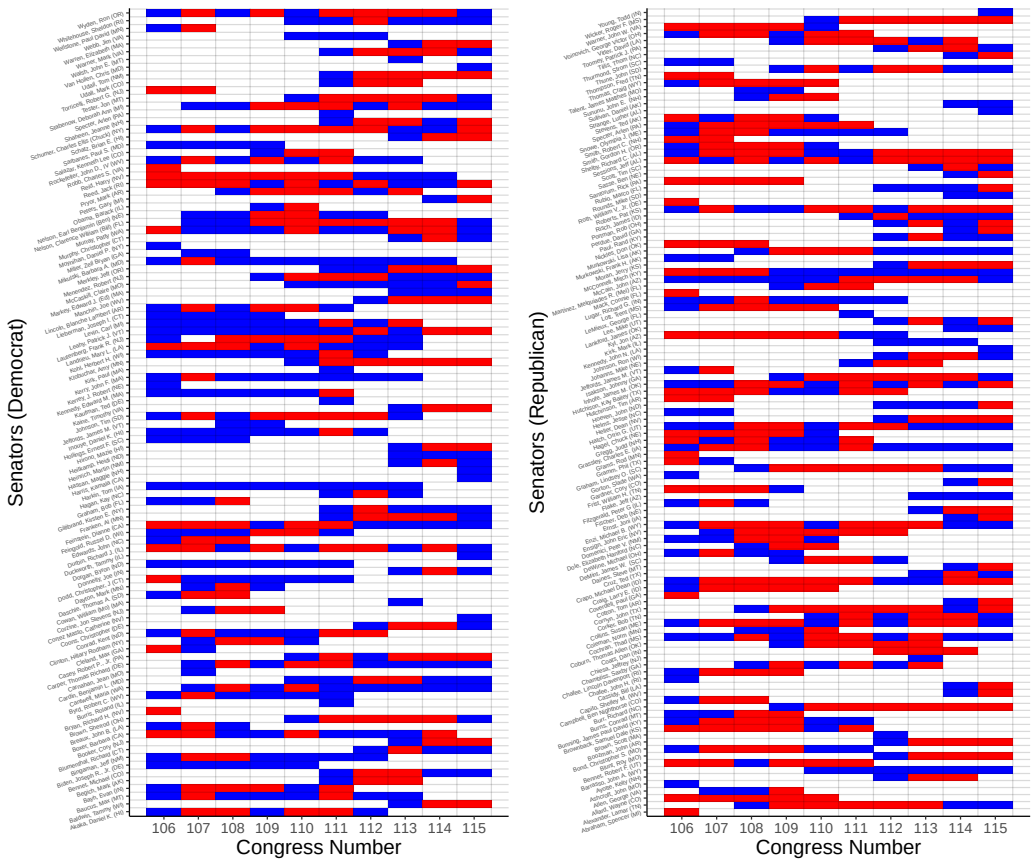

Figure IV.1: **Churning in Committee Membership**: This figure depicts the frequency of committee membership changes for each senator. Red (Blue) cell indicates that the senator moved to at least one (no) new committee in the congress that he/she did not serve in the previous congress. The white cell denotes the congress that the politician did not serve.

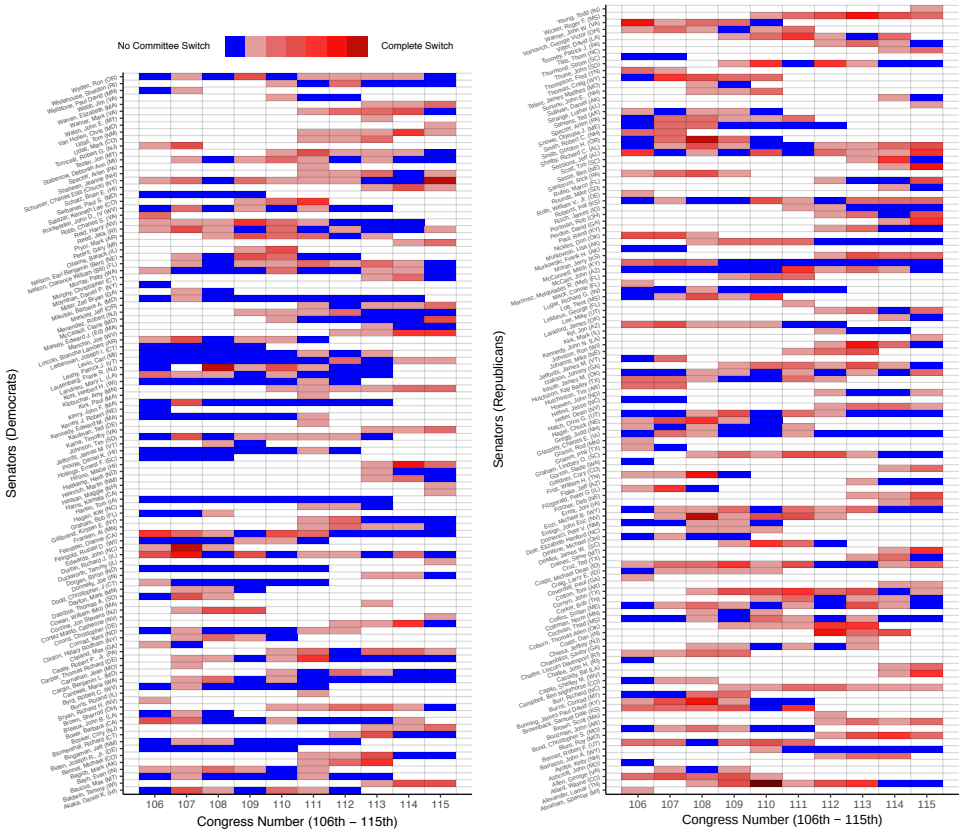

Figure IV.2: **Changes in Committee Membership**: This figure distinguishes the degrees of committee membership changes for democrats (left) and republicans (right), providing further details to Figure IV.1.

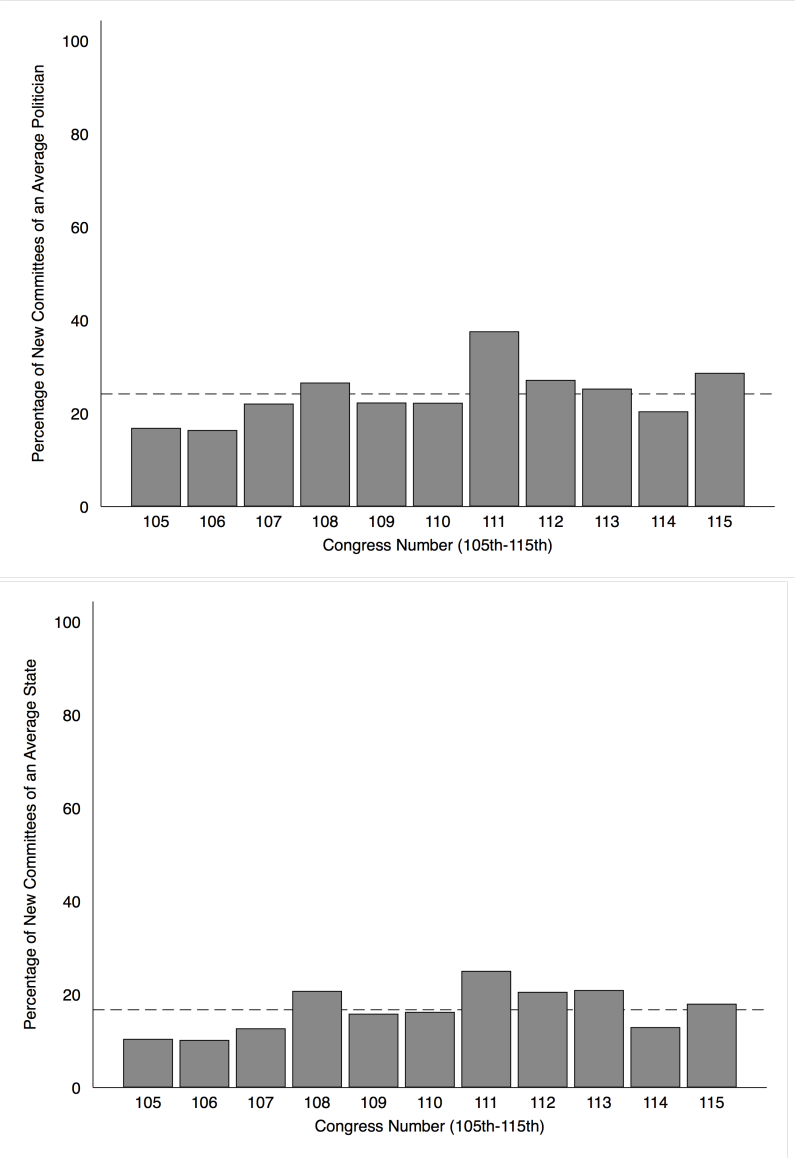

Figure IV.3: **Changes in Committee Membership**: Panel (a) of this figure shows the percentage of new standing committees the average politician participates in each Congress. If the average politician participates in 4 committees each Congress, then that means that one of those committees will be a new committee for her given that the percentage of new committees is 24 percent. Panel (b) presents the same statistics at the state level. It shows the percentage of new standing committees the average state participates in each Congress. It is on average 17 percent across Congress. Since the average number of committees that the average state participates in is 16, around 3 of those committees are new for that state.

D Relevance of Co-Location Connections

The identification strategy of the paper exploits the idea that the co-location of firms' headquarters and politicians' State is a good proxy for measuring connections between firms and politicians. In this subsection we provide supporting evidence for this conjecture. Using a dataset of campaign contributions of firms, we document the share of campaign contributions done by public firms to candidates from a state that is given by firms that have headquarters in the same state. We show this for each state in Figure IV.4. The average across states is 92 percent (blue line in Figure IV.4). This means that in the average state, 92 percent of total contributions of public firms done to candidates from that state are done from public firms with headquarters in the same state of the candidate.

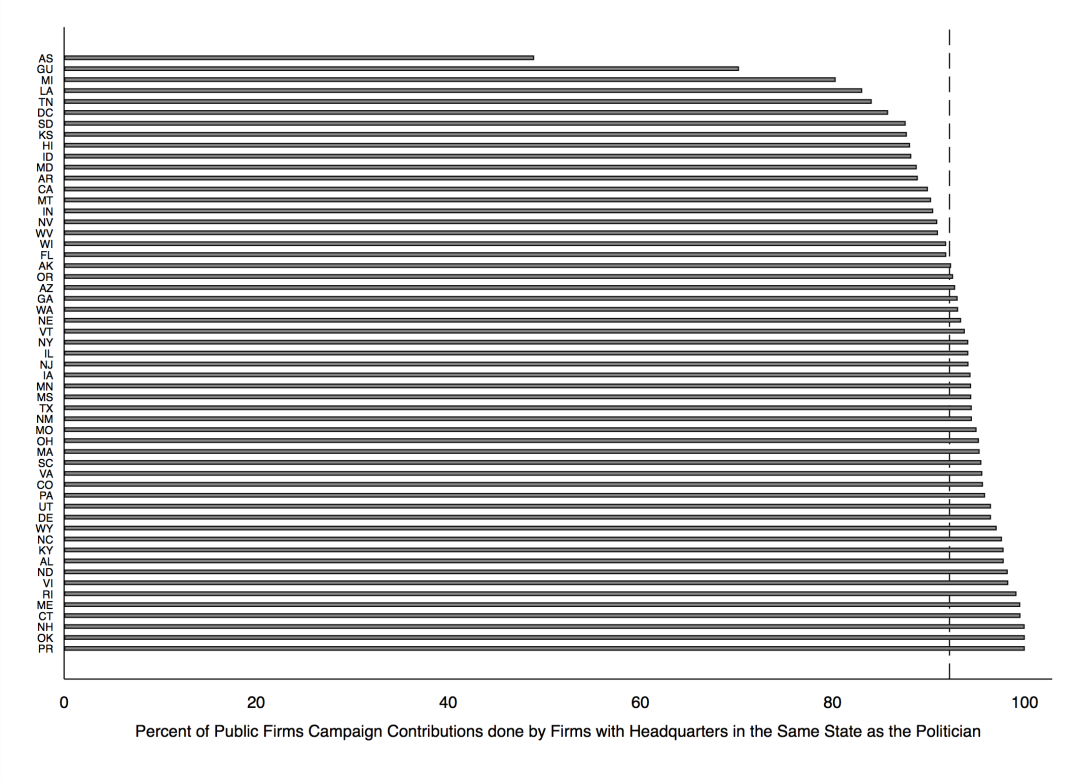

Figure IV.4: **Campaign Contributions from Firms in the Same State**: This figure documents the share of total campaign contributions of public firms to candidates in each state that is done by firms that have headquarters in the same state as the candidate. Each bar presents this statistics for each state. The blue line presents the average across states, which is 92 percent.

E List of Standing Committees

Senate	House
Agriculture, Nutrition, and Forestry	Agriculture
Appropriations	Appropriations
Armed Services	Armed Services
Banking, Housing, and Urban Affairs	Budget
Budget	Education and the Workforce
Commerce, Science, and Transportation	Energy and Commerce
Energy and Natural Resources	Ethics
Environment and Public Works	Financial Services
Finance	Foreign Affairs
Foreign Relations	Homeland Security
Health, Education, Labor, and Pensions	House Administration
Homeland Security and Governmental Affairs	Judiciary
Judiciary	Natural Resources
Rules and Administration	Oversight and Government Reform
Small Business and Entrepreneurship	Rules
Veterans' Affairs	Science, Space, and Technology
	Small Business
	Transportation and Infrastructure
	Veterans' Affairs
	Ways and Means

Table IV.3: This table presents the list of standing committees in the Senate and the House that we consider in the analysis.

F Distribution of Lobbying Activity

In this subsection we document the distribution of lobbying activity across different economic and political dimensions. Figure IV.5, IV.6, IV.7, IV.8 and IV.9 present the distribution of lobbying activity across congress, committee, lobbying issues, industry and state, respectively. It shows these distribution both in terms of number of firms (unweighted) and lobbying expenditure (weighted).

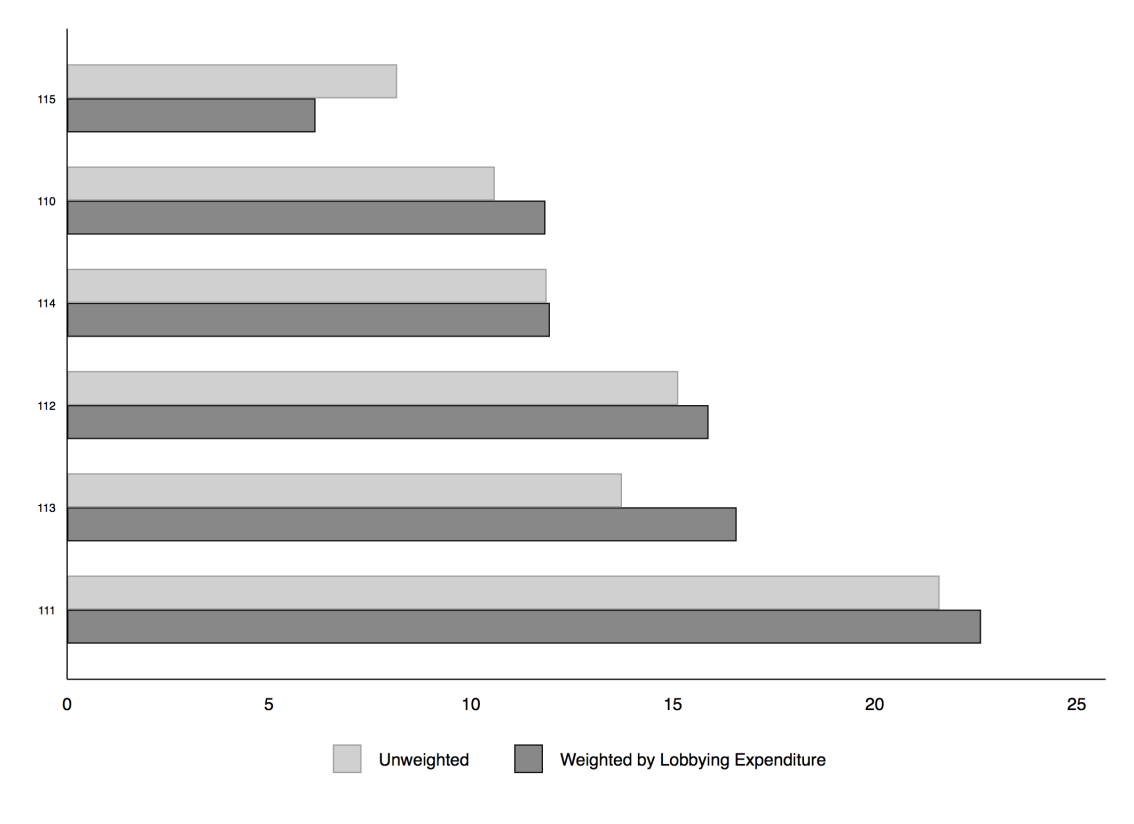

Figure IV.5: **Distribution of Lobbying Activity Across Congress**: This figure presents the distribution of lobbying firms (red) and the share of lobbying expenditure (blue) across congress for the 2008-2018 sample.

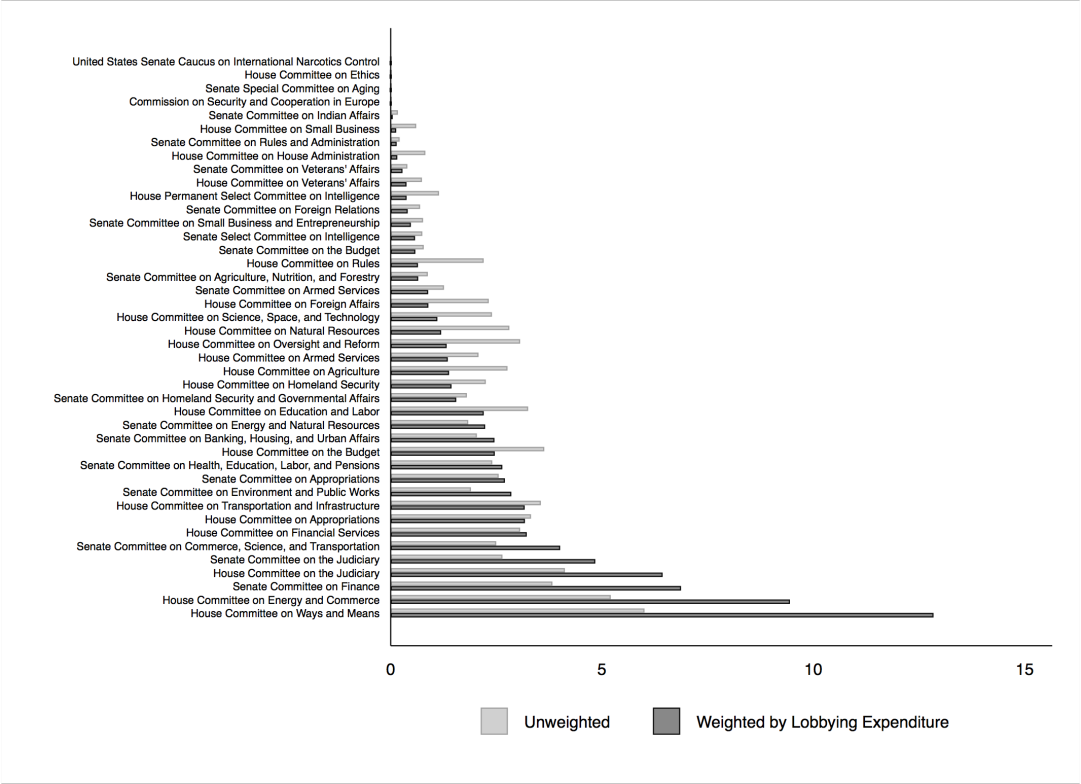

Figure IV.6: **Distribution of Lobbying Activity Across Committees**: This figure presents the distribution of lobbying firms (red) and the share of lobbying expenditure (blue) across committees for the 2008-2018 sample.

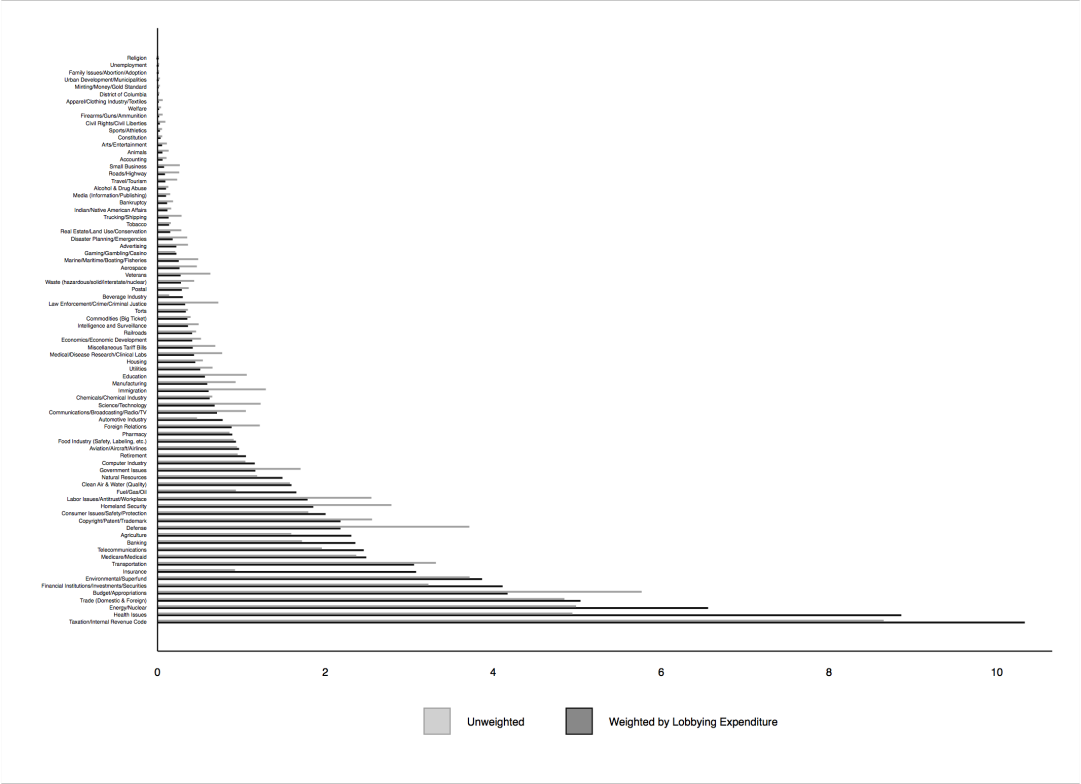

Figure IV.7: **Distribution of Lobbying Activity Across Lobbying Issues**: This figure presents the distribution of lobbying firms (red) and the share of lobbying expenditure (blue) across lobbying issues for the 2008-2018 sample.

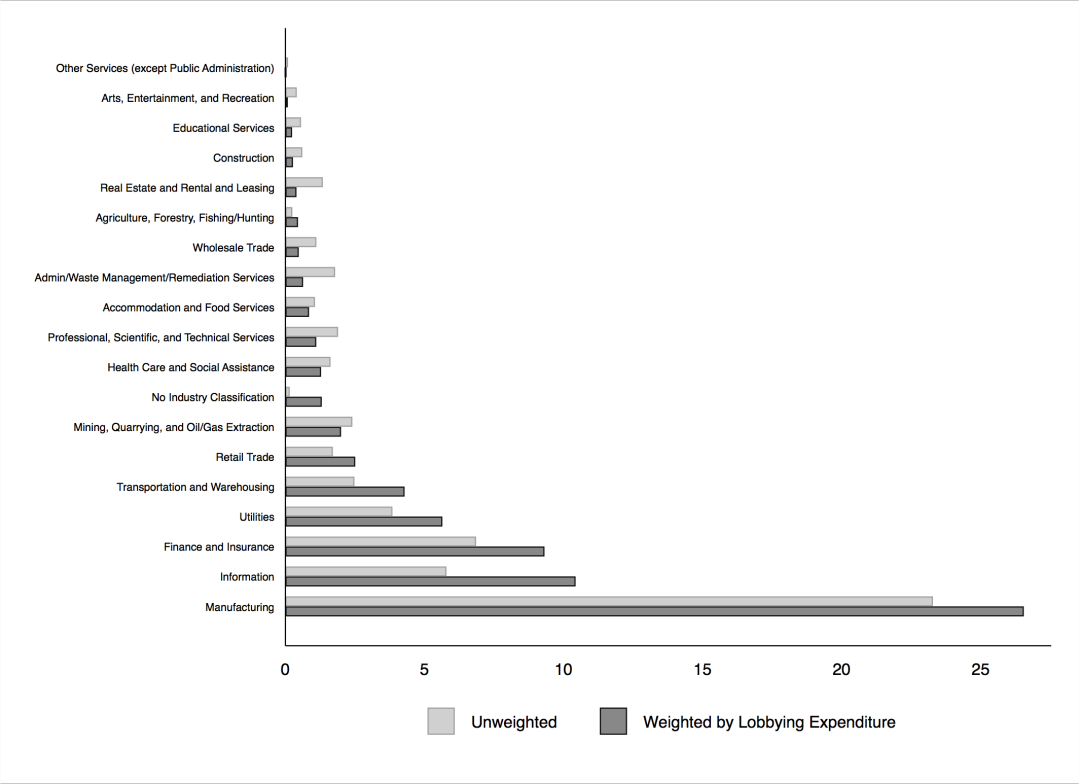

Figure IV.8: **Distribution of Lobbying Activity Across Industries**: This figure presents the distribution of lobbying firms (red) and the share of lobbying expenditure (blue) across 2-digit Naics industries for the 2008-2018 sample.

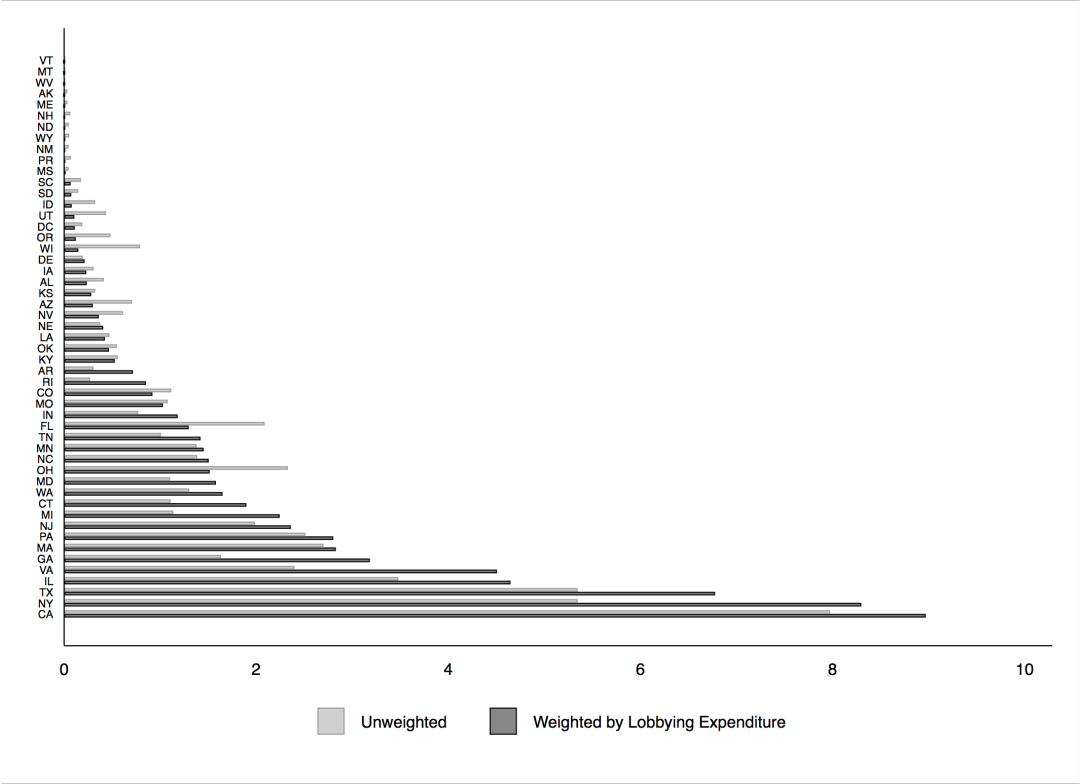

Figure IV.9: **Distribution of Lobbying Activity Across States**: This figure presents the distribution of lobbying firms (red) and the share of lobbying expenditure (blue) across states for the 2008-2018 sample.

V Reduced Form Analysis

In this appendix we present evidence on (i) robustness to the weights used to define the instrument, (i) the first stage of the IV strategy, (iii) the effect of the first stage on other political dimensions, and (iv) descriptive statistics on the distribution of changes of the instrument.

A Robustness of Weights of Shift-Share Instrument in Second Stage

In this subsection we present robustness evidence to the IV strategy implemented in Section III of the main text. We present two types of robustness. The first, varies the timing of the weights used in the instrument to weight the relevance of committees for firms. Table V.1 presents the results. In the benchmark, we used the committee weights that are lagged one period before we committee membership changes. We repeat the benchmark result in the top panel of Table V.1. The middle and bottom panel of this table uses weights lagged two and three years, respectively. One can see that the results are largely robust to this variation. The second robustness, uses weights defined by lobbying expenditure instead of the number of bills that a firm lobbies on committees.[11] Table V.2 shows the main results using weights with lobbying expenditure in $t-1$, $t-2$ and $t-3$. The positive correlation in the OLS and causal effect in the IV also holds with this type of weights. Furthermore, the direction of the bias works in the same way as with weights using the number of bills.

[11] Note that the dataset does not have information of direct lobbying expenditure on each committee. Instead, we use the overall lobbying expenditure divided by the number of committees the firms lobbies on, i.e., the average lobbying expenditure by firms across committees.

	Log Sales		Log VA		Log Profits		Log Capital-Payroll Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0484	0.240	0.0197	0.147	0.0401	0.327	0.0116	0.0570
	(0.0128)	(0.0715)	(0.00793)	(0.0559)	(0.0127)	(0.0847)	(0.00790)	(0.0518)
N	9180	9180	5851	5851	6284	6284	7572	7572
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Sample	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag		nBills, t-2		nBills, t-2		nBills, t-2		nBills, t-2
Mean DV	7.74	7.74	6.99	6.99	6.15	6.15	.19	.19
SD DV	2.27	2.27	1.87	1.87	1.91	1.91	1.65	1.65
SD IV	2.03	2.03	2.04	2.04	2.02	2.02	2.04	2.04

	Log Sales		Log VA		Log Profits		Log Capital-Payroll Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0484	0.266	0.0197	0.245	0.0401	0.364	0.0116	0.0429
	(0.0128)	(0.0709)	(0.00793)	(0.0873)	(0.0127)	(0.123)	(0.00790)	(0.0511)
N	9180	9180	5851	5851	6284	6284	7572	7572
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Sample	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag		nBills, t-3		nBills, t-3		nBills, t-3		nBills, t-3
Mean DV	7.74	7.74	6.99	6.99	6.15	6.15	.19	.19
SD DV	2.27	2.27	1.87	1.87	1.91	1.91	1.65	1.65
SD IV	2.03	2.03	2.04	2.04	2.02	2.02	2.04	2.04

Table V.1: **Different Timing of Weights for Second Stage of IV:** This table presents the OLS and IV between lobbying expenditures and firms economic outcomes. It shows robustness to Table 1 of the main text by using different committee weights. It presents robustness using weights from $t-2$ and $t-3$ (relative to the baseline estimates that uses weights from $t-1$). Profits are defined as sales minus wage bills, capital expenditures and intermediate input expenditures. All regressions have firm, year, sector-year and state-year fixed effects. Standard errors are double clustered at firm and year level.

	Log Sales		Log VA		Log Profits		Log Capital-Payroll Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0484	0.198	0.0197	0.130	0.0401	0.215	0.0116	0.0397
	(0.0128)	(0.0702)	(0.00793)	(0.0467)	(0.0127)	(0.0782)	(0.00790)	(0.0591)
N	9180	9180	5851	5851	6284	6284	7572	7572
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Sample	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag		lobby, t-2		lobby, t-2		lobby, t-2		lobby, t-2
Mean DV	7.74	7.74	6.99	6.99	6.15	6.15	.19	.19
SD DV	2.27	2.27	1.87	1.87	1.91	1.91	1.65	1.65
SD IV	2.03	2.03	2.04	2.04	2.02	2.02	2.04	2.04

	Log Sales		Log VA		Log Profits		Log Capital-Payroll Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0484	0.262	0.0197	0.258	0.0401	0.273	0.0116	0.0906
	(0.0128)	(0.0716)	(0.00793)	(0.0885)	(0.0127)	(0.122)	(0.00790)	(0.0641)
N	9180	9180	5851	5851	6284	6284	7572	7572
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Sample	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag		lobby, t-3		lobby, t-3		lobby, t-3		lobby, t-3
Mean DV	7.74	7.74	6.99	6.99	6.15	6.15	.19	.19
SD DV	2.27	2.27	1.87	1.87	1.91	1.91	1.65	1.65
SD IV	2.03	2.03	2.04	2.04	2.02	2.02	2.04	2.04

Table V.2: **Different Value of Weights for Second Stage of IV:** This table presents the OLS and IV between lobbying expenditures and firms economic outcomes. It shows robustness to Table 1 of the main text, using different committee weights. It defines the weights in terms of lobbying expenditure instead of the number of bills a firm lobbies on a committee. It presents robustness using weights from $t-2$ and $t-3$ (relative to the baseline estimates that uses weights from $t-1$). Profits are defined as sales minus wage bills, capital expenditures and intermediate input expenditures. All regressions have firm, year, sector-year and state-year fixed effects. Standard errors are double clustered at firm and year level.

B First Stage

Table V.3 presents the first stage of the second stage results presented in Table 1 of the main text. We run the following specification:

$$y_{jt} = \alpha + \beta z_{jt} + \gamma_j^F + \gamma_t^T + \gamma_{s(j)t}^S + \gamma_{i(j)t}^I + \varepsilon_{jt}$$

were y_{jt} is lobbying expenditure of firm j at year t, z_{jt} is the instrument and $(\gamma_j^F, \gamma_t^T, \gamma_{s(j)t}^S, \gamma_{i(j)t}^I)$ are firm, time, state-time and industry-time fixed effects, respectively.

Across specifications, the instrument has a positive effect on lobbying expenditure and the F-stat is sufficiently large. A positive effect of the instrument on lobbying expenditure is not mechanic. This is due to the feature that the instrument shifts the market value of lobbying. This leads to a substitution and a scale effect. If the value of lobbying is larger, firms could substitute towards other activities and lobby less, given the size of the firm. This is the substitution effect. But the firm also gets bigger, which leads

to spending more in all activities, including lobbying. This is the scale effect. Our results highlight that the scale effect dominates the substitution effect.

In our main specifications, the weights of the instrument are build on the number of bills that a firm lobbies on a committee in $t-1$. Here we explore two robustness to that: (i) we define the weights in $t-2$ and $t-3$ (Table V.4), and (ii) we define the weights using average lobbying expenditure done in a committee (Table V.5). The main results are robust to these variations of the definition of the weights.

	Log Sales	Log VA	Log Profits	Log Capital-Payroll Ratio
	(1)	(2)	(3)	(4)
Z	6.719	6.436	6.683	6.329
	(1.514)	(1.833)	(1.670)	(1.517)
N	9180	5851	6284	7572
Firm and Year FE	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓
Model	OLS	OLS	OLS	OLS
F-Stat	19.70	12.30	16	17.40
Sample	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag	nBills, t-1	nBills, t-1	nBills, t-1	nBills, t-1
Mean DV	-1.19	-1.24	-1.13	-1.23
SD DV	2.03	2.04	2.02	2.04
SD IV	.02	.02	.02	.02

Table V.3: **First Stage of Benchmark IV Specification:** This table presents the first stage of the benchmark results of the IV strategy presented in Table 1 of the main text. The specification has on the left-hand side lobbying expenditure at the firm-time level and the right-hand side the instrument. Column 1-4 presents the result for different second stages since the sample depends on the outcomes of the second stage. All regressions have firm, year, sector-year and state-year fixed effects. The weights of the instrument are defined using the number of bills that a firm lobbied on committees at $t-1$. Standard errors are double clustered at firm and year level.

	Log Sales	Log VA	Log Profits	Log Capital-Payroll Ratio
	(1)	(2)	(3)	(4)
Z	5.920	5.284	5.687	5.155
	(1.552)	(1.927)	(1.693)	(1.607)
N	9180	5851	6284	7572
Firm and Year FE	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓
Model	OLS	OLS	OLS	OLS
F-Stat	14.60	7.500	11.30	10.30
Sample	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag	nBills, t-2	nBills, t-2	nBills, t-2	nBills, t-2
Mean DV	-1.19	-1.24	-1.13	-1.23
SD DV	2.03	2.04	2.02	2.04
SD IV	.02	.02	.02	.02

	Log Sales	Log VA	Log Profits	Log Capital-Payroll Ratio
	(1)	(2)	(3)	(4)
Z	4.840	4.262	4.665	4.163
	(1.038)	(1.227)	(1.067)	(1.121)
N	9180	5851	6284	7572
Firm and Year FE	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓
Model	OLS	OLS	OLS	OLS
F-Stat	21.80	12.10	19.10	13.80
Sample	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag	nBills, t-3	nBills, t-3	nBills, t-3	nBills, t-3
Mean DV	-1.19	-1.24	-1.13	-1.23
SD DV	2.03	2.04	2.02	2.04
SD IV	.02	.02	.02	.02

Table V.4: **Different Timing of Weights for First Stage of IV:** This table presents robustness of the first stage of the benchmark results of the IV strategy presented in Table 1 of the main text. The robustness is implemented in terms of the timing of the definition of the weights used to build the shift-share instrument. The specification has on the left-hand side lobbying expenditure at the firm-time level and the right-hand side the instrument. Column 1-4 presents the result for different second stages since the sample depends on the outcomes of the second stage. All regressions have firm, year, sector-year and state-year fixed effects. The weights of the instrument are defined using the number of bills that a firm lobbied on committees at $t-2$ and $t-3$ (relative to the baseline that uses weights defined at $t-1$). Standard errors are double clustered at firm and year level.

	Log Sales	Log VA	Log Profits	Log Capital-Payroll Ratio
	(1)	(2)	(3)	(4)
Z	5.739	5.884	6.031	5.305
	(1.414)	(1.953)	(1.625)	(1.550)
N	9180	5851	6284	7572
Firm and Year FE	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓
Model	OLS	OLS	OLS	OLS
F-Stat	16.50	9.100	13.80	11.70
Sample	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag	lobby, t-2	lobby, t-2	lobby, t-2	lobby, t-2
Mean DV	-1.19	-1.24	-1.13	-1.23
SD DV	2.03	2.04	2.02	2.04
SD IV	.01	.01	.02	.01

	Log Sales	Log VA	Log Profits	Log Capital-Payroll Ratio
	(1)	(2)	(3)	(4)
Z	4.501	4.363	4.714	3.939
	(0.992)	(1.217)	(1.123)	(1.058)
N	9180	5851	6284	7572
Firm and Year FE	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓
Model	OLS	OLS	OLS	OLS
F-Stat	20.60	12.90	17.60	13.90
Sample	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag	lobby, t-3	lobby, t-3	lobby, t-3	lobby, t-3
Mean DV	-1.19	-1.24	-1.13	-1.23
SD DV	2.03	2.04	2.02	2.04
SD IV	.01	.01	.01	.01

Table V.5: **Different Type of Weights for First Stage of IV:** This table presents robustness of the first stage of the benchmark results of the IV strategy presented in Table 1 of the main text. The robustness is implemented in terms of the variable in defining the weights used to build the shift-share instrument. The specification has on the left-hand side lobbying expenditure at the firm-time level and the right-hand side the instrument. Column 1-4 presents the result for different second stages since the sample depends on the outcomes of the second stage. All regressions have firm, year, sector-year and state-year fixed effects. The weights of the instrument are defined using lobbying expenditure on committees at $t-2$ and $t-3$ (relative to the baseline that uses weights defined at $t-1$). Standard errors are double clustered at firm and year level.

C First Stage Effect on Other Political Dimensions

In this section we present evidence of the effect of the instrument on other political dimensions. We run the following specification:

$$y_{jt} = \alpha + \beta z_{jt} + \gamma_j^F + \gamma_t^T + \gamma_{s(j)t}^S + \gamma_{i(j)t}^I + \varepsilon_{jt} \tag{24}$$

were y_{jt} is a political characteristic of firm j at year t, z_{jt} is the instrument and $(\gamma_j^F, \gamma_t^T, \gamma_{s(j)t}^S, \gamma_{i(j)t}^I)$ are firm, time, state-time and industry-time fixed effects, respectively. In other words, this is the same specification of the first stage but using other political variables on the left-hand side rather than lobbying expenditure.

Table V.6 presents the result. Column 1 replicates the benchmark first stage.[12] Column 2, 3, 4 and 5 shows that an increase in the instrument increases the number of reports, the number of issues, the number of bills and the number of committees that the firm lobbied on. This evidence provides potential mechanisms of how the first stage affects outcomes in the second stage. These results highlight that when the value of firms' political connections in Congress increases, they increase lobbying activity across multiple dimensions simultaneously. This stresses how important the value of these connections are in Congress for these firms.

Column 6 of Table V.6 shows that the instruments also increases the likelihood of doing lobbying inhouse. This result can be rationalized if there is a fixed cost of insourcing lobbying, if the value of lobbying increases sufficiently enough, then it becomes profitable to insource lobby.

Table V.7-V.8 presents robustness to Table V.6 by varying the variables used to define the weights in building the shift-share instrument. Table V.7 uses the number of bills lobbied on each committee at $t-2$ and $t-3$ rather than at $t-1$ (which is the benchmark specification). Table V.8 uses average lobbying expenditure spent on each committee at $t-1$, $t-2$ and $t-3$ rather than using the number of bills lobbied on each committee (which is the benchmark specification). Our main results are robust to these robustness exercises.

Finally, we look at the effect of the instrument on a different political dimension of firms influence on politicians: campaign contributions. We run the same specification as in Equation (24), but now we use variables related to campaign contribution behavior, such as the total campaign contribution given by firms to politicians, the number of candidates a firm supports with campaign contributions and whether the firm make campaign contributions. Table V.9-V.10 presents the result across different strategies in defining the weights for the shift-share instrument. Across specifications of these two tables, the instrument increases campaign contributions and the number of candidates that firms support. It does not increase robustly the likelihood of contributing at all. This evidence is consistent the idea that our instrument shifts not only the returns to lobbying but also the returns to campaign contributions. It also suggest some role for mismeasurement in our IV specification. The instrument not only changes the first stage outcome, but other mechanisms of how firms can influence politicians, such as campaign contributions. This is consistent with previous results in the literature showing that instruments that shift the value of political connections affect firms expenditures on politicians such as corporate philanthropy (Bertrand et al., 2020). Thus, our instrument shifts not only lobbying expenditure but other mechanisms of influence of firms on politicians, therefore justifying even further the significant second stage results.

[12]The results are slightly different compared to our benchmark results in Table V.3 since the sample used is different. Furthermore, since we are not conditioning on having an economic characteristic in the second stage, our sample size is larger and represents all firms for which we have lobbying reports. This sample size is larger than the one for which we have information in Compustat.

	Lobbying Expense	Number of Reports	Number of Issues	Number of Bills	Number of Committees	Inhouse
	(1)	(2)	(3)	(4)	(5)	(6)
Z	6.923	4.175	3.604	27.38	19.30	0.972
	(1.149)	(0.569)	(0.485)	(3.691)	(2.415)	(0.198)
N	15800	15800	15800	15800	15800	15800
Firm and Year FE	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓	✓	✓
Sample	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag	nBills, t-1	nBills, t-1	nBills, t-1	nBills, t-1	nBills, t-1	nBills, t-1
Mean DV	-1.57	1.62	1.1	1.42	.96	.33
SD DV	2.35	.95	.91	1.79	1.17	.39
SD IV	.02	.02	.02	.02	.02	.02

Table V.6: **Politics Behavior and the Value of Firms' Political Connections:** This table presents the results of the specification of Equation (24), where y_{jt} is lobbying expenditure (Column 1), number of reports (Column 2), number of issues (Column 3), number of bills (Column 4), number of committees (Column 5) that firm j lobbied on at year t. Column 6 reports the effect of the instrument on a dummy variable of whether the firm insources lobbying. All regressions have firm, year, sector-year and state-year fixed effects. The weights of the instrument are defined using the number of bills that a firm lobbied on committees at $t-1$. Standard errors are double clustered at firm and year level.

	Lobbying Expense	Number of Reports	Number of Issues	Number of Bills	Number of Committees	Inhouse
	(1)	(2)	(3)	(4)	(5)	(6)
Z	4.914	3.703	2.987	24.39	17.38	0.845
	(1.217)	(0.512)	(0.480)	(4.408)	(2.998)	(0.195)
N	15032	15032	15032	15032	15032	15032
Firm and Year FE	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓	✓	✓
Sample	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag	nBills, t-2	nBills, t-2	nBills, t-2	nBills, t-2	nBills, t-2	nBills, t-2
Mean DV	-1.52	1.65	1.1	1.48	1.01	.33
SD DV	2.31	.95	.91	1.8	1.18	.39
SD IV	.01	.01	.01	.01	.01	.01

	Lobbying Expense	Number of Reports	Number of Issues	Number of Bills	Number of Committees	Inhouse
	(1)	(2)	(3)	(4)	(5)	(6)
Z	3.994	2.913	2.642	21.83	15.88	0.811
	(1.053)	(0.447)	(0.463)	(3.740)	(2.575)	(0.192)
N	14208	14208	14208	14208	14208	14208
Firm and Year FE	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓	✓	✓
Sample	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag	nBills, t-3	nBills, t-3	nBills, t-3	nBills, t-3	nBills, t-3	nBills, t-3
Mean DV	-1.48	1.68	1.1	1.56	1.05	.33
SD DV	2.28	.95	.9	1.82	1.19	.4
SD IV	.01	.01	.01	.01	.01	.01

Table V.7: **Politics Behavior and the Value of Firms' Political Connections: Different Timing of Weights of Instrument** This table presents robustness to the results of the specification of Equation (24), where y_{jt} is lobbying expenditure (Column 1), number of reports (Column 2), number of issues (Column 3), number of bills (Column 4), number of committees (Column 5) that firm j lobbied on at year t. Column 6 reports the effect of the instrument on a dummy variable of whether the firm insources lobbying. All regressions have firm, year, sector-year and state-year fixed effects. The weights of the instrument are defined using the number of bills that a firm lobbied on committees at $t-2$ and $t-3$ (relative to the baseline estimates that use weights defined at $t-1$). Standard errors are double clustered at firm and year level.

	Lobbying Expense	Number of Reports	Number of Issues	Number of Bills	Number of Committees	Inhouse
	(1)	(2)	(3)	(4)	(5)	(6)
Z	5.361	3.693	3.211	23.52	16.64	0.867
	(1.085)	(0.467)	(0.476)	(4.498)	(3.067)	(0.210)
N	15032	15032	15032	15032	15032	15032
Firm and Year FE	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓	✓	✓
Sample	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag	lobby, t-2	lobby, t-2	lobby, t-2	lobby, t-2	lobby, t-2	lobby, t-2
Mean DV	-1.52	1.65	1.1	1.48	1.01	.33
SD DV	2.31	.95	.91	1.8	1.18	.39
SD IV	.01	.01	.01	.01	.01	.01

	Lobbying Expense	Number of Reports	Number of Issues	Number of Bills	Number of Committees	Inhouse
	(1)	(2)	(3)	(4)	(5)	(6)
Z	4.150	2.891	2.725	21.12	15.21	0.862
	(0.973)	(0.413)	(0.455)	(3.784)	(2.605)	(0.198)
N	14208	14208	14208	14208	14208	14208
Firm and Year FE	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓
Sector-Year FE	✓	✓	✓	✓	✓	✓
Sample	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007	Post 2007
Weight Lag	lobby, t-3	lobby, t-3	lobby, t-3	lobby, t-3	lobby, t-3	lobby, t-3
Mean DV	-1.48	1.68	1.1	1.56	1.05	.33
SD DV	2.28	.95	.9	1.82	1.19	.4
SD IV	.01	.01	.01	.01	.01	.01

Table V.8: **Politics Behavior and the Value of Firms' Political Connections: Different Types of Weights of Instrument** This table presents robustness to the results of the specification of Equation (24), where y_{jt} is lobbying expenditure (Column 1), number of reports (Column 2), number of issues (Column 3), number of bills (Column 4), number of committees (Column 5) that firm j lobbied on at year t. Column 6 reports the effect of the instrument on a dummy variable of whether the firm insources lobbying. All regressions have firm, year, sector-year and state-year fixed effects. The weights of the instrument are defined using average lobbying expenditure that a firm lobbied on committees at $t-2$ and $t-3$ (relative to the baseline estimates that use weights defined at $t-1$). Standard errors are double clustered at firm and year level.

	Campaign Contribution	Number Candidates	Whether Contributed
	(1)	(2)	(3)
Z	2.296	2.761	0.243
	(0.867)	(0.811)	(0.150)
N	5088	5118	15032
Firm and Year FE	✓	✓	✓
State-Year FE	✓	✓	✓
Sector-Year FE	✓	✓	✓
Sample	Post 2007	Post 2007	Post 2007
Weight Lag	nBills, t-2	nBills, t-2	nBills, t-2
Mean DV	10.42	2.98	.34
SD DV	1.47	1.32	.47
SD IV	.02	.02	.01

	Campaign Contribution	Number Candidates	Whether Contributed
	(1)	(2)	(3)
Z	2.031	2.596	0.201
	(0.933)	(0.787)	(0.185)
N	4818	4846	14208
Firm and Year FE	✓	✓	✓
State-Year FE	✓	✓	✓
Sector-Year FE	✓	✓	✓
Sample	Post 2007	Post 2007	Post 2007
Weight Lag	nBills, t-3	nBills, t-3	nBills, t-3
Mean DV	10.43	2.97	.34
SD DV	1.47	1.32	.47
SD IV	.02	.02	.01

Table V.9: **Campaign Contributions and the Value of Firms' Political Connections: Different Timing of Weights of Instrument** This table presents the effect of our instrument on variables of campaign contribution following the specification of Equation (24), where y_{jt} is overall campaign contribution of firm j at year t (Column 1), number of candidates the firm supports at t (Column 2) and whether the firm supports any candidate (Column 3). All regressions have firm, year, sector-year and state-year fixed effects. The weights of the instrument are defined using the number of bills that a firm lobbied on committees at $t-2$ and $t-3$ (relative to the baseline estimates that use weights defined at $t-1$). Standard errors are double clustered at firm and year level. *** p<0.01, ** p<0.05, * p<0.1

	Campaign Contribution	Number Candidates	Whether Contributed
	(1)	(2)	(3)
Z	2.879	3.119	0.259
	(1.032)	(0.906)	(0.148)
N	5088	5118	15032
Firm and Year FE	✓	✓	✓
State-Year FE	✓	✓	✓
Sector-Year FE	✓	✓	✓
Sample	Post 2007	Post 2007	Post 2007
Weight Lag	lobby, t-2	lobby, t-2	lobby, t-2
Mean DV	10.42	2.98	.34
SD DV	1.47	1.32	.47
SD IV	.02	.02	.01
	Campaign Contribution	Number Candidates	Whether Contributed
	(1)	(2)	(3)
Z	1.854	2.278	0.263
	(0.948)	(0.838)	(0.200)
N	4818	4846	14208
Firm and Year FE	✓	✓	✓
State-Year FE	✓	✓	✓
Sector-Year FE	✓	✓	✓
Sample	Post 2007	Post 2007	Post 2007
Weight Lag	lobby, t-3	lobby, t-3	lobby, t-3
Mean DV	10.43	2.97	.34
SD DV	1.47	1.32	.47
SD IV	.01	.01	.01

Table V.10: **Campaign Contributions and the Value of Firms' Political Connections: Different Timing of Weights of Instrument** This table presents the effect of our instrument on variables of campaign contribution following the specification of Equation (24), where y_{jt} is overall campaign contribution of firm j at year t (Column 1), number of candidates the firm supports at t (Column 2) and whether the firm supports any candidate (Column 3). All regressions have firm, year, sector-year and state-year fixed effects. The weights of the instrument are defined using average lobbying expenditure that a firm lobbied on committees at $t-2$ and $t-3$ (relative to the baseline estimates that use weights defined at $t-1$). Standard errors are double clustered at firm and year level. *** p<0.01, ** p<0.05, * p<0.1

D Dynamics of Lobbying Effect on Firm Size

This subsection evaluates the dynamics of the effect of the lobbying on firm economic characteristics. We implement a Jorda local projection strategy:

$$y_{it+h} = \beta + \alpha_h \log l_{it} + \alpha_y y_{it-1} + \epsilon_{it+h}, \tag{25}$$

where $h = \{1, 2, 3, 4\}$, y_{it+h} is an outcome of firm i, h years after the lobbying shock, l_{it} is lobbying expenditure of firm i at year t. We implement this strategy with an OLS model and also with the IV strategy by instrumenting $\log l_{it}$ with our shift-share instrument. Figure V.1 presents both OLS and IV versions of $\hat{\alpha}_h$ for three different outcomes y_{it+h} of Equation (25): log sales, log value added and log capital-payroll ratio. It shows a positive and increasing effect of lobbying on firm sales when estimating with OLS. With the IV strategy, the effect is stronger in the short run, but vanishes after two years. It also shows that the OLS significantly underestimates the lobbying effect in the short run (α_1). The effect on value added are not statistically different from zero when estimating with OLS but strongly positive

when estimating with IV. This highlights again that OLS underestimates the effect of lobbying. It also shows that the OLS underestimates the dynamic effect of lobbying in the sense that the effect on value added is increasing until 2 years after the shock and the effect is still significant 3 years after the shock. This stress the sluggish response of firm economic outcomes to changes in firms' value of political connections. Finally, the OLS strategy shows a positive effect of lobbying on the capital-payroll ratio in the short run but not a statistically significant effect with the IV strategy, highlighting that lobbying seems to have a stronger effect on firm size rather than the composition of inputs.

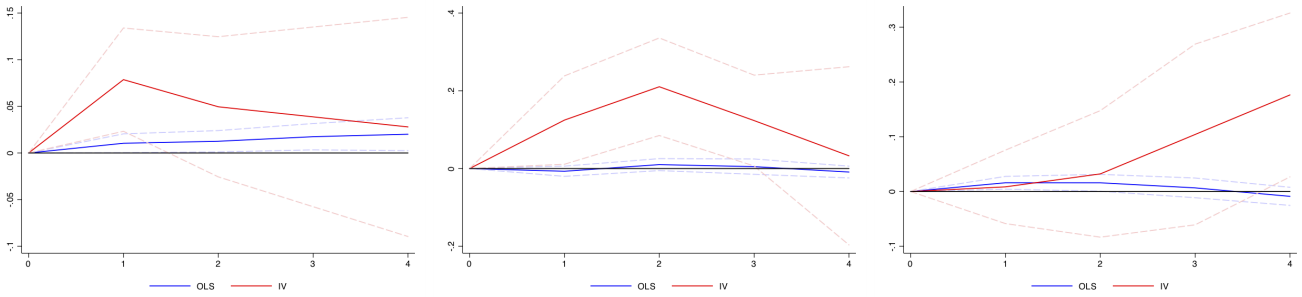

Figure V.1: **The Effect of Lobbying on Firm Dynamics:** This figure presents the OLS (blue) and IV (red) estimates of α_h from Equation (25). Panel (a), (b) and (c) shows this for y_{it+h} being log sales, log value added and log capital-payroll ratio, respectively. The IV strategy uses the shift-share instrument built with weights of the number of bills a firms lobbied on a committee in $t-1$. Dashed lines represent confidence intervals with 95 percent of confidence.

E Distribution of Instrument Changes

In this subsection we document how the variation of the instrument is distributed across different economic and political dimensions. The goal is to understand in which dimension of the data is the source of variation in our instrument. Note that the only way the instrument varies over time for a given firm is if the politician connected to that firm changes committee into or from a committee that is relevant for the firm. In particular, we document the share of firms for which the instrument varies over time across: congress (Figure V.2), committees (Figure V.3), lobbying issues (Figure V.4), industry (Figure V.5) and state (Figure V.6). The main takeaway of these figures is that they show that there is heterogeneity in how many firms present changes of the instrument over time but overall there does not seem to be any congress, committee, lobbying issue, industry or state dominating the variation.

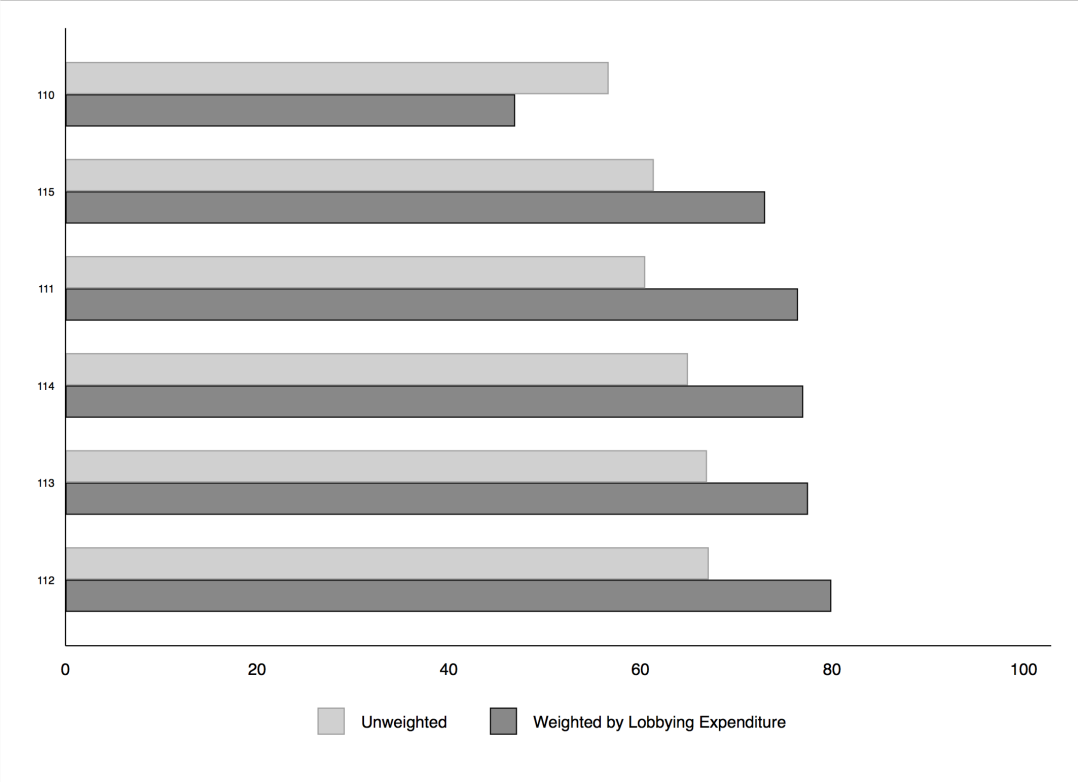

Figure V.2: **Share of Lobbying with Variation in Instrument at Congress Level**: This figure presents the share of lobbying firms (red) and the share of lobbying expenditure (blue) within each congress that experience firm-level changes in the instrument over time.

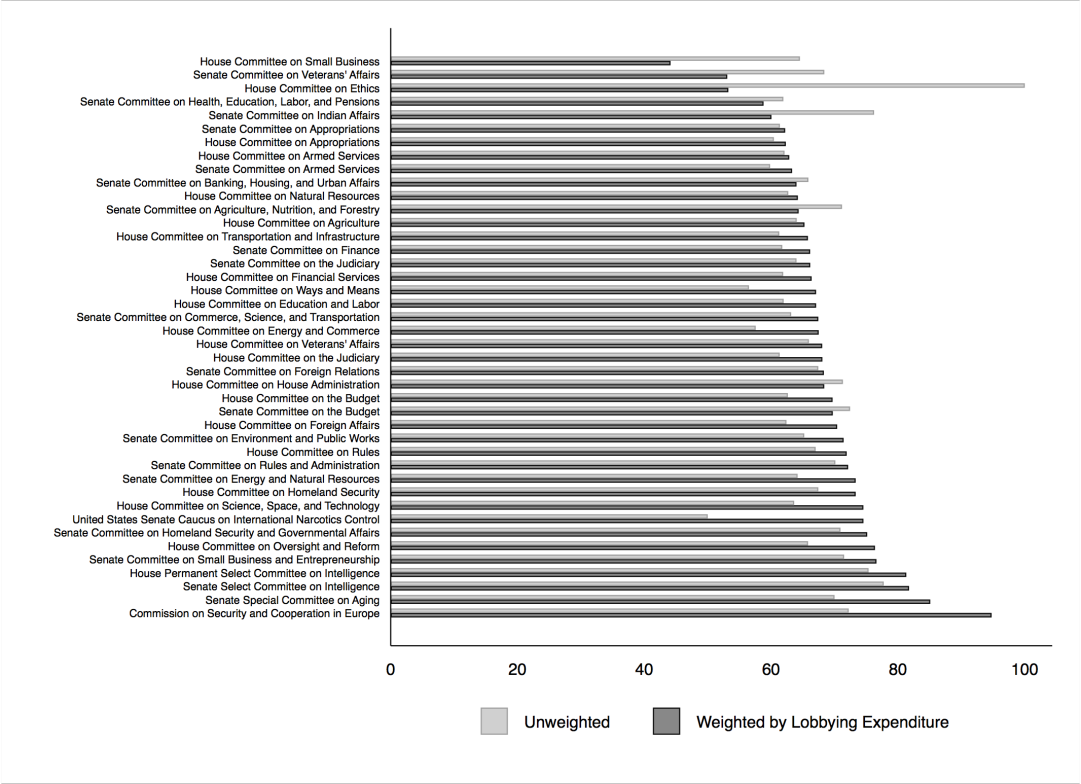

Figure V.3: **Share of Lobbying with Variation in Instrument at Committee Level**: This figure presents the share of lobbying firms (red) and the share of lobbying expenditure (blue) within each standing committee that experience firm-level changes in the instrument over time.

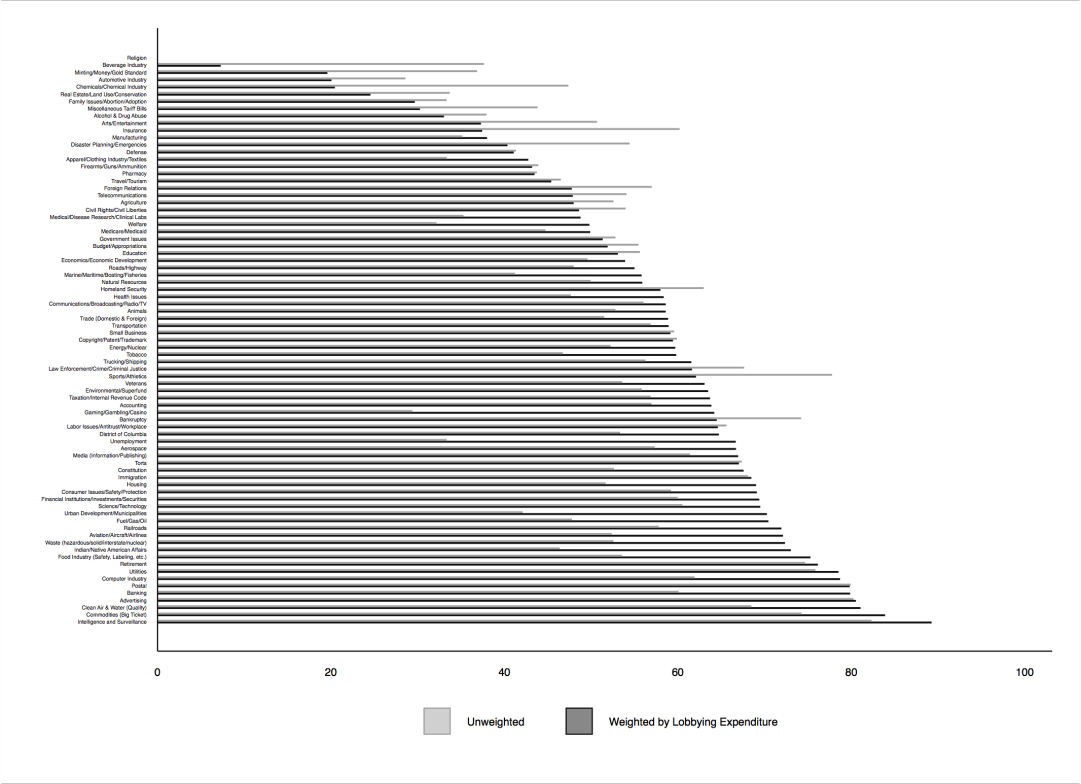

Figure V.4: **Share of Lobbying with Variation in Instrument at Issue Level**: This figure presents the share of lobbying firms (red) and the share of lobbying expenditure (blue) within each lobbying issue that experience firm-level changes in the instrument over time.

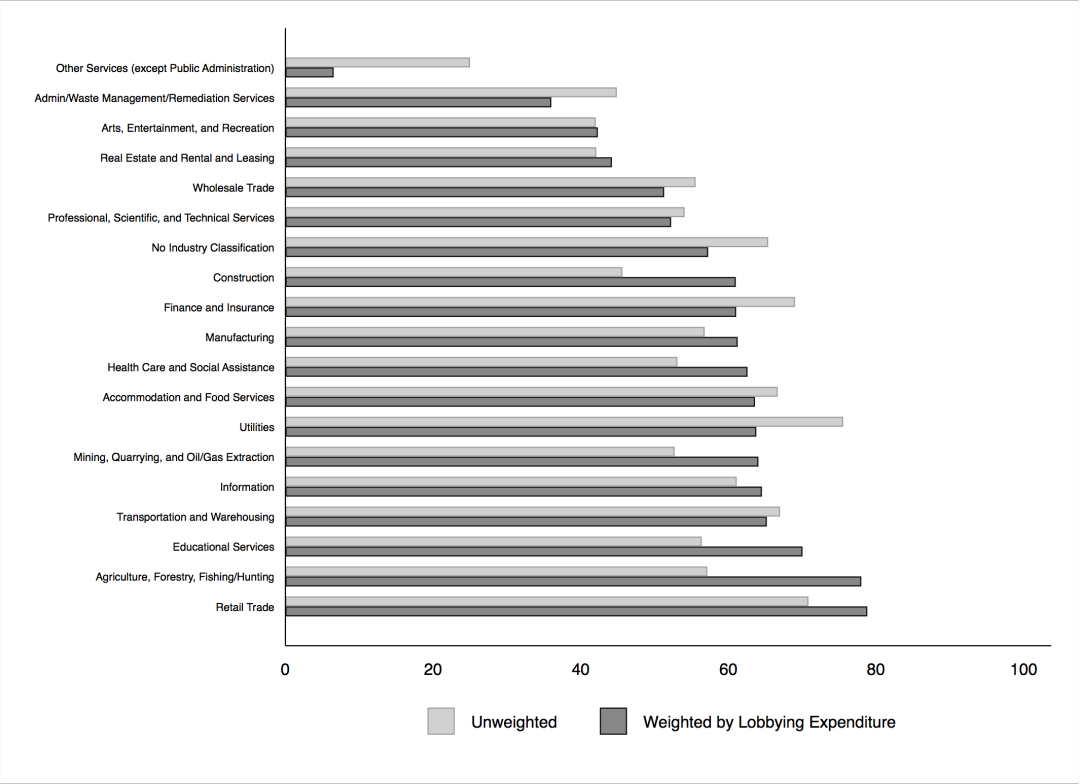

Figure V.5: **Share of Lobbying with Variation in Instrument at Industry Level**: This figure presents the share of lobbying firms (red) and the share of lobbying expenditure (blue) within each industry that experience firm-level changes in the instrument over time.

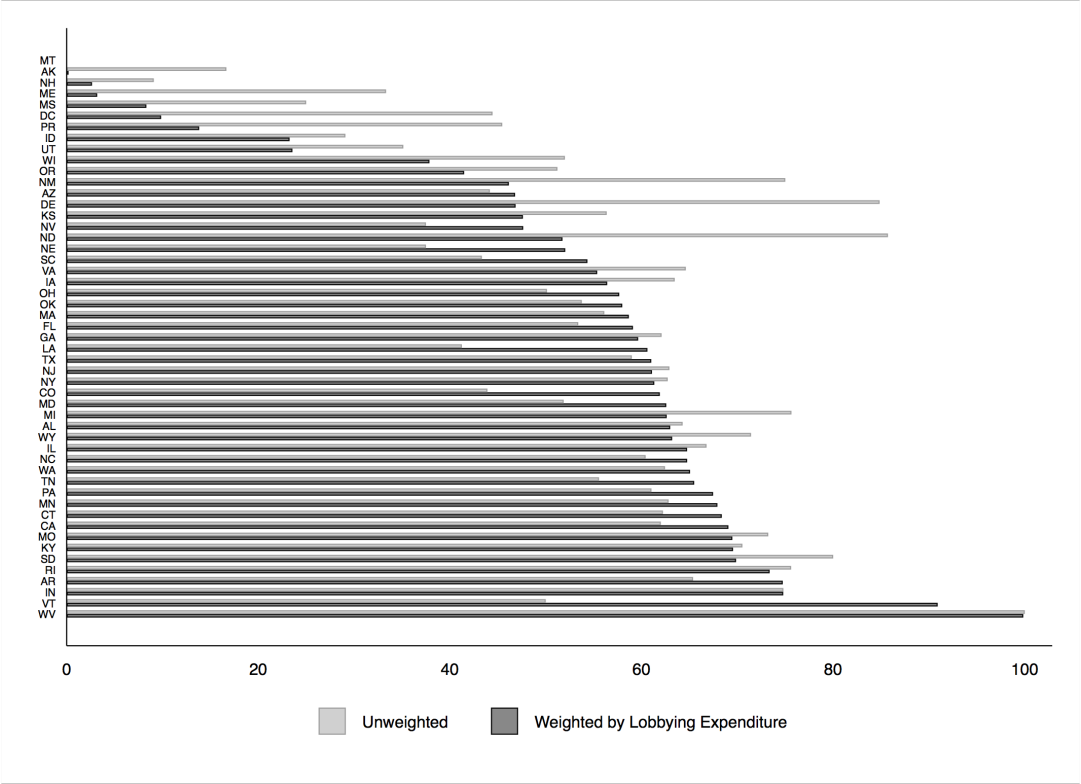

Figure V.6: **Share of Lobbying with Variation in Instrument at State Level**: This figure presents the share of lobbying firms (red) and the share of lobbying expenditure (blue) within each state that experience firm-level changes in the instrument over time.

VI Structural Estimation

We implement a SMM algorithm in four steps. First, the model is simulated with a given value for Θ. Second, we use the simulation of the model to produce a set of moments, which we stack into the vector $\hat{m}(\Theta)$. Third, we produce the same set of moments with data and stack this into the vector m. Finally, we compute an objective function to evaluate the deviations of the simulated moments from the data moments, $d(\Theta) = m - \hat{m}(\Theta)$. If this difference is not below some threshold, the algorithm is repeated with different parameter values until a minimum is reached. The estimation procedure is based on the following moment condition:

$$\mathbb{E}\left[d(\Theta_0)\right] = 0,$$

where Θ_0 is the true value of Θ. Thus, the algorithm for $\hat{\Theta}$ is

$$\hat{\Theta} = \underset{\Theta}{\operatorname{argmin}}\{d(\Theta)'\mathbf{W}d(\Theta)\},$$

where $\mathbf{W}$ is a weighting matrix which is the generalized inverse of the estimated variance-covariance matrix of the moments calculated from the data.[13]

We document descriptive statistics of the estimated version of the model. First, Figure VI.1 documents the marginal distributions of the primitives $\phi = \{\phi^P, \phi^D, \phi^L\}$.

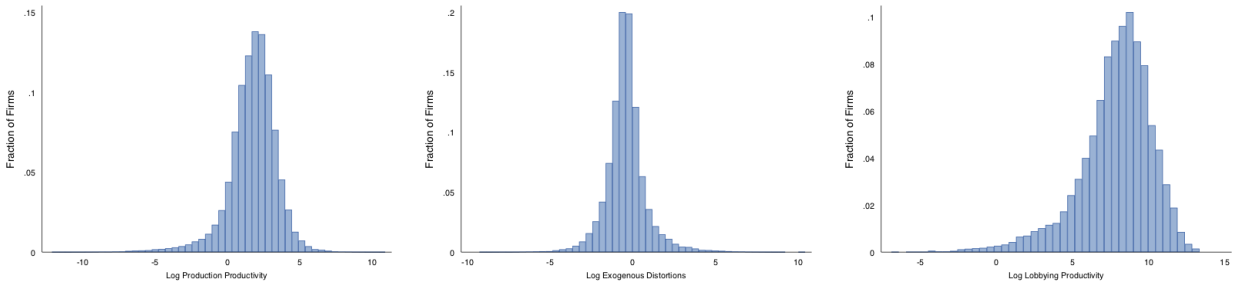

Figure VI.1: **Marginal Distributions of Firms' Primitives:** This figure presents the marginal distribution of each of the primitives estimated from the model. The figures show that the primitives follow a log-normal distribution.

Second, we document the fit of the estimated version of the model to two sets of moments from the data: the percentage of firms that lobby in each sector, and the distribution of the number of firms across sectors. In both cases, the figures demonstrate a relatively good fit of the model.

[13] We assume the identity matrix, which effectively weights all the moments equally.

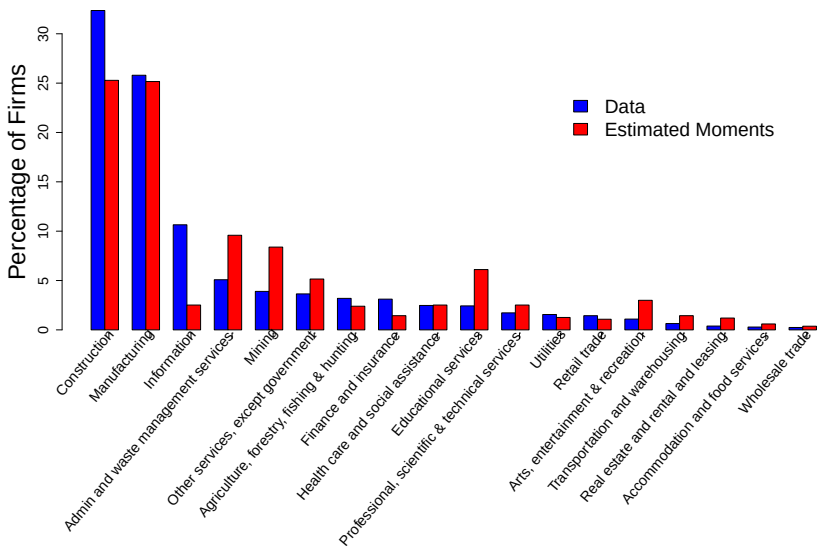

Figure VI.2: **Number of Firms Share Fit**: This figure shows the distribution of the number of firms across sectors, both in the data and the one simulated from the estimated version of the model.

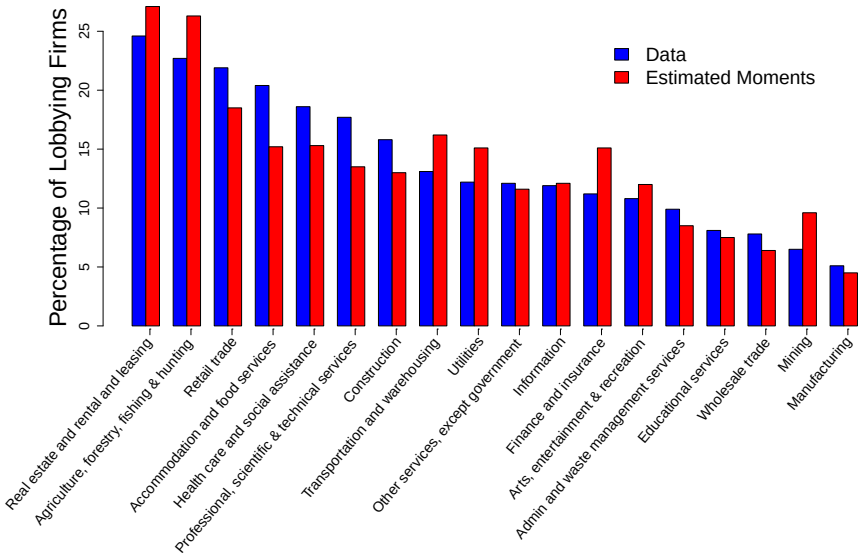

Figure VI.3: **Lobbying Share Fit**: This figure shows the percentage of firms in each sector that lobby, both in the data and the one simulated from the estimated version of the model.

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