The Effects of Firms' Lobbying on Resource Misallocation*

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October 29, 2018

Abstract

We study the causal effect of firms' lobbying activities on the misallocation of resources through the distortion of firm size. To address the endogeneity between firms' lobbying expenditure and their size, we propose a new instrument. Specifically, we measure firms' political connections based on the geographic proximity between their headquarter locations and politicians' districts in the U.S., and trace the value of these connections over time by exploiting politicians' assignment to congressional committees. We find that a 10 percent increase in lobbying expenditure leads to 3 percent revenue gains. To investigate the macroeconomic consequences of these effects, we develop a heterogeneous firm-level model with endogenous lobbying. Using a novel dataset that we construct, we document new stylized facts about lobbying behavior and use them, including the one from the instrument, to estimate the model. Our counterfactual analysis shows that the return to firms' lobbying activities amounts to a 22 percent decrease in aggregate output in the U.S.

Keywords: Firm-level lobbying, misallocation, aggregate productivity, political connections
JEL Codes: D22, L11, L25, P16

*We thank Gene Grossman, Esteban Rossi-Hansberg, Steve Redding, Richard Rogerson, Juan Pablo Xandri, Ezra Oberfield, Atif Mian, Eduardo Morales, Jan De Loecker, as well as numerous seminar participants for helpful discussions and comments. Eliza Riley provided superb research assistance. Huneeus is grateful to financial support from the International Economics Section (IES), the Simpson Center for the Study of Macroeconomics, the Program for Latin American Studies (PLAS) and the Fellowship of Woodrow Wilson Scholars at Princeton University. Kim acknowledges financial support from the National Science Foundation (SES-1725235).

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1 Introduction

Distortions in the allocation of resources between firms can reduce aggregate productivity in an economy (Hsieh and Klenow, 2009). Researchers have identified several channels through which firms' decision making influence this misallocation. For instance, by charging prices above marginal costs, firms can produce less than efficiently (Baqaee and Farhi, 2017); 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, 2018). Yet, an important dimension of firms' decisions that is often overlooked in studying misallocation is their capacity to influence policy-making directly through lobbying. Politically active firms may obtain policy benefits at the expense of other firms (Khwaja and Mian, 2005; Kang, 2015), which, in turn, could allow them to survive and grow more than otherwise.

In this paper, we study the causal effect of firms' lobbying activities on the misallocation of resources, through firms' influence on policies that affect their size. We begin by documenting a set of new facts about firms' lobbying behavior in the U.S. In doing so, we construct a comprehensive dataset of firm-level lobbying covering all lobbying activities in the U.S. from 1999 to 2018. This dataset not only includes firms' lobbying expenses but also identifies to which congressional committees the lobbying activity is being exerted, by connecting it through detailed information on all lobbied bills since the 106th Congress. We merge this dataset with standard economic characteristics of public firms and show, among other facts, that firms that lobby more tend to be bigger. This is consistent with the idea that lobbying leads to private benefits for politically active firms.

To address the endogeneity in this relationship we build a new instrumental variable (IV). 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. This variation will affect the returns to lobbying differentially as firms are heterogeneously exposed to committees according to their own characteristics, such as which products they produce. The identification assumption is that firms cannot influence committee membership. Thus, we follow the strategy of a standard *shift-share* design (Adão et al., 2018), 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 these connections based on the geographic proximity between firms' headquarter locations and politicians' electoral districts. We find that a 10 percent increase in lobbying expenditure leads to 3 percent revenue gains. Furthermore, our IV estimates are an order of magnitude larger in absolute value than the OLS ones, highlighting the importance of addressing the endogeneity in the relationship between lobbying expenses and firms' revenues.

In order to understand the macroeconomic implications of this result, we develop a heterogeneous firm-level model with endogenous lobbying. The model features standard ingredients from firm-level models such as 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, in the spirit of how selection works in Melitz (2003). Given this selection, firms choose how much to lobby in order to gain policy benefits that provide revenue gains. The key mapping in the model is between firms' lobbying expenditures and these policy benefits. Although we impose a functional form assumption for this mapping in our quantitative analysis, we provide one micro foundation for this assumption through a simple game between a policymaker and firms (Grossman and Helpman, 1994). The policymaker cares about the household's utility as well as lobbying expenditures. The latter may happen because the policymaker uses those resources for legislative activities (Hall and Wayman, 1990; Hall and Deardorff, 2006). We find that the policymaker rewards firms' lobbying differentially as long as it is not possible for her to perfectly substitute individual lobbying expenses. Hence, our model captures the empirical regularity that politicians diversify the *quid pro quo* with their connections to firms in order to reduce the salience and risks of firms' influence.

We support key assumptions in the model by documenting several consistent facts that emerge from the firm-level lobbying dataset. First, there is a strong selection into lobbying. Only around 12 percent of public firms lobby and these firms are significantly bigger than non-lobbyists. Second, political activity is significantly persistent both in terms of lobbying expenses, and entry and exit from lobbying. Third, lobbying behavior seems to be more consistent with firm-level lobbying rather than industry-level. Specifically, business organizations account for but a small fraction of total lobbying expenses while firms spend significantly larger amounts. We also find that firms individually lobby on congressional bills that are concerned with very narrow policy issues that directly affect them (e.g., a policy toward a specific product). In fact, the median number of special

interest groups that lobby on any given lobbied bill in the last 20 years is just two. The salience of individual firm-level lobbying activity motivates our modeling assumption in Section 3 that considers lobbying as a private activity of firms, rather than a coordinated effort that requires collective actions among many firms. We also use the facts together with the moments from firms' size distribution, firms' lobbying activity, and the aforementioned instrument to estimate the model with a simulated method of moments.

Finally, starting from the estimated model, we perform a series of counterfactuals to understand the macroeconomic consequences of firms' lobbying activities. We show that firms' lobbying expenses reduce aggregate output by 22 percent relative to an economy where the return to lobbying is set to zero. This reduction comes from two sources. The first is that reducing lobbying implies a decline in the dispersion of firms' marginal revenues of inputs, which improves the 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 41 percent of the total effect, highlighting the importance of the model for understanding the aggregate effects of firms' lobbying activities.

We contribute to two strands of the literature. First, we connect to the literature of the misallocation of resources between firms pioneered by Restuccia and Rogerson (2008) and Hsieh and Klenow (2009). That 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, 2017), financial frictions in capital markets (Midrigan and Xu, 2014) and contract enforcement in intermediate input markets (Boehm and Oberfield, 2018), 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 et al. (2018), who look at the effect of lobbying on capital misallocation. We contribute to this literature by implementing, to the best of our knowledge, the first quantitative evaluation of the effect of firms' lobbying activities on the misallocation of resources through the distortion of firm size. To do this, we develop a general equilibrium firm model that features endogenous lobbying and estimate this model to evaluate the macroeconomic effects of firms' lobbying activities.

Next, we contribute to the political economy literature on corporate lobbying (Hansen and Mitchell, 2000; Ansolabehere et al., 2002). Specifically, our study explains why firms get bigger as

a result of lobbying. This is in contrast to the conventional focus on the opposite causal direction whereby researchers investigate how firms with 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 provide a new instrument to identify the causal effect of firms' political activity on their economic performance. The instrument exploits exogenous variation to the value of firms' political connections via changes in committee memberships of politicians. The instrument uses an identification strategy that is similar to recent research using committee assignments to obtain causal identification in studying firms' political activities (Bertrand et al., 2018; Fouirnaies and Hall, 2017; Powell and Grimmer, 2016). Second, we quantify not only the firm-level effects of lobbying but also its macroeconomic effects. We find significant private returns to lobbying (Richter et al., 2009; Kang, 2015) as well as a quantitative evaluation of how politically connected firms may be responsible for inefficiencies in the U.S. economy. Finally, we build a novel dataset that contributes to the rapidly growing empirical literature that examines interest group lobbying (De Figueiredo and Richter, 2014). Our dataset covers the universe of lobbying activities since 1999 and is matched to activities of other political actors such as firms and politicians across various sectors and committees. We find that firm-level lobbying expenditures are significantly larger than that by industry-organizations.

The remaining of the paper is organized as follows. The next section describes the data and documents a set of novel stylized facts about firms' lobbying behavior. Section 3 presents the model. Section 4 implements the instrumental variable strategy, estimation of the model, and counterfactual analysis. Section 5 concludes.

2 Data

We construct a novel database that connects firm-level economic activities to their 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"[1] on behalf of their clients.[2] We parse more than one million original filings available from the Senate Office of Public Records

[1] "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.

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

(SOPR). Each report contains information on the client firms, the identity of lobbyists, the total amount of lobbying expenditure in the corresponding period, list of issues lobbied, whether lobbying activity was in-house or not, and lobbied legislative bills.[3]

Note that compliance of lobbying activity is closely monitored and enforced. Although the contents of lobbying as well as the incurred expenses are based on a good faith description and estimates by lobbyists, it is annually audited by the Government Accountability Office (GAO). According to the 2014 audit report by GAO, 90% of lobbyists filed lobbying reports as required, and 93% could provide documentation related to the expenses.[4] Any lobbyist who fails to comply with the legal requirements will be subject to $200,000 fine or up to 5 years of imprisonment, or both as of 2015. Furthermore, lobbyists must immediately file an amendment of original filing if they are notified of any defect or they omitted any relevant information on lobbying. Indeed, lobbying information available from the reports has become a reliable source to study lobbying in the literature (e.g., Ansolabehere et al., 2002; Bombardini and Trebbi, 2012; Bertrand et al., 2014).

Our dataset is unique in two dimensions. First, we establish a direct link between lobbying clients (i.e., firms) and the list of public firms. Indeed, the lack of standard company identifier in the lobbying report 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 Trebbi, 2012; Bertrand et al., 2018).[5] We overcome this problem and study political behavior of all publicly trading 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 A describes the details of this procedure. The lobbying database as well as the firm identifiers (gvkey) is made publicly available through the webpage

[3]The LDA mandates lobbyists to disclose any congressional bill number, title, and the section of interest associated with lobbying.

[4]The 2014 GAO report on Lobbyist's compliance with disclosure requirements is available from http://www.gao.gov/products/GAO-15-310

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

(http://www.LobbyView.org).

Second, we measure the relative importance of congressional committees for each individual firm i at year t by considering the complete list of bills that have been lobbied by the firm up to $t-1$. Specifically, we first identify the complete list of bills that have been lobbied by firm i. We then check the committee c to which each bill is assigned and aggregate this information across all lobbied bills. This procedure gives a measure of relative significance for each pair of firm and committee across time, w_{ict}. Our approach differs from Bertrand et al. (2014) who assign relevant issues[6] to each congressional committees *a priori*. For example, the Senate Finance committee is linked to the following lobbying issues: Unemployment, Trade, Taxation, Welfare, Retirement, and Medicare/Medicaid.[7] Note that multiple issues are mapped to multiple committees with equal weights. They then consider the "issue overlap" 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 committees where the bills are considered. We also distinguish the *relative* importance of each committee for individual firms by incorporating the frequency of bill-to-committee links. We provide further details of the measure in Section 4.

2.1 Stylized Facts

In this section, we document six facts from the data that will guide the development of the model in Section 3. We explore the relationship between firm characteristics and their lobbying activities.

Fact 1 *Firm Lobbying is Relatively Rare.* Lobbying 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. On average, just 11.8 percent of public firms lobby across years. Table 1 illustrates the point more broadly across two-digit NAICS industries. We consistently find that lobbying is relatively rare. For example, only about 5 percent of firms in Finance and Insurance industry (NAICS code 52) have reported that they engaged in lobbying on any policy issues. Note that some firms are

[6]Section 15 of each 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 also available from the Office of the Clerk, U.S. House of Representatives.

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

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 SVC	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 SVC	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 1: **Descriptive Statistics across NAICS 2 digit Industries**: This table presents descriptive statistics of lobbying activities across all COMPUSTAT firms in 21 NAICS 2-digit industries. The numbers are the averages across years from 1999 to 2017. For example, we see that, on average, there are about 2,930 firms in a manufacturing industry, and 15.8% of them are found to have lobbies, on average. Among these, about 6.5% has in-house lobbying department. The median lobbying expenses of firms in each industry ranges from $30,000 to $60,000 per year. The last column presents an example firm who lobbied from each industry.

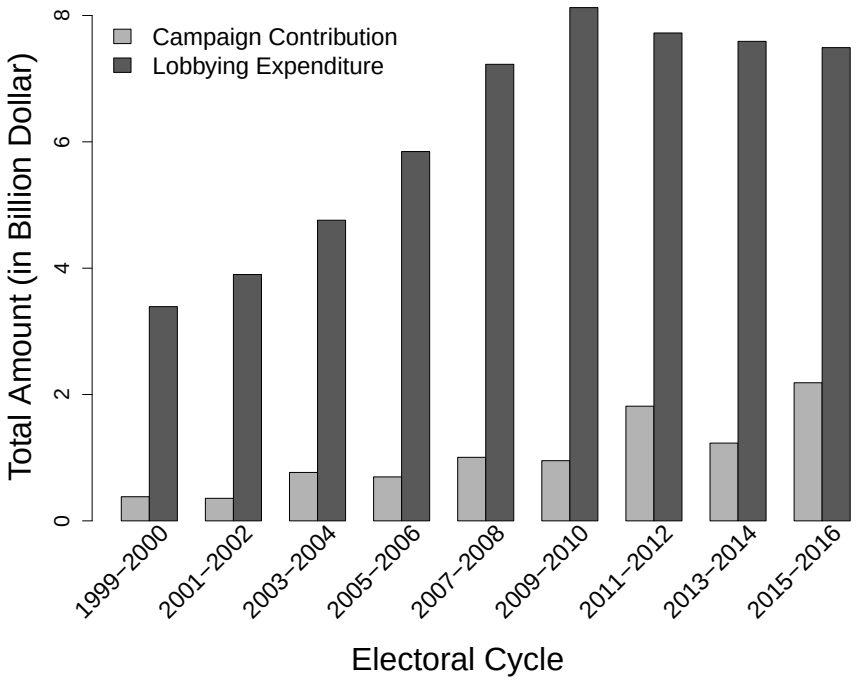


Figure 1: **Money in Politics: Campaign Contributions vs. Lobbying Expenditures:** This figure compares the total amount reported to be spent for campaign contribution and lobbying. It shows that, on average, lobbying expenditure is more than six times larger than campaign contribution. We used data from FEC (available from `http://classic.fec.gov/finance/disclosure/ftpdet.shtml`) to calculate the campaign contribution amount, 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.

actively lobbying by establishing their own in-house lobbying department. However, this is also uncommon as shown by the fourth column. For example, only 6.5% of manufacturing firms employ in-house lobbyists.

Fact 2 *More money is spent on lobbying than campaign contributions.* Tullock (1972) 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 sum to only about $200 million, which is significantly smaller than the hundres of billions of dollars in public expenditures then. Researchers still find that campaign contributions are relatively smaller than public spending of the government (Ansolabehere et al., 2003). On the other hand, we find that lobbying expenditure is significantly larger than campaign contributions. To be sure, money spent on lobbying is still much smaller compared to 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

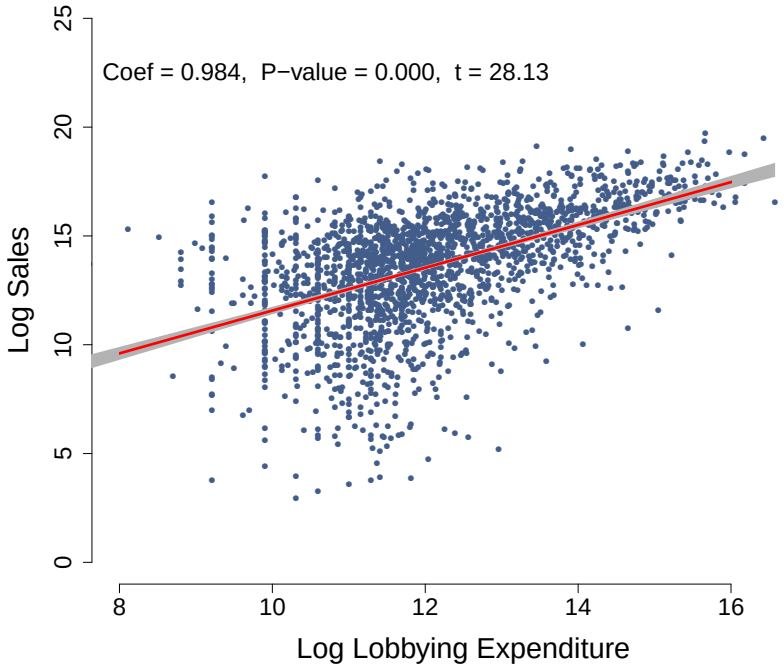
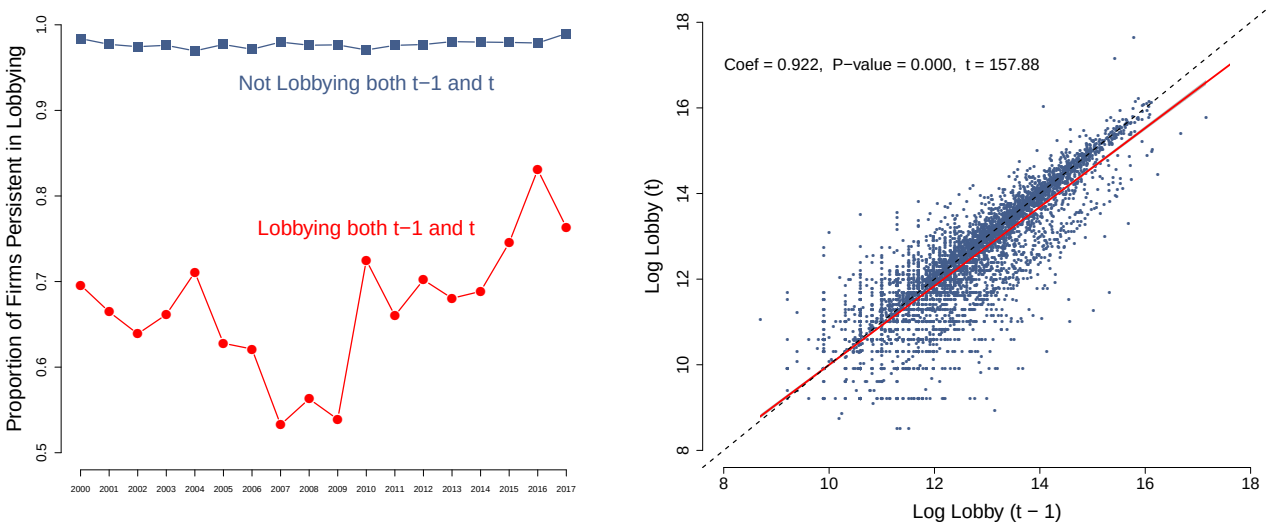


Figure 2: **Revenues and Lobbying Expenditure:** This figure shows that firm's size measured by its sales is positively correlated with lobbying expense.

all PAC (political action committee), party committee, candidate committee, and other federal committees combined. In Section 4, we will quantify the returns to lobbying.

Fact 3 *Positive and robust correlation between firms' revenues and lobbying activity. This holds both in the extensive and intensive margin.* As noted in **Fact 1**, firm-level lobbying is relative rare. An important distinction that has been studied in the literature is that firms that engage in lobbying tend to be larger than politically inactive firms in the extensive margin (Kim and Osgood, 2018). Figure 2 shows that the positive correlation between firm size and lobbying expenditure holds in the intensive margin as well. That is, conditional on lobbying, larger firms tend to spend more money in lobbying.

Fact 4 *Lobbying behavior is highly persistent. This holds both in the extensive and intensive margin.* Over time, lobbying activities are highly persistent. We examine this by tracking the lobbying activities of all public firms that remain competitive 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 continue lobbying in 2017.



(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 (whether lobbying) and intensive margins (dollar amount conditional on lobbying). The left panel shows that firms that did not lobby in the previous year tends not to lobby in the following year as well (blue line). On the other hand, over 70% of firms tend to lobby in two consecutive years (red line). We note that there was a decrease in the intensive margin especially during the financial criss between 2007 and 2009. The right panel shows that the intensive margin is highly correlated whereby lobbying expenses remains similar. The dotted line corresponds to the 45-degree line.

Note that this is a conservative measure of the persistence of lobbying as we focus exclusively on two adjacent years. In fact, we observe a significant drop in the sticky behavior during the financial crisis of 2007–2018, but the overall persistence becomes much higher as we allow for a wider window over time. The right panel shows that there exists a positive and robust correlation between the lobbying expenses in the internsive margin conditional on lobbying in both years. Moreover, we find that the amounts of lobbying are also persistent in absolute values (indicated by the dotted 45 degree line). This is an important empirical fact that motivates our identification in Section 4 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 expenses are greater in amounts than the spending by industry associations.* To date, empirical studies of special interest group politics have focused primarily

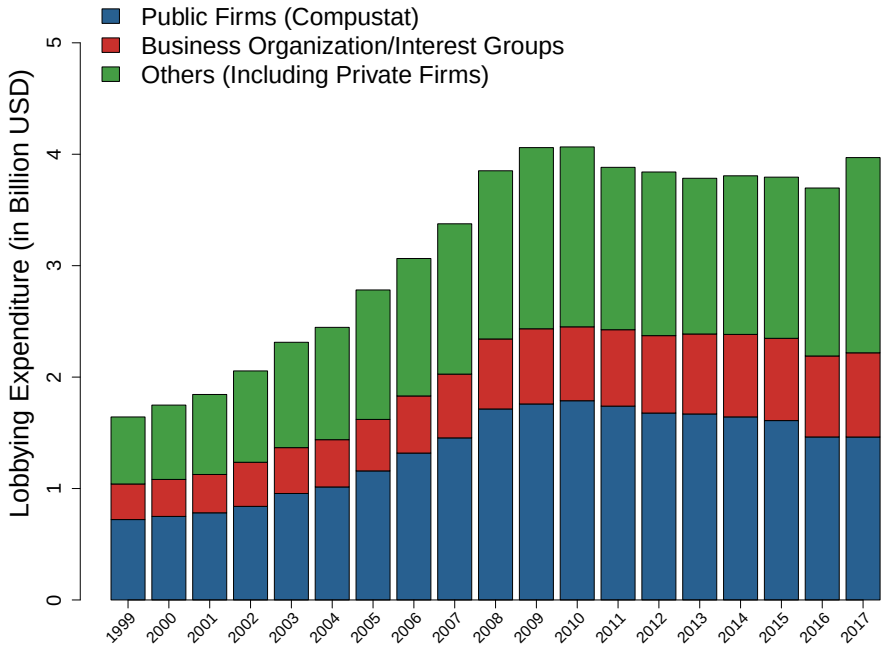


Figure 4: **Firm vs Industry Level Lobbying Expenditure:** This figure compares the total lobbying expenses by firms and industry organizations. We first identify all public firms from COMPUSTAT database (blue). To identify industry organizations (red), we included all lobbying clients with NAICS code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

on industry-level political activities such as campaign contributions (Goldberg and Maggi, 1999; Gawande and Bandyopadhyay, 2000). Although lobbying through industry associations is highly important, we find that firms' individual lobbying activities are at least as prevalent as those by industry organizations. In particular, Figure 4 shows that firm-level lobbying expenses (blue) are in fact much larger than that by industry and business organizations combined (red). Note that this excludes lobbying expenses by all private firms.

Fact 6 *Most congressional bills are lobbied by only one or two interest groups.* One of unique contributions that we make is to identify lobbied congressional bills. 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 on a Senate bill in the 109th Congress "A bill to reduce temporarily the duty on certain audio headphones achieving

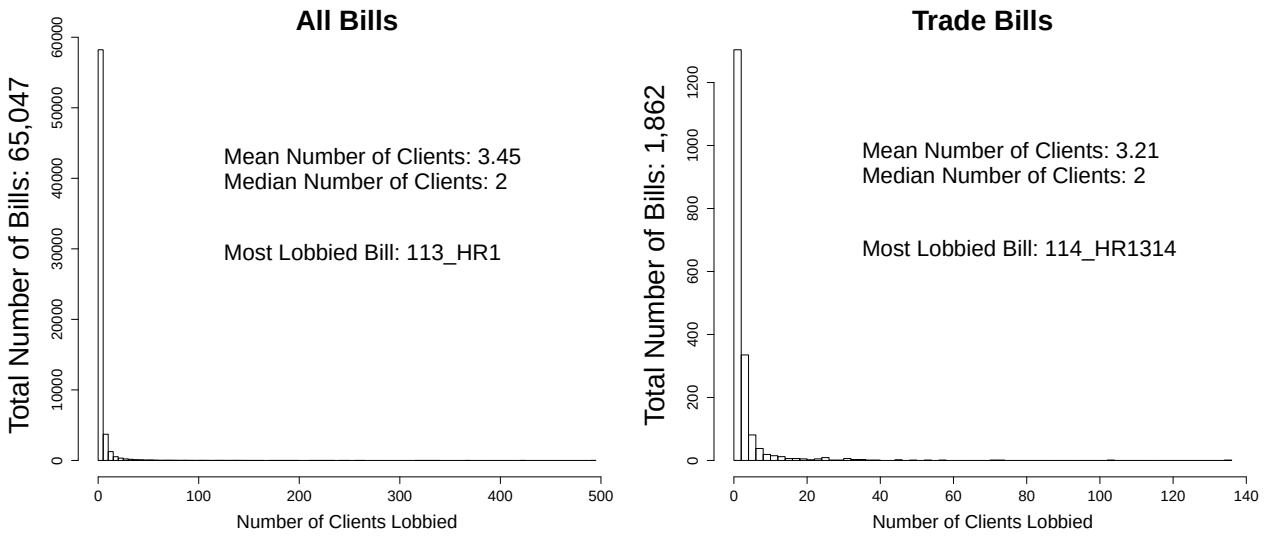


Figure 5: **Distribution of Number of Lobbyists per Bill (106th – 115th Congress)**: This figure depicts the distribution of the number of lobbying clients that lobby on congressional bills. The left panel shows that the median number of clients that lobby on any given Senate or House bill is two. The right panel shows a similar pattern for trade bills.

full-spectrum noise reduction" (S.2325). This is a bill that reflects highly specialized interest of a particular firm, and in fact Bose Inc. was the only firm that reported to have lobbied on the bill. Figure 5 shows that lobbying activities reflect narrow interest 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 the overall median number equals to two. We find similar patterns across various policy areas such as trade bills as shown by the right panel. Appendix C.1 shows the distribution across all 79 lobbying issues.[8]

3 A Theory of Firm-Level Lobbying

In this section, we develop a heterogeneous firm model with lobbying decisions. We proceed in two steps in order to investigate misallocation of resources between firms through the creation of distortions. The first, presented in Section 3.1, introduces a model that generalizes Hsieh and Klenow (2009)'s framework along the lines of Melitz (2003). Specifically, we incorporate firm's decision to lobby, both whether to lobby or not (the extensive margin) and how much to spend on lobbying activity (the intensive margin). In this first step, the mapping between lobbying effort and

[8]For each bill, we assign the most relevant lobbying issue by identifying the most frequent issue codes in the lobbying report that a given bill appears.

distortions is taken to be given to facilitate our flexible exposition of the misallocation of resources between firms. Section 3.2 presents the second step whereby we provide one micro foundation for the mapping assumed in the previous step. We accomplish this goal by incorporating a simplified version of Grossman and Helpman (1994)'s lobbying model.

3.1 Model with Exogenous Lobbying-to-Distortions Mapping

Overview of the Model This model is an extension of Hsieh and Klenow (2009)'s framework along the lines of Melitz (2003). It is a multi-industry model that features standard ingredients such as heterogeneous firms, selection into production and firm entry. An important key feature that we introduce is that firms choose endogenously whether to lobby as well as how much they spend on lobbying. Lobbying activity entails benefits and costs. The benefits are distortions that exclusively help the firms' revenues whereas the costs are the expenditures the firms have to spend in order to lobby (which include a variable and a fixed component). The latter induces selection into lobbying, and hence firms that lobby will obtain benefits through distortions at the cost of aggregate misallocation. This is the main mechanism the model will explore.

Setup The economy is populated by a representative household and a mass X of firms. 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 $\phi = (\phi^P, \phi^L, \phi^\tau)$, where ϕ^P, ϕ^L and ϕ^τ is a Hicks-neutral productivity term, a lobbying productivity term, and an exogenous wedge term, respectively.[9] 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 F_ϕ, with density f_ϕ. Similarly, there is an endogenous probability function over firm states, given by F_ϕ and firm selection, denoted by $\hat{F}_\phi$, with density $\hat{f}_\phi$.

Household The household supplies inelastically N units of labor, M units of intermediate inputs while receiving firms' profits and revenues created by government policies. It has nested preferences first over different industries and over firms' differentiated varieties within industries:

[9] A quality demand shifter is ignored because it is standard to show that in this class of models, and with the available data, one could identify separately the demand shifter from the Hicks-neutral productivity term.

$$
\begin{aligned}
Y &= \prod_{s=1}^{S} Y_s^{\theta_s}, \quad \text{with} \quad \sum_{s=1}^{S} \theta_s = 1 \\
Y_s &= \left[\int \left(c_s(\phi)\right)^{\frac{\sigma_s^C - 1}{\sigma_s^C}} d\hat{F}_\phi(\phi) \right]^{\frac{\sigma_s^C}{\sigma_s^C - 1}},
\end{aligned}
$$

where S is the number of industries, $\{\theta_s\}_{s=1}^S$ are the Cobb-Douglas shares. Y_s is the aggregate demand of industry s with a constant elasticity of substitution (CES), $c_s(\omega)$, across the varieties within the industry s, and X_s is the mass of firms in industry s. Each industry has a different elasticity of substitution, $\sigma_s^C > 1$. Given this setup, 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:

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

where $y_s(\phi)$, $n_s(\phi)$, $k_s(\phi)$ and $m_s(\phi)$ are output, employment, capital stock, and intermediate inputs of firm ϕ in industry s, respectively, and $\{\alpha_s^i\}$ are the Cobb-Douglas weights in industry s, where CRS implies that $\alpha_s^N + \alpha_s^K + \alpha_s^M = 1$.[10] In order to produce, firms in each industry s have to spend f_s^P units of labor.

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. Note that, we allow for heterogeneous markups across industries, because the elasticity of substitution in demand, $c_s(\omega)$, is modeled to be different across industries.

Distortions Firms face output distortions $\tau_s(\cdot)$.[11] These distortions imply departures from optimal allocations, given the market structure of monopolistic competition. We assume these distortions are collected as revenues by the government and rebated back to the household via a lump-sum transfer, T, thus keeping a balanced budget. These distortions can come from regulation

[10] 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 et al. (2018). These extensions will be explored in future versions of this paper.

[11] Similar objects are named wedges in the framework of Hsieh and Klenow (2009).

such as sales taxes. For the purpose of this paper, we need not take a stand on which are the specific sources for these wedges. These wedges are defined by:

$$1 + \tau_s(\phi) \quad = \quad \left(\phi_s^L l_s(\phi)\right)^{\beta_s} + \phi_s^\tau, \tag{1}$$

where $l_s(\phi)$ are the resources allocated towards lobbying activity (which could be zero), β_s is a parameter that governs the curvature of the distortions-to-lobbying effort, and ϕ_s^τ 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 this component to account for other possible sources of misallocation and thus not load all the misallocation in the economy to lobbying activity.

Lobbying Decision Firms can decide whether to spend resources in lobbying activity. In order to lobby, a firm ϕ in industry s has to spend f_s^L units of labor as 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, it compares the benefits from lobbying, which are given by the extra revenue provided by the distortion, and 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:

$$\begin{aligned}
y_s(\phi) \quad &\geq \quad c_s(\phi) + m_s^S(\phi), \quad \forall s, \quad \forall \phi \\
N \quad &\geq \quad \sum_{s=1}^{S} \left(X_s f_s^E + \int \left(n_s(\phi) + f_s^P + \mathbb{1}^L(\phi) \left(l_s(\phi) + f_s^L \right) \right) d\hat{F}_\phi(\phi) \right) \\
M \quad &\geq \quad \sum_{s=1}^{S} \int m_s(\phi) d\hat{F}_\phi(\phi) \\
T \quad &\equiv \quad \sum_{s=1}^{S} \int \tau_s(\phi) r_s(\phi) d\hat{F}_\phi(\phi),
\end{aligned}$$

where $\mathbb{1}^L(\phi)$ is an indicator function equals to one if firm ϕ chooses to lobby, $m_s^S(\phi)$ is total output sold to other firms, and $r_s(\phi)$ is firm ϕ's revenue.

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

$$\text{(ZPC-Production)} \quad \pi_s^{NL}(\phi^*) \quad = \quad 0 \tag{2}$$

$$\text{(ZPC-Lobbying)} \quad \pi_s^L(\phi^{**}) \;=\; \pi_s^{NL}(\phi^{**}), \tag{3}$$

where $\pi_s^{NL}(\cdot)$ and $\pi_s^L(\cdot)$ are the profit functions if the firm does not lobby and does lobby, respectively. Equation (2) says that if a firm has $\phi = \phi^*$, then it will not lobby and produce zero net profits from producing. Thus, since $\pi_s^{NL}(\cdot)$ and $\pi_s^L(\cdot)$ are increasing functions in its argument, firms with $\phi < \phi^*$ do not find it profitable to produce. Conversely, firms with $\phi > \phi^*$ do find it profitable to produce, but maybe not to lobby. Similarly, firms with $\phi = \phi^{**}$ choose to produce and lobby, but gain zero net profits. Firms with $\phi < \phi^{**}$ choose not lobby whereas those with $\phi \geq \phi^{**}$ choose to lobby. Furthermore, firms with $\phi^* \leq \phi < \phi^{**}$ choose to produce but not to lobby. Thus, these ZPCs imply cutoffs in firms' states that characterize firms' extensive margin decision into production and lobbying activity.

Free Entry Condition There is free entry (FE) in this model. Firms have to pay an entry cost f_s^E in terms of labor, in order to have the option to take a draw of their state ϕ. The free entry condition is characterized by the following:

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

where $V_s^E = \mathbb{E}\left[\bar{V}_s - f_s^E\right]$ and $\bar{V}_s$ are the expected net and gross value of entry in industry s, respectively.[12]

Lobbying and Revenues Given the setup of the model, Proposition 1 summarizes the relationship between lobbying expenditures and revenues.

Proposition 1. *Using the first order conditions, the relationship between lobbying and revenues is the following:*

$$\log r_s(\phi) \;=\; \gamma_0 + (1-\beta_s)\log l_s(\phi) - \beta_s \log \phi_s^L \tag{4}$$

Proof. All proofs are in Appendix E.1. ■

The result comes from the first-order condition of firms' intensive margin decision on lobbying. It says that the relationship between lobbying activity and revenues is log linear, with a return $1-\beta_s$. The residual of this relationship is firms' lobbying productivity ϕ_s^L. Importantly, this

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

proposition shows why running a simple ordinary least squares (OLS) between these two characteristics would induce a biased estimator of $1-\beta_s$, since $corr(\log l_s(\phi), \log \phi_s^L) \neq 0$. The value of this correlation would inform about 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 4, but highlight for now that the model provides a clear interpretation of the positive relationship between size and lobbying, while revealing the limitations of inference using naive correlations between these two characteristics.

Lobbying and Misallocation Given the relationship between lobbying, distortions, and firm outcomes, we now show how this influences aggregate productivity. Proposition 2 directly characterizes the connection, extending the aggregation result from Hsieh and Klenow (2009).

Proposition 2. *Aggregate output and sectoral productivity in this economy is given by the following:*

$$Y = \prod_{s=1}^{S} \left(\Phi_s^P N_s^{\alpha_s^N} K_s^{\alpha_s^K} M_s^{\alpha_s^M} \right)^{\theta_s} \tag{5}$$

$$\Phi_s^P = \underbrace{X_s^{\frac{1}{\sigma_s^C - 1}}}_{Entry} \underbrace{\left(\frac{N_s^P}{N_s} \right)^{\alpha_s^N}}_{Fixed\ Costs} \underbrace{\left[\int \left(\phi_s^P \frac{\overline{TFPR}_s}{TFPR_s(\phi)} \right)^{\sigma_s^C - 1} \hat{f}_\phi(d\phi) \right]^{\frac{1}{\sigma_s^C - 1}}}_{Aggregation\ of\ Firms'\ Productivity}, \tag{6}$$

where Φ_s^P is aggregate productivity in industry s, L_s^P is the total labor used directly in production as opposed to paying for fixed costs, $\hat{f}_\phi(\cdot)$ is the equilibrium density of firms that produce in the economy, $TFPR_s(\phi) = p_s^y(\phi)\phi_s^P$ is revenue-productivity of firm ϕ in industry s, i.e. the market value of firms' productivities, and $\overline{TFPR}_s$ is the average revenue-productivity across firms within industry s. Expression (6) shows that aggregate productivity in this economy is influenced by three forces. The first involves entry, the second the use of fixed costs in the economy and the third, how firms' productivity and quality are aggregated. It is in this last term that one can see the influence of distortions on aggregate productivity through distorting how much each firm is weighted in this aggregation.[13] Intuitively, in the absence of distortions, $TFPR_s(\phi) = \overline{TFPR}_s$

[13]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 4.2.

and thus firms are aggregated according to the weights given by the equilibrium density of firms, $\hat{f}_\phi(\cdot)$. 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 one from the industry they belong to. This implies that those firms' productivity will influence aggregate productivity more than what they should in the absence of distortions. This is the mechanism we explore quantitatively in Section 4.2. Before doing that, we show one way to micro found the assumption made in equation (1) with respect to how firms' lobbying influences distortions and their revenues.

3.2 A Microfoundation of Lobbying-to-Distortions Mapping

Overview of the Model In the previous section, we took an exogenous mapping between firms' lobbying effort and distortions. This section propose one micro foundation for this mapping based on a game between the government and firms. The government cares about the household's utility, and thus about efficiency and firms' lobbying expenditures. 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 micro foundation for the misallocation of resources between 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 industries represents misallocation in this economy.

Setup The game between the government and firms consists of three stages. In the first, firms choose whether to enter, whether to lobby, and how much to lobby. In the second stage, the government chooses distortions given firms' entrance and lobbying efforts. In the final stage, firms choose how much to produce given the policies and the household chooses consumption. The final stage can be thought as a regular firm model with distortions such as the one from Hsieh and Klenow (2009). The difference here is that those distortions 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 the regular firm model with the structure already described in the

previous section.[14] The only difference is that in stage three, there is no longer a lobbying decision. By this stage, lobbying decision has already been made and distortions are already defined. Note that distortions are exogenous at this stage. In stage two, the government solves the following problem:

$$W = \max_{\tau_s(\cdot)} \quad V^C\left(\{p^y(\phi)\},\{\tau(\phi)\}\right) + a\underbrace{\left[\int \left(\phi^L l(\phi)\right)^{\frac{\sigma^L-1}{\sigma^L}} \hat{f}_\phi(d\phi)\right]^{\frac{\sigma^L}{\sigma^L-1}}}_{L} \tag{7}$$

$$s.t.$$

$$V^C\left(\{p^y(\phi)\},\{\tau(\phi)\}\right) = \frac{I-T}{P} \tag{8}$$

$$\frac{\partial y(\phi)}{\partial \tau(\phi)} = \sigma^C \frac{y(\phi)}{1+\tau(\phi)} \tag{9}$$

$$\frac{\partial l(\phi)}{\partial \tau(\phi)} = \frac{\partial \pi(\phi)}{\partial \tau(\phi)}, \tag{10}$$

where $V^C\left(\{p^y(\phi)\},\{\tau(\phi)\}\right)$ is the household's indirect utility, L is a CES aggregator of lobbyists' expenditures and a is the relative weight that the government allocates to lobbyists in comparison with the representative household. Government welfare is the sum between household's welfare and the welfare it obtains from lobbying activity. Government can directly care about lobbying activity for several reasons. The simplest one is that the lobbyists can provide another source of income for the government. 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 micro foundation for the relevant mapping between lobbying effort and wedges.[15] Equations (8) and (9) come from the household and firms' problem in stage 3. Equation (10) 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.

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

[15] 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 industries, it becomes the same welfare function where the government aggregates lobbying effort linearly. Thus, our specification for the welfare function nests Grossman and Helpman (1994)'s.

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 3. *The solution to the problem stated in equations* (7)-(10) *is the following:*

$$\frac{\tau(\phi)}{1+\tau(\phi)} = 1+\sigma^C + a\frac{\phi^L}{\sigma^C-1}\left(\phi^L\frac{l(\phi)}{L}\right)^{\frac{1}{\sigma^L}}\left(\frac{1-F_\phi(\phi^{**})}{1-F_\phi(\phi^*)}\right) \tag{11}$$

Proposition 3 provides three predictions of how the government allocates distortions in this game. First, if the government does not value firms' lobbying expenditures ($a=0$), then $\tau(\phi)/(1+\tau(\phi)) = 1+\sigma^C$. That is, the government would still allocate a flat distortion within industries to fix the distortion created by constant markups. Second, if the government does value lobbying ($a>0$), then distortions are heterogeneous depending on how much lobbying activities firms actually engage in. How much they 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 the more concentrated lobbying expenditure is across firms. 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 $l(\phi)$.[16] The intuition of these results are important. Why would the government have love for variety of lobbying expenditure? 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 it would be at the cost of the household's welfare and it could be easier to identify that concentrated influence and make opposition to it. Whereas, if the influence is dispersed across actors, it could be less difficult for the household to form opposition to it because the interests would be spread. Thus, the love for variety could arise due to a preference of the government to reduce political risks of opposition to lobbying expenditure. This is how the model justifies heterogeneous distortions and lobbying expenditures at the firm level. The facts shown in Section 2 are consistent with this view of lobbying behavior. Finally, $\tau(\phi)/(1+\tau(\phi))$ increases with the mass of firms lobbying, $\frac{1-F_\phi(\phi^{**})}{1-F_\phi(\phi^*)}$.

[16] Note that in this case, one would arrive to the specification of the government's welfare in Grossman and Helpman (1994).

4 Empirical and Quantitative Analysis

This section describes the main empirical exercises implemented in the paper. It proceeds in three steps. First, it describes the instrumental variable (IV) approach designed to causally address how lobbying influences firm size. Second, it takes moments from the data, and estimates the parameters of the model. Finally, it concludes with counterfactual analysis to investigate how lobbying affects the misallocation of resources and aggregate productivity.

4.1 Causal Evidence of Lobbying Expenditure on Revenues

Lobbying Instrument The relationship between lobbying expenditures and firm size is subject to a standard endogeneity challenge, which is shown explicitly in Proposition 1. As in a standard productivity estimation, the effect of lobbying expenditure on revenues needs to control for the productivity of lobbying. Since lobbying is chosen as a function of its productivity, for identification one needs variation in lobbying behavior that is exogenous to variation in firms' lobbying productivity. In order to address this, we propose a new instrument that shifts the profitability of lobbying, holding constant firms' primitives. The instrument measures changes in the value of firms' political connections 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. The shifts come from politicians' changes in committee membership in the U.S. Congress, that affects firms heterogeneously because they are subject to connections to different politicians and also different exposures to committees' activities. Formally, the instrument is defined as follows:

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

where i and t denote firms and years, Ω_i is the set of politicians in firm i's networks, 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 its interactions: Ω_i, w_{ict-k} and d_{jct}. We describe each in turn.

First, firm i's political connections, Ω_i, is defined by the co-location of i's headquarters and the politicians of that district. Politicians that represent the state where i's headquarters is located, belong to i's connections. Second, committee weights, w_{ict-k}, represent how important a

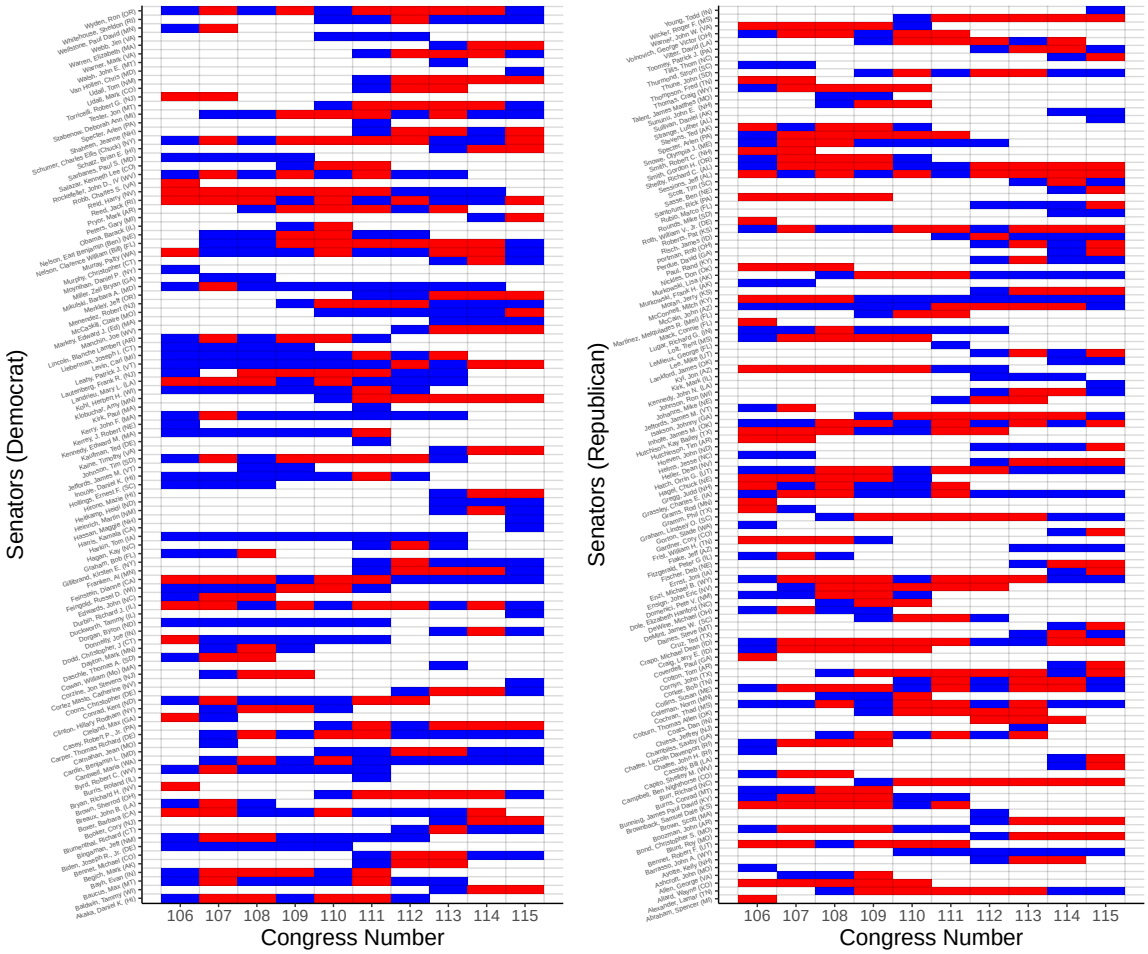


Figure 6: **Churning in Committee Membership**: This figure depicts the frequency of committee membership changes for each senator. Red (Blue) cell indicates that the senator moved to at least one (no) new committee in the congress that he/she did not serve in the previous congress. The white cell denotes the congress that the politician did not serve.

committee is for a firm in terms of the frequency of committee assignments of the bills that are directly lobbied by the firm. Formally, the weights are defined as follows:

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

where b_{ict-k} is the number of bills that i lobbied and were assigned to committee c in year $t-k$. 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 measure this, we searched the entire lobbying reports to identify the bills that have been lobbied by each individual firm, let alone the respective committee that each bill was assigned to.

Finally, d_{jct} measures the shift of how politicians move between committees.[17] This shift provides the identification of the instrument.[18] The key identifying assumption is that changes of politicians between committees is exogenous to firms characteristics and influence. Thus, a key component of the instrument relies on politicians actually changing committees over time. The churning of committee membership is presented in Figure 6. It describes how often politicians move to a new committee (red) and how likely that they stay in the committees between two consecutive congresses. The figure shows that changes of committees is frequent for both democrats and republican senators. Quantitatively, the average probability of a politician changing a committee between Congress is around 30 percent. This number is relatively constant across Congresses, as Figure C.2 shows in the appendix.

To construct the instrument for firm i at time t, we rely on the following three simultaneous variations. First, a politician needs to change committees over time. Second, that politician needs to belong to firm i's connections: that is, she/he needs to represent the state where i has its headquarter. Finally, the committee into which the politician enters, or from which it exits, must have a non-zero weight for i. We illustrate this with Figure 7. It shows the returns of lobbying to three firms when their own "connected" politicians change committee memberships in two periods. Specifically, we suppose that 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, 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.

Identification We discuss three potential challenges to the identification strategy, each one related to each ingredient of the instrument. The first is related to the locations of firms and politicians. If it were easy for any of the two to change locations over time, then this would threaten

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

[18] As opposed to the share providing the identification, as in the shift-share design in Goldsmith-Pinkham et al. (2018).

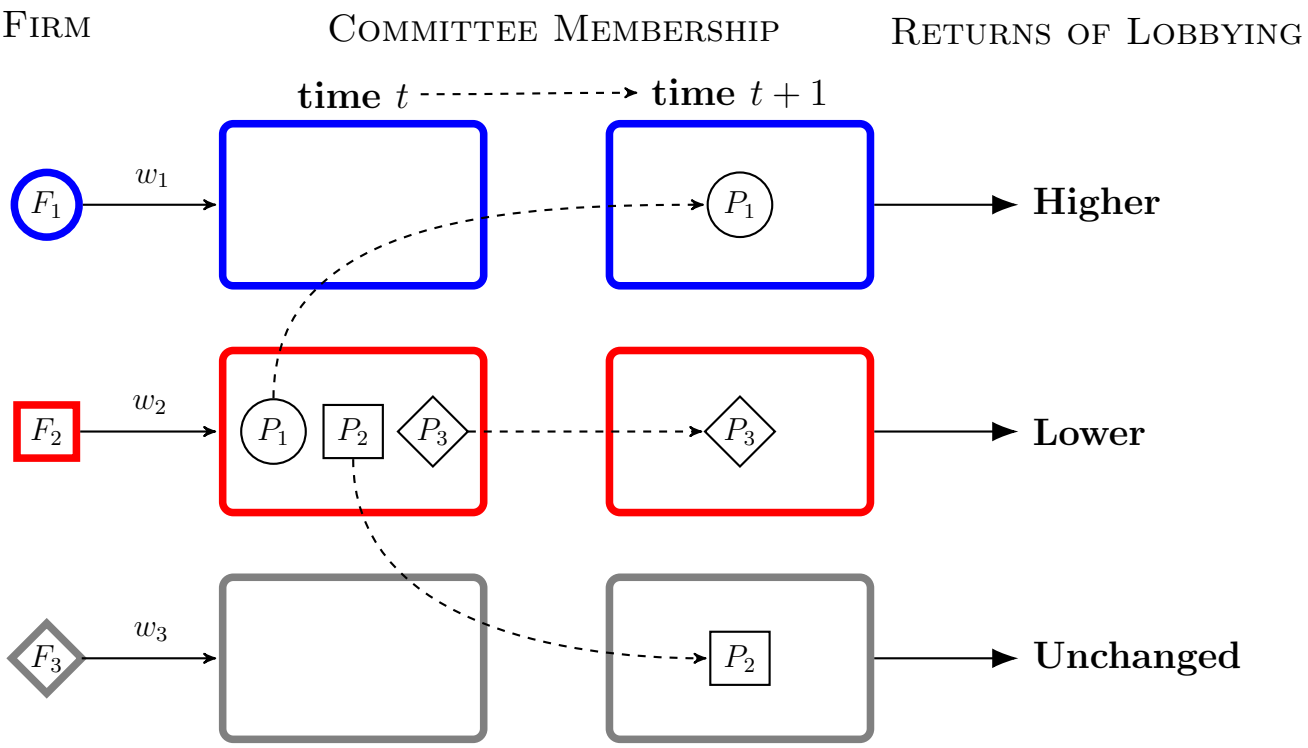


Figure 7: **The Effects of Committee Membership Changes on Values of Lobbying**: This figure illustrates the identification strategy employed in the empirical analysis. It shows the returns of lobbying when three politicians (P_1, P_2, and P_3) who served in Red committee (middle) at time t change their 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.

the identification. For example, if firms can freely move to other states with representatives serving in the committees that are highly relevant for them, then changes in committee membership would directly influence firms' location as well as their political connections, undermining the identification. This is highly unlikely, because firms' locations are often 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 second 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.

The final issue is whether firms can directly influence the assignment of politicians into committees. We confirm that this does not hold because those decisions are determined by various factors exogenous to firms such as electoral outcomes and inter-party negotiations, party's independent committee (e.g., Democrats's Steering and Outreach Committee), and seniority[19]. To be sure, firms may still indirectly influence the committee assignment. 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 "wish list", reflecting the interests of their constituencies, plays an important role in the committee assignment process, we emphasize that our identification comes from the *changes* in the lobbying value over time. For example, Kamala Harris (D-CA) was appointed to the Committee on Commerce, Science, and Transportation in the 115th Congress, which might be endogenous to the importance of technology industry in California. However, we focus on investigating how this new assignment increased the marginal value of lobbying especially for the technology companies as no senators from the state served in the committee in the 114th Congress. On the other hand, if senators from a certain state do not change their memberships (e.g., Montana senators serving in the Agriculture, Nutrition, and Forestry Committee for their beef industry), then such observations will not contribute to our estimation.[20] In fact, politicians often have to represent heterogeneous interests of their constituencies, and therefore the churning of memberships that we observed in Figure 6 would be inconsistent with the presumption that politicians select into certain committees and stay there always representing specific interests with no variation over time.

Results Table 2 presents the main result of IV approach. Column 1 and 2 shows the simple OLS between firms' sales and lobbying expenditure, similar to the one presented in Figure 2, but including a set of fixed effects. It shows that the correlation is significant and robust. Given the

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

[20] Even in this case, we find that no senator from Montana served in the committee in the 114th Congress.

	Log Sales				Log Profits			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0436***	0.0500***	0.319***	0.227***	0.0241**	0.0468***	0.322***	0.236*
	(0.00891)	(0.0117)	(0.0754)	(0.0795)	(0.00948)	(0.0130)	(0.114)	(0.124)
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	OLS	IV	IV	OLS	OLS	IV	IV
F-Stat			21.30	20.20			14.30	13.10
Sample	All	Post 2007	All	Post 2007	All	Post 2007	All	Post 2007
Weight Lag			t-1	t-1			t-1	t-1
N	15332	8796	15332	8796	10369	6064	10369	6064

Table 2: **Firm Sales, Profits and Lobbying:** This table presents the OLS and IV between lobbying expenditures and firms' sales and profits. Profits are defined as sales minus wage bills, capital expenditures and intermediate input expenditures. All regressions have firm, year and state-year fixed effects. The weights of the instrument are defined at $t-1$. Standard errors are double clustered at firm and year level. *** p<0.01, ** p<0.05, * p<0.1

endogeneity concerns, column 3 and 4 shows the IV's second stage. It shows that the relationship is significantly positive and bigger than the OLS. Taking column 4 as our preferred estimate, it shows that an increase in 1 percent of lobbying expenditures translate into 0.2 percent increase in revenues. The table shows that the F-stat of the first stage is sufficiently big. Finally, our finding is robust to using firms profits as outcome, which takes into account factor expenditures of firms such as labor, capital and intermediate inputs. More robustness to this specification can be found in Appendix F. Given this strong causal relationship between lobbying expenditure and sales, we proceed to the structural estimation to evaluate how important this relationship is for the misallocation of resources and aggregate output.

4.2 Structural Estimation

In this section we describe the structural estimation of the model described in Section 3.1. The estimation proceeds in three steps. First, a set of parameters are defined 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.

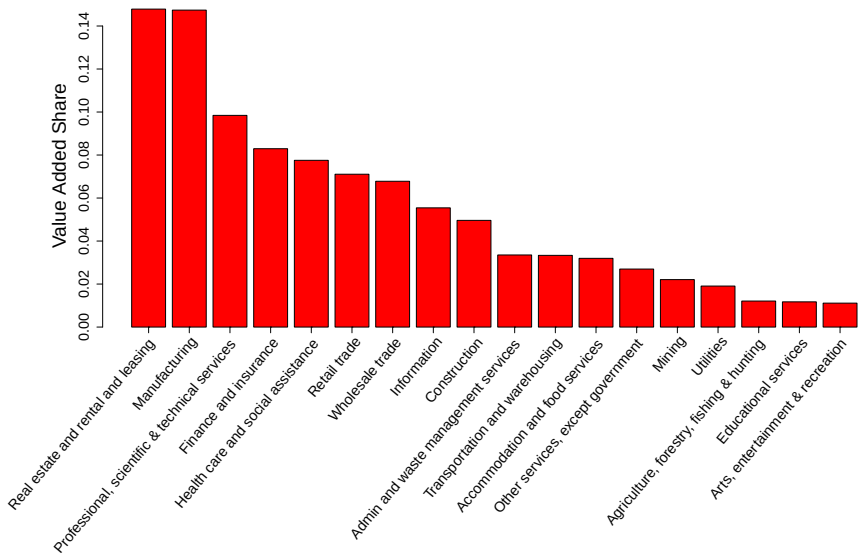


Figure 8: **Value Added Share**: This figure presents value added shares relative to total value added across industries, for each industry and year, averaged across the period of 2000-2017. Own calculations using data from the BEA. It corresponds to $\{\theta_s\}_{s=1}^{S}$ in the model.

Exogenous Parameter Restrictions A set of parameters are set exogenously. First, given that we do not have enough power to estimate heterogeneous β_s's, we set $\beta_s = \beta$ for all s. Second, given that we do not have sufficiently good data to estimate σ_s^C, we set $\sigma_s^C = 4$, a value in the range of the values used in the literature (Hsieh and Klenow, 2009).[21] 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 $\delta = 0.025$ (Bernard et al., 2007). Finally, we assume a joint log-normal distribution for F_ϕ, and assume that its mean is zero. This is without loss of generality since it is straightforward to show that the model is invariant to these means. For simplicity, we assume for now that this distribution is same across industries. It is straightforward to extend this to heterogeneous distributions across industries.

Calibrated Parameters A set of parameters can be obtained directly from analytical solutions of the model. First, θ_s are value added shares of industries relative to total gross domestic product (GDP). Second, α_s^N and α_s^M are labor and intermediate input costs relative to gross output. Finally, given the assumption of CRS, we have that $\alpha_s^K = 1 - \alpha_s^L - \alpha_s^M$. These moments can be directly extracted from the data using information from the Bureau of Economic Analysis (BEA). Both the results behind this calibration and the data used are standard in the literature (Hsieh

[21] We show how sensitive our results are to this assumption.

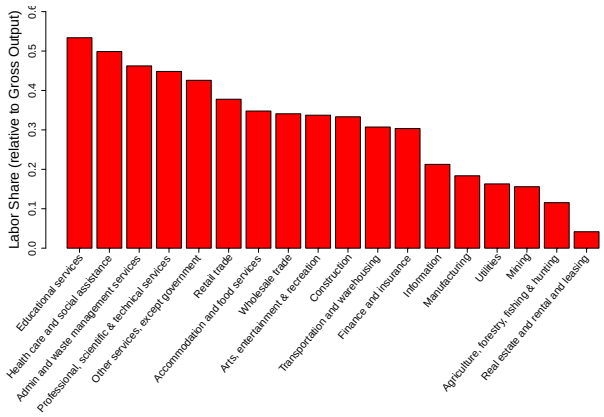


Figure 9: **Labor Share**: Labor expenditures relative to gross output, for each industry and year, averaged across the period of 2000-2017. Own calculations using data from the BEA. It corresponds to $\{\alpha_s^L\}_{s=1}^S$ in the model.

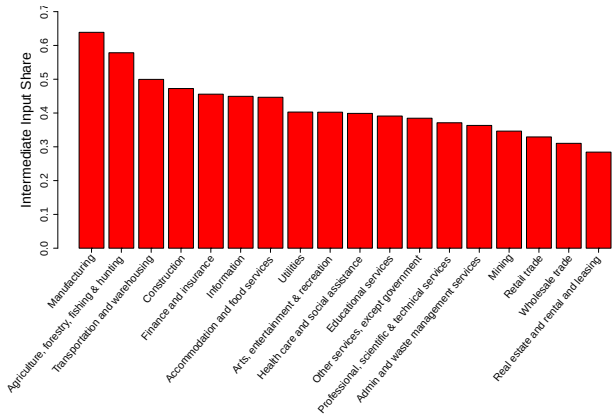


Figure 10: **Intermediate Input Share**: Intermediate input expenditures relative to gross output, for each industry and year, averaged across the period of 2000-2017. Own calculations using data from the BEA. It corresponds to $\{\alpha_s^M\}_{s=1}^S$ in the model.

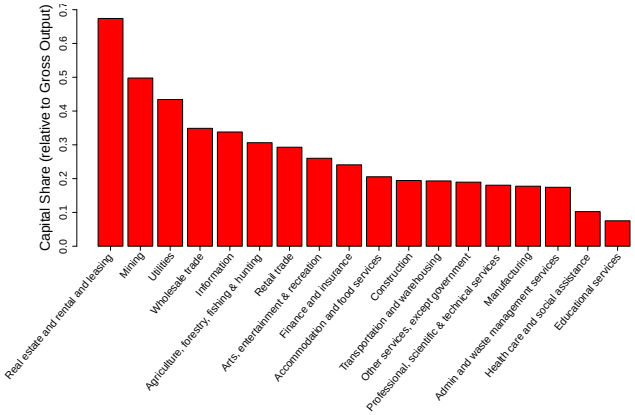


Figure 11: **Capital Share**: Defined as the residual of labor and intermediate input shares, relative to gross output: $\alpha_s^K = 1 - \alpha_s^L - \alpha_s^M$. Computed for each industry and year, averaged across the period of 2000-2017. Own calculations using data from the BEA.

and Klenow, 2009; Caliendo et al., 2017). The moments for the value added shares of industries, and the Cobb-Douglas weights are shown in Figures 8, and 9 – 11.

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. This method is chosen given that the model does not have an analytical solution of some parameters as a function of data. These parameters are the fixed costs $\{f_s^P, f_s^L\}$, the variances and covariances of the distribution F_ϕ, and the returns to lobbying, β. Thus, we estimate the following vector of parameters:

$$\Theta = \{f_s^P, f_s^L, v(\phi^P), v(\phi^L), v(\phi^\tau), cov(\phi^P, \phi^L), cov(\phi^P, \phi^\tau), cov(\phi^L, \phi^\tau), \beta\}.$$

The algorithm proceeds in four steps. In the first, the model is simulated given a value for Θ. Second, with the simulation of the model, a set of moments is produced and stacked into the vector $\hat{f}(\Theta)$. Third, the same set of moments is produced with data and stacked into the vector f. Finally, an objective function is computed to evaluate the deviations of the simulated moments from the data moments, $d(\Theta) = f - \hat{f}(\Theta)$. If this difference is not minimized according to some threshold, the algorithm is repeated for a different set of 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 looks for $\hat{\Theta}$ such that

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

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.[22]

Moments Used and Related Parameters Three 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 intuitively how each moment used is related to the parameters estimated. The first set involves the share of firms that lobby and the distribution of the number of firms across industries which are reported in Table 1. These

[22] For now, we assume the identity matrix, which effectively weights all the moments equally.

moments are related to the fixed cost of production and lobbying. The fixed cost are related to the distribution of number of firms across industries and the fixed lobbying cost to the share of firms that select into lobbying activity. The second set involves moments of the joint distribution of firm size, distortions, and lobbying expenditures. These moments are directly related to the matrix of idiosyncratic primitives in the cross-section. More dispersion in the productivity primitive will induce more dispersion in firm sales. Similarly for lobbying expenditures and firms' output wedges. The correlation between these variables is related in turn to the correlation between the primitives.

The third set of moments are the OLS and IV regressions of sales on lobbying expenditures documented in Table 2. This set of moments relates to the returns to lobbying and the correlation between lobbying productivity and lobbying expenditures. As is standard, the departures between the true parameter in a regression and the biased one created by endogeneity issues is given by the correlation between the endogenous variable and the residual in the regression. In our case, the structural regression is given by equation (4) in which the true parameter is $(1-\beta)$ and the bias comes from the fact that lobbying expenditures are a function of the residual, which is lobbying productivity ϕ^L. Thus, assuming that the identification assumption on the instrument holds, the IV strategy correctly identifies $(1-\beta)$. Given that, the biased OLS estimate is the sum of the IV estimate and the correlation between lobbying expenditures and lobbying productivity. This, in turn is related to the parameters that govern the correlation between lobbying productivity and other firms' primitives that underly lobbying expenditures. Thus, targeting the estimate of the second stage of both the OLS and IV model contributes to identifying both β and the correlation between firms' primitives.

Estimation Result The results of the estimation are presented in Table 3. It shows that the model is able to replicate the main features of the moments used from the data. In particular, in order to generate a downward bias of the OLS estimate relative to the IV, it predicts a positive correlation between firms' production and lobbying productivity and a positive correlation between firms' lobbying productivity and residual distortion ϕ^τ. Similarly, the share of firms across industries and the share of firms within industries that lobby are also well approximated by the estimated model. With these results, we proceed to study different counterfactuals of how lobbying influences aggregate output.

Parameter	Parameter Name	Targeted Moment	Data	Model
f_s^P	Production fixed cost	Distribution of Number of Firms	Table 1	Figure D.1
f_s^L	Lobbying fixed cost	Share of lobbying Firms	Table 1	Figure D.2
$v(\phi_s^P)$	Variance of Production Productivity	Firms' Sales Dispersion	2.8	2.4
$v(\phi_s^L)$	Variance of Lobbying Productivity	Firms' Lobbying Expenditure Dispersion	2.1	1.8
$v(\phi_s^\tau)$	Variance of Residual Distortions	Firms' Output Wedge Dispersion	1.1	1.6
$corr(\phi_s^P, \phi_s^L)$	Cov of Production and Lobbying Productivity	Firms' Correlation of Sales and Lobbying	0.5	0.3
$corr(\phi_s^P, \phi_s^\tau)$	Cov of Production Productivity & Residual Distortions	Firms' Correlation of Sales and Output Wedges	-0.5	-0.1
$corr(\phi_s^L, \phi_s^\tau)$	Cov of Lobbying Productivity & Residual Distortions	Firms' Correlation of Lobbying and Output Wedges	0.2	0.4
β_{OLS}	Returns to Lobbying	Biased OLS of Returns to Lobbying $(1-\beta)$	0.05	0.045
β_{IV}	Returns to Lobbying	IV Returns to Lobbying $(1-\beta)$	0.23	0.19

Table 3: **Parameter and Moments from the SMM:** This table documents the results of the SMM procedure. It shows, for each parameter, the point estimate and the targeted moment. Note that the column 5 of the last 2 rows show the structural coefficient of the OLS and IV estimate, which is $1-\beta$, whereas column 2 shows the implied estimated β.

Counterfactual with no Lobbying We evaluate quantitatively how aggregate output changes with lobbying activity. To understand the effect of lobbying activity, we consider a counterfactual where $\beta = 0$, i.e., firms choose endogenously not to lobby. In that case we find that output would be 22 percent higher than the one where firms obtain the return to lobbying that we estimate from the data. The left panel of Figure 12 shows sensitivity of how those losses from vary with β. The figure shows a slightly non-linear negative relationship between output changes and the returns to lobbying. There are two main forces behind the losses of lobbying activity. As Proposition 2 shows, one is because lobbying directly affects firms' wedges, which affect the dispersion of TFPR and thus how firms' productivity is aggregated. This is the traditional channel studied in Hsieh and Klenow (2009). The second channel is that by changing the allocation of resources, demand for labor can change which in turn changes factor prices and thus entry of firms. Changes in entry also affect aggregate output since the household has a utility that features love for variety. Of the aforementioned 22 percent losses, around 41 percent are due to changes in entry. The remaining is given by changes in the allocation of resources among existing firms. This highlights that the effect of lobbying on changes in entry is an important margin to consider when evaluating its aggregate impact.

Given that we do not estimate the elasticity of substitution and that it is an important parameter as Proposition 2 shows, we evaluate what role the parameter plays in these results. The right panel of Figure 12 shows how the changes in the 22 percent losses from lobbying activity change

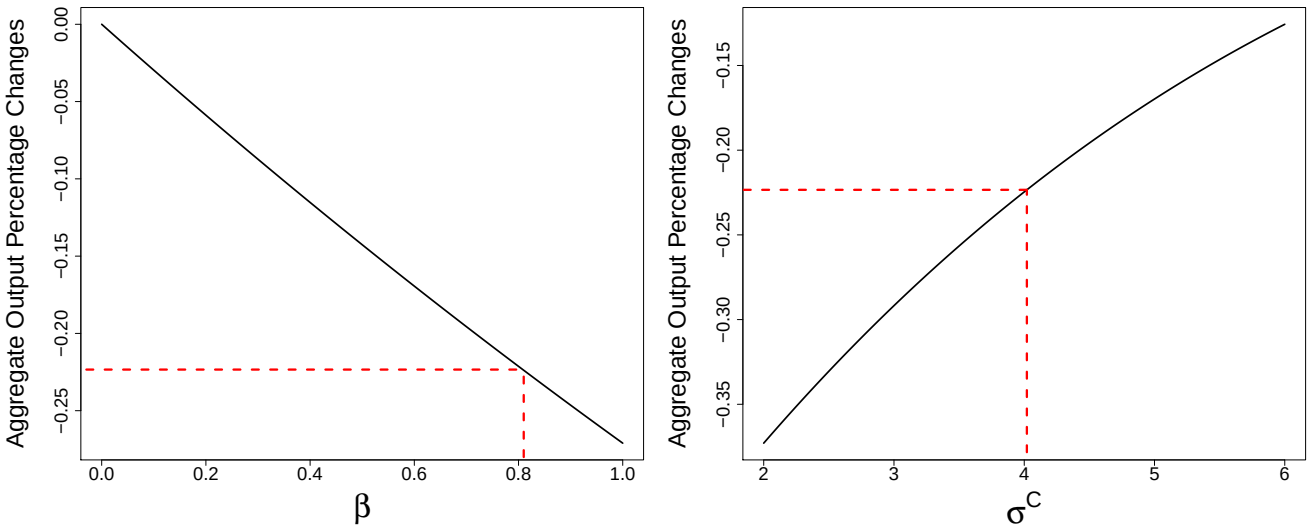


Figure 12: **Simulation Results**: This figure shows counterfactual analysis of the effect of lobbying activity on aggregate output. The left panel shows percentage changes in aggregate output for different values of β, relative to the case with no lobbying, $\beta = 0$. The right panel shows how changes in aggregate output when $\beta_{IV} = 0.81$, vary with different σ^C. The dashed red line corresponds to the values of the benchmark estimated model.

with the value of σ^C, relative to the benchmark level of $\sigma^C = 4$. One can see that if σ^C declines to 2, the losses would still be of around 38 percent, whereas if it increases to 6 it would go down until around 13 percent. The intuition is that as σ^C increases, there is less scope for the monopolistic competition to extract its residual demand and the household can substitute away more easily whatever effect lobbying activity has. On the other hand, if there is less substitution and products are more differentiated, then lobbying has a bigger effect because the household cannot substitute varieties when lobbying affects their prices. This shows that the elasticity of substitution in final demand is important in governing the effects of lobbying on aggregate output.

5 Conclusions

This paper examines how firms' lobbying activity in the U.S. affects aggregate output by misallocating resources between firms. To address this, we went from micro causal estimates of the effect of firms' lobbying expenditures on firm size using a novel instrument, to aggregate output by developing a heterogeneous firm model with endogenous lobbying. By estimating the model with micro data, we show that firms' lobbying activity decreases output by 22 percent relative to an economy without lobbying activity. The main force behind this effect is changes in the size

distribution of firms because, through lobbying, some firms get bigger than what they should. 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. Thus, by providing direct micro evidence and aggregate quantifications, we explored the understanding of how firms' political activities affects the allocation of resources in the economy.

Several open questions appear after these results and remain for future research. On the one hand, what is dampening competition in these lobbying markets? Why are there not more firms entering into lobbying activity? Why is there so much persistence in this lobbying? These are key questions to improve the functioning of this market. On the other hand, how does the opposite direction of the relationship between size and lobbying works? How does the business cycle of the economy affect firms' lobbying activity? This is also necessary if one is to fully understand how the politics interact with the economics of firm behavior, and how this in turn impacts aggregate output of an economy.

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Appendix A 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.[23] 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.[24] 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 B. 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.[25]

[23] 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.

[24] 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.

[25] 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

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.[26] 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.[27] 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.

most of the existing studies might contain numerous duplicates by including both original filings and their amendments.

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

[27] 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.

Appendix B LD-2 Report Example

Clerk of the House of Representatives
Legislative Resource Center
B-106 Cannon Building
Washington, DC 20515
http://lobbyingdisclosure.house.gov

Secretary of the Senate
Office of Public Records
232 Hart Building
Washington, DC 20510
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 B.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).

Appendix C Supporting Facts

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

C.1 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.DrugAbuse	2.1	1	1	10	200
Animals	2.1	2	1	11	412
ApparelInd	1.5	1	1	7	140
Arts.Entertainment	1.9	1	1	7	42
Automotive.Ind	3.8	2	1	37	319
Aviation	4.1	2	1	93	836
Bakruptcy	4.4	2	1	29	78
Banking	3.0	2	1	45	1,646
BeverageInd	3.3	3	1	15	27
Budget.Approp	8.2	2	1	421	2,577
Chemicals	4.8	2	1	83	124
CivilRights	1.9	2	1	40	1,263
CleanAir.Water	5.7	2	1	104	1,289
Commodities	8.1	3	1	35	35
Communications	3.0	2	1	52	757
ComputerInd	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
DisasterPlanning	1.9	1	1	9	261
DistrictofColumbia	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
FamilyIssues	1.6	2	1	15	726
FinancialInst	4.2	2	1	338	1,404
Firearms	1.6	1	1	12	644
FoodInd	3.1	2	1	72	560
ForeignRelations	1.6	1	1	19	1,322
FuelGasOil	3.1	2	1	20	264
Gambling	3.4	2	1	16	99
GovernmentIssues	2.0	1	1	139	2,399
HealthIssues	3.1	2	1	319	6,797
HomelandSecurity	8.2	2	1	158	816
Housing	2.2	2	1	35	722
Immigration	2.8	2	1	133	1,249
IndianAffairs	1.6	1	1	11	495
Insurance	4.0	2	1	82	931
Intelligence	4.0	3	1	17	58
LawEnforcement	1.8	1	1	30	1,172
Manufacturing	2.4	1.5	1	25	90
Marine.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
NaturalResources	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
RealEstate	1.6	1	1	5	502
Religion	1.3	1	1	3	93
Retirement	3.3	2	1	134	1,062
Roads.Highway	4	2	1	49	71
Science.Technology	2.7	2	1	30	400
SmallBusiness	1.8	1	1	10	483
Sports.Athletics	1.7	1	1	6	59
TariffsMisc	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.Tourism	3.2	2	1	17	95
Trucking.Shipping	3.8	2	1	33	128
Unemployment	2.0	2	1	6	48
UrbanDvlpmnt	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 C.1: This table shows that the skewed distribution that we observed in Figure 5 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.2 Changes in Committee Membership

This subsection highlights in more detail how committee membership changes over time for politicians. Figure C.1 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, figure C.2 shows the likelihood of changing a committee over time. It shows that this likelihood is around 30 percent on average across Congress. Furthermore, it highlights that this number has been fairly constant over time.

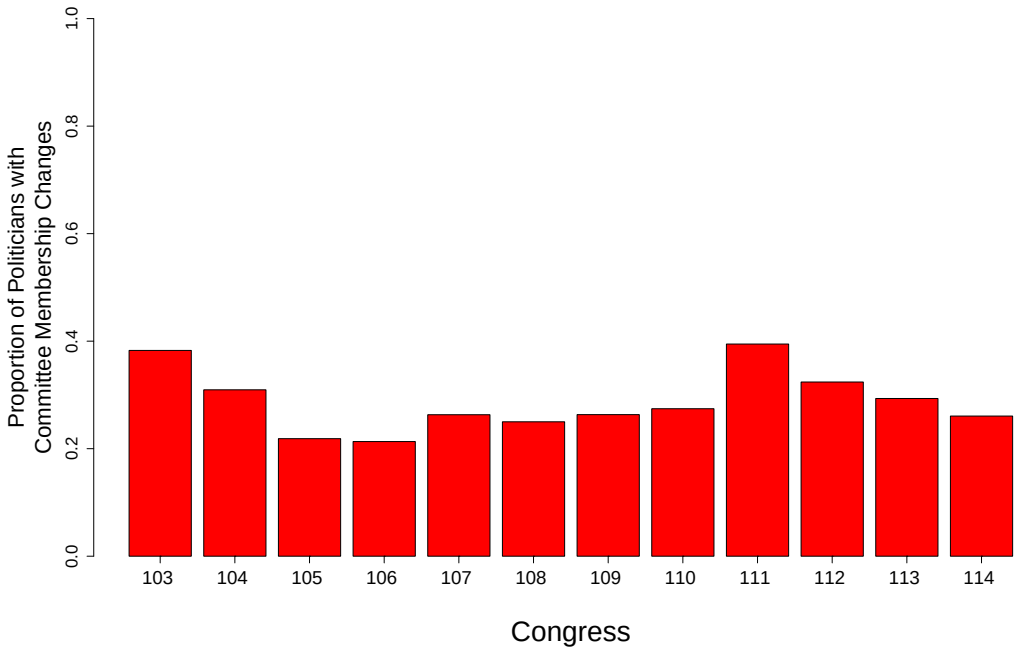

Figure C.2: **Changes in Committee Membership**: This figure shows the proportion of politicians who changed his/her committee membership in the standing committees across congressional sessions. It shows that about 29% of politicians change their memberships.

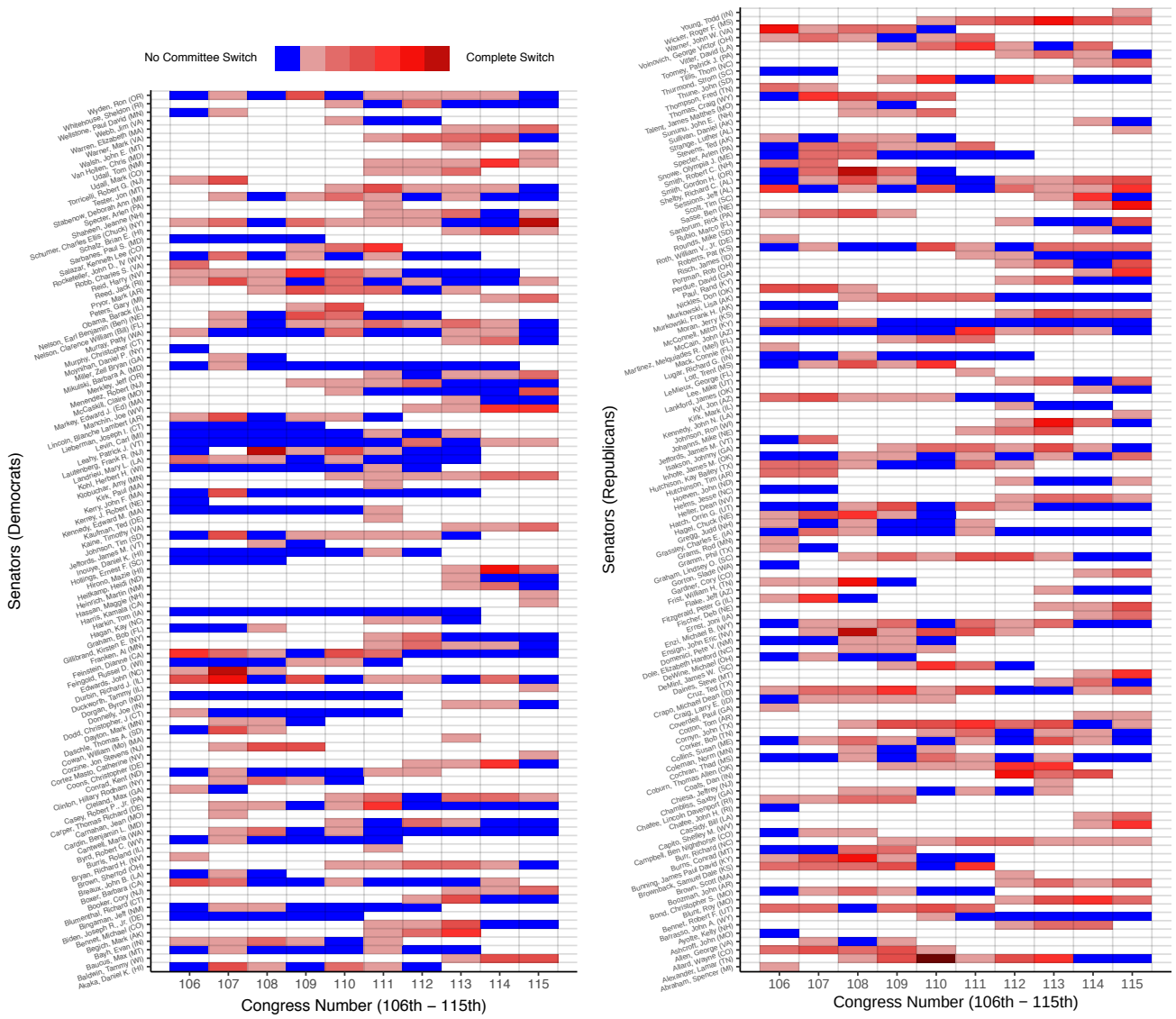

Figure C.1: **Changes in Committee Membership**: This figure distinguishes the degrees of committee membership changes for democrats (left) and republicans (right), providing further details to Figure 6.

C.3 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
	Technology Modernization Subcommittee
	Transportation and Infrastructure
	Veterans' Affairs
	Ways and Means

Table C.2: This table presents the list of standing committees in the Senate and the House that we consider in the analysis.

Appendix D Structural Estimation

This appendix shows 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 industry, and the distribution of the number of firms across industries. In both cases, the figures demonstrate a relatively good fit of the model.

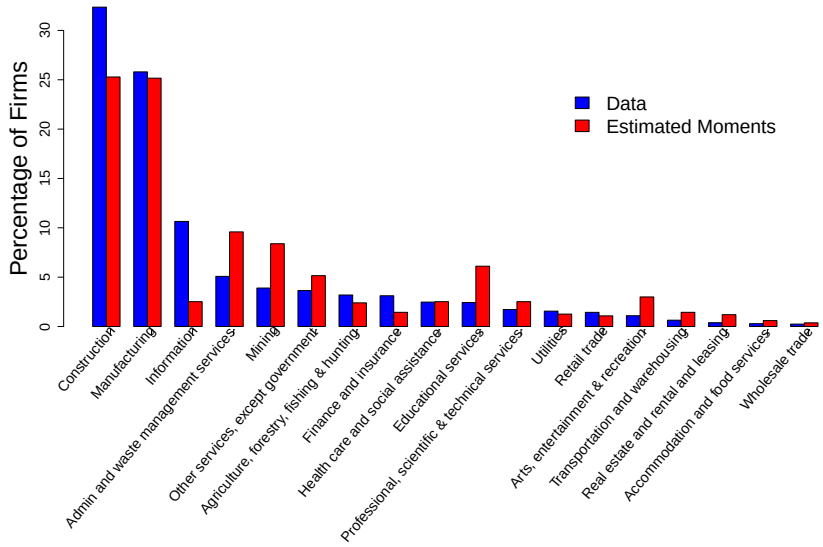

Figure D.1: **Number of Firms Share Fit**: This figure shows the distribution of the number of firms across industries, both in the data and the one simulated from the estimated version of the model.

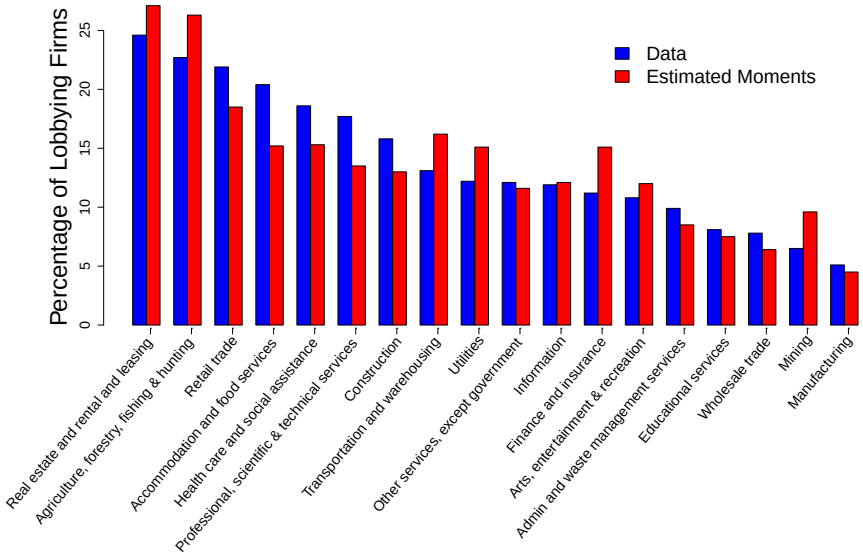

Figure D.2: **Lobbying Share Fit**: This figure shows the percentage of firms in each industry that lobby, both in the data and the one simulated from the estimated version of the model.

Appendix E Model

This appendix presents more details about the model described in the paper.

E.1 Proofs

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

Proof of Proposition 1. The first order condition of firms' intensive margin lobbying decision is the following:

$$\beta_s(\phi_s^L l_s(\phi))^{\beta_s} r_s(\phi) = w l_s(\phi)$$

By taking logs and rearranging one arrives to equation (4). ■

Proof of Proposition 2. Firms' first order conditions imply that the marginal revenue product of factors are the following:

$$\begin{aligned}
MRPN_s(\phi) \equiv \frac{\partial r_s(\phi)}{\partial n_s(\phi)} &= \frac{\sigma_s^C - 1}{\sigma_s^C} \alpha_s^N \frac{r_s(\phi)}{n_s(\phi)} = \frac{w}{1+\tau_s(\phi)} \\
MRPK_s(\phi) \equiv \frac{\partial r_s(\phi)}{\partial k_s(\phi)} &= \frac{\sigma_s^C - 1}{\sigma_s^C} \alpha_s^K \frac{r_s(\phi)}{k_s(\phi)} = \frac{p^K}{1+\tau_s(\phi)} \\
MRPM_s(\phi) \equiv \frac{\partial r_s(\phi)}{\partial m_s(\phi)} &= \frac{\sigma_s^C - 1}{\sigma_s^C} \alpha_s^M \frac{r_s(\phi)}{m_s(\phi)} = \frac{p^M}{1+\tau_s(\phi)}
\end{aligned}$$

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

$$\begin{aligned}
Y_s &= \Phi_s^P N_s^{\alpha_s^N} K_s^{\alpha_s^K} M_s^{\alpha_s^M} \\
\Phi_s^P &= X_s^{\frac{1}{\sigma_s^C - 1}} \left(\frac{N_s^P}{N_s}\right)^{\alpha_s^N} \left(\frac{\overline{MRPN}_s}{w}\right)^{\alpha_s^N} \left(\frac{\overline{MRPK}_s}{p^K}\right)^{\alpha_s^K} \left(\frac{\overline{MRPM}_s}{p^M}\right)^{\alpha_s^M} \left[\int \left(\phi^P (1+\tau_s(\phi))\right)^{\sigma_s^C - 1} \hat{f}_\phi(d\phi)\right]^{\frac{1}{\sigma_s^C - 1}}
\end{aligned}$$

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

$$\Phi_s^P = X_s^{\frac{1}{\sigma_s^C-1}} \left(\frac{N_s^P}{N_s}\right)^{\alpha_s^N} \left[\int \left(\phi^P \frac{\overline{TFPR}_s}{TFPR_s(\phi)}\right)^{\sigma_s^C-1} \hat{f}_\phi(d\phi)\right]^{\frac{1}{\sigma_s^C-1}}$$

■

Proof of Proposition 3. Using the first order conditions of the problem stated in equations (7)-(10) and assuming that $w = 1$, one has the following:

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

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 (7)-(10) and rearranging, one arrives to the result of equation (11)

■

Appendix F Reduced Form Analysis

In this appendix I present robustness evidence to the IV strategy implemented in section 4. 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. 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 F.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, uses value added as the outcome, rather than sales and profits. Table F.2 shows the main table using weights in $t-1$, $t-2$ and $t-3$. The positive correlation in the OLS and causal effect in the IV also holds when using value added. Furthermore, the direction of the bias works in the same way as with sales.

	Log Sales				Log Profits			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0436***	0.0500***	0.319***	0.227***	0.0241**	0.0468***	0.322***	0.236*
	(0.00891)	(0.0117)	(0.0754)	(0.0795)	(0.00948)	(0.0130)	(0.114)	(0.124)
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	OLS	IV	IV	OLS	OLS	IV	IV
F-Stat			21.30	20.20			14.30	13.10
Sample	All	Post 2007	All	Post 2007	All	Post 2007	All	Post 2007
Weight Lag			t-1	t-1			t-1	t-1
N	15332	8796	15332	8796	10369	6064	10369	6064

	Log Sales				Log Profits			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0423***	0.0500***	0.378***	0.304***	0.0244**	0.0468***	0.488***	0.371***
	(0.00895)	(0.0117)	(0.0877)	(0.0872)	(0.00977)	(0.0130)	(0.147)	(0.128)
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	OLS	IV	IV	OLS	OLS	IV	IV
F-Stat			15.20	18.70			9.300	9.900
Sample	All	Post 2007	All	Post 2007	All	Post 2007	All	Post 2007
Weight Lag			t-2	t-2			t-2	t-2
N	14542	8796	14542	8796	9885	6064	9885	6064

	Log Sales				Log Profits			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0448***	0.0500***	0.393***	0.381***	0.0303***	0.0468***	0.610***	0.560**
	(0.00962)	(0.0117)	(0.103)	(0.126)	(0.00977)	(0.0130)	(0.216)	(0.234)
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	OLS	IV	IV	OLS	OLS	IV	IV
F-Stat			11.40	16.40			6	6.900
Sample	All	Post 2007	All	Post 2007	All	Post 2007	All	Post 2007
Weight Lag			t-3	t-3			t-3	t-3
N	13710	8796	13710	8796	9344	6064	9344	6064

Table F.1: **Different Baseline Weights for IV:** This table presents the OLS and IV between lobbying expenditures and firms' sales and profits. It shows robustness to the main table, using different committee weights. Besides presenting the baseline regression, it presents robustness using weights from $t-2$ and $t-3$. Profits are defined as sales minus wage bills, capital expenditures and intermediate input expenditures. All regressions have firm, year and state-year fixed effects. Standard errors are double clustered at firm and year level. *** p<0.01, ** p<0.05, * p<0.1

	Log Sales				Log VA			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0436***	0.0500***	0.319***	0.227***	0.0251***	0.0299**	0.287***	0.177**
	(0.00891)	(0.0117)	(0.0754)	(0.0795)	(0.00667)	(0.00948)	(0.0916)	(0.0686)
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	OLS	IV	IV	OLS	OLS	IV	IV
F-Stat			21.30	20.20			14.50	17.10
Sample	All	Post 2007	All	Post 2007	All	Post 2007	All	Post 2007
Weight Lag			t-1	t-1			t-1	t-1
N	15332	8796	15332	8796	10851	6097	10851	6097

	Log Sales				Log VA			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0423***	0.0500***	0.378***	0.304***	0.0255***	0.0299**	0.392***	0.271***
	(0.00895)	(0.0117)	(0.0877)	(0.0872)	(0.00684)	(0.00948)	(0.123)	(0.0925)
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	OLS	IV	IV	OLS	OLS	IV	IV
F-Stat			15.20	18.70			8.400	7.900
Sample	All	Post 2007	All	Post 2007	All	Post 2007	All	Post 2007
Weight Lag			t-2	t-2			t-2	t-2
N	14542	8796	14542	8796	10299	6097	10299	6097

	Log Sales				Log VA			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Lobby	0.0448***	0.0500***	0.393***	0.381***	0.0282***	0.0299**	0.564***	0.514***
	(0.00962)	(0.0117)	(0.103)	(0.126)	(0.00694)	(0.00948)	(0.195)	(0.188)
Firm and Year FE	✓	✓	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Model	OLS	OLS	IV	IV	OLS	OLS	IV	IV
F-Stat			11.40	16.40			6.700	9.200
Sample	All	Post 2007	All	Post 2007	All	Post 2007	All	Post 2007
Weight Lag			t-3	t-3			t-3	t-3
N	13710	8796	13710	8796	9697	6097	9697	6097

Table F.2: **Different Baseline Weights for IV:** This table presents the OLS and IV between lobbying expenditures and firms' sales and value-added. It shows robustness to the main table, using different committee weights. Besides presenting the baseline regression, it presents robustness using weights from $t-2$ and $t-3$. Value added is defined as sales minus intermediate input expenditures. All regressions have firm, year and state-year fixed effects. Standard errors are double clustered at firm and year level. *** p<0.01, ** p<0.05, * p<0.1