Market Power and Political Connections*

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Abstract

Do politics drive the rise of market power in the United States? This paper studies the effect of corporate political connections with congressional committee members on market power in the US. For identification, we exploit a congressional procedure (committee exile) that leads to quasi-exogenous variations in a committee member's political influence, and thus in a firm's political connections with committees. We find that, on average, 10% more successful political connections to incumbent committee members increased firm-level markups by 1.09 percentage points for US public firms. The key mechanism is the exemption of increasing costs associated with regulatory burdens, rather than government procurement contracts. Overtime, we observe an increase in political connections among large firms. For sectors with larger increases in the concentration of political power, measured by HHI of political connections or total political expenditures, their market concentration also increased more. Overall, our results reveal political connections as a source of market power and distorted competition.

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1 Introduction

Over the last few decades, there has been a rise of market power and a decrease in competition across countries and industries (De Loecker and Eeckhout, 2018; Grullon et al., 2019; Autor et al., 2020; De Loecker et al., 2020). In the absence of competitors' pressure, firms may gain market power and sell goods at higher prices. At the same time, the rise of market power leads to redistribution of resources from consumers to owners of firms: consumers pay higher prices for goods, and firms' profit shares are higher. This has implications not only for consumer welfare, but also for labor share of income (Autor et al., 2020; De Loecker et al., 2020) and investment (Gutiérrez and Philippon, 2017).

Despite the important macroeconomic implications of market power, little evidence has systematically uncovered its sources. In this paper, we show the increase of corporate political connections with US congressional committee members as a source of the rise of market power. In general, politics can help to secure their market status through various ways, such as government procurement contracts (Brogaard et al., 2020), relaxed regulatory oversight (Correia, 2014; Heitz et al., 2023), or tax rate benefits (Richter et al., 2009). The advantages over their competitors, granted by politics, allow these firms to overcome regulatory or bureaucratic frictions and obtain higher market shares, even without growth in productivity (Akcigit et al., 2022). A notable example of politics driving market power is "Halliburton Loophole", exempting fracking from federal oversights under the Safe Drinking Water Act in 2005. The provision was named after the oil service giant Halliburton, because it was well seen as the efforts of Halliburton, the largest player in the hydraulic fracturing industry. Before the endorsement of the bill, Halliburton strategically donated to congressional members in key committees associated with the bill, accounting for half of their connected members in the previous election cycle. In the roll call vote , members with Halliburton campaign contributions were 30% more likely to vote "yes" for the bill. As a consequence, Halliburton reached an all-time-high net income of 2.4, 2.3 and 3.5 billion USD during 2005-2007, compared to a loss of 1 billion USD in 2004.

To empirically estimate the effect of political connections on market power, however, the key challenge is the reverse causality. On one hand, political connections help firms to collect more government information, give a voice to politicians, or block regulatory oversights that impose a wedge on marginal production costs. On the other hand, firms with higher market power allocate more resources for accessing politicians or influencing politics, creating the "vicious circle" between market power and politics (Zingales, 2017; Eeckhout, 2021). To address this concern, we propose an identification strategy that exploits the involuntary removal of US congressional committee members (committee exile), first introduced and studied in Grimmer and Powell (2013, 2016), as a source of quasi-exogenous variations in a member's influence on the policy-making process. Since firms access committee members for their influence, this congressional procedure consequently leads to quasi-exogenous variations in the firms' political connections.

Committee exile occurs to junior Congress members who win their congressional elections and return to the Congress, but their party loses majority in the Congress. After a congressional election defeat, committee ratios are adjusted to reflect the incoming majority's seat advantage, and the outgoing majority party unevenly loses seats on every committee.[1] When a committee member is exiled, she is removed from a valued committee and usually given a less valued assignment, hence generating dynamics of her political connections with firms, and their effects over time. This unique empirical setting allows us to overcome the reverse causality problem for three reasons. First, the probability of committee exile for the losing party depends on various moving parts, such the number of returning politicians and the number of seats lost across committees, both of which are very hard to predict beforehand. Second, exiled members can be re-elected from their congressional districts, implying that they possess similar interests, capacity, and political skills to non-exiled ones. This helps us to eliminate the potential politician-level confounding factors in committee exile outcomes.[2] Third, there is substantial uncertainty about whether exiled members can go back to their previous committee assignments. Exiled members must fight off other exiled ones in order to obtain the seat, because the number of new seats that are available on the committee is substantially less than the number of legislators who want to return to the committee.[3]

We exploit the feature of committee exile and construct a firm-election cycle level variable, measuring a firm's exposure to committee exile. To begin, we restrict the sample within junior members with an average seniority of maximum three election cycles (six years).[4] These members are comparable in their likelihood of being exiled if their party loses. We define a firm as being connected to a committee member in an election cycle, if political action committees (PACs) sponsored by the firm made campaign contributions to the member in this

[1]It is usually a routine that most committee members return to their previous seats after wining the reelection. However, as Grimmer and Powell (2013) show, both Republicans and Democrats select members with lowest seniority in each committee in case of committee exile. This rule has been used to select legislators for removal in order to maintain party comity. See two seminal papers of Grimmer and Powell for more details on the incidence and characteristics of committee exile, as well as its electoral, political, and pecuniary consequences.

[2]It is impossible to measure all the characteristics that affect committee assignments. Exiled and non-exiled politicians were similar in terms of levels of prior vote share, days missed in Washington, number of bills sponsored, money raised, party-unity score and other observable characteristics. Apart from the observable characteristics, obtaining desired committee assignments also depends on unobservable political skills, such as the demonstration of legislative capacity in a particular area. These characteristics are difficult to measure. This limits the potential influence of the unobservable characteristics on the estimation of the effect of committee assignments on the politicians' legislative behaviors and thus on firm production.

[3]As a case study, Grimmer and Powell conducted a semi-structured interview with Rosa DeLauro (D-CT) who was exiled from the Appropriations committee after 1994 elections. She talked about consequences of the congressional defeat and committee exile "is in the purview of the majority...None of that did I think about." She also said that "I did not contemplate the overall Democratic loss, what that would mean for the Appropriations committee."

[4]Our results are robust to the sample of "strictly" one-term members (two years).

election cycle.[5] A firm's political connections are summed as the total number of committee members connected to the firm, and its exposure to committee exile is the share of unsuccessful (exiled) political connections over total political connections. Thus, our identification is based on two assumptions. First, exiled and non-exiled members were indifferent in their donations received from firms, or number of connected firms. Second, there was also no difference in firms' observable characteristics between those ever and not donating to exiled members.

Following De Loecker et al. (2020), our measure of market power first uses markups, the wedge between a variable input's expenditure share in sales and that input's output elasticity. We then use profit rates(total sales minus all costs as a share of sales) and market capitalization as a share of sales as alternative measures. The empirical analysis first focuses on the 111th Congress (2009-2010), when the Democratic Party lost not only control of the House, but also many seats across different committees. This Congress was unique in the empirical setting because there was the highers number of committee exiles ever, which was largely unexpected. When firms donated to members who were exiled in the next Congress, they had fewer "successful" political connections compared to firms donating to only non-exiled members. In a difference-in-difference approach, we compare market power of firms with more successful political connections (without committee exile) vis-à-vis those with fewer connections (with committee exile), before and after the end of 111th Congress. We find that firms with more successfully connected politicians, on average, experienced a 0.151 relatively higher increase in markups after the 111th Congress, compared to those with fewer successful political connections. We confirm the findings with profit rates and market value over sales. When decomposing markup into sales and variable input costs, we find that the effects were driven by a relative decrease in variable input costs for firms with more successful connections. Next, we extend the analysis to the whole sample period of 103rd-113th Congress (1993-2014), and regress measures of market power on the share of firms' unsuccessful political connections. By doing so, we use the unsuccessful share as a continuous treatment and estimate the overall effects of committee exile on market power over time. The results show that 10% more successful political connections ($\sim$ 3 junior politicians) to important committee members led to 1.09% relatively higher firm-level markups and 0.54% relatively higher profit rates. The back-of-envelope calculation shows that one standard deviation of firms' political connections ($\sim$ 67 politicians) accounted for around 18.6% of the cross-sectional variations in their markups.

On the basis of the main results, we also provide additional empirical evidence on the heterogeneous effects across firms' "partisanship", committees' importance, or members' seniority. First, we restrict the sample within firms connected to more Democrats than

[5]In this paper, we focus on federal government level policymakers - the congressional committees. As legislative sub-organizations in the US Congress, congressional committees have specific but important duties. For example, one of the most influential, the Appropriations Committee, passes appropriations bills and regulates government spending. The Budget Committee provides legislative oversight of the federal budgetary process and reviews all bills and resolutions on the budget. The congressional committee members influence legislative decisions, government awards, and budgetary plans, all of which may help firms gain competitive advantage and thereby increase their market power. Over the last few decades, firms have been increasing their levels of connections to committee members, in particular for large firms, as shown in Figure 1

Republicans and find that the effects were significantly stronger. This finding implies that (i) our main results were not driven by party loss but the removal of individual members, and (ii) connections with Democrats had stronger effects on market power compared to Republicans. Second, we restrict the sample of members to those who had assignments in very important committees[6], and find that the effects were still significant but not stronger than baseline results. This finding suggests that although important members were more powerful in general, they might have less direct impact on passing or blocking regulations than members in committees associated with these bills. Besides, these members had more connected firms and hence limited resources for each firm, so that firms had to compete for them. Third, if we strictly focus on one-term (two years) members who had the same exposure in case of committee exile, the estimated coefficients are also not significantly different from the main results.

Next, we explore the potential mechanisms behind the effects of political connections on market power. The first mechanism is the exemption of regulatory burdens which imposes a wedge that increases marginal production costs, confirmed by the results on relative variable input costs. Taking the example of Halliburton loophole, the enactment of Safe Drinking Water Act amendment exempted Halliburton from regulatory costs. The financial performance of Halliburton before and after the SDWA enactment confirmed the importance of this channel. Second, we also examine the channel of federal government procurement contracts.[7] Overall, we find a positive but insignificant effect of political connections on firms' exercised procurement value during each period. However, when we restrict the firm sample to those with above-median (at least 15) political connections, firms with more successful political connections were able to have a larger increase in the value of government procurement contracts exercised. Although this suggests a source of higher markups due to the price premium for government contracts (Bandiera et al., 2009), however, the magnitude of the effect is very small. Among the firms with political connections, the ratio of exercised procurement contracts over firm sales was between 0.04% and 0.12% in our sample period. Thus, the channel of escaping regulatory burdens was far more important than procurement channel.

At the same time, the empirical setting allow us to study the effects of political connections on firm-level outcomes related to market power. Our difference-in-difference analysis highlight the following findings. First, firms with more successful connections grew more in employment, consistent with the findings by Akcigit et al. (2022). Political connected firms were able to produce without the wedge imposed by regulatory burdens. This helped them to preempt competition with their competitors, grabbed higher market shares and grew more in labor.

[6]We classify committee members as "important" if they have assignments in Ways and Means (tax-writing), Appropriations (passing appropriation bills and regulate expenditures of money by the government), Energy and Commerce (legislative oversight relating to telecommunications, consumer protection, food and drug safety, public health, air quality and environmental health, the supply and delivery of energy, and interstate and foreign commerce), or Oversight and Accountability Committee (main investigative committee) in the House.

[7]Several papers have documented the effects of political connections on federal government procurement contracts. Brogaard et al. (2020) show the effect of political connections on the probability of the renegotiation of existing government contracts. Choi et al. (2021) provide evidence about the effect of political connections on government spending and thus on job creation.

Second, firms with fewer successful connections distributed more dividends to shareholders and made insignificantly fewer investments. Third, there was a higher effective tax rate for firms with fewer successful connections.

Given the causal effects of political connections on market power, we investigate the macroeconomic implications of this relationship. We define the concentration of (i) levels of political connections, and (ii) sales using the Herfindahl-Hirschman Index (HHI). At state-sector level, cells with a larger increase in their concentration of the political connections experienced a sharper rise in the market concentration. The results imply a reallocation of market shares to firms with more political power as well as a reallocation of firm resources to political expenditures. This relationship is stronger for finance, wholesale and transportation/utility sectors, potentially because these industries had been highly regulated.

Motivated by the empirical evidence, we also develop a theoretical framework to demonstrate how political connections can distort market power. We build a model where firms have regulatory burdens imposing a wedge on marginal production costs, and such regulatory burdens may be eliminated by making transfers and connecting to politicians. The model features competition for political power à la Grossman and Helpman (1994) and competition for market shares as in Atkeson and Burstein (2008). Our model provides insights into revealing escaping regulatory burdens as a channel of political connections affecting market power.

Our paper, first and foremost, provides a direct contribution for the research on the interplay between politics, competition and market power. Political connections have important roles in shaping competition (Faccio and Zingales, 2021) and antitrust regulations (Mehta et al., 2020). Recent papers also have started to study they interplay between politics and market power, such as the circularity (Callander et al., 2022) within "vicious circle" between politics and market power (Zingales, 2017; Eeckhout, 2021). In particular, Cowgill et al. (2022) examine the link between lobbying and concentration in industries, which directly affects market power. Akcigit et al. (2022) explore the interaction between political connections and innovation with Italian dataset. Our paper contributes to this literature by documenting the effects of firm political connections on market power with an identification strategy.[8] In a broader scale, our paper builds upon the literature that studies the rise of market power (Traina, 2018; Syverson, 2019; De Loecker, Eeckhout, and Unger, 2020; De Loecker, Eeckhout, and Mongey, 2021). De Loecker, Eeckhout, and Unger (2020) document the rise of market power with a cost-based method to measure firm-level markups. Then De Loecker, Eeckhout, and Mongey (2021) explore both the cause and consequences of the rise in market power with a quantitative framework. Our paper provides a source of the rising market power, that is, firms' political connections with congressional committee members.

Generally speaking, this paper is related to the general literature on corporate strategies

[8]Although we are among the first to compile such a comprehensive dataset, the main data sources have been validated and explored extensively in previous papers. For example, campaign contributions in Cooper et al. (2010); Akey (2015), lobbying expenditures in Bertrand et al. (2014, 2020); Grotteria (2023), charitable donations in Bertrand et al. (2020, 2021), independent political expenditures in Petrova et al. (2019), government procurement contracts in Brogaard et al. (2020); Cox et al. (2020); Nigmatulina (2022); Grotteria (2023).

in seeking political influence and connections, which has been prevalent among research in economics and finance over recent years. Corporate political connections are not only found to have widespread existence (Faccio, 2006), but also associated with higher stock returns (Goldman et al., 2008; Cooper et al., 2010; Akey, 2015), more government contracts (Goldman et al., 2013; Brogaard et al., 2020; Choi et al., 2021; Aobdia et al., 2022), firm survival (Zheng et al., 2015), relaxed regulatory oversight (Correia, 2014; Heitz et al., 2023), tax relief Richter et al. (2009), and even externalities such as higher default rates on bank loans (Khwaja and Mian, 2005) or risk exposure (Kostovetsky, 2015). We contribute to this series of literature by developing a congressional procedure as an identification strategy and we show that political connections distort competition by helping firms to escape regulatory burdens.

As an important congressional procedure in the United States politics, committee assignments have attracted extensive attention from researchers in economics and business. Our paper is also related to the emerging literature focusing on this specific congressional procedure. Bertrand et al. (2014) finds that lobbyists follow politicians they were initially connected to when those politicians switch to new committee assignments. Bertrand et al. (2020) generates a time-varying, pair-specific measure linking company interests to specific legislators, which is shown to be predictive of corporate donations to charities in the legislator's district. Our paper leverages committee exile from Grimmer and Powell (2013, 2016) as the identification strategy, and estimate the effect of political connections on firm market power.

The rest of the paper is organized as follows. In the next section, we demonstrate anecdotal evidence to elaborate how political connections affect market power. Section 3 describes data sources, measures and summary statistics. Section 4 presents the empirical analysis. Section 5 examines potential channels and limitations of the main results. Section 6 studies the macroeconomic implications of the increasing concentration of political connections. Section 7 develops a theoretical framework. Section 8 concludes.

2 Anecdotal Evidence: Halliburton Loophole

We start the paper by using an anecdotal example to show how political connections affect market power, with an oil service firm, Halliburton. It was the first firm patented fracturing and had largest fracturing operations (drilling to obtain oil and gas) in the world. In 2005, the 109th Congress passed the Energy Policy Act and amended the Safe Drinking Water Act (SDWA), a major tool the Environmental Protection Agency (EPA) used to keep our drinking water clean. In particular, the SDWA provided an exemption for the fluids used in hydraulic fracturing, so that hydraulic fracturing firms can inject known hazardous materials directly into underground drinking water supplies. Apparently, the amendment exempted these firms from high regulatory burden.

Our aim is to show that Halliburton's campaign contributions to Congressional committee members were strategic and decisive in the committees and members' votes, and finally the

enactment of the bill.[9] After the introduction of bills, votes are extremely important in passing two chambers, resolving differences and finally enactment of laws. To do so, we download the roll call vote results of the Energy Policy Act of 2005[10] in both chambers agreed to conference report. Then we link each member to Halliburton's campaign contribution records by their last name, state, party and chamber. We also performed a manual-check process to make sure that all records of campaign contributions correspond to incumbent members in the 109th Congress (2005-2006). Out of 534 incumbent members voting on the Energy Policy Act, Halliburton donated to 77 in the 108th Congress, and 186 ever since 103rd until 108th Congress.[11]

The first question we address is whether Halliburton strategically donated to members from key committees related to the bill or relevant industries. The bill was sponsored by Joe Barton (TX), and cosponsored by Richard Pombo (CA) and William Thomas (CA), all of whom are Republicans with campaign contributions from Halliburton. It is also associated with the following 8 committees in the House: Energy and Commerce, Education and the Workforce, Financial Services, Agriculture, Resources, Science, Ways and Means, and Transportation and Infrastructure. In Figure 3, we plot the distribution of committee assignments within members who received campaign contributions from Halliburton in the 108th Congress. Among them, 38 out of 77 members (49.4%) have assignments in the 8 committees associated with the Energy Policy Act of 2005, and the number becomes 38/57 (66.7%) within the House of Representatives. Given the large number of 535 members in both chambers, our descriptive statistics imply that Halliburton strategically donated to members who are pivotal to associated industries and regulations.

Next, we want to examine whether Halliburton's connections, defined by campaign contributions, did make a difference in the roll call vote results in two chambers. In Figure 2 Panel A, we plot the distribution of votes ("Yes", or "No/Not Voting") for members with campaign contributions from Halliburton in the 109th Congress, for all members, House and Senate, respectively. The "Yes" votes accounted for 93.5% (72 out of 77) among all Congress members with Halliburton contributions, but only 60.6% (277 out of 457) among the members without Halliburton contributions. The numbers become 94.7% (54/57) and 58.6% (221/377) within the House, and 90% (18/20) and 70% (56/80) within the Senate. Panel B confirms the findings by comparing politicians ever or never received campaign contributions during 103rd-108th Congresses. The results imply that Congress members receiving campaign finance from

[9]The exemption was perceived, by conventional wisdom, as the recommendation of the Energy Task Force headed by Vice President Richard Cheney, former CEO of Halliburton. However, Fisman et al. (2012) find that the value of personal ties to Cheney was precisely estimated as zero, implying that personal rent-seeking was unlikely to lead to political favors. The main reason might be, as they claimed, "...Since Cheney's every decision was scrutinized by numerous watchdog organizations and media outlets that span the ideological spectrum, their frequent reports of potential conflicts may have, in fact, helped to prevent Cheney's personal favor giving, rather than reveal it..." Thus, the Halliburton loophole was more likely to come from business-politics relationship instead of personal ties to the vice president.

[10]Referred as "H.R.6 - Energy Policy Act of 2005" on congress.gov: https://www.congress.gov/bill/109th-congress/house-bill/6?s=3&r=1&q=%7B%22search%22%3A%22H.R.6%22%7D, accessed on September 8, 2024.

[11]We omit Halliburton campaign contributions in the 109th Congress, because the Energy Policy Act was introduced at an early phase of the 109th Congress (April 18, 2005) and became law relatively quickly on August 8, 2005.

Halliburton were more likely to support bills that gave the firm a "shield" preventing the wedge increasing production costs imposed by regulatory oversights. Such an example also justifies our political connection measure based on campaign contributions.

Ultimately, Halliburton's financial performance significantly turned the table after the bill. Compared to a net loss of one billion USD in 2004, it reached a net income of $2.4 billion USD in 2005, recognized as "the best in our 86-year history" as announced by Halliburton's chairman Dave Lesar. Subsequently, Halliburton announced a net income of $2.3 and $3.5 billion USD in 2006 and 2007, keeping itself as the most profitable company in the oil service industry. In other words, benefits of exempting "industry-wise" regulations might be exclusively reserved for certain companies and hence increase their market power.

3 Data, Measures and Sample Statistics

3.1 Data Source and Sample Construction

We collect detailed information of records of all political action committee (PAC) campaign contributions, lobbying expenditures and independent expenditures from OpenSecrets[12] during 1993-2014 (103rd - 113th Congress), and restrict recipients of campaign contributions only within individual congressional committee members as Democrats or Republicans. We obtain the list of members of the US Congress, their committee assignments and seniority within each committee from Charles Stewart's Congressional Data Page during 1993-2014 (103rd - 113th Congress).[13] The committee exile, as in Grimmer and Powell (2013), includes 152 cases of involuntary leaves of congressional committee members during 103rd - 113th Congresses. Exiled members are matched with their assignments and seniority by first and last names, as well as congressional districts and parties.

The government procurement data comes from the US Federal Procurement Data System (FPDS), which provides comprehensively detailed information on almost all federal contracts for 65 branches, departments and agencies of the federal government since 2001. We retrieve detailed contractual information from the USAspending.gov webpage, which reports detailed information on initial values, awarding date and renegotiation values on any contract with a transaction value of at least $3,000.[14]

Firm-level variables come from Compustat/CRSP merged. Given the complex historical data and absence of common identifiers among the datasets we collect, we overcome the

[12]Opensecrets was created from a merger of the Center for Responsive Politics (CRP) and the National Institute on Money in Politics (NIMP) in 2021. As a nonprofit organization based in Washington, D.C, Opensecrets tracks money in politics and its effect on elections and policy, and keeps the universe records of campaign contributions from individuals and PACs, lobbying expenditures and independent expenditures in details. In the United States, corporations are not allowed to directly donate to politicians. Instead, they create PACs to budget their political expenditures. The full disclosure of independent expenditures start from 107th Congress (2001), from when we have the independent expenditures data.

[13]Stewart III and Woon (2017)

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

challenging data-linking process by fuzzy matching and hand-checking. Second, to merge PAC contributions, lobbying expenditures and independent expenditures with listed firms, we perform a fuzzy matching process between Compustat firm names and organizations sponsoring the PACs in Opensecrets. Thereafter, we also handcheck fuzzy-matched organizations to make sure they denote the same firm essentially. Finally, in a similar manner, firm names are fuzzy matched and hand checked with government contracts recipients or their parent organizations. We employ a threshold of Levinstein distance ≥ 0.8 in all the fuzzy matching processes, to avoid losing possibly correct pairs. Regarding the macroeconomic variables, we download sector wage bills from County Business Patterns (CBP) datasets, and GDP information from the US Bureau of Economic Analysis. All monetary variables are in real values, deflated by Consumer Price Index (2015 = 100).[15] Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Our sample spans 1993-2014 (103rd-113th Congresses) and consists of 5,580 observations of 1,024 unique firms conditional on non-zero contributions to committee members. Table 2 reports summary statistics at both firm-election cycle and sector-state election cycle level.

3.2 Measures and Sample Statistics

Political connections. Following Bertrand et al. (2020), we measure political connections as a dummy variable equal to one if a firm is connected to a committee member by making campaign contributions, and zero otherwise.[16] Figure 5 shows patterns of firm political connections to committee members via campaign contributions. On the left panel, we plot the distribution of number of politicians connected to each firm, conditional on non-zero contributions in each election cycle. More than 50% of participating firms donated to more then 30 members in each election cycle. On the right panel, we plot the distribution of ratio of connections to Democrats to all members. Most of participating firms had a ratio between 0.3 to 0.6, suggesting that they donated to both Democrats and Republicans in the Congress.

There are multiple ways to define political connections, such as executives' experiences in the government (Bertrand et al., 2018), or geographical proximity between firm headquarters and politician's congressional districts (Brogaard et al., 2020; Bertrand et al., 2020). We focus on Congress members and contributions to them for the following reasons. First, compared to local politicians, Congress members are in charge of different regulatory oversights which are pivotal to firms and industries. Hence, they may significantly affect firms' production inputs and market shares by exempting regulation burden for these firms. Second, by looking at campaign contributions to individual members, we are able to exploit the quasi-exogenous nature of

[15] https://fred.stlouisfed.org/series/CPIAUCSL

[16] In this paper, we focus on the extensive margin of firm political connections (number of connections) rather than the intensive margin (importance of each connection). We abstract from using the amount of campaign contributions to measure the level or magnitude of political connections, because firms can have multiple pecuniary connections with politicians, including lobbying and independent expenditures. As shown in Figure A1, firms with more connections with committee members are on average more likely to have higher lobbying and independent expenditures.

committee exile and observe the dynamics of firms' political connections. Our Halliburton example suggests that political connections measured by campaign contributions can indeed affect the production of specific firms.

Market power. The main measure of market power is markup. Following the cost-based method developed by De Loecker et al. (2020), from the first order condition of a firm's cost minimization problem with respect to variable input V, we obtain an expression for firm level markups μ:

$$\mu_{it} = \theta_{it}^{V} \frac{P_{it}Q_{it}}{P_{it}^{V}V_{it}}.$$

where θ_{it}^{V} is the output elasticity with respect to the variable input, P_{it} is the price of the good, Q_{it} the output of the good, P_{it}^{V} is the price of the variable input and and V_{it} is the variable input used to produce the good.

As stated in De Loecker et al. (2020), this expression is derived without specifying a particular demand system. To measure markup, what we need are (i) the reverse of the revenue share of the variable input costs $\frac{P_{it}Q_{it}}{P_{it}V_{it}}$, and (ii) the output elasticity of the variable input θ_{it}^{V}. We measure the variable input costs with cost of goods sold (COGS in Compustat).[17] We illustrate this measure in Appendix C. Alternatively, we also use profit rates and market value/sales to confirm our findings.

Committee members connections with firms and industries. Figure 6 shows how many firms or their industries (SIC 2-digit) are connected to each politician. On the left panel, we plot the distribution of number of firms connected to each committee member in one Congress, conditional on the member receiving campaign contributions from at least one US public firms. Half of committee members are connected to more than 50 firms, and more than 10% committee members are connected to more than 100 firms. On the right panel, we plot the distribution of the industries which firms connected to members belong to. More than 50% of committee members are connected to firms from 6 different industries.

4 Empirical Analysis

4.1 Institutional Design: Committee Exile

To seek political influence, firms choose whether to make campaign contributions and whom

[17] Consistent with De Loecker et al. (2020), we find a sharp rise in average markups of the U.S. public firms during 1992-2016 as shown in Figure A2. In addition, among these firms, those with political connections have relative higher average markups and a steeper rise in markups.

to connect in congressional committees based on their firm or industry characteristics.[18] Thus, political connections between firms and committee members are correlated with many firm-level and politician-level observable and unobservable characteristics. A reverse causality issue exists: a higher markup may be both the cause and consequence of more political connections. To address this concern, we exploit exile of congressional committee members, as introduced in Grimmer and Powell (2013, 2016), as a source of quasi-exogenous variation in a firm's political connections. After a defeat of the majority party in a congressional election, committee exile happens when there are not sufficient number of slots to accommodate the returning members who win the election in their congressional districts. The reason is that the outgoing majority party is forced to relinquish power by loss of valued committee assignments for returning incumbents, and electoral losses are spread unevenly across committees.[19] Members exiled from their previous assignments may be given less-valued ones, and hence lose their political power. As a result, firms connected to the exiled members lose their connections with committees in the Congress. In Figure 7, we plot numbers of all exile cases over time in our sample period (1993-2014) at the end of each Congress,[20] omitting the Congresses without exile. The bulk of exile cases happens after a major wave election changing control of the chamber, in particular 103th Congress and 111th Congress.

4.2 Identifying Assumptions

We verify two sets of identifying assumptions to validate the exogeneity of committee exile to observable characteristics of both politicians and firms. First, we show that exiled (leaving) and non-exiled (remaining) politicians were indifferent in their political abilities measured by observed characteristics, including their funds received and number of firms connected before congressional election defeat. To verify this, we compute total campaign contributions from all firm PACs and the total number of connected firms at the member-election cycle level. Then, we regress the two variables on a dummy of an exiled member, interacted with election-cycle dummies around the exile. By doing so, we are able to compare the trends of the two variables between exiled and non-exiled members, before and after the committee exile happened.

[18] A congressional committee is a legislative sub-organization in the United States Congress that handles a specific duty, rather than the general duties of Congress. Given that committee members develop specialized knowledge of the matters under their jurisdiction, there are indeed preferential committee assignments. For example, in the House of Representatives, Ways & Means, Energy & Commerce and Appropriations Committees are recognized as more powerful compared to Rules, Veteran's Affairs and Small Business Committees, due to the essence of the issues oversighted by the committee. According to OpenSecrets, Ways & Means, Energy & Commerce and Appropriations Committees top the list of number of revolving door people profiled. See https://www.opensecrets.org/revolving/top.php?display=C&chamb=H.

[19] For any new Congress, the committee assignment process begins with the committee assignments and party ratios of the previous congress. Following the election, although new and returning members submit committee or transfer requests, the majority and minority party leaders must negotiate the committee sizes and party ratios for each committee, to reflect the majority status. Once a member has received an assignment on a committee, it is assumed that she or he will have the option to continue to serving on it.

[20] Although the timing of committee exile is displayed as the Congress of the legislators that were indeed exiled by Grimmer and Powell (2013), our paper defines committee exile as the end of the current Congress with election loss, when decisions are made.

In Panel A of Figure 8, we plot coefficients and depict 95% confidence intervals of firms connected, for both exiled and non-exiled members by election cycle. There is a parallel trend before committee exile, but a significant decrease in connected firms after, for exiled politicians compared to returning members. We obtain similar results for campaign funds received by politicians as shown in Panel B of Figure 8. The findings imply that it was very hard for firms to predict which politicians committee exiles would happen to, and firms only adjusted their campaign contributions after the committee members were reassigned.

Second, we provide evidence that firm-level markups or political connections are not associated with a firm's likelihood of experiencing committee exiles. We use balanced tests to verify that firms' exposure to committee exile is not related to observable characteristics, including sales, variable input costs, campaign contributions and total number of political connections.

Panel C verifies the second set of identifying assumptions at firm level. We plot standardized difference (t-value) of firm characteristics between firms experiencing and not experiencing committee exiles among its connected politicians, and depicts 95% confidence intervals. The four variables include ln (total amount of campaign contributions), ln (number of connected politicians), ln (variable input costs) and ln (sales). None of the differences is significantly different from zero, implying that these firm characteristics cannot predict committee exile. Taken together, our findings in Figure 8 suggest that, the exposure to committee exile at both politician and firm level is orthogonal to their observable characteristics as well as those unobservable characteristics that are related to the observable ones.

4.3 Quasi-Exogenous Variations in Firm-level Political Connections

To take advantage of committee exile at firm level, we construct a variable measuring quasi-exogenous variations in firm political connections resulted from committee exile.[21] Since committee exile happens at the end of a Congress, we define a firm-politician-election cycle level dummy variable indicating committee exile of the politician:

$$Exile_{i,p,t} = \begin{cases} 1 & \text{if pol } p \text{ receiving donations from firm } i \text{ in period } t \\ & \text{is exiled at the end of period } t. \\ 0 & \text{if pol } p \text{ receiving donations from firm } i \text{ in period } t \\ & \text{is not exiled at the end of period } t. \end{cases}$$

Then we aggregate firm i's total number of unsuccessful political connections due to committee exile at the end of election cycle t:

$$UnsuccessfulConnections_{i,t} = \sum_{p} Exile_{i,p,t}. \tag{1}$$

[21] An unsuccessful "level" of political connections will encounter endogeneity issues again because it also depends on how many committee members are connected, which are firm endogenous decisions.

Thus, firm i's "unsuccessful share" in political connections at the end of period t is measured as:[22]

$$UnsuccessfulShare_{i,t} = \frac{UnsuccessfulConnections_{i,t}}{\underbrace{PoliticalConnections_{i,t}}_{\text{"Flow" of connections firms make in election cycle } t}}. \quad (2)$$

Figure 9 plots the distribution of unsuccessful share constructed from committee exiles. Out of 5,580 firm-election cycle observations with campaign contributions to committee members, a nontrivial number of 1,179 (21.1%) observations have a positive unsuccessful share. Firms with a higher unsuccessful share were usually connected to few committee members. It is noticeable that for each firm-election cycle, it is possible to construct several measure of $UnsuccessfulShare_{i,t}$ within different groups of politicians. To begin, we include all junior committee members with less than three-year average seniority across all committees. Thereafter, we restrict the sample of committee members with filters such as those ever exiled or within important congressional committees. In the empirical analysis, we first create treatment ($Unsuccessful_{i,t} > 0$) and control groups ($Unsuccessful_{i,t} = 0$) according firm's total unsuccessful political connections to build up the causal link from political connections to market power. Then we use the continuous variable $UnsuccessfulShare_{i,t}$ to quantify the relationship in all Congresses.

4.4 Difference-in-Difference Analysis around the 111th Congress

In the 2010 midterm elections, the Republican Party won the majority in the House of Representatives. While the Democrats kept their Senate majority, the number of their seats? was reduced from the previous Congress. As shown in Figure 7, the number of committee exiles in 111th Congress was far more than that in other Congresses, which was largely unexpected. Accordingly, this particular election cycle might have stronger effects on firm outcomes compared to other election cycles with committee exiles. Therefore, our empirical analysis starts by focusing on committee exile at the end of the 111th Congress (2009-2010), after which Democratic Party unexpectedly lost many seats in the Congress. As illustrated in Figure 4, we define firms in the treatment group as those which ever donated to committee members in the 110th Congress (2007-2008), who were then exiled at the end of 111th Congress. Hence, the control group includes firm donating to committee members in the 110th Congress none of whom were exiled at the end of 111th Congress. In other words, a firm in the control group was able to build up more successful political connections than a comparable firm in the treatment group. In an diff-in-diff approach, we compare market power outcomes of firms in the treatment and control groups, before and after this event. The specification is written as:

$$Y_{i,t} = \alpha + \beta_1 Affected_i + \beta_2 POST + \beta_3 Affected_i \times POST + \boldsymbol{\theta X_{i,t-1}} + \eta_i + \epsilon_{i,t}, \quad (3)$$

[22] A lower unsuccessful share implies more successful connections built up by a firm.

where $Y_{i,t}$ are measures of firm i's ln (markup) at time t, defined as ln (sales/variable input costs $\times$ industry level scale elasticity). Then we decompose markup into sales and variable input costs to explore which channel matters more. For robustness of the results on ln (markup), we replace the dependent variable with alternative measures, including profit rates and present value of all future profits firms can bring to the shareholders, ln (market value/sales). $Affected_i$ is a dummy equal to one if firm i is in the treatment group ($Loss_{i,t} > 0$), and zero if it is in the control group ($Loss_{i,t} = 0$). $POST$ is a dummy equal to one if time t is after 111th Congress, and zero otherwise.[23] $X_{i,t-1}$ contains a series of lagged firm characteristics including ln (total sales) and ln (number of political connections), to make sure firms in the analysis are comparable in their size and level of political connections. Industry fixed effects are included and standard errors are clustered at firm level. Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. The sample is restricted within three Congresses (6 years) before and two Congresses (4 years) after the committee exile at the end of 111th Congress, and to firms with campaign contributions. The main coefficient of interest is β_3, which measures the average treatment effect of committee exile on affected firms. Following the hypothesis on the effect of successful political connections, we expect $\beta_3 < 0$ to reflect the negative effect of committee exile on market power.

Table 3 reports the estimated coefficients and standard errors of the diff-in-diff analysis of market power. As shown in column (1), firms in the treatment group experienced a relative decrease of 0.109 in the ln (markup) after the 111th Congress, compared to similar firms in the control group. For a firm with an average markup of 1.46 in the sample, this implies a 0.15 (10.2%) decrease in its markup.[24] Similar results also hold for profit rates and ln (market value/sales), though the result is only marginally significant for ln (market value/sales). These additional results imply that firms building up fewer successful political connections not only charged fewer excess profits in the current period, but also lost present value of all discounted future profits for their shareholders. Taken together, the results imply that firms experiencing committee exile in their connected politicians, or building up fewer successful political connections, lost market power and had fewer profits.

It is natural to ask whether the effects of committee exile on market power was mainly driven by relative changes in sales or relatively higher variable input costs associated with regulatory burdens. In column (2) and (3) of Table 3, we replace the dependent variable with ln (sales) and ln (variable input costs) respectively. After committee exile, firms with fewer successful political connections (treatment group) had relatively significantly higher total costs, but the coefficient for sales is insignificantly positive. The results imply that firms building up fewer successful connections had relatively higher variable input costs while relative decrease in their sales was not very large. In other words, firms with more successful political connections were able to exempt themselves from higher marginal production costs associated with regulatory burdens.

[23] We omit time fixed effects because they are the coefficients of the base group interacted with time.

[24] This is computed as exp(0.378) - exp(0.378-0.109)

To further explore the dynamic treatment effects over time, we replace the $POST$ dummy with a series of election cycle dummies before and after the 111th Congress and run Equation 3 in an event study approach. The event study results in Panel B of Table 3 confirm our standard diff-in-diff analysis, with parallel trends before the committee exile. For graphical illustration, we plot the coefficients and 95% confidence intervals of the event estimation results in Figure 10-12. With parallel trends before committee exile, the effects lasted for at least two election cycles (4 years). To understand whether the effects are driven by firms in the treatment or control groups, we plot levels of coefficients and 95% confidence intervals for ln (markup) of two groups separately in Panel B of Table 10. The results show that firms that were able to build up more political connections (control group) experienced a relative larger increase in markups. They also had a relative larger decrease in their variable input costs.

4.5 All Election Cycles

After confirming the effect of the mass committee exile at the end of the 111th Congress, we study the effect of committee exiles of all election cycles from 103rd to 113th Congresses (1993-2014) with a continuous measure of firm exposure. We regress market power variables on $UnsuccessfulShare_{i,t}$ defined by Equation 2, i.e., share of unsuccessful connections among all political connections due to committee exile. By doing so, we are able to (i) study whether committee exiles have such similar effects on market power across all election cycles, and (ii) quantify the magnitude of how unsuccessful political connections affects market power on average. We employ the following specification:

$$Y_{i,t} = \alpha + \beta UnsuccessfulShare_{i,t-1} + \boldsymbol{\theta X_{i,t-1}} + \delta_i + \gamma_t + \epsilon_{i,t}. \tag{4}$$

where $Y_{i,t}$ is a variable related to market power of the firm i in election cycle t. Similar to previous analysis, we first use ln (markup) and then replace it with alternative measures including ln (market value/sales), profit rate, ln (sales) and ln (variable input costs). $UnsuccessfulShare_{i,t-1}$ is the share of unsuccessful political connections measured by Equation 2 in election cycle $t-1$. Firm-level lagged controls $X_{i,t-1}$ include ln (total sales) and ln (total number of political connections). We also include firm and election cycle fixed effects control for unobserved time-invariant firm characteristics as well as the effects of aggregate shocks. Standard errors are clustered at firm level. For robustness, we also alternatively include industry-election cycle as well as state-election cycle fixed effects to control for industry-level or state-level shocks. Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. The sample is restricted to firms with campaign contributions during 103rd-113th Congresses. The main coefficient of interest is β estimating the average effect of unsuccessful political connections on firm outcomes. We expect $\beta < 0$ for market power and profit rate measures as the dependent variables, and $\beta > 0$ for variable input costs. In other words, our main hypothesis is that firms with fewer success-

ful political connections experienced a relative decrease in market power. At the same time, firms with more successful connections had a relative increase in market power by escaping regulations.

Table 4 reports the estimated coefficients and standard errors of the baseline regression results. Consistent with our hypothesis, as shown in column (1), a 10% higher unsuccessful share of political connections leads to a significantly decrease in ln (markup) by 0.78%. Although the unsuccessful share does not have significant effects on total sales, variable input costs or market value/sales in column (2)-(4), the signs of coefficients are consistent with our hypothesis. At the same time, the results on profit rates in column (5) suggest that fewer successful political connections lead to a relative larger decline in profit rates driven by regulatory burdens. For a firm with average markup in the regression sample ($\sim$1.41), a one-standard-deviation decrease of unsuccessful share ($\sim$10%) leads to 1.09 percentage points decrease in markups.[25] Similarly, this effect is 0.54 percentage point for profit rates.

Alternatively, we also measure firms' exposure to committee exile with levels of exiled and non-exiled political connections with committee members. We replace $UnsuccessfulShare_{i,t}$ with the ln ($UnsuccessfulConn_{i,t}$) (exiled political connections) and ln ($PoliticalConnections_{i,t} - UnsuccessfulConn_{i,t}$), i.e., successful political connections, in Equation 2, to estimate the effects of successful and unsuccessful political connections on firm outcomes. We expect that non-exiled committee members led to an increase in markups while exiled ones did not have any effects. Table 8 reports the estimation results of levels of political connections. Column (1) verifies our hypothesis, which is also consistent with the diff-in-diff results that firms with more successful political connections had a relatively larger increase in markups.

4.6 Is the Effect Driven by Party Loss?

Most of exiled committee members were Democrats, after the Republican Party won the majority, as shown in Figure 7. Therefore, a natural concern is that our main results were driven by party loss instead of unsuccessful connections with committee members in an election cycle. In other words, firms experienced a relative decrease in their market power because they bet the wrong party, not the exiled politicians. To address this issue, we restrict the subset of firms within those donating to more junior Democrats than Republicans. These firms had a "Democratic Partisanship" and were more likely to acquire information or resources from Democrats, with more comparable exposure to the election loss of Democratic Party.

We report the estimation results in Table 5. For firms with Democratic partisanship, the coefficients of $UnsuccessfulShare$ on ln (markup), profit rate and ln (COGS) are consistent with and larger than the baseline results in Table 4. These results confirm our findings that among firms connected to more Democrats, fewer successful connections also leads to a relative decrease in markups and profit rates, and a relative increase in firm production costs. In addition, more unsuccessful connections to Democrats led to a larger effect on firm outcomes.

[25] Markups can be computed as exp(.34-.078*0.1) - exp(0.34).

Our findings imply that, although firms tended to donate to both Democrats and Republicans at the same time, compared to Republicans, Democrats on average might be able to reward firms more through preferential treatments in regulations.

4.7 Selection of Committee Members

Up to now, our empirical analysis has been focusing on the sample of junior committee members, who almost equally likely to be exiled. However, even among these junior members, there might be variations in their influence, depending on importance of their assigned committees or the terms of their assignments. In this section, we provide evidence on how the above two factors may affect our main results.

To analyze the effects of political connections to more important committee members, we classify committee members as "important" if they have assignments in Ways and Means (tax-writing), Appropriations (passing appropriation bills and regulate expenditures of money by the government), Energy and Commerce (legislative oversight relating to telecommunications, consumer protection, food and drug safety, public health, air quality and environmental health, the supply and delivery of energy, and interstate and foreign commerce), or Oversight and Accountability Committee (main investigative committee) in the House.[26] These committees have also been proved to be the most powerful ones in terms of their committee expenditures, join-to-leave ratios or number of revolving door people profiled.[27][28]

Table 6 reports the estimation results of the effects of political connections to important committees. The coefficients for ln (markup) and profit rate in column (1) and (5) are still significantly negative. Compared to Table 4, the magnitudes are slightly smaller but not significantly different. This result implies that a junior member with an assignment in an important committee did not have a larger effect on her connected firms' market power, compared to one without. The effect could be driven by potentially higher competition for these important committee members. In other words, they might provide lower average support for firms, compared to members in less important committees but connected to less firms. It it noticeable that if we compare the number of observations of Table 6 and Table 4, 92.4% (4,216 out of 4,564) of junior committee members in the regression sample had assignments in the important committees we specify. This is due to the fact that exiles were also more likely happen to members in important committees.

Regarding the sample of politicians, the selection criteria of junior politicians is one to three terms (two to six years) in the baseline results. As a robustness check, we restrict the sample

[26] These committees may have different names historically. For example, the Committee on Energy and Commerce had been renamed as "Commerce" during 104th-106th Congresses. The Committee on Oversight and Accountability had been renamed as "Government Operations" in 103th Congress, "Government Reform and Oversight" during 104th-105th Congresses, "Government Reform" during 106th-109th Congresses, "Oversight and Government Reform" during 110th-115th Congresses and "Oversight and Reform" during 116th-117th Congresses.

[27] https://www.theatlantic.com/politics/archive/2014/06/here-are-americas-most-wanted-house-committee-chairmen/455682/

[28] https://www.opensecrets.org/revolving/top.php?display=C&chamb=H

to committee members who had only one term (two years) in all committees, and were equally likely to be exiled in a congressional defeat. Correspondingly, we generate $UnsuccessfulShare$ variable according to Equation 2 with this restrictive set of politicians. We repeat the regression of Equation 4 to study the effect of political connections with one-term committee members on firm outcomes.

Table 7 reports the estimation results of the effects of political connections to one-term committee members. 88.9% (4,057/4,564) of firms have donated to one-term committee members in our sample and the coefficients of ln (markup) and profit rate are significantly negative. The magnitudes are marginally larger then baseline results in Table 4. One possible explanation is that these "truly marginal" committee members were connected to fewer firms compared to other junior members, and were more likely to provide advantageous information or resources to their connected firms.

5 Channels and Other Firm Strategies

5.1 Procurement Contracts

Political Connections can essentially alter affect government policy-making and resources allocation process in a number of ways. For example, Brogaard et al. (2020) show the effect of political connections on the probability of the renegotiation of existing government contracts. Choi et al. (2021) provide evidence on the effect of political connections on government spending and hence on job creation. We explore whether committee exile might have impacts on firms' exercised value of government procurement contracts. To do so, we replace the dependent variable in Equation 3 as ln (procurement value exercised), and estimate the diff-in-diff regression. As shown in Table 9, overall, we find a negative but insignificant effect of political connections on firms' exercised procurement value for all firms with positive campaign contributions. However, when we restrict the sample to firms with above median political connections (> 15), as shown in Column (2), firms with more successful political connections experienced a relatively larger increase in their exercised value of government procurement contracts.

5.2 Other Firm Strategies

Apart from the effects on market power, the institutional setting of our identification strategy can also be used in a wider range of studies on firm behaviors and strategies. To do so, we replace the dependent variable in Equation 3 with other firm outcomes and estimate the effects of committee exile on other firm strategies. In particular, we focus on the following four variable: employment, dividends to shareholders, investment rate, and effective tax rates. Political connected firms may grab more market shares and grow more in revenues and employment. Dividends and investment rate, at the same time, may reflect the trade-off between distributions

of current profits to shareholders and investment in potential growth opportunities in the future. Given financial and resource constraints, a firm may compete for good investment opportunities by reducing in its distributions to shareholders. Lastly, as important determinants of profits, the tax benefits of political spending and activities have also been studied in Richter et al. (2009). To policy makers, the effective tax rate is particularly important because it provides evidence of corporate tax provisions and incentives.[29] A higher tax rate implies lower profits.

Table 10 reports the estimation results of other firm strategies after committee exile. First, we find that there was a relative shrinkage in employment for unsuccessful firms, consistent with the findings by Akcigit et al. (2022). Political connections helped successfully connected firms to preempt competition with their competitors and thus grew more in labor. Second, they distributed more dividends to shareholders, potentially driven by insignificantly fewer investment opportunities. Third, these firms paid a higher effective tax rates, which is also consistent with our main results on profit rates.

6 State-Sector Level Evidence: Measures of Concentration

So far we have documented the causal effects of individual firm political connections on market power and other firm-level outcomes. In this section, we provide state-sector evidence of the relationships between market concentration and concentration of political power. Our measures of concentration are based on Herfindahl-Hirschman index (HHI), defined at the state-sector (two-digit SIC codes)-election cycle level. We use total sales or employment to compute market concentration. For concentration of political power, we use levels of political connections or total political expenditures, which include the sum of campaign contributions and lobbying expenditures. We estimate the following OLS regressions:

$$CONC_{Market,sjt} = \alpha + \beta CONC_{PP,sjt} + \eta_t + \delta_{sj} + u_{sjt}, \tag{5}$$

where $CONC_{Ind,sjt}$ is market concentration and $CONC_{PP,sjt}$ is concentration of political power at the level of state s-sector j-election cycle t. η_t and δ_{sj} are time and state-sector fixed effects, respectively, Standard errors u_{sjt} are clustered at the state-sector level.

Table 11 reports estimate coefficients β from Equation 5. As shown in columns (1)-(4), there is a significantly positive relationship between market concentration and political power concentration, confirmed with alternative measures of both. These relationships are statistically significant at 1% level. The results imply (i) for markets with higher political power concentration, they were more likely to have higher market concentration, and (ii) there was a reallocation of market shares to firms with more political power as well as a reallocation of firm resources to political expenditures.

[29] In the definition of effective taxed, deferred portion of tax is excluded concerning corporate tax burdens, and global taxes are includes because it may be problematic to separate domestic and foreign taxes for large public firms. For the denominator, we use EBIT (earnings before interest expenses and taxes) to measure the book income before interests and taxes.

To understand how this relationship varies across sectors, we estimate Equation 5 for each sector and report coefficients and standard errors in Table 12. The positive relationship between market concentration and concentration of political power holds in all sectors, with statistical significance at 1% levels. In particular, this magnitude is exceptionally larger for firms in the finance sector, followed by the transportation and utility sectors, and the wholesale sector.

7 A Theoretical Framework

Motivated by the above empirical evidence, we develop a model with firms' competition and political connections and demonstrate how political connections affect market power. The model incorporates both competition for political influence from Grossman and Helpman (1994) and Cowgill et al. (2022), and competition for market shares from Atkeson and Burstein (2008). In the model, political connections help firms escape the regulatory burden and avoid the wedge that increases marginal production costs, following previous literature (Restuccia and Rogerson, 2008; Hsieh and Klenow, 2009; Garicano et al., 2016; Akcigit et al., 2022).

7.1 Environment

Time is discrete. There are three types of agents: households, firms and a policymaker.[30] Households are identical and normalized to one. They consume goods, supply labor inelastically, and trade shares in a representative portfolio of all firms in the economy which pay dividends. There is a continuum of markets indexed $j \in [0,1]$ and each market contains M potential entrants. Firms are heterogeneous in productivity z_{ij}, and the production technology is linear in labor such that $y_{ij} = z_{ij} n_{ij}$. The wage of each unit of labor is W and hence the cost of per unit of goods is $\frac{W}{z_{ij}}$. We assume there is regulatory burden, which imposes a wedge $\tau > 1$ that increases marginal cost of per unit of good from $\frac{W}{z_{ij}}$ to $\frac{\tau W}{z_{ij}}$.[31]

Policymaker. The policymaker receives firm-level transfers t_{ij} and assigns a set of firm-specific policies $\mathcal{P} = \{F_{ij}\}_{i \in M, j \in J}$ at a social cost $w(\mathcal{P})$. The transfers can be seen as a firm's political expenditures to build up enough connections or to lobby for congressional bills, and F_{ij} is the probability of successfully obtaining the political connections and escaping regulations. If a firm is lucky to successfully build up the political connections, it can avoid the wedge τ. In particular, τ can be seen an additional wedge imposed on products or services in the industry, such as the cost of processing hydraulic fracking fluids, exemplified by the previous section.[32]

[30] There is no capital accumulation or adjustment costs. Without aggregate shock, time subscripts can be dropped and the firm's static problem will eventually maximize its utility in infinite time horizon.

[31] In equilibrium, $M_j < M$ firms choose to enter the market and produce if fixed cost $\phi > 0$, which are indexed as $i \in \mathcal{I} = \{1, ..., M_j\}$. In this paper, we abstract from firm entry and assume all firms will enter the market $M_j = M$, and we will discuss the role of firm entry in the future as an extension.

[32] Apart from our example of "Halliburton Loophole", Kang (2015) provides the policy example of the financial industry bailout bill (H.R. 1424) including solar energy tax provision. A more recent example is the Transparency, Accountability, Permitting and Production of (TAPP) American Resources Act, which removed the regulatory burden impeding energy companies from easily obtaining permits for pipelines and for oil, gas, and coal drilling.

The policymaker's objective is to maximize (i) total profits made by firms, plus (ii) the total political contributions from firms.[33] At the same time, the policymaker incurs a social cost by deviating from the optimal policy or voters' dis-preferences to such suboptimal policies. Such a "social" cost can be the "political" cost for her re-election probability or as in the Halliburton example, the environment cost of the exemption. Hence, the policymaker chooses F_i by solving the problem:

$$\max_{\mathcal{P}=\{F_{ij}\}_{i\in M,j\in J}} \int_j \Big(\sum_i t_{ij}(\mathcal{P}) + \sum_i \big(\mathbb{E}_i \pi_{ij}(\mathcal{P}) - t_{ij}(\mathcal{P})\big) + w(\mathcal{P})\Big) dj,$$

where the social cost $w(\mathcal{P})$ can take the reduced form of

$$w(\mathcal{P}) = -\beta \int_j \sum_i F_{ij}^{\alpha} dj,$$

with β as the weights on the social costs.[34]

Households. Households discount the future at rate γ, choose consumption of each good c_{ij} and supply labor subject to a disutility of work. The utility of consumption of the differentiated final goods is the double constant elasticity of substitution (CES) aggregator of consumption utility, from goods within markets and across the continuum of markets (Atkeson and Burstein, 2008). There is a cross-market elasticity of demand $\theta > 1$, and within-sector elasticity of demand $\eta > 1$. We assume $\eta > \theta$, implying that households are more willing to substitute goods within each market than across markets. Thus, a household's problem is:

$$\max_{\{c_{ij}\}_{i\in M,j\in J},N} C - \bar{\psi}^{-\frac{1}{\psi}} \frac{N^{1+\frac{1}{\psi}}}{1+\frac{1}{\psi}}, \quad s.t. \quad C = \Big(\int_{j=0}^{1} c_j^{\frac{\theta}{\theta-1}} dj \Big)^{\frac{\theta-1}{\theta}}, c_j = \Big(\sum_{i=0}^{1} c_{ij}^{\frac{\eta}{\eta-1}} \Big)^{\frac{\eta-1}{\eta}}.$$

Households do not save, and consume their income in each period. We denote Π as firm profits net of political contributions. Households receive after-tax labor income W, the net profits of firms $\Pi - T_f$ where T_f is the total transfers by the firms, as well as the total transfers received by the policymaker T_p. Therefore, their budget constraint is given by:

$$\int_0^1 \sum_{i\in M} p_{ij} c_{ij} dj \leq Z = WN + \Pi - T_f + T_p.$$

Timing. There are two steps in each period. At the beginning of each period, productivity z_{ij} for all firms in each sector are realized. In the first step, given the productivity, firms play the political game with the policymaker. After firms choose the transfer t_{ij} and the policymaker chooses the set of policies $\mathcal{P}$, the relaxation of regulatory burden is realized following the

[33] In this paper, we simplify the problem by assuming a weight of one in firms' total profits.

[34] Note that similar to the firm profits, to simplify the model, we assume the total transfer received by the policymaker $T_p = \int_j \sum_i t_{ij} dj$ will be equally split by the household.

probability determined by the policies. In the second step, firms produce goods and pay wages. Once policies $\mathcal{P}$ are realized, firms' production only depends on their own and competitors' productivity. Firms' decisions made in the first step rely on the expectations of outcomes in the second step. Details of the backward induction are explained in Appendix B.3.

Equilibrium. The equilibrium is characterized in Proposition 1 in Appendix B.1.

7.2 Model Predictions

We discuss four main predictions generated by the model. Based on the model setup, firms that successfully build up the political connections can escape the regulatory burden and therefore grab more market shares, though they do not necessarily grow in productivity.

Prediction 1 Political connections are associated with higher markups and higher profit rates.

A two-firm (within each sub-market) case of Prediction 1 is proved in Appendix B.5. The intuition is that, with Cournot competition, firms that produce more efficiently get more customers and a higher market share. These firms have higher residual demand elasticity and thus steeper residual demand. Then, they are able to set higher markups and have higher profit rates.

Prediction 2 More profitable firms make more transfers and are more likely to escape the regulatory burden.

Proposition 2 matches with Figure 1. That is, large firms build up more political connections. More productive firms get a higher market share and higher profit rates. Their profits increase more by escaping the regulation. On the other hand, they lose more if the policymaker give better policies to the other firms. Therefore, more profitable firms make more transfers and in turn, they get better policies and are more likely to escape the burden.

Prediction 3 Heavier regulation burden ($\uparrow \tau$) lead to more transfers to the policymaker, especially from large firms. This drives a higher product market concentration and a lower labor share of income.

When the regulation burden is heavier, firms can become even more profitable if they can escape it via political connections. Hence, more profitable firms make more transfers, are more likely to escape it, and grab even more market share. Importantly, higher market power immediately leads to lower expenditures on inputs such as labor. Thus, heavier regulatory burden ends up in a higher concentration of political connections among the profitable firms, a higher product market concentration, and a lower aggregate labor share of income.

Prediction 4 A higher social cost for the policymaker ($\uparrow \beta$) leads to less distorted policies,

a lower product market concentration and a higher labor share of income.

The higher β, the more costly for the policymaker to set policies that favor specific firms. Hence, the policymaker chooses policies that are less distorted towards the profitable firms, which will be more likely to cut their transfers to the policymaker. Thus, a less distorted set of policies leads to more competition for market shares, a relatively lower product market concentration, and a higher aggregate labor share of income.

In Panel C of Table 13, we display a summary on how primitives of the model affect firm strategies and aggregate equilibrium.[35] Our model demonstrates the effect of firms' competition for political influence on their competition for market share, where political connections help firms escape the wedge. In addition to market power, our model also highlights the effects of political connections among the large and profitable firms on the labor share of income.

8 Conclusion

In this paper, we study the causal effects of politics on market power in the United States, with both a new identification strategy and a simple theoretical framework. We showed that political connections with Congressional committee members could drive the increasing market power of large firms. Importantly, we revealed a new mechanism of politics driving market power, that is, the exemption of regulatory burdens that might impose a wedge on marginal production costs. In particular, political connections with committee members could affect the oversights and outcomes of regulations, and be used by firms to escape regulations. At state-sector level, we find a positive relationship between market concentration in sales or employment, and concentration of political power measured by political connections or total political expenditures. Such a relationship implies not only an across-firm reallocation of market shares to politically connected firms, but also a reallocation of firm resources to political expenditures within these firms. Building upon the seminal discussions on causes and consequences of market power, our paper shows the role of politics in driving the rise of market power and distorting competition.

[35] We focus on three parameters: firm productivity dispersion σ_z, the wedge imposed by regulatory burden τ and the slope of the social cost to policies β. We also show in Panel A and B of Figure 14, given a set of parameters, the change of policies and political contributions in response to the changes in σ_z, τ and β. In Panel C and D of Figure 14, we plot the level of markups and the variation in markups within markets in response to the changes in the three parameters. A more detailed discussion is shown in Appendix B.6.

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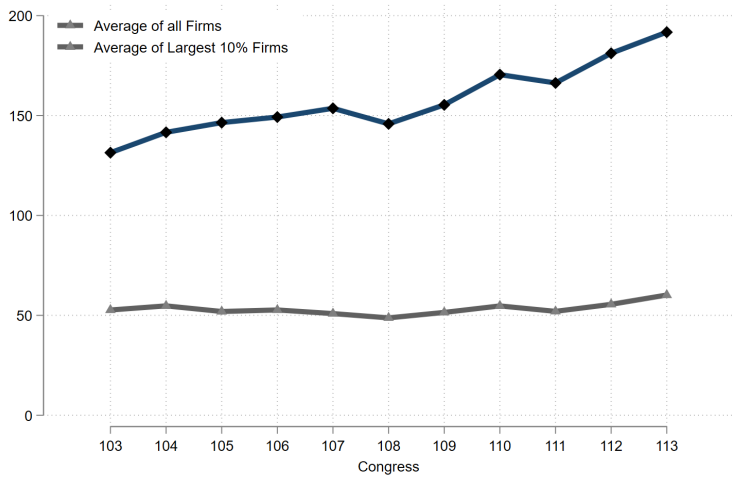
Figures and Tables

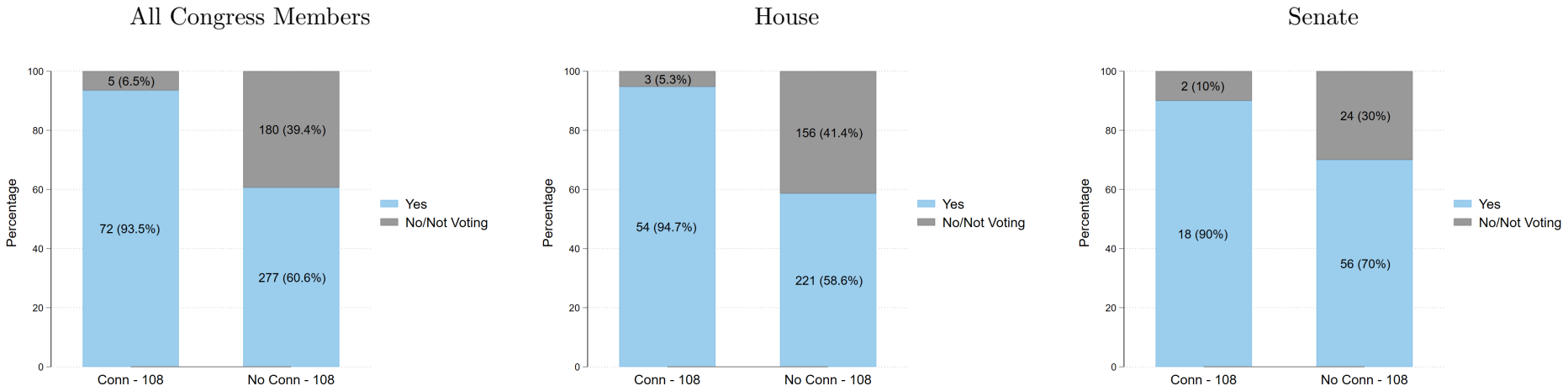
Figure 1: Levels of Poitical Connections over 1993-2014



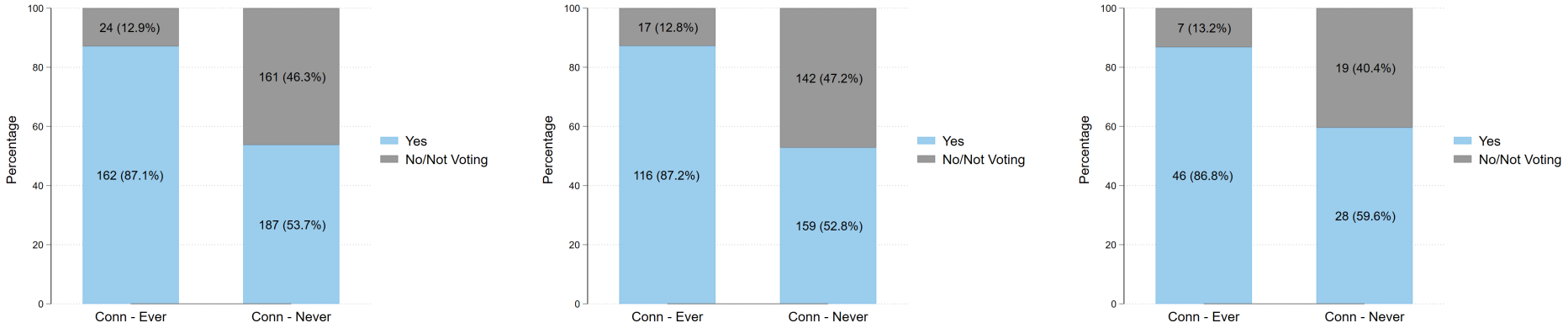
Notes: This figure plots the average levels of firms' political connections to committee members over time. We plot the series for the average of both all firms and firms in the top 10% of sales. The sample is restricted to firms with non-zero campaign contributions to committee members.

Figure 2: Congress Member Votes and Political Connections with Halliburton - Energy Policy Act of 2005

Panel A: Distribution of Votes by Political Connections in the 108th Congress

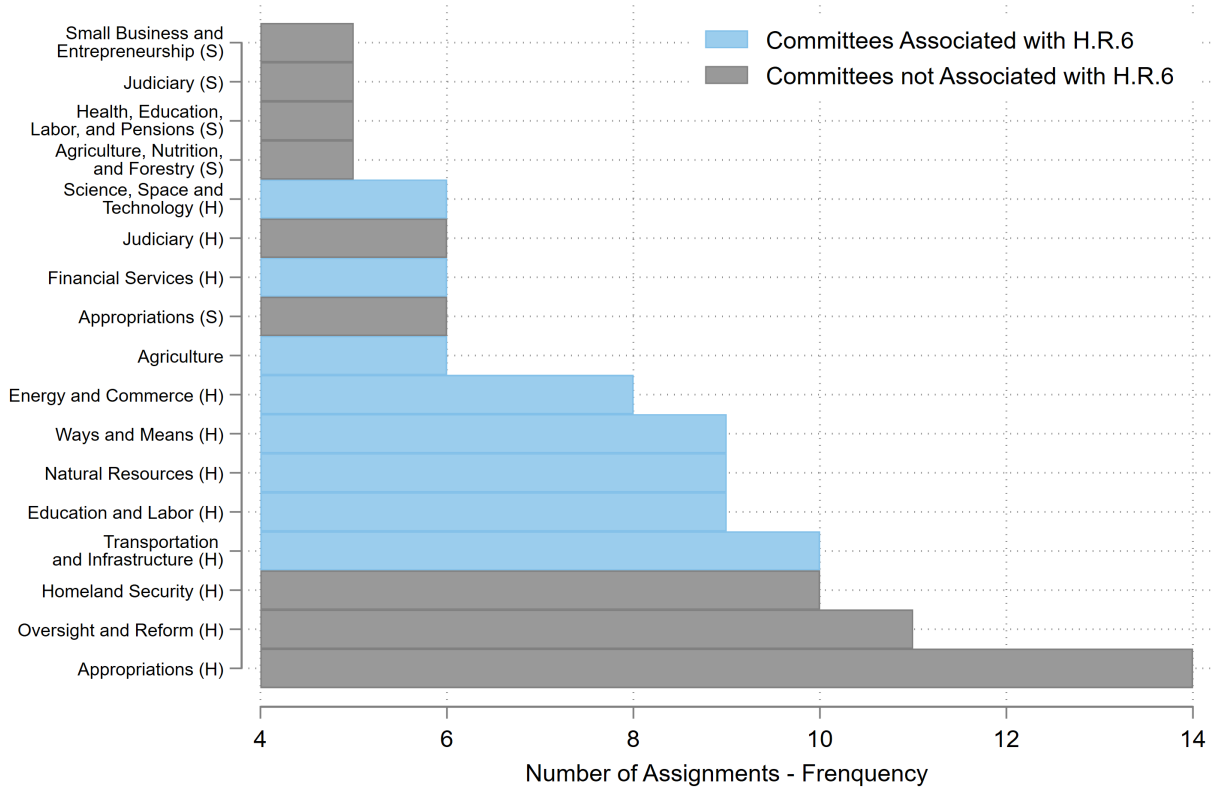


Panel B: Distribution of Votes by Political Connections during 103rd-108th Congresses



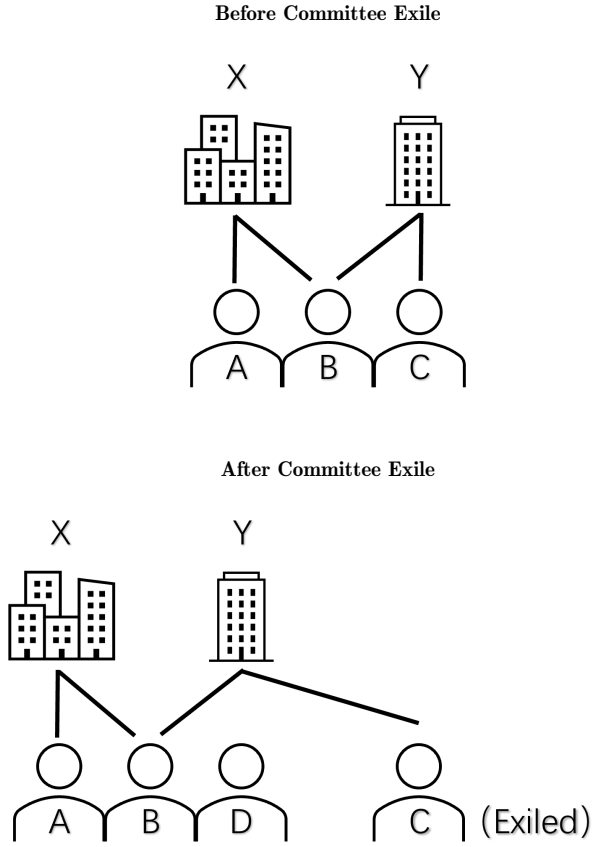
Notes: This figure plots the distribution of roll call vote on the conference report for the Energy Policy Act of 2005 in the 109th Congress, among Congress members with and without political connections with Halliburton. In both Panels, we plot the percentage of "Yes" and "No/Not Voting" by members who received campaign contributions from Halliburton, for all Congress members, House and Senate respectively from left to the right. Panel A restricts the sample of members with Halliburton campaign contributions only in the 108th Congress, and Panel B with any Halliburton campaign contributions until the 108th Congress. Voting rates and numbers for "Yes" and "No/Not Voting" are also displayed in both panels.

Figure 3: Committee Assignments of Politicians Connected to Halliburton



Notes: This figure plots the distribution of committee assignments among 77 Congress members with campaign contributions from Halliburton in the 108th Congress. Each member may have assignments in multiple committees at the same time. Eight House committees associated with H.R.6 (the Energy Policy Act of 2005) are displayed in blue bars, accounting for 38 members. committees not associated with H.R.6 are displayed in gray bars. The sample is restricted within committees with at least 5 committee members connected to Halliburton via campaign contributions.

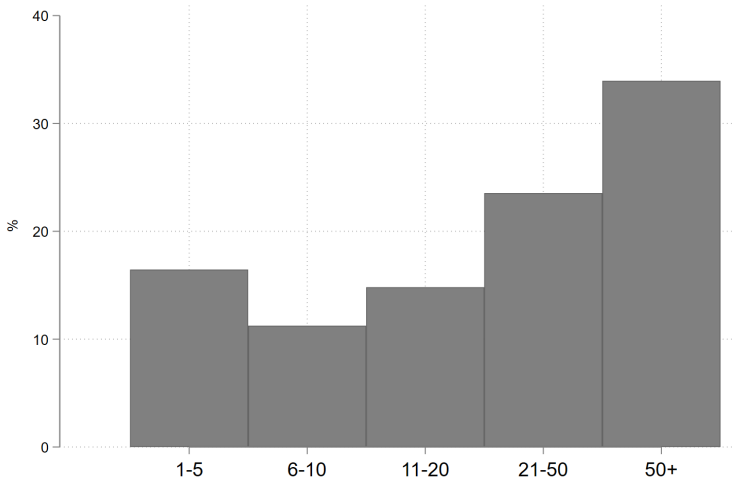
Figure 4: Identification - A Graphical Illustration



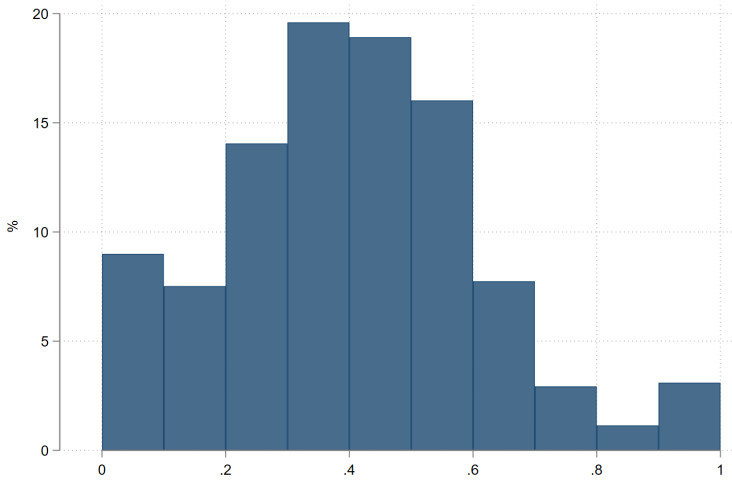
Notes: This figure illustrates the identification strategy with committee exile. There are two firms and four politicians. Politician C is exiled after the congressional defeat but politician A and B are not. Firm X connected to politician A and B builds up more successful political connections to members in this committee. However, since politician C is not in the committee any more, firm Y previously connected to politician C builds up only one successful political connection to politician B. In other words, firm Y keeps 50% of all political connections made in the last period with members in the committee.

Figure 5: Firm Level Political Connections with Committee Members

Panel A: Distribution of Connected Members to a Firm



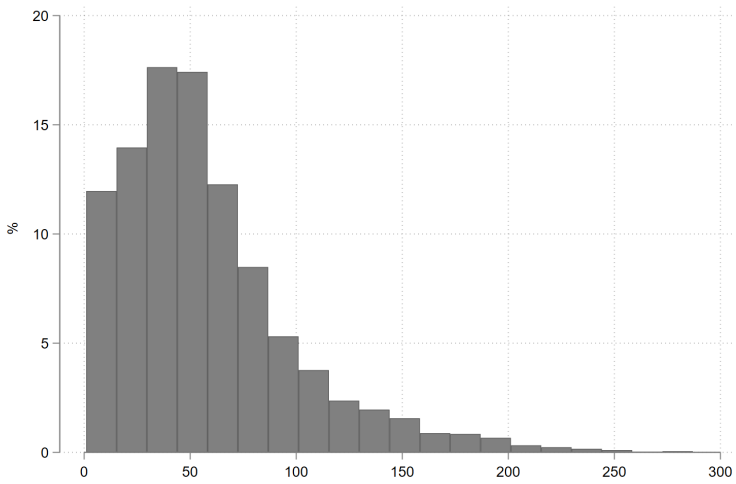
Panel B: Ratio of Democrats Connected to a Firm



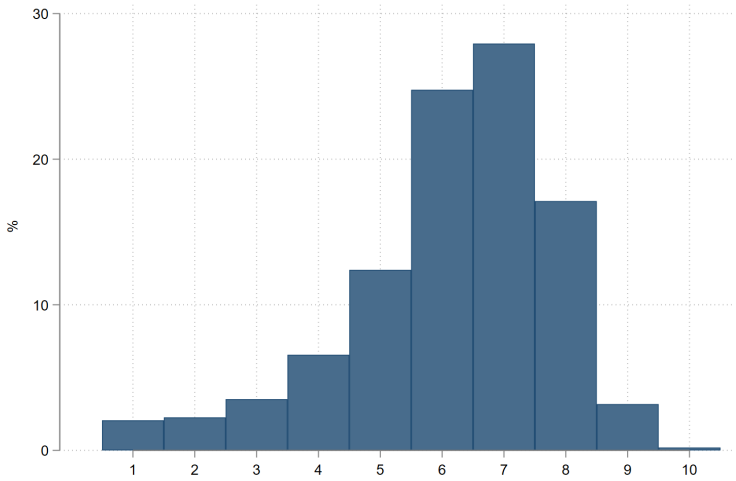
Notes: This figure shows patterns of firm-level political connections to all committee members (junior + senior) in each election cycle (two years). Panel A plots the distribution of number of connected members. Panel B plots the ratio of connected Democrats over all members. All the numbers are conditional on firm PAC's non-missing campaign contributions to congressional committee members, which is around 28.6% in the sample.

Figure 6: Committee-Member Level Political Connections with Firms

Panel A: Distribution of Connected Firms to a Politician

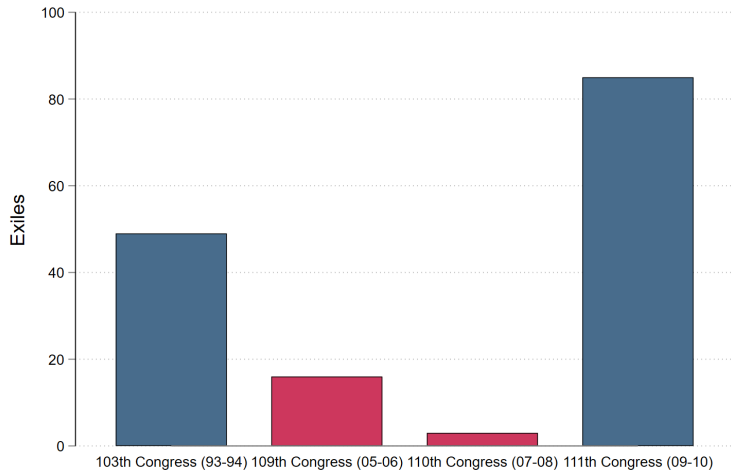


Panel B: Distribution of Connected Industries to a Politician



Notes: This figure shows patterns of committee-member-level political connections in each election cycle (two years), conditional on members with connections to firms. (94.8% of all congressional committee members) Panel A plots the distribution of number of firms connected to each politician. Panel B plots the distribution of number of SIC 2-digit industries connected to each politician.

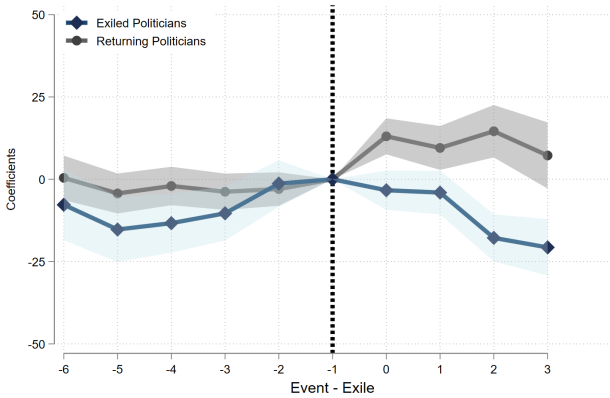
Figure 7: Committee Exile: Number of Cases over 1993-2014



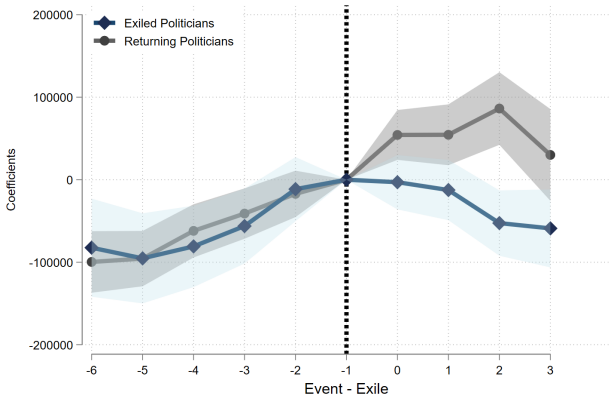
Notes: This figure plots the number of exile cases at the end of each election cycle in our sample period (1993-2014), omitting the Congresses without exile. Red bars denote exiled Republicans and blue bar denote exiled Democrats. The numbers of committee exiles are 49, 16, 3 and 85 in the four Congresses, respectively.

Figure 8: Identifying Assumptions

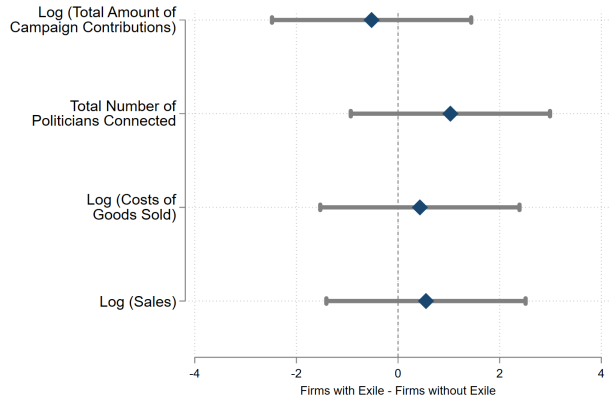
Panel A: Number of Firms Connected to Exiled and Returning Politicians



Panel B: Funds Raised from Firms by Exiled and Returning Politicians

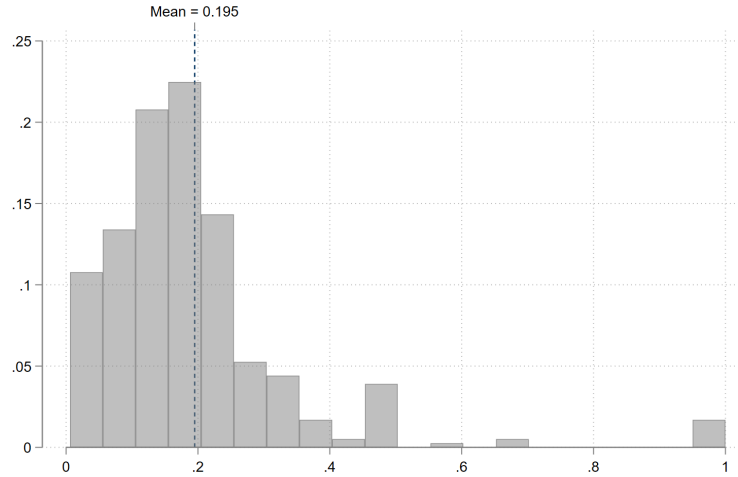


Panel C: Characteristics of Firms with or without Exiled Political Connections



Notes: This figure verifies the identifying assumptions of the empirical strategy. In Panel A, we regress number of firms connected on the interaction between dummy of exile and time dummies before and after exile, at member-election cycle level. We plot estimated coefficients and depict 95% confidence intervals of connections to exiled and returning politicians before and after the committee exile. In Panel B, we implement the same method as in Panel A but replace the dependent variable with campaign funds raised from public firms by each committee member. In Panel C, we regress firm characteristics on a dummy indicating whether the firm has donated to exiled committee members. We plot standardized difference (t-value) and depicts 95% confidence intervals of ln (sales), ln (costs of goods sold), total number of political connections and ln (total campaign contributions), between firms experiencing and not experiencing committee exile.

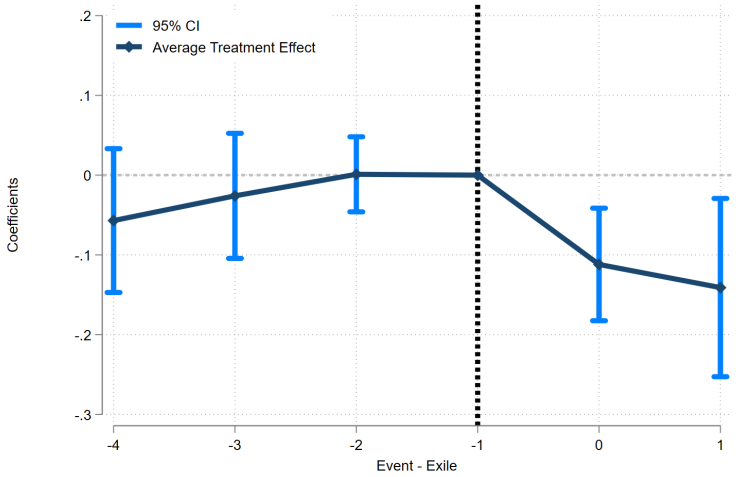
Figure 9: Distribution of the Share of Unsuccessful Connections



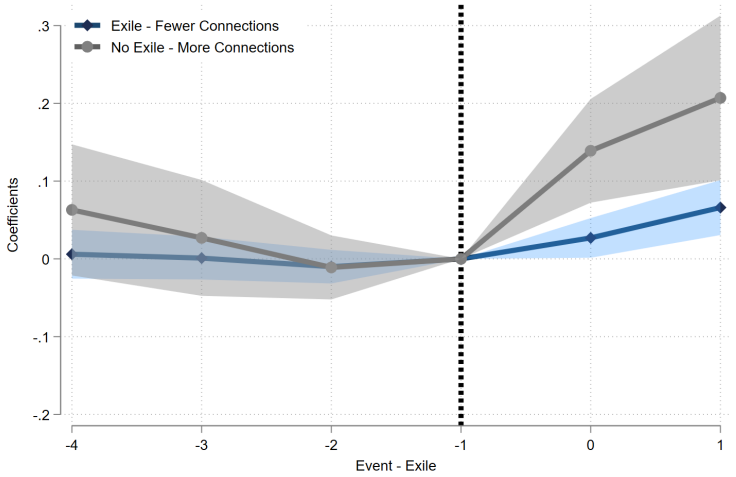
Notes: This figure plots the distribution of the share of unsuccessful connections constructed from committee exiles in Equation 2 among junior committee members (average seniority in all committee assignments$\leq$3). Conditional on connections with committee members via campaign contributions, 21.1% (1,190 out of 5,638 firm-election cycle observations) have experienced committee exile.

Figure 10: Event Study around the 111th Congress - ln (Markup)

Panel A: Treatment Effect



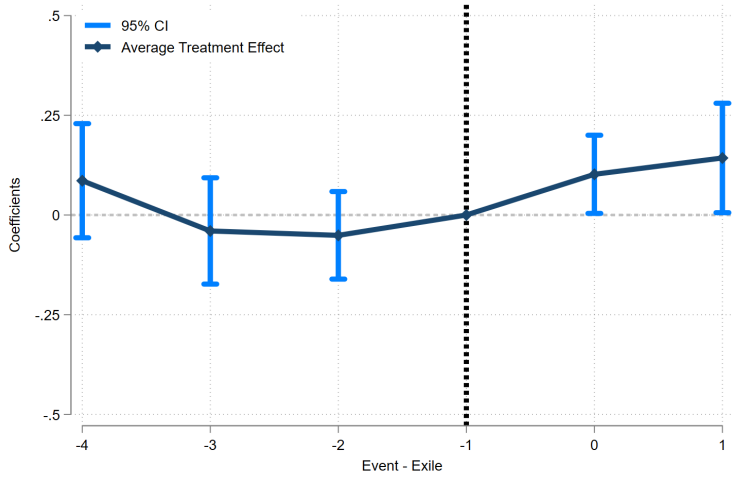
Panel B: Treatment vs Control Groups



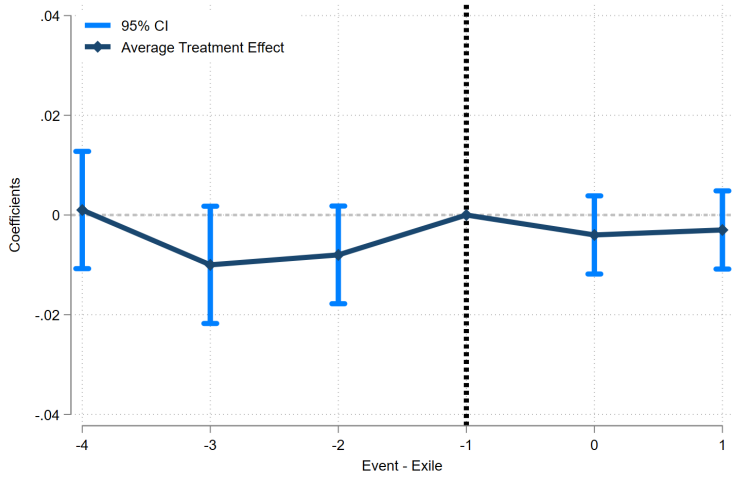
Notes: This figure plots estimated coefficients and depicts 95% CI of ln (markup) in the event study format of Equation 3. Firms are divided into with or without unsuccessful political connections (due to committee exile) at the end of the 111th Congress. In Panel A we plot the treatment effects over time. In Panel B we plot levels of coefficients and the standard errors of treatment and control groups. Firm level controls include lagged ln (sales) and ln (number of political connections). Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Industry fixed effects are included and standard errors are clustered at the firm level.

Figure 11: Event Study around the 111th Congress - Variable Input Costs and Sales

Panel A: Variable Input Costs



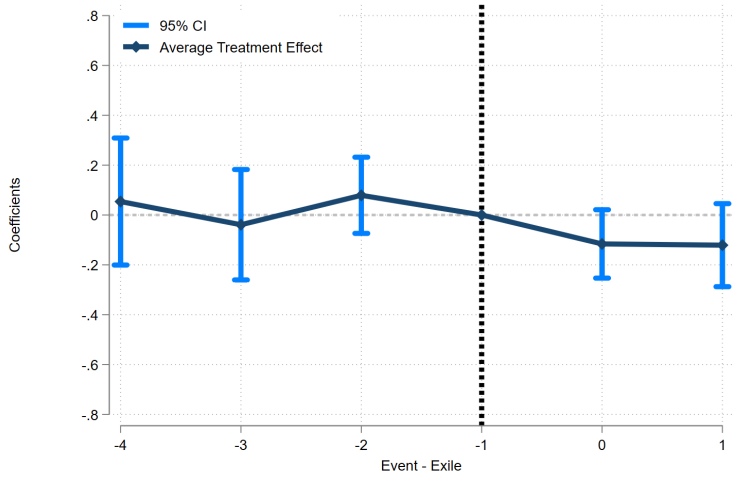
Panel B: Sales



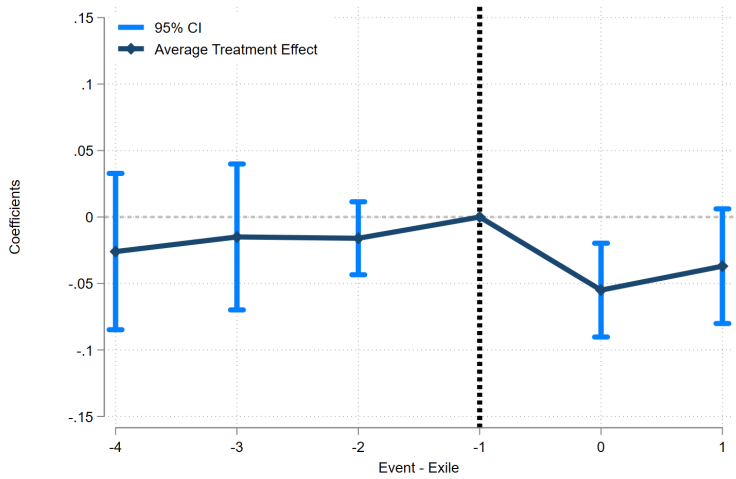
Notes: This figure plots estimated coefficients and depicts 95% CI in the event study format of Equation 3. Firms are divided into with or without unsuccessful political connections at the end of the 111th Congress. In Panel A the dependent variable is ln (variable input costs), and in Panel B the dependent variable is ln (sales). Firm level controls include lagged ln (sales) and ln (number of political connections). Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Industry fixed effects are included and standard errors are clustered at the firm level.

Figure 12: Event Study around the 112th Congress - Other Market Power Measures

Panel A: Market Value/Sales

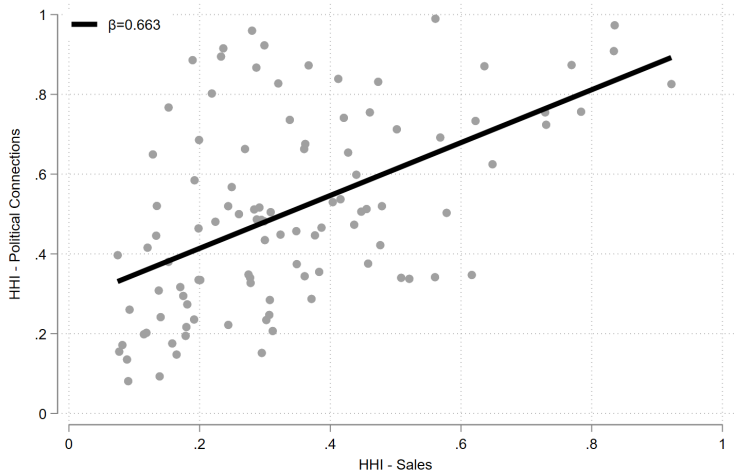


Panel B: Profit Rate



Notes: This figure plots estimated coefficients and depicts 95% CI in the event study format of Equation 3. Firms are divided into with or without unsuccessful political connections at the end of the 111th Congress. In Panel A the dependent variable is ln (market value/sales), and in Panel B the dependent variable is profit rate. Firm level controls include ln (sales) and ln (number of political connections). Firm-level cost shares (COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Industry fixed effects are included and standard errors are clustered at the firm level.

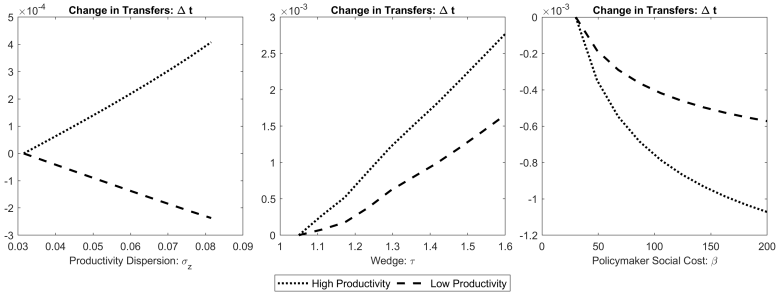
Figure 13: Relationship between HHI of Political Connections and Sales in the 112th Congress



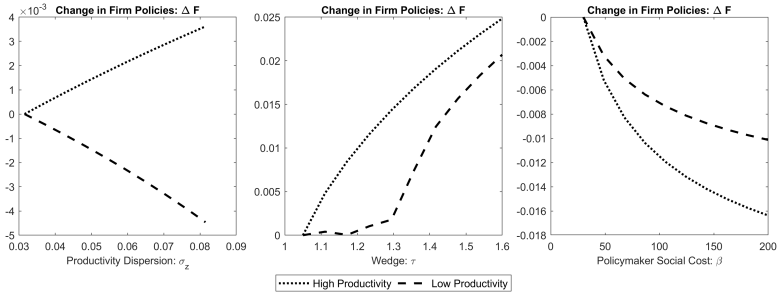
Notes: This figure displays the scatterplot (with linear fit) between the HHI of political connections against the HHI of sales in 112th Congress (2011-2012). HHI is defined at 2-digit SIC industry × state × Congress level. The regression sample is restricted within industry-state-election cycle cells with non-zero campaign contributions.

Figure 14: Model Comparative Statics

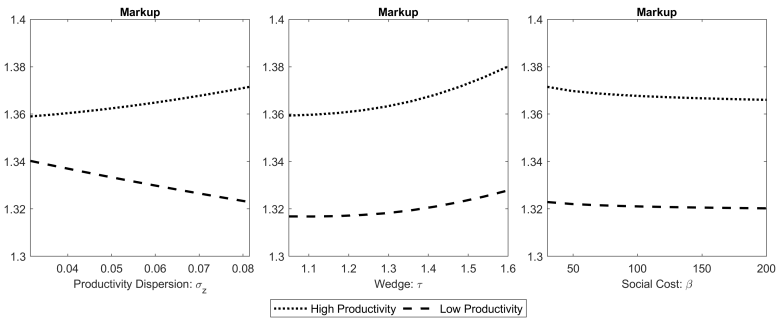
Panel A: Political Game - Transfers t



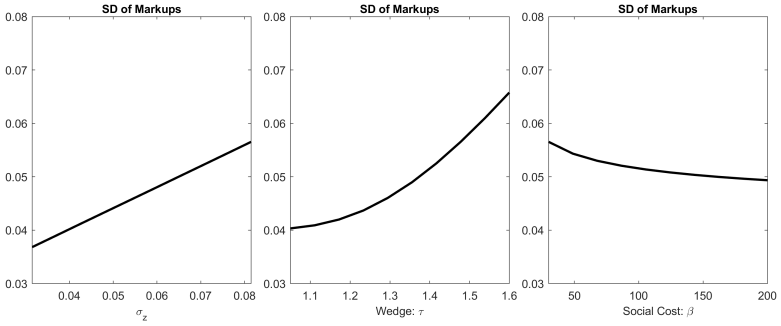
Panel B: Political Game - Policies F



Panel C: Markups



Panel D: Dispersion in Markups



Panel E: Labor Share

Notes: This figure plots the comparative statics of transfers, policies, markups and labor share of income in response to changes in three parameters: productivity dispersion σ_z, wedge τ and social cost β. From Panel A to E, the graphs are (a) firms' transfers to the policymaker τ, (b) the policymaker's policy assigned to firms F, (c) levels of markups, (d) dispersion of markups, and (e) aggregate labor share.

Table 1: Variable Definitions

Variable	Definition	Main Data Source
Firm-Level Financial Variables		
Markup	Sales/cost of goods sold × constant elasticity = 0.85	Compustat and De Loecker et al. (2020)
Profit rate	(Sales - cost of goods sold - capital cost - selling, general, and administrative expense)/sales	Compustat
Market Value	Common shares outstanding × price close - annual fiscal year	Compustat
Effective Tax Rates	(income taxes total - deferred taxes)/(pretax income - equity in earning + special items + interest expense)	Compustat, defined by Gupta and Newberry (1997)
Firm-Level Political Connections and Expenditures Variables		
Firm PAC contributions	Campaign contributions from Political Action Committee (PAC) sponsored by the firm to a committee member in a Congress	OpenSecrets
Total firm PAC contributions	Total campaign contributions from PAC sponsored by a firm to all current incumbent members in Congress	OpenSecrets
Number of politicians connected	Total number of committee members donated by a firm via campaign contributions in a Congress	OpenSecrets
Loss of/exiled political connections	Number of exiled committee members donated by a firm via campaign contributions in a Congress	OpenSecrets
Non-exiled political connections	Number of non-exiled (returning) committee members donated by a firm via campaign contributions in a Congress	OpenSecrets
Lobbying expenditures	Total lobbying expenditures associated with firm PAC	OpenSecrets
Independent expenditures	Total independent expenditures associated with firm PAC	OpenSecrets

Notes: This table provides definitions of the variables constructed, as well as their sources.

Table 2: Summary Statistics

Panel A: Firm-Election Cycle Level Variables

	Mean	SD	Median	N
Ln (Sales)	16.03	0.16	16.04	5,580
Ln (COGS)	8.73	1.54	8.78	5,580
Markup	1.62	1.31	1.23	5,580
Ln (Markup)	0.34	0.45	0.20	5,580
Ln (Market Value/Sales)	1.18	1.45	1.05	5,580
Profit Rate	0.19	0.19	0.18	5,580
Ln (Dividends)	3.28	4.50	4.99	5,579
Ln (Employment)	7.71	0.73	7.87	5,368
Effective Tax Rates	0.25	0.15	0.25	3,339
Ln (Procurement Value Exercised)	-3.35	4.81	-4.61	5,571
Ln (Number of Procurement Contracts)	-3.98	2.32	-4.61	5,580
Loss Share	0.04	0.11	0.00	5,580
Loss Share (Important Committees)	0.06	0.15	0.00	5,153
Loss Share (Marginal Members)	0.03	0.11	0.00	4,973
No. of Political Connections	28.16	36.43	14.00	5,580
Number of politicians (junior + senior)	55.62	66.99	30.00	5,580
No. of Political Connections - D	10.97	16.24	4.00	5,580
No. of Political Connections - R	17.19	22.42	8.00	5,580
No. of Political Connections - Exiled	1.10	3.46	0.00	5,580
No. of Political Connections - Non Exiled	27.06	35.30	13.00	5,580

Notes: This table reports summary statistics of the sample used in the empirical analysis. Panel A reports firm-election cycle variables conditional on non-missing campaign contributions. Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages. All monetary variables are deflated by annual CPI (2015 = 100).

Table 3: Difference-in-Difference Regressions

Panel A: Standard DiD

	(1)	(2)	(3)	(4)	(5)	(6)
	Ln (Markup)	Ln (COGS)	Ln (Sales)	Ln (Market Value/Sales)	Markup	Profit Rate
Affected=1	0.065**	0.057	0.012***	0.304*	0.193*	0.020
	(0.032)	(0.042)	(0.003)	(0.166)	(0.103)	(0.015)
After 111th Congress=1	0.156***	-0.214***	-0.005*	0.250***	0.670***	0.051***
	(0.034)	(0.044)	(0.003)	(0.082)	(0.197)	(0.012)
Affected=1 × After 111th Congress=1	-0.109***	0.124**	-0.000	-0.140	-0.487**	-0.033**
	(0.036)	(0.048)	(0.003)	(0.090)	(0.206)	(0.013)
Ln (No. of Pol Connections) - Lagged	0.006	-0.001	-0.001	-0.014	0.027	0.000
	(0.006)	(0.011)	(0.001)	(0.023)	(0.018)	(0.003)
Ln (Sales) - Lagged	-0.182	8.047***	0.895***	-0.450	-0.596	0.023
	(0.142)	(0.330)	(0.014)	(0.603)	(0.446)	(0.048)
R-squared	0.681	0.936	0.962	0.518	0.516	0.405
No. obs	2,668	2,668	2,668	2,668	2,668	2,668
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Event Study

	(1)	(2)	(3)	(4)	(5)	(6)
	Ln (Markup)	Ln (COGS)	Ln (Sales)	Ln (Market Value/Sales)	Markup	Profit Rate
Affected=1	0.082*	0.051	0.015***	0.312*	0.250*	0.033
	(0.045)	(0.058)	(0.004)	(0.179)	(0.141)	(0.021)
Affected=1 × Congress=108	-0.057	0.086	0.001	0.048	-0.176	-0.026
	(0.046)	(0.073)	(0.006)	(0.157)	(0.116)	(0.030)
Affected=1 × Congress=109	-0.026	-0.040	-0.010*	-0.113	-0.127	-0.015
	(0.040)	(0.068)	(0.006)	(0.120)	(0.127)	(0.028)
Affected=1 × Congress=110	0.001	-0.051	-0.008*	0.039	0.038	-0.016
	(0.024)	(0.056)	(0.005)	(0.093)	(0.079)	(0.014)
Affected=1 × Congress=112	-0.112***	0.102**	-0.004	-0.124	-0.376**	-0.055***
	(0.036)	(0.050)	(0.004)	(0.081)	(0.149)	(0.018)
Affected=1 × Congress=113	-0.141**	0.143**	-0.003	-0.176*	-0.717**	-0.037*
	(0.057)	(0.070)	(0.004)	(0.094)	(0.299)	(0.022)
R-squared	0.683	0.938	0.964	0.528	0.520	0.406
No. obs	2,668	2,668	2,668	2,668	2,668	2,668
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimation results of diff-in-diff regressions by Equation 3. Dependent variables include ln (markup), ln (sales), ln (variable input costs), ln (market value/sales), level of markup and profit rate. $Affect_i$ is a dummy equal to one (treated group) if firm i experiences committee exile among its connected members at the end of the 111th Congress, and zero (control group) otherwise. POST is a dummy equal to one for 112th and 113th Congresses (2011-2014), and zero for 108th-110th Congresses (2005-2010). Panel A reports the results of standard diff-in-diff regressions. Panel B reports the results of event study regressions, in which $POST$ is replaced by a series of time dummies before and after the 111th Congress (base group). Firm-level lagged controls include ln (sales) and ln (number of political connections). The sample is restricted within three Congresses (6 years) before and two Congresses (4 years) after the committee exile at the end of 111th Congress, and firms with campaign contributions. Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Industry fixed effects are included and standard errors are clustered at the firm level. All monetary variables are deflated by annual CPI (2015 = 100). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 4: Committee Exile in All Congresses

	(1)	(2)	(3)	(4)	(5)
	Ln (Markup)	Ln (COGS)	Ln (Sales)	Ln (Market Value/Sales)	Profit Rate
Unsuccessful Share	-0.078**	0.052	-0.006	-0.020	-0.054**
	(0.035)	(0.062)	(0.007)	(0.117)	(0.023)
R-squared	0.845	0.957	0.963	0.863	0.598
No. obs	4,564	4,564	4,564	4,564	4,564
Firm Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Congress FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimated coefficients and standard errors of the OLS regressions of Equation 4. Dependent variables include ln (markup), ln (sales), ln (variable input costs), ln (market value/sales), level of markup and profit rate. The main independent variable is the lagged share of unsuccessful political connections resulted from committee exile, defined by Equation 2. Firm-level lagged controls include ln (sales) and ln (number of political connections). The sample is restricted to firms with campaign contributions during 103rd-113th Congresses, and junior politicians with average seniority in all assigned committees smaller or equal to three (six years). Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Firm and election cycle fixed effects are included and standard errors are clustered at the firm level. standard errors are clustered at the firm level. All monetary variables are deflated by annual CPI (2015 = 100). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 5: Firms with Democratic Partisanship

	(1)	(2)	(3)	(4)	(5)
	Ln (Markup)	Ln (COGS)	Ln (Sales)	Ln (Market Value/Sales)	Profit Rate
Unsuccessful Share	-0.253**	0.226*	-0.010	0.259	-0.146**
	(0.110)	(0.136)	(0.010)	(0.225)	(0.065)
R-squared	0.888	0.971	0.977	0.879	0.667
No. obs	1,010	1,010	1,010	1,010	1,010
Firm Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Congress FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimated coefficients and standard errors of the OLS regressions of Equation 4 within firms with Democratic partisanship. Dependent variables include ln (markup), ln (sales), ln (variable input costs), ln (market value/sales), level of markup and profit rate. The main independent variable is the lagged share of unsuccessful political connections resulted from committee exile, defined by Equation 2. Firm-level lagged controls include ln (sales) and ln (number of political connections). The sample is restricted to firms with campaign contributions and Democratic more than Republican political connections during 103rd-113th Congresses, and junior politicians with average seniority in all assigned committees smaller or equal to three (six years). Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Firm and election cycle fixed effects are included and standard errors are clustered at the firm level. Standard errors are clustered at the firm level. All monetary variables are deflated by annual CPI (2015 = 100). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 6: Important Committees

	(1)	(2)	(3)	(4)	(5)
	Ln (Markup)	Ln (COGS)	Ln (Sales)	Ln (Market Value/Sales)	Profit Rate
Unsuccessful Share (Important Committees)	-0.055**	0.034	-0.006	-0.017	-0.044***
	(0.024)	(0.043)	(0.004)	(0.073)	(0.015)
R-squared	0.861	0.957	0.963	0.868	0.616
No. obs	4,216	4,216	4,216	4,216	4,216
Firm Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Congress FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimated coefficients and standard errors of the OLS regressions of Equation 4 within politicians assigned to important committees in the Congress, including Ways and Means, Appropriations, Energy and Commerce, or Oversight and Accountability committees. Dependent variables include ln (markup), ln (sales), ln (variable input costs), ln (market value/sales), level of markup and profit rate. The main independent variable is the lagged share of unsuccessful political connections resulted from committee exile, defined by Equation 2. Firm-level lagged controls include ln (sales) and ln (number of political connections). The sample is restricted to firms with campaign contributions during 103rd-113th Congresses, and junior politicians with average seniority in all assigned committees smaller or equal to three (six years) and assignment in the above important committees. Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Firm and election cycle fixed effects are included and standard errors are clustered at the firm level. standard errors are clustered at the firm level. All monetary variables are deflated by annual CPI (2015 = 100). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 7: Politicians with One-Term Seniority in All Committees

	(1)	(2)	(3)	(4)	(5)
	Ln (Markup)	Ln (COGS)	Ln (Sales)	Ln (Market Value/Sales)	Profit Rate
Unsuccessful Share (1-Term Politicians)	-0.101***	0.013	-0.013**	-0.110	-0.059*
	(0.037)	(0.054)	(0.006)	(0.092)	(0.032)
R-squared	0.850	0.955	0.962	0.866	0.612
No. obs	4,057	4,057	4,057	4,057	4,057
Firm Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Congress FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimated coefficients and standard errors of the OLS regressions of Equation 4 within one-term (two years) seniority in all assigned committees. Dependent variables include ln (markup), ln (sales), ln (variable input costs), ln (market value/sales), level of markup and profit rate. The main independent variable is the lagged share of unsuccessful political connections resulted from committee exile, defined by Equation 2. Firm-level lagged controls include ln (sales) and ln (number of political connections). The sample is restricted to firms with campaign contributions during 103rd-113th Congresses, and junior politicians with one-term (two years) seniority in all assigned committees. Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Firm and election cycle fixed effects are included and standard errors are clustered at the firm level. standard errors are clustered at the firm level. All monetary variables are deflated by annual CPI (2015 = 100). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 8: Levels of Exiled and Non-Exiled Political Connections

	(1)	(2)	(3)	(4)	(5)
	Ln (Markup)	Ln (COGS)	Ln (Sales)	Ln (Market Value/Sales)	Profit Rate
Ln (Exiled Pol Connections)	-0.001	0.002	-0.000	-0.008	-0.002
	(0.002)	(0.004)	(0.000)	(0.007)	(0.001)
Ln (Non-Exiled Pol Connections)	0.012**	0.012	0.002**	0.019	0.001
	(0.006)	(0.010)	(0.001)	(0.021)	(0.003)
R-squared	0.845	0.957	0.963	0.863	0.597
No. obs	4,564	4,564	4,564	4,564	4,564
Firm Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Congress FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimated coefficients and standard errors of the OLS regressions of Equation 4 replacing $UnsuccessfulShare$ with exiled and non-exiled political connection in natural logs. Dependent variables include ln (markup), ln (sales), ln (variable input costs), ln (market value/sales), level of markup and profit rate. Firm-level lagged controls include ln (sales) and ln (number of political connections). The sample is restricted to firms with campaign contributions during 103rd-113th Congresses, and junior politicians with one-term (two years) seniority in all assigned committees. Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Firm and election cycle fixed effects are included and standard errors are clustered at the firm level. standard errors are clustered at the firm level. All monetary variables are deflated by annual CPI (2015 = 100). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 9: Other Channels - Procurement Contracts

	Ln (Procurement Value Exercised)	
	Full Sample	Above-Mediam Political Connections
Affected=1	0.170	-0.243
	(0.137)	(0.450)
After 111th Congress=1	0.016	0.549*
	(0.137)	(0.290)
Affected=1 × After 111th Congress=1	-0.206	-0.788**
	(0.155)	(0.322)
R-squared	0.952	0.959
No. obs	2,659	1,190
Firm Controls	Yes	Yes
Industry FE	Yes	Yes

Notes: This table reports estimation results of diff-in-diff regressions by Equation 3 on federal government procurement contracts. Dependent variables is ln (exercised value of contracts) provided by federal obligated amount in USAspending.gov. $Affect_i$ is a dummy equal to one (treated group) if firm i experiences committee exile among its connected members at the end of the 111th Congress, and zero (control group) otherwise. POST is a dummy equal to one for 112th and 113th Congresses (2011-2014), and zero for 108th-110th Congresses (2005-2010). Column (1) includes all firms in the sample and column (2) includes firms with above-median (15) political connections. Firm-level lagged controls include ln (sales) and ln (number of political connections). The sample is restricted within three Congresses (6 years) before and two Congresses (4 years) after the committee exile at the end of 111th Congress, and firms with campaign contributions. Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Industry fixed effects are included and standard errors are clustered at the firm level. All monetary variables are deflated by annual CPI (2015 = 100). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 10: Other Firm-level Strategies

	(1)	(2)	(3)	(4)
	Ln (Employment)	Ln (Dividends)	Investment Rate	Effective Tax Rates
Affected=1	0.022	0.039	0.030**	-0.008
	(0.068)	(0.424)	(0.012)	(0.020)
After 111th Congress=1	0.036	-0.044	0.007	-0.062***
	(0.034)	(0.270)	(0.009)	(0.018)
Affected=1 × After 111th Congress=1	-0.066*	0.599*	-0.012	0.045**
	(0.039)	(0.307)	(0.010)	(0.021)
R-squared	0.759	0.600	0.374	0.207
No. obs	2,578	2,667	2,455	1,559
Firm Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Notes: This table reports estimation results of diff-in-diff regressions by Equation 3. Dependent variables include ln (employment), ln (dividends), investment rate and effective tax rates. $Affect_i$ is a dummy equal to one (treated group) if firm i experiences committee exile among its connected members at the end of the 111th Congress, and zero (control group) otherwise. POST is a dummy equal to one for 112th and 113th Congresses (2011-2014), and zero for 108th-110th Congresses (2005-2010). Firm-level lagged controls include ln (sales) and ln (number of political connections). The sample is restricted within three Congresses (6 years) before and two Congresses (4 years) after the committee exile at the end of 111th Congress, and firms with campaign contributions. Firm-level cost shares (COGS/variable costs and COGS/total costs) are trimmed at 1% and 99% percentages to avoid outliers. Industry fixed effects are included and standard errors are clustered at the firm level. All monetary variables are deflated by annual CPI (2015 = 100). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 11: HHI Sales vs. HHI Political Connections

	(1)	(2)	(3)	(4)
	HHI (Sales)	HHI (Emp)	HHI (Sales)	HHI (Emp)
HHI (Political Connections)	0.249***	0.218***		
	(0.031)	(0.032)		
HHI (Political Expenditures)			0.211***	0.159***
			(0.030)	(0.029)
R-squared	0.895	0.864	0.895	0.866
No.obs	1,791	1,791	1,984	1,984
State × Sector FE	Yes	Yes	Yes	Yes
Congress FE	Yes	Yes	Yes	Yes

Notes: This table reports estimation results of OLS regressions by Equation 5. The dependent variables are HHI of firm sales or employment at state-sector level for each election cycle (2 years), in which sectors are defined at two-digit SIC codes. The independent variables include the HHI of firms' number of political connections or total political expenditures, including campaign contributions and lobbying expenditures, both of which are computed in the same way as the HHI of firm sales at state-sector level. For columns (1) and (3), the sample is restricted to state-sector-election cycle cells with positive political connections. For columns (2) and (4), the sample is restricted to state-sector-election cycle cells with positive total political expenditures. State-sector and election cycle fixed effects are included and standard errors are clustered at state-sector level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 12: HHI Sales vs. HHI Political Connections - Across Industries

	HHI (Sales)				
	Manufacturing	Finance	Wholesale	Service	Trans + Utils
HHI (Political Connections)	0.193***	0.365***	0.266***	0.161***	0.267***
	(0.069)	(0.073)	(0.072)	(0.058)	(0.065)
R-squared	0.906	0.820	0.896	0.902	0.898
No. obs	356	341	63	269	417
Sector × State FE	Yes	Yes	Yes	Yes	Yes
Congress FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimation results of OLS regressions by Equation 5 by sectors. Similar to Table 11, the dependent variable HHI of firm sales at sector-state level for each election cycle, in which the sectors are grouped at 2-digit NAICS level. The independent variable is the HHI of firms' number of political connections computed in the same way as the HHI of firm sales at sector-state level. The sample is restricted to sector-state-election cycle cells with positive campaign contributions from public firms. Sector-state and election cycle fixed effects are included and standard errors are clustered at sector-state level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 13: Model - Firm Outcomes and Political Connections

Panel A: The Impact of Competition on Firm Transfers

	Monopoly	Oligopoly	Perfect Competition
Transfers t_i	$-w(F_i^*)$	$\sum_{n \neq I} \mathbb{E}\pi_{nj}(\mathcal{P}_{-i}^*) + w(\mathcal{P}_{-i}^*) - \Big(\sum_{n \in \mathcal{I}} \mathbb{E}\pi_{nj}(\mathcal{P}^*) + w(\mathcal{P}^*)\Big)$	$-w(F_i^*)$

Panel B: The Impact of Political Connections on Firms

	Labor Productivity	Market Share	Profit
Connected Firms	↑↑	↑↑	↑↑

Panel C: Summary of Comparative Static Results

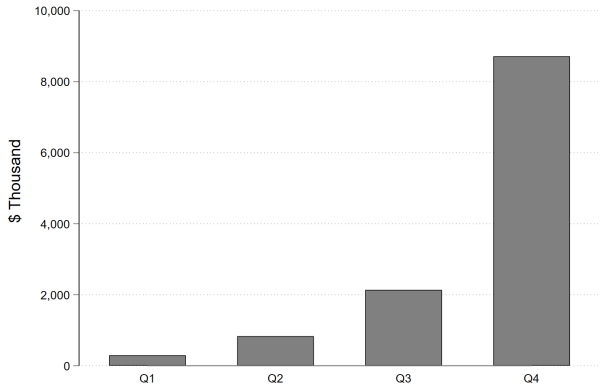
	Average Transfers	Average Markups	Labor Share of Income
Technology ↑ σ_z	↑↓	↑↑	↓↓
Regulatory Burden ↑ τ	↑↑	↑↑	↓↓
Social cost ↑ β	↓↓	↓↓	↑↑

Notes: Panel A reports the features of the transfer for firm i to the policymakers in equilibrium, given the other firms $n \in \mathcal{I} \setminus i$. We discuss three cases, including monopoly, oligopoly or perfect competition. Panel B reports the changes in labor productivity, market shares and profit for firms that successfully build up the connection with the policymaker and escape the wedge, compared to the unsuccessful firms, conditional on their original productivity. Panel C reports the responses of transfers, average markups, and labor share of income to the changes in σ_z, τ and β.

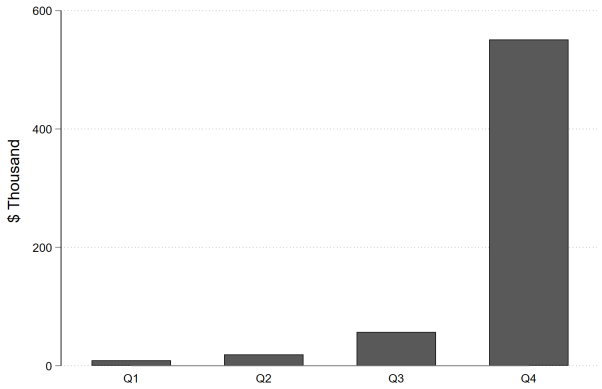
Appendix A: Figures and Tables

Figure A1: Lobbying and Independent Expenditures vs. Political Connections

Panel A: Lobbying Expenditures



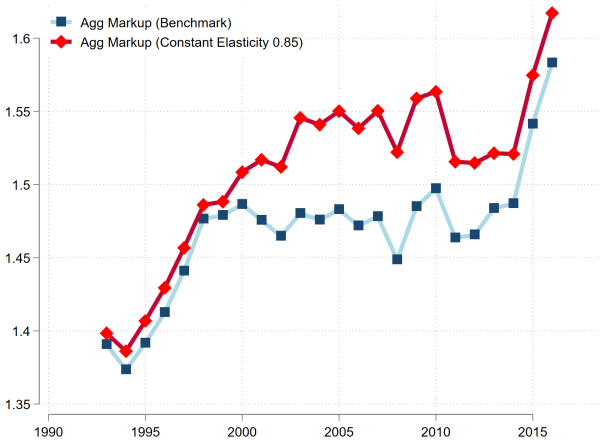
Panel B: Independent Expenditures



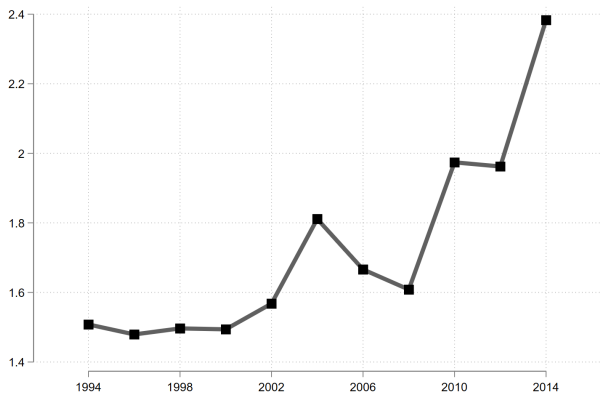
Notes: This figure shows average lobbying and independent expenditures in each election cycle, for firms in each quartile of levels of connected committee members. Panel A plots the distribution of lobbying expenditures, and Panel B plots the distribution of independent expenditures. All monetary variables are in real values, deflated by Consumer Price Index (2015 = 100).

Figure A2: Markups of US Public Firms 1992-2016

Panel A: Markups for All Public Firms



Panel B: Markups for Public Firms with Political Connections



Notes: Panel A plots the average markup trends during 1993-2016 for all public firms with time-varying industry-level output elasticity of variable inputs as the benchmark (in blue) and with a constant elasticity 0.85 (in red). Panel B plots the average markup trends for firms with positive campaign contributions during 1993-2014 for each election cycle with a constant elasticity 0.85.

Appendix B: Model

B.1 Equilibrium

Let $\mathcal{P}$ denote the set of probability from which the policymaker may choose. We bound $\mathcal{P}$ such that $0 \leq F_{ij} \leq 1$, $\forall ij \in \mathcal{I} \times J$. We restrict attention to equilibria that lie in the interior of $\mathcal{P}$. And we focus on symmetric equilibria that same productivity type firms always have the same strategies (since I assume the productivity of their competitors are the same). Since competition between firms only happens within submarket instead across submarkets, the policies chosen by the policymaker for submarket $-j$ do not affect submarket j. From Lemma 2 from Bernheim and Whinston (1986), an equilibrium to the political game for submarket j can be characterized as follows (Bernheim and Whinston, 1986; Grossman and Helpman, 1994; Cowgill et al., 2022):
Proposition 1 (Bernheim and Whinston, 1986): $\left(\{t_{ij}\}_{i\in\mathcal{I}_j, j\in J},\ \mathcal{P}\right)$ is a subgame-perfect Nash equilibrium of the political game if and only if, within each submarket $j \in J$:
(a) t_{ij} is feasible, that is, $0 \leq t_{ij} \leq \pi_{ij}$, $\forall\ i \in \mathcal{I}$;
(b) $\mathcal{P}^* \in \text{argmax}_{\mathcal{P}=\{F_{ij}\}_{i\in\mathcal{I}}} \sum_i t_{ij}(\mathcal{P}) + \sum_i (\mathbb{E}_i \pi_{ij}(\mathcal{P}) - t_{ij}(\mathcal{P})) + w(\mathcal{P})$ on $\mathcal{P}$;
(c) $\mathcal{P}^* \in \text{argmax}_{\mathcal{P}=\{F_{ij}\}_{i\in\mathcal{I}}} \mathbb{E}_i \pi_{ij}(\mathcal{P}) - t_{ij}(\mathcal{P}) + \sum_i t_{ij}(\mathcal{P}) + \sum_i (\mathbb{E}_i \pi_{ij}(\mathcal{P}) - t_{ij}(\mathcal{P})) + w(\mathcal{P})$ on $\mathcal{P}$, $\forall\ i \in \mathcal{I}$;
(d) $\forall\ n \in \mathcal{I}$, $\exists\ \mathcal{P}^n \in \mathcal{P}$ s.t.

$$\sum_i t_{ij}(\mathcal{P}^n) + \sum_i (\mathbb{E}_i \pi_{ij}(\mathcal{P}^n) - t_{ij}(\mathcal{P}^n)) + w(\mathcal{P}^n) \tag{B.1}$$

$$= \sum_i t_{ij}(\mathcal{P}^*) + \sum_i (\mathbb{E}_i \pi_{ij}(\mathcal{P}^*) - t_{ij}(\mathcal{P}^*)) + w(\mathcal{P}^*) \tag{B.2}$$

and

$$t_{nj} = 0 \tag{B.3}$$

Condition (a) restrict the political contributions to those that are feasible.

Condition (b) specifies the preferences of the policymaker. The policymaker chooses the policies that maximize her own welfare. With continuous contribution t_{ij}, the FOC condition for the policy set $\mathcal{P}$ from Condition (b) is

$$\sum_i \nabla t_{ij}(\mathcal{P}) + \sum_i \Big(\nabla \mathbb{E}_i \pi_{ij}(\mathcal{P}) - \nabla t_{ij}(\mathcal{P})\Big) + \nabla w(\mathcal{P}) = 0 \tag{B.4}$$

Condition (c) specifies that for each firm ij, the policymaker chooses the equilibrium policy set that maximizes the joint welfare of herself and that firm. If the policymaker does not do that, then firm ij could increase its contributions so as to incentivize the policymaker to choose the policy that benefit both of them. In that case, the policymaker gets to extract some of the extra surplus from such policy switch. We discuss later that when the number of firms within each submarket $1 < M < \infty$, the policymaker could aquire all of such extra surplus from policy

switch, given the firms making positive contributions.

With the FOC condition for the policy set $\mathcal{P}$ from Condition (c) as

$$\nabla \mathbb{E}_i \pi_{ij}(\mathcal{P}) - \nabla t_{ij}(\mathcal{P}) + \sum_i \nabla t_{ij}(\mathcal{P}) + \sum_i \Big(\nabla \mathbb{E}_i \pi_{ij}(\mathcal{P}) - \nabla t_{ij}(\mathcal{P}) \Big) + \nabla w(\mathcal{P}) = 0, \tag{B.5}$$

which is equivalent to

$$\nabla \mathbb{E}_i \pi_{ij}(\mathcal{P}) - \nabla t_{ij}(\mathcal{P}) = 0 \tag{B.6}$$

combining Equation B.4. Equation B.6 states that firms choose contributions such that their marginal cost of contributions equates the marginal return from the policies on their expected profits. We refer to an equilibrium in which firms choose the strategies that maximize their welfare as an truthful equilibrium. In a Nash Equilibrium, the policy set satisfies

$$\mathcal{P}^* \in \underset{\mathcal{P} \in \mathcal{P}}{\operatorname{argmax}} \sum_i \mathbb{E}_i \pi_{ij}(\mathcal{P}) + w(\mathcal{P}) \tag{B.7}$$

Equation B.7 means that, in equilibrium, firm contribution strategies induce the policymaker to behave as if it were maximizing a social-welfare function that assign weights equal to 2 to firms with positive contributions and weights equal to 1 to firms with zero contributions (Grossman and Helpman, 1994).[36]

We then solve the problem through FOC w.r.t. F_{ij}. We assume the same productivity set of firms in each submarket. We focus on the equilibra in which the policymaker assigns the same policies to firms with the same productivity.

Political Contributions. Now we discuss the contribution strategies using Condition (b) and (d). Condition (d) guarantees that there exists a policy set that delivers the same welfare to the policymaker as the equilibrium policy set. This alternative policy set can be seen as an outside option of the policymaker that allows her to extract surplus from the relationship with the firm. Denote I as a coalition of firms within a submarket j such that $I \subset \mathcal{I} = \{1, 2, .., M\}$ and $t_{ij} = 0$, $\forall\ i \in I$. Then from Condition (b), the policymaker solves

$$\mathcal{P}^*_{-I} \in \underset{\mathcal{P} \in \mathcal{P}}{\operatorname{argmax}} \sum_{n \notin I} t_{nj}(\mathcal{P}) + \sum_i (\mathbb{E}_n \pi_{nj}(\mathcal{P}) - t_{nj}(\mathcal{P})) + w(\mathcal{P})$$

Denote $\sum_{n \in I} \hat{t}_{nj}$ as the sum of contributions made by this coalition that make the policymaker indifferent from choosing the equilibrium policy set $\mathcal{P}^*$ and the policy set $\mathcal{P}^*_{-I}$. To maximize their profits net of the contributions, firms would reduce the contributions down to the point that the policymaker is just indifferent between the two policies. Then $\sum_{n \in I} t_{nj}$ satisfies that the policy set $\mathcal{P}^*$ that benefits firm $i \in I$ should deliver at least the same welfare to the policymaker as the welfare with the other policy set $\mathcal{P}^*_{-I}$.

[36] Grossman and Helpman (1994) discuss a more general case and the utility of the policymaker is $\mathcal{P}^* \in \operatorname{argmax}_{\mathcal{P}=\{F_{ij}\}_{i \in \mathcal{I}}} \sum_i t_{ij} + a \sum_i (\pi_{ij} - t_{ij})$ on $\mathcal{P}$, $a \in \mathcal{R}^+$. In this case, the weights for firms with possitive contributions would be $a + 1$ and the weights for firms without contributions would be a.

$$\begin{aligned}
&\sum_{n\notin I} t_{nj}(\mathcal{P}^*_{-I}) + \sum_n \Big(\mathbb{E}_n\pi_{nj}(\mathcal{P}^*_{-I}) - t_{nj}(\mathcal{P}^*_{-I})\Big) + w(\mathcal{P}^*_{-I}) \\
\leq &\sum_n t_{nj}(\mathcal{P}^*) + \sum_n \Big(\mathbb{E}_n\pi_{nj}(\mathcal{P}^*) - t_{nj}(\mathcal{P}^*)\Big) + w(\mathcal{P}^*)
\end{aligned} \tag{B.8}$$

which means the $\forall i \in I$, firms need to compensate the policymaker enough such that she will no deviate to another policy set.

When $M = 1$, if $I = 1$, $\mathcal{I} \setminus i = \emptyset$. The two problems described above are equivalent. To maximize her welfare, the policymaker chooses the same policy no matter whether the firm makes positive transfer. Therefore, we have $\mathcal{P}^*_{-I} = \mathcal{P}^*$. With the negative social cost, the firm makes the contributions so as to compensate for $w(\mathcal{P}^*)$. In this case, the policymaker has no bargaining power and does not extract additional surplus from the firm's profit.

When $1 < M < \infty$, Equation B.7 can be rewritten as

$$\begin{aligned}
\sum_{n\in I} t_{nj}(\mathcal{P}^*) \geq &\sum_{n\notin I} t_{nj}(\mathcal{P}^*_{-I}) + \sum_n \Big(\mathbb{E}_n\pi_{nj}(\mathcal{P}^*_{-I}) - t_{nj}(\mathcal{P}^*_{-I})\Big) + w(\mathcal{P}^*_{-I}) \\
&- \sum_{n\notin I} t_{nj}(\mathcal{P}^*) - \sum_n \Big(\mathbb{E}_n\pi_{nj}(\mathcal{P}^*) - t_{nj}(\mathcal{P}^*)\Big) - w(\mathcal{P}^*) \\
&= \sum_n \mathbb{E}_n\pi_{nj}(\mathcal{P}^*_{-I}) - \sum_{n\in I} t_{nj}(\mathcal{P}^*_{-I}) + w(\mathcal{P}^*_{-I}) \\
&- \sum_n \mathbb{E}_n\pi_{nj}(\mathcal{P}^*) + \sum_{n\in I} t_{nj}(\mathcal{P}^*) - w(\mathcal{P}^*).
\end{aligned} \tag{B.9}$$

From Equation B.6, with continuous contributions, when $t_{nj}(\mathcal{P}^*_{-I}) > 0$ and $t_{nj}(\mathcal{P}^*) > 0$ following Proposition 2 in the next section, we have

$$\begin{aligned}
t_{nj}(\mathcal{P}^*_{-I}) - t_{nj}(\mathcal{P}^*) &= \nabla t_{ij}(\mathcal{P}) \\
&= \nabla \mathbb{E}_i\pi_{ij}(\mathcal{P}) \\
&= \mathbb{E}_n\pi_{nj}(\mathcal{P}^*_{-I}) - \mathbb{E}_n\pi_{nj}.(\mathcal{P}^*)
\end{aligned}$$

Then Equation B.9 can be rewritten as

$$\forall I \subset \mathcal{I}, \quad \sum_{n\in I} t_{nj}(\mathcal{P}^*) \geq \Big(\sum_{n\notin I} \mathbb{E}\pi_{nj}(\mathcal{P}^*_{-I}) + w(\mathcal{P}^*_{-I})\Big) - \Big(\sum_{n\in\mathcal{I}} \mathbb{E}\pi_{nj}(\mathcal{P}^*) + w(\mathcal{P}^*)\Big). \tag{B.10}$$

Equation B.10 defines the minimum level of transfer to the policymaker to keep her from switching to other policies that does not favor firm $n \in I$. Since we assume firms maximize the net profit from the transfers, then it defines a unique level of transfer for any firm $i \in \mathcal{I}$.

The transfer is similar to the one in Grossman and Helpman (1994). The intuition is that any coalition of firms should compensate the policymaker such that she does not deviate from optimal policies that maximize the total profit net of the disutility of non-optimal policies. When $1 < M < \infty$, the competition for political influence is so intense that the policymaker has all the bargaining power and take all of the extract surplus from policy switching.

When $M \to \infty$, we have perfect competition among firms. The effect of contributions from a single firm on the policymaker will be negligible and thus zero contribution from the single firm will not affect the policies for the other firms. The common agency problem between one policymaker and multiple firms then becomes a problem between the policymaker and each firm. As in the case when $M = 1$, the firms choose the contributions to compensate the policymaker for the social cost(to keep the policymaker active). In this case, the firms have all the bargaining power and extract all the surplus.

B.2 Model Predictions

The model generates two features that match the data. We discuss the two features in this section. We provide proof for the lemmas for a two-firm case in Appendix B.5.

Lemma 1: Given the real productivity of the competitors $\tilde{z}_{-i1} = \tilde{z}_{-i2}$, among any two firms with the same productivity level $z_{i1} = z_{i2}$, if $\tilde{z}_{i1} = z_{i1}$ and $\tilde{z}_{i2} = z_{i2}/\tau$, then we have market share $s_{i1} > s_{i2}$, markups $\mu_{i1} > \mu_{i2}$ and profits $\pi_{i1} > \pi_{i2}$, and vice versa.

The model also generates general equilibrium effect of a change to the political connections.

Lemma 2: Markups of the competitors. Given the real productivity of the competitors $\tilde{z}_{-i1} = \tilde{z}_{-i2}$, among any two firms with the same productivity level $z_{i1} = z_{i2}$, if $\tilde{z}_{i1} = z_{i1}$ and $\tilde{z}_{i2} = z_{i2}/\tau$, then we have market share $s_{n1} < s_{n2}$, markups $\mu_{n1} < \mu_{n2}$ and profits $\pi_{n1} < \pi_{n2}$, $\forall$ $n \in \mathcal{I} \setminus i$.

Lemma 1 describes the heterogeneity in markups across similar-productivity firms. Lemma 2 describes the general equilibrium effects of a change to political connections of a firm ij on its competitors within the same submarket $-ij$.

Proposition 2: (Political game) For any two firms (that enter the market) within the same submarket j with productivity $z_{1j} < z_{2j}$, we have political contributions $0 < t_{1j} < t_{2j}$, and policies $0 < F_{1j} < F_{2j}$ from the policymaker.

Proposition 3: (Market power) For any two firms (that enter the market) within the same submarket j with productivity $z_{1j} < z_{2j}$, we have their expected markups $\mathbb{E}\mu_{1j} < \mathbb{E}\mu_{2j}$ and expected profits $\mathbb{E}\pi_{1j} < \mathbb{E}\pi_{2j}$, and the dispersion of markups and profits across different cases $var(\mu_{1j}) < var(\mu_{2j})$ and $var(\pi_{1j}) < var(\pi_{2j})$.

Proposition 4: Benefit from political connections. Given the real productivity of firms within the submarket $j \in \{z_{1j}, z_{2j}, ..., z_{Ij}\}$ and $\{\tilde{z}_{nj}\}_{n \in \mathcal{I} \setminus i}$, if $\tilde{z}_{ij} = z_{ij}$, a higher τ leads to a higher market share s_{ij} and a higher markup μ_{ij}, $\forall$ $i \in \mathcal{I}$ and $\forall$ $j \in \mathcal{J}$.

Proposition 4 is proved following Lemma 1.

Uniqueness. Given that: (i) the unique Cournot Nash equilibrium in the second step for each possible case, (ii) the marginal increase in the welfare of the policymaker from a small change in policies to a firm is strictly increasing in firm productivity, and (iii) the differentiability and convexity of $w(\mathcal{P})$, there exist a unique equilibrium with all firms making positive contributions that satisfies the conditions in Proposition 1.

B.3 Backward Induction: Second Step

We discuss the solutions in detail in this section. Starting from the second step when firms already realize their political connections and regulation wedge. For simplicity, we assume there are M firms with the same set of productivity $\{z_1, z_2, ..., z_M\}$ in each sub-market j. We have 2^M number of possible cases of realized "real" productivity $\{\tilde{z}_i\}_{i\in\mathcal{I}}$ in each sub-market. And we focus on the symmetric equilibria in which firms with the same productivity z_i and the same competitors z_{-i} choose the same transfer t_i. Since there is a continuum of industries with the same set of potential firms, the distribution of markups in this economy depends on the probability of each case. The market demand is the following:

$$Y = \Big(\int_{j=0}^{J} J^{-\frac{1}{\theta}} \Big(\sum_{i\in\mathcal{I}} M^{-\frac{1}{\eta}} (y_{ij})^{\frac{\eta-1}{\eta}} \Big)^{\frac{\eta}{\eta-1}\frac{\theta-1}{\theta}} dj \Big)^{\frac{\theta}{\theta-1}} \tag{B.11}$$

subject to the budget constraint

$$\int_{j=0}^{1} \Big(\sum_{i\in\mathcal{I}} p_{ij} y_{ij} \Big) dj \leq Z = WN + \Pi - T_f + T_p.$$

where Z is the total income of household in each period, W is the equilibrium wage for each unit of labor and N represents the total unit of labor supplied by the household. Π is the total profit that goes to the firm owners (the representative household in this case). We assume the total transfer received by the policymaker be equally split by the household. In equilibrium, $T_f = T_p$. Therefore, we have

$$WN + \Pi = PY.$$

where P is the price of the final good and Y is the output of the final good.
Since there is a continuum of industries in the economy, the prices and production of firms in submarket $-j$ do not affect the choices of firms in submarket j. Each firm is infinitesimally small relative to all firms in other markets and take the price indices of all other markets p_j as given. Within a submarket j, there is strategic interaction. Firm ij chooses quantity y_{ij}, taking its competitors' strategies y_{-ij} as given. Then, given market demand, within submarket j, the firm i maximizes its profit:

$$\pi(y_{ij}; \mathbf{y}_{-ij}, \mathcal{P}, P, Y) = \max_{y_{ij}} p\left(y_{ij}, \mathbf{y}_{-ij}, \mathcal{P}, P, Y\right) y_{ij} - \frac{W}{\tilde{z}_{ij}} y_{ij}, \quad \tilde{z}_{ij} \in \left\{ z_{ij}, \frac{z_{ij}}{\tau} \right\}.$$

where $p(y_{ij}, \mathbf{y}_{-ij}, \mathcal{P}, P, Y)$ is the inverse demand function obtained from Equation B.11 and $\frac{W}{\tilde{z}_{ij}}$ is the constant marginal cost from the linear production function. Firms solve for the Cournot-Nash equilibrium in their market. Their demand for labor is $n(z, \mathcal{P}, P, Y)$.

Then the optimization problem can be written as:

$$\mathcal{L} = \left(\int_j \left(\frac{1}{J}\right)^{\frac{1}{\theta}} \left(\sum_i \left(\frac{1}{M}\right)^{\frac{1}{\eta}} (y_{ij})^{\frac{\eta-1}{\eta}} \right)^{\frac{\eta}{\eta-1}\frac{\theta-1}{\theta}} dj \right)^{\frac{\theta}{\theta-1}} - \Lambda \left(\int_j \sum_i p_{ij} y_{ij} dj - Z \right),$$

where $p_j y_j = Z_j = \sum_{i'} p_{i'j} y_{i'j}$ and $p_j = \left(\sum_i \frac{p_{ij}^{1-\eta}}{M} \right)^{\frac{1}{1-\eta}}$.

Re-write the above Lagarangian equation use sector level output and price y_j and p_j:

$$\mathcal{L} = \left(\int_j \left(\frac{1}{J}\right)^{\frac{1}{\theta}} y_j^{\frac{\theta-1}{\theta}} dj \right)^{\frac{\theta}{\theta-1}} - \Lambda \left(\int_j p_j y_j dj - Z \right).$$

Similar to the results above:

$$\frac{y_{j'}}{y_j} = \left(\frac{p_{j'}}{p_j}\right)^{-\theta} \Leftrightarrow \frac{\sum_{j'} p_{j'} y_{j'}}{y_j} = \frac{\sum_{j'} p_{j'}^{1-\theta}}{p_j^{-\theta}} \Leftrightarrow y_j = \frac{Z p_j^{-\theta}}{P},$$

where

$$py = Z = \int_j p_j y_j, P = \left(\int_j \left(\frac{1}{J}\right)^{\frac{1}{\theta}} p_j^{1-\theta} \right)^{\frac{1}{1-\theta}}, y_j = J^{-1} \frac{p_j^{-\theta}}{P^{-\theta}} Y,$$
$$\text{and} \quad p_{ij} = y_{ij}^{-\frac{1}{\eta}} y_j^{\frac{1}{\eta}-\frac{1}{\theta}} M^{-\frac{1}{\eta}} J^{-\frac{1}{\theta}} Y^{\frac{1}{\theta}} P.$$

Then the unique Cournot-Nash equilibrium allocation satisfies:

$$\begin{aligned}
p_{ij} &= y_{ij}^{-\frac{1}{\eta}} y_j^{\frac{1}{\eta}-\frac{1}{\theta}} X, X = J^{-\frac{1}{\theta}} M^{-\frac{1}{\eta}} Y^{\frac{1}{\theta}} P, \\
p_{ij} &= \mu_{ij} \frac{W}{\tilde{z}_{ij}}, \\
\mu_{ij} &= \frac{\epsilon_{ij}}{\epsilon_{ij} - 1}, \qquad \text{and} \\
\epsilon_{ij} &= - \left. \frac{\partial \log y_{ij}}{\partial \log p_{ij}} \right|_{y^*_{-ij}} = \left[\frac{1}{\theta} s_{ij} + (1 - s_{ij}) \frac{1}{\eta} \right]^{-1}.
\end{aligned}$$

where ϵ is the residual demand elasticity and s is the market share.

We denote the optimal price through markup μ_{ij}, which is defined as price over marginal cost and is determined by the residual demand elasticity ϵ_{ij}. The residual is related to the firm's market share. Therefore, markup μ_{ij} is determined by firm i's share in market j revenue.

Firms with a higher market share s_{ij} have higher residual demand elasticity, and thus steeper residual demand. These firms are able to set higher markups. As the market share close to one, the residual demand elasticity increases and gets close to θ. It decreases and converge to $\eta > \theta$ if the market share close to zero. A firm with market share close to 1 behaves like a monopolist within the market The elasticity of substitution of goods is close to θ and is lower than the within market one.

Notice that s_{ij} can be obtained as follows:

$$s_{ij} = \frac{\partial y_j}{\partial y_{ij}} \Big/ \frac{y_j}{y_{ij}} = \frac{p_{ij} y_{ij}}{\sum\limits_{i'}^{M_j} p_{i'j} y_{i'j}} = \frac{p_{ij}^{1-\eta}}{\sum_{i'} p_{i'j}^{1-\eta}} = \frac{\left(\frac{\mu_{ij}}{\tilde{z}_{ij}}\right)^{-\eta}}{\sum_{i'} \left(\frac{\mu_{ij}}{\tilde{z}_{ij}}\right)^{-\eta}}.$$

Therefore, both market shares and markups of firms in market j are determined only through the productivity $z_j = (z_1, ..., z_M)$ of firms within the market. Firms with relative higher productivity z_{ij} compared to their competitors can sell at lower prices and take a higher market share. Their markups are even higher: a higher market share allow them to exert more market power.

Wage. Normalizing the price for final goods to 1 ($P = 1$), we obtain the wage through the following equations:

$$P = \left(\int_j \frac{1}{J} \Big(\Big(\sum_i \frac{1}{M} p_{ij}^{1-\eta} \Big)^{\frac{1}{1-\eta}} \Big)^{1-\theta} dj \right)^{\frac{1}{1-\theta}},$$

$$\Leftrightarrow \frac{W}{P} = \left(\int_j \frac{1}{J} \Big(\sum_i \frac{1}{M} \left(\frac{\tilde{z}_{ij}}{\mu_{ij}} \right)^{\eta-1} \Big)^{\frac{1-\theta}{1-\eta}} dj \right)^{\frac{1}{\theta-1}}.$$

Labor Market Clearing. We compute the total employment N using labor market clearing condition.

$$N^d = Y \left(\frac{W}{P} \right)^{-\theta} \int_j \frac{1}{J} \left(\sum_i \left(\frac{\tilde{z}_{ij}}{\mu_{ij}} \right)^{\eta-1} \right)^{\frac{\eta-\theta}{1-\eta}} \left(\sum_i \frac{1}{\tilde{z}_{ij}} \left(\frac{\tilde{z}_{ij}}{\mu_{ij}} \right)^{\eta} \right) dj + \int_j M \phi dj,$$

$$N^s = \bar{\psi} \left(\frac{W}{P} \right)^{\psi}, \quad \text{and}$$

$$N^d = N^s.$$

The labor supply only depends on W. We interpret the labor supply as the number of workers with fixed working hours instead of the hours worked by each worker since we only have information about aggregate employment.

Firm Entry. To close the equilibrium described above, we now discuss how the number of firms in both submarkets in each sector is determined. A firm enters any submarkets within its sector if it expect positive profit:

$$\mathbf{1}(\phi > 0) = \mathbf{1} \left(y_{ij}^* \left(\mu_{ij}^* - 1 \right) \frac{W}{\tilde{z}_{ij}} \geq \phi \right).$$

Although the Cournot Nash Equilibrium described above given $\{M\}_{j \in J}$ is unique, there can be multiple equilibria due to the symmetric homogeneous sectors. We select one equilibrium following the procedure described in De Loecker, Eeckhout, and Mongey (2021). In this paper, we simplify the model and assume $\phi = 0$ such that all firms enter the market.

B.4 First Step: The Political Game

Given the profits of each firm in all possible cases, we solve the following maximization problem:

$$\mathcal{P}^* \in \underset{\mathcal{P}=\{F_i\}_{i\in\mathcal{I}}}{\text{argmax}} \sum_i \sum_k Prob(case = k)\pi_i^k + w(\mathcal{P}).$$

Reduce form of $w(\mathcal{P})$: a social cost with

$$w(\mathcal{P}) = -\beta \sum_i F_i^\alpha.$$

FOC with respect to F_i:

$$\sum_k \frac{\partial Prob(case = k)}{\partial F_i} \sum_i \pi_i^k = -\frac{\partial w(\mathcal{P})}{\partial F_i}.$$

B.5 Proof of the two-firms case

Lemma 1: Given the real productivity of the competitors $\tilde{z}_{-i1} = \tilde{z}_{-i2}$, among any two firms with the same productivity level $z_{i1} = z_{i2}$, if $\tilde{z}_{i1} = z_{i1}$ and $\tilde{z}_{i2} = z_{i2}/\tau$, then we have market shares $s_{i1} > s_{i2}$ and markups $\mu_{i1} > \mu_{i2}$, and vice versa.

Proof: Take $M = 2$ firms as an example and extend the proof to $M \geq 2$ firms. Assume $z_{1j} < z_{2j}$.

Table A1: Possible of Outcomes for the Two-Firm Case

The tables below display the distribution of productivity, policies, market shares and markups for the two firms under different cases. For example, in case $(1, 1)$, both firm 1 and 2 get to escape the wedge. In case $(1, 0)$, $(0, 1)$ and $(0, 0)$, firm 1 or 2 or neither manages to escape the wedge.

(a) Productivity

1 \ 2	1	0
1	$(z_1,\ z_2)$	$(z_1,\ z_2/\tau)$
0	$(z_1/\tau,\ z_2)$	$(z_1/\tau,\ z_2/\tau)$

(b) Probabilities

1 \ 2	1	0
1	$F_1 * F_2$	$F_1 * (1 - F_2)$
0	$(1 - F_1) * F_2$	$(1 - F_1) * (1 - F_2)$

(c) Market Shares

1 \ 2	1	0
1	$(s_1^1,\ s_2^1)$	$(s_1^2,\ s_2^2)$
0	$(s_1^3,\ s_2^3)$	$(s_1^4,\ s_2^4)$

(d) Markups

1 \ 2	1	0
1	$(\mu_1^1,\ \mu_2^1)$	$(\mu_1^2,\ \mu_2^2)$
0	$(\mu_1^3,\ \mu_2^3)$	$(\mu_1^4,\ \mu_2^4)$

Our proof has three steps: we first prove that $s_2^3 > s_2^1 = s_2^4 > s_2^2$.

By contradiction. Suppose $s_2^3 < s_2^1$. Then we have:

$$\frac{\left(\frac{\mu_2^3}{z_2}\right)^{-\eta}}{\left(\frac{\mu_2^3}{z_2}\right)^{-\eta}+\left(\frac{\mu_1^3}{z_1/\tau}\right)^{-\eta}} < \frac{\left(\frac{\mu_2^1}{z_2}\right)^{-\eta}}{\left(\frac{\mu_2^1}{z_2}\right)^{-\eta}+\left(\frac{\mu_1^1}{z_1}\right)^{-\eta}}$$

$$\Rightarrow$$

$$\frac{\frac{\mu_1^3}{z_1/\tau}}{\frac{\mu_2^3}{z_2}} < \frac{\frac{\mu_1^1}{z_1}}{\frac{\mu_2^1}{z_2}}$$

$$\Rightarrow$$

$$\frac{\mu_2^3}{\tau\mu_1^3} > \frac{\mu_2^1}{\mu_1^1}$$

$$\Rightarrow$$

$$\frac{s_2^3}{\tau s_1^3} = \frac{s_2^3}{\tau(1-s_2^3)} > \frac{s_2^1}{s_1^1} = \frac{s_2^1}{1-s_2^1}$$

$$\Rightarrow$$

$$\tau - 1 > \frac{\tau}{s_2^3} - \frac{1}{s_2^1} > \frac{\tau}{s_2^1} - \frac{1}{s_2^1}, if \quad s_2^3 < s_2^1$$

$$\because \tau > 1 \Rightarrow$$

$$s_2^1 > 1. \quad Contradition.$$

We repeat it for the other (in)equality conditions.

Lemma 2: Markups of the competitors. Given the real productivity of the competitors $\tilde{z}_{-i1} = \tilde{z}_{-i2}$, among any two firms with the same productivity level $z_{i1} = z_{i2}$, if $\tilde{z}_{i1} = z_{i1}$ and $\tilde{z}_{i2} = z_{i2}/\tau$, then we have market shares $s_{n1} < s_{n2}$ and markups $\mu_{n1} < \mu_{n2}$, $\forall\ n \in \mathcal{I} \setminus i$.

Lemma 2 is proved following Lemma 1.

B.6 Comparative Statistics

Here we discuss the response of policies, transfers, markups to the changes in three parameters: firm productivity dispersion σ_z, the wedge imposed by regulatory burden τ and the slope of the social cost to policies β. Figure 14 plots the comparative statistics.

As σ_z increases, high-productivity firms become more efficient and have higher market shares and markups. Their profits increase more without the regulatory burden, therefore, high-productivity firms make more transfers to the policymaker and receives better policies. The better policies in turn leads to even higher market shares and markups for these firms. The opposite applies to low-productivity firms because they become less efficient in production. In general, more dispersed productivity distribution results in a more dispersed distribution of transfers and policies, as well as the markups.

As τ increases, when $\tau < \bar{\tau}$, all firms benefit more from the removal of the regulatory

burden and the wedge, especially for firms with higher productivity. [37] Therefore, both high- and low-productivity firms make more political transfers and get better policies. The effect is more pronounced for high-productivity firms since their profits rise more, the larger the wedge τ is, as shown in Proposition 4. [38] Overall, a larger wedge τ due to a higher regulatory burden leads to large benefit from political connections. It results in more inequality across firms in transfers, policies and markups.

β affects economic outcomes in the opposite way compared to τ, but with different slope. As β increases, it is more costly for the policymaker to favor specific firms, especially to the profitable firms. The transfers and policies decrease, more for high-productivity firms. These firms then experience a reduction in market shares and markups. In general, this means a higher cost for the policymaker to lift the regulatory burden or give other preferential treatment to the firms results in less political expenditures and a lower inequality among the firms.

B.7 Solve the Equilibrium: Procedure

We follow De Loecker, Eeckhout, and Mongey (2021) to solve the model:

1. All firms draw the productivity from a log normal distribution;
2. Obtain equilibrium markups for all firms in each possible case of realized regulations (in total 2^M cases);
3. Get the policies F_{ij} such that marginal gain $\sum_i \mathbb{E}\pi_{ij}$ equates marginal cost $\alpha\beta F_{ij}^{\alpha-1}$;
4. Compute the minimum transfers $\sum_{i\in I} t_{ij}$ for any coalition $I \subset \mathcal{I}$, get transfer t_{ij} that minimize $\int_j \sum_i t_{ij}^2$

For step 3, we cannot directly obtain wage W and output Y. Therefore, within the step, we do the following:

1. Guess F_{ij} and get marginal probability of each case wrt. each F_{ij}, denote as MPF_{ij} since we focuse on the symmetric solutions;
2. Normalize P = 1 and obtain equilibrium wage W and output Y and profits for each firm in each case;
3. Find $\{F_{ij}\}$ that minimize $\sum_i MPT_{ij}\pi_{ij} - \alpha\beta F_{ij}^{\alpha-1}$.

[37] There exists a $\bar{\tau}$ such that $\forall\ j \in \mathcal{J}$ and $\forall\ i, n \in \mathcal{I}$, if $z_{ij} > z_{nj}$, we always have $z_{ij} > \bar{\tau} z_{nj}$.

[38] However, the share of transfers over sales does not necessarily increase for high-productivity firms due to a even larger increase in their sales. This is consistent with the empirics that large firms only experience a slight increase in the share of political expenditures over sales.

C Markup Measure

In this subsection, we illustrate how to obtain firm level markups through the cost based method following De Loecker et al. (2020). Assume a Cobb-Douglas production function:

$$Q_{it} = F(A_{it}, V_{it}, K_{it}) = A_{it} V_{it}^{\theta^V} K_{it}^{\theta^k},$$

where with constant returns to scale $\theta^V + \theta^k = 1$. Firm's cost minimization problem is:

$$\begin{aligned} &\min_{V_{it}, K_{it}} P_{it}^V V_{it} + r_{it} K_{it} + F_{it} \\ &s.t. \quad Q_i t \geq \bar{Q}_{it}, \end{aligned}$$

where P_{it} is the price of variable input V_{it}, r_{it} is the cost of capital K_{it} and F_{it} represent the fixed cost.

The Lagrangian function for firm cost minimization problem is:

$$\mathcal{L}(V_{it}, K_{it}, \lambda_{it}) = P_{it}^V V_{it} + r_{it} K_{it} + F_{it} - \lambda_{it}(Q_i t - \bar{Q}_{it}),$$

and FOC w.r.t. variable input V:

$$\frac{\partial \mathcal{L}_{it}}{\partial V_{it}} = P_{it}^V - \lambda_{it} \frac{\partial Q_{it}}{\partial V_{it}} = 0$$

The elasticity of output to variable input V is

$$\begin{aligned} \frac{\partial Q}{\partial V} / \frac{Q}{V} = & && \text{(B.12)} \\ & \theta^V A_{it} V_{it}^{\theta^V - 1} K_{it}^{\theta_k} / (A_{it} V_{it}^{\theta^V - 1} K_{it}^{\theta^k}) && \text{(B.13)} \\ & = \theta^V && \text{(B.14)} \\ & = \frac{1}{\lambda_{it}} \frac{P_{it}^V V_{it}}{Q_{it}} && \text{(B.15)} \end{aligned}$$

Same for the elasticity of output to variable input K

$$\begin{aligned} \frac{\partial Q}{\partial K} / \frac{Q}{K} = & && \text{(B.16)} \\ & \theta^K A_{it} V_{it}^{\theta^V} K_{it}^{\theta^k - 1} / (A_{it} V_{it}^{\theta^V} K_{it}^{\theta_k - 1}) && \text{(B.17)} \\ & = \theta^K && \text{(B.18)} \\ & = \frac{1}{\lambda_{it}} \frac{r_{it} K_{it}}{Q_{it}} && \text{(B.19)} \end{aligned}$$

λ_{it} can be seen as a measure for the marginal cost (if the condition is not binding then for each additional unit of production the firm can "tolerant" some increase in their production cost without increasing the $\mathcal{L}$). We define the markup μ as $\mu = \frac{P}{\lambda}$ price over marginal cost. In that

case, we obtain μ with:

$$\mu_{it}^{V} = \theta_{it}^{V} \frac{P_{it}Q_{it}}{P_{it}^{V}V_{it}}$$
$$\mu_{it}^{k} = \theta_{it}^{k} \frac{P_{it}Q_{it}}{r_{it}K_{it}}.$$

In equilibrium,

$$\mu_{it}^{V} = \mu_{it}^{k},$$

because firms should use both inputs such that marginal costs of the two equalize to λ. In the data, this is not true because of the adjustment cost of capital.

In our paper, we use the markup computed as follows:

$$\mu = \theta^{V} \frac{Sales}{COGS}, \quad \text{with.}$$

We use markups computed with $\theta^{V} = 0.85$ in our main results understanding that the elasticity of output w.r.t. variable inputs V does not change too much over 2000-2014. We also use the industry-level time-varying output elasticity θ^{V} following the two-stage following De Loecker et al. (2020) to compute firm level markups.