Industrial Policy and Political Investment: Evidence from the CHIPS Act and Green Energy Transition

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Abstract

This paper examines how large industrial policy programs shape firm political spending. We argue that firm-level lobbying rises when large, firm-specific policy rents are at stake, especially when the total size and allocation of benefits remain uncertain. Undistributed benefits also induce firms that had never lobbied to overcome fixed entry costs and begin investing in politics. Event studies of two landmark 2022 industrial policies, the CHIPS and Science Act and the Inflation Reduction Act, show that semiconductor firms increased lobbying expenditures by about 52% between 2018 and 2022, while green-energy firms increased lobbying by about 112%. In both industries, new lobbying firms (the extensive margin) and previously active firms (the intensive margin) each contribute substantially, with entry accounting for about 40% of the semiconductor increase and roughly two-thirds of the green-energy increase. The increase persists after enactment, reflecting firms' concerns over ex post subsidy allocation and policy uncertainty from political transitions. We further find that, controlling for project size and political contributions, each additional $1 million in lobbying is associated with $66 million in CHIPS Act subsidies for the average award.

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1 Introduction

For decades, the prevailing consensus in economics held that government intervention to promote specific sectors was inefficient and prone to capture. Yet industrial policy has experienced a dramatic resurgence: the total number of industrial policy interventions globally rose from under 100 in 2010 to over 1,500 by 2022, with the share of all trade interventions classified as industrial policy nearly quintupling over the same period (Juhasz et al., 2023).

The United States during the Biden Administration exemplifies this trend. The CHIPS and Science Act of 2022 (CHIPS Act) committed $52.7 billion in semiconductor subsidies, motivated by supply chain disruptions exposed by the COVID-19 pandemic, technology competition with China, and the associated risks posed by the concentration of semiconductor production in Taiwan. The Inflation Reduction Act (IRA) of the same year further directed $369 billion toward clean energy investment to accelerate the transition towards renewables and electric vehicles. Together, these two bills constitute the largest U.S. industrial policy intervention since World War II.

This resurgence raises a question that existing research has largely left unanswered. The literature on industrial policy has focused primarily on evaluating the outcomes of implemented programs (Erten et al., 2026; Allcott et al., 2024; Bistline and Wolfram, 2025; Bushnell and Smith, 2025; Bombardini et al., 2024). Yet large subsidy programs create powerful incentives for firms well before any money is allocated. When legislation signals that substantial rents will exist but leaves their distribution unresolved, firms face strong incentives to invest politically in order to secure a larger share of a pie predetermined in the bill. How do firms respond when large government subsidies become expected but not yet allocated?

This paper examines how firms respond when large government subsidies are on the table but the overall size and distribution of the pie across potential recipients remain uncertain. Unlike broad deregulatory measures or industry-wide tax benefits that characterize the typical object of industry lobbying, recent industrial-policy statutes such as the CHIPS Act and selected IRA programs rely heavily on administratively allocated grants, loans, and credits that confer project- or firm-specific benefits (Bown and Wang, 2024; Bistline and Wolfram, 2025). Firms must actively compete for discretionary grants and favorable administrative treatment that determine the amount they receive, as well as how quickly the subsidies could be actually distributed. The fact that the subsidies will be distributed among firms competing in the same industry further introduces business-stealing motives: increasing the firm's own subsidies also lowers competitors' subsidies. This feature fundamentally alters the incentive structure facing firms, increasing the marginal return to political investment and limiting free-rider incentives that typically suppress lobbying (Bombardini, 2008; Bombardini and Trebbi, 2012; Moshary and Slattery, 2026).

To understand how industrial policies affect lobbying expenditures, we estimate event studies of firm lobbying expenditure around CHIPS and IRA passage, with firm and year fixed effects and standard errors clustered at firm level. Under the preferred Poisson Pseudo Maximum-Likelihood specification, semiconductor firms increased mean lobbying by 52% in 2022 — the year CHIPS was signed — relative to other technology sectors. For firms in renewables, clean electricity, and EV/batteries, spending rose by 246% in 2023 and 331% by 2025 relative to the fossil and nuclear energy sectors. On the extensive margin, the probability that a semiconductor firm engages in any lobbying rises by 23.3 percentage points at its 2023 peak, and the analogous clean-energy entry effect reaches 15.0 percentage points by 2024. On the intensive margin, conditional on being an incumbent lobbying firm pre-2018, semiconductor firms' dollar spending rises by 43% at peak (2022) while clean-energy incumbents more than triple theirs by 2025. The post-2022 lobbying surge therefore reflects both substantial entry — firms overcoming the fixed cost of political participation — and intensified spending by already-political incumbents.

This paper makes three contributions. First, we advance a novel structural condition under which firms intensify lobbying spending. Prior work has documented that campaign contributions have little effect on legislative voting and that interest groups spend surprisingly little on politics relative to the policy stakes involved (Ansolabehere et al., 2003; Bombardini and Trebbi, 2011). We argue that this puzzle dissolves once we distinguish between lobbying over whether a policy passes, which determines the size of the pie, and lobbying over how its benefits are allocated, which determines who gets what share of the pie. When allocation is individualized and uncertain, incentives to free-ride on the collective industry effort to lobby collapse and political investment becomes a competitive necessity.

Second, we provide suggestive evidence linking lobbying expenditures to subsidy receipt. By combining firm-level lobbying records with the universe of CHIPS Act awards, we show that lobbying expenditures are associated with larger subsidy allocations, controlling for project size and political contributions, within semiconductor firms. Furthermore, the association is significantly stronger for lobbying expenditures after the passage of the CHIPS Act, suggesting that political investment during the post-legislative administrative process shapes distributive outcomes.

Finally, we document that industrial policy reshapes the broader landscape of organized political interests. The lobbying response we observe operates on both the extensive and intensive margins: new firms enter the lobbying market while incumbents simultaneously increase expenditures. This finding suggests that large subsidy programs do not merely redirect existing political activity but create new participants in political investment. This is consistent with our theory that the prospect of particularistic subsidies induces firms to overcome the fixed costs of political investment that had previously deterred lobbying (Kerr et al., 2014), which we formalize in Section F.1 in the Appendix. Given that most firms do not lobby but lobbying is persistent (Bombardini and Trebbi, 2020), the new era of industrial policy has potentially lasting consequences for the composition of interest group politics in the United States.

2 Literature

2.1 Does Political Spending Buy Policy Outcomes?

The earliest and most extensive strand of this literature asks whether campaign contributions translate into favorable legislative votes. The consensus answer is largely negative. Ansolabehere et al. (2003) show that corporate contributions are modest relative to policy stakes and have little detectable effect on roll-call voting, arguing instead that contributions reflect ideological alignment rather than strategic investment. Model-based estimation reaches a related conclusion from a different angle: Bombardini and Trebbi (2011) show that interest groups may substitute voter support for money, making the relationship between economic stakes and contributions non-monotonic. More recent work has complicated this picture. Fowler et al. (2020) and Fouirnaies and Fowler (2022) find positive but heterogeneous returns to contributions, while Grier et al. (2023) document a correlation between contributions and supportive votes in the sugar industry. The methodological challenge of separating selection from influence remains unresolved.

A more durable finding is that contributions operate through access rather than votes. Kalla and Broockman (2016) show experimentally that contributions significantly increase the likelihood of obtaining meetings with congressional officials, facilitating the lobbying relationships through which substantive influence is exercised. This reorientation, from vote-buying to access, suggests that lobbying expenditures could be the primary instrument of firm political investment.

2.2 What Are the Returns to Lobbying Expenditures?

A second strand of the literature examines returns to lobbying expenditures. The empirical lobbying literature emphasizes lobbying as a central channel through which organized interests shape policy choice, implementation, and the distribution of surplus (Bombardini and Trebbi, 2020; Huneeus and Kim, 2024). Related research finds substantially larger and more consistent returns than political contributions, particularly in settings that resemble industrial policy such as industry subsidies and trade protection.

The most relevant designs involve discretionary, contestable government funds. de Figueiredo and Silverman (2006) estimate substantial returns to lobbying for academic earmarks, but only when the relevant legislator sits on the Appropriations Committee. Kang (2016) estimates returns to energy-sector lobbying during the 110th Congress via a contest function model, finding that rival industries' expenditures partly offset one another but that the expected private returns to favored policies still far exceed lobbying costs. Adelino and Dinç (2014) show that lobbying expenditures in early 2009 predict receipt of stimulus funds under the American Recovery and Reinvestment Act.[1] Bertrand et al. (2014) show that

[1] In the financial crisis context, Blau et al. (2013) find that banks received outsized TARP funds per dollar lobbied, while Igan et al. (2012) show that lobbying lenders earned positive abnormal returns at TARP announcement.

the value of a lobbyist derives more from political connections than from issue expertise, generating testable predictions about which legislators firms target. In the tax domain, Richter et al. (2009) find that higher lobbying expenditures reduce effective tax rates, and Alexander et al. (2009) estimate large returns to lobbying around a single repatriation tax provision.[2]

This literature also illuminates how firm-level lobbying participation interacts with industry structure. Bombardini (2008) shows that fixed participation costs entail that larger firms within a sector lobby while smaller firms will abstain and free-ride on the larger firms' efforts. Kerr et al. (2014) document large fixed costs of entering the lobbying market and the persistence of lobbying at the firm level. Bombardini et al. (2023) find that competition shocks increase firm lobbying expenditures, concentrated among firms seeking government support rather than investing in productivity. Recent work also finds that mergers and acquisitions within an industry increase political spending of the said industry (Moshary and Slattery, 2026; Cowgill et al., 2022). The literature broadly indicates that lobbying choices within an industry are strategic substitutes, inducing free-riding behavior. We show that industrial policies that award project-specific subsidies could create incentives for lobbying to be strategic complements.

2.3 When Do Firms Begin to Invest Politically?

Despite this rich body of work, three questions remain largely unaddressed. First, the existing literature focuses mostly on lobbying responses after a policy is enacted or a funding pool is announced. You (2017) shows that lobbying often continues after

[2] The shareholder-value literature provides complementary evidence. Borisov et al. (2016) use the Abramoff scandal as an exogenous shock and find that firms spending more on lobbying lost significantly more market value at the scandal's revelation, implying large positive returns in normal times. Hill et al. (2013) and Chen et al. (2015) document positive associations between lobbying intensity and multi-year accounting and market performance.

passage because firms seek to influence regulatory implementation and the distribution of particularistic benefits. We move earlier in the policy sequence, examining the period between credible legislative momentum and actual passage. During this window, the size of rents is increasingly likely but allocation remains open, giving firms strong incentives to begin investing politically before formal enactment. Whether and when this anticipatory response emerges is an open empirical question.

Second, existing work often treats lobbying activity as a given and asks what returns it generates. It has not examined how industrial policy reshapes the composition of organized political interests, that is, to what extent the increase in observed lobbying comes from firms entering the lobbying market for the first time or politically experienced incumbents expanding their activity. Bombardini (2008) and Kerr et al. (2014) imply that entry should be costly and therefore limited, but this prediction has not been tested against the shock of a major industrial policy program. The distinction matters because new entrants will shape both the size and allocation of surplus, thus influencing the ultimate impact of industrial policies on industry structure and growth (Huneeus and Kim, 2024).

Third, the literature on lobbying returns has focused on single-episode settings involving one stimulus act or tax provision. It has not established whether the mechanism generalizes across industries and policy types. We address this gap by concurrently studying two distinct contemporary industrial policy programs, semiconductors and green energy, within the same theoretical and empirical framework.

The CHIPS Act and the IRA provide a useful setting for examining these gaps because both created large prospective rents while leaving important allocation decisions unresolved. In semiconductors, firms faced a fixed pool of discretionary grants whose recipients would be selected through an administrative process. In clean energy, firms faced formally broader tax incentives, but eligibility rules, bonus credits, and domestic-content requirements still shape the value of the benefits available to them (Allcott et al., 2024; Bistline and Wolfram, 2025). These features make the two policies well suited for studying how project-specific industrial policy shapes political investment on both intensive and extensive margins.

3 Background

3.1 The CHIPS and Science Act

The CHIPS and Science Act of 2022 represents the largest direct federal investment in semiconductor manufacturing in U.S. history, committing $52.7 billion in subsidies to support domestic production, research, and workforce development (Bown and Wang, 2024). Its passage reflected a convergence of distinct pressures that had been building for several years.

By the early 2020s, U.S. policymakers viewed increasing dependence on semiconductors made in East Asia as a national security vulnerability given rising tensions with China and the importance of chips to defense and emerging AI industries. The COVID-19 pandemic made this dependence visible by producing chip shortages that disrupted automobiles, electronics, medical devices, and other manufacturing sectors. At the same time, China's large-scale investment in its domestic semiconductor industry intensified concerns that U.S. firms would lose technological leadership without comparable scale of state intervention.

Despite growing bipartisan consensus on the importance of semiconductors, the legislative path to enactment was strained by disagreements on implementation details and priorities. That the CHIPS Act was entangled with more polarizing bills such as the IRA as part of the legislative bargaining process did not help. The Endless Frontier Act, which formed the intellectual basis for much of what would become the CHIPS Act, was introduced in May 2020 but died in committee. The Senate passed the United States Innovation and Competition Act in April 2021, which incorporated provisions to fund semiconductor manufacturing facilities. A House-Senate conference then reconciled the USICA with the House's America COMPETES Act over the course of 2022, and President Biden signed the resulting CHIPS and Science Act into law in August 2022. This extended legislative timeline is central to our empirical design: the two-year window between credible legislative momentum and final passage provides substantial variation in the timing of firms' anticipatory lobbying responses.

The allocation of CHIPS funds was designed to be competitive and discretionary. Rather than distributing subsidies formulaically across the industry, the Department of Commerce administered a grant application process in which firms submitted proposals for specific manufacturing investments. Awards ranged from small research grants to multi-billion-dollar agreements with major manufacturers. This structure ensured that the prospect of large subsidies was known well in advance of their distribution, while their firm-specific allocation remained genuinely uncertain throughout the legislative and early administrative period.

3.2 The Inflation Reduction Act

The green energy transition unfolded through a sequence of legislative events spanning several years, providing another rich environment to assess the extent to which lobbying responses are anticipatory or reactive to specific legislative milestones or policy signals. The first major signal came in February 2019, when Representative Alexandria Ocasio-Cortez and Senator Ed Markey introduced the Green New Deal resolution. The resolution was non-binding and never came close to passage, but its introduction marked a decisive shift in the political salience of clean energy investment. For the first time, a major legislative vehicle framed decarbonization as an occasion for large-scale federal industrial investment. The proposal attracted sustained national attention and forced both parties to take explicit positions on the scope of federal clean energy ambition.

The second major event was the Infrastructure Investment and Jobs Act, signed into law in November 2021. Although primarily a traditional infrastructure bill, the IIJA included $65 billion for clean electricity transmission and $7.5 billion to build a national electric vehicle charging network. The third and most consequential event was the Inflation Reduction Act, signed in August 2022. The IRA directed approximately $369 billion toward climate and clean energy provisions over ten years, deploying a combination of production tax credits, investment tax credits, manufacturing incentives, and loan guarantees (Bistline and Wolfram, 2025). Key provisions included the 45X advanced manufacturing production credit, the 48C qualified advanced energy project credit, the 30D clean vehicle credit, and new credits for clean electricity production and investment. The IRA constituted the largest climate investment in U.S. history and fundamentally altered the financial landscape for green energy industries, which cover solar, wind, electric vehicles, battery storage, and clean hydrogen.

3.3 Parallels between Semiconductor & Green Energy Industrial Policy

The CHIPS Act and the IRA share several structural features that are central to our theoretical argument. The first shared feature is the presence of large rents. In both cases, the legislative process made clear that substantial federal resources would flow to the relevant industries before the precise amount or distribution was determined. In both cases, the expected value of available subsidies was large enough to make political investment rational for firms that might otherwise not have engaged.

The second shared feature is specificity. CHIPS grants were awarded through a competitive application process in which the details of awards to specific projects are subject to prolonged negotiation and administrative discretion. Many IRA tax credits are also awarded on administrative discretion, or subject to eligibility restrictions such as domestic content requirements. The clearest example is §48C, the Advanced Energy Project Credit: firms applied through DOE for an allocation capped at $10 billion, and only selected projects would be awarded out of a competitive process. Finally, how exactly these policy packages would be implemented was not fixed at legislative enactment but was modified over time through administrative proposals and rules. This sustained uncertainty gave firms ongoing incentives to invest politically throughout the legislative and administrative phases, not merely at the moment of passage.

What exacerbates this uncertainty is the polarized politics in the United States over how technology and energy policy should be conducted. Developments under the second Trump administration illustrate that industrial policy implementation remains contested after formal legislative enactment, suggesting that formally legislated awards are not guaranteed to sustain in the current political climate. President Trump's apparent preference for tariffs over subsidies to promote domestic semiconductor manufacturing cast considerable doubt over whether announced CHIPS Act awards would be distributed according to the original terms. Much of what was implemented under Biden was renegotiated. In March 2025, the White House created a United States Investment Accelerator within the Department of Commerce, which is responsible for administering the CHIPS Program

Office and renegotiating existing awards. Subsequent implementation moved toward more transactional award terms: Intel's August 2025 agreement converted unpaid CHIPS grants and related awards into a federal equity stake, while Commerce moved to invalidate the Biden-era Natcast agreement for the National Semiconductor Technology Center and bring the program under NIST control. These changes show that even signed awards may remain exposed to revised milestones and administrative reinterpretation.

The IRA experienced even more implementation uncertainty from political polarization over climate and energy policy. On January 20, 2025, the White House directed agencies to pause disbursements of IRA and IIJA funds pending review, including funds for electric-vehicle charging programs. Litigation followed over whether already-awarded climate and infrastructure funds could be withheld, and federal courts blocked parts of the freeze in cases involving IRA and IIJA grants and EV-charging funds. Congress then used the July 2025 reconciliation law to accelerate the termination of several clean-energy credits, and the administration directed Treasury to enforce the wind and solar phaseout through revised beginning-of-construction guidance. IRS Notice 2025-42 narrowed the path for preserving eligibility by eliminating the five-percent safe harbor for most wind and solar projects and requiring physical work before the statutory deadline.

These developments point to a distinct source of ex post lobbying. After a change in partisan control, firms must defend the terms negotiated with the previous administration from a precarious position. The prospect of political transition therefore extends the need for lobbying beyond simply negotiating for policy passage: beneficiaries continue to lobby to preserve the expected value of prior commitments.

The difference in policy structure between the two cases allows us to assess how much allocation uncertainty is needed to trigger political investment. The CHIPS Act represents a near-ideal case of individualized allocation: a fixed pool of discretionary grants administered through a competitive application process, with explicit winners and losers. The IRA occupies a different position. Its primary instruments are tax credits that are nominally available to any qualifying firm, which more closely resembles the uniform-benefit structure that the collective action literature predicts will suppress political investment. Yet even under this more permissive structure, we find a sharp and sustained increase in green energy firm lobbying. This suggests that the mechanism does not require the extreme form of individualized allocation present in the CHIPS Act. Large rents combined with uncertainty over eligibility and future regulatory implementation appear sufficient to induce significant political investment.

4 Research Design

4.1 Treatment and Control Groups

To show that industrial policy bills increase firm lobbying for eligible firms in semiconductors and green energy, we have to define appropriate control groups for our difference-in-differences strategy. For semiconductors, we compare lobbying trajectories among firms in the electronics and the broader information technology sector. The treatment group consists of semiconductor manufacturers, which are the primary intended beneficiaries of CHIPS subsidies. These firms design, fabricate, or package semiconductor devices and are directly eligible for the manufacturing incentives at the core of the CHIPS Act. We consider two industries as appropriate control groups for semiconductors. The first consists of electronics manufacturers, which produce downstream products that incorporate semiconductors but do not manufacture semiconductors themselves. Prominent examples of non-semiconductor hardware manufacturers include Apple, Dell, and IBM. The second consists of IT, software, and internet firms, which depend on semiconductors as inputs but whose core business activities are even further removed from semiconductor fabrication. These include prominent internet giants like Alphabet Inc, Meta, and Microsoft. Both control industries operate in the broader technology ecosystem and might be expected to share general trends in political engagement as the technology sector continues to gain prominence in the American political economy, but neither has direct exposure to CHIPS subsidies.

Figure 1 plots the aggregate lobbying expenditures of the treated and control sectors with data collected from OpenSecrets/Center for Responsive Politics. The plot shows that semiconductor firms' total lobbying spend (orange) surpassed that of other electronic manufacturers (green), driven primarily by firms who would eventually obtain CHIPS Act subsidies (red). This further suggests that CHIPS Act subsidies could be the key driver for such an increase. Lobbying spending from software/internet firms continued to increase in this period, reflecting the sector's growing size and importance. However, relative to the level of the initial year (2012), lobbying expenditures from semiconductor firms increased faster than internet firms in percentage terms, again driven by eventual CHIPS Act beneficiaries (Figure 2). Figures A1, A2, A3 in the Appendix present stacked bar plots of lobbying spend by individual semiconductors/electronics manufacturing/internet & software firms across years. We see that CHIPS Act recipients such as Intel, Samsung, and Micron increased lobbying spending after 2020, but a lot of semiconductor firms' new lobbying expenditures come from the "other" category, potentially indicating spending from firms new to lobbying.

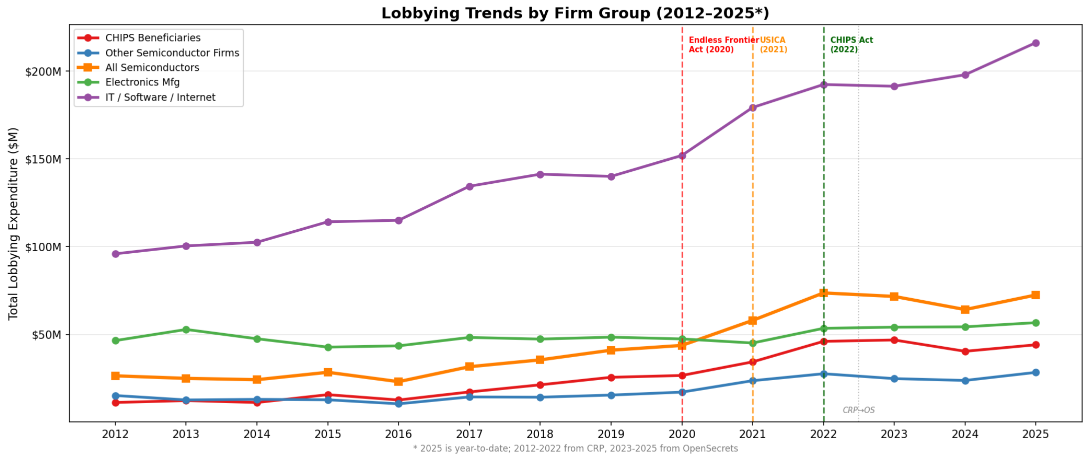

Figure 1: Total Semiconductor Lobbying Spend vs Other Tech Sectors

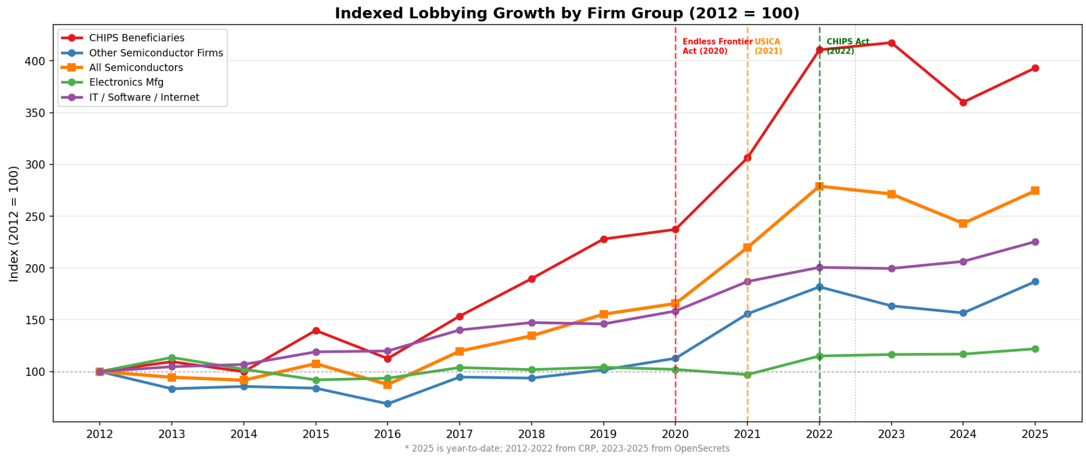

Figure 2: Semiconductor Lobbying Pct Increase from 2012 vs Other Tech Sectors

For the green energy analysis, we compare lobbying trajectories among energy-sector firms in a similar spirit to Kang (2016). The treatment group consists of 467 firms in solar, wind, broad renewables, electric vehicle, and battery sectors, which are the primary beneficiaries of IRA and IIJA clean energy provisions. The control group consists of 1,899 fossil fuel and nuclear firms, which see the green energy transition primarily as a competitive threat rather than a subsidy opportunity. Figure 3 plots aggregate lobbying spending of different energy sectors, while Figure 4 plots the sector's increase relative to 2012. The increase in green energy sector relative to coal, nuclear and oil & gas is particularly striking, driven heavily by the broad renewables sector, which includes battery/EV/electrification firms that are the primary beneficiaries of the IRA. Figures A4 and A5 in the Appendix present by firm/industry association lobbying spend. Again the "other" category dominates the increase in spending after 2019, suggesting again possibility of new entry.

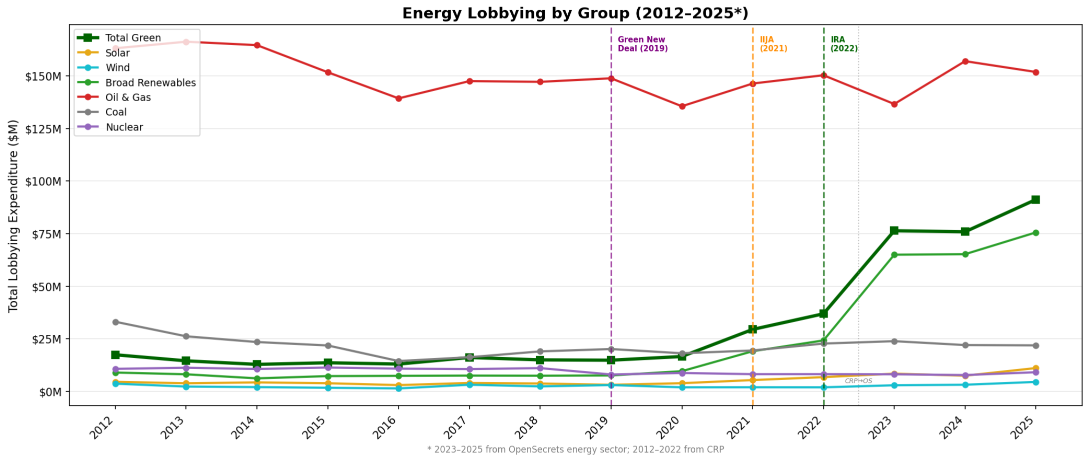

Figure 3: Total Green Energy Lobbying Spend vs Other Energy Sectors

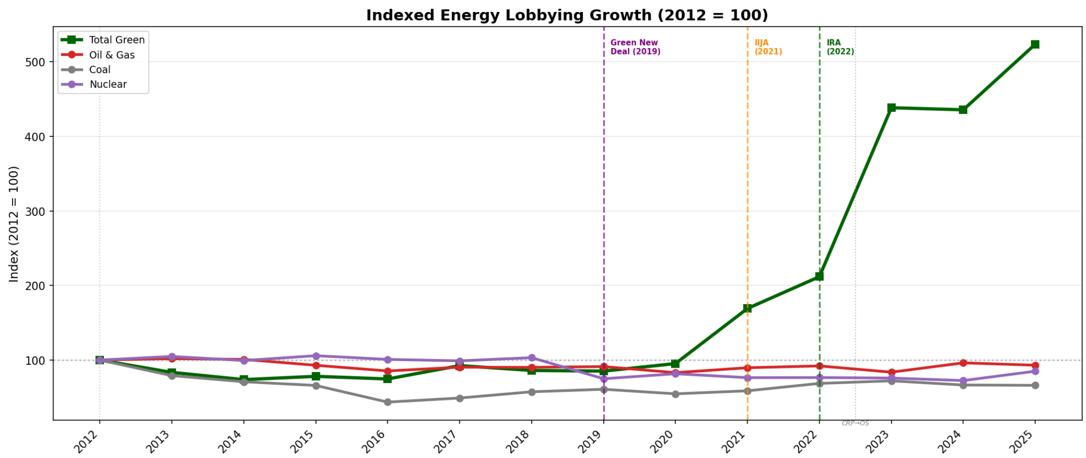

Figure 4: Green Energy Lobbying Pct Increase from 2012 vs Other Energy Sectors

We further highlight differences between the control group choices that are analytically useful. The semiconductor control group consists of downstream customers of semiconductor products. They are indirect beneficiaries of the CHIPS Act, and the public representations of many of these firms also welcome U.S. efforts to reshore domestic semiconductor manufacturing. On the other hand, the control group of green energy firms instead consists of competitors of the subsidized industry that presumably oppose green energy subsidies. These control-group choices are useful because they address different versions of the same identification concern: sector-specific demand shocks may simultaneously increase firm size, raising lobbying capacity, while inducing policymakers to enact industrial policy.

In the semiconductor case, electronics and IT firms share many of the same technology-sector shocks as semiconductor manufacturers, including demand for computing from the artificial intelligence boom, geopolitical concerns toward hardware supply-chain disruptions, and the rising political salience of the digital economy. Their exclusion from direct CHIPS manufacturing subsidies makes them a natural benchmark for assessing whether semiconductor lobbying rose because of general technology-sector conditions or because of direct subsidy eligibility. In the green-energy case, fossil fuel and nuclear firms provide a benchmark within the broader energy-policy environment. They are exposed to common shocks such as energy demand and electrification infrastructure investment, but they see clean-energy subsidies primarily as competitive pressure. Thus, the two designs identify the difference-in-differences between direct industrial policy beneficiaries and the two different types of control groups that are exposed to comparable shocks as the treated: the semiconductor sector's controls are downstream complements, while the green-energy sector's controls are competitors producing substitutes. In both cases, the comparison is intended to separate lobbying responses to broad sectoral demand and supply shocks from lobbying responses to concentrated industrial policy benefits.

4.2 Increase in Lobbying for Semiconductor and Green Energy Firms

To study whether the timing of CHIPS Act-related legislation affects semiconductor firms' lobbying behavior, we compare lobbying trajectories among technology firms, distinguishing 83 semiconductor firms—the primary intended beneficiaries of CHIPS subsidies—from two control groups: electronics manufacturers and IT/software firms that total 353 firms in a sample from 2012–2025. Of these, 22 treated firms and 72 control firms were founded after 2012. If lobbying expenditure is not observed for a firm in a year after the firm's founding year, we assume the firm spends zero dollars in lobbying. Our event study estimates the differential change in lobbying among semiconductor firms following the introduction of the Endless Frontier Act in May 2020, the passage of USICA by the Senate in April 2021, and the signing of the CHIPS Act in August 2022. The estimating equation takes the form:

$$\text{Lobbying}_{ft} = \sum_{k \neq -1} \beta_k \left(\text{Exposure}_f \times \mathbf{1}[t - T_0 = k]\right) + \gamma_f + \delta_t + \varepsilon_{ft} \tag{1}$$

where Lobbying_{ft} is the inverse hyperbolic sine transformation of lobbying expenditure by firm f in year t, Exposure_f indicates membership in the semiconductor treatment group, γ_f are firm fixed effects, and δ_t are year fixed effects. Standard errors are clustered at the firm level. The reference year is 2020, the year of the Endless Frontier Act. Coefficients on pre-period indicators provide a test of the parallel trends assumption.

We apply the same event study framework to an unbalanced panel of 2,366 energy-sector firms from 2012 to 2025, as some firms were founded after 2012. The treatment group comprises 467 firms in solar, wind, broad renewables, and electric vehicle and battery sectors. The control group comprises 1,899 fossil fuel and nuclear firms, which face the green energy transition as a competitive threat rather than a subsidy opportunity. The reference year is 2018, prior to the introduction of the Green New Deal. Multiple legislative events—the Green New Deal in 2019, the Infrastructure Investment and Jobs Act in 2021, and the Inflation Reduction Act in 2022—allow us to assess whether the lobbying response is anticipatory or reactive, and whether it accelerates as policy certainty increases. All specifications follow equation (1) with outcome $\text{arcsinh}(\text{lobby}_{ft})$, firm and year fixed effects, and standard errors clustered at the firm level.

To address concerns that regressions with "log-like" transformed outcomes are unit sensitive (Chen and Roth, 2024), we also estimate analogous regressions of (1) with a Poisson specification that we estimate with Poisson Pseudo-Maximum Likelihood (PPML):

$$E\Big[\text{Lobbying}_{ft} \mid \text{Exposure}_f, \gamma_f, \delta_t\Big] = \exp\Bigg\{\sum_{k \neq -1} \beta_k \Big(\text{Exposure}_f \times \mathbf{1}[t - T_0 = k]\Big) + \gamma_f + \delta_t\Bigg\} \tag{2}$$

4.3 Extensive vs. Intensive Margin Decomposition

The aggregate lobbying increase includes responses from extensive and intensive margins. On the extensive margin, firms previously uninvolved in lobbying may enter the lobbying market in response to policy uncertainty and the heightened pressure to compete for subsidies. On the intensive margin, incumbent lobbying firms may increase their expenditures for similar motives. We decompose these responses via two estimating equations on the same panel with identical fixed effects and standard error clustering. The extensive margin is estimated via a linear probability model on the indicator $\mathbf{1}\{\text{lobby}_{ft} > 0\}$ using the full panel. The intensive margin is estimated by restricting the sample to firms with any pre-baseline (2018) lobbying activity, retaining zeros within this subset.

We complement the regression decomposition with a dollar-level accounting exercise. For each firm f, we compute average annual expenditure $E_{f,p}$ in the pre-period (2012–2018) and post-period (2019–2025), and classify firms as entrants ($E_{\text{pre}} = 0$, $E_{\text{post}} > 0$), exiters ($E_{\text{pre}} > 0$, $E_{\text{post}} = 0$), or stayers (positive expenditure in both periods). Summing across firms for a particular group $g \in \{$semiconductors, electronics/software/internet, green energy, fossil & nu the per-firm change in lobbying per year for each group g decomposes as:

$$\Delta \bar{E}_g = \frac{1}{N_g} \left[\underbrace{\sum_{\text{Entry}_g} E_{\text{post}}}_{\text{entry}} - \underbrace{\sum_{\text{Exit}_g} E_{\text{pre}}}_{\text{exit}} + \underbrace{\sum_{\text{Stay}_g} (E_{\text{post}} - E_{\text{pre}})}_{\text{intensive}} \right] \tag{3}$$

where N_g is the number of ever-lobbying firms in group g, so that $\Delta \bar{E}_g$ is expressed per firm. This decomposition allows us to assess whether the increase in lobbying reflects the mobilization of new political participants, increased effort by incumbent lobbying firms, or both. We further test industrial policy timings' effect on a firm's entry into lobbying with the event study analogous to (1), but with an indicator on whether the firm f lobbies in year t:

$$1(\text{Lobbying} > 0)_{ft} = \sum_{k \neq -1} \beta_k \left(\text{Exposure}_f \times \mathbf{1}[t - T_0 = k] \right) + \gamma_f + \delta_t + \varepsilon_{ft} \tag{4}$$

4.4 Lobbying and Subsidy Allocation

To examine whether lobbying and political contributions translate into subsidy allocation, we estimate cross-sectional Poisson PPML regressions of CHIPS award dollars received on the firm's political-investment stocks. The estimating equation is as follows:

$$E[\text{Award}_f \mid \mathbf{X}_f] = \exp\Big(\alpha + \beta_L \,\text{Lobby}_f + \beta_C \,\text{Contrib}_f + \gamma_P \,\text{Proj}_f + \gamma_F \,\text{Foreign}_f\Big) \quad (5)$$

where Award_f is the raw dollar value of firm f's CHIPS grant plus loan (zero for non-awardees); Lobby_f and Contrib_f are cumulative lobbying expenditures and federal congressional campaign contributions over a post-policy window; Proj_f is the firm's announced project size; and Foreign_f is an indicator for firms headquartered outside the United States. All dollar regressors are in millions. Two samples are reported: the broad "competitor pool" of all semiconductor firms together with CHIPS awardees (columns 1–2 of Table 2), and the narrower intensive-margin sample of awardees with reported project size (column 3). Column (2) of Table 2 splits the post-policy window into the legislative-push period (2019–2022, spanning the Endless Frontier Act, USICA, and CHIPS Act signing) and the award-rollout period (2023–2024), allowing us to test which phase of political engagement is most strongly associated with allocation outcomes. A positive β_L in column (1) would indicate that policy-period lobbying tracks subsidy capture; a positive β_L on the 2023–2024 sub-window in column (2), conditional on 2019–2022 lobbying, would suggest that engagement during the bureaucratic award-allocation phase predicts award size above and beyond engagement during legislative passage.

4.5 Campaign Contributions and Roll-Call Voting

To examine whether campaign contributions from semiconductor firms influenced legislative support for the CHIPS Act, we estimate OLS regressions of representative votes on HR4346, the roll-call vote on final passage of the CHIPS Act, on contributions received from semiconductor firms and a set of representative-level controls:

$$\text{Vote}_i = \alpha + \beta_1 \log(\text{SemiContrib}_i + 1) + \beta_2 \text{Constituency}_i + \mathbf{X}_i' \gamma + \varepsilon_i \tag{6}$$

where Vote_i equals one if representative i voted Yea on HR4346 and zero otherwise. $\log(\text{SemiContrib}_i + 1)$ is the natural log of total contributions from semiconductor firms received in the 2022 election cycle. Constituency_i indicates that the representative's district contains at least one pre-existing semiconductor manufacturing facility. Controls include committee membership, legislative effectiveness, ideological distance from the floor median, seniority, and vote share in the prior election. We estimate the model on the full House sample and separately for Republican representatives, replacing distance from the floor median with distance from the party median in the Republican-only specifications. State fixed effects are included in the third specification of each sample.

The CHIPS Act passed the House with broad Democratic support but Republican opposition, creating meaningful cross-sectional variation in the outcome variable that is concentrated among Republican representatives. Among Democrats, the bill was largely a party-line vote, leaving little variation for contributions or constituency factors to explain. We therefore focus particular attention on the Republican subsample, where ideological heterogeneity within the party generated genuine variation in voting behavior. Within this group, we examine whether Republican representatives who received larger contributions from semiconductor firms were more likely to cross party lines and support the bill, and whether representing a district with existing semiconductor manufacturing capacity independently predicted Yea votes.

5 Results

5.1 Lobbying Expenditures

Figure 5 shows the event-study estimates that compare lobbying activity among semiconductor firms with electronics manufacturers and IT/software firms from 2012 to 2025, using 2020 as the reference year. The coefficients before 2020 are generally close to zero and statistically insignificant, suggesting that semiconductor firms followed similar lobbying trends as the control groups before the legislative push for CHIPS subsidies.

The pattern changes after 2020. Lobbying activity among semiconductor firms begins to increase relative to the control group in 2021, following Senate passage of USICA, and the gap becomes larger in 2022 and 2023. The estimates remain positive and statistically significant through 2024 and 2025, indicating that the increase in lobbying continued after passage of the CHIPS Act rather than ending once the legislation was signed into law.

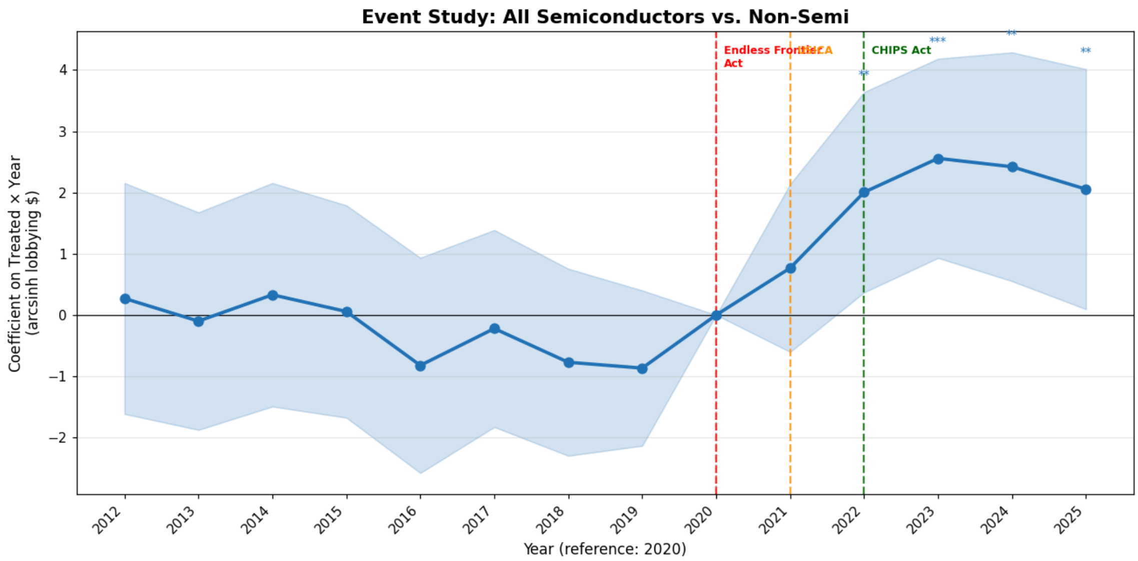

Figure 5: All Semiconductors vs. Electronics Manufacturers + IT/Software, 2012–2025

Figure 6 shows the event-study estimates for the green energy case, comparing lobbying activity among clean energy firms with fossil fuel and nuclear firms from 2012 to 2025, using 2018 as the reference year. Similar to the semiconductor case, the coefficients before the major policy changes are generally close to zero and statistically insignificant, suggesting that clean energy firms followed similar lobbying trends as the control groups before the expansion of green energy subsidies. The pattern changes after 2021. Lobbying activity among clean energy firms increases relative to the control group following passage of the IIJA and continues to rise through enactment of the IRA in 2022. The estimates remain positive and statistically significant through 2025, suggesting that firms continued increasing political activity during the implementation and allocation stages of the policy period. Both event study results are robust to the alternative PPML specification presented in Equation (2), which is shown in Appendix Table A1 and Figures A6 & A7.

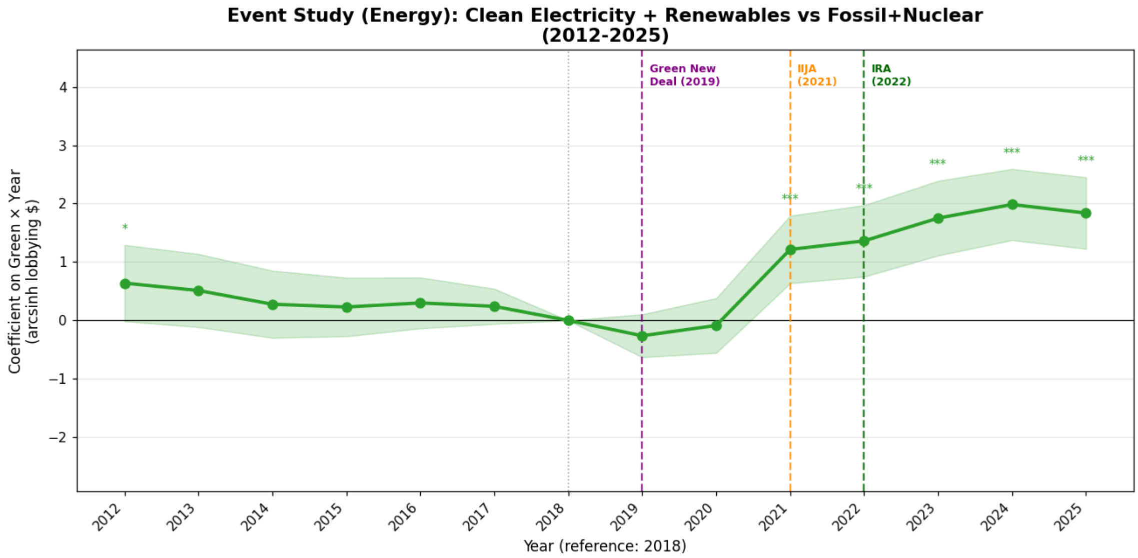

Figure 6: All Green vs. Fossil + Nuclear, 2012–2025

We also conduct the same event study analysis for campaign contribution from semiconductor firms (see Appendix Figures A8–A11 for details). However, it yields no evidence of a post-2020 treatment effect, consistent with a large body of prior literature suggesting that direct campaign contributions are not the primary instrument through which firms exercise political influence. Our finding mirrors this broader pattern: semiconductor firms' lobbying activity responds sharply to the CHIPS Act legislative process while their contribution patterns do not, suggesting that these firms channeled their political investments primarily through the lobbying channel.

As discussed, the fossil fuel and nuclear firms used as the control group faced the green energy transition mainly as a competitive challenge rather than as a source of subsidies. As a result, differences in lobbying trends between the two groups more clearly reflect opposing policy incentives. This differs from the semiconductor case, where electronics manufacturers and IT/software firms may also have expected indirect benefits from CHIPS subsidies as downstream technology users. If some firms in the semiconductor control group also increased lobbying in anticipation of policy benefits, the estimated treatment effect may understate the full difference between semiconductor firms and firms without policy exposure. The fact that the post-2020 coefficients remain large and statistically significant nonetheless suggests a substantial lobbying response among semiconductor firms. This is consistent with our theoretical claim that firm-specific subsidies make lobbying for subsidies strategic complements among potential beneficiaries, as obtaining a larger share of the pie of CHIPS grants confers advantages in the product market. This is further illustrated by the substantial extensive margin response following the industrial policy bills observed below.

5.2 Entry: How Industrial Policy Reshapes the Lobbying Market

The increased lobbying observed for semiconductors and green energy firms could come from greater spending by firms already active in politics or the entry of firms that had not previously lobbied. The distinction matters because entry changes the composition of organized interests, resulting in more firms participating in politics within an industry.

Entry is also evidence that firm-specific discretionary subsidies diminish free-riding incentives, forcing entrants to overcome the fixed costs of establishing presence in Washington to influence the rules and administrative discretion of the subsidy programs. As lobbying is known to be persistent at the firm level, one consequence is that interests of a broader group of firms in the industry could be represented in Washington.

The upper panels in Figures 7 and 8 report the coefficients from the event study specification in (4). The results suggest that relative to other tech firms, semiconductors are about 21 percentage points more likely to lobby in 2022 when the CHIPS Act was signed, rising to a peak of 23 percentage points by 2023. Green energy firms are 10 percentage points more likely to lobby in 2022 following IRA passage, rising to a peak of 15 percentage points by 2024. To test intensive margin effects, we also run the same event study specification as (1), with lobbying spending as the outcome, on the subset of treated and control firms *who have lobbied prior to 2018.* The coefficients are plotted in the bottom panel of Figures 7 and 8. For these incumbent lobbying firms, lobbying spending also increased.

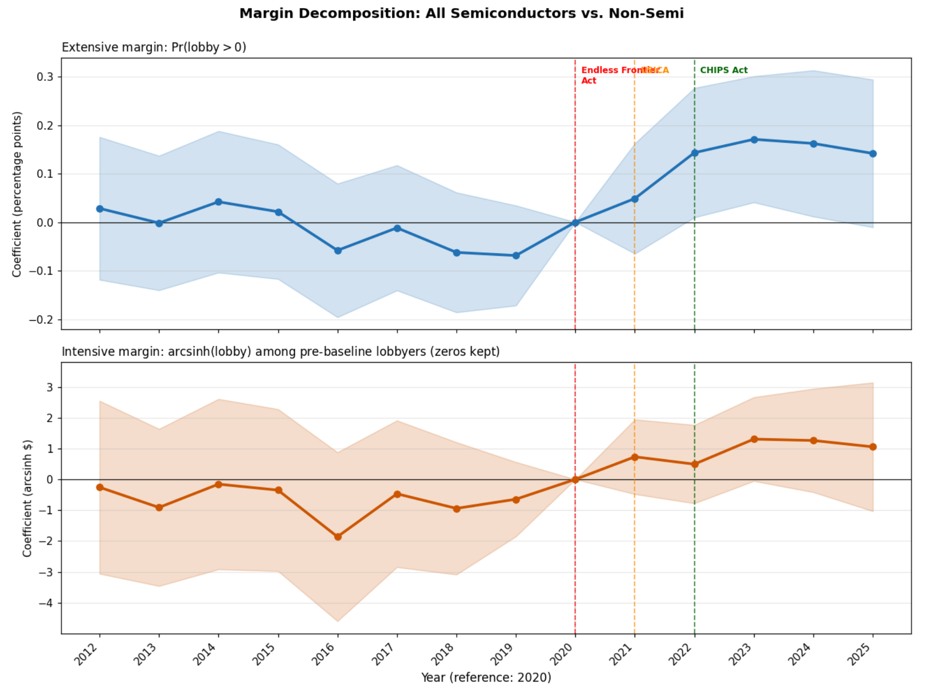

Figure 7: Extensive & Intensive Margin Responses: Semiconductors

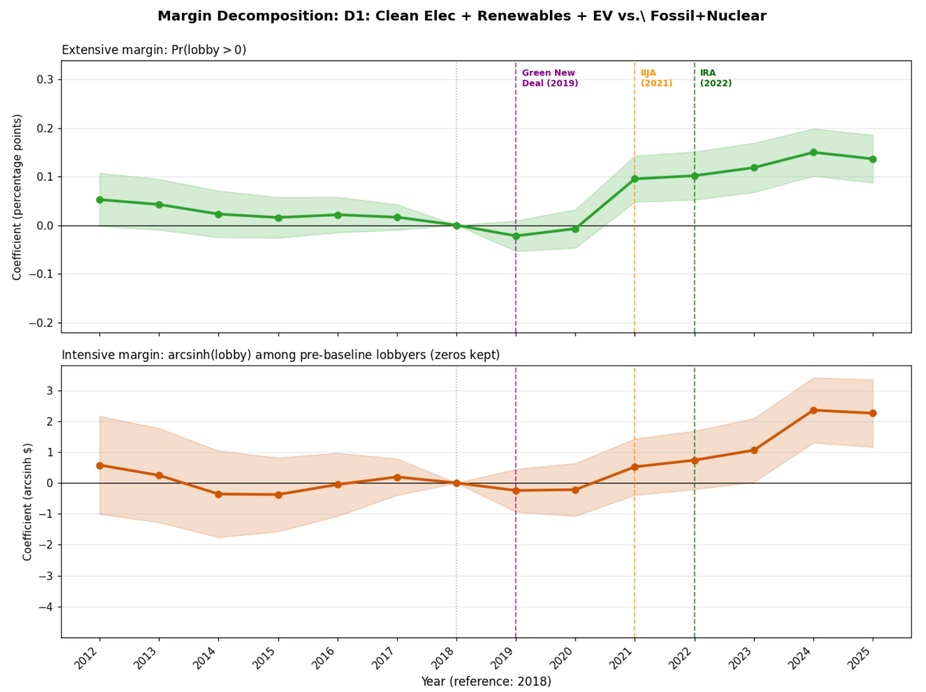

Figure 8: Extensive & Intensive Margin Responses: Green Energy

Poisson PPML robustness. The arcsinh transformation handles zeros at the cost of a non-standard functional form. As a robustness check, we re-estimate the event study with Poisson pseudo-maximum likelihood (PPML), using the raw expenditure level as the outcome. Figures A12 and A13 show the PPML analogue of the margin decomposition, with the top panel estimated on the full panel (combining extensive and intensive variation) and the bottom panel restricted to pre-baseline lobbying firms (isolating the within-incumbent response). Pre-trends remain flat and post-treatment coefficients are positive and statistically significant in both cases, confirming the qualitative pattern from the arcsinh specification. The full PPML regression tables are reported in Appendix Table A1.

Table 1 shows that both extensive and intensive margins are empirically important. The decomposition is computed over firms that lobbied in at least one year of the panel ("ever-lobbying firms") and is reported as average lobbying per firm. Among semiconductor firms, average annual lobbying per firm rose by $420.6 thousand between the pre-period (2012–2018) and the post-period (2019–2025). New entrants account for $164.2 thousand, or 39 percent of the increase, while incumbent lobbying firms account for $256.4 thousand, or 61 percent. The semiconductor case therefore does not fit a simple fixed-cost story in which the response is concentrated entirely among firms already familiar with the lobbying process: although incumbents contribute the larger share, previously inactive firms still account for almost two-fifths of the increase. The expected value of CHIPS subsidies appears large enough to draw previously inactive firms into the lobbying market while also inducing incumbent firms to raise spending.

The green-energy case shows an even stronger extensive-margin response. Treated green-energy firms increased per-firm annual lobbying by $102.5 thousand, with entry contributing $66.3 thousand, or about 65 percent of the net change. Exit reduces the total by $14.8 thousand, so the entry component still exceeds one-half of the net increase. At the same time, incumbent green-energy lobbying firms also raised spending ($51.0 thousand, or 50 percent), while fossil fuel and nuclear firms in the control group experienced a net decline in lobbying despite substantial entry. This contrast suggests that the IRA and related clean-energy programs did not merely coincide with a general increase in energy-sector lobbying. They changed which firms found lobbying worthwhile, shifting political activity toward firms positioned to benefit from clean-energy subsidies.

Table 1: Decomposition: Extensive vs. Intensive Margins of Lobbying Response

	Semi (CHIPS)		Green (IRA)	
	Treated	Control	Treated	Control
Sample composition (ever-lobbying firms)				
# firms	82	349	271	1,035
Entrants	50	155	98	241
Exiters	0	3	99	361
Stayers	32	191	74	433
Per-firm lobby flows ($k/firm/yr)				
Pre-period (2012–2018)	292.6	340.5	54.1	180.9
Post-period (2019–2025)	713.2	635.3	156.6	173.0
Δ per firm ($k/yr)	**+420.6**	+294.7	**+102.5**	−7.7
Entry	164.2 (**39%**)	100.6 (34%)	66.3 (**65%**)	31.0
Exit	0.0 (0%)	−0.2 (0%)	−14.8 (−14%)	−27.5
Intensive	256.4 (**61%**)	194.3 (66%)	51.0 (**50%**)	−11.2

Notes: Sample restricted to firms with positive lobbying in at least one year of the panel ("ever-lobbying firms"). *Entrant*: $0 in every year of the pre-period, positive in at least one year of the post-period. *Exiter*: reverse. *Stayer*: positive in both periods. The decomposition is exact: Δ = Entry + Exit + Intensive (Exit is negative by sign convention). Shares of Δ in parentheses for treated columns; control shares omitted in the Green sample because Δ(Fossil+Nuclear) is negative and small relative to its components. Pre-period is the annual mean over 2012–2018; post-period over 2019–2025.

5.3 Lobbying, Contributions, and CHIPS Subsidy Allocation

We report the results of Equation (5) in Table 2. In the single-window specification (column 1), each additional million dollars of 2019–2024 lobbying is associated with a 6.8% increase in expected CHIPS award value across semiconductor firms ($\hat{\beta}_L = 0.066$, $p < 0.01$). When the post-policy window is split (column 2), aggregate lobbying in 2019–2022 is small and statistically indistinguishable from zero once 2023–2024 lobbying is held fixed ($\hat{\beta}_L^{19-22} = 0.042$), while the coefficient on 2023–2024 lobbying rises to $\hat{\beta}_L^{23-24} = 0.449$ ($p < 0.01$). At the median post-CHIPS lobby budget of a major awardee ($2.5 million in 2023–2024) this implies a multiplicative effect on expected award value of $\exp(0.449 \times 2.5) - 1 \approx 207\%$, or an additional roughly $2.3 billion on top of the $1.1 billion mean award. The result is consistent with rent extraction during bureaucratic allocation rather than vote-buying during legislative drafting: firms that lobbied harder while the Department of Commerce was negotiating individual award packages received larger packages, even conditional on project scale, foreign status, and on whether they had already lobbied through the legislative cycle, consistent with the returns of ex-post lobbying found in You (2017).

The intensive-margin specification on awardees alone (column 3) confirms that the relationship is not driven only by selection into the award pool. Among the 28 firms that both received an award and disclosed a project size, each additional million dollars of 2019–2024 lobbying corresponds to a 4.7% increase in expected grant amount ($\hat{\beta}_L = 0.046$, $p < 0.01$), holding project size and foreign status fixed. Translated to dollars at the average within-winner award of $1.4 billion, the implied marginal return is on the order of $66 million in additional award per $1 million of post-policy lobbying. The industry-wide ratio is consistent in order of magnitude: the semiconductor sector spent approximately $1.7 billion on lobbying over 2019–2024 and received $39 billion in CHIPS grants and loans, a realized average of roughly $23 per dollar lobbied. The intensive-margin estimate in column (3) lies below this aggregate ratio because it isolates the within-winner conditional return after project scale and foreign status are partialed out, whereas the aggregate ratio bundles selection and intensive allocation into a single average.

Project size remains the single largest determinant of award magnitude. A coefficient of 2×10^{-5} per million of project value implies that a \$100 billion announced project — the Intel, Micron, and TSMC tier — raises expected award by $\exp(0.02 \times 100) - 1 \approx 640\%$ relative to a one-billion-dollar baseline project. The Foreign indicator carries a large positive coefficient in the pooled single-window specifications (columns 1 and 3) but collapses to zero in the split-window specification (column 2). This pattern suggests that the foreign-firm award premium operates through the timing of political engagement rather than through firm origin per se: foreign awardees increased United States lobbying during 2023–2024 and were rewarded in the allocation. Once the 2023–2024 lobby variable is included separately, it absorbs the within-foreign variation that the pooled Foreign indicator was previously capturing.

Campaign contributions show a more muted pattern. Total contributions over 2019–2024 carry positive but statistically insignificant coefficients in both the broad and the intensive samples (columns 1 and 3). The split specification (column 2) decomposes this null into a borderline-positive legislative-push coefficient and a borderline- negative award-window coefficient, both significant only at the 10% level. Taken together with the much sharper lobbying results, the evidence is consistent with corporate political activity operating primarily through the lobbying channel during the CHIPS award-allocation phase rather than through direct contributions to federal candidates.

Table 2: Lobbying, Contributions, and CHIPS Award Allocation

	(1)	(2)	(3)
Sample	Semi ∪ Award	Semi ∪ Award	Awardees w/ proj
Window	2019–2024	2019–22 + 23–24	2019–2024
Lobby 2019–24 ($M)	0.066***		0.046***
	(0.024)		(0.013)
Lobby 2019–22 ($M)		0.042	
		(0.039)	
Lobby 2023–24 ($M)		0.449***	
		(0.150)	
Contrib 2019–24 ($M)	0.085		0.078
	(0.081)		(0.051)
Contrib 2019–22 ($M)		2.651*	
		(1.421)	
Contrib 2023–24 ($M)		-10.305*	
		(5.402)	
Project Size ($M)	0.00002***	0.00001***	0.00001***
	(0.00000)	(0.00000)	(0.00000)
Foreign (1/0)	1.156***	-0.001	1.064***
	(0.327)	(0.445)	(0.225)
N	184	184	28

Notes: Poisson PPML, level-on-level. LHS is the raw dollar value of the CHIPS award (grants plus loans; zero for non-awardees). Columns (1)–(2) use the broad competitor pool of semiconductor firms and CHIPS awardees; column (3) restricts to awardees with reported project size. Column (1) collapses political investment into a single 2019–2024 window; column (2) splits it into the legislative-push (2019–2022) and award-rollout (2023–2024) sub-windows. All dollar regressors in millions of dollars. Foreign = 1 for non-US-headquartered firms. Coefficients are semi-elasticities; HC1 standard errors in parentheses. $^{***}p<0.01$, $^{**}p<0.05$, $^{*}p<0.1$.

5.4 Roll-Call Voting: The Limits of Campaign Contribution

A simple cross-tabulation reinforces this pattern. As shown in Tables A2 and A3, the highest Yea rates in both the full sample and the Republican-only sample are concentrated among representatives whose districts contain a semiconductor facility and who received contributions from semiconductor firms, suggesting that constituency exposure and contribution receipt are complements rather than substitutes in predicting support for the CHIPS Act.

Table 3 presents OLS estimates of the determinants of representative votes on HR4346. Contributions from semiconductor firms are positively associated with Yea votes in both the full sample and the Republican-only sample, but the coefficients are small and statistically indistinguishable from zero across all specifications. The introduction of state fixed effects in columns (3) and (6) does not change this pattern.

Constituency exposure shows a more substantive pattern. Representatives whose districts contain pre-existing semiconductor manufacturing facilities are significantly more likely to vote Yea in both the full sample and the Republican-only sample, though the effect loses significance once state fixed effects are included. This attenuation suggests that the constituency effect is partly driven by geographic clustering of semiconductor facilities within particular states rather than district-level exposure per se.

In the full sample, the dominant predictor of vote choice is party affiliation rather than any economic or constituency factor, reflecting the near-unanimous Democratic support for the bill. Restricting attention to Republican representatives reveals more meaningful variation. Among Republicans, distance from the party median is negative and significant, indicating that more moderate members were more likely to cross party lines and vote in favor of the CHIPS Act.

Table 3: OLS Estimates: Vote on HR4346 (CHIPS and Science Act)

	Full Sample			Republican Only		
	(1)	(2)	(3)	(4)	(5)	(6)
log(Semi Contrib +1)		0.003	0.001		0.009*	0.001
		(0.003)	(0.003)		(0.005)	(0.005)
Appropriations Cmte	-0.005	-0.004	0.003	-0.064	-0.074	0.005
	(0.034)	(0.034)	(0.034)	(0.084)	(0.082)	(0.086)
Constituency (semi facility)	0.047**	0.046**	0.029	0.088*	0.087*	0.061
	(0.023)	(0.023)	(0.024)	(0.046)	(0.046)	(0.049)
LES Ratio	0.017	0.017	0.020	0.011	0.012	0.021
	(0.016)	(0.016)	(0.018)	(0.026)	(0.026)	(0.035)
Dist. from Floor Median	-0.514***	-0.494***	-0.493***			
	(0.107)	(0.107)	(0.103)			
Dist. from Party Median				-0.853***	-0.809***	-0.911***
				(0.180)	(0.181)	(0.215)
Seniority	0.003	0.003	0.003	0.001	0.001	-0.000
	(0.003)	(0.003)	(0.003)	(0.007)	(0.007)	(0.008)
Vote Pct	0.000	0.000	0.000	-0.001	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Democrat	0.631***	0.636***	0.651***			
	(0.068)	(0.068)	(0.068)			
N	430	430	430	210	210	210
R^2	0.813	0.814	0.857	0.185	0.197	0.463
Adj. R^2	0.810	0.810	0.836	0.161	0.169	0.307
State FE	No	No	Yes	No	No	Yes

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Dependent variable equals 1 if the member voted Yea on HR4346 (CHIPS and Science Act, July 2022). Columns (1)–(3) use the full House sample; columns (4)–(6) restrict to Republican members. *Constituency* equals 1 if the member's district contains at least one pre-existing semiconductor manufacturing facility (SIA). *log(Semi Contrib +1)* is the natural log of total contributions from CHIPS Beneficiaries and Semiconductor Firms received in the 2022 election cycle. *Dist. from Floor Median* is the absolute DW-NOMINATE distance from the chamber floor median. *Dist. from Party Median* is the absolute DW-NOMINATE distance from the member's party median.

Tables 4 and 5 present mediation analyses examining whether the effect of constituency exposure on vote choice operates through campaign contributions. In both the full sample and the Republican-only sample, the average causal mediation effect is near zero and statistically insignificant, while the direct effect of constituency exposure on voting remains positive and significant. The proportion mediated is effectively zero in both cases.

These results indicate that representing a district with pre-existing semiconductor facilities independently predicts support for the CHIPS Act, but this effect does not run through contributions from semiconductor firms. Constituency exposure shapes vote choice directly, likely through the electoral incentives that come with representing workers and firms in the semiconductor industry, rather than through the financial channel that the contributions literature emphasizes. The result is consistent with Bombardini and Trebbi (2011)'s argument that financial contributions and promised jobs/physical investment are substitutes in generating legislative support.

Table 4: Mediation Analysis: Constituency → Contribution → Vote — Full Sample

Effect	Estimate	95% CI	p-value
ACME (indirect)	0.000	[-0.003, 0.003]	0.978
ADE (direct)	0.088	[0.034, 0.141]	0.002***
Total Effect	0.088	[0.034, 0.141]	0.002***
Prop. Mediated	0.000	[-0.039, 0.041]	0.980

ACME = Average Causal Mediation Effect (indirect path via log contribution). ADE = Average Direct Effect (direct path from constituency to vote). Proportion mediated = ACME / Total Effect. Bootstrap SE with 1,000 simulations. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 5: Mediation Analysis: Constituency → Contribution → Vote — Republican Members Only

Effect	Estimate	95% CI	p-value
ACME (indirect)	0.002	[-0.010, 0.016]	0.784
ADE (direct)	0.089	[-0.002, 0.183]	0.058*
Total Effect	0.091	[-0.001, 0.188]	0.056*
Prop. Mediated	0.011	[-0.265, 0.332]	0.792

ACME = Average Causal Mediation Effect (indirect path via log contribution). ADE = Average Direct Effect (direct path from constituency to vote). Proportion mediated = ACME / Total Effect. Bootstrap SE with 1,000 simulations. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

We further examine whether semiconductor firms strategically directed campaign contributions toward House Representatives representing districts with pre-existing semiconductor manufacturing capacity. Table A4 presents the PPML event study estimates for geographic targeting. Exposed districts received significantly larger contributions in the pre-period (112th–114th Congresses), suggesting that semiconductor firms had already established stronger political ties with representatives from manufacturing-intensive districts prior to any formal legislative activity. However, this pre-existing gap does not widen after the onset of legislative activity: post-period coefficients are small and statistically indistinguishable from zero. The violation of parallel trends in the pre-period precludes a clean causal interpretation of these estimates. Nonetheless, the absence of a post-treatment increase is consistent with the view that semiconductor firms did not escalate geographic targeting of campaign contributions in response to the CHIPS Act legislative process. We use the 116th Congress as the reference period, as it marks the earliest stage of formal legislative discussion around semiconductor industrial policy.

6 Conclusion

This paper has examined how firms respond to large industrial-policy programs in the window between credible legislative momentum and actual distribution of benefits. First, both semiconductors and clean energy firms sharply increase lobbying expenditures following key legislative milestones, with effects that persist well into the implementation period. Second, this response operates on both the extensive and intensive margins. Roughly two-fifths of the increase in semiconductor lobbying and two-thirds of the increase in green-energy lobbying come from firms that had not previously engaged in federal lobbying at all. Third, the same firms that respond strongly on the lobbying margin show no corresponding response in direct campaign contributions, and we find no evidence of geographic targeting of contributions toward members representing exposed districts. The political-investment response is channeled almost entirely through lobbying.

Appendix Section F.1 rationalizes these facts with a two-period signaling model in which firms with privately observed project quality face a policy package that mixes broad industry benefits with firm-specific awards. The model formalizes the distinction between different industrial policies that produce different incentives for firm lobbying: lobbying over whether a policy promising industry-wide benefits passes is subject to collective-action problems, but lobbying over how a fixed pool of rents is allocated across firms is not. When subsidy specificity is high and rivals' awards impose harm from downstream product market competition, free-riding incentives collapse. Lobbying becomes a strategic complement, and previously inactive firms find it worthwhile to pay the fixed cost of political entry. Political turnover further sustains lobbying after enactment because the continuous signal sent to the previous administration via lobbying is not observed by the succeeding administration, while entry status is.

These results bear on three active literatures. For the long-running debate over the returns to political spending, our findings suggest that the puzzle of "too little money in politics" dissolves once we separate vote-buying from allocation-shaping. Firms do not pay to flip roll-call votes; they pay to position themselves for discretionary administrative decisions whose distributive consequences are large and firm-specific. For the literature on the political economy of industrial policy, our results imply that the design choice between broad credits and targeted awards is not neutral with respect to the composition of organized political interests. More individualized allocation draws in more firms and creates more durable political infrastructure, with potentially lasting consequences for the lobbying market long after the original program has been spent. For the literature on firm political organization, the substantial extensive-margin response we document provides direct evidence that major industrial policy can shift the composition of who participates in federal lobbying, not merely how intensively existing participants spend.

Several limitations point to natural extensions. First, we have not exploited within-industry variation in product-market overlap to test the business-stealing mechanism of the model directly, i.e., individual firm awards hurt competitors' profits, generating incentives to lobby not just to increase one's own but to decrease opponents' subsidy share. Second, the model treats the choice of lobbyist as a black box. The fact that most extensive-margin entrants are politically inexperienced raises the question of which intermediaries—lobbying firms, trade associations, or in-house teams—enable entry into the political market, and whether the supply side of lobbying capacity is itself a binding constraint on firms' political investment. Finally, the ongoing renegotiation of CHIPS and IRA awards under the second Trump administration provides a natural setting in which to analyze the model's implication that political transition shifts firm political investment toward re-signaling and entry. We leave these questions to future work.

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Appendix

Supplementary Results

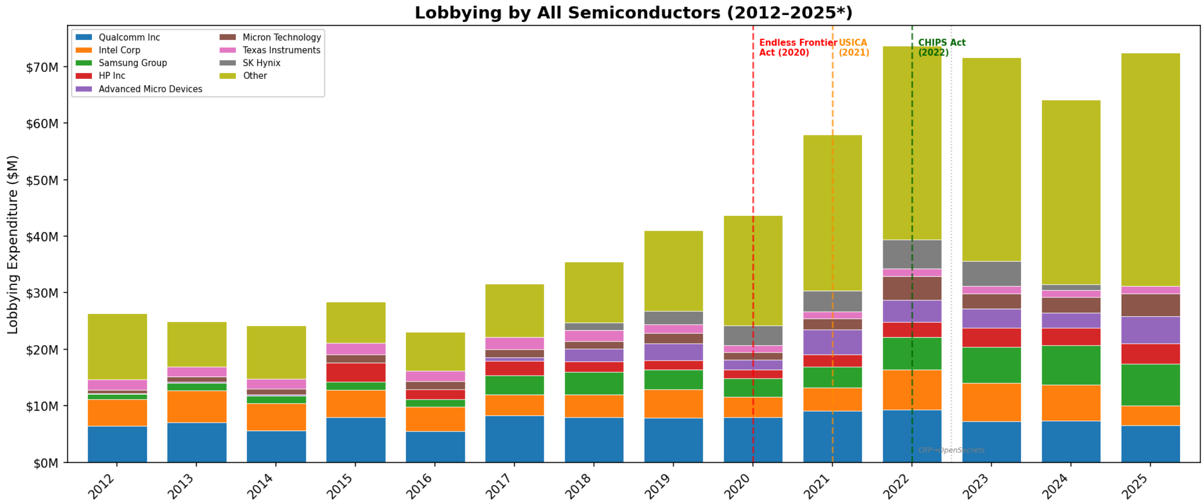

Figure A1: By firm lobbying expenditures, semiconductors

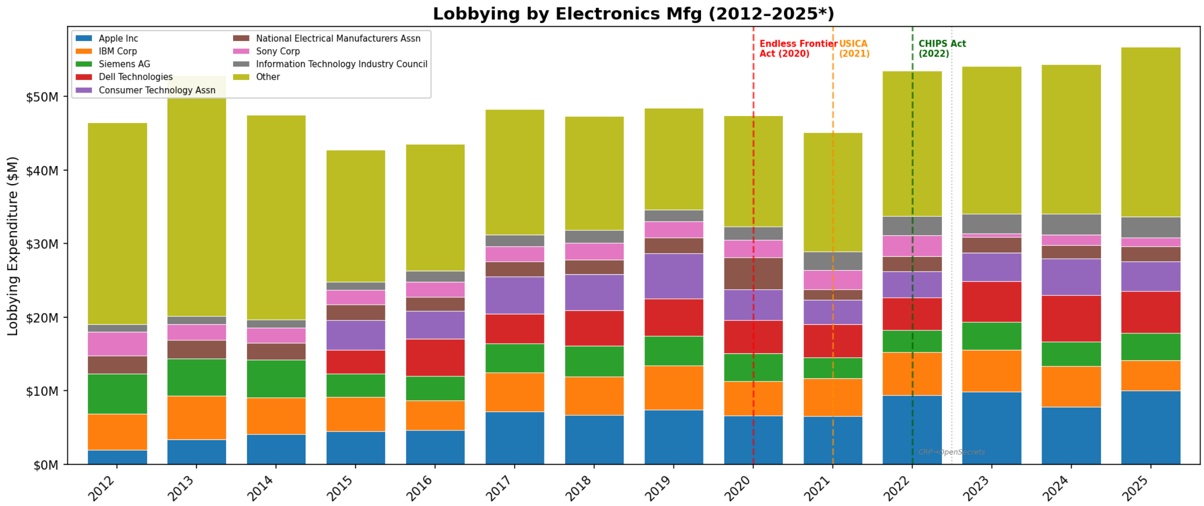

Figure A2: By firm lobbying expenditures, electronics manufacturing

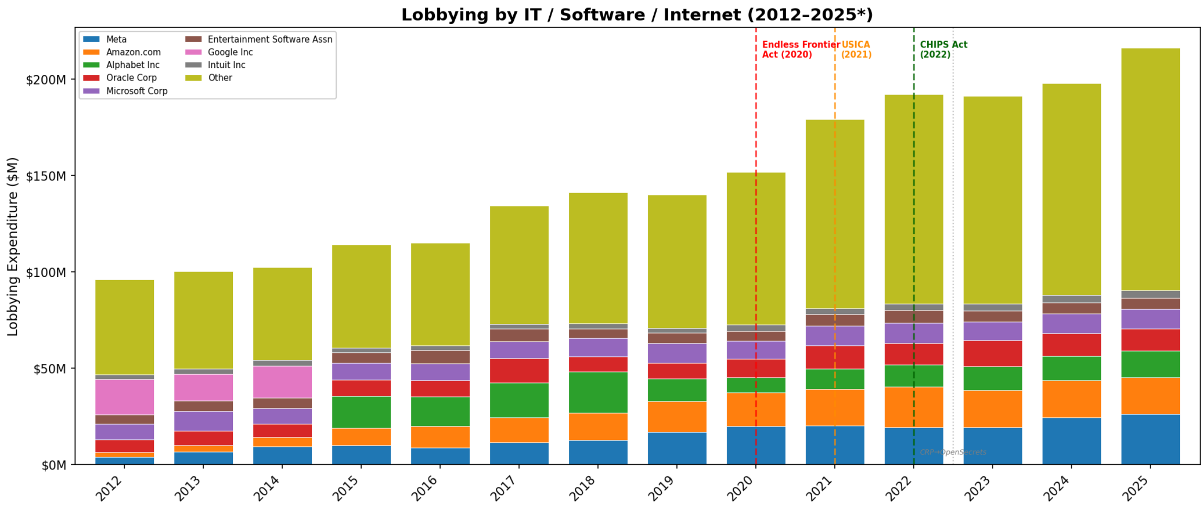

Figure A3: By firm lobbying expenditures, internet/software

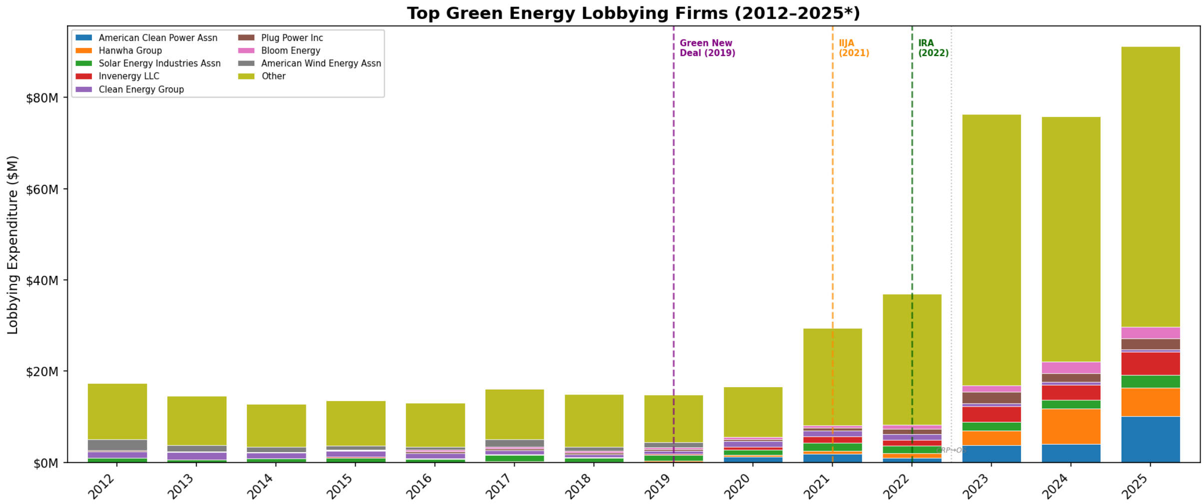

Figure A4: By firm lobbying expenditures, green firms

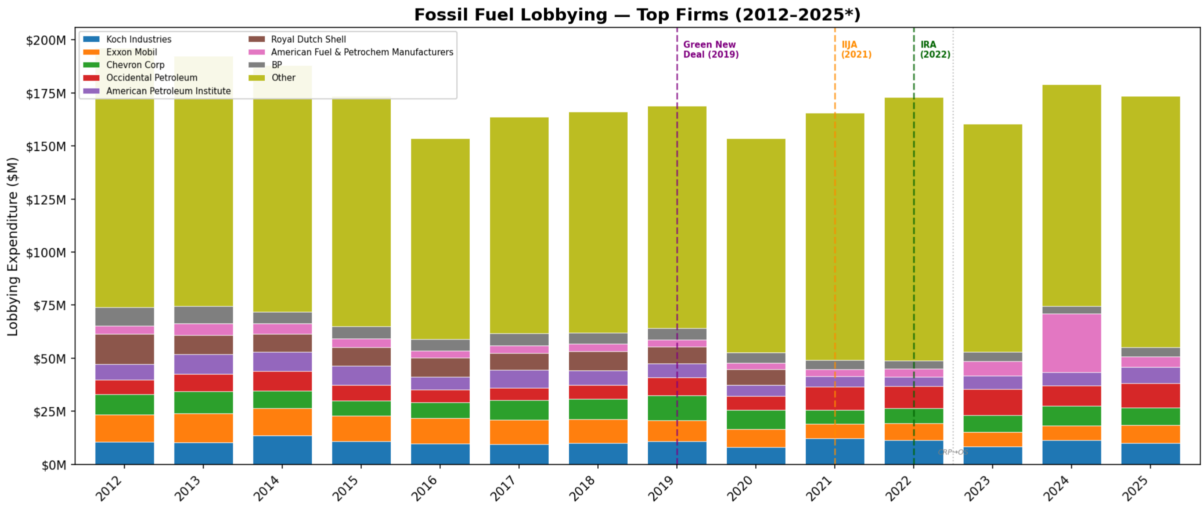

Figure A5: By firm lobbying expenditures, fossil fuel firms

Table A1: Event-Study Estimates: arcsinh and Poisson PPML, Both Cases

	Semi vs. Non-Semi		Green vs. Fossil+Nuclear	
	(1) arcsinh	(2) PPML	(3) arcsinh	(4) PPML
T × 2012	+0.270	+0.146	+0.639*	+0.139
	(0.962)	(0.312)	(0.334)	(0.186)
T × 2013	-0.100	+0.046	+0.512	-0.031
	(0.906)	(0.303)	(0.319)	(0.183)
T × 2014	+0.330	-0.050	+0.277	-0.160
	(0.931)	(0.274)	(0.294)	(0.176)
T × 2015	+0.057	-0.079	+0.230	-0.047
	(0.885)	(0.253)	(0.256)	(0.149)
T × 2016	-0.823	-0.357	+0.299	+0.011
	(0.897)	(0.235)	(0.222)	(0.142)
T × 2017	-0.221	-0.211	+0.241	+0.106
	(0.821)	(0.203)	(0.154)	(0.107)
T × 2018	-0.772	-0.110	–	–
	(0.779)	(0.155)		
T × 2019	-0.867	-0.005	-0.263	-0.010
	(0.647)	(0.106)	(0.187)	(0.107)
T × 2020	–	–	-0.087	+0.071
			(0.239)	(0.147)
T × 2021	+0.766	+0.154**	+1.215***	+0.563***
	(0.699)	(0.078)	(0.295)	(0.174)
T × 2022	+2.005**	+0.308***	+1.362***	+0.751***
	(0.835)	(0.099)	(0.312)	(0.191)
T × 2023	+2.558***	+0.267**	+1.751***	+1.241***
	(0.830)	(0.127)	(0.326)	(0.210)
T × 2024	+2.420**	+0.129	+1.985***	+1.214***
	(0.953)	(0.140)	(0.311)	(0.273)
T × 2025	+2.054**	+0.172	+1.838***	+1.460***
	(1.000)	(0.188)	(0.312)	(0.225)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm
Obs.	5,692	5,632	32,406	17,615
Firms	436	–	2,366	–

Notes: 2012–2025 firm-year panel, trimmed to each firms founding year. Cols. (1), (3): PanelOLS on arcsinh(expenditure). Cols. (2), (4): Poisson PPML on raw $ level with log link; $e^{\beta}-1 = \%\ \Delta$ in expected expenditure vs. the sample reference (Semi: 2020; Green: 2018). Firm and year FE; firm-clustered SE. PPML drops separation observations. $^{***}p<0.01$, $^{**}p<0.05$, $^{*}p<0.1$.

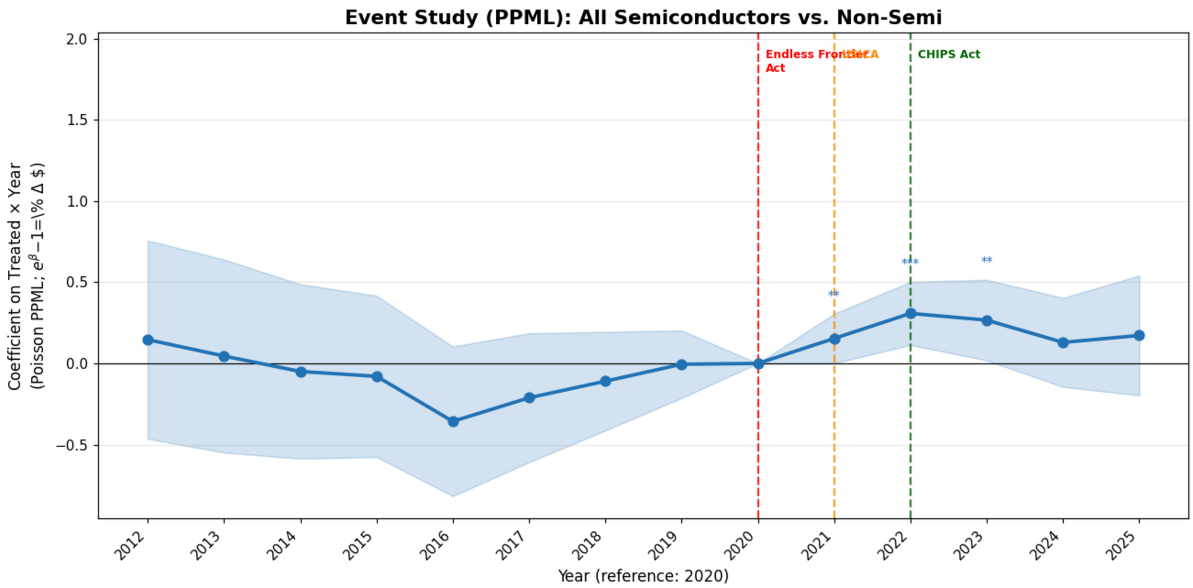

Figure A6: Semiconductors vs other Tech Lobbying Expenditure event study, PPML

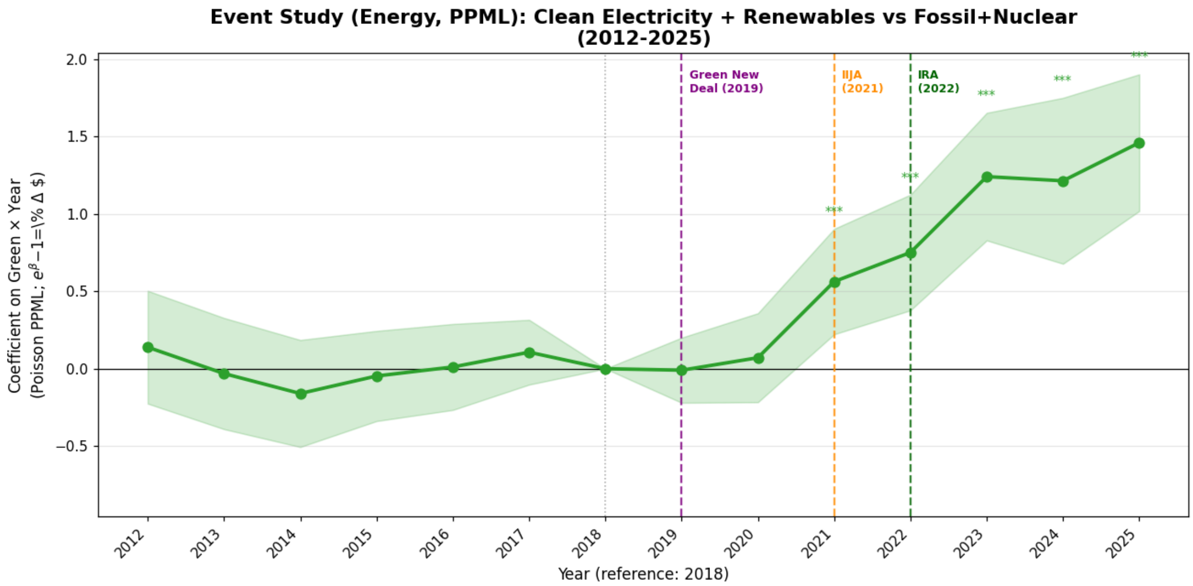

Figure A7: Green vs other Energy Lobbying Expenditure event study, PPML

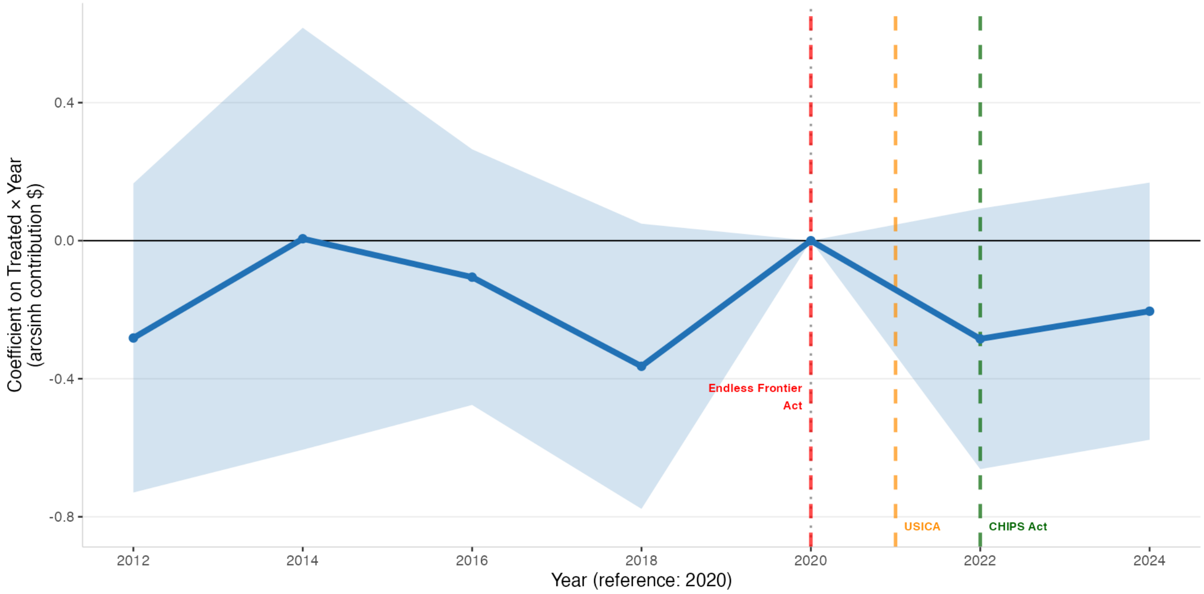

Figure A8: Event study: campaign contributions, all semiconductors vs. electronics manufacturing

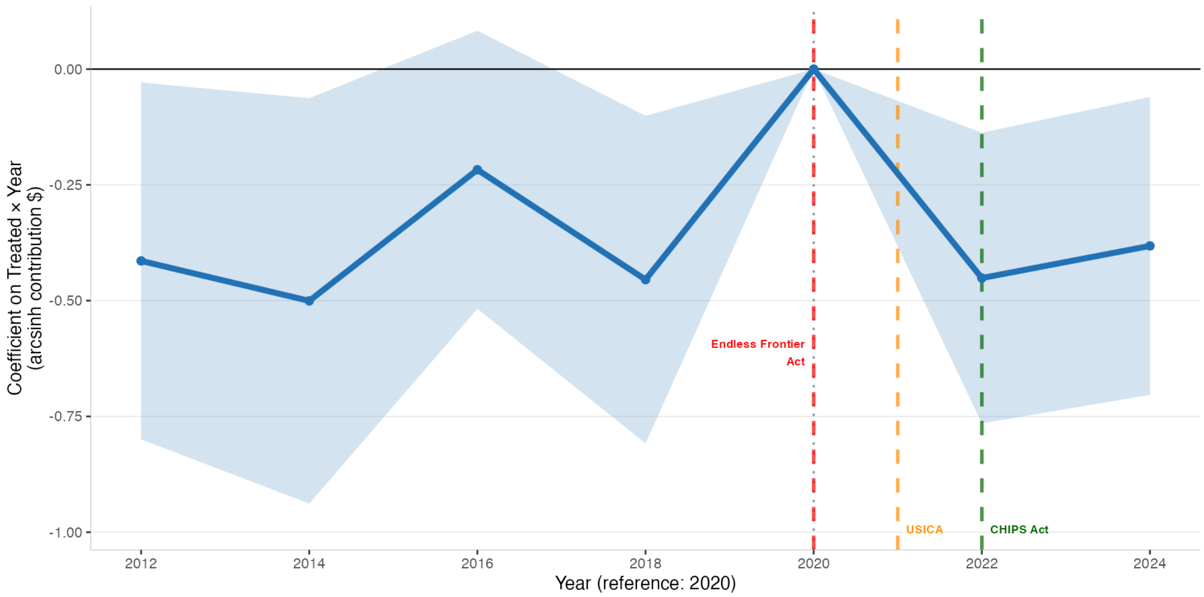

Figure A9: Event study: campaign contributions, all semiconductors vs. electronics manufacturing and IT/software

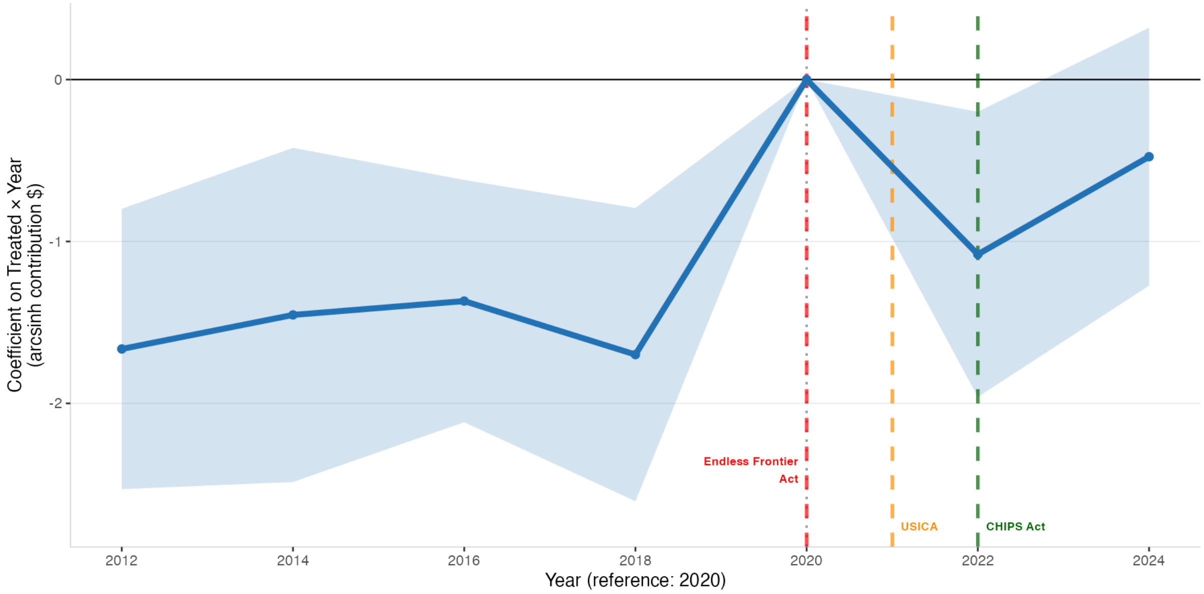

Figure A10: Event study: campaign contributions, CHIPS beneficiaries vs. electronics manufacturing

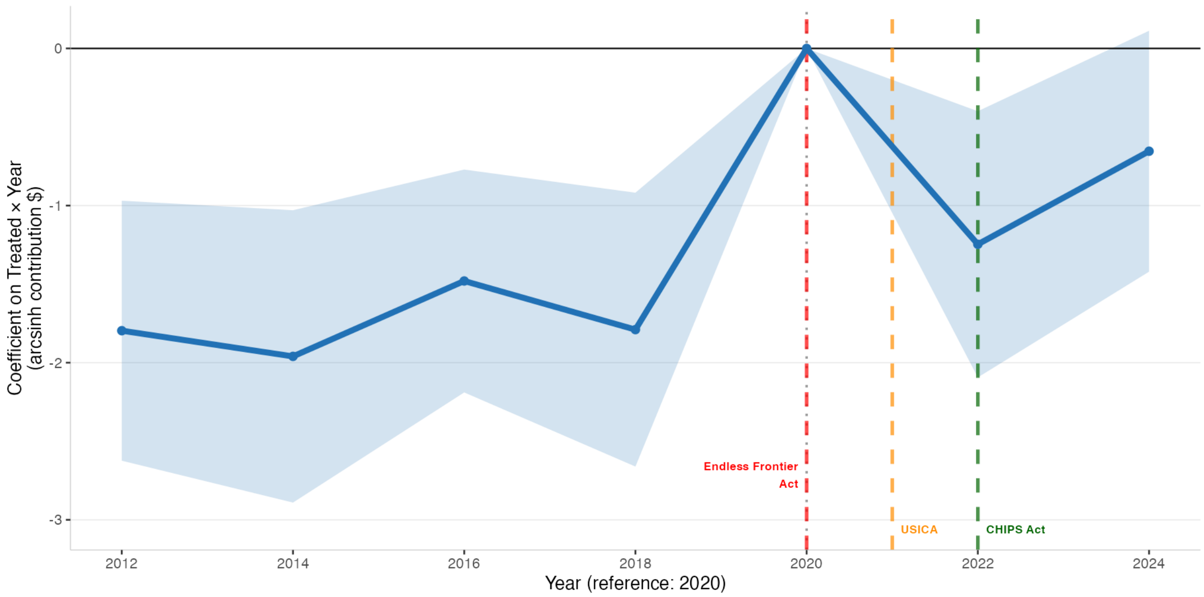

Figure A11: Event study: campaign contributions, CHIPS beneficiaries vs. electronics manufacturing and IT/software

Table A2: Yea Rate by Constituency Exposure and Contribution Receipt: Full Sample

	Contrib = 0	Contrib > 0
Has Facility	0.585 (N=65)	0.73 (N=141)
No Facility	0.316 (N=79)	0.531 (N=145)

Each cell reports the Yea rate on HR4346 with sample size in parentheses. *Has Facility* = constituency contains a pre-existing semiconductor manufacturing facility (SIA). *Contrib* > 0 = member received at least one contribution from CHIPS/Semi firms in the 2022 cycle.

Table A3: Yea Rate by Constituency Exposure and Contribution Receipt: Republican Members Only

	Contrib = 0	Contrib > 0
Has Facility	0.1 (N=30)	0.208 (N=48)
No Facility	0.036 (N=56)	0.118 (N=76)

Each cell reports the Yea rate on HR4346 with sample size in parentheses. *Has Facility* = constituency contains a pre-existing semiconductor manufacturing facility (SIA). *Contrib* > 0 = member received at least one contribution from CHIPS/Semi firms in the 2022 cycle.

Table A4: Event Study DiD: Effect of Semiconductor Facility on Industry Contributions

	PPML	
	(1)	(2)
Event-time interactions: $semi_i \times \mathbf{1}[t - T_0 = k]$		
$\hat{\beta}_{-4}$ *(112th)*	0.356***	0.361***
	(0.129)	(0.128)
$\hat{\beta}_{-3}$ *(113th)*	0.414**	0.422**
	(0.169)	(0.172)
$\hat{\beta}_{-2}$ *(114th)*	0.256*	0.286*
	(0.150)	(0.147)
$\hat{\beta}_{-1}$ *(115th)*	-0.160	-0.097
	(0.119)	(0.103)
$\hat{\beta}_{+1}$ *(117th)*	0.159	0.169
	(0.121)	(0.110)
$\hat{\beta}_{+2}$ *(118th)*	0.195*	0.170
	(0.117)	(0.127)
$\hat{\beta}_0$ *(116th, T_0, baseline)*	0.000	0.000
	(—)	(—)
Controls		
LES Ratio		0.078***
		(0.018)
Dist. from Floor Median		-0.058
		(0.160)
Seniority		0.127
		(0.150)
Vote Pct		0.010
		(0.007)
Democrat		4.126***
		(0.124)
N	2668	2668
Within R^2	—	—
Member + Congress FE	Yes	Yes
Controls	No	Yes
SE	Cluster (State)	Cluster (State)

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Dependent variable is total contributions from CHIPS Beneficiaries and Semiconductor Firms received by House member i in the election cycle corresponding to Congress t. Both columns use Poisson pseudo-maximum likelihood (PPML) to account for the zero-inflated and non-negative outcome; coefficients are interpreted as semi-elasticities. Column (1) includes no additional controls; column (2) adds les_ratio, dist_floor, seniority, votepct, and democrat. $semi_i$ equals 1 if the member's district contains at least one semiconductor facility (SIA), and 0 otherwise. The event-time variable $k = t - T_0$ is defined relative to the 116th Congress (T_0, 2019); the 116th Congress ($k = 0$) is the omitted baseline. All specifications include member and congress fixed effects. Standard errors clustered at the state level in parentheses.

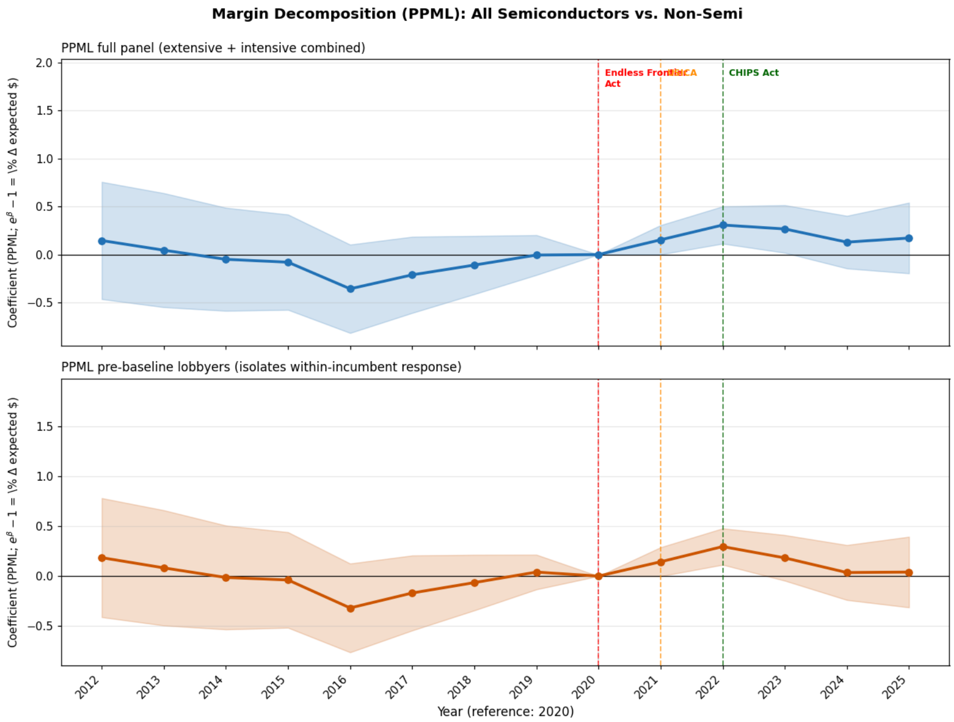

Figure A12: Margin Decomposition (PPML): Semiconductors

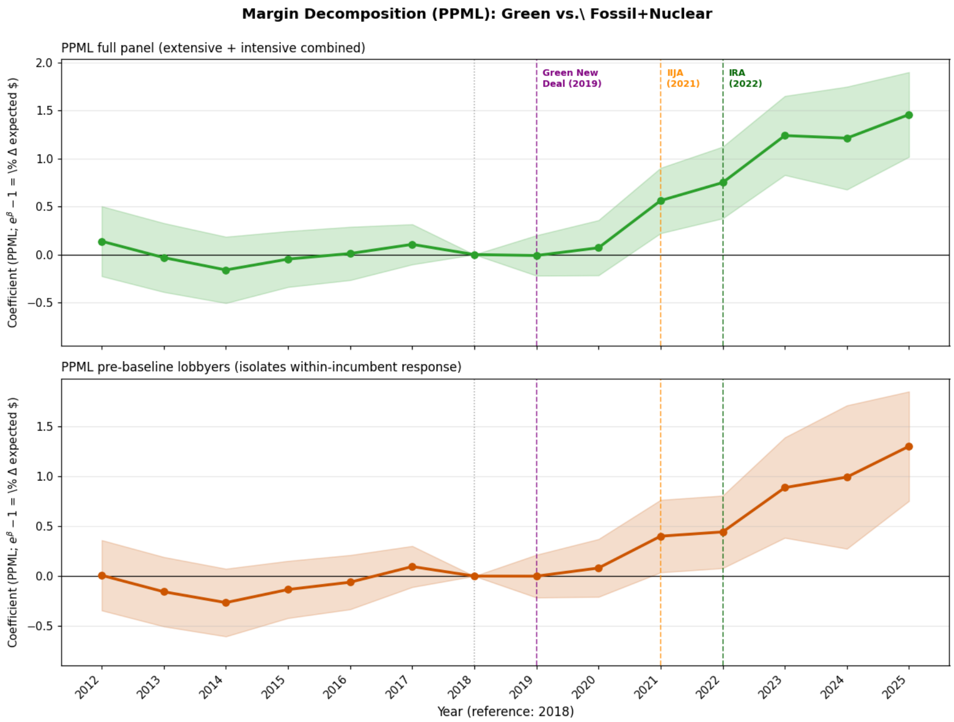

Figure A13: Margin Decomposition (PPML): Green Energy

F.1 Theory

We formalize the mechanism linking industrial policy to firms' political investment. The model distinguishes two types of industrial policies: broad industry benefits and firm-specific awards. Broad benefits are shared across firms, which cover industry-level policies such as trade protection and tax credits. Their non-rival nature induces firms to free-ride on others' lobbying costs. Firm-specific awards are instead rivalrous: a firm's lobbying can increase its own allocation while reducing the relative position of its competitors, especially when subsidies help firms to compete in their respective markets. This distinction matters when large policy rents are expected but allocation remains unresolved.

Political uncertainty could further increase lobbying in equilibrium. Two parties that differ in their sensitivity to subsidy costs could be in office in future periods. The information lobbied is only observed by the incumbent, thus political transition creates the need to re-communicate information via lobbying.

Another feature of the model is that entry into lobbying is itself informative. A set of politically experienced firms have already paid the fixed cost of lobbying at the start of the game, while others have not. Given initial project quality, potential entrants can decide to pay the fixed cost in period 1 or wait until period 2. Because entry is costly, the decision to enter conveys information about project quality. The policymaker therefore observes two types of signals: a discrete entry decision that is always observed and a continuous lobbying expenditure signal that will be lost in political transition.

F.1.1 Environment and Timing

There are N firms indexed by $i \in \{1, \ldots, N\}$. Each firm has a project that may receive industrial-policy support. Project quality in period t is $q_{it} > 0$, which is privately observed by the firm. q_{it} represents the marginal benefit of subsidies from the policymaker's perspective, accounting for the project's net social payoff and the firm's true need for such subsidies.

At the beginning of the game, N_I firms have already paid the fixed cost of entering the lobbying market. Denote this set by $\mathcal{I}_0$. These firms are incumbent lobbying firms. The remaining $N_E = N - N_I$ firms have not paid the fixed cost. Denote this set by $\mathcal{E}_0$, which are the potential entrants.

There are two periods. In period 1, the incumbent party I controls policy. In period 2, the incumbent remains in power with probability $1 - \zeta$, while the other party O takes office with probability ζ. Let T be an indicator for whether political control changes in period 2. Thus $\Pr(T = 1) = \zeta$. The parties differ in their sensitivity to subsidy costs and the size of the total budget.

The timing is as follows: In period 1, all firms observe q_{i1}. Incumbent lobbying firms choose lobbying expenditures $\ell_{i1} \geq 0$. Potential entrants choose whether to enter the lobbying market. Let $e_{i1} \in \{0, 1\}$ indicate that firm i pays fixed cost F and enters. Firms that enter choose $\ell_{i1} \geq 0$. Firms that do not enter cannot lobby in period 1. The period-1 entry decision is observed by both parties, but the informative content of period-1 lobbying is observed only by the incumbent policymaker. The incumbent observes the period-1 signal, forms beliefs, and chooses a broad benefit G_1 and firm-specific allocations $\{x_{i1}\}_{i=1}^{N}$.

Each firm also receives a period-2 quality shock with probability $\delta_q \in [0, 1]$. Let R_i be an indicator that firm i receives a quality shock, so $\Pr(R_i = 1) = \delta_q$, and period-2 quality is $q_{i2} = (1 - R_i)q_{i1} + R_i\widetilde{q}_{i2}$, where $\widetilde{q}_{i2}$ is the new shock privately observed by firm i. This shock captures new project information that was not available in period 1.

In period 2, firms observe political transition T and q_{i2}. Firms that have already paid the fixed cost remain active. Firms in $\mathcal{E}_0$ that did not enter in period 1 may enter in period 2, let $e_{i2} \in \{0,1\}$ denote that firm i enters in period 2. A firm that enters in period 2 pays F and chooses lobbying expenditure $\ell_{i2} \geq 0$. Active firms, firms that have paid the fixed cost, also choose $\ell_{i2} \geq 0$.

The period-2 policymaker observes the entry history and current lobbying. If there is no transition, the incumbent also observes the period-1 lobbying signal. If there is a transition, the new party observes entry decisions but does not observe the informative content of period-1 lobbying. Thus the period-2 signal is

$$z_{i2}(T) = \left(\underbrace{\mathbf{1}\{i \in \mathcal{I}_0\}, e_{i1}, e_{i2}}_{\text{entry status}\in\{0,1\}}, \underbrace{(1-T)\ell_{i1}, \ell_{i2}}_{\text{lobbying spend}\in R_+} \right). \tag{7}$$

Let m_{it} denote the policymaker's posterior belief about firm i's project quality in period t. In period 1, the incumbent observes

$$z_{i1} = (\mathbf{1}\{i \in \mathcal{I}_0\}, e_{i1}, \ell_{i1}), \tag{8}$$

and forms $m_{i1} = E[q_{i1} \mid z_{i1}]$

In period 2, the governing party observes $z_{i2}(T)$ and forms $m_{i2}(T) = E[q_{i2} \mid z_{i2}(T)]$.

F.1.2 Policymaker Payoff

Given observed firm actions and political transition, the policymaker in each period chooses two types of benefits. The first is a broad industry benefit G_t, which benefits all firms in the sector. The second is a vector of firm-specific allocations $\{x_{it}\}_{i=1}^{N}$.

Let $\eta \in [0,1]$ measure the benefit specificity of the policy package, so that firm i's payoff from $\{G_t, x_{it}\}$ is $(1-\eta)G_t + \eta x_{it}$. Higher η corresponds to a setting where the policymaker is more sensitive to project quality and prefers to target resources towards good projects. The CHIPS Act manufacturing subsidies represent a case where η is close to 1. The bulk of subsidies are distributed among firms discriminately depending on project quality, as every firm's proposed project provides different benefits that depend on the firm's technology capabilities and market position. For green industrial policy, the policy package contains more broad-based tax credits. Here, the policy goal is to expand any eligible clean energy production with less attention to firm-specific value-add and market competitiveness. Hence η is closer to 0, but not completely due to firm-specific provisions like Section 48C. In the Appendix Section F.1.6, we provide a microfoundation where policymaker wants to maximize quality adjusted output while firms maximize profit in a differentiated goods Bertrand demand system that justifies approximating the reduced form policy and firm payoffs in this section.

Let $M_t = \sum_{i=1}^{N} m_{it}$ denote perceived aggregate project quality, and let $S_t = G_t + \sum_{i=1}^{N} x_{it}$ denote total subsidies. Given posterior beliefs m_{it}, party $\theta \in \{I, O\}$ chooses G_t and $\{x_{it}\}_{i=1}^{N}$ to maximize

$$\begin{aligned} W_\theta(G_t, x_t; m_t) =& (1-\eta) a_G M_t G_t + \eta a_X \sum_{i=1}^{N} m_{it} x_{it} \\ & - \frac{\kappa_\theta}{2} \left[G_t^2 + \sum_{i=1}^{N} x_{it}^2 + \lambda_\theta S_t^2 \right], \end{aligned} \tag{9}$$

subject to

$$G_t \geq 0, \qquad x_{it} \geq 0 \quad \text{for all } i.$$

The parameters $a_G > 0$ and $a_X > 0$ together with weight η represent the policymaker's payoff from subsidizing the industry and individual projects. The cost is convex in the budget spent on G, x and total spending S_t, capturing decreasing marginal returns of industrial policy and budget allocation constraints. κ_θ measures party θ's inherent generosity towards the industry. λ_θ also captures the industry's importance to party θ

relative to other priorities.

For any interior allocation, the first-order conditions are

$$\frac{(1-\eta)a_G M_t}{\kappa_\theta} = G_t + \lambda_\theta S_t \iff G_t = \left[\frac{(1-\eta)a_G M_t}{\kappa_\theta} - \lambda_\theta S_t\right]_+ \tag{10}$$

and

$$\frac{\eta a_X m_{it}}{\kappa_\theta} = x_{it} + \lambda_\theta S_t \iff x_{it} = \left[\frac{\eta a_X m_{it}}{\kappa_\theta} - \lambda_\theta S_t\right]_+ \tag{11}$$

Let $h_t \in \{0,1\}$ indicate whether $G_t > 0$ in equilibrium, and let $\mathcal{P}_t$ denote the set of firms receiving positive firm-specific awards. Write $p_t = |\mathcal{P}_t|$ and $n_t = h_t + p_t$, where n_t is the number of subsidy programs handed out in equilibrium. Conditional on the active set $(h_t, \mathcal{P}_t)$, combining the first order conditions (10), (11), and the definition $S_t = G_t + \sum_{i=1}^{N} x_{it}$, total subsidy is

$$S_t^*(h_t, \mathcal{P}_t; \theta) = \frac{\left[h_t(1-\eta)a_G M_t + \eta a_X \sum_{j\in\mathcal{P}_t} m_{jt}\right]}{\kappa_\theta\left[1+\lambda_\theta n_t\right]}. \tag{12}$$

Then if broad industry benefit is distributed ($h_t = 1$), we have

$$G_t^*(m_t;\theta) = \frac{\left[1+\lambda_\theta(n_t-1)\right](1-\eta)a_G M_t - \lambda_\theta \eta a_X \sum_{j\in\mathcal{P}_t} m_{jt}}{\kappa_\theta(1+\lambda_\theta n_t)}. \tag{13}$$

If $h_t = 0$, then $G_t^*(m_t;\theta) = 0$. For any firm $i \in \mathcal{P}_t$,

$$x_{it}^*(m_t;\theta) = \frac{\left[1+\lambda_\theta(n_t-1)\right]\eta a_X m_{it} - \lambda_\theta h_t(1-\eta)a_G M_t - \lambda_\theta \eta a_X \sum_{j\in\mathcal{P}_t\setminus\{i\}} m_{jt}}{\kappa_\theta(1+\lambda_\theta n_t)}. \tag{14}$$

and $x_{it}^*(m_t;\theta) = 0$ for $i \notin \mathcal{P}_t$.

Hence a firm's allocation x_{it}^* depends not only on its own perceived quality m_{it} but also on the perceived quality of other firms. In particular, a firm only receives a subsidy in equilibrium if the priority index $\rho_{it}(m_{it}, m_{-it}, \theta) = [1 + \lambda_\theta(n_t - 1)]\, \eta a_X m_{it} - \lambda_\theta h_t(1 - \eta) a_G M_t - \lambda_\theta \eta a_X \sum_{j \in \mathcal{P}_t \setminus \{i\}} m_{jt} > 0$. m_{it} must be high enough relative to other firms' quality m_{jt} and aggregate quality M_t, and for $i \in \mathcal{P}_t$, the subsidy x^*_{it} is strictly increasing in m_{it}. Thus the policymaker allocates with the following algorithm: rank firms by m_{it}, and iteratively adds i to $\mathcal{P}_t$ as long as $\rho_{it}(m_{it}, m_{-it}, \theta) > 0$ for all i in $\mathcal{P}_t$, and stops when this no longer holds. Then the policymaker finalizes the award.

F.1.3 Firm Payoffs

Firm i receives private value from broad benefit G_t and firm-specific benefits x_{it}. Furthermore, we assume that for given subsidy, the value to the firm is also increasing in the firm's project quality q_{it}, so that the benefit of $\{G_t, x_{it}\}$ to firm i is $q_{it}[(1-\eta)G_t + \eta x_{it}]$. This is consistent with the interpretation of q_{it} as the marginal social value of a unit of subsidy derived from the proposed project. Cost of lobbying is quadratic, ℓ^2_{it}, capturing decreasing marginal returns.

With downstream market competition, subsidies received by rival firms x_{-it} may decrease the firm's payoff via downstream market competition. Rivals can produce more via subsidies, reducing equilibrium own profit. In increasing returns to scale industries like semiconductors that rationalize industrial policies (Lashkaripour and Wu, 2024), the decrease in the firm's own profit could be convex in rival subsidies. We use the quadratic business-stealing loss to model this channel in the reduced form, whose microfoundation from a differentiated-goods demand system we provide in Appendix Section F.1.6:

$$D_i(x_{-i,t}) = \frac{\psi}{2} \sum_{j \neq i} (x_{j,t})^2, \qquad \psi \geq 0. \tag{15}$$

The quadratic term captures the possibility that rival support becomes more damaging as it accumulates.

Firm i's period-t payoff given own project quality q_{it}, own and rival lobbying ℓ_{it}, ℓ_{-it} is thus

$$\pi_{it}(q_{it}, \ell_{it}; \ell_{-it}, \theta) = \underbrace{q_{it}[(1-\eta)G_t^*(\ell_{it}; \ell_{-it}, \theta) + \eta x_{it}^*(\ell_{it}; \ell_{-it}, \theta)]}_{\text{subsidy payoff}} - \underbrace{\frac{\psi}{2}\sum_{j \neq i}(x_{jt}^*)^2}_{\text{loss from rival subsidies}} - \underbrace{\ell_{it}^2}_{\text{lobby cost}} \tag{16}$$

$\pi_{it}(q_{it}, \ell_{it}; \ell_{-it}, \theta)$ satisfies increasing differences in q_{it} and ℓ_{it}:

$$\frac{\partial^2 \pi_{it}}{\partial q_{it}\, \partial \ell_{it}} = \frac{\partial \left[(1-\eta)G_t^*(\ell_{it}; \ell_{-it}, \theta) + \eta x_{it}^*(\ell_{it}; \ell_{-it}, \theta)\right]}{\partial \ell_{it}} > 0.$$

Firms with higher quality projects benefit more from lobbying, supporting a monotone signaling equilibrium. Firms that are potential entrants further pay a fixed cost F if they choose to enter in period t. Incumbent lobbying firms in $\mathcal{I}_0$ have already paid this cost before the game begins.

F.1.4 Equilibrium

We now characterize equilibrium behavior. The key objects are the firm's entry decision and continuous lobbying expenditure, and both affect the policymaker's posterior belief of project quality and allocation. An equilibrium consists of entry strategies, lobbying strategies, beliefs, and policy choices. Firms maximize expected payoffs. Policymakers maximize (9). Beliefs are consistent with equilibrium strategies wherever Bayes' rule applies.

We focus on monotone equilibria. Within each information class, higher-quality firms are weakly more likely to enter and, conditional on being active, choose weakly higher lobbying expenditures. This is the natural equilibrium selection because the firm payoff has increasing differences in project quality and lobbying whenever own lobbying raises the policy benefits relevant to the firm.

Let c denote a firm's lobbying class. In period 1, $c \in \{I, E1, N1\}$, where I denotes incumbent lobbying firms, $E1$ period-1 entrants, and $N1$ non-entrants. In period 2, $c \in \{I, E1, E2, N2\}$, where $E2$ denotes period-2 entrants and $N2$ firms that remain inactive. The policymaker uses class-specific beliefs because incumbent lobbying firms, entrants, and non-entrants face different costs and histories.

Belief mapping. For each period t and class c, let q^c_{Et} denote the entry cutoff and let q^c_{St} denote the cutoff above which active firms choose strictly positive continuous lobbying. A hybrid monotone equilibrium has the following form:

$$e_{it} = 1 \quad \Longleftrightarrow \quad q_{it} \geq q^c_{Et},$$

and, conditional on being active,

$$\ell_{it} = \begin{cases} 0, & q_{it} < q^c_{St}, \\ \phi^c_t(q_{it}; h_t), & q_{it} \geq q^c_{St}, \end{cases}$$

where h_t denotes the public history and $\phi^c_t(\cdot; h_t)$ is strictly increasing on the separating region.

The policymaker's posterior has three regions. If a potential entrant does not enter, the posterior is

$$m^c_t(0, 0; h_t) = E[q_{it} \mid q_{it} < q^c_{Et}].$$

If the firm enters but does not spend on continuous lobbying, the posterior is

$$m_t^c(1, 0; h_t) = E[q_{it} \mid q_{Et}^c \leq q_{it} < q_{St}^c].$$

If the firm enters and chooses positive lobbying, the policymaker inverts the class-specific lobbying schedule:

$$m_t^c(1, \ell; h_t) = (\phi_t^c)^{-1}(\ell; h_t) \qquad \text{for } \ell > 0.$$

Thus entry alone conveys that quality is above the entry cutoff, while positive lobbying further separates higher-quality firms among active firms.

This representation nests three cases. In a fully separating equilibrium, $q_{Et}^c = q_{St}^c$, so every entrant sends a distinct positive signal. In an entry-only pooling equilibrium, firms above the entry cutoff pay F but choose the same continuous lobbying level, so the policymaker updates only from entry. In the hybrid case, moderate-quality firms enter but pool at low or zero lobbying, while higher-quality firms separate through positive spending. The hybrid case is empirically natural because entry is costly and informative, while fine separation through lobbying is worthwhile only when the marginal value of additional information is high.

Continuous signaling. Fix a class c, a history h_t, and rivals' equilibrium strategies. Let

$$B_{it}(m_t; \theta) = (1 - \eta)G_t^*(m_t; \theta) + \eta x_{it}^*(m_t; \theta)$$

denote firm i's policy benefit from broad and firm-specific subsidies. Let

$$R_{it}(m_t; \theta) = \frac{\psi}{2} \sum_{j \neq i} \left[x_{jt}^*(m_t; \theta)\right]^2$$

denote the business-stealing loss from rival awards. If a firm with true quality q sends a signal that induces posterior $\widehat{q}$, its gross payoff is

$$qB_{it}(\widehat{q}, m_{-i,t}; \theta) - R_{it}(\widehat{q}, m_{-i,t}; \theta) - \ell_t^c(\widehat{q}; h_t)^2.$$

In a separating region, incentive compatibility implies

$$2\ell_t^c(q; h_t)\frac{\partial \ell_t^c(q; h_t)}{\partial q} = \Delta_t^c(q; h_t),$$

where

$$\Delta_t^c(q; h_t) = q\frac{\partial B_{it}}{\partial m_{it}} - \frac{\partial R_{it}}{\partial m_{it}}.$$

The term $\Delta_t^c(q; h_t)$ is the marginal value of being perceived as a higher-quality project. It includes the direct value of own policy benefits and the defensive value of reducing rival awards.

With the normalization $\ell_t^c(q_{St}^c; h_t) = 0$, the separating lobbying schedule is

$$[\ell_t^c(q; h_t)]^2 = \int_{q_{St}^c}^{q} \Delta_t^c(r; h_t)\, dr.$$

A separating region therefore exists whenever $\Delta_t^c(q; h_t) > 0$ on that region. Lobbying is increasing in quality if the marginal value of perceived quality is positive.

Period-2 equilibrium. We solve the game by backward induction. In period 2, firms observe the political transition T, their current quality q_{i2}, and whether they have already paid the fixed cost. The period-2 policymaker observes entry history and current lobbying. If $T = 0$, the incumbent also observes the informative content of period-1 lobbying. If

$T = 1$, the new party observes entry status but not the period-1 continuous signal.

A firm that has not yet entered compares the value of entering with the value of remaining inactive. Let $J_2^E(q, T)$ be the value of entering in period 2 net of the fixed cost, and let $J_2^N(q, T)$ be the value of not entering. The period-2 entry cutoff solves

$$J_2^E(q_{E2}^*(T), T) = J_2^N(q_{E2}^*(T), T).$$

Under single crossing, the period-2 entry rule is

$$e_{i2} = 1 \quad \Longleftrightarrow \quad q_{i2} \geq q_{E2}^*(T).$$

Thus period-2 entry is informative about current quality.

The quality shock R_i is observed by the firm but not by the policymaker. Hence the policymaker cannot condition beliefs directly on whether project quality changed. If $T = 0$ and the firm chooses no period-2 lobbying, the incumbent's posterior mixes firms whose quality did not change with shocked firms that did not find new lobbying worthwhile. If $T = 1$, the new party cannot use the old continuous signal and relies more heavily on entry history and period-2 lobbying. The probability that the old continuous signal is insufficient from the firm's perspective is

$$\Pr(T = 1 \text{ or } R_i = 1) = \zeta + (1 - \zeta)\delta_q.$$

This expression governs the expected need for period-2 re-signaling.

Period-1 equilibrium. In period 1, incumbent lobbying firms choose ℓ_{i1} while anticipating the period-2 continuation game. The period-1 signal has immediate value because it affects the incumbent's period-1 allocation. It has continuation value only when the incumbent remains in office and current quality does not change. Let $\beta \in (0, 1]$ denote the discount factor. The period-1 signaling condition for an active firm can be written as

$$2\ell_{i1}\frac{\partial \ell_{i1}}{\partial q_{i1}} = \Delta_1(q_{i1}; I) + \beta(1-\zeta)(1-\delta_q)\Delta_2^{\text{carry}}(q_{i1}; I),$$

where $\Delta_1(q_{i1}; I)$ is the current-period marginal value of being perceived as higher quality by the incumbent, and $\Delta_2^{\text{carry}}(q_{i1}; I)$ is the continuation value of the same signal if it remains informative in period 2.

Potential entrants compare entering in period 1 with waiting. Let $J_1^E(q)$ denote the value of entering in period 1, net of the fixed cost, and let $J_1^N(q)$ denote the value of waiting. The period-1 entry cutoff solves

$$J_1^E(q_{E1}^*) = J_1^N(q_{E1}^*).$$

The period-1 entry rule is

$$e_{i1} = 1 \quad \Longleftrightarrow \quad q_{i1} \geq q_{E1}^*.$$

Thus period-1 entrants are positively selected on project quality. If project quality has distribution F_Q, the expected number of period-1 entrants is

$$E[N_{E1}] = N_E[1 - F_Q(q_{E1}^*)].$$

F.1.5 Comparative Statics

The following propositions summarize the model's empirical implications.

Proposition 1. Allocation follows a common-threshold rule. For a fixed active set $(h_t, \mathcal{P}_t)$, the policymaker's optimal allocation is increasing in perceived project quality and decreasing in the common subsidy threshold. A firm receives a positive award only if its perceived quality is sufficiently high relative to the perceived quality of other claimants and aggregate industry quality.

Implication. Lobbying matters because it changes the posterior m_{it}. A firm can increase its expected award by raising the policymaker's belief about its project quality. But the allocation is relative: the same posterior is less valuable when other firms also have high perceived quality.

Proposition 2. Higher-quality active firms lobby more. Suppose $\Delta_t^c(q; h_t) > 0$ and is weakly increasing on the separating region. Then the equilibrium lobbying schedule $\ell_t^c(q; h_t)$ is strictly increasing in q.

Proof. In a separating region,

$$2\ell_t^c(q; h_t)\ell_t^{c\prime}(q; h_t) = \Delta_t^c(q; h_t).$$

If $\Delta_t^c(q; h_t) > 0$, then $\ell_t^{c\prime}(q; h_t) > 0$ whenever $\ell_t^c(q; h_t) > 0$.

Implication. Lobbying is a costly signal of project quality. Higher-quality firms spend more because the same policy allocation is more valuable to them and because a higher posterior raises their expected allocation.

Proposition 3. Firm-specificity raises lobbying when targeted awards dominate broad benefits. An increase in η raises lobbying in a separating region if

$$\frac{\partial}{\partial \eta}\Delta_t^c(q; h_t) > 0.$$

A sufficient condition is that the marginal value of firm-specific awards exceeds the marginal value of broad support:

$$q\frac{\partial x_{it}^*}{\partial m_{it}} - \frac{\partial R_{it}}{\partial m_{it}} > q\frac{\partial G_t^*}{\partial m_{it}}.$$

Implication. As the policy package becomes more firm-specific, lobbying rises when firms gain more from improving their own allocation than from expanding the broad industry benefit. This is the key distinction between CHIPS-style discretionary awards and broader tax-credit policies.

Proposition 4. Business stealing increases defensive lobbying. Suppose that own lobbying raises firm i's posterior and reduces expected awards to close rivals, so that

$$\frac{\partial x_{jt}^*}{\partial m_{it}} < 0 \qquad \text{for close competitors } j \neq i.$$

Then an increase in ψ raises the marginal value of lobbying:

$$\frac{\partial \Delta_t^c(q; h_t)}{\partial \psi} = -\sum_{j \neq i} x_{jt}^* \frac{\partial x_{jt}^*}{\partial m_{it}} > 0.$$

Implication. The stronger the product-market harm from rival awards, the stronger the incentive to lobby defensively. This is the mechanism through which firm-specific industrial policy can weaken free-riding and increase political investment.

Proposition 5. Entry rises when contestable rents increase. The expected number of entrants rises when the net value of entering increases. Formally, if a parameter α raises $J_t^E(q) - J_t^N(q)$ for all q near the entry cutoff, then

$$\frac{\partial q_{Et}^*}{\partial \alpha} < 0 \qquad \text{and} \qquad \frac{\partial E[N_{Et}]}{\partial \alpha} > 0.$$

Parameters that can satisfy this condition include higher a_X, lower κ_θ, higher η, and higher ψ, provided these parameters raise the expected value of targeted allocation.

Implication. Large industrial-policy programs increase lobbying on the extensive margin because firms that previously stayed out of politics find it worthwhile to pay the fixed cost.

Proposition 6. Political transition raises period-2 lobbying but can reduce the continuation value of period-1 lobbying. The probability that firms need to re-signal in period 2 is

$$p_{\text{resignal}} = \zeta + (1-\zeta)\delta_q.$$

Hence

$$\frac{\partial p_{\text{resignal}}}{\partial \zeta} = 1 - \delta_q \geq 0, \qquad \frac{\partial p_{\text{resignal}}}{\partial \delta_q} = 1 - \zeta \geq 0.$$

At the same time, the continuation value of period-1 continuous lobbying is multiplied by $(1-\zeta)(1-\delta_q)$.

Implication. Political uncertainty shifts political investment toward period-2 lobbying because a new party does not observe the old continuous signal. It can also make entry more attractive relative to continuous lobbying because entry status is observed by both parties.

Proposition 7. Rival lobbying can be a strategic complement under firm-specific allocation. Let firm j's lobbying raise its posterior m_{jt}. Firm i's lobbying is locally strategically complementary to firm j's lobbying if

$$\frac{\partial \Delta_t^c(q; h_t)}{\partial m_{jt}} > 0.$$

Using the payoff above,

$$\frac{\partial \Delta_t^c}{\partial m_{jt}} = q\frac{\partial^2 B_{it}}{\partial m_{it}\partial m_{jt}} - \frac{\partial^2 R_{it}}{\partial m_{it}\partial m_{jt}}.$$

Since

$$R_{it} = \frac{\psi}{2}\sum_{k\neq i}(x_{kt}^*)^2,$$

the business-stealing component contains the term

$$-\psi\frac{\partial x_{jt}^*}{\partial m_{jt}}\frac{\partial x_{jt}^*}{\partial m_{it}}.$$

In a rivalrous allocation, $\partial x_{jt}^*/\partial m_{jt} > 0$ and $\partial x_{jt}^*/\partial m_{it} < 0$, so this term is positive. Lobbying is strategically complementary when this defensive effect dominates the standard contest effect.

Implication. Rival lobbying need not always raise own lobbying. Under broad benefits, rival lobbying can induce free-riding. Under firm-specific awards, rival lobbying can instead induce defensive lobbying because rival awards impose product-market harm. The complementarity is strongest when subsidies are targeted, rival awards are competitively damaging, and firms remain close enough in the allocation contest that lobbying can change the distribution of awards.

Proposition 8. Entrant counts affect incumbent lobbying through both public-good and contest channels. The number of entrants is publicly observed. A larger entrant count raises perceived aggregate quality M_t, which can increase the broad benefit G_t. It also increases the number of potential claimants for firm-specific awards. For an incumbent firm, the effect of entry on lobbying is positive if

$$\frac{\partial}{\partial N_{Et}} \Delta_t^I(q; h_t) > 0.$$

Implication. Entrant counts have ambiguous effects in general. When benefits are broad, more entrants can increase the common industry benefit and reduce own lobbying incentives through free-riding. When benefits are firm-specific, more entrants raise the value of distinguishing oneself from a larger pool of claimants and can increase defensive lobbying. The model therefore predicts heterogeneous responses: high-quality incumbents may increase lobbying when entry rises, while marginal firms may pool at low spending or remain inactive.

F.1.6 Microfoundation for the Reduced-Form Payoffs

This section provides a local microfoundation for the reduced-form policymaker and firm payoffs used in Section F.1. The purpose is not to estimate a full structural model of product-market competition, but to show that the reduced-form objects have a natural interpretation in a differentiated-goods environment where the policymaker values quality-adjusted output and firms care about equilibrium profits.

Consider a sector with differentiated products. Firm i has privately observed project quality q_{it}, while the policymaker observes only posterior belief m_{it}. Broad support G_t expands demand or productive opportunity for the sector, while firm-specific support x_{it} increases firm i's ability to serve the market. Let $\eta \in [0, 1]$ index the specificity of the policy package: when η is high, firm-specific support is more important; when η is low, broad support is more important.

Let firm i's demand shifter be

$$\Gamma_{it} = \tau q_{it} \left[(1-\eta)G_t + \eta x_{it}\right] - \omega \sum_{j\neq i} x_{jt}^2,$$

where $\tau > 0$ captures the direct effect of policy support on firm i's effective market position and $\omega \geq 0$ captures business stealing from rival subsidies. The first term says that policy support is more valuable when the firm's project quality is high. The second term says that rival subsidies lower firm i's residual demand by helping rivals expand capacity or otherwise compete more aggressively. The square captures the idea that large awards to a particular rival are especially damaging.

A simple differentiated-goods demand system is

$$y_{it} = \bar{a}_i + \Gamma_{it} - bp_{it} + s\sum_{j\neq i} p_{jt}, \qquad b > 0, \quad s \geq 0.$$

Firms choose prices and have constant marginal costs. Let $\Pi_{it}^*(\Gamma_t)$ denote firm i's equilibrium Bertrand profit. Around a baseline allocation with small policy-induced demand shifts, equilibrium profits admit the first-order approximation

$$\Pi_{it}^*(\Gamma_t) \simeq \Pi_{it}^*(0) + \left.\frac{\partial \Pi_{it}^*}{\partial \Gamma_{it}}\right|_0 \Gamma_{it}.$$

Normalizing the positive coefficient

$$\left.\frac{\partial \Pi_{it}^*}{\partial \Gamma_{it}}\right|_0 \tau$$

to one, and collecting constants, this gives

$$\Pi_{it}^*(G_t, x_t, q_t) \simeq q_{it}\left[(1-\eta)G_t + \eta x_{it}\right] - \frac{\psi}{2}\sum_{j\neq i} x_{jt}^2,$$

where $\psi > 0$ is proportional to the equilibrium profit loss from rival subsidy-induced capacity. This is the firm payoff used in the main text before lobbying costs. Hence the reduced-form business-stealing loss

$$D_i(x_{-i,t}) = \frac{\psi}{2}\sum_{j\neq i} x_{jt}^2$$

can be interpreted as a local approximation to the product-market profit loss caused by rival subsidies.

The policymaker's payoff can be derived from a corresponding quality-adjusted output objective. Suppose the policymaker believes that broad support increases output for all firms, while firm-specific support increases output for the recipient. Locally, perceived policy-induced output is

$$\Delta y_{it}(G_t, x_{it}) = \alpha_G G_t + \alpha_X x_{it}.$$

The policymaker values output weighted by perceived project quality, so the gross perceived benefit is

$$\sum_{i=1}^{N} m_{it}\Delta y_{it} = \alpha_G M_t G_t + \alpha_X \sum_{i=1}^{N} m_{it}x_{it}, \qquad M_t = \sum_{i=1}^{N} m_{it}.$$

Introducing the benefit-specificity weight η gives

$$(1-\eta)a_G M_t G_t + \eta a_X \sum_{i=1}^{N} m_{it}x_{it},$$

which is the gross benefit term in the policymaker payoff. The broad component is valued according to aggregate perceived project quality, while the firm-specific component is valued according to the recipient's perceived quality.

Finally, suppose subsidies have increasing administrative or fiscal costs. A quadratic approximation to these costs is

$$\frac{\kappa_\theta}{2}\left[G_t^2+\sum_{i=1}^{N}x_{it}^2+\lambda_\theta S_t^2\right], \qquad S_t=G_t+\sum_{i=1}^{N}x_{it}.$$

The first two terms capture decreasing returns to allocating more through a single policy margin. The term in S_t^2 captures the common cost of total subsidy exposure. The parameter κ_θ measures party θ's cost sensitivity: a higher κ_θ implies a lower willingness to spend on subsidies.

Combining the gross benefit and cost terms yields

$$W_\theta(G_t,x_t;m_t)=(1-\eta)a_G M_t G_t+\eta a_X\sum_{i=1}^{N}m_{it}x_{it}-\frac{\kappa_\theta}{2}\left[G_t^2+\sum_{i=1}^{N}x_{it}^2+\lambda_\theta S_t^2\right].$$

Thus the reduced-form payoff in the main text is consistent with a structural environment in which the policymaker values quality-adjusted output, firms value their own subsidy-induced market position, and rival subsidies reduce private profits through downstream competition.

The firm and policymaker objectives differ because business stealing is a private profit effect. Rival subsidies can reduce firm i's equilibrium profit even when they raise quality-adjusted output from the policymaker's perspective. This wedge is central to the model. The policymaker allocates subsidies according to perceived project quality, while firms lobby because the distribution of firm-specific awards affects their private product-market payoffs.