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Shirking in Congress: Investment Portfolios, Firm Lobbying, and Trade Legislation

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Doctor of Philosophy in Political Science

by

Caleb Ziolkowski

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ABSTRACT OF THE DISSERTATION

Shirking in Congress: Investment Portfolios, Firm Lobbying, and Trade Legislation

by

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University of California, Los Angeles, 2021
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These papers examine how legislators' personal preferences, firm lobbying, and electoral pressure interact to shape trade policy. The first paper exploits the two-member districts of the Senate to show that, when voting on preferential trade agreements (PTAs), senators often vote in line with their personal preferences—as revealed by their investment portfolios. Owning firms that lobby on PTAs drives this relationship. The second paper employs multiple analyses—including a time-series, cross-section matching approach—to show that firm lobbying on trade-related legislation increases when legislators own them, supporting my argument that legislators that invest in firms sympathize with the goals of these firms. The third paper leverages the Senate's staggered elections, legislators' post-retirement announcement voting behavior, and variations in salience across PTAs and states to demonstrate that increasing electoral pressure mitigates legislators' tendency to vote their personal preferences on PTAs—evidence that legislators' personal preferences lead to shirking on PTA votes.

The dissertation of Caleb Ziolkowski is approved.

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To my family and friends, who seem to still like me even though I have spent more time with this dissertation than them

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ACKNOWLEDGEMENTS

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Chapter 1

Introduction

The trade legislation the government enacts has financial implications for firms. Firms make public statements supporting or opposing trade policy. They engage in political activity—some of it highly costly like lobbying—to achieve policy objectives. Legislators deciding trade policy frequently have significant investments in firms, including in those lobbying on trade policy. How do legislators' investments influence trade legislation?

In the following papers, I address this question. In the first paper, I focus on how legislators' personal preferences and firm lobbying interact to affect trade legislation. I show that legislators' support of preferential trade agreements (PTAs) increases the more their investment portfolios gain from PTAs. Further, I show that it is ownership of firms that lobby on trade—specifically firms that lobby on the specific PTA under consideration—that explains the increase in support. This paper updates the existing theories of PTA formation by relaxing assumptions that firms oppose rather than support trade liberalization and that voters favor PTAs due to consumer benefits.

The second paper explores the other side of this interaction, showing that when legislators are more likely to sympathize with a firm—revealed by their investments—the firm becomes much more likely to lobby on trade-related policy. I use a matching approach appropriate to time-series cross-sectional data to show that legislators' ownership of firms precedes a doubling of the likelihood of lobbying, an effect sustained for years. This paper,

along with the first, offers a fresh perspective on lobbying; firms inform legislators how policy relates to legislators' personal preferences. In contrast, existing theories see lobbying as a *quid pro quo* or the provision of information that helps legislators win reelection.

I then turn to focus more directly on the role that electoral accountability plays in my theory and explore the implications for representation. The third paper demonstrates that legislators' willingness to vote their personal preferences on PTAs dissipates as electoral pressure increases. Among other tests, I leverage the quasi-exogenous shock of the Senate's staggered elections to show that senators vote their personal preferences when elections are distant but cease doing so when elections loom. Conversely, upon retirement, legislators vote their personal preferences even more strongly. When the salience of PTAs increases—either across PTAs or geographies—the effect of legislators' personal preferences decreases. These results lead to the conclusion that personal preferences can cause legislators to shirk.

Taken together, these articles offer broad support for my theoretical argument. While electoral accountability restrains legislators, there are limits to its reach, which opens space for legislators' personal preferences to affect their behavior. They tend to vote their personal preferences—as revealed by their investment portfolios—particularly when elections are distant. Further, firms are more likely to lobby when legislators are likely to sympathize with them due to personal preferences—such as owning stock in a firm. Firms' lobbying, in turn, appears to inform legislators how policy relates to the legislators' personal preferences. In sum, legislators' personal preferences, electoral pressure, and firms' political activity interact to shape trade policy.

Chapter 2

Capital on Capitol Hill: Legislators' Investments, Firm Lobbying, and Trade Policy

2.1 Introduction

Why do policymakers support trade liberalization?[1] Existing answers focus mostly on constituency interests as determined by trade theories, particularly Heckscher–Ohlin (HO) and Ricardo-Viner (RV) (Hiscox 2002). Alternate approaches hold that special interest groups (Baldwin and Magee 2000; Grossman and Helpman 1994), institutions (Bailey, Goldstein, and Weingast 1997; Mansfield, Milner, and Rosendorff 2002), and party politics (Milner and Tingley 2011) pull the policymaker away from the constituency towards firm, national, or party interests, respectively.

Yet, these theories do not fully explain trade support. For example, Democrats John Kerry and Ted Kennedy together represented Massachusetts in the Senate for 25 years. They were similar in sources of political action committee (PAC) contributions, age, gender, and ideology. Nothing in the literature predicts they would take different positions on preferential trade agreements (PTAs). Sometimes, though, they split votes on PTA legislation—like the Oman PTA and trade promotion authority in 2002—with Kerry voting

[1] Often I write "trade (liberalization)" where "economic integration" could apply. This ambiguity stems from the nature of modern trade liberalization, where things like non-tariff barriers, environmental standards, etc. play a large role.

for and Kennedy against.[2] Likely some other individual characteristic matters—something beyond constituency, party, institutions, campaign contributions, gender, age, and ideology.

Policymakers' personal characteristics help explain their behavior—including Kennedy and Kerry's diverging votes. Legislators' investment portfolios reveal their personal preferences towards trade—*either* because legislators have preexisting dispositions (which drive both their trade-related investments and their trade support) *or* because, in some sense, they are self-dealing. New new trade theory (NNTT) allows me to measure how trade impacts legislators' investments. I posit a principal-agent relationship between legislators and constituents, allowing space for these portfolio-revealed preferences to affect legislators' support of PTAs. A central implication of my theory is that legislators whose investment portfolios benefit from PTAs will support them more. I extend and modify dominant theories of PTA formation by incorporating legislators' personal preferences, drawing on NNTT, and accounting for firms' and voters' heterogeneous trade preferences.

I offer a fresh perspective of lobbying, suggesting firms may inform legislators how complex policy maps onto legislators' personal preferences. Legislators might not know how trade legislation impacts the firms they own, particularly given trade's heterogeneous effects (Melitz 2003). Firms could lobby to inform legislators of these effects. Legislators owning these firms should be sympathetic to this information due to personal preferences. Kennedy and Kerry were both wealthy, yet only Kerry directly owned stock of firms that lobbied Congress on trade. Thus, differing patterns of investment and lobbying by firms can explain why Kerry supports PTAs more.

To test my theory, I collect data on legislators' investments, merging it with business databases to determine how PTAs should impact these investments. I incorporate lobbying data to measure whether these firms informed Congress of their PTA preferences. I conduct analysis on the roll call votes on all new PTAs voted on by Congress since 2004. I exploit

[2]The United States-Oman PTA (H.R. 5684) passed, 63 to 32, and the Trade Act of 2002 (H.R. 3009) obtained cloture, 64 to 32.

dual-member districts to compare how differences in financial self-interest explain diverging PTA support between senators from the same state and party voting on the same PTA. This controls for party-, geographic constituency-, and PTA-level confounders, as well as interactions thereof. Addressing such confounders advances the empirical analysis of trade votes in Congress.

I find that legislators whose investment portfolios gain from PTAs vote for them more. Ownership of firms that lobby drives the relationship. An interquartile range (IQR) shift in a senators' informed financial self-interest increases the predicted probability of supporting a PTA by 11.3 percentage points—equivalent to roughly 46% of the effect of switching parties. The effect for Democrats, about 19.1 percentage points, roughly equals three quarters of the effect of making them Republicans.

2.2 From trade theory to preferences

Trade theory can elucidate the preferences of political actors, thereby explaining outcomes of interest—including trade policy, national political cleavages, capital market integration, exchange rates, and immigration policy (Frieden 1991, 2014; Peters 2015; Rogowski 1987; e.g. Stolper and Samuelson 1941). Typically scholars ascribe trade theory-derived preferences to constituents or special interests, not legislators. I argue economic interests—whether best described by HO, RV, etc.—should shape policy indirectly—through constituent and special interest group preferences—and directly—*through legislators' preferences*.

Some hold that electoral incentives restrict legislators' behavior, making personal preferences irrelevant (e.g. Downs 1957; Mayhew 1974). Others consider *both* voters' *and* special interests' preferences: the dominant theory of PTA formation argues constituents' preferences and rents from firms motivate politicians (Mansfield, Milner, and Rosendorff 2002) (MMR); Grossman and Helpman (1994) (GH) argue that import-competing firms dominate campaign contributions and, reflecting RV, want protection while voters reward politicians

who liberalize trade; Kim (2017) models government as a unitary actor motivated by lobbying rents and voter welfare. Such approaches assume that legislators' *personal preferences*—preferences not tied to constituents or special interests—do not matter.

If legislators have agency *and* personal preferences motivate them, accounting for these preferences will help explain trade politics. Many studies of Congress show that personal characteristics coincide with distinct legislative behavior, suggesting personal preferences may do so as well. Legislators with military experience vote differently on some military issues (Lupton 2017). Legislators who smoke tend to oppose bills restricting tobacco advertising and use; legislators with children in public school more often vote against school voucher legislation; and legislators that belong to threatened, smaller religious denominations are more supportive of bills protecting religious liberty (Burden 2007). Finally, legislators with business backgrounds display more pro-business voting (Witko and Friedman 2008).

2.2.1 Incorporating legislators' personal preferences

I posit a principal-agent relationship between legislators and their electoral constituencies, arguing reelection *and* personal preferences motivate legislators. Legislators' investment portfolios reveal their personal preferences, which may influence trade support. Firms' and voters' preferences over PTAs vary and they can lobby or vote accordingly. Firm lobbying makes legislators more certain of the mapping between their personal preferences and trade policy.

Legislators' investment portfolios may reveal their personal preferences because *financial self-interest*—the impact of trade policy on a legislator's personal finances—directly influences legislators' PTA support. This is, in some sense, *self-dealing*. Alternately, legislators may have prexisting *beliefs* that move them to support PTAs and direct their investments toward firms that gain from trade. Both these reasons are plausible and will result in a correlation between legislators' financial self-interest and PTA support (c.f. Peterson and

Grose 2020).

Evidence suggests a relationship between financial self-interest and certain legislative voting. Legislators with agriculture-related assets tend to cast roll call votes in favor of agricultural policies that benefit these assets (Welch and Peters 1983). During the great recession, legislators with investments in firms that would gain from government intervention were more likely to support such intervention (Peterson and Grose 2020; Tahoun and Lent 2018).

Experiments also indicate a link between investments and political preferences/behavior. Israeli citizens randomly assigned financial assets became more aware of the broader economic risks of conflict between Palestine and Israel, more willing to offer concessions for peace, and more likely to vote for parties more supportive of the peace process (Jha and Shayo 2019). Those from a national sample in England assigned to receive £50 to invest in stocks became substantially more opposed to regulation of financial markets (Margalit and Shayo 2021).

2.2.2 Trade heterogeneously impacts firms

I use NNTT to measure legislators' financial self-interest. NNTT arguably best describes trade in recent decades (Krugman 1979; Melitz and Trefler 2012). Other trade theories have drawbacks. HO implies trade benefits nearly all members of Congress given their endowments. RV offers more varied predictions, but the high level of intra-industry trade makes measuring whether the firms legislators own are exporting or import-competing difficult—in its top 20 exporting industries the US now *imports* as much as it *exports* (Kim 2017).

NNTT implies that firms' trade preferences vary within industries. In industries characterized by substantial product differentiation, international market integration allows the most productive firms to increase their market share and exports; less productive firms lose market share and sometimes close (Melitz and Ottaviano 2008). Industries with high product differentiation are characterized by some level of market power perhaps due to consumers'

brand loyalty or love of variety (Melitz and Trefler 2012). More productive firms produce goods at lower marginal costs, enabling them to survive import competition and compete in foreign markets (Melitz and Ottaviano 2008).

Using NNTT means relaxing MMR and GH's assumption that firms desire protection. Legislators owning productive firms in industries with high product differentiation should favor PTAs. Legislators owning few or no firms impacted by PTAs should have weak, relatively anti-PTA preferences. Legislators owning firms hurt by PTAs have strong, anti-PTA preferences, but such legislators are rare in the data. The test most likely to find results would involve comparing legislators strongly opposed to PTAs to legislators with strong preferences in favor. The variation available affords a more challenging test: comparing legislators with investments in firms not impacted by PTAs (or legislators without significant investments) *with* those that should strongly favor PTAs.

Legislators may not have the time or desire to explore the complex impacts of PTAs on the firms they own. I expect, therefore, that simply owning firms that gain from PTAs might not increase legislators' support. They may also need information.

Firm lobbying offers one possibility for legislators to learn about the effects of PTAs. Since lobbying is costly and firms maximize profits, lobbying informs legislators that own the lobbying firms how PTAs impact their portfolios. Much of the literature on lobbying in general (Bombardini and Trebbi 2020) and on trade specifically (e.g. Grossman and Helpman 1994; Kim 2017) treats lobbying as a *quid pro quo* in which legislators sell policy for lobbying rents. I argue lobbying conveys information—and thus is conceptually distinct from an exchange of resources (De Figueiredo and Richter 2014). Extant informational theories of lobbying argue that special interest groups inform legislators how a policy impacts the nation or their constituents, helping them win reelection (Grossman and Helpman 2001). I argue firm lobbying can inform legislators how complex policy relates to their personal preferences—preferences distinct from reelection.[3]

[3]We may wonder if legislators know what they own. If firms appeal to legislators' underlying preferences—

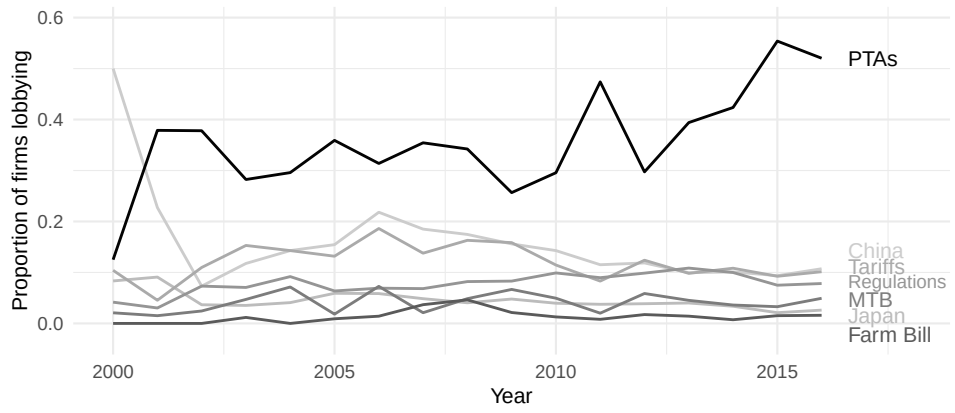


Figure 2.1: **Many firms engage in PTA-related lobbying.** The proportion of firms reporting lobbying on PTA-related legislation out of firms reporting lobbying specific trade-related legislation with comparisons to other major trade-related issues.

Firm lobbying addresses concerns that PTAs might not affect firms enough for legislators to consider their personal preferences when voting. After all, "[w]e know what groups care about because of what they do, and especially because of what they spend money on" (Hacker and Pierson 2010, 132). Firms spend time and money lobbying PTAs. I use publicly listed and unlisted firms' trade-related lobbying disclosures (Kim 2018) to produce Figure 2.1, showing the proportion of firms lobbying on PTA-related legislation out of the number of firms that lobbied on trade (I remove firms that left blank the "Specific Lobbying issues" field). Figure 2.1 also displays other major trade issues firms lobby. Appendix 2.5.1 discusses the data and the regular expressions used. Apart from 2000—when Congress voted on China's WTO accession (itself essentially a PTA, though I did not code it as such)—the proportion of firms lobbying on PTA-related legislation tends to hover between 30 and 50% percent, substantially higher than other issues.

Other evidence also suggest PTAs matter to firms. Firms aim to maximize profits, a key driver of stock prices (Haugen and Baker 1996); NNTT, backed by substantial empirics,

their pro-trade *beliefs*—even if legislators are unaware of what they own, their investments in firms that lobby will still predict PTA support. If *self-dealing* is at play, legislators must have some knowledge of what they own. The likelihood they don't know exactly what they own probably increases as they own more stock—particularly if a broker manages their investments. Yet, legislators almost certainly know if they invest in large companies and, if they hear several large companies support a PTA, they probably believes they own some firms that want the PTA to pass.

leads to the conclusion that PTAs increase the profits of productive firms in industries characterized by product differentiation. Event studies attest to the importance of PTAs, finding they impact the valuation of stocks (e.g. Dür and Lechner 2018); these studies likely understate the impact since investors anticipate many (political) events—many in the business community stay abreast of the wending progress of PTA negotiations—and stock prices incorporate most the value of anticipated events beforehand (Bhattacharya et al. 2000; Borochin and Golec 2016). Firms participating in committee hearings overwhelmingly signal that PTAs have a positive impact (Lee and Osgood 2019). While such firms might offer an overly optimistic assessment of economy-wide effects, such signals indicate PTA support. Proctor & Gamble, one of the largest firms in the US and one Kerry owned shares in 2006, even publicly tracked whether legislators supported PTAs (La Botz 2008).

2.2.3 Voters have complex preferences

I argue that voters are not uniformly pro- or anti-trade. According to NNTT, trade lets consumers enjoy more selection yet heterogenously affects the firms employing voters. Older trade theories—e.g. RV and HO—also have this possible tension; voters gain as consumers but the labor effects may harm them. Many studies have done little to reconcile these potentially offsetting effects of trade (Bailey and Brady (1998) is an exception). MMR and GH assume that voters favor PTAs due to consumer benefits.

More recent studies suggest some legislators may represent voters that oppose PTAs. Trade can cause geographically-concentrated harm (Autor, Dorn, and Hanson 2013; Hakobyan and McLaren 2016). Voters in harmed areas appear motivated to vote for anti-PTA policies and politicians—e.g. Donald Trump and the European far-right (Ballard-Rosa, Jensen, and Scheve 2018; Colantone and Stanig 2018). Many legislators behave like voters punish PTA support: legislators representing districts threatened by off-shoring talk in a more protectionist manner (Owen 2017); legislators in districts impacted by the "China

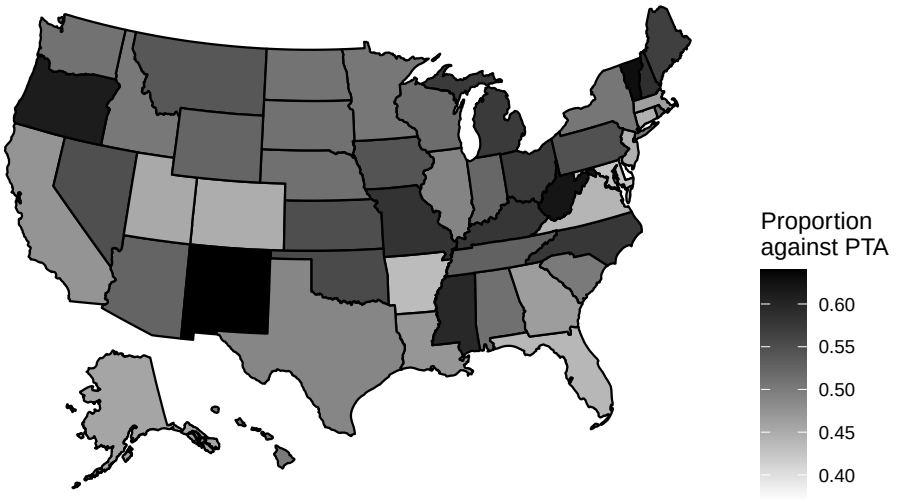


Figure 2.2: **Map of anti-PTA sentiment.** The weighted proportion of CCES respondents in each state that opposed a PTA with Peru and Colombia.

shock" oppose trade liberalization (Feigenbaum and Hall 2015); and legislators support PTAs less when elections loom (Conconi, Facchini, and Zanardi 2014).

Survey evidence suggests legislators may represent voters with preferences on PTAs that vary from fairly supportive to quite opposed. The Cooperative Congressional Election Study (CCES) occasionally includes a question about PTAs in its 50,000+ person national stratified sample surveys. The size and composition of the survey provides reasonable estimates of state-level respondent opinion. Figure 2.2 shows the proportion of respondents that opposed a PTA with Colombia and Peru in 2008—a year after the Peruvian PTA went into effect and three years before the Colombian PTA did. Opposition ranges from less than 40% to over 60%. This cautions against assuming voters uniformly oppose or support PTAs.

Another approach to accounting for constituents measures economic variables that should predict labor market effects. Some, building off RV, measure industry-specific, district-level production (Hiscox 2002) or employment in exporting versus import-competing firms (Conconi, Facchini, and Zanardi 2014). Others measure factor endowments emphasized by HO (Milner and Tingley 2011). This relies on an assumption difficult to verify; constituents' preferences can be proxied by trade-theory derived measures of the effect of

PTAs on the labor market. There are, additionally, two potential measurement problems. First, geographic constituencies are not the same as electoral constituencies (consider two U.S. senators from the same state but different parties); using geographic constituencies to measure constituents' preferences results in measurement error (Fenno 1978). Second, this approach has not accounted for the insights of NNTT—and may thus be measuring the wrong things. Measuring NNTT's implied effects at the constituency level seems empirically challenging. My research design abstracts away from these measurement problems *while* incorporating NNTT.

In my theory, voters may oppose or favor PTAs. Legislators are uncertain how much voters will penalize them for PTA roll call votes since voters care about other issues, too (Przeworski, Stokes, and Manin 1999). Voters want PTA policy near their ideal point. The higher a PTA's potential salience, the greater a legislator's belief that voters may vote on PTA policy. Legislators know the distribution of PTA salience but not its realization, smoothing their objective functions and allowing personal preferences to affect their optimum strategies (Persson and Tabellini 2016).

2.2.4 Equilibrium behavior and empirical implications

Firms choose whether to lobby. Firms will be more likely to lobby as their PTA-related gains or losses increase. Yet, firms may lack the wherewithal to lobby, especially smaller, less productive firms hurt by PTAs (Kim 2017). Those unaffected have no reason to lobby.

Legislators update their beliefs about how legislation relates to their personal preferences. If the firms they own lobbied in favor of or against trade, legislators become more certain that they personally favor or oppose PTAs. If firms they own do not lobby on trade, legislators remain more uncertain and ambivalent. Legislators vote, considering their personal preferences, voters' PTA preferences, and expected PTA salience. The salience is realized and voters choose the candidate they prefer, based on PTA policy and other factors.

Empirical implications: *H1) the more a PTA aligns with a legislator's financial self-interest, the more the legislator supports the PTA*, since legislators' financial self-interest should reveal their personal preferences. I anticipate legislators' portfolios provide information about the direction *and* intensity of their personal preferences. For example, legislator A owns \$1000 in a highly productive firm involved in trade while B owns \$1000 in a highly unproductive firm involved in trade. A has more financial self-interest in supporting the PTA than B. If instead legislator B owns \$1m in the same highly productive firm that A owns, A and B's preferences push them in the same direction, but B's preferences are more intense.

H2) The effect of financial self-interest on PTA support depends on legislators' information about how PTAs relate to their financial self-interest. Lobbying should convey this information, leading legislators to increasingly vote their personal preferences as measured by their financial self-interest, unlike uninformed legislators who own firms that should gain from PTAs but do not lobby. We can also imagine other means of getting information about financial self-interest, such as pre-congressional career experience—those with a background in business may better understand how PTAs relate to their personal preferences.

2.3 Empirical analysis

To test these empirical implications I gather data on legislators' assets and combine it with firm and legislator variables. US legislators annually disclose their assets.[4] Opensecrets.org has digitized these reports since 2004. I use business databases to get data on these assets' productivity and differentiation. This involved manually checking company names reported by legislators to deal with misspellings etc. in order to link these to unique firm IDs (like Orbis's BVDID). I match 96.6% (57.4%) of legislators' assets that Opensecrets.org classifies

[4]Ethics in Government Act of 1978.

Table 2.1: Data collected

Data	Original source	Variables	N
Personal finances	Center for Responsive Politics (Clerk of the House, Senate Office of Public Records)	name of asset (as reported by filer), asset value, asset type, type of income from asset, location of asset, industry of asset (CRP coding)	311,595
Firm financials	COMPUSTAT and Orbis (Bureau van Dijk); Imrohorouglu & Tuzel	net income, employees, cost of goods sold, equity, total assets, industry codes (NAICS), capital expenditure, property, plant, and equipment; total factor productivity	314,778 and over 365 million; 29,213
Mutual fund details	CRSP	market capitalization of firms, the proportion of mutual fund portfolios firms comprise	over 224 million
Industry details	Broda & Weinstein; Census Bureau	product differentiation; US imports and exports by NAICS code	8,213
Lobbying	LobbyView	lobbying activity by year; lobbying activity by bill; amount spent on lobbying	56,064
Bills	voteview.com	roll call votes on preferential trade agreements (PTAs)	4,715
Campaign contributions	Federal Election Commission	labor PAC contributions, corporate PAC contributions	311,222 (labor), 1,068,672 (corporate)
Constituency characteristics	Foster-Molin and Social Explorer; Census Bureau	percent foreign-born in a district, percent recently arrived, percent Black, percent Hispanic, percent with high school ed., percent with bachelors degree, unemployment, median income, population; number of people employed in NAICS industries	33,077 (annual, county-level for some variables)
Other legislator characteristics	Foster-Molin and The Congressional Biographical Directory; voteview.com; Nelson & Stewart; Carnes	age, gender, race, Senate class; ideology scores (DW-NOMINATE), party; committee membership; pre-politics career/occupation	5,885

[a] Note: The primary dataset is a panel of legislator-votes with corresponding variables.

as public (private) firms.[5] For mutual funds, I multiply the portfolio proportions of listed shares held at the end of each year with corresponding firm-level data and sum, resulting in average measures of productivity and differentiation for the mutual fund. I impute missing values for mutual funds since diversification leads to less variation in differentiation and productivity compared to firms. Table 4.1 has details on the data assembled.

I create my measure of legislators' PTA-related `Financial self-interest` with this data. Legislators must report assets over $1000, indicating into which of 10 "bins" each asset falls (Figure 2.3). I take the midpoints of each bin to estimate the value.[6] Though

[5]Data on public firms from Eggers and Hainmueller (2013), which I extended temporally and marginally increased the match rate, aided the effort. The asset-level missingness seldom means a legislator goes from owning significant capital to little and the key results hold when summing up senators' assets without weighting by productivity or differentiation, which does not suffer this missingness.

[6]The results change little when using the lower or upper bound. Consistent with previous work (Eggers and Hainmueller 2014), using exact asset values reported by legislators for imputation doesn't substantively alter results.

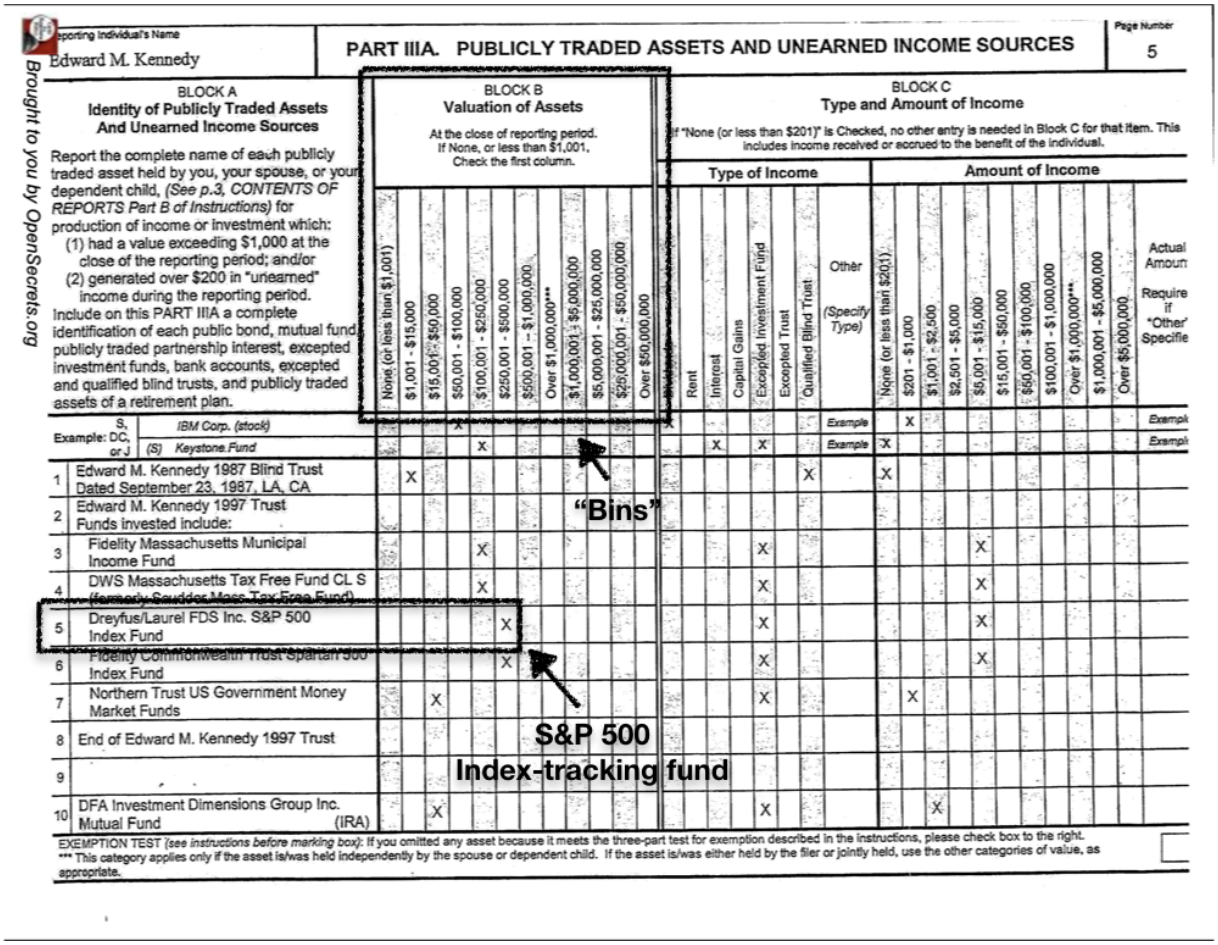


Figure 2.3: **Page 5 of Kennedy's 2006 financial disclosure.** `OpenSecrets.org`.

legislators may disclose inaccurately, formal enforcement and potential punishment by voters limit this (Eggers and Hainmueller 2014). The standard deviation of total assets is $35m and the median is about $1m.

I rely on NNTT to determine how PTAs impact legislators' assets. I weight the value of each legislator's investment by its productivity and product differentiation and sum by legislator-year. Labor productivity $\left(\frac{\text{net income}}{\text{employees}}\right)$ measures productivity, following Kim (2017).[7] The measure of differentiation—the inverse of the mean elasticity of substitution for Harmonized System 10-digit products with an associated NAICS 6-digit code (Broda and Weinstein 2006)[8]—removes firms that do not produce internationally traded goods, including those selling services. I expect diminishing marginal effects for `Financial self-interest` so I use a logarithmic-type of transformation.[9] I standardize continuous variables—including `Financial self-interest`—to have mean 0 and standard deviation .5, aiding model convergence and coefficient interpretation (Gelman and Hill 2006). Figure 2.4 shows the distribution of `Financial self-interest`. Legislators who only own assets that do not produce internationally traded goods produce the spike near 0 in the *right panel*.

Clearly my theory could encompass all trade votes, but PTAs present the best test. PTAs, unlike most legislation, cannot be amended, cannot be combined with non-trade legislation, and face a simple up-down vote. This limits strategic voting, allows a cleaner measure of support of free trade, and makes the mapping between legislators' portfolios and their financial self-interest relatively straightforward. Though PTAs do more than reduce tariffs, firms that gain from the deeper economic integration facilitated by PTAs are also distinguished by the firm characteristics NNTT highlights (Antras and Helpman 2004;

[7]Using market capitalization, capital productivity, return on assets, return on equity, or total factor productivity (İmrohoroğlu and Tüzel 2014) produces similar results.

[8]I first attempt to match firms' primary NAICS codes. If this was a non-traded industry, I attempt matching secondary or alternate codes available.

[9]When I multiply the value of assets by their productivity and differentiation—before summing by legislator—it is possible to have negative values since net income can be negative. Thus, I follow Gelman and Hill (2006) in transforming the data. For x less than or equalt to -1, I calculate the negative log of the absolute value of x; for x greater than or equal to 1, I take the log; and, for x less than 1 and greater than -1, I set x equal to 0.

Baccini 2019; Bernard, Jensen, and Schott 2009). During the period of the study, PTAs comprised the major trade legislation (c.f. Conconi, Facchini, and Zanardi 2014) that faced final passage votes *and* can reasonably thought to reveal support of trade. Other trade votes are messier. Vietnamese permanent normal trade relations (PNTR), considered by the 109th Senate, was combined with H.R. 6111—a tax and healthcare bill; legislators' financial self-interest could be related to these issues, potentially confounding results. Russian PNTR included the Magnitsky Act, leading to virtually unanimous Senate support. Other trade legislation involved little firm lobbying (Kim 2017), suggesting little effect on most legislators' `Financial self-interest`. Miscellaneous tariff bills (MTBs) must pass with Unanimous Consent (Ludema, Mayda, and Mishra 2010), offering no variation in support.

Congress is central to PTAs. It has constitutional authority—i.e. a veto (Krehbiel 1998)—over them and can deny the president the power to negotiate (Bailey, Goldstein, and Weingast 1997). Congress sets the negotiating objectives and active lobbying by MCs of the United State Trade Representative indicates Congress matters even during negotiations when Congress has no formal role (You 2020).

I examine all new PTAs voted on by the United States Congress since 2004—Morocco, Australia, Central America (CAFTA), Oman, Bahrain,[10] Peru, Colombia, Panama, and South Korea.[11] This amounts to a total of 458 same-party, same-state, same-PTA votes for which personal financial disclosures are available and both senators voted on the FTA. I code `PTA support` 1 for "yeas." About 90% (33%) of Republicans (Democrats) support these PTAs.

[10]The Senate passed the Bahrain PTA by voice vote.

[11]I don't examine the United States-Mexico-Canada Trade Agreement (USMCA), a renegotiation of NAFTA, because the substance and political dynamics departed from previous PTAs. USMCA seems more protectionist than what it replaced, meaning firms that gain from freer trade might oppose it. The Trump Administration's heightened focus on trade arguably made USMCA more salient. Yet it was framed as a populist redress for NAFTA. At the same time, the uncertainty created by the White House's negotiating tactics, including threatening withdrawal from NAFTA, meant many firms likely supported USMCA to remove uncertainty—despite the increase in protectionism. The White House's inclusion of labor and environmental standards in USMCA catered to (organized) labor, encouraging Democrat support.

Figure 2.4: **Histogram of senators' `Financial self-interest` in 2006.** *Left-panel:* Senators' total assets.

2.3.1 Legislators vote their financial self-interest on PTAs

I expect that legislators will support PTAs more when PTAs align with their `Financial self-interest` (*H1*). Using PTA votes to rigorously test this hypothesis requires accounting for the influence of constituencies—which may or may not be driven by economic characteristics. Adequately measuring this is difficult. Even in the context of political economy studies where trade theory can help infer constituents' preferences, knowing which theory and how to operationalize it is not straightforward. Measuring these factors at the electoral rather than geographic constituency complicates the task. Even if we perfectly account for trade theory-derived preferences, we may be missing other important constituency variables.

Adding district or legislator fixed effects—something not done by previous studies of trade votes—likely fails to properly account for constituency-level confounders. Constituencies can change overtime. For example, the temporal and spatial variation in the impact of Chinese imports on local labor markets would not be addressed by a combination of legislator/district fixed effects and year fixed effects. Additionally, legislator/district fixed effects fail to account for many other changes take place across time and PTAs—which party holds the presidency, the economic importance of a PTA, the geopolitics of a PTA, etc. Even if legislator or district fixed effects are combined with PTA fixed effects and interactions with party, attempting to also control for constituency factors that interact with these time-variant factors is complicated. Further, for this paper, legislator fixed effects could subsume the theorized effect of `Financial self-interest` if `Financial self-interest` varies lit-

tle within legislators *and/or* if pre-existing *beliefs* drive investments and PTA support but change little over time, even if individual investment portfolios change.

Comparing legislators' roll call votes within the same district, party, and PTA—something possible in the Senate—sidesteps these issues. To show that legislators' trade theory-inferred preferences teach us something about trade politics, accounting for legislators' party-specific, geographic constituency is crucial. My approach accounts for not only constituency-level confounders but also a legislators' party, the specific PTA, and *interactions between all three*. This approach, for example, controls for the possibility that, while Democrat senators feel pressure from the Obama White House to support the Panama PTA, those from Michigan recognize that many of their primary voters are particularly leery of foreign trade. At the same time, it accounts for the fact Democrats feel considerably less pressure to listen to the Bush White House's pleas to support CAFTA but those from California must consider that Silicon Valley backs the deal, organized labor opposes it, and some of their constituents—sometimes dubious of PTAs—are sympathetic toward this PTA due to ethnic ties to the region. Constituents' preferences, partisan politics, and the economic and security implications vary and interact across PTAs. My approach not only controls for this but also is conservative, assuming legislators' personal preferences don't influence the votes of senator pairs voting together. In particular, most Republican senator pairs vote for PTAs—the GOP likely attracts legislators with pro-trade preferences. My approach assumes personal preferences contribute nothing to such senators' PTA support, even if this is not the case.

2.3.1.1 Strong bivariate relationship within senator pairs

I start with a simple comparison of `PTA support` and financial self-interest within same-party, same-state, same-PTA senator pairs (Figure 2.5). To determine which member of a pair gains more, I compare their measures of `Financial self-interest`, coding as a "1"

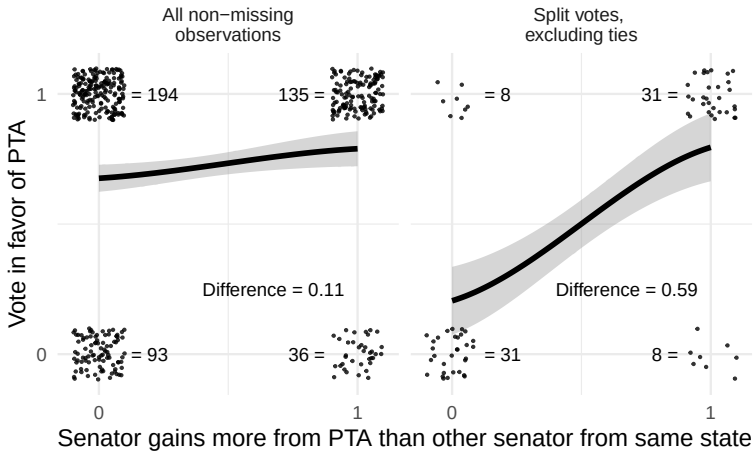


Figure 2.5: **Bivariate analysis shows senators that gain from PTA tend to support them.** *Left panel:* includes all complete pairs. *Right panel:* excludes pairs with same value of `Financial self-interest` ("ties") and pairs that voted together. LOESS confidence intervals and smoothed lines.

the member with more. For instance, in 2005 Tom Carper's (D-DE) measure of `Financial self-interest` is 0.63 while Joe Biden's (D-DE) is -0.31. Tom Carper should gain more—denoted as "1."

The *first panel* of Figure 2.5 shows the relationship between all same-party, same-state, same-PTA observations for which *neither* member of the pair has missing values for these two variables (e.g., if one senator didn't vote, I remove the pair of votes). We see the average level of support for those who own less than their senate partner is 68%, compared to 79% for those that stand to gain more, a difference in means (DIM) of 11 percentage points.

The *second panel* in Figure 4.3 excludes "ties"—cases where both members of a senator pair have the same `Financial self-interest`, which most frequently happens when neither senator invests in firms producing internationally traded goods. Here I also remove all senator pairs that did not split their votes. The research design restricts any possible effect of `Financial self-interest` to these observations. If party, state, and PTA factors—as well as interactions between them—explained senators' PTA votes we would see no relationship, instead of the DIM of 59 percentage points we actually find.

2.3.1.2 Accounting for individual-level confounders

Is this relationship robust to controlling for possible individual-level counfounders? Potential confounders consist of personal, partisan, constituency, and PTA-specific characteristics; the paired senator approach controls for the latter three categories. One concern in accounting for individual level confounders is whether they are pre- or post-treatment (Aronow and Miller 2019). Gender at birth and age—included in previous analyses of PTA votes (Conconi, Facchini, and Zanardi 2014; Milner and Tingley 2011)—seem to be safely categorized as pre-treatment. These studies also include personal characteristics—ideology, PAC contributions, and the margin of victory in previous elections—that may be post-treatment confounders. Arguably including these variables may understate the effect size: for instance, legislators with personal preferences in favor of PTAs may receive more corporate PAC contributions due to their pro-PTA preferences. With this in mind, I still explore if the relationship between PTA votes and `Financial self-interest` is robust to their inclusion. For ideology, I use DW-NOMINATE scores (Lewis et al. 2018; Poole and Rosenthal 1985). Following Conconi, Facchini, and Zanardi (2014), I measure campaign contributions as the log of the sum of contributions made to a legislator by labor union (corporate) PACs per two-year cycle. Though not considered previously, since certain career backgrounds may dispose legislators to favor PTAs, I gather data on the proportion of legislators' pre-congressional careers spent in 3 broad categories—profit-oriented professions, service-oriented professions, and working-class jobs (Carnes 2013), though the coverage of this career background data does not extend to the whole period of my study, so their inclusion entails losing observations.

First, I run a logistic regression of PTA votes on `Financial self-interest` and `Age` and `Sex`. I include a random intercept for each same-party, same-state, same-PTA pairs and estimate the model using Bayesian analysis.[12] I use weakly informative priors over

[12]Maximum likelihood estimation (MLE) generally overfits, leading to biased estimates (e.g. Ward and Ahlquist 2018), which Bayesian analysis addresses (Gelman et al. 2013). With more complex models MLE often results in perfect separation, compromising inference (Ward and Ahlquist 2018). Bayesian analysis, by *penalizing the size of effects*, can provide valid estimates in this case (Gelman et al. 2008).

population parameters. I choose priors that allow the random intercepts to easily take on large values—approaching the improper priors implicit in MLE and thereby mimicking the fixed effects of MLE while still allowing for model convergence (Appendix 2.5.2). I then test if the effect remains when including post-treatment controls: `Ideology`, `Corporate PAC` and `Labor PAC` contributions, and a two-degree polynomial of `Margin of victory`—accounting for any diminishing effects of `Margin of victory`. I allow all of these terms to vary by party, to account for potential heterogeneous effects across parties. Lastly, I add `Career background` and estimate the model. The missingness of these variables means losing 66 observations.

To interpret the models, I focus on a particular quantity of interest (QOI) that minimizes extrapolation: the average expected effect of a first difference (AFD) (Ward and Ahlquist 2018). I specifically calculate how an interquartile range (IQR) shift in `Financial self-interest` changes the predicted probability of voting for a PTA. That is, for all observations I calculate the predicted probability of voting for a PTA when `Financial self-interest` is set to the third quartile, subtract from this the predicted probability of voting for a PTA when `Financial self-interest` is set to the first quartile, and then calculate the mean. Doing this across draws of the posterior distribution produces the central tendency and credible intervals of this QOI. I calculate this QOI for all observations, as in the *left panel* of Figure 2.5, and for the senator pairs that split their votes, similar to the *right panel* of Figure 2.5.

Figure 2.6 shows the AFD of an IQR shift in `Financial self-interest`. The estimated effect when including pre-treatment controls is about 11 percentage points—about 15% of the average level of support (72%). The observations driving this effect—senator pairs who split their votes—have an AFD of 38 percentage points. Adding post-treatment controls does not markedly change the results. When MLE does not result in perfect separation, the results are similar (Appendix 2.5.3).

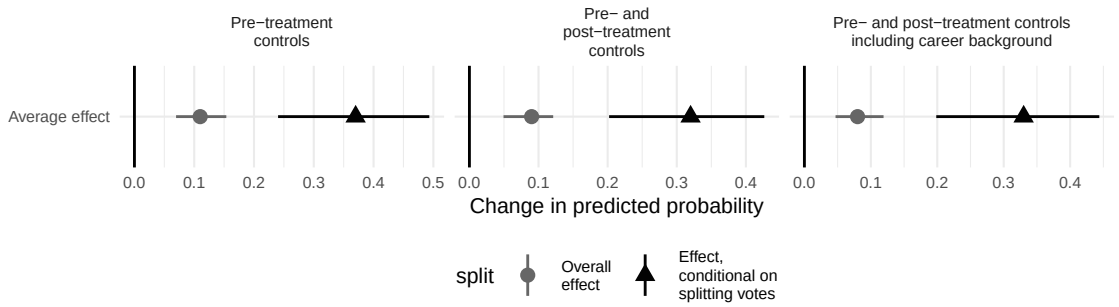


Figure 2.6: **Support for PTAs increases with financial self-interest after controlling for confounders.** The AFD of an IQR shift in `Financial self-interest` for all observations and for senator pairs who split votes. Mode and 95% high density intervals from 10,000 posterior draws.

Do these results depend on case selection and the limited number of same-party, same-state senators? While I noted at length the difficulty of controlling for constituency-level variables when one cannot (or chooses not) to leverage dual-member districts, nevertheless I test *H1* on 3511 PTA votes in the House. Despite substantial institutional differences and a different modeling approach, I find the AFD of an IQR shift in `Financial self-interest` is about 4 percentage points (Appendix 2.5.5). The somewhat smaller effect accords with the notion that, facing reelection more frequently, House members do not have as much electoral slack to vote their personal preferences.

My measurement choices—though informed by NNTT and following previous scholarship where applicable—could affect the results. I show other ways of summarizing the data produce consistent findings (Appendix 2.5.6). Simply classifying an asset as "productive" or "unproductive" based on the median value of productivity, summing, and then comparing the effect of owning "productive" versus "unproductive" firms finds that only the former predicts increased support of PTAs in senator pairs. Similar results obtain for "differentiated" versus "undifferentiated" assets. I also show that the trade orientation of legislators' portfolios has a distinct and larger predictive effect on PTA support than wealth (Appendix 2.5.7). Given the missingness for `Productivity` and `Differentiation` for private firms and the complex measurement choices for mutual funds, I also show that dropping these classes

of assets does not change the results (Appendix 2.5.8).

I test if `Financial self-interest` predicts other House and Senate votes on economic and non-economic issues: abortion, espionage, financial regulation, and taxes. I find `Financial self-interest` is far more predictive of PTA votes (Appendix 2.5.9). This attests to the vailidity and trade-specificity of `Financial self-interest`, as well as suggesting that the measure captures something other than a general pro-business disposition.

Finally, I offer evidence that *personal preferences* drive the effect of `Financial self-interest`. My theory suggests that as electoral pressure increases, legislators' personal preferences should be crowded out by electoral concerns. I leverage the staggered election cycles of the Senate to show that `Financial self-interest` has a smaller effect on legislators in the final two years of their term (Appendix 2.5.10). I also show that increasing PTA salience—whether measured through the size of the PTA or through CCES survey responses—reduces the effect of `Financial self-interest` (Appendix 2.5.11).

2.3.2 Firm lobbying as information

I now test whether the relationship between `Financial self-interest` and `PTA support` depends on legislators having information about the mapping between their personal preferences and PTAs (*H2*). Legislators might get such information from firm lobbying. The Lobby Disclosure Act (LDA) requires firms to quarterly (biannually before 2007) report if they lobbied Congress on trade. One way to use this data is to assume that firm lobbying on trade legislation—PTAs or otherwise—informs legislators how trade effects the firms they own. Thus, if legislators own firms that lobby on trade, they know how PTAs relate to their personal preferences—and their PTA votes should be more influenced by their personal preferences, measured by `Financial self-interest`.

Importantly, firms need not report which legislators or staff they contacted. Some evidence suggests that lobbyists contact many legislators (about PTAs). Foreign governments

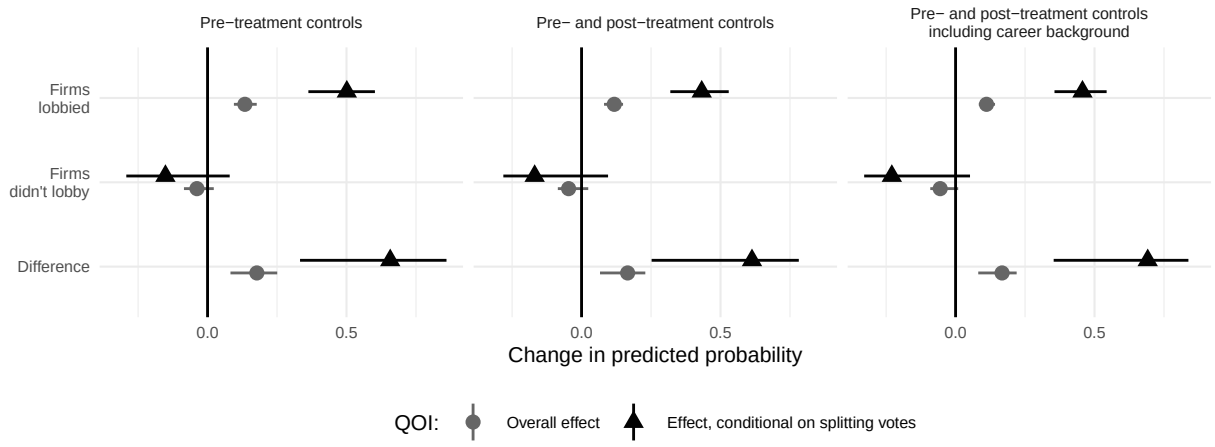


Figure 2.7: **Support for PTAs increases with `Informed financial self-interest`.** The AFD of an IQR shift in `Informed financial self-interest`, `Uninformed financial self-interest`, and the difference between the two for all observations and for senator pairs who split votes. Mode and 95% high density intervals from 10,000 posterior draws.

lobbying the US government, unlike firms, must disclose which who they contact. These disclosures reveal that the Korean, Panamanian, and Colombian governments contacted 538 (out of 839) legislators over the course of the negotiations and ratification of these PTAs, with many legislators contacted multiple times (You 2020). Lobbyists sometimes organize events where they can interact with hundreds of legislators over the course of a few days (Birnbaum 2015, 22). I assume LDA reports of firm lobbying offer a proxy of whether firm lobbying might have informed legislators about firms' trade preferences.

2.3.2.1 Owning firms that lobby increases PTA support

I create `Informed financial self-interest` by summing—by year—each legislator' productivity, differentiation weighted assets conditional on the asset reporting lobbying Congress on trade that year. I similarly create `Uninformed financial self-interest` with assets that didn't lobby, which offers a useful comparison analogous to a placebo. To test if lobbying on trade leads to more PTA support, I use the models from Section 2.3.1.2, replacing `Financial self-interest` with `Informed financial self-interest` and `Uninformed financial-self interest`.

The results suggest that owning firms that lobbied on trade increase PTA support, while owning firms that don't lobby—but should gain from trade—has little or no effect. Figure 2.7 shows the AFD of an IQR shift in `Informed financial self-interest` is about 14 percentage points when pre-treatment controls are included. The inclusion of post-treatment controls does not change the mode or the 95% high density intervals much. While not included in the figure, the AFD of an IQR shift in `Informed financial self-interest` is largest for Democrats—19.5 percentage points compared to 4.4 percentage points for Republicans—based on the model that includes *all* pre-and post-treatment controls. The stronger effect for Democrats results at least in part from the generally high PTA support among Republicans. The overall difference with `Uninformed financial self-interest`—with an AFD of roughly 0—is large and precisely estimated. The AFDs of `Informed financial self-interest` for senators that split there votes is around 50 percentage points and roughly that much larger than the effect of `Uninformed financial self-interest`.

2.3.2.2 PTA-specific lobbying appears crucial

What if, unless firms specifically lobby on particular PTAs, legislators do not tend to infer the firms' PTA preferences? The measure of `Informed financial self-interest` would be too broad. I construct a more precise measure of `PTA-informed financial self-interest`—ownership of firms that lobby specifically on PTAs—that should still predict `PTA support` while owning firms that lobbied on something other than PTAs should not. I use this more precise measure to probe the existence of a tighter link between PTA support, legislators' investments in firms, and PTA-specific lobbying by those firms.

Approximately 80% of reports on trade-related lobbying specify what legislation they lobbied. I use regular expressions to determine which firms lobbied specific PTAs, either at the time of the vote or in the years before (Appendix 2.5.1). I also determine which firms lobbied on other issues—but *not* PTAs—at the time of the PTA vote and in the three years

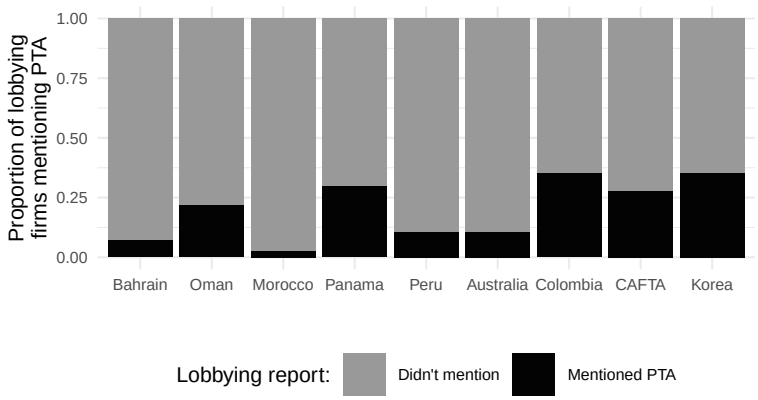


Figure 2.8: **Firm lobbying on specific PTAs.** Includes all firms that reported lobbying on trade and tariff issues except firms that didn't report specific legislation or that reported lobbying on PTAs but didn't specify which ones. Firms that "didn't mention" a specific PTA are those that were active lobbying during the year of the PTA vote and/or within the three years before and never mentioned the PTA.

prior to create another placebo—`Non-PTA-informed financial self-interest`. According to NNTT, this placebo variable taps ownership of firms that gain from PTAs and these firms lobby Congress about trade. The placebo only differs from `PTA-informed financial self-interest` because the firms' lobbying disclosures don't mention PTAs. Figure 2.8 shows the proportion of firms that mentioned a specific PTA out of those that reported lobbying particular legislation—PTAs or otherwise. I remove firms that reported lobbying PTAs but didn't specify which ones.

Legislators indeed seem to rely on PTA-specific lobbying for information on how PTAs relate to their personal preferences. Figure 2.9 shows the average effect of an IQR shift in `PTA-informed financial self-interest` is about 13 (10) percentage points when pre-treatment (and post-treatment) controls are included. The difference with `Non-PTA-informed financial self-interest`—with an AFD of roughly 0—is between 13 and 15 percentage points. These quantities are about 3 to 4 times as large for senator pairs that split their votes.

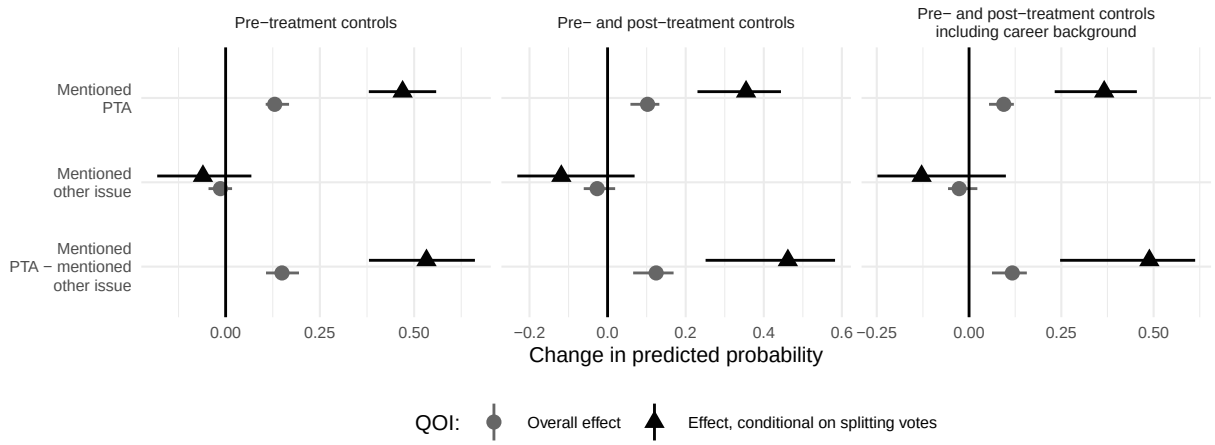


Figure 2.9: **Support for PTAs increases with `PTA-informed financial self-interest`.** The AFD of an IQR shift in `PTA-informed financial self-interest`, `Non-PTA-informed financial self-interest`, and the difference between the two for all observations and for senator pairs who split votes. Mode and 95% high density intervals from 10,000 posterior draws.

2.3.2.3 Lobbying as firms revealed preferences

NNTT has strong theoretical and empirical credentials, yet using the firm characteristics highlighted by NNTT to determine winners and losers—and thus the effect on legislators' portfolios—requires numerous measurement decisions. While I've provided robustness checks, firm lobbying offers a way to set aside NNTT—and its assumptions—in exchange for a simple assumption that firms that lobby on PTAs tend to support them.

Assuming firms tend to lobby in favor of PTAs seems justified. About 5% of firms that lobby on PTAs indicate whether they support or oppose the agreements. Figure 2.10 makes clear that these firm overwhelmingly express support—roughly 91% of the time. My brief analysis is consistent with more in depth investigations of the content of firm lobbying over PTAs (Blanga-Gubbay, Conconi, and Parenti 2020). Such positivity towards trade shows up in the congressional testimony of firms (Lee and Osgood 2019). Applying the logic of collective action to the universe of firms suggests that it is precisely the large firms that gain from economic integration that will be able to dominate lobbying, which is consistent with their public statements (Kim and Osgood 2019).

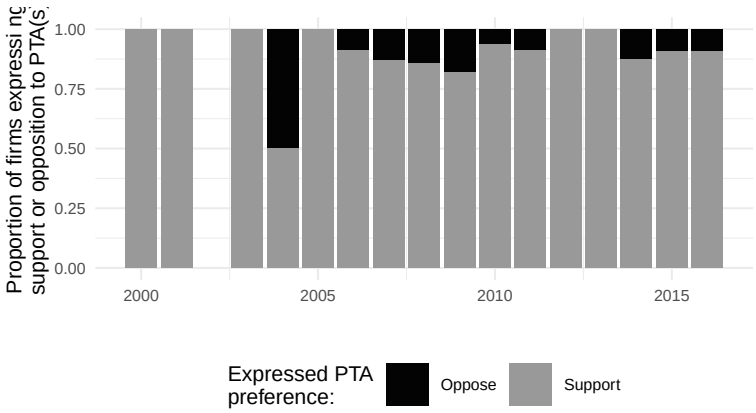


Figure 2.10: **Most firms report supporting PTAs.** Includes all firm-year observations that reported supporting or opposing PTAs.

Using this assumption, instead of weighting legislators' assets by their differentiation and productivity, we can simply sum their investments in firms that lobby on PTAs—`PTA lobbied assets`. Again, summing their assets that lobby on other trade-legislation—and *not* PTAs—provides a useful placebo (`Non-PTA lobbied assets`). Though still measures of (un)informed financial self-interest, I choose these names to reflect the construction of these variables. I log transform them as I anticipate diminishing returns. I fit models like in Section 2.3.1.2, exchanging `Financial self-interest` for `PTA lobbied assets` and `Non-PTA lobbied assets`. I make 20,000 draws from the posterior distribution to increase the effective sample size for these models.

Senators that have more investments in firms that lobbied on PTAs—firms that typically support PTAs—are more likely to support PTAs than the other senator from the same state and same party voting on the same PTA. Figure 2.11 shows the AFD of an IQR shift in `PTA lobbied assets` to be about 10 percentage points, about 7 percentage points greater than the estimated effect of `Non-PTA lobbied assets`—assets that lobbied on trade, just not on PTAs. The AFDs conditional on senator pairs splitting their votes are about 3-4 times as large.

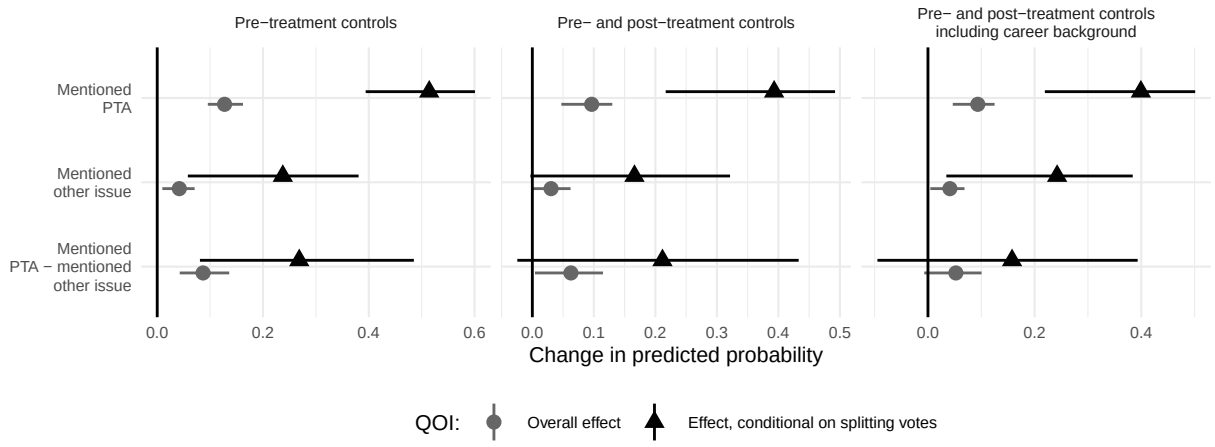


Figure 2.11: **Support for PTAs increases with `PTA-lobbied assets`.** The AFD of an IQR shift in `PTA-lobbied assets`, `Non-PTA-lobbied assets`, and the difference between the two for all observations and for senator pairs who split votes. Mode and 95% high density intervals from 20,000 posterior draws.

2.3.3 Substantive effects

The magnitude of the effect of financial self-interest compares favorably with other important variables. Here I focus in particular on `Informed financial self-interest`, using the model from Section 2.3.2.1 that includes pre- and post-treatment variables, including `Career background`. First, I estimate the effect of party, which tends to dominate all other variables in contemporary US politics. I calculate the party AFD by setting all observations' party to Republican and DW-NOMINATE scores to the Republican median, calculating predicted probabilities. I subtract from these predicted probabilities the predicted probabilities that result from setting all observations to Democrat and giving them the Democratic median DW-NOMINATE score. So calculated, switching from Democrat to Republican makes a legislator 24.8 percentage points more likely to support PTAs (Figure 2.12). The AFD of an IQR shift of `PTA-informed financial self-interest` of 11.3 percentage points (Figure 2.7) amounts to almost half the effect of party.

Having shown the importance of party, I next contextualize the size of the effect of `Informed financial self-interest` relative to other control variables *within parties*. This

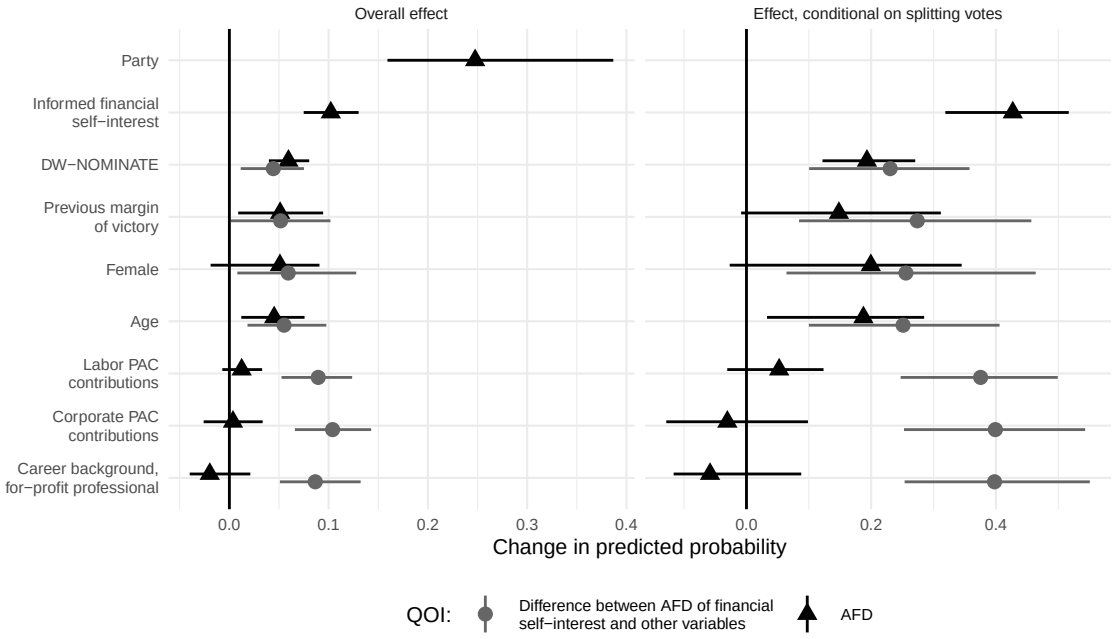


Figure 2.12: **The impact of financial self-interest relative to other variables.** The AFDs of an IQR shift in `Informed financial self-interest` and continuous control variables, the AFD of moving from 0 to 1 for binary control variables, and the difference in *magnitude* between the AFD for `Informed financial self-interest` and the other AFDs. Mode and 95% high density intervals from 10,000 posterior draws.

comparison is particularly important when the AFD of an IQR shift in variables, particularly `DW-NOMINATE`, is bound up with the effect of changing parties. Figure 2.12 shows AFDs (triangles) of *within-party* IQR shifts for `Informed financial self-interest` and continuous control variables (i.e. `DW-NOMINATE`, `Margin of victory`, etc.).[13] It also shows the AFDs (circles) of a change from 0 to 1 for binary variables (i.e. `Female`) and the difference in *magnitude* between the AFD of `Informed financial self-interests` and other AFDs. Party aside, `Informed financial self-interest` has a larger estimated AFD than all other variables, including variables that receive much attention in the trade legislation literature (i.e. PAC contributions) and the literature on Congress (i.e. DW-NOMINATE

[13]For example, when calculating the within-party `DW-NOMINATE` AFD, I set each Democrat (Republican) observation's `DW-NOMINATE` score to the third quartile value among Democrats (Republicans) and calculate the predicted probability of supporting PTAs. I subtract from this vector the predicted probabilities when setting `DW-NOMINATE` to the first quartile value among Democrats (Republicans) and take the mean of the resulting vector. Doing this across posterior draws gives the posterior distributions of the AFD of a within-party IQR shift in `DW-NOMINATE`.

scores).

The results for informed financial self-interest appear robust and cut against alternate explanations. For the 3511 PTA votes in the House, the AFD of `Informed financial self-interest` is 6 percentage points, 7 percentage points larger than that of `Uninformed financial self-interest` (Appendix 2.5.5). Lobbying obviously need not be the only way legislators could come to understand the more complex effects of PTAs; in Appendix 2.5.12 I show that legislators with business backgrounds respond more to `Financial self-interest`. At the same time, these results are not due to some legislators having broadly pro-business dispositions that correlate with owning firms that lobby on trade; I find that in neither the House nor Senate does `Informed financial self-interest` predict support of financial deregulation or tax cuts (Appendix 2.5.9), further confirmation that my measure captures conveyance of trade-specific information. Finally, I address any further concerns that differing *electoral constituencies* between same-state, same-party senators might drive these findings; retiring senators vote their `Informed financial self-interest` even more strongly Appendix 2.5.13.

2.4 Conclusion

Legislators voting on trade must weigh many factors: concentrated economic effects on firms and some parts of the labor market; foreign policy; national economic effects; partisan concerns; the wishes of the administration; and nativism or cosmopolitanism, which could lead their constituents to oppose or favor increasing ties to other countries aside from the economic effects. Could their personal preferences affect their calculus, too? With its varying effects on firms, how might legislators know trade's impact on their investments?

I argue that legislators personal preferences, reflected by their investment portfolios, affect their support of trade. Assuming legislators have electoral space to pursue policies they care about, I expect them to support trade more when it benefits their investments.

New new trade theory (NNTT)—which holds that trade heterogeneously affects firms—informs my measure of trade's impact on legislators' investments. If legislators don't know these heterogenous effects, I expect lobbying by firms they own may inform them, which constitutes a new theory of how lobbying influences legislators. My theory updates and extends dominant theories of PTA formation by using NNTT to incorporate legislators' personal preferences and accounting for firms' and voters' varying preferences.

I collect extensive data on legislators' investments that predicts how trade should affect legislators' investments to test my theory. I account for the possibility that geographic constituencies, partisan factors, and PTA-specific variables interact to confound the relationship between legislators' personal preferences and their support of trade by leveraging the dual-member districts of the Senate, comparing same-party, same-state senators voting on the same PTAs—in addition to a suite of individual-level controls. I find that legislators' financial self-interest predicts their support of trade. Further, I show that ownership of firms that lobby on PTAs—and not those that don't lobby or that lobby on other legislation—drives the effect. This effect tends to outstrip all others except party.

My research may help explain why the Senate supports trade more than the House. While numerous scholars posit the larger constituencies of the Senate as an explanation (e.g. Magee et al. 1989), the argument does not seem born out by close scrutiny of the data (Karol 2007). Given that senators are systematically wealthier—and have more invested in firms that should gain from and lobby on trade—my theory offers another reason why senators should support trade more.

This study also opens up new avenues on public opinon. Most research assumes individual trade preferences stem from factor endowments, industry employment, or consumer benefit. Scheve and Slaughter (2001), a notable exception, find that home ownership in areas hurt by trade decreases support of trade. My findings suggest that other assets—namely investment portfolios—might be an important source of peoples' trade preferences. This

could be particularly important in the US, where about 50% of households are invested in the stock market (Federal Reserve 2019). A better understanding of individuals' preferences on trade policy could change our view of the domestic politics of international trade.

Finally, scholars should explore this in other contexts. The US has enduring democratic institutions, competitive elections, extensive disclosures of legislators' personal finances, and independent media inclined to publicize any legislative behavior that appears corrupt. If such institutions are absent, as they are in most of the world, politicians likely have more room to pursue their personal trade-related preferences. Conversely, during this study trade was low-salience. More issue salience may limit legislators' willingness to support policies that align with their—but not their constituents'—preferences.

2.5 Appendix

2.5.1 Content analysis of LDA reports

LDA disclosure forms have a field for lobbyists to list specific legislation. For trade-related lobbying between 2000 and 2016, on roughly 80% of reports the lobbyists write something in this field. Sometimes they write specific bill numbers, but often lobbyists will refer to PTAs without reference to a bill number. In fact, much lobbying on PTAs takes place years before a bill is introduced (You 2020). Instead of matching bill numbers, I use a set of regular expressions to find PTAs—I developed this set of regular expressions by reading through about 20,000 of the 65,159 reports and noting the different ways PTAs were referenced throughout. While reading through, I also made note of other issues that came up frequently in reports and how they were referenced, allowing for quantitative comparison of the frequency of lobbying on these issues relative to PTA lobbying. Following Conconi, Facchini, and Zanardi (2014) I include legislation relating to Trade Promotion Authority, since Congress must grant this to allow the president to meaningfully negotiate PTAs.

While permanent normal trade relations (PNTR) votes in Congress served essentially to establish a PTA with the country in question under that country's WTO accession agreement, I have not tried to capture this lobbying, meaning if anything the count of firms lobbying on PTA-related legislation should be higher that what I report. PTAs can be referred to by a number of names whereas the number of terms mentioned for most other major issues is far more restricted (that is, it's hard to lobby on China without mentioning "China" or the "PRC"). Below I list the regular expressions used for each topic in Figure 2.1.

PTAs: `(?i)FTA`, `(?i)TPA`, `(?i)Trade Promotion`, `(?i)fast track`, `(?i)Trade Negotiating Authority`, `(?i)Trade Facilitation Accord`, `(?i)Free.Trade Agreement`, `(?i)Multilateral Trade Agreement`, `(?i)Bilateral Trade Agreement`, `(?i)Free Trade Act`, `(?i)Columbia Free Trade`, `(?i)Free Trade of the Americas`, `(?i)TPP`,

(?i)Trans-Pacific Partnership, (?i)TTIP, (?i)T-TIP, and (?i)Transatlantic Trade and Investment Partnership. *China*: (?i)China and (?i)PRC. *MTBs*: (?i)MTB, (?i)Miscellaneous Tariff Bill, (?i)Miscellaneous Trade. *Regulations*: (?i)regulation, (?i)standard. *Tariffs*: (?i)tariff. *Farm Bill*: (?i)Farm Bill. *Japan*: (?i)Japan.

The regular expressions for specific PTA lobbying (see Figure 2.8) are a bit more complex, since sometimes "FTA" or some version of it can be separated from the actual country name. Firms sometimes report lobbying on "FTAs - Oman, Central America, Peru, Columbia, Thailand, Australia, Panama, and Korea." Colombia is often misspelled and clearly some countries can be mentioned long after (or before) the "FTA" term. Again, based on reading through about 1/3 of the 65,159 reports I generated the following regular expressions (using Columbia as an example):

(?i)Trade Promotion Agreement[a-z]*\\W+(?:\\w+\\W+){0,21}?(?i)Col.mbia, (?i)Free Trade Agreement[a-z]*\\W+(?:\\w+\\W+){0,21}?(?i)Col.mbia, (?i)FTA[a-z]*\\W+(?:\\w+\\W+){0,21}?(?i)Col.mbia, (?i)Col.mbia FTA, (?i)Col.mbia TPA, (?i)Col.mbia Trade Promotion, (?i)Col.mbia Trade Facilitation Accord, (?i)Col.mbia Free.Trade Agreement, (?i)Col.mbia\\W+(?:\\w+\\W+){0,5}?(?i)FTA, (?i)Col.mbia\\W+(?:\\w+\\W+){0,5}?(?i)Free Trade, and (?i)Col.mbia TPA.

2.5.2 Notes on priors

For most terms in the Bayesian models in the paper I use weakly informative priors—essentially ruling out unreasonably large estimates (be they positive or negative) (Gelman et al. 2008). Having standardized all the variables, summarizing them is straightforward. For binary coefficients (PTA indicators, gender, business background, etc.), the priors are normal distributions with mean 0 and standard deviation of 2.5. For continuous variables—age and financial self-interest—the standard deviation is approximately 5 and increases to

about 12.5 for the interaction terms (e.g. PTAs $\times$ financial self-interest).

The intercepts for each nest—each containing a same-party, same-state, same-PTA pair of votes—are modeled as a multivariate normal with mean 0 (Gelman et al. 2013; Goodrich et al. 2020). The covariance matrix for this multivariate normal density is decomposed into a correlation matrix and variances, with the variances decomposed into the product of a simplex vector and the trace of the matrix. To get the trace, the square of a scale parameter is multiplied by the order of the matrix. The trace equals the sum of the variances.

A large trace allows the parameter for each nest's intercept to easily take on relatively large values—as the trace approaches infinity these random intercepts become indistinguishable from MLE fixed effects. I increase the trace by increasing the scale parameter, the prior over which is a gamma distribution. I set this gamma distribution's shape parameter to 50 and its scale parameter to 10 (the defaults are 1 and 1), resulting in a mean of 500. Increasing the scale parameter much further creates convergence problems—recall perfect separation is why MLE is not feasible in the first place. These priors create a high expected sum of variances—$500^2 \times 229$, with 229 being the order of the covariance matrix (the order is 196 for models including `Career background`).

In terms of overall estimated effects, these priors matter little; financial self-interest is both good at predicting which pairs vote together (which a small trace weights more heavily due to "borrowing strength" across nests) and, when pairs split votes, which senator will vote in favor (which a larger trade weights more heavily). The priors chosen, however, allow us to better estimate *how financial self-interest explains senator-pair divergences in behavior.*

2.5.3 Main results similar when using with MLE

Figure 2.13 shows the AFD of an IQR shift inf `Financial self-interest` based on a regression of PTA support on `Financial self-interest`, `Age`, `Female`, and fixed effects for each same-party, same-state, same-PTA senator pair, estimated with MLE. The results are

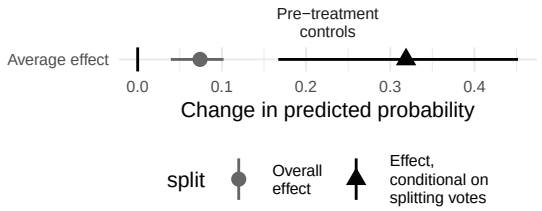


Figure 2.13: **Support for PTAs increases with financial self-interest after controlling for confounders, MLE.** The AFD of an IQR shift in `Financial self-interest`, for all observations and for senator pairs who split votes. Median and 95% confidence intervals from 1000 simulations.

comparable to those in Figure 2.6. Using MLE on more complex models results in perfect separation—though the results also depart little from those presented in the paper.

2.5.4 Crossvalidation for House models

I use information criteria and crossvalidation to select the statistical model I use when analyzing PTA votes in the House. There are a huge number of models I could attempt to run—particularly given all the potential constituency-level confounders in the House. In some models my variable of interest may be statistically and substantively significant, but inference is more reliable when models better capture the data generating process (Gelman et al. 2013; Gelman and Hill 2006; Ward and Ahlquist 2018). I fit many models, testing if each model (1) does well at explaining the variation in the outcome for data on which the model was fit, (2) is not *needlessly* complex, and (3) is good at predicting out-of-sample observations on which the model was not trained (Friedman, Hastie, and Tibshirani 2001).

I fit a logit model, with votes in support of an PTA coded as a 1, those against as 0, and excluding those that were not "yea" or "nay." I control for `DW-NOMINATE` scores, `Career background` (Carnes 2013), `Labor/Corporate PAC` contributions, `Margin of victory`, `Age`, `Party`, `Presidential copartisanship`, and `Female`. I also include several constituency-level controls: `Median hosehold income`, `Unemployment`, the `Ratio` of employees in exporting over import-competing industries, and the proportions of `Bachelors holders`, `Foreign`

`born`, `Black`, and `Hispanic` (Table 2.1).

I used 5-fold cross validation and a large number of model specifications for different variables representing different theories. For HO, I summed the legislator's assets. For new trade theory (NTT), which focuses on industries, I summed their differentiation-weighted assets. For NNTT, I weighted their assets with the different productivity measures and then summed. Finally, I follow Melitz and Ottaviano (2008)—which I will refer to, in this section, as (N)NTT but referred to as NNTT in the paper—weighting legislators' assets both by their differentiation and firm productivity, then summing. I test many different specifications of the model, including interactions of important variables and squared terms of variables where it seemed appropriate (Gelman and Hill, 2006). I selected the best performing models for each measure based on Akaike information criterion (AIC), Bayesian information criterion (BIC), and the logistic loss for the five-fold cross validation. AIC and BIC are calculated without five-fold cross validation. They both punish complexity, with BIC applying stricter penalties to additional terms than does AIC.

Selecting the best performing model for each measure, I then reran the five-fold cross validation, this time calculating additional measures of model fit: accuracy, precision, F1, and the area under the receiver operating characteristic curve (AUC). These metrics are calculated on the out-of-sample portion of the five-fold cross validation for each iteration. The evidence points to the measures that combine the differentiation and productivity weights as being the best, justifying their centrality in my measure of `Financial self-interest`; results are shown in Figure 2.14.

Since I have multiple variables to measure productivity, I denote the different NNTT measures in Figure 2.14 by referring to the individual measures of productivity. "NTT" means the value of the asset was weighted by the product differentiation in that industry. Looking at Figure 2.14, if we think that modern trade theories should add something to classic theories, the AIC, BIC and AUC—an excellent single number summary of predictive

	Measure	AIC	BIC	AUC	Log_loss	Accuracy	F1	Precision
1	TFP-NTT	2635.340	3251.706	0.910	-0.393	0.846	0.888	0.875
2	Labor prod-NTT	2643.676	3241.551	0.910	-0.395	0.844	0.888	0.872
3	Size-NTT	2648.243	3246.117	0.910	-0.394	0.856	0.888	0.875
4	ROA-NTT	2653.738	3251.613	0.909	-0.396	0.845	0.889	0.873
5	Capital prod-NTT	2656.374	3254.248	0.910	-0.395	0.845	0.878	0.875
6	ROE-NTT	2656.374	3254.248	0.909	-0.397	0.845	0.879	0.875
7	NTT	2657.327	3255.202	0.909	-0.393	0.848	0.889	0.875
8	TFP (NNTT)	2662.573	3278.938	0.909	-0.395	0.844	0.878	0.876
9	H-O	2678.489	3288.691	0.907	-0.398	0.847	0.881	0.875

Figure 2.14: **Model fit and predictive power for different measures of (productive and/or differentiated) capital.**

performance—tell this story perfectly. The HO measure performs the worst in all these categories. If we look at only differentiation or productivity by themselves, they do better than HO. Yet the best performers, no matter how we measure productivity, are those where, following (N)NTT, we combine productivity and differentiation.

The negative logistic loss and F1 measures are not dramatically different, but sometimes the models using just differentiation or productivity outperform some of those that combine the two. The precision results do not differentiate much between the models, though the measures using labor productivity and ROA are laggards. The only metric where the HO mechanism performs better than most is accuracy, where it is in the top three. It should be noted, however, that accuracy is a blunter measure of model performance than AUC or the negative logistic loss (a guess of 51% and 99% are treated the same—either right or wrong).

2.5.5 Main results similar in the House

The main finding, that legislators should be more likely to support PTAs when their financial self-interest increases, holds in the House. Using the cross-validated model (Appendix 2.5.4), estimating the AFD of an IQR shift in `Financial self-interest` produces Figure 2.15. The fact that the estimate is smaller than that for the Senate (Figure 2.6) coheres with my

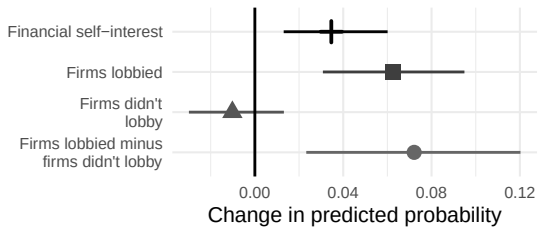


Figure 2.15: **Main results replicate in the House.** The AFD of an IQR shift in `Financial self-interest`, `Informed financial self-interest`, `Uninformed financial self-interest`, and the difference between the latter two. Calculated across all observations of PTA votes in the House. Median and 95% confidence intervals from 1000 simulations.

theory. House members, facing greater electoral pressure through more frequent elections, more closely vote their constituents' preferences.

Legislators can only act according to their trade-related preferences if they know how policy relates to those preferences. As in the Senate, I find evidence of this in the House. Using firm lobbying as a mechanism by which legislators gain information, I show it is `Informed financial self-interest` that predicts support of PTAs. Using the crossvalidated House model as the point of departure (Appendix 2.5.4), I switch out the original `Financial self-interest` measure for both the `Informed` and `Uninformed` measures.

2.5.6 Alternative operationalizations of financial self-interest

To show the relationship between financial self-interest and support of PTAs does not depend on the particular way I constructed the measure, I show similar results using different operationalizations. If I simply classify the firms politicians own as productive *and* part of industries involved in international trade, the effect of financial self-interest still holds. I classify a firm as "productive" if it its measure of labor productivity is greater than the median in the data. I use the firm's NAICS code to determine if it produces internationally traded goods. All others are "unproductive." I then sum up all the value of a senators' shares in productive firms and in unproductive ones. I use a model like that in Section 2.6,

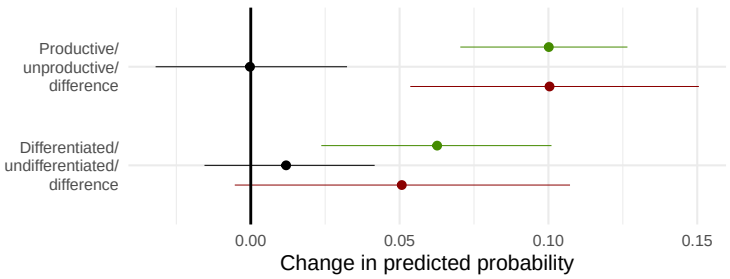


Figure 2.16: **Support for PTAs increases when legislators own productive or differentiated firms.** The effect of an AFD for an IQR shift in `(Un)Productive` and `(Un)Differentiated` measures of financial self-interest. 95% confidence intervals from 1000 simulations.

but with these changes: I use MLE—perfect separation does not happen in this model; I use same-party, same-state, same-PTA fixed effects instead of random intercepts; I substitute these `Productive` and `Unproductive` measures for `Financial self-interest`. Figure 2.16 shows that the effect of this `Productive` measure of financial self-interest is large and significantly different from the `Unproductive` measure. I do the same with differentiation. Firms in industries where differentiation is greater than the median observed and that make traded goods are labeled "differentiated" and those not are labeled "undifferentiated." Replacing the original measure of `Financial self-interest` with these two measures, once again we see that the estimated effect for the measure NNTT predicts will matter for PTA support is much larger than the complementary measure (Figure 2.16).

2.5.7 Trade-orrientation effect versus wealth effect

It makes sense to examine total assets drive the results, since my measurement choice to weight the value of legislators' assets by their productivity and differentiation combines what might be considered a total assets or wealth effect—represented by the value of the asset—with the trade orientation of their portfolio—determined by the productivity and industry differentiation of the asset.

I create two new variables. The first measures a senators' `Total assets`—I sum the esti-

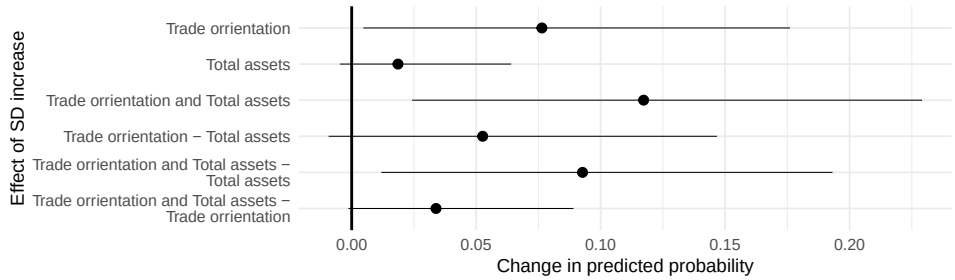


Figure 2.17: **Senators' total assets do not drive findings.** The estimated AFD of an increase in a standard deviation (+ .5) for given variables and differences in AFDs. "Trade-oriented portfolio and total assets" increases both these variables by .5 and calculates the AFD relative to the status quo. 95% Bayesian highest density credible intervals from 4000 posterior draws.

mated value of a senators' assets for each year. The second measures the `Trade-orientation` of a senators' portfolio; I multiply the productivity by the differentiation of each asset a senator owns; I then divide the result by the value-weighted proportion of the senator's portfolio that the asset comprises; and I sum the results by senator-year. Again, because I anticipate diminishing returns, I transform the variable to reduce skew and standarze it to have mean 0 and standard deviation .5. I also include an interaction term between the `Trade-orientation` and `Total assets`. I fit a model like that including pre-treatment controls in Section 2.3.1.2, exchanging the measure of `Financial self-interest` for the three variables introduced here.

`Trade-orientation` increase a senators' probability of supporting PTAs. Further, the interaction term with `Total assets` is positive, consistent with my argument that more invested in firms that gain from trade reflects more *intense* trade-related preferences. The coefficient for the trade-oriented portfolio is 8.2, that for total assets is 3.1, and the interaction term is 12.8. The first two estimates are significant at the 95% level, while the interaction is nearly so.

To aid with interpretation, Figure 2.17 shows the AFD of a standard deviation increase in these variables (+ .5). The estimated effect for `Trade orrientation` is 7.5 percentage points, that for `Total assets` is about 2, and the estimated difference between these is

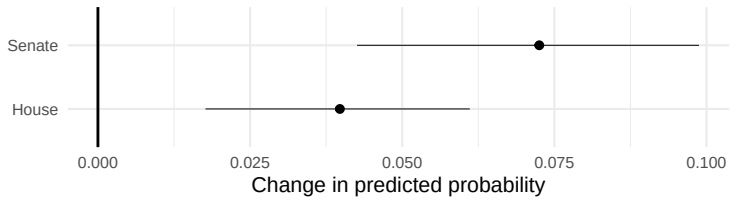


Figure 2.18: **Results robust to dropping mutual funds, private firms.** The AFD of an IQR shift in `Financial self-interest`. The cross validated model for the House and the same-state, same-party, same-vote fixed effects Senate model with pre-treatment covariates produce estimates, using MLE. 95% confidence intervals from 1000 simulations.

about 5 percentage points. Further, the impact of the positive interaction effect can be seen in the estimated 12 percentage point effect of increasing both, which is larger than the effect of `Trade-orientation` or `Total assets` alone.

2.5.8 Robust to dropping all but public firms

Dropping assets that appear to be bank accounts, mutual funds, and private firms before creating `Financial self-interest` does not change the results (Figure 2.6). Other combinations categories of assets do not change these basic results as long as publicly listed firms are included (results available on request).

2.5.9 Trade specificity of `(Informed) Financial self-interest`

I download all final passage votes related to abortion, espionage/intelligence, financial regulation, and taxation (Issue codes "Abortion/Care of deformed newborns," "CIA/Spying/Intelligence," "Banking and Finance," and "Tax rates") happening the same years as the PTA votes (`voteview.com`). Coding votes in favor of restricting abortion, supporting espionage, against financial regulation, and against taxes as 1,[14] I fit the `Financial self-interest` House model from Appendix 2.5.5 and Senate model with pre-treatment controls from Appendix 2.3.1.2 with the new outcome variables. The *left panel* of Figure

[14]Though the models allow flexibility across bills, coding them all in a consistent direction allows coherent estimates when aggregating.

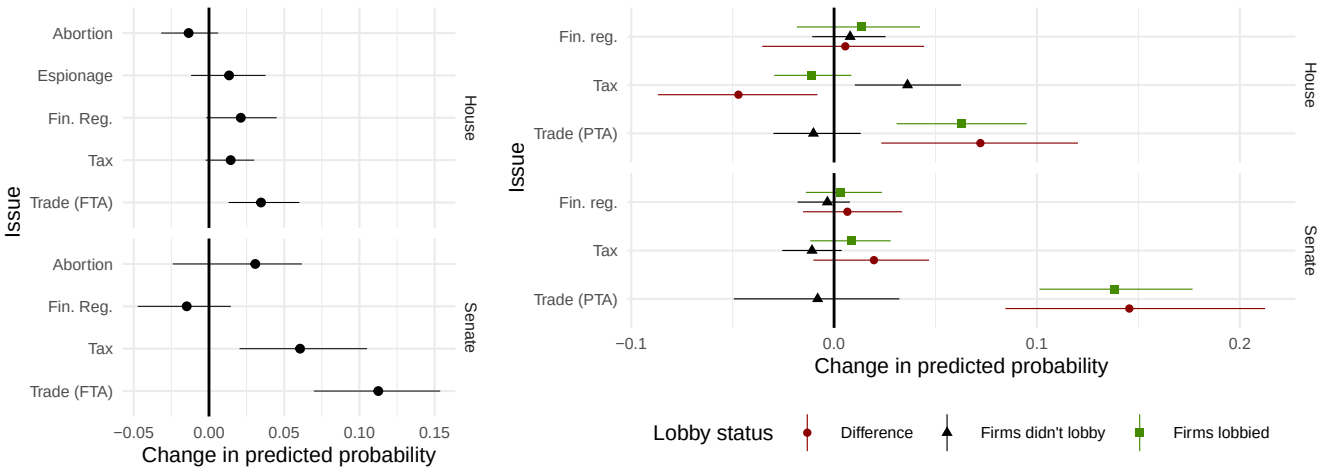


Figure 2.19: `Financial self-interest` **and the information from trade lobbying are trade-specific.** *Left panel:* House (Senate): AFD for an IQR shift in `Financial self interest` across several issue areas during same years as votes on PTAs. 95% confidence (credible) intervals from 1000 simulations (4000 posterior draws). *Right panel:* Same as left panel, except conditional on MCs being informed of their financial self-interest—measured by firm lobbying on trade.

2.19 shows the AFDs of an IQR shift in `Financial self-interest`—tailored to capture legislators' *trade-related* financial self-interest—bear out expectations (no espionage votes happened in the Senate). The signs of the point estimates for abortion and financial regulation switch across chambers and are not different from zero at conventional levels of significance. Espionage votes do not achieve conventional significance either. The estimate for tax legislation is consistent across chambers but only reaches conventional levels of significance in the Senate. Many firms that would gain from trade would have an interest in tax policy, so perhaps this result is not surprising. Still, the point estimates for PTAs is larger than for tax legislation in both chambers.

Further, if my theory about lobbying on trade conveying information about the relationship between complicated trade-policy and legislators' personal preferences, this lobbying shouldn't operate in the same way for non-trade issues. To test this, I take the pre-treatment control Senate model from Section 2.3.2.1 and the `Informed financial self-interest` House model from Appendix 2.5.5, exchanging the dependent variable for votes on taxes and financial regulations—issues that seem potentially related to `Financial self-interest` if

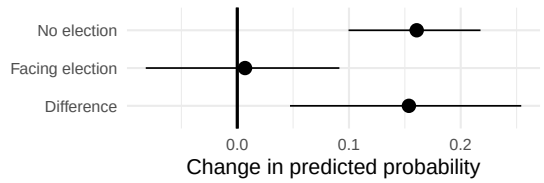


Figure 2.20: **The effect of `Financial self-interest` decreases with electoral pressure.** The AFD of `Financial self-interest`, conditional on `Facing election`. 95% Bayesian high density credible intervals from 4000 posterior draws.

pro-business behavior by legislators owning large firms drive my findings. The right panel of Figure 2.19 shows the only non-PTA instance of there being an appreciable difference between `Informed` and `Uninformed financial self-interest` is in the House for tax legislation, where the effect is in the opposite direction of what we find for PTAs.

2.5.10 Elections erode the effect

Senators facing reelection should expect more effective monitoring by voters, reducing the effect of financial self-interest. Taking the pre-treatment controls model from Section 2.3.1.2, I interact `Facing election` with `Financial self-interest`. Figure 2.20 shows the AFD of and IQR shift in `Financial self-interest`, conditional on facing an election. When not facing election, `Financial self-interest` has a strong effect that disappears when elections loom. The difference between these quantities is about 15 percentage points.

2.5.11 Salience mitigates the effect

`Financial self-interest` should matter less when legislation matters more to voters. We can look for evidence across PTAs. The more important an PTA, the more salient it is likely to be. I use a gravity model of trade as one way of measuring the importance of PTAs.[15]

[15] I use the meta-analysis of gravity model estimations by Head and Mayer (2014). Across structural gravity models, they report the median estimated distance coefficient is -1.14 and the median coefficient for the origin country's GDP is .86. I calculate a country's predicted trade flows with the US as $\propto \frac{\texttt{GDP}^{.86}}{\texttt{distance from US}^{1.14}}$.

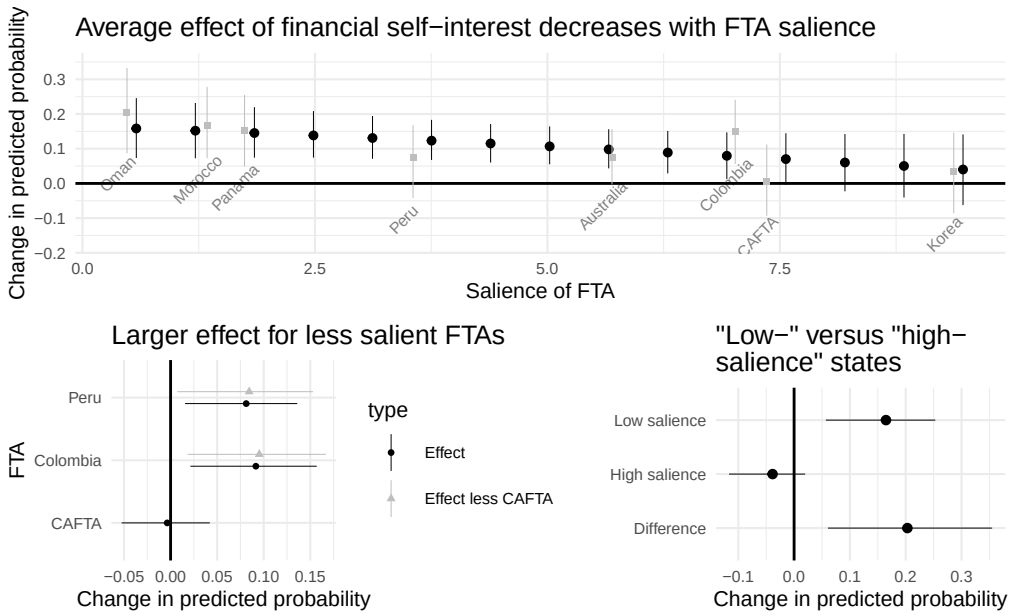


Figure 2.21: **The effect of financial self-interest decreases as salience increases.** AFD of IQR shifts in `Financial self-interest` conditional on `Salience`. 95% Bayesian highest density credible intervals from 4000 posterior draws. *Top panel:* gravity model estimates measures `Salience`. FTA-specific effects (colored grey) from pre-treatment control model in Section 2.3.1.2 with a PTA interaction term with `Financial self-interest` added. *Bottom-left panel*: `Salience` is the inverse of the proportion of "Don't know" CCES responses; CAFTA is more salient. *Bottom-right panel:* `Salience` is the inverse of the proportion of "Don't know" CCES responses at the state-level—aggregating the 2006, 2007, and 2008 CCES FTA questions. "High" ("Low") salience corresponds to setting `Salience` for all observations a standard deviation above (below) the mean state-level `Salience`.

The widespread opposition to CAFTA (Irwin 2017)—which has the second-highest latent salience score—and NAFTA (Irwin 2017)—which would have an even larger score—attests to some degree of measurement validity.

I add an interaction term between gravity-model `Salience` and `Financial self-interest` to the pre-treatment controls model from Section 2.3.1.2.[16] I calculate the AFD of an IQR shift in `Financial self-interest` for 15 evenly-spaced levels of `Salience` ranging from the minimum to the maximum value observed (top panel of Figure 2.21). There is a clear downward trend in the effect of `Financial self-interest`

[16]To ensure convergence, I choose a shape parameter of 20 and a scale parameter of 10 for the gamma distribution for the variance of the random intercepts (cf. Appendix 2.5.2).

as `Salience` increases.

While encouraging, this measure elides increases in salience with increases in financial self-interest across PTAs—while larger PTAs may matter more to voters, they may also have larger impacts on legislators' financial self-interest. CCES data offers an alternate measure of `Salience` for some PTAs.[17] When asked about CAFTA in 2006 and 2007 and Colombia and Peru in 2008 respondents could choose "support," "oppose," or "don't know." I use the inverse of the proportion of respondents choosing "don't know" as a measure of salience; if an PTA is salient, voters seemingly should have an opinion.

Comparing CAFTA and Colombia holds the gravity estimates constant since these PTAs have nearly identical gravity estimate. 25% of respondents had no opinion on CAFTA, while 39% had no opinion on Colombia and Peru. Modeling the relationship between `Financial self-interest` and CCES `Salience` results in a statistically significant change in the effect of `Financial self-interest`, conditional on `Salience`. Taking the pre-treatment controls model from Section 2.3.1.2, I add an interaction between the CCES `Salience` and `Financial self-interest`—which can vary by party. I control for the gravity estimates by adding an interaction with `Financial self-interest`. The bottom-left panel of Figure 2.21 shows that `Financial self-interest` was significantly smaller for the more salient CAFTA.

I use the CCES data to show the effect of `Financial self-interest` decreases as salience increases across states; I estimate state-level `Salience` by combining the 2006, 2007, and 2008 PTA responses—weighting by the number of respondents per survey—to construct the measure. I take the pre-treatment controls model from Section 2.3.1.2 and interact `Financial self-interest` with state-level `Salience` and with `Party`, to ensure the findings hold within parties. The bottom right panel of Figure 2.21 shows that the AFD of an IQR shift in `Financial self-interest` in "low" salience states is about 17 percentage points greater than for "high" salience states.

[17] I use the CCES postratification weights throught this section.

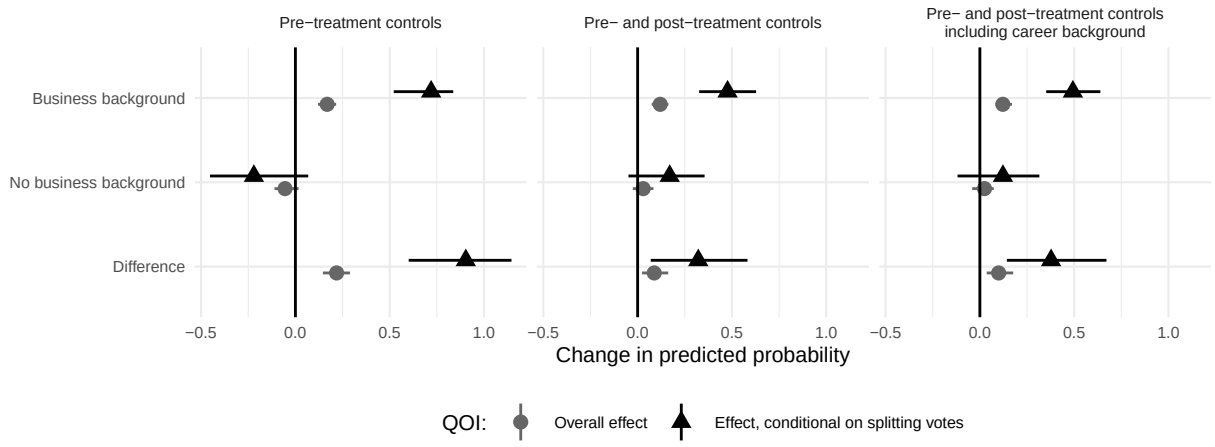


Figure 2.22: **Effect of `Financial self-interest` conditional on business background.** The AFD of an IQR shift in `Financial self-interest`, conditional on `Business background`, for all observations and for senator pairs who split votes. Mode and 95% high density intervals from 10,000 posterior draws.

2.5.12 Business background as information

Legislators that have more information about the interests of firms due to their experience before joining Congress might better know how PTAs impact firms. I take the models from Section 2.3.1.2 and add an interaction between `Financial self-interest` and `Business background`—defined as having worked as an executive or employee for a business (Carnes 2013). As anticipated, `Financial self-interest` has a strong impact on legislators with a business background and not on those that don't (Figure 2.22).

2.5.13 Retirement and informed financial self-interest

If personal preferences drive legislators' support of PTAs, then legislators should vote these personal preferences even more strongly when the electoral connection is severed. Thus, `Informed financial self-interest`—ownership of firms lobbying on trade—should lead to increased support when senators are `Retiring`. `Retiring` takes on a value of 1 when senators are in the last two years of the term in which they retire—they tend to announce retirement early in their final Congress. Using the models from Section 2.3.1.2, I exchanges

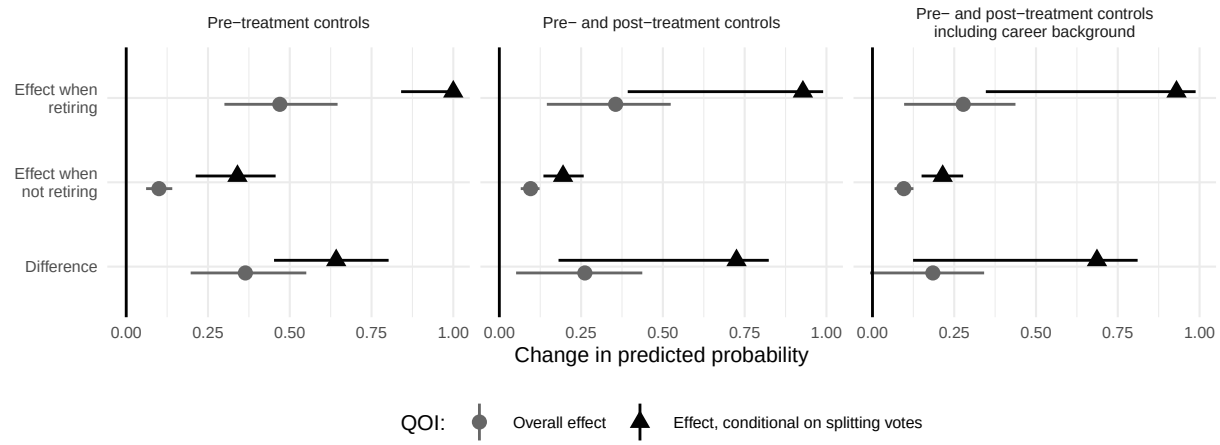


Figure 2.23: **Effect of `Financial self-interest` increases in retirement.** The AFD of an IQR shift in `Informed financial self-interest`, conditional on `Retirement`, for all observations and for senator pairs who split votes. Mode and 95% high density intervals from 10,000 posterior draws.

`Financial self-interest` for `Informed financial self-interest`, `Retiring`, and an interaction between the two. The overall AFD of and IQR shift in `Informed financial self-interest` for `Retiring` senators is significantly larger than for those that are not, regardless of controls.

Chapter 3

Friends in High Places: Firm Lobbying and Legislators' Investments

"I have found that there is no difficulty in inducing men to look after their own property"

—Oakes Ames, U.S. House Member and lobbyist for the Union Pacific and the Crédit Mobilier

3.1 Introduction

Why do only some firms lobby? Many answers focus on the characteristics of firms. Long-standing theories apply the logic of collective action to conclude that large firms will be more likely to lobby. Government policy has large potential costs and benefits for these firms. Large firms are less likely to need to lobby with other firms and can more easily pay lobbying expenses. The scholarship on trade-related lobbying highlights additional economic characteristics of firms that explain which will lobby. This work draws on well-established economic theories about the heterogeneous effects that trade liberalization has on firms, emphasizing factors like differentiation and productivity.

I argue that focusing on legislators' characteristics—specifically whether they might sympathize with firms that lobby—can also explain firms' lobbying decisions. The Crédit Mobilier scandal of the 1860s illustrates my argument. Union Pacific Railroad executives

furtively used the Crédit Mobilier—a Union Pacific subcontractor—to to the Union Pacific for exorbitant construction costs. Since these executives also invested in the Crédit Mobilier, they—and other stockholders including politicians—realized large investment returns. The effect was to transfer shareholder value from the Union Pacific—which received substantial funding and favorable financing from the U.S. government—to the Crédit Mobilier and it's shareholders.

Members of Congress were intimately involved in the scheme. Representative Oakes Ames (R-MA), an investor *and* lobbyist for the Union Pacific and Crédit Mobilier, personally made sales to other members of Congress (MCs), with his records of legislators' purchases surfacing in subsequent congressional investigations. Ames claimed that MCs who bought shares in the Crédit Mobilier became "friends" of the company. The company then lobbied these "friends"—a term which, though distinct from bribery, had more to do with expectations of reciprocity than amiability[1]—to introduce legislation to the firm's benefit and to stymie threatening legislation.[2] In 1872 the *New York Sun* broke the story, dubbing it "The King of Frauds" because it involved corporate and political corruption, ensnaring members of the Grant administration and MCs, in addition to executives of the Union Pacific Railroad.

Ames' observation—that legislators tend to sympathize with firms they own and these sympathies impact lobbying outcomes—helps explain firm lobbying today. Firms, when considering whether to lobby, undertake a cost-benefit analysis. They balance the certain costs of lobbying with the probability that this lobbying will prove successful and the value of success to their bottom line. While economic characteristics of firms can affect these components of their calculus, firms are not the only actor involved. The preferences of

[1] "'Friend' was, perhaps, the key word in Gilded Age governance and business... Friendship was a code: a network of social bonds that could organize political activity. Affection was not necessary" (White 2011, 93–100). Further, friends did not need to be bribed; "[firms] resorted to bribery—a quid pro quo—only when their network of friends was insufficient to a crisis at hand" (White 2011, 115).

[2] Some evidence of this in the public record is that "stockholders"—likely (via) Ames—had asked representative Henry Dawes to introduce legislation allowing the Union Pacific to change the requirements of its board meetings which would make have aided Crédit Mobilier in passing rules that would seemingly increase its executives' control and, thereby, ability to realize personal gains. *Congressional Globe*, House, 40th Congress, 2nd session, Dec. 16, 1867, pp. 210-211.

those lobbied impact the probability that firms' lobbying will be successful. Legislators' investment portfolios reveal some of their preferences, with legislators tending to sympathize with the policy goals of firms in which they invest. This leads to the central implication of my argument; firms owned by (more) legislators are more likely to lobby.

There are several avenues by which firms might know if legislators own them, including shareholder lists and legislators' financial disclosures. Yet, firms need not know legislators own them for legislators' sympathies to affect their lobbying decisions. If firms' beliefs about their chances of lobbying successfully involve updating based on previous lobbying outcomes, factors that influence those previous outcomes would affect their updated beliefs and subsequent lobbying decisions. This holds true even if firms do not know much about the factors that affected their lobbying outcomes. That is, a firm may not know that legislators tend to sympathize with them, but if they lobby successfully they will more likely decide to continue to lobby. If legislators' sympathies contributed to this success, then legislators' sympathies can affect the firm's lobbying decisions without the firm knowing it.

Firms probability of realizing favorable legislative outcomes is also affected by the legislative power of particular legislators that own firms, partisan control of legislative chambers, and firm size. Not all legislators have the same capacity to affect legislation; some have more power over (trade-related) legislation due to things like committee assignments or leadership positions. Firms owned by more powerful legislators should find lobbying more appealing. Since the party controlling a chamber influences legislative outcomes more, I expect changes in chamber control should impact the value of legislator ownership. Firms should be more likely to lobby when owned by the majority. Firm size should have a moderating effect on legislator ownership. Large firms can more readily bear the costs of lobbying and may have intrinsically stronger arguments for policy concessions because their performance has a larger impact on the economy; small firms will be more influenced by the sympathies of legislators.

In my empirical tests, I find evidence that firms owned by (more) legislators are more

likely to lobby. I find strong support for my arguments about the power of individual legislators, partisan control of legislative chambers, and the size of firms. I use multiple approaches to address difficult identification issues. I demonstrate that the expected relationship between firm lobbying and legislator ownership of firms exists, accounting for potential firm- and industry-level confounders. I employ a time-series cross-sectional (TSCS) matching approach that shows the probability of lobbying more than doubles once a firm is owned by at least one legislator when compared to firms with identical treatment histories and similar covariate values. I offer evidence that the relationship is chamber-specific—firms owned by legislators in one chamber are more likely to lobby only that chamber than the other chamber. These results support my argument and undercut alternate explanations.

The article proceeds as follows. In the next section, I develop my argument about why legislators' investment portfolios influence firms' lobbying decisions, highlighting how it differs from previous explanations. Next, I describe my data and empirical strategy and report main findings as well as evidence that addresses alternate explanations. The final section concludes.

3.2 Which firms lobby

3.2.1 Benefits of lobbying

Theory and empirical evidence suggest firms play an outsized role in lobbying and that lobbying benefits their bottom line. The concentrated nature of the costs and benefits of government policy for firms gives them an advantage in overcoming collective action problems, increasing the chance they will lobby relative to other actors—particularly voters (Olson 1965; Schattschneider 1935). Additionally, there is mounting evidence that lobbying produces, on average, positive returns for firms (Bombardini and Trebbi 2020). Borisov, Goldman, and Gupta (2016), using the negative shock originating from the 2006 Jack Abramoff

legal scandal, estimate that—for firms engaged in lobbying around that event—an additional $100,000 more in lobbying expenditures in the 3 years before the shock leads to a loss of roughly $1.2m in shareholder value on average. A reasonable corollary is that lobbying produces large returns for (some) firms absent this sort of negative shock. Huneeus and Kim (2021), leveraging variation in committee assignments of legislators serving in the districts where firms are headquartered, estimate that a 10% increase in lobbying increases value-added by 1.3%; for a firm with the median value-added, this implies that spending $2000 more on lobbying adds $63,700 to the firm's value. They find similar returns to lobbying in terms of profits and sales. If firms can overcome collective action problems *and* lobbying increases sales, profits, and market value, why don't all firms engage in it?

The literature, thus far, has echoed Olson (1965), arguing that collective action arguments can also be applied to the universe of firms as an explanation of firms' lobbying decisions. These theories imply that size should be an important factor. Large firms do not have to organize with others to *profitably* lobby government (Drope and Hansen 2006); they can more easily pay the fixed costs required to set up lobbying operations (Huneeus and Kim 2021; Kerr, Lincoln, and Mishra 2014).[3]

3.2.2 We know a lot about which firms lobby on trade

The trade-related lobbying literature has extensively explored why certain firms lobby—including the role of firm size (Kim and Osgood 2019) and several other factors—making it a good area to see if my theory has something to contribute. In a less well-studied domain, it might be easier to find results in part because other important factors have yet to be identified; we already have fairly compelling models of firms' trade-related lobbying decisions. The advanced state of the trade-related lobbying literature likely depends in part on the well-developed theoretical and empirical scholarship that has explained trade patterns by focusing

[3]Further, since global economic integration leads to highly concentrated benefits, it is likely that *pro-integration* firms are the large firms that dominate lobbying (De Bièvre and Dür 2005).

on *firm-level characteristics* (Antras and Helpman 2004; Bernard et al. 2007; Bernard and Jensen 1999; Bernard, Jensen, and Schott 2009; Helpman, Melitz, and Yeaple 2004; Melitz 2003). This literature shows that firm-level variables help determine which firms gain and lose from trade liberalization. Political scientists and economists have presented evidence that these firm-level variables also explain firms' political activity—including lobbying (Blanchard and Matschke 2015; Bombardini and Trebbi 2012; Jensen, Quinn, and Weymouth 2015; Kim 2017; Osgood 2017).[4]

Market power, broadly defined, is a key driver of whether firms lobby individually, according to this literature. If firms operate in competitive markets, any gains they might receive from policy changes might also benefit their competitors, vitiating the incentive to lobby individually. The more competitive the sector, the less likely firms are to lobby individually, instead lobbying together to protect the entire sector from international competition (Bombardini and Trebbi 2012). When firms have market power, they should be more likely to lobby individually. One source of market power may specifically be consumers' "love of variety" (e.g. Melitz and Trefler 2012). Differentiation—the degree to which a firms' consumers avoid substituting its product for that of another firm—is a crucial factor in understanding firms' lobbying behavior on trade (Kim 2017; Osgood 2016, 2017); the more firms retain gains from policies due to monopolistic competition, the more motivated they will be to lobby individually for reciprocal market openness—they do not fear foreign competition as much because of the differentiation in their industry. Further, firms in differentiated industries will be less motivated to lobby for protection when another firm in the same industry lobbies for openness. Their customers will not readily switch between to a different product simply because of the cost reduction that openness may bring. In fact, Kim (2017) argues many trade policy concessions are a private good, noting that the median number of firms lobbying Congress on miscellaneous trade bills is one and that tariff schedules are often granular enough for firms to lobby for changes that only impact them and not their closest

[4]While firms can and do form trade associations to lobby, business lobbying generally and over trade specifically is dominated by individual firms (Bombardini and Trebbi 2012; Huneeus and Kim 2021).

competitors.

Beyond size and market power, several other variables help predict firms' political activity. Productive firms in differentiated industries appear best positioned to take advantage of freer trade, while less productive ones seem to face increased competition causing a decrease in market share and possible shuttering (Melitz and Ottaviano 2008; Topalova and Khandelwal 2011). Applying this to trade politics, higher levels of productivity are associated with more lobbying, and the interaction between productivity and differentiation also is substantively and statistically significant (Kim 2017). Further, industries with more multinationalization tend to have lower tariffs, perhaps indicating that MNCs lobby for—and are granted—lower tariffs (Blanchard and Matschke 2015).

3.2.3 Lobbying as quid pro quo or information

While developing sophisticated theories on how firms' characteristics influence their lobbying decisions, the literature tends to model governments simplistically, as unitary actors that value *both* national economic welfare *and* lobbying rents from firms (e.g. Kim (2017)). Grossman and Helpman (1994) explain campaign contributions by developing a model that predict that governments who care more about national economic welfare will liberalize trade more; firms primarily demand protectionism while freer trade benefits consumers and the national economy. While governments may vary in the policy concessions they grant to firms, this variation only occurs between states or perhaps administrations. That is, all compatriot firms face the same policy concession supply curve. Yet, governments' willingness to supply policy concessions to particular firms may vary *across firms*.

Work on informational theories of lobbying focuses more directly on the supply side of lobbying, though a dearth of data limits empirical research along these lines. This work argues that some legislators may be more sympathetic to special interests because they share certain goals with the lobbying entities, but these legislators have less information than the

special interests on the state of the world and how policy helps attain those goals (Grossman and Helpman 2001). The information transferred through lobbying in these theories concerns how policy affects constituency or national welfare because it helps legislators get reelected; from this perspective lobbying is welfare-enhancing (Bombardini and Trebbi 2020). A lack of direct information about the content of lobbying messages makes rigorous tests of this theory difficult (Bombardini and Trebbi 2020), though some recent efforts explore how the ideology of lobbyists and the legislators they might lobby impacts who lobbyists contact (Groll and Ellis 2014, 2017; Hirsch et al. 2021). These efforts, while adding some support to the basic contours of the informational theories of lobbying, have not systematically probed the role of firms in these interactions and thus don't address the question of which firms lobby.

We don't know much about the actual content of lobbyists' messages, but it is possible to overstate the significance of this lack of data, particularly for firms. Grossman and Helpman (2001) hold that politicians can't take special interest groups' messages at face value and must rely on what they believe about the interests of the lobbying entity to decide how far to trust the message. It would be naive to assume that legislators simply believe firms' claims that trade policy x is good for national welfare, workers, etc.; in terms of public statements—sometimes called "outside" lobbying (Kollman 1998)—this is precisely what large firms tend to say (Kim and Osgood 2019; Lee and Osgood 2019). If lobbying is costly and firms maximize profits, the *mere act of lobbying* signals that firms anticipate a policy as financial ramifications. After all, "[w]e know what groups care about because of what they do, and especially because of what they spend money on" (Hacker and Pierson 2010, 132). Regardless of firms' purported reasons for their policy position, legislators that sympathize with the general aims and interests of the firms will be inclined to listen to and act on these firms' policy desires.

Assumptions about legislators' (electoral) motivations restrict the scope of informational theories of lobbying as well. In these theories, legislators ultimately care about elections *and* they win elections by pleasing a majority of voters in their district. If and only if both

of these assumptions are true, then the type of information that matters to legislators will necessarily be related to reelection. Both assumptions, however, may be overly restrictive. Legislators might have goals beyond reelection and winning elections can be achieved without pleasing a majority of voters on every issue (Persson and Tabellini 2016). Indeed, support from an ardent minority and getting through a primary seem sufficient to win office in most constituencies, at least in the US (Kujala 2020). Even if we accept the stark assumption that voters are the sole actor determining a legislator's reelection fate, voters' do not have the ability to select and sanction this legislator along all policy dimensions with a single, periodic vote (Przeworski, Stokes, and Manin 1999), to say nothing of the fact that voters' exhibit imperfect monitoring (Lindstädt and Vander Wielen 2011). This is to say that, even under the most stringent assumptions about voters' ability and willingness to hold legislators to account, legislators can often win reelection while taking policy positions contrary to those of the pivotal voter in their district across a number of issues.

Since legislators have at least some freedom to ignore the policy preferences of their voters on some issues, information that does not maximize legislators' reelection chances can nonetheless influence the legislators' policy positions. There likely exist numerous reasons why legislators may sympathize with firms, well beyond the desire to please the median voter in their district. Firms should be more likely to engage in lobbying to the extent that some legislators prove sympathetic and these legislators act on the information firms can provide, even if this information does not help the legislator win reelection. If there are few or no legislators that sympathize, firms should be less inclined to incur the costs of lobbying.

3.2.4 Legislators likely sympathize with firms they've invested in

Evidence suggests that legislators' investment portfolios reveal their preferences over policies that impact assets they own. Legislators with agriculture-related assets tend to cast roll call votes in favor of agricultural policies that benefit these assets (Welch and Peters

1983). Two studies find that, after controlling for confounders, legislators with investments in firms that were particularly vulnerable to the financial crisis of 2008—firms that would gain from intervention by the government—were more likely to support legislation enabling the government to shore up financial markets (Peterson and Grose 2020; Tahoun and Lent 2018). All this attests to a strong association between legislators' investment portfolios and support of policies that positively affect their investments. It seems legislators' preferences—either for financial gain or underlying preferences that drive *both* their investments *and* their support of legislation that benefits the firms in which they invest—ultimately can influence their public behavior (Peterson and Grose 2020).

Experimental evidence further bolsters the claim that legislators' investment portfolios may affect political preferences and behavior. Israeli citizens randomly assigned Israeli and Palestinian financial assets became more aware of the broader economic risks of conflict between Palestine and Israel, more willing to offer concessions for peace, and more likely to vote for parties more supportive of the peace process (Jha and Shayo 2019). Those from a national sample in England assigned to receive £50 to invest in stocks became substantially more opposed to regulation of financial markets (Margalit and Shayo 2021). While a nationally representative sample may not respond to owning stocks the same way politicians do, this is still strong evidence that investment portfolios affect policy preferences.

Thus, legislators that invest in firms should be sympathetic to the goals of these firms. When these legislators lack information about how policy affects the firms in which they invest, lobbying by these firms could inform sympathetic legislators and influence their behavior. This seems especially applicable to more complicated issues and/or issues with little public salience. Legislators are more likely to lack information about how complex policy impacts firms. Further, complicated and low-salience issues will be less likely to result in electoral consequences, freeing legislators to act on their extra-electoral preferences (Persson and Tabellini 2016). In the US case, much trade-related legislation is both fairly complex and—at least during the time covered in this study—a low-salience issue for most voters

(Vavreck, Sides, and Tausanovitch 2019).

Do firms know legislators' sympathies? There are at least three ways firms (or their lobbyists) could learn who owns them. First, firms have comprehensive lists of shareholders. Comparing these lists to a list of national legislators would not be burdensome for many corporations—particularly corporations considering whether to pay for a lobbying campaign. Of course, there would be some uncertainty with this method. Second, legislators themselves annually disclose this information—which provides the data for this study. To the extent firms have the resources to review legislators' financial disclosures (something made easy given digitization of the data by groups like Open Secrets), they can know whether legislators own their stock. Third, lobbyists might be more aware of legislators' investment portfolios—out-of-house lobbyists might even seek out firms to represent based on this knowledge (Birnbaum 2015, 60).

Alternatively, my argument could be useful even if firms never know that legislators own them. Firms may try to lobby for reasons unrelated to legislators' investment portfolios. These firms learn whether or not lobbying is effective, which happens to be a function of whether legislators own them. Those for whom it is effective will be more likely to continue to lobby, and thus legislators' investment portfolios could predict firm lobbying because of the underlying legislators' preferences with which they correlate, regardless of firms having direct knowledge of legislators' investments. Additionally, legislators that own firms could, conceivably, invite firms in which they invest to lobby—with or without advertising their investments in these firms when doing so.

To summarize, firms, seeking to maximize profits, should lobby more when legislators are sympathetic; legislators' investment portfolios should reveal these sympathies. This holds as long as we believe that lobbying is costly, that policy affects firms' profitability, that firms have information legislators lack, and that the probability of firms lobbying successfully increases when legislators are sympathetic.

3.2.5 Empirical implications

This leads to the expectation that, since the probability of a firm's lobbying effectiveness increases when legislators own the firm, firms should lobby more when they are owned. Here I articulate three implications along these lines.

H1) Firms that are owned by at least one legislator lobby more (binary). Having at least one legislator likely to sympathize with them can help firms achieve policy goals. This implication is agnostic about the direction/nature of firms' policy goals. That is, firms may be for or against some trade-related policy and, either way, want to contact legislators to voice this concern.

H2) Firms owned by more legislators lobby more (count). Here I assume that firms' legislative aims will be more successful with the support of more legislators. For certain legislative goals of firms this might not be the case (perhaps adding language to or sponsoring a bill) but for many goals numbers tend to matter (e.g. roll call vote outcomes, enlisting cosponsors for bills, moving items on or off the agenda).

H3) As the cumulative size of legislators' investments in a firm increases, that firm should be more likely to lobby (continuous). This assumes that increases in the amount invested amount correspond to more intense legislators' preferences. I expect the marginal intensity of preferences to decrease as investment size increases for individual legislators.

3.3 Data and Methods

I test my theory by analyzing the trade-related lobbying behavior of publicly listed firms in the United States from 2004 to 2014. As stated above, scholarship on the trade-related lobbying behavior of firms is well developed, providing baseline expectations about what factors matter. The United States is one of the few countries that requires detailed reporting

by lobbyists *and* granular financial disclosures by members of Congress—the availability of this data in machine-readable form dictates the years covered in the analysis.[5] Further, vast amounts of data are available on the characteristics of public firms in the United States—including those thought to be important for their trade-related preferences. Many of the most powerful MNCs are among these firms and, thus, by studying firms' lobbying of Congress we learn not only about the political economy of one of the world's largest economies but perhaps also gain insight into how powerful US MNCs behave in other political systems that affect their interests.

I begin by establishing that the expected relationship exists, first through simple bivariate analysis and then with more sophisticated methods to control for possible confounders. I address simultaneity, which includes using a matching approach appropriate to time-series cross-sectional (TSCS) data to exploit the timing of legislators' ownership of firms and firms' lobbying. Beyond this, I use myriad additional implications of my theory and empirical strategies to probe the plausibility of alternative explanations of the findings.

3.3.1 Data on firm ownership and lobbying

My empirical effort requires the combination of data on legislators' investments with data on firms' trade-related lobbying. Since 1978, MCs annually disclose, *inter alia*, earned and unearned income, assets, and liabilities.[6] Though MCs may disclose inaccurately, formal enforcement and potential punishment by voters limit this (Eggers and Hainmueller 2014). The data is available in digital form from the Center for Responsive Politics for the years 2004 to 2014. I use MCs' investments in public firms to measure their underlying sympathies toward firms for this time period, referring to this independent variable of interest as `Legislator ownership`.

Legislators must report assets worth more than $1000. Having worked extensively to

[5] `https://www.opensecrets.org/bulk-data/downloads`.
[6] Ethics in Government Act of 1978.

match the reported names of firms legislators own to the companies legal names and to unique identifiers like GVKEYs (Compustat), I make two different versions of `Legislator ownership` that I use to test two of the empirical implications laid out above. `Legislator ownership (binary)` takes the value of 1 if at least one MC owns a firm in a given year. `Legislator ownership (count)` is the total number of MCs that owns a firm in a given year.

Constructing `Legislator ownership (continuous)`, which accounts for the size of MCs investments in firms, requires additional steps. MCs report into which of 10 increasingly large "bins" each asset falls, ranging from between $1000 and $5,000 for the smallest bin to $25m or more for the top bin. I take the midpoints of each bin to estimate the value of an individual's investment.[7] I then sum the log of these individual investments by firm-year to create `Legislator ownership (continuous)`. I take the log of individual investments because, as stated above, I anticipate diminishing marginal increases of sympathy towards a firm as individual legislators' investments increase.

Lobbyists' reports required by the Lobbying Disclosure Act of 1995 (LDA) show if firms lobbied Congress on trade (Kim 2018), which I match with legislators' firm ownership data based on the GVKEYs. To measure lobbying, I create a simple binary variable—`Firm lobbying`—that takes on a value of 1 if the firm lobbied Capitol Hill on trade in a given year. I get the universe of public firms for 2004 to 2014 from the Center for Research in Security Prices (CRSP); any firm that fails to match with `Legislator ownership` in a given year is given a value of 0 for `Legislator ownership`.

Critical to note is that the LDA does not require lobbyists to declare who precisely is contacted by lobbyists in Congress. The data enabling studies like Hirsch et al. (2021) is only required for lobbyists working on behalf of foreign governments and is governed by the Foreign Agents Registration Act (FARA). While we know precisely which firms politicians

[7]Previous work (Eggers and Hainmueller 2014) has found that more elaborate estimates of the value of legislators' assets failed to substantively alter their results.

own, we largely cannot know if firms are contacting legislators that own them. Thus, the empirical work must rely on aggregated measures of contact and ownership. I offer evidence to address concerns arising from this data limitation.

3.4 Results

Figure 3.1 shows the results of a bivariate analysis of `Legislator ownership` and `Firm lobbying`.[8] When looking at `Legislator ownership (binary)`—the *left panel*—we see that the difference in the mean proportion of firms lobbying when moving from unowned to owned is 18.9%, meaning that owned firms are 14.2 times more likely to lobby than unowned firms. In the *middle panel*, as `Legislator ownership (count)` increases from 0 to 50, the probability of lobbying goes from about 0 to nearly 1. The fitted line includes a quadruple knot spline to ensure that this positive relationship holds *conditional* on ownership by at least one legislator. The *right panel* shows that as `Legislator ownership (continuous)` increases, the chances a firm lobbies sharply increases, nearing 1 once the sum of legislators' logged investments in a firm approaches 1000. Again, a quadruple knot spline guarantees the increase in the probability of lobbying is not solely due to the relationship we see in the *left panel* when moving from unowned to owned.

3.4.1 Accounting for confounders

Now, I turn to regression approaches to account for variables the literature has highlighted as important (e.g. Kim 2017). This involves using business databases (CRSP, Orbis, and COMPUSTAT) to gathering firm-level data on `Capital expenditure`, `Employment`, `Property, Plant, and equipment`, `Cost of goods sold`, `Market capitalization`, `Productivity`,

[8]Following Kim (2017), I focus on firms producing internationally traded goods—that is, at least one firm a given industry trades the good internationally. Appendix 3.6.1 shows that these relationships hold for the entire universe of public firms, including firms selling services.

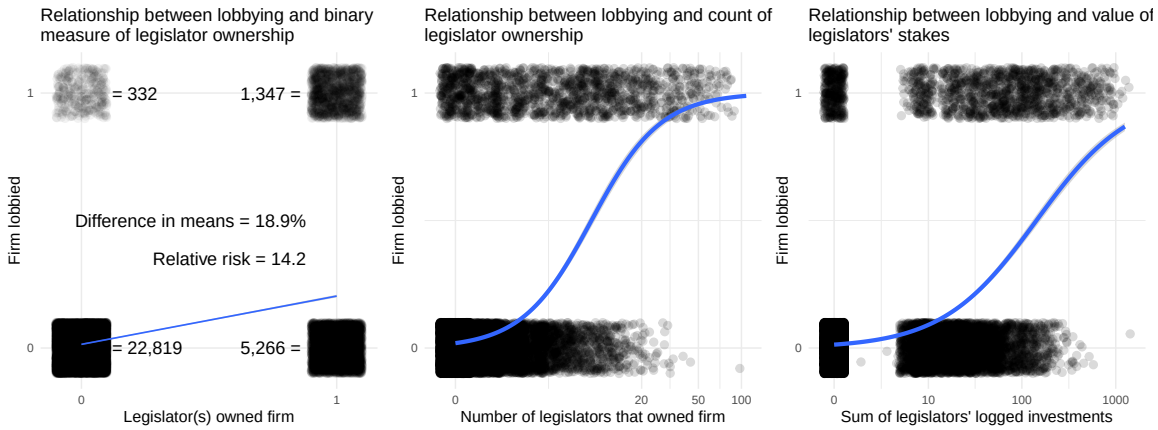


Figure 3.1: **Lobbying increases with legislators' ownership of firms.** *Left panel:* the relationship between firm lobbying and legislator ownership. Linear regression provides the fitted line and confidence intervals. *Middle panel:* firms owned by more legislators are more likely to lobby. A logistic link function with a quadruple-knot cubic spline provides the smoothed line and confidence intervals. *Right panel:* as the sum of legislators' logged investments in a firm increases, so does the probability of lobbying. A logistic fit with a quadruple-knot cubic spline provides the smoothed line and confidence intervals.

`Differentiation`, and six-digit `NAICS` codes to account for industry-level factors like the multinationalization of an industry (Blanchard and Matschke 2015). Following Kim (2017) I use labor productivity, $\frac{\texttt{Net income}}{\texttt{Employees}}$, for `Productivity`. `Differentiation`—the inverse of the mean elasticity of substitution for Harmonized System 10-digit products with an associated NAICS 6-digit code (Broda and Weinstein 2006)—is unavailable for firms that do not deal in internationally traded goods, including firms dealing in services. If I exclude `Differentiation` and include these other firms, the results tend to change little.

I test *H1* with an analysis closely following Kim (2017). I begin with a logistic regression of `Firm lobbying` on `Firm ownership (binary)` and the previously listed controls—including an interaction of `Productivity` and `Differentiation`—fitting the model with maximum likelihood estimation (MLE). I cluster the standard errors at the firm level. While Kim (2017) uses NAICS 2-digit fixed effects (22 terms), I can use NAICS 3-digit fixed effect (27 terms) without running into significant problems with model convergence—in Appendix 3.6.2 I include all firms in the CRSP data (and drop `Differentiation`), yielding 93 NAICS 3-digit fixed effects. I also include year fixed effects. I refer to this as the *baseline model*.

The *top-left panel* of Figure 3.2 shows the positive relationship between `Legislator ownership (binary)` and `Firm lobbying` holds when accounting for potential confounders. To examine model implications, I first set `Legislator ownership (binary)` to 0 for all firms and calculate the mean predicted probability of lobbying. I do the same setting `Legislator ownership (binary)` to 1. I use 1000 simulations to produce confidence intervals (c.f. Tomz, Whittenberg, and King 2003). Unowned firms lobby with a probability of 0.03 compared to 0.16 for owned firms, meaning the latter is 5.5 times more likely to lobby. The difference of 12.6 percentage points clears conventional levels of statistical significance. Including `Differentiation` limits the universe of firms analyzed to those producing goods that are traded internationally. Appendix 3.6.2 shows that these results and the others in this section hold when looking at all the firms in CRSP.

To test whether firms lobby more when owned by more legislators (*H2*), I add `Legislator ownership (count)` to the *baseline model* while retaining `Legislator ownership (binary)`—the latter accounts for the effect of moving from unowned to owned and the former estimates how much `Firm lobbying` increases as more legislators own the firm. I calculate the average predicted probability of lobbying for all firms when setting `Legislator ownership (count)` to all integers from 0 to 125, using 1000 simulations to produce confidence intervals. The *top-middle panel* of Figure 3.2 shows a strong, positive relationship between `Firm lobbying` and `Legislator ownership (count)`, with the predicted probabilities reaching nearly 100% when 35 legislators own the firm.

Next, I add `Legislator ownership (continuous)` to the *baseline model* to test whether the size of legislators' investments predicts lobbying (*empirical implication 3*). `Legislator ownership (binary)` remains in the model to account for potential non-linearity when moving from unowned to owned. I find the average predicted probability of lobbying across the range of `Legislator ownership (continuous)` by calculating predicted probabilities for all firms after setting the value of `Legislator ownership (continuous)` to each multiple of 5 from 0 to 1555—the maximum observed value of this

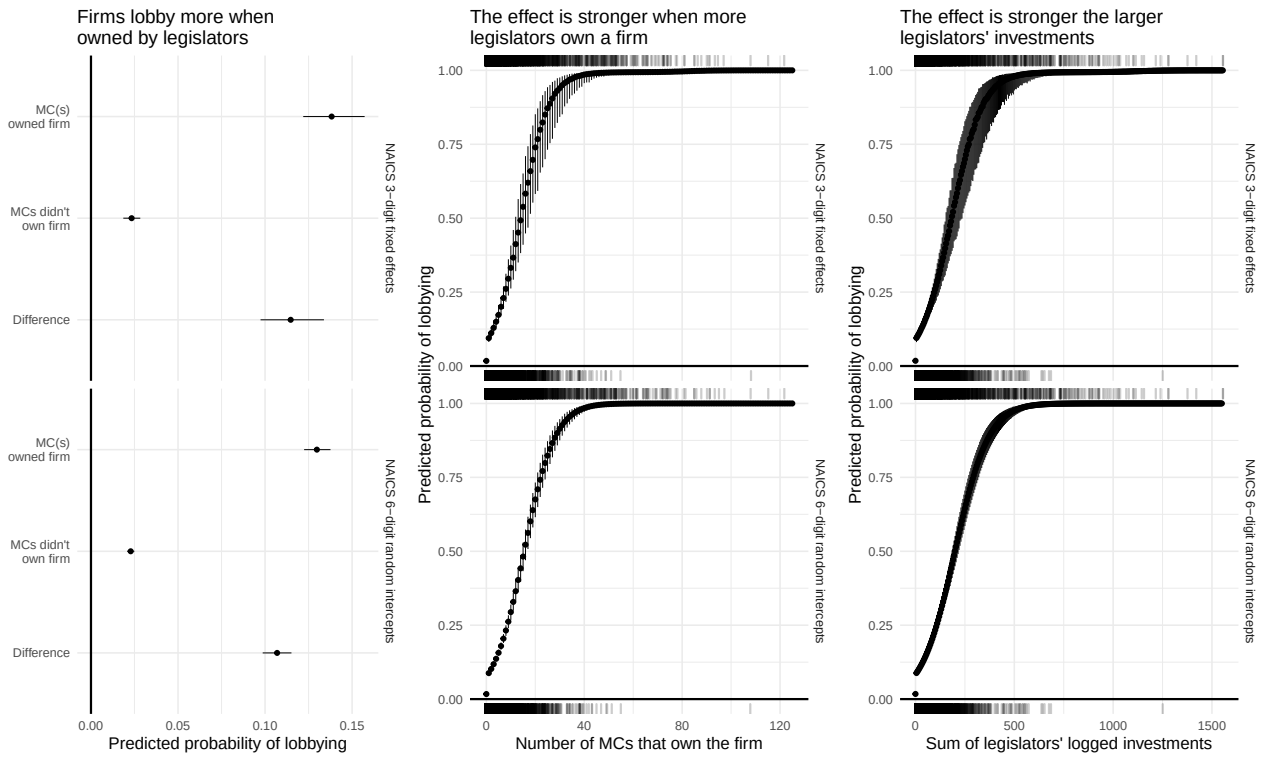


Figure 3.2: **Lobbying increases with legislators' ownership of firms after accounting for likely confounders.** All quantities represent average effects across all observations. Observed values for firms that lobbied on the ceiling and did not lobby on the floor. *Top row:* 95% confidence intervals from 1000 simulations using standard errors clustered by firms. Includes NAICS 3-digit fixed effects and uses MLE. *Bottom row:* 10,000 posterior draws produce 95% credible intervals. NAICS 6-digit random effects and Bayesian analysis. *Left column:* the relationship between firm lobbying and ownership by at least one legislator. *Middle column:* firms owned by more legislators are more likely to lobby. *Right column:* as the sum of legislators' logged investments in a firm increases so does the probability of lobbying.

variable is 1556.2. I use 1000 simulations to calculate confidence intervals. The *top-right panel* of Figure 3.2 shows a positive relationship that traces out the sigmoid curve, with predicted probabilities reaching nearly 1 when the sum of legislators' logged investments surpasses 500.

Using MLE limits the industry fixed effects to NAICS 3-digit codes; adding too many predictors results in convergence issues, particularly perfect separation, rendering inference unreliable (Ward and Ahlquist 2018). Bayesian analysis penalizes the size of coefficients and can successfully fit hierarchical models with NAICS 6-digit random intercepts (430 terms) and a random intercept for each year. These random intercepts account for observed and unobserved industry-level and year-specific variables. Appendix 3.6.2 shows that the results hold when including all firms in CRSP, which entails estimating 928 NAICS 6-digit random intercepts.[9]

The *bottom row* of Figure 3.2 shows the results of the Bayesian analysis of models including the NAICS 6-digit random intercepts, which otherwise corresponds to the MLE-based analysis in the top row. As is clear, accounting for NAICS 6-digit-level factors (observed or otherwise) in addition to the possible confounders discussed above does little to the relationship between `Legislator ownership` and `Firm lobbying`.

3.4.2 Addressing simultaneity

It is possible simultaneity explains these results, though there are reasons to doubt this. A high degree of scrutiny attends legislators that appear to trade securities about which they have privileged information due to their position as legislators (Eggers and Hainmueller 2014), suggesting legislators like senator Richard Burr (R, NC)—the Intelligence Committee Chair who sold $1.7m in stocks on February 13, 2020 that seemed to protect him from the

[9]I use flat priors—equivalent to implicit frequentist priors—for population-level variables (e.g. `Legislator ownership` and control variables). I specify weakly informative priors over the hierarchical standard deviation parameters to lightly regularize the random intercepts, enabling model convergence (Appendix 3.6.3 has details).

market pullback caused by subsequent *public* revelations of the risks posed by COVID-19 (Temkin and Markarian 2020)—are the exceptions that prove the rule. Yet, those exceptions could instead be the tip of the iceberg, so it is worth exploring whether evidence exists that would rule out simultaneity.

The basic simultaneity argument is that firm lobbying leads MCs to invest. Some additional implications of my model born out in the data are inconsistent with this argument. I predict that ownership of firms by particularly powerful groups of politicians should increase (the value of) lobbying by these firms. In contrast, the basic simultaneity argument implies that legislators should be inclined to invest in the stock of firms that lobby, regardless of whether MCs have more or less legislative power. If they hear about a promising company through its lobbying, the desire to make a good investment will affect both powerful and weak legislators alike.

I use several different measures of `Powerful legislator ownership` to test this argument. Each of these variables is a count variable, similar to `Legislator ownership (count)`, but is based on a subset of powerful legislators *and* has a complementary variable which is the relevant set of "weak" legislators. `Powerful legislator ownership (senator)` versus `Weak legislator ownership (representative)`: an individual senator matters more than a representative for many reasons, including that there are fewer senators (i.e. an individual makes up a larger proportion of the chamber) and they have more individual legislative clout (Sinclair 2016). `Powerful legislator ownership (leadership)` versus `Weak legislator ownership (non-leadership)`: chamber and party leadership positions—I focus on party whips, party leaders, and the Speaker of the House—all have increased ability to support and oppose legislation. `Powerful legislator ownership (committee)` versus `Weak legislator ownership (non-member)`: members of the Senate Committee on Finance and the House Ways and Means Committee have primary jurisdiction over trade-related legislation. `Powerful legislator ownership (chair)` versus `Powerful legislator ownership (other member)` versus `Weak legislator ownership`

`(non-member)`: `Powerful legislator ownership (chair)`, accounting for ownership by the chair and ranking member, should have a strong effect relative to other committee members (Berry and Fowler 2018).

To test if `Powerful legislator ownership` corresponds to higher levels of `Firm lobbying`, I start with the *baseline model* (Section 3.4.1), removing `Legislator ownership (binary)`. I fit four models where each one includes terms derived from one of the four measures of `Powerful legislator ownership`; I include `Powerful legislator ownership`, `Weak legislator ownership`, and interactions between these variables. This setup blends *H1* and *H2*, minimizes the number of interaction terms needed, and is conceptually straightforward. It allows a direct comparison of the relationship between `Firm lobbying` and legislator ownership between *powerful legislators* and *weak legislators*. If my theory is right, we should see a stronger relationship for powerful legislators.

To interpret these models, I find the average predicted probability of lobbying for all firms for a range of values for `Powerful legislator ownership`, setting `Weak legislator ownership` to zero, and then *vice versa*. Figure 3.3 shows that `Powerful legislator ownership` is more predictive of `Firm lobbying`. For instance, when 10 senators own a firm, that firm has about a 65% chance of lobbying, versus a roughly 45% when 10 representatives own the firm (*top-left panel*). The *top-right panel* shows a striking divergence in `Leadership` versus `Non-leadership` ownership. If four (out of nine) leaders own a firm, it lobbies with a probability of about 0.6, while if the same number of rank and file members own a firm, it lobbies with a probability of about 0.1. The *bottom-left panel* of Figure 3.3 shows the relationship between `Firm lobbying` and `Powerful legislator ownership (committee)` is stronger; if eight members of the committees responsible for trade legislation own a firm, that firm has over a 50% chance of lobbying versus only about 30% for a firm owned by eight non-committee legislators. Finally, *bottom right panel* reveals that while `Powerful legislator ownership (other member)` matters relative to legislators off the committee, the impact of the chair and/or ranking member owning the firm is larger still—if

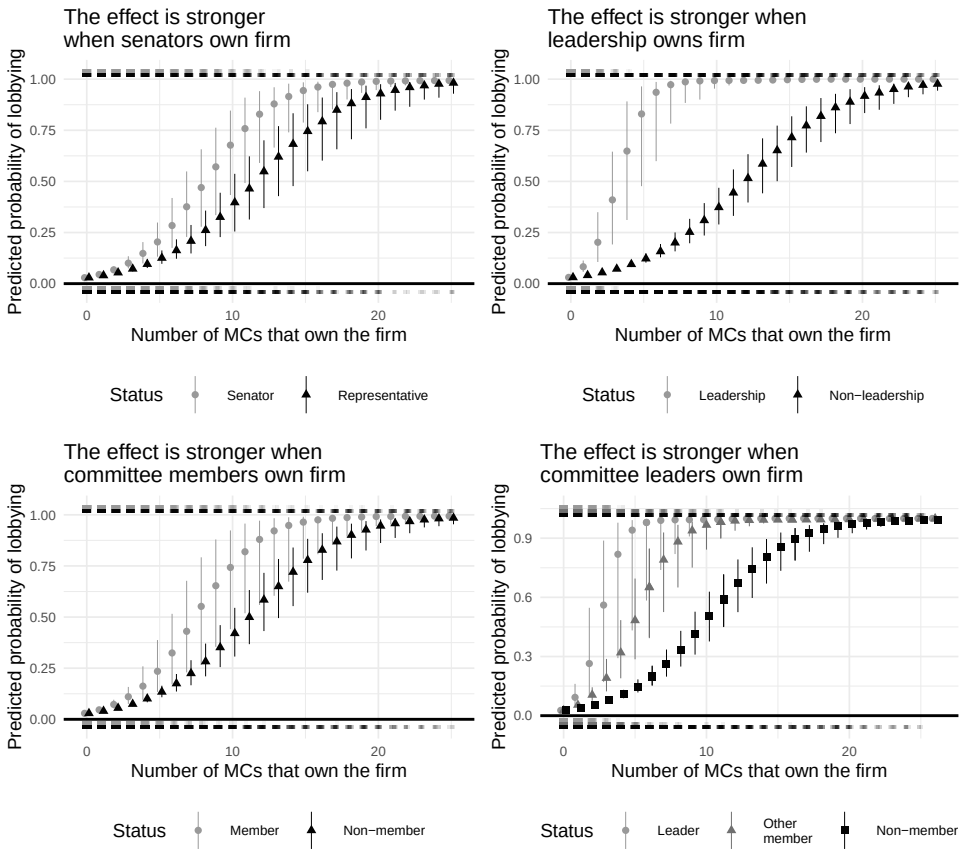


Figure 3.3: **Firms owned by powerful legislators lobby more.** 95% confidence intervals from 1000 simulations. Standard errors clustered by firms. All quantities represent average effects across all observations. Observed values for firms that lobbied on the ceiling or did not lobby on the floor. *Top-left panel:* ownership by senators versus representatives. *Top-right panel:* ownership by party and chamber leadership versus the rank and file. *Bottom-left panel:* ownership by members of "trade" committees versus non-members. *Bottom-right panel:* a comparison of the effect of ownership by the chairperson or ranking member of "trade" committees versus other members versus non-members.

three committee leaders own a firm, it lobbies with a probability of about 0.6, compared to about 0.2 for other committee members and under 0.1 for those off the committee.

As the rugs in Figure 3.3 make suggest, the fact that there are fewer powerful legislators for every operationalization of power means that the range of `Powerful legislator ownership` is far smaller than that of `Weak legislator ownership`. This numerical asymmetry does not drive the results. In Section 3.4.3.2 I show that the effect of `Legislator ownership` is stronger when firms are owned by members of the majority party; this shows that ownership of firms by a smaller group of legislators does necessarily lead to a larger effect. Rather, it is the proportion of firms that lobby given ownership by x members of a group that drives the size of the effect, controlling for other factors.

A look at raw data illuminates this point (and does so absent any modeling assumptions). Table **??** shows the proportion of firms lobbying conditional on whether they are owned by trade committee leaders, other committee members, or non-members. I display `Legislator ownership` from 1 to 4—4 is maximum number of committee leaders that can own a firm in a year. If we look at when `Legislator ownership` equals 1, we see that there are 1080 firms and 38% of them lobby; 3561 firms are owned by exactly 1 non-leader of the committee and 16% lobby; 5% of the 6209 firms owned by non-members lobby. This trend—that ownership by committee leaders is far more predictive of lobbying than ownership by other committee members, which in turn is more predictive than ownership by non-members—continues for the whole range of `Powerful legislator ownership (committee leader)`. This pattern does not emerge because more powerful legislators having more wealth to invest in more firms—rather, their investments are concentrated in firms that lobby.

The argument that powerful legislators should not disproportionately own firms that lobby—thereby ruling out *simultaneity*—loses plausibility either if firms only lobby these powerful legislators or firms more intensely lobby powerful legislators and legislators investments increase with lobbying intensity.[10] We have evidence that when foreign governments

[10]A different challenge to these results is that leaders may be systematically different. While a concern,

lobby on trade legislation they tend to contact nearly all legislators (You 2020).[11] Yet, foreign governments' lobbying might not mirror firm lobbying; firms may lobby powerful legislators exclusively or far more intensely. The patina of corruption acquired by legislators choosing to invest in firms because these firms lobbied might make us dubious of this type of simultaneity, particularly if we think powerful legislators are more politically ambitious than average—and thus wary about appearing to engage in insider trading. Still, ruling out this version of simultaneity would strengthen my argument.

I leverage the timing of `Firm lobbying` *vis-à-vis* `Legislator ownership` as another way of addressing simultaneity. I match firms who get ownership treatment—that is, go from being unowned to owned at time t—to similar control firms—e.g. firms that remain unowned at t—tracking differences in their lobbying behavior across two periods before and five periods after treatment (Kim, Kosuke, and Wang 2021). I use the Mahalanobis distance between the covariates discussed in Section 3.4.1 for pre-treatment periods to match treated units to the nearest two control units; control firms must have identical treatment histories as the treated unit. I calculate the average treatment effect on treated (ATT) using a difference-in-differences estimator that accounts for a time trend. Appendix 3.6.4 shows that the mean difference between treated and control units for each covariate in every pre-treatment period is well below 0.5 standard deviations of the covariate across all treated observations in the data for that period, with most falling below 0.2 sd.

This approach may understate the effects of `Legislator ownership`. By focusing on firms that switch between control and treatment—measured by `Legislator ownership`

this raises issues of omitted variables rather than simultaneity; I address omitted variables in Section 3.4.3. We must be clear that however, that for systematic differences in powerful legislators to explain these results, it *must* be that these legislators are different in ways that make them more likely to invest in firms that lobby. I suggest ambition—something leaders may have more of—should make them hesitant to do this. The story of then representative Lyndon Johnson turning down what essentially was a gift of an oil company because it would "kill [him] politically"—wrecking his chances to be president—illustrates the point (Caro 1982).

[11] You (2020) uses data filed in compliance with the Foreign Agents Registration Act (FARA) of 1938. Foreign governments must adhere to this—they do not have the option to report their activities under LDA, which does not require firms to disclose who they lobby. Foreign firms, however, can file under the LDA, meaning the FARA data does not capture much of their activity nor any activity of domestic firms.

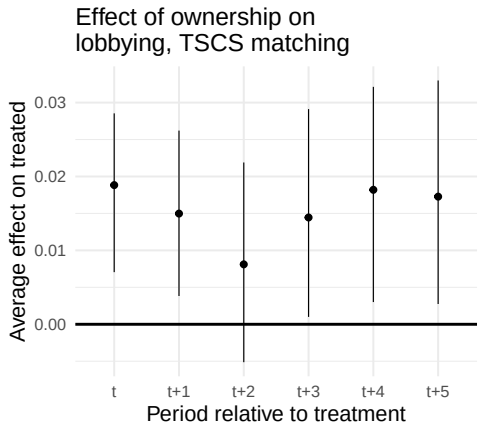


Figure 3.4: **Estimated average effects of legislator ownership on firm lobbying using TSCS matching.** Matching methods that adjust for the treatment and covariate histories during the two years before the treatment produce the estimates of the ATT for the five years following treatment, with 95% bootstrap confidence intervals.

`(binary)`—at some point *during* the time series, this method necessarily focuses on a subset of firms, excluding firms owned by at least one legislator throughout the period (a subset of that may be particularly impacted by legislator ownership). This framework focuses on the binary as opposed to the count or continuous measures of `Legislator ownership`, which ultimately throws out information about treatment dosage.

Nonetheless, the results of this analysis (Figure 3.4) reveal that `Legislator ownership (binary)` has a significant, sustained ATT on `Firm Lobbying`. Of the unowned firms in this analysis, roughly 1.2% lobby. The average ATT across the six periods—about 1.5 percentage points—more than doubles this. Simultaneity does not seem to explain the relationship between legislator ownership. Some results below reinforce this conclusion.

3.4.3 Evidence against unobserved confounders

Finally, what if an omitted variable—which must be largely orthogonal to controls and varies within industries, given the results from the MLE and Bayesian analysis (Section 3.4.1)—gives rise both to `Firm lobbying` and `Legislator ownership`? If an omitted variable leads to widespread investment by MCs—widespread enough cause more concentrated

investment by smaller groups of powerful legislators—and also drives lobbying, it could explain the powerful legislator findings. The TSCS matching results mean the timing of the impact of changes in this variable must simultaneously cause changes in `Firm lobbying` and `Legislator ownership`.

3.4.3.1 Small versus large firms

I turn to additional pieces of evidence and implications of my theory that either restrict or do not easily fit with this omitted variable explanation. First, I predict smaller firms should be more affected by `Legislator ownership`. For large firms, the mostly fixed costs of lobbying represent a relatively small expense. Also, their size may enhance the effectiveness of their lobbying efforts since they arguably have more impact on the health of the national economy and they tend to employ more people. `Legislator ownership` should matter less for large firms' lobbying. Small firms, however, will more often find the costs of lobbying outweigh the benefits. For such firms, the enhanced efficacy of lobbying when legislators own them should increase the chances they lobby.

To test this prediction, I fit a model like the *baseline model* (Section 3.4.1) where I replace `Legislator ownership (binary)` with an interaction between `Legislator ownership (count)` and `S&P 500`—a binary variable taking the value of 1 when the firm is in the S&P 500, a widely used measure of the largest 500 public firms. I calculate the average predicted probabilities of lobbying for a range of values of `Legislator ownership (count)` across all firms when setting to `S&P 500` to 0 and then to 1. The results show that increasing the number of legislators that own a firm outside of the S&P 500 results in a faster increase in the predicted probability of lobbying (*left panel* of Figure 3.5).

We might be concerned that the S&P 500 distinction is either arbitrary or, since it is so widely used, could be correlated with factors not included in the model. Another approach is to replace `S&P 500` with `Market capitalization`, with the expectation that the interac-

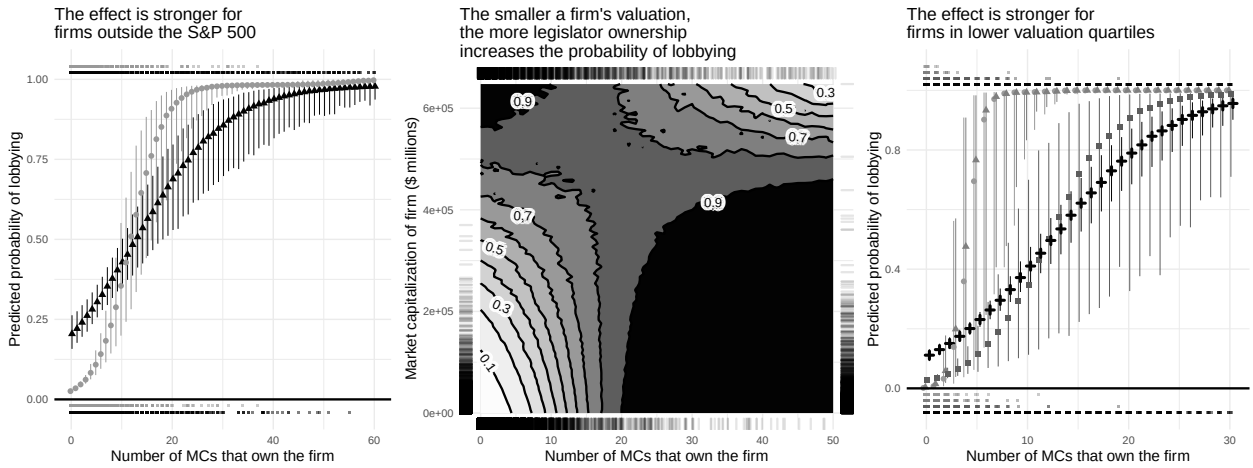


Figure 3.5: **Smaller firms are more affected by legislator ownership.** 95% confidence intervals from 1000 simulations. Standard errors clustered by firms. All quantities represent average effects across all observations. Rugs show observed values for firms that lobbied (ceiling/right) or did not (floor/left). *Left panel:* S&P 500 firms versus those outside of the index. *Middle panel:* the predicted probability of lobbying across the range of `Market capitalization` (*y-axis*) and `Legislator ownership (count)` (*x-axis*). *Right panel:* the results of estimating the effect of legislator ownership separately for each quartile of `Market capitalization`.

tion term between `Market capitalization` and `Legislator ownership (count)` should be negative. The estimate for this coefficient is -6.4e-07 with a standard error of 1.1e-07, statistically significant well beyond conventional levels. I plot the average predicted probabilities of lobbying across many values of `Legislator ownership (count)` and `Market capitalization` to convey the model implications (*middle panel* of Figure 3.5). When setting `Market capitalization` to a lower value—for example, $50b—increasing `Legislator ownership (count)` rapidly increases firms' probability of lobbying; when no legislators own the firm the probability of lobbying is about 0%, which rises to over 30% (80%) when 10 (20) legislators own the firm. For a large value of `Market capitalization`—for example, $600b—the predicted probabilities of lobbying actually fall as `Legislator ownership (count)` increases. The model implies that legislator ownership matters a lot more to smaller firms.

These results—especially the negative results for the largest firms—provide impetus

to further explore possible non-linear effects of `Market capitalization` and its interaction with `Legislator ownership (count)`. I create a new variable for the size of firms—`Market capitalization (quartile)`—binning firms into four quantiles. Each quartile enters the model as a binary variable, thereby estimating the effect of `Legislator ownership (count)` *within* each quartile of `Market capitalization`. Looking at the *right panel* of Figure 3.5, note that, when unowned (that is, `Legislator ownership (count)` = 0), the probability of lobbying increases when moving from firms in the first quartile to those in the fourth, as we would expect. Also, as per expectations, the effect of `Legislator ownership (count)` is larger for smaller firms. The effect of legislator ownership on the lobbying behavior of firms in the first and second quartiles is similar—with the first quartile firms slowly catching the second quartile firms, albeit with wide confidence intervals. By comparison, `Legislator ownership (count)` has a more moderate—but certainly positive—effect on firms with `Market capitalization` higher than the median, with the effect on firms in the third quartile being somewhat stronger than those in the fourth quartile. The most striking result is that, though starting substantially lower, the predicted probabilities that firms in the first and second quartiles lobby quickly overtake the predicted probabilities for firms in the third and fourth quartiles as `Legislator ownership (count)` increases. This finding—that small firms are more affected by `Legislator ownership` than large ones—further restricts what sort of omitted variable might explain the results in this paper. Such an omitted variable *must correlate negatively* with firm size.

3.4.3.2 Party control

As another way to narrow the omitted variables that might explain my findings, I turn to implications regarding which party controls a chamber. The party with a majority has more influence over legislation. Therefore, firms should see lobbying as more valuable when members of the majority own them—similar to the argument about powerful legislators (Section 3.4.2). Since control of chambers changes relatively quickly and it seems unlikely legislators

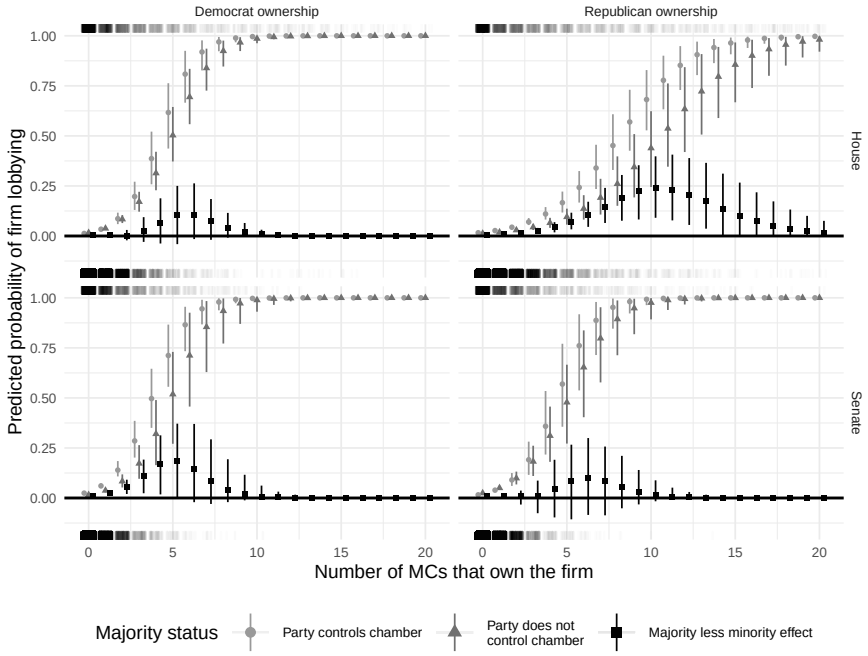


Figure 3.6: **Firms lobby more when owned by (more) members of the majority.** 6000 draws from the posterior distribution produce 95% credible intervals. Rugs show observed values for firms that lobbied (ceiling) or did not (floor). All quantities represent average effects across all observations. Each panel shows the effect of legislator ownership when a particular party in a given chamber is in control, when it's not, and the difference between these quantities.

significantly alter their investment portfolios each time their party gains or loses control of the chamber (c.f. Eggers and Hainmueller 2014), it is hard to imagine many omitted variables that might explain why firms owned by the new (erstwhile) majority should suddenly lobby more (less). If firms' lobbying behavior changes with swings in the partisan control of chambers, it strongly suggests that any omitted variable that might explain the relationship between `Legislator ownership` and `Firm Lobbying` must be in some way related to legislators' portfolio-revealed preferences.

Given the counter-majoritarian nature of the Senate, I expect the results in the Senate should be less clear-cut than those in the House. Even if a firm is only owned by members of the Senate minority party, minority senators have significant legislative clout; in the House, the majority can more easily push through legislation despite minority opposition.

To test this, I first create four variables similar to `Legislator ownership (count)` but

that are chamber- and party-specific (e.g. `Legislator ownership (House Democrats)`). I also create two dummy variables for whether Democrats control the House or Senate (e.g. `Democrat Senate majority`). I fit a model like the *baseline model* (Section 3.4.1) where I replace `Legislator ownership (binary)` with the chamber- and party-specific count variables of legislator ownership as well as all combinations of interactions between these variables—including up to a four-way interaction—to allow these variables to operate as substitutes (e.g. if a firm is already owned by Senate Democrats, this may lessen the impact of House Republican ownership for this firm). Finally, I include interactions between the chamber- and party-specific count variables and the appropriate Democratic majority dummy (e.g. `Legislator ownership (House Democrats)` $\times$ `Democrat House majority`). MLE results in perfect separation, so I rely on Bayesian analysis with improper priors for population terms and weakly informative priors for the year and NAICS 3-digit random intercepts (Appendix 3.6.3 has details).

To interpret the model, I find the average predicted probabilities of lobbying across all firms when the number of legislators owning a firm in a particular chamber and from a particular party increases from 0 to 20, conditional on whether that party controls that chamber and setting the ownership by the other chamber/party to 0. Figure 3.6 shows that the difference between the effect of ownership by a party increases when that party controls the House. The inverse-logit link function means that the size of the difference in the predicted probability of lobbying varies as legislator ownership increases, reaching a high of 11 (24) percentage points for Democrats (Republicans) when 5 (10) members of their party own a firm. Note that the effect of ownership by Democrats is stronger than that of ownership by Republicans, particularly in the House. In Appendix 3.6.6 I more explicitly show that the effect of ownership by Democrat MCs is larger than for Republican MCs, which my theory predicts if we believe that Democrats have a lower baseline propensity to support legislation preferred by the firms that they own.

In the Senate, the same basic pattern emerges, and Democrats (Republicans) see a

maximal difference of about 19 (10) percentage points when 5 (6) MCs own the firm. Some of the differences for Democrats and all of those for Republicans fall short of traditional levels of statistical significance, unsurprising given the minority's power in the Senate. The fact that there are necessarily fewer members of the minority party and therefore fewer of them to own firms does not drive these results—recall Section 3.4.2 where ownership by smaller groups (e.g. senators versus representatives, leadership versus rank-and-file, etc.) is more predictive of firm lobbying than ownership larger groups. Rather, it is that when a party is in the minority, a lower proportion of the firms they own lobby. These results add further evidence against simultaneity; it is hard to see lobbying leading to a change in the composition of legislators' portfolios precisely when legislators become part of the majority.

Perhaps a party's agenda pushes particular firms to lobby? In this case, a party's agenda may be influenced by the same sort of preferences that drive their investments, since we've already established that the investments of the majority party are more predictive of firm lobbying than the minority's investments—though note that the effect of minority ownership is still substantial. If the majority's agenda is part of the story, this *does not* run against the basic argument that the policy preferences of those in power, revealed by their investments, matter for firms' lobbying decisions. It does offer a channel through which this could happen. To the extent we think that a party's agenda will benefit the firms they own *if and only if* the firms lobby, this seems compelling. However, if we imagine that a party's agenda threatens firms they don't own (perhaps a Democrat majority looking to pass stricter carbon emissions regulations that threaten oil companies) and we think lobbying is a mechanism by which firms can inform legislators about high costs of these regulations of which the legislators are ignorant (e.g. Grossman and Helpman 2001), then we would expect the majority's agenda might push firms *not* owned by the majority to lobby (oil companies would feel compelled to lobby when Democrats, who don't own oil companies as frequently, to lobby when Democrats are in control to protect themselves). Yet, this is exactly the opposite of the findings, casting some doubt that the legislative agenda of the majority is

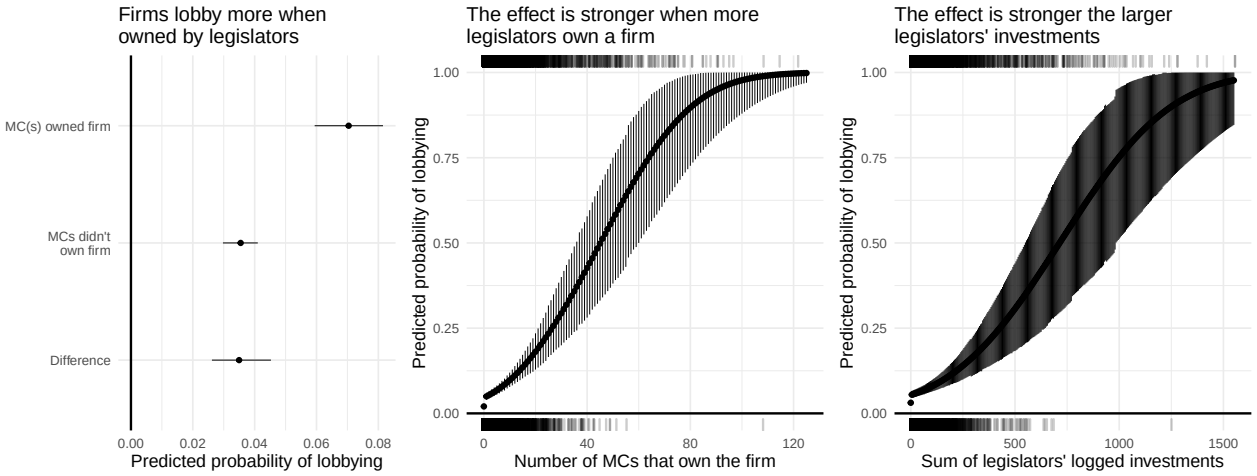


Figure 3.7: **Within-firm analysis shows firms lobby more when owned by legislators.** 10,000 posterior draws produce 95% credible intervals. All quantities represent average effects across all observations. Rugs show observed values for firms that lobbied (ceiling) or did not (floor). *Left panel:* the relationship between firm lobbying and ownership by at least one legislator. *Middle panel:* firms owned by more legislators are more likely to lobby. *Right panel:* as the sum of legislators' logged investments in a firm increases so does the probability of lobbying.

the primary mechanism for these findings.

3.4.3.3 Within-firm lobbying

Another way to account for firm-level omitted variables is to see if the relationship between ownership and lobbying holds *within* firms. Given problems of perfect separation for models including anything more granular than NAICS 3-digit fixed-effects, firm-level fixed effects using MLE are not an option. I again turn to Bayesian analysis, fitting a hierarchical model with a random intercept for each firm (5226 terms)—Appendix 3.6.5 shows that the results hold when including firms that don't produce internationally traded goods, yielding 11,400 random intercepts. These random intercepts account for omitted variables at a granular level—slow-changing, firm-level variables orthogonal to the firm-level controls. Like above, I use flat priors over population terms and weakly informative priors over the standard deviation of the hierarchical parameters (Appendix 3.6.3 has details).

The analysis follows that in Section 3.4.1. Figure 3.7 shows the results. The *left panel*

shows that `Legislator ownership (binary)` doubles the probability a firm will lobby, going from 3.5% to 7%. Conditional on at least one legislator owning the firm, the *middle panel* shows that as more MCs own the firm the predicted probability of lobbying sharply increases, surpassing 50% (90%) when about 45 (90) MCs own the firm. The same pattern holds when analyzing the effect of `Legislator ownership (continuous)`, which sees the average predicted probability of lobbying increase markedly as the size of legislators' investments increases. While these estimates are smaller than in Section 3.4.1, they are still substantial, particularly since firms with little variation in `Legislator ownership` contribute little to the estimate even if `Legislator ownership` influences their lobbying in the theorized manner.

Regarding confounding omitted variables, so far I've ruled out many possibilities: variables that do not change at precisely the same time as lobbying behavior and ownership (given the TSCS results); variables that correlate with the controls in the various models, including the industry, year, and within-firm fixed effects; variables that do not correlate with more concentrated ownership by powerful legislators; variables that correlate positively with firm size; and variables that do not change with swings in partisan chamber control. Seemingly only fast-changing, firm-level omitted variables remain a viable alternate explanation.

3.4.3.4 Chamber-specific lobbying

I now offer evidence that firms disproportionately lobby legislators that own them. If it's true that firms are more likely to lobby sympathetic legislators, then they should be motivated to contact those that own them. I stated above—following the literature—the LDA does not require firms to say which legislators they contact. This is not entirely accurate. Though firms have no requirement to name which legislator they contact, they must report which chamber they lobby. Unsurprisingly, given the high fixed costs of lobbying (Huneeus and

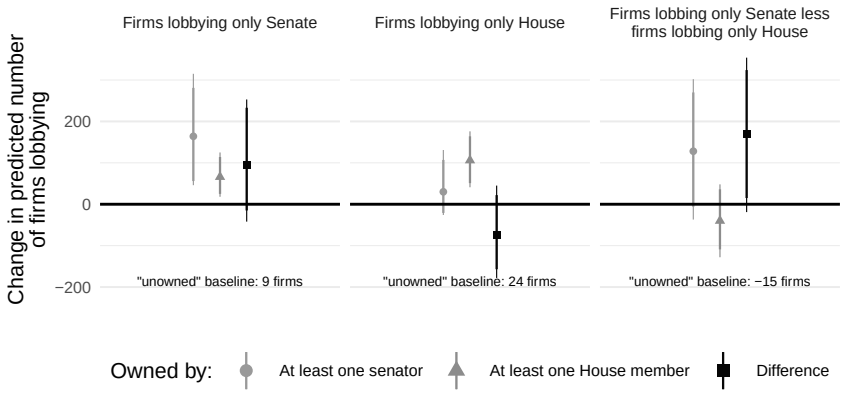


Figure 3.8: **Firms tend to lobby the chamber that owns them.** Results based on multinomial logistic regression. 10,000 posterior draws produce 90 and 95% credible intervals. All quantities represent average first differences when firms are owned by at least one legislator versus unowned, with separate estimations made for the change in the number of firms lobbying each chamber and the difference between chambers, conditional on ownership by senators or representatives. Facets note the predicted number of firms lobbying when no legislators own firms.

Kim 2021; Kerr, Lincoln, and Mishra 2014) and the institutional requirements that both chambers agree on trade policy (Bailey, Goldstein, and Weingast 1997), most firms lobbying one chamber lobby the other as well—roughly 95.6% of firm-years. That leaves, however, a small number of firms that report lobbying only one chamber—64 (44) firm-years in the House (Senate), involving 49 (30) unique firms. Thus, 0.17% of observations lobby only a single chamber.[12] These observations—though rare—allow for a less aggregated measure of which legislators firms contacted. My theory implies that, when firms lobby only one chamber, they will be more likely to lobby a chamber that owns them.

To test this, I fit a multinomial logistic regression of `Firm lobbying (categorical)` (a variable taking on one of four values—"lobbied both chambers," "lobbied neither," "lobbied the House," or "lobbied the Senate") on the right-hand side variables in the *baseline model* (Section 3.4.1), with the exception that I exchange `Legislator ownership (binary)` for

[12]The numbers in this paragraph are based on firms for which data on the control variables are available. In this analysis, I do not control for `Differentiation` to include more observations where firms lobbied one firm or the other—there are 29,764 unique firm-years that have a value for `Differentation` (meaning they produce internationally traded goods) compared to 64,007 unique firm-years for which data on the other control variables are available. Note, however, that the analysis of this larger universe has largely mirrored that which controls for `Differentiation` (c.f. Appendix 3.6.1, Appendix 3.6.2, Appendix 3.6.5).

the two chamber-specific versions of this variable and an interaction between them. Because perfect separation happens using MLE, I use Bayesian analysis and, thus, include NAICS 3-digit random intercepts instead of fixed effects. As in previous Bayesian models, I use flat priors for population parameters and weakly informative priors over the hierarchical standard deviation parameters (Appendix 3.6.3 has details). Note the heavy burden placed on finding the predicted relationship for the two categories of `Firm lobbying (categorical)` in which we are interested. Lobbying on trade-related legislation is rare—less than 4% of observations. Observations for "lobbied the House (Senate)" comprise less than 0.1% (0.07%) of the data, making these outcomes extremely rare. Any results related to these categories of interest likely will have considerable statistical uncertainty.

Despite the sparsity of observations that lobby only one chamber, the estimated effect of chamber-specific ownership on chamber-specific lobbying is in the right direction, is relatively large, and the ultimate quantities of interest hover at conventional levels of statistical significance. Figure 3.8 shows the implications of this model in terms of the average first difference (Ward and Ahlquist 2018) in the number of firms predicted to lobby each chamber when all firms are owned by at least one MC compared to when they are not. That is, I find the predicted number of firms lobbying when setting `Legislator ownership` to 1 and subtract from this the predicted number of firms lobbying when setting `Legislator ownership` to 0, calculating these quantities separately for the combinations senator versus representative ownership and lobbying the House versus the Senate. The *left facet* shows that ownership by senators leads to about 95 more firms lobbying the Senate than ownership by representatives, while the *middle facet* shows ownership by representatives leads to about 74 more firms lobbying the House compared to ownership by senators. When owned by at least one senator (representative), 128 (40) more firms lobby the Senate (House) compared to the unowned baseline of 15 more firms lobbying the House (*right panel*)—these quantities represent the chamber-specific effects of ownership by senators and representatives. The final quantity in the *right panel* shows that ownership by at least one senator results

in about 169 more firms lobbying the Senate than the House compared to ownership by at least one representative. This represents the difference in the chamber-specific effects of senator ownership versus representative ownership, and the 95% credible interval only just contains 0. Appendix 3.6.7 shows that similar analyses for the chamber-specific versions of `Legislator ownership (count)` and `Legislator ownership (continuous)` display the same basic pattern even though the dearth of observations lobbying a single chamber places a heavier burden on these measures of `Legislator ownership`.

It is difficult to imagine an omitted firm-level characteristic, fast-changing or otherwise, that would lead to both chamber-specific lobbying by particular firms *and* increased ownership by that chamber and not the other chamber—particularly given that simultaneity does not appear to be the predominant explanation of the relationship between `Firm lobbying` and `Legislator ownership` (Section 3.4.2 as well as majority results presented in Figure 3.6). The observational nature of the data means an omitted variable could confound this relationship, yet the results taken together make such a possibility appear unlikely.

3.5 Conclusion

Lobbying represents a costly endeavor with uncertain payoffs. Some firms see the consequences of government policy and the possibility of lobbying successfully as worthwhile. Firm characteristics play an important role in whether or not they choose to lobby. At the same time, legislators have significant investments in some firms. Legislators consider policies that will impact these investments. Does firm lobbying depend on whether—and which—legislators own firms? Is the story of the Crédit Mobilier an exemplar or an exception? Does Ames' observation—that legislators, like most people, have a predisposition to look after their property—help us understand which firms lobby?

I argue that legislators' sympathies affect firms' lobbying decisions. Firms look to maximize profits and legislators have electoral slack in choosing their positions on at least

some policies. Legislators tend to legislate in line with their sympathies revealed by their investments. Legislation often has effects that firms understand better than legislators. The key implication of my theory follows; a firm owned by legislators is more likely to lobby and, conditional on being owned, this firms becomes even more likely to lobby as the number of legislators that own the firm and the size of their stake further increase. As a vivid, if extreme, example, the Crédit Mobilier thought the value of legislator ownership to the firm's lobbying efforts justified ethically suspect—perhaps illegal—subsidization of legislators' stock purchases.

While the data available do not allow a direct test of the causal mechanism—I must rely on aggregated measures of lobbying contact—the expected relationship remains strong when controlling for confounders commonly cited in the literature as well as accounting for industry- and firm-level unobserved confounders. Firms' probability of lobbying increases when powerful legislators own them. Firm lobbying temporally follows changes in ownership. Changes in partisan chamber control reveal that firms are more likely to lobby when owned by a majority. Further, the chamber-specific relationship between ownership and lobbying is unlikely to arise by chance, offering further evidence that firms lobby legislators that own them. These findings constitute a preponderance of evidence in support of my argument.

In terms of generalizability, the US has a long history of competitive elections, laws requiring comparatively granular disclosure of lobbying activity and legislators' personal finances, and independent media inclined to publicize anything that has a hint of insider trading or corruption. To the extent that these features are less prevalent in other political systems—especially weaker democracies and non-democratic systems—we could expect politicians' investment portfolios to lead to even more attempts by firms to influence policy, through lobbying or other channels. On the other hand, trade—particularly during the time of this study—was fairly low-salience. More salient issues should be more closely watched by constituents, thereby limiting politicians' electoral slack, meaning that lobbying by firms is less likely to be successful and more firms may not incure the costs of lobbying legislators

about these issues.

My argument speaks to broader concerns about collective action problems. In the context of lobbying, large firms—possessing greater resources—are expected to dominate lobbying, which the data bear out. Yet, the connection between firms and politicians that invest in them appears to be a powerful substitute for size. A firm with a market capitalization of \$3.6m that 2 legislators own and a firm with a market capitalization of \$17.1b that no legislators own both have about a 2.4% chance of lobbying.[13] That is, being owned by 2 legislators makes the smaller firm as likely to lobby as one that is more than 4,700 times larger. Even if this estimate is one or two orders of magnitude too high, it strongly suggests the importance of a sympathetic audience for firms' lobbying behavior.

This article contributes to our fundamental understanding of how firms influence—and may be perceived to influence—policy. First, I offer a new theory of how firm lobbying works. By elucidating how legislators sympathies can affect firms' political activity, my work echoes and extends older scholarship on how the commingling of political and economic elites' interests may shape policymaking (Mills 2000; Schattschneider 1960); I present a concrete way firm lobbying may form and exploit connections between the interests of firms and legislators. Second, the existence and strength of these connections may mean that the focus of most research on populism and political discontent on economic and cultural grievances (Mudde and Rovira Kaltwasser 2018) tends to overlook another possibility. Following reporting on senator David Perdue's (R-GA) stock trading in 2020, senator Jeff Merkley (D-OR) said of legislators' investments in individual stocks, "There is no way that the public can't sense, can't absolutely smell, that this is corrupt, that you have it in the back of your mind when you vote. You may have the public interest in your mind, but you also have in your mind how that decision might impact the value of your portfolio."[14] Connections between legislators and firms like those explored in this article—perhaps only the perception of these

[13]These predicted probabilities come from the model that produces the *middle panel* of Figure 3.5.

[14]`https://www.nytimes.com/2020/12/02/us/politics/david-perdue-stock-trades.html`.

connections—may add to a public sense that political and economic elites have an outsized influence on policy, thereby contributing to the politics of discontent.

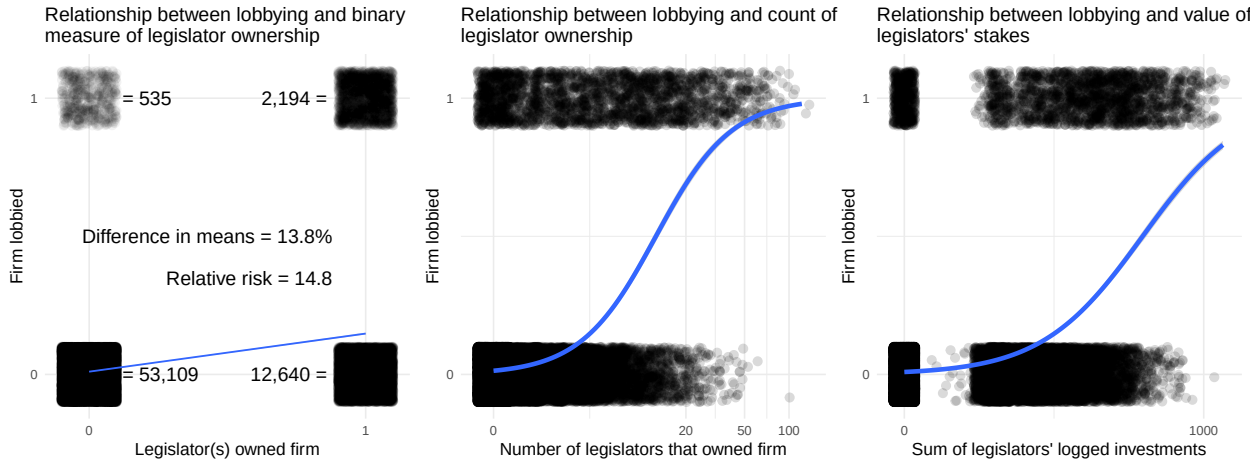


Figure 3.9: **Lobbying increases with legislators' ownership of firms when all public firms are included in the analysis.** *Left panel:* the relationship between firm lobbying and legislator ownership. Linear regression provides the fitted line and confidence intervals. *Middle panel:* firms owned by more legislators are more likely to lobby. A logistic link function with a quadruple-knot cubic spline provides the smoothed line and confidence intervals. *Right panel:* as the sum of legislators' logged investments in a firm increases, so does the probability of lobbying. A logistic fit with a quadruple-knot cubic spline provides the smoothed line and confidence intervals.

3.6 Appendix

3.6.1 Bivariate analysis of all public firms

Figure 3.9 shows that a bivariate analysis including all public firms—not just those producing internationally traded goods—still results in a strong positive relationship between `legislator ownership` and `firm lobbying`. Though the difference in means in the *left panel* is smaller than in the *left panel* of Figure 3.1, the relative risk is actually larger (14.8 versus 14.2) because the proportion of firms lobbying when unowned is lower for this larger universe. In the *middle* and *right panels*, quadruple knot splines ensure that the positive relationship between `legislator ownership` and `firm lobbying` holds conditional on at least one legislator owning the firm.

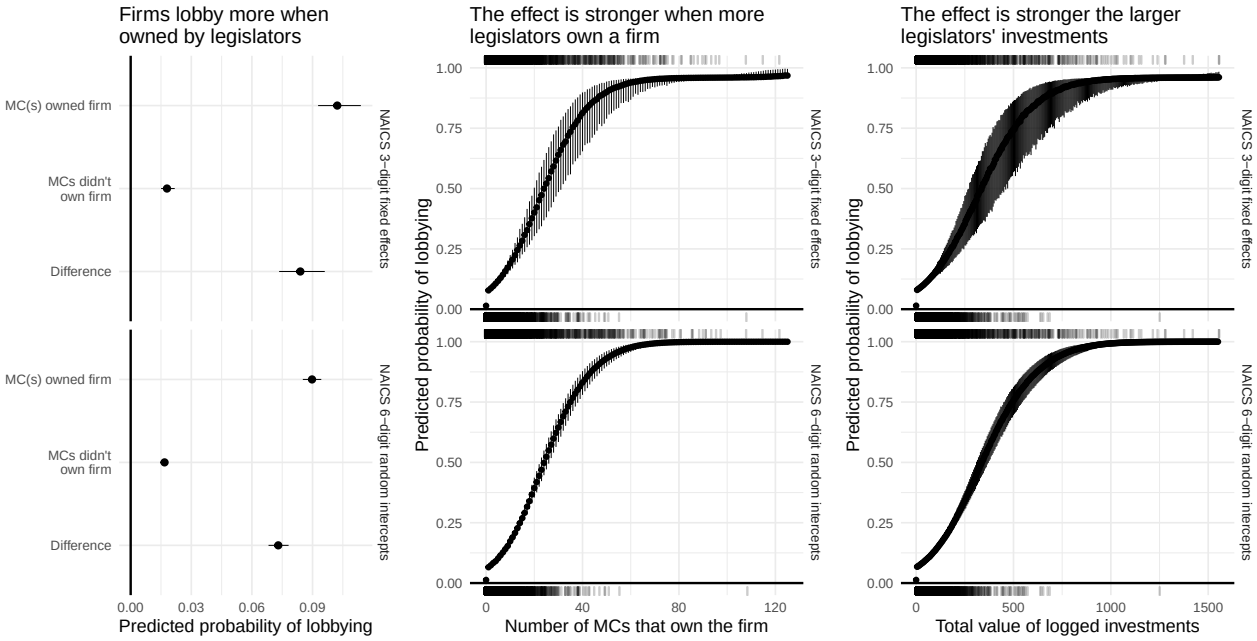


Figure 3.10: **Lobbying increases with firm ownership when including all public firms.** Includes all firms for which data on firm-level confounders (except `Differentiation`) are available. *Top row:* 95% confidence intervals from 1000 simulations using standard errors clustered by firms. Includes NAICS 3-digit fixed effects and uses MLE. *Bottom row:* 10,000 posterior draws produce 95% credible intervals. NAICS 6-digit random effects and Bayesian analysis. *Left column:* the relationship between firm lobbying and ownership by at least one legislator. *Middle column:* firms owned by more legislators are more likely to lobby. *Right column:* as the sum of legislators' logged investments in a firm increases so does the probability of lobbying.

3.6.2 Controlling for confounders for all public firms

3.6.3 Notes on priors

When fitting models with Bayesian analysis, I use flat priors for population-level variables—typically these are some measure of `Legislator ownership` and the control variables discussed in Section 3.4.1. Flat or improper priors are equivalent to the implicit priors in frequentist statistics (Jackman 2009). I use weakly informative priors over the hierarchical standard deviation parameters—typically for year and NAICS 3/6-digit random intercepts—in order to provide some regularization to enable model convergence and improve sampling efficiency. Specifically, I use a half student-t distribution with 3 degrees of freedom and a

scale parameter of 2.5 as a prior for the hierarchical standard deviation parameters, following Gelman (2006) and Bürkner (2017).

These Bayesian random intercepts take the place of fixed effects in models fit with MLE in the paper; it is precisely when adding too many fixed effects that MLE runs into problems of perfect separation, since the likelihood can be maximized by selecting arbitrarily large values for some coefficients, ultimately compromising inference (Ward and Ahlquist 2018). Intuition suggests that, while coefficients of fixed effects may be large, it is improbable that they are infinite or the only factor that matters in explaining behavior of a group. Choosing priors that mildly restricts these values—-in this case priors that assumes that there is (a small amount of) information in group j's behavior that can illuminate group i's behavior—seems not only sensible but, according to some, far more defensible than the improper priors of frequentist statistics (Jackman 2009). Further, mild regularization allows Bayesian analysis to fit models where MLE results in perfect separation, and is one good option to deal with overfitting (Ward and Ahlquist 2018). Indeed, statisticians have increasingly been moving towards various types of regularization as a default given the pernicious effects of overfitting—effects that tend to be overlooked in political science (Ward and Ahlquist 2018).

3.6.4 Covairate balance for TSCS matching

Figure 3.11 shows the covariate balance for the TSCS matching analysis in Figure 3.4. Relative to the variation in the data, the differences between treated in control units when estimating the ATT of `Legislator ownership (binary)` on firm lobbying are quite small.

3.6.5 Within-firm results hold for all firms

Including firms that do not produce internationally traded goods does not substantially change the results of the within-firm analysis (Section 3.4.3).

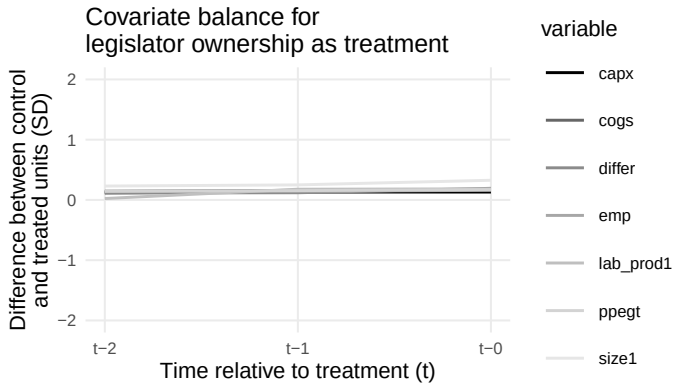


Figure 3.11: **The covariate balance for the TCSC matching analysis.** See Figure 3.4. The difference between the treated and control units is standardized by the standard deviation of that covariate across all observations in the analysis for that period.

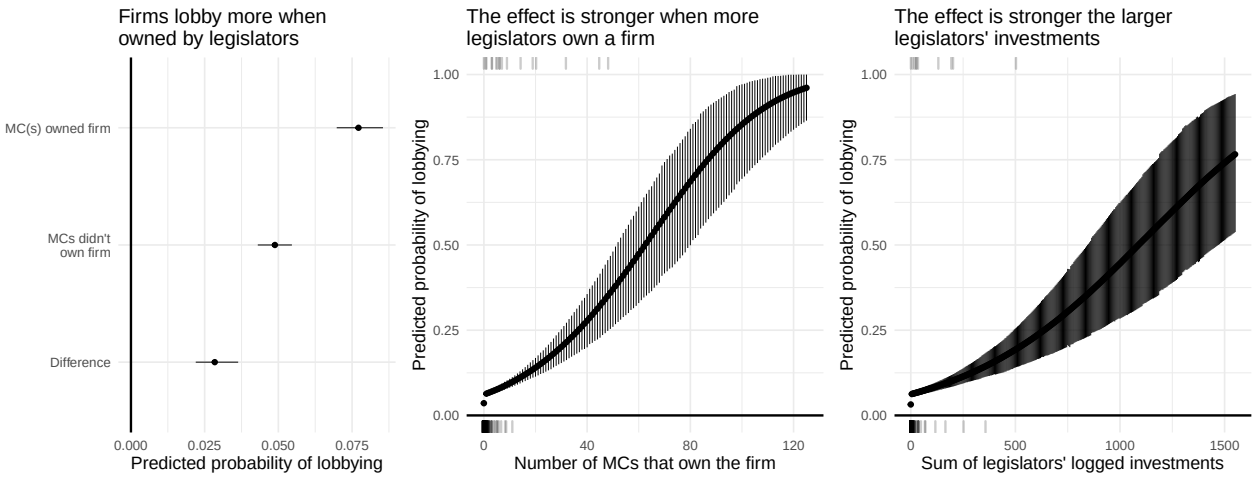


Figure 3.12: **Within-firm analysis shows firms lobby more when owned by legislators when including all public firms.** Includes all firms for which data on firm-level confounders (except `Differentiation`) are available. 10,000 posterior draws produce 95% credible intervals. All quantities represent average effects across all observations. Rugs show observed values for firms that lobbied (ceiling) or did not (floor). *Left panel:* the relationship between firm lobbying and ownership by at least one legislator. *Middle panel:* firms owned by more legislators are more likely to lobby. *Right panel:* as the sum of legislators' logged investments in a firm increases so does the probability of lobbying.

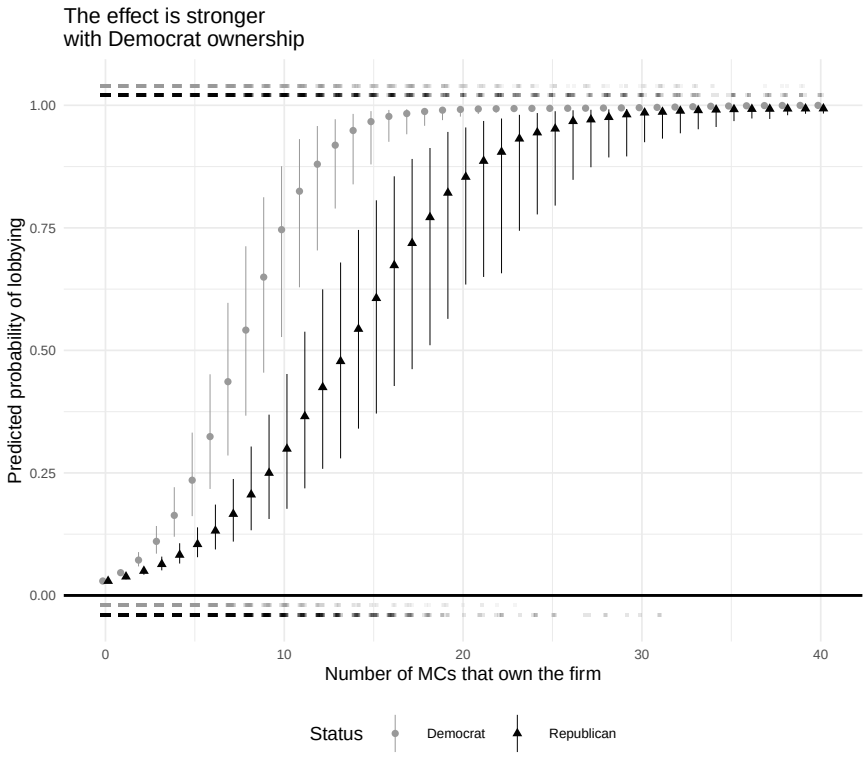


Figure 3.13: **Firms are more likely to lobby when more members of the anti-business party own them.** 95% confidence intervals from 1000 simulations. Standard errors clustered by firms. Quantities represent the averaged predicted probability a firm will lobby as the number of legislators owning the firm increases, conditional on the party of the legislators.

3.6.6 Partisan differences in effects

Legislators from pro-business parties tend to enjoy support from businesses and voters that prefer or at least tolerate pro-business policy. This means that, absent lobbying, these legislators are quite likely to support pro-business legislation. Their sympathies as revealed by their investment portfolios will be less likely to have an *appreciable* effect on their behavior.

In the US context, therefore, I expect that, since Republicans tend to nearly always support more pro-business policies, lobbying them may not be necessary in many instances. Democrats, however, are more likely to face pressure to oppose pro-business policies from some voters, labor unions, etc. Thus, lobbying sympathetic Democrats will tend to have

larger payoffs than lobbying Republicans. Firms should lobby more often when owned by Democrats than Republicans.

I create party-specific versions of `Legislator ownership (count)` in order to test this. I take the *baseline model* (Section 3.4.1) and exchange these party-specific measures for `Legislator ownership (binary)` and an interaction between them. I calculate the average predicted probabilites of lobbying across all firm-years when one party-specific ownership variable is increased from 0 to 40 while the other is held at 0.

Figure 3.13 shows the effect of ownership is clearly stronger when Democrats own firms. For instance, when 10 Democrats own a firm it lobbies with a probability of about 0.75, while for a firm owned by Republicans the probability is about 0.30. This strongly confirms the expectation that firms owned by Democrats should lobby more than compared to when they are owned by Republicans.

3.6.7 Count and continuous chamber-specific results

Figure 3.8 showed that chamber-specific measures of `Legislator ownership (binary)` predicted chamber-specific lobbying by firms. Here, I first fit a similar multinomial logistic regression swapping the chamber-specific measures of `Legislator ownership (binary)` for chamber-specific measures of `Legislator ownership (count)`. Given the dearth of observations that lobbied only a single chamber—0.12% of observations—I expect a high level of uncertainty in the estimates.

Figure 3.14 shows that the chamber-specificity of the relationship holds in this model, expressed as the average predicted number of firms lobbying. The effect of ownership by senators (the *top row*) is clearly stronger in the Senate, while the effect of ownership by representatives appears stronger in the House—though the estimates are smaller and more uncertain (*middle row*). The *first panel of the bottom row* shows impact of senator ownership is larger than representative ownership in the Senate, while the *second panel of the bottom*

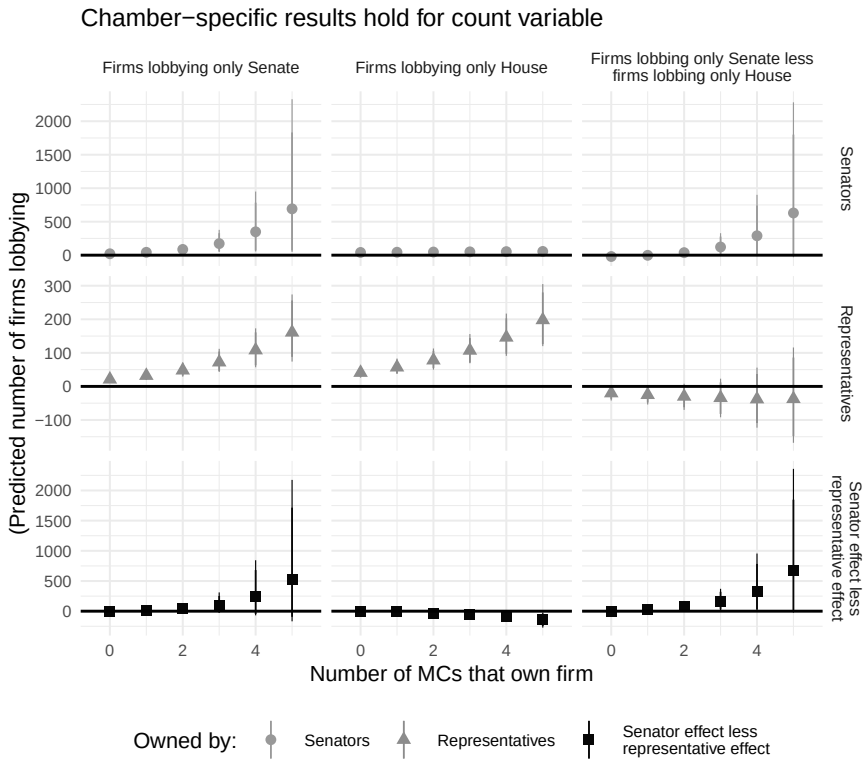


Figure 3.14: **Firms are more likely to lobby a chamber when more members of the chamber own them** Results based on multinomial logistic regression fit with Bayesian analysis. 8,000 posterior draws produce 90 and 95% credible intervals. Quantities represent the predicted number of firms that lobby, with separate estimations made for each chamber and the difference between chambers, conditional on ownership by senators or representatives.

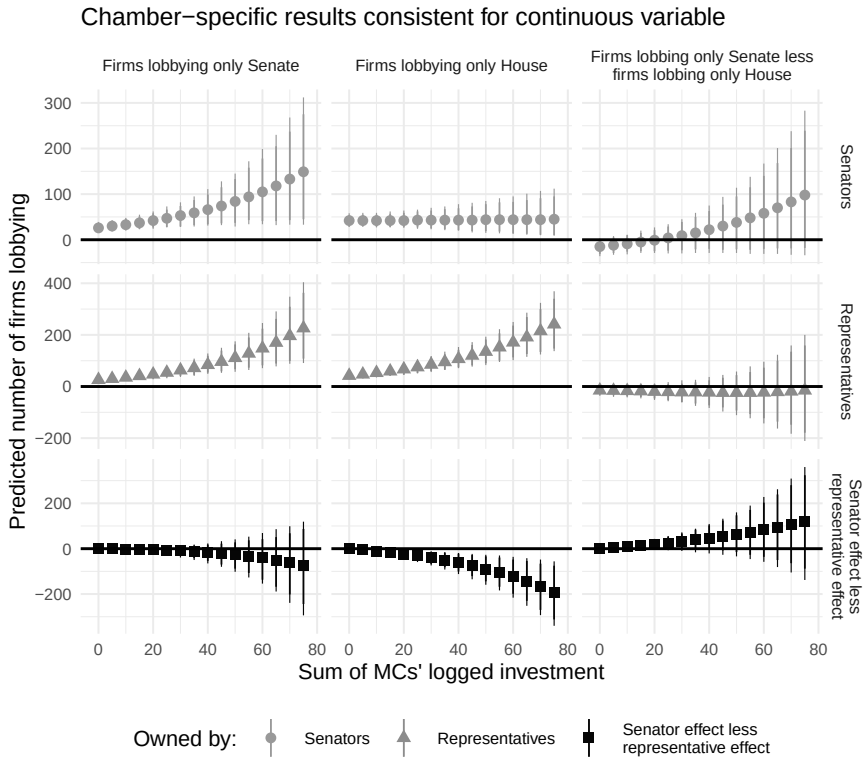


Figure 3.15: **Firms are more likely to lobby a chamber when the investments of members of the chamber increase.** Results based on multinomial logistic regression fit with Bayesian analysis. 5,000 posterior draws produce 90 and 95% credible intervals. Quantities represent the predicted number of firms that lobby, with separate estimations made for each chamber and the difference between chambers, conditional on the size of the investment by senators or representatives.

row shows the pattern reverses in the House. The *third panel of the bottom row* shows that the chamber-specific effect of senator ownership and representative ownership are different at conventional levels of statistical significance.

Next, I undertake the same analysis, including chamber-specific measures of `Legislator ownership (continuous)` instead of the count variable. Figure 3.15 shows the results. All are in the expected direction except the effect of the size of investments by representatives' ownership, which has a large effect on lobbying by the Senate. The effect of senator ownership clearly leads to more firms lobbying only the Senate than only the House, and this as well as the large effect of representative ownership on the number of firms lobbying the House and not the Senate means that the overall quantity of interest—the chamber-

specific effect of ownership by one chamber versus the other—is still in the right direction, though it does not come too near to statistical significance for many larger values of `Legislator ownership (continuous)`. These results support the argument that the effect of `Legislator ownership` is chamber-specific.

Chapter 4

Pocketbook Voting in Congress: Evidence of Shirking from Trade Votes

> *"No man is allowed to be a judge in his own cause; because his interest would certainly bias his judgment... yet... what are the different classes of legislators, but advocates and parties to the causes which they determine?"*

— James Madison, *Federalist 10*

> *"[T]he government in general should have a common interest with the people... [f]requent elections are unquestionably the only policy by which this... can be effectually secured."*

— Alexander Hamilton or James Madison, *Federalist 52*

4.1 Introduction

Do members of Congress represent their constituents? The literature provides at least two qualified affirmations. First, contemporary studies find that more affluent constituents tend to be better represented than less affluent ones. These studies show legislators' behavior corresponds to some of their constituents' preferences by also showing an apparent lack of representation for (many) others. Second, studies demonstrate legislators respond to

imminent elections; this finding rests on legislators proving less responsive when elections remain distant.

Legislators—as imperfect agents—likely follow their personal preferences to varying degrees, partially as a function of electoral pressure. Legislators will vote their preferences more strongly when less concerned with reelection—due to lower *levels of monitoring* and/or less *effective punishment* by voters. I use legislators' personal investment portfolios to measure their personal preferences. Their portfolios might reveal their preferences because of *self-dealing*, loosely defined. On the other hand, legislators might have preexisting *beliefs* that favor business and these *beliefs* could drive their investments *and* their support of policy. Either way, legislators' support of business-friendly legislation should increase as the benefits to their portfolios increase. Electoral pressure should mitigate this.

I test my theory with roll call votes on free trade agreements (FTAs). I show firms lobby more on FTAs than any other trade issue, suggesting FTAs matter to firms and by extension their owners. These agreements face simple up-down votes with no amendments, reducing strategic voting and offering a relatively clean measure of legislators' policy positions. Empirically-backed economic theory allows for nuanced measurement of how trade liberalization impacts legislators' investment portfolios. I match the firms that legislators own to financial and business databases to measure how FTAs impact them.

Institutional features of the Senate let me rigorously test my theory. Staggered elections and early retirement announcements offer variation in electoral pressure. Dual-member districts allow me to control for party-specific, geographic constituency variables. By comparing senators from the same state and party voting on the same bill, I completely control for all party- and FTA-level variables, as well as *interactions between* state-, party-, and FTA-level variables. I offer numerous robustness checks.

I find that an interquartile range (IQR) shift in senators' *financial self-interest*—the degree to which an FTA affects their investment portfolio—increases support of FTAs by 11

percentage points, approximately 35% of the effect of switching parties. Imminent elections erode the effect, while retirement augments it. The effect decreases as FTA salience—and thus the likelihood of electoral consequences—increases. The effect on Democrats, 22 percentage points, amounts to two-thirds of the effect of making a Democrat a Republican.

These findings suggest legislators' representation of affluent constituents could be partially incidental; many legislators may simply vote their own (affluent) preferences. Further, the literature focusing on changing electoral pressure has not said much about what precisely draws legislators away from their constituents—and what direction legislators might be drawn. I offer evidence that personal preferences might push senators to vote differently when they have more electoral space *and* my theory anticipates the *direction* in which their preferences push them.

4.2 Representation in Congress

What motivates legislators? Elections encourage them to behave with an eye toward their constituents (e.g. Downs 1957; Mayhew 1974). Some posit that ignoring any of legislators' goals beyond reelection will not compromise analysis of their behavior because they see office as a prerequisite to achieve these goals (Arnold 1990). The constituent-legislator connection, however, is not a direct mapping from geographic constituents to legislative behavior. Fenno (1978) emphasizes subconstituencies and electoral constituencies. Who, exactly, comprises these crucial constituents? Legislators' behavior corresponds much more strongly to the preferences of affluent constituents (Bartels 2018; e.g. Gilens 2012; Gilens and Page 2014)—particularly donors (Canes-Wrone and Gibson 2019).

Consistent with the argument that legislators respond to their electoral constituencies, electoral pressure affects roll call votes. Redistricting leads legislators to vote in a way that better corresponds to their new constituents' preferences (Leveaux-Sharpe 2001; Stratmann 2000). Retiring legislators, freed from electoral pressure, engage in ideological *and* participa-

tory shirking (Rothenberg and Sanders 2000; Tien 2001), with shirking defined as behavior departing from what would happen if voters perfectly monitored and effectively punished legislators (Rothenberg and Sanders 2000).

Yet, while electoral constituencies' preferences motivate legislators, other factors matter, too. If constituents monitor more effectively when elections approach, politicians will shirk less at these times—something early observers expected (Madison and Hamilton 2009) and scholarship affirmed (Amacher and Boyes 1978; Figlio 2000; Lindstädt and Vander Wielen 2011; cf. Bender and Lott 1996). Clearly some factor(s) encourages shirking when elections remain distant.

Might *personal preferences* be such a factor? Related work on "ideological shirking" (e.g. Lott 1987) relies on a difficult-to-interpret residual term (Zupan 1990), and omitted constituency-level variables may explain the results (Kau and Rubin 1993). Others focus on how more tangible measures of personal preferences influence voting behavior, though without addressing shirking. Legislators with military experience vote differently from most legislators on issues where military experience is highly salient (Lupton 2017). Legislators who smoke more frequently oppose bills restricting tobacco advertising and use; legislators with children in public school more often vote against school voucher legislation; legislators that belong to threatened, smaller religious denominations are more supportive of bills protecting religious liberty (Burden 2007). Legislators with business backgrounds show a modest increase in probusiness voting (Witko and Friedman 2008). Legislators' financial self-interests predicts their votes on agriculture (Welch and Peters 1983) and financial regulation bills (Peterson and Grose 2020; Tahoun and Lent 2018). While these characteristics lead to distinctive voting behavior, its not clear that these legislators are behaving any differently than if they were being perfectly monitored and effectively punished by voters; voters may even support this distinctive behavior.

4.2.1 Personal preferences and shirking

I argue *personal preferences*—specifically those related to financial self-interest—can lead to shirking.[1] Reelection *and* personal preferences motivate legislators. Legislators' personal preferences may arise due to *self-dealing* or personal *beliefs*, either of which their investment portfolios reveal. These personal preferences can make legislators more supportive of policies that benefit their portfolios; electoral pressure mitigates this effect.

Legislators' investment portfolios may reveal their personal preferences because *financial self-interest*—the expected impact of policy on their investments—directly influences them. Voting one's financial self-interest for personal enrichment is a sort of *self-dealing*. Alternately, legislators may *both* support policies *and* make investments due to preexisting, pro-trade *beliefs*. Both reasons seem plausible and predict a correlation between legislators' financial self-interest and policy support.

Legislative votes on FTAs offer a good test of this theory. First, FTAs seem important to firms. Firm lobbying offers evidence of this. After all, "[w]e know what groups care about because of what they do, and especially because of what they spend money on" (Hacker and Pierson 2010, 132). Using publicly listed and unlisted firms' trade-related lobbying disclosures (Kim 2018), I find the proportion of firm that mention lobbying on FTAs relative to those mentioning other issues (Figure 4.1). Section 4.7.1 discusses the data and the regular expressions used. Apart from 2000—when Congress voted on China's WTO accession (itself essentially a FTA, though I did not code it as such)—the proportion of firms lobbying on FTA-related legislation tends to hover between 30 and 50% percent, vastly more than the other issues commonly appearing in reports. Modern trade theory—including empirical results—leads to the conclusion that trade leads productive firms to gain marketshare (Trefler 2004). Event studies find that FTAs affect firm valuations (e.g. Dür and Lechner 2018)—

[1] This stands in contrast to many existing princpal-agent models that emphasize how special interest groups could play a role (e.g. Barro 1973).

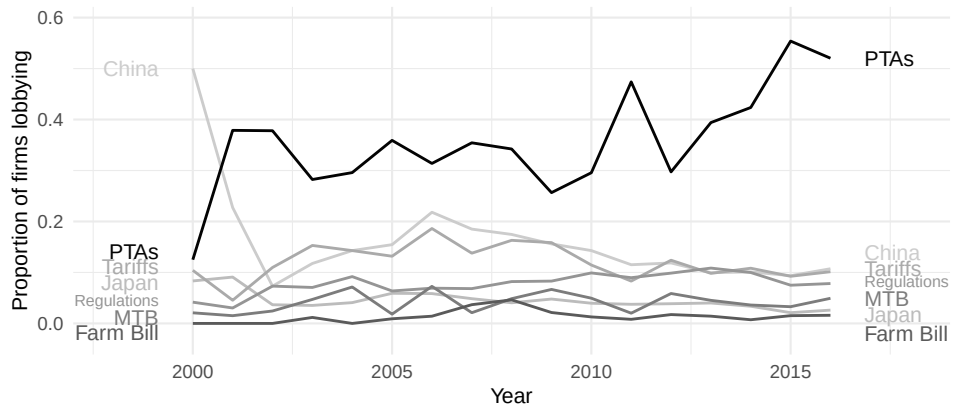


Figure 4.1: **Many firms engage in PTA-related lobbying.** The proportion of firms reporting lobbying on PTA-related legislation out of firms reporting lobbying specific trade-related legislation with comparisons to other major trade-related issues.

though event studies probably understate effects since stock prices incorporate most the value of these events beforehand (Bhattacharya et al. 2000; Borochin and Golec 2016). Firms congressional testimony (Lee and Osgood 2019) and public statements (Kim and Osgood 2019) overwhelmingly declare that FTAs have a positive impact on the national economy. This all suggests firms see financial gain in FTAs.

Furthermore, unique features of FTAs make analysis of them more straightforward. FTAs, unlike most legislation, cannot be amended, cannot be combined with other legislation, and face simple up-down votes. This limits strategic voting and allows a cleaner measure of policy support, in addition to enabling a tractable mapping between economic theory and legislators' financial self-interest.

Specifically, I use New New Trade Theory (NNTT) to infer legislators' financial self-interest. NNTT seems to empirically best describe the economy over the period covered in this study (Kim 2017). NNTT holds that more *productive* firms gain from FTAs, particularly those in industries with high product *differentiation*—industries characterized by some level of market power, perhaps due to consumers' brand loyalty or love of variety (Melitz and Trefler 2012). More productive firms produce goods at lower marginal costs and—when faced with trade liberalization—can cover the costs of competing in export markets and survive

increased import competition (Melitz 2003). Differentiation enables productive firms to profit from trade liberalization. These same firm characteristics—*productivity* and *differentiation*—explain which firms benefit from FTA provisions that go beyond reducing tariffs (e.g. Antras and Helpman 2004; Bernard, Jensen, and Schott 2009).

Thus, FTAs are in the financial self-interest of legislators invested in productive, differentiated firms affected by trade. Legislators owning few or no firms impacted by FTAs should have weak, relatively anti-FTA preferences. Legislators with more capital in firms hurt by FTAs have strong, anti-FTA preferences.

Voters want FTA policy near their ideal point but exhibit imperfect monitoring due to several factors, *inter alia* collective action problems, information costs, ambivalence, and memory decay (Bednar 2006; Kalt and Zupan 1990). These factors likely change over time and elections should mitigate some of these problems, in part because elites provide more information when elections loom (Amacher and Boyes 1978; Figlio 2000; Kalt and Zupan 1990; Lindstädt and Vander Wielen 2011).

Voters also struggle to punish politicians even when monitoring succeeds since they care about many issues but cast a single vote; voters consider salient issues more when voting (Przeworski, Stokes, and Manin 1999). Legislators know the distribution of FTA salience but not its realization, leaving them uncertain how voters will weigh FTA roll call votes. This assumption smooths legislators' objective functions, meaning electoral competition need not eliminate rent extraction from a legislator's optimum strategy (Persson and Tabellini 2016)—be they financial or belief-based rents. The expected level of salience can vary across FTAs and voters, as some FTAs are more likely to motivate voters and some voters care more about FTAs.

4.2.2 Equilibrium behavior and empirical implications

Legislators vote, considering their personal preferences, voters' FTA preferences, the time to the election (which affects voters' monitoring), and the expected salience of the FTA. The salience is realized and voters choose the candidate they prefer, based on FTA policy enacted, the information they have about FTA votes (which is a function of the recency of these votes), and the salience of the FTA.

Empirical implications: *1) the more an FTA aligns with a legislator's financial self-interest, the more the legislator supports the FTA*. I theorize legislators' portfolios provide information about both the direction *and* intensity of their personal preferences. For example, legislator A owns \$1000 in a highly productive firm involved in trade while B owns \$1000 in a highly unproductive firm involved in trade. A has more financial self-interest in supporting the FTA than B. If instead legislator B owns \$1m in the same highly productive firm that A owns, A and B's preferences push them in the same direction, but B's preferences are more intense.

2a) The effect of financial self-interest decreases when close to an election. As noted above, voters tend to better monitor legislators more closely when elections draw near, increasing electoral pressure. Relatedly, *2b) the effect of financial self-interest increases once retirement is announced,* as the electoral connection is severed.

3) As the salience of FTAs increases the effect of financial self-interest decreases. We can imagine finding variation in salience across FTAs or geographies. We could also compare FTAs to different issues that vary in salience.

4.3 Data and methods

To identify shirking in roll call votes, adequately controlling for constituency-level variables presents challenges. For instance, many of the recent studies of legislators' personal preferences and their voting behavior control for constituency differences. Of course, there may be confounding variables that lead constituencies to select legislators with particular backgrounds. These constituents may intentially select someone with a military background, for instance, *because* such legislators vote in a particular way. Such legislators may be shirking or they could be voting precisely how constituents prefer. If we could measure *all* relevant constituency-level variables, this approach could reveal more about shirking, but doing so is difficult, perhaps impossible.

Dual-member districts can help by facilitating comparisons of legislators from the same party and state voting on the same FTA—which I'll refer to as *senator pairs*. This comparison accounts not only for geographic constituency-level confounders but also a legislators' party, the specific FTA, and interactions between all three. This approach can control for a scenario where senate delegations face unique state-level, party-specific pressures as well as pressures specific to an FTA. Note that using senator pairs probably *underestimates* the effect of personal preferences since these preferences cannot matter when pairs vote together. In particular, since most Republican senator pairs vote together in favor of FTAs, my approach assumes some factor other than personal preferences explains these votes—even though the GOP likely draws legislators with pro-trade preferences.

I begin by showing a strong bivariate relationship between FTA support and financial self-interest within senator pairs. Next, I control for other individual level-factors with Bayesian regression analysis. Generally, maximum likelihood estimation (MLE) overfits, leading to biased estimates (Ward and Ahlquist 2018), something Bayesian analysis avoids (Gelman et al. 2013). Further, some models in the paper perfectly explain the data—

unsurprising given financial self-interest strongly predicts diverging behavior between senator pairs and given the high parameter-to-observation ratio—including an intercept term for every same-party, same-state, same-FTA pair of votes. Bayesian analysis addresses perfect separation by *penalizing the size of coefficients* (Gelman et al. 2008).[2]

I primarily choose weakly informative priors, ruling out unreasonably large estimates (be they positive or negative) (Gelman et al. 2008). I choose extremely uninformative priors for the random intercepts for senator pairs, though (see Appendix 4.7.2). This allows (an interaction of) FTA-specific, constituent, and partisan factors to effectively explain senator pairs that vote together. Like MLE fixed effects, if a senator pair votes together, these random intercepts adjust to closely fit the data, denying other variables explanatory power.

The analysis of the bivariate relationship shows that, without extensive modeling, financial self-interest increases FTA support. Adding pre-treatment variables confirms the relationship (as well as adding post-treatment, individual-level confounders—Appendix 4.7.6). I then look for evidence of shirking, showing that, in line with expectations, the relationship changes with approaching elections, retirement, and salience.

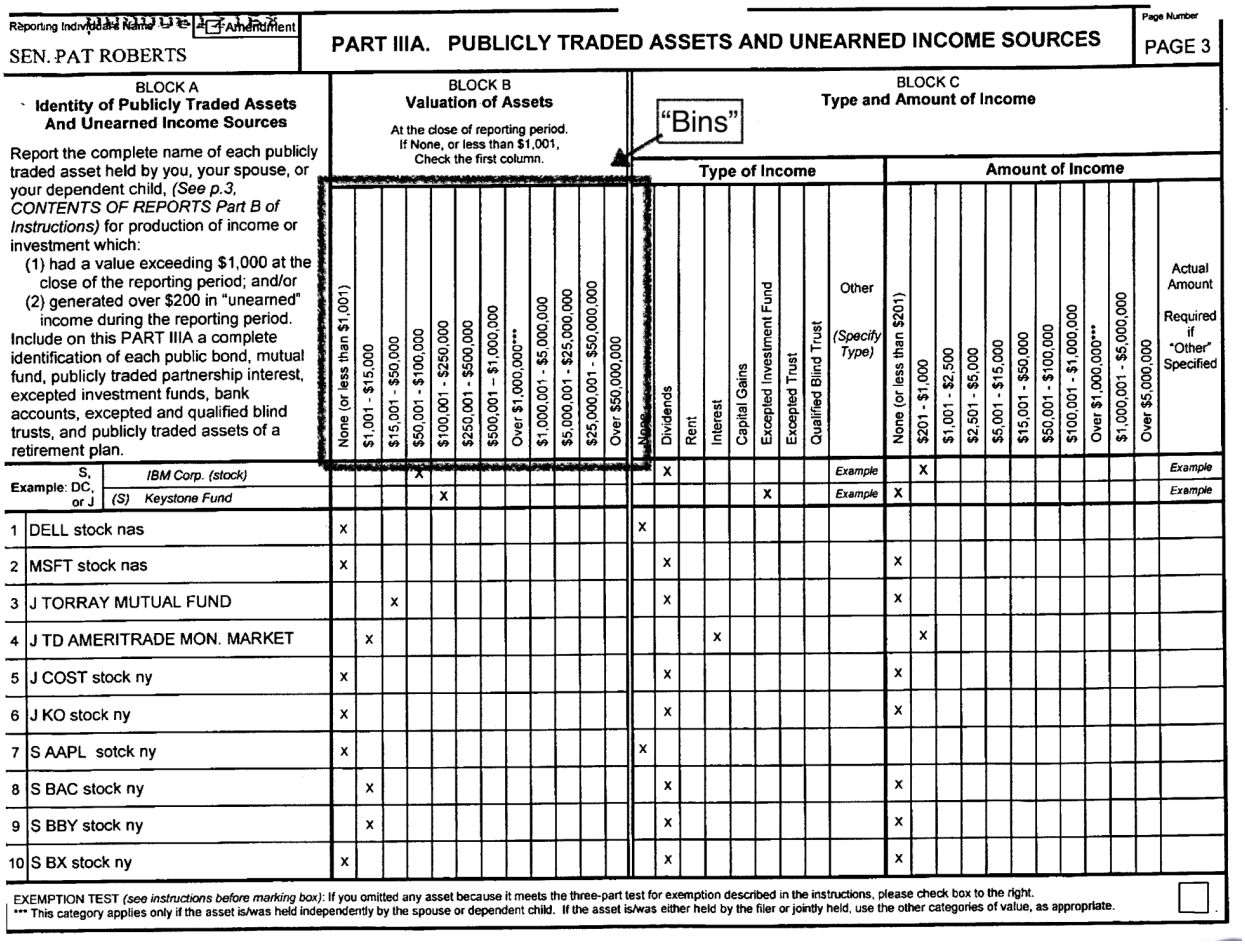
4.3.1 Measuring support of FTAs and financial self-interest

I examine all FTAs enacted from 2004 to 2011—Morocco, Australia, Central America (CAFTA), Oman, Bahrain,[3] Peru, Colombia, Panama, and South Korea.[4] Congress has constitutional authority—i.e., a veto (e.g. Krehbiel 1998)—over FTAs and it can deny the president the power to meaningfully negotiate (Bailey, Goldstein, and Weingast 1997). About 90% (33%) of Republicans (Democrats) support these FTAs. I code a "yea" vote as "1," a "nay" as "0," and any other vote (such as not voting) as missing.

[2]Models where MLE does not result in perfect separation produce similar results (including those in the House and most Senate models when financial self-interest is not interacted with FTA indicator terms).

[3]The Senate passed the Bahrain FTA by voice vote.

[4]These are all the FTAs passed during the window for which `opensecrets.org` has bulk data available for personal financial disclosures (2004 to 2014).



Reporting Individual's Name: SEN. PAT ROBERTS — ☐ Amendment

PART IIIA. PUBLICLY TRADED ASSETS AND UNEARNED INCOME SOURCES — Page Number: PAGE 3

BLOCK A — Identity of Publicly Traded Assets And Unearned Income Sources

Report the complete name of each publicly traded asset held by you, your spouse, or your dependent child, *(See p.3, CONTENTS OF REPORTS Part B of Instructions)* for production of income or investment which:
(1) had a value exceeding $1,000 at the close of the reporting period; and/or
(2) generated over $200 in "unearned" income during the reporting period.
Include on this PART IIIA a complete identification of each public bond, mutual fund, publicly traded partnership interest, excepted investment funds, bank accounts, excepted and qualified blind trusts, and publicly traded assets of a retirement plan.

BLOCK B — Valuation of Assets
At the close of reporting period. If None, or less than $1,001, Check the first column.

"Bins"

BLOCK C — Type and Amount of Income

Example: S, DC, or J	Asset	Block B: None (or less than $1,001)	$1,001 - $15,000	$15,001 - $50,000	$50,001 - $100,000	$100,001 - $250,000	$250,001 - $500,000	$500,001 – $1,000,000	Over $1,000,000***	$1,000,001 - $5,000,000	$5,000,001 - $25,000,000	$25,000,001 - $50,000,000	Over $50,000,000	Block C: Type of Income — None	Dividends	Rent	Interest	Capital Gains	Excepted Investment Fund	Excepted Trust	Qualified Blind Trust	Other (Specify Type)	Amount of Income — None (or less than $201)	$201 - $1,000	$1,001 - $2,500	$2,501 - $5,000	$5,001 - $15,000	$15,001 - $50,000	$50,001 - $100,000	$100,001 - $1,000,000	Over $1,000,000***	$1,000,001 - $5,000,000	Over $5,000,000	Actual Amount Required if "Other" Specified
S, DC, or J	*IBM Corp. (stock)*				X										X							*Example*		X										*Example*
S, DC, or J	*(S) Keystone Fund*					X													X			*Example*	X											*Example*
1	DELL stock nas	x												x																				
2	MSFT stock nas	x													x								x											
3	J TORRAY MUTUAL FUND			x											x								x											
4	J TD AMERITRADE MON. MARKET		x														x							x										
5	J COST stock ny	x													x								x											
6	J KO stock ny	x													x								x											
7	S AAPL sotck ny	x												x																				
8	S BAC stock ny		x												x								x											
9	S BBY stock ny		x												x								x											
10	S BX stock ny	x													x								x											

EXEMPTION TEST *(see instructions before marking box)*: If you omitted any asset because it meets the three-part test for exemption described in the instructions, please check box to the right. ☐

*** This category applies only if the asset is/was held independently by the spouse or dependent child. If the asset is/was either held by the filer or jointly held, use the other categories of value, as appropriate.

Figure 4.2: **Page 3 of Pat Roberts' 2011 financial disclosure.** `OpenSecrets.org`.

Table 4.1: Data collected

Data	Original source	Variables	N
Personal finances	Center for Responsive Politics (Clerk of the House, Senate Office of Public Records)	name of asset (as reported by filer), asset value, asset type, type of income from asset, location of asset, industry of asset (CRP coding)	311,595
Firm financials	COMPUSTAT and Orbis (Bureau van Dijk); Imrohorouglu & Tuzel	net income, employees, cost of goods sold, equity, total assets, industry codes (NAICS), capital expenditure, property, plant, and equipment; total factor productivity	314,778 and over 365 million; 29,213
Mutual fund details	CRSP	market capitalization of firms, the proportion of mutual fund portfolios firms comprise	over 224 million
Industry details	Broda & Weinstein; Census Bureau	product differentiation; US imports and exports by NAICS code	8,213
Lobbying	LobbyView	lobbying activity by year; lobbying activity by bill; amount spent on lobbying	56,064
Bills	voteview.com	roll call votes on preferential trade agreements (FTAs)	4,715
Campaign contributions	Federal Election Commission	labor PAC contributions, corporate PAC contributions	311,222 (labor), 1,068,672 (corporate)
Constituency characteristics	Foster-Molin and Social Explorer; Census Bureau	percent foreign-born in a district, percent recently arrived, percent Black, percent Hispanic, percent with high school ed., percent with bachelors degree, unemployment, median income, population; number of people employed in NAICS industries	33,077 (annual, county-level for some variables)
Other legislator characteristics	Foster-Molin and The Congressional Biographical Directory; voteview.com; Nelson & Stewart; Carnes	age, gender, race, Senate class; ideology scores (DW-NOMINATE), party; committee membership; pre-politics career/occupation	5,885

[a] Note: The primary dataset is a panel of legislator-votes with corresponding variables.

I measure legislators' `Financial self-interest` through their assets, focusing on their investments in firms, following NNTT (Table 4.1 has details for this and other variables). Legislators annually disclose assets worth $1000 or more, indicating into which of 10 "bins" each asset falls (Figure 4.2).[5] I take the midpoints of each bin to estimate the value.[6] Though legislators may disclose inaccurately, formal enforcement and potential punishment by voters limit this (Eggers and Hainmueller 2014). The standard deviation of total assets is $35`m`, with roughly half reporting over $1`m`.

I weigh the value of each asset by its productivity and differentiation, summing these weighted values. Labor productivity, net income divided by employees, measures productivity.[7] The measure of differentiation—the inverse of the mean elasticity of substitution for

[5]Ethics in Government Act of 1978.

[6]The results hold when using the lower or upper bound. Approximately 11% of the time legislators reported exact values. Consistent with previous work using personal finance data (Eggers and Hainmueller 2014), using these exact values for imputation doesn't substantively alter results.

[7]Using market capitalization, capital productivity, return on assets, return on equity, or total factor productivity (İmrohoroğlu and Tüzel 2014) produces similar results.

Harmonized System 10-digit products with an associated NAICS 6-digit code (Broda and Weinstein 2006)[8]—removes firms that do not deal in internationally traded goods.

Constructing this measure of `Financial self-interest` requires matching the assets listed on legislators' personal financial disclosures to firms in the Orbis (Bureau van Dijk), Compustat, and/or CRPS business databases. This involved manually checking to deal with typos etc. by legislators. I match 96.6% (57.4%) of legislators' assets that `opensecrets.org` classifies as public (private) firms.[9] This asset-level missingness seldom means a legislator goes from owning significant capital to little.[10] For mutual funds, I multiply the portfolio proportion of listed shares held at the end of each year with corresponding firm-level data and sum, resulting in average measures of productivity and differentiation for the mutual fund. I impute missing values since diversification leads to less variation in differentiation and productivity compared to firms. Dropping mutual funds and/or private firms and repeating the analysis does not substantially change the results (Appendix 4.7.5).

I use a logarithmic-type of transformation to measure `Financial self-interest` since I expect a move from \$0 to \$1 million matters more than one from \$25`m` to \$26`m`. I standardize continuous variables to have mean 0 and standard deviation 0.5, which both helps with model convergence and interpretation (Gelman and Hill 2006). Appendix 4.7.3 has more information on the construction and distribution of `Financial self-interest`.

Senators tend to either have significant investments in firms expected to gain from trade or they tend not to own firms involved in trade—not many legislators own firms expected to be negatively affected by FTAs (see Appendix 4.7.3). A test most likely to find results would involve comparing legislators strongly in favor of FTAs to those strongly opposed. The variation available, however, is between those strongly in favor and those weakly opposed: a

[8]Firms can have several NAICS codes. I first attempt to match that designated as primary. If this was a non-traded industry, I match any secondary or alternate codes available.

[9]Data on public firms from Eggers and Hainmueller (2013), which I extended temporally and marginally improved the match rate, aided the effort.

[10]The main results hold when summing up senators' assets without weighting, which does not suffer this missingness.

harder test.

We might be concerned that these measurement choices, though theoretically defensible, drive results. Reassuringly, the key comparisons that dominate the data are between senators with few or no investments and legislators owning firms that should gain; the distinction between owning versus not owning investments impacted by FTAs is more crucial than the measurement particulars, which the bivariate analysis reflects. Second, other ways of summarizing the data produce consistent findings (Appendix 4.7.4).

I measure electoral pressure using quasi-exogenously assigned election cycles (Conconi, Facchini, and Zanardi 2014). Following other scholars' results (e.g. Lindstädt and Vander Wielen 2011), I define `Facing election` as the final two years of a senator's term. I measure `Retirement` as the last two years of the term in which a senator *voluntarily* retires (Karol 2015).

I measure `Salience` with a gravity model of trade—the larger the predicted trade flows, the more likely the FTA matters to voters. This requires legislators to respond more to increases in salience than to increases in financial self-interest. I also use the Cooperative Congressional Election Study (CCES) responses to questions on FTAs as another way to measure salience across FTAs *as well as* across states. I provide evidence that financial self-interest has a smaller effect on immigration—which appears more salient (Vavreck, Sides, and Tausanovitch 2019).

Potential confounders consist of personal, constituency, and FTA-specific characteristics. The senate pairs approach adjusts for the latter two categories. Personal characteristics include ideology, career background, and PAC contributions. While post-treatment, their inclusion changes the results little (Appendix 4.7.6). For ideology, I use `DW-NOMINATE` scores (Lewis et al. 2018; Poole and Rosenthal 1985). Since certain `Career background` may dispose legislators to favor FTAs, I gather data on the proportion of legislators' pre-congressional careers spent in 3 broad categories—profit-oriented professions, not-for-profit-

oriented professions, and working-class jobs (Carnes 2013). Following Conconi, Facchini, and Zanardi (2014), I measure campaign contributions as the log of the sum of contributions made to a legislator by labor union (corporate) PACs per two-year cycle—`Labor/Corporate PACs`. Like similar studies (Conconi, Facchini, and Zanardi 2014; Milner and Tingley 2011), I collect data on the margin of victory in the previous general election, age, party, coparti-sanship with the president, and gender.

4.4 Results

A simple comparison of FTA support and financial self-interest within *senator pairs* produces the expected relationship. I determine which member of the *senator pair* stands to gain more from trade by comparing their values of `Financial self-interest`, coding those with more as "1." For example, for the Australia FTA, Tom Carper's (D-DE) `Financial self-interest` is 0.63 while Joe Biden's (D-DE) is -0.31—so Carper should gain more from the FTA.

Figure 4.3 displays the relationship. The *top row* shows the relationship between all senator pairs for which *neither* member of the pair has missing values for these two variables (e.g., if one senator doesn't vote I remove the pair). We see the average level of support for those who own less than their senate partner is 67%, compared to 79% for those that stand to gain more, a difference in means (DIM) of 12 percentage points. We see this difference is large for Democrats—where support goes from 43% to 62%—and small for Republicans.

The quantities in the *top row* of Figure 4.3 are of primary concern. Yet, we can drill down to understand better what drives the difference. The *bottom row* excludes "ties" *and* senator pairs that vote together. "Ties" are cases where both members of a state's Senate delegation have the same `Financial self-interest` which cannot explain diverging behavior. This most frequently happens when neither senator invests in firms producing traded goods. Thus, given the senator pair design, the *bottom row* isolates the observations that determine if

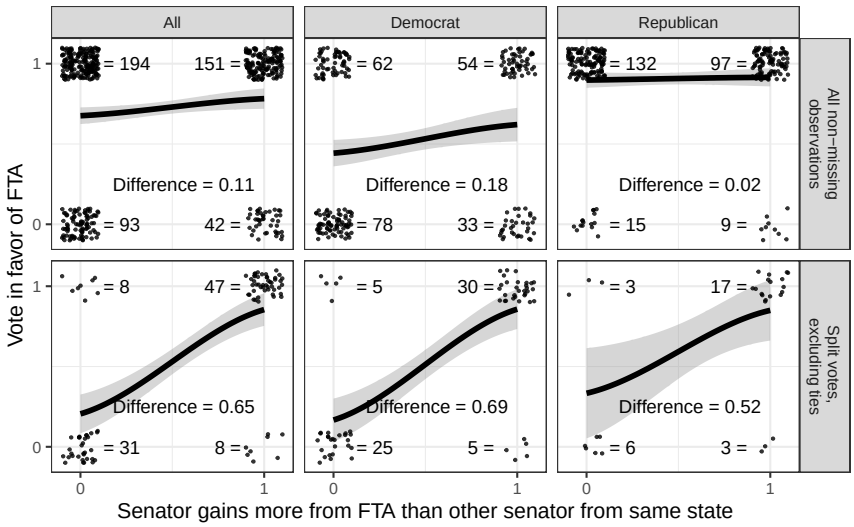


Figure 4.3: **Bivariate analysis shows financial self-interest predicts FTA support.** *Top row:* all complete pairs. *Bottom row:* excludes pairs with the same value of `Financial self-interest` ("ties") and pairs that didn't split votes. LOESS provides confidence intervals and smoothed lines.

`Financial self-interest` predicts FTA support. While this bivariate analysis controls for constituency, party, and FTA factors, we should account for other individual-level variables.

4.4.1 Results robust to controlling for individual-level confounders

I account for pre-treatment, individual-level confounders—sex and age—using Bayesian analysis. I fit a hierarchical, logistic model where each same-party, same-state, same-FTA pair of votes is placed in its own nest, which is analogous to adding MLE fixed effects for each pair. I add an interaction between `Financial self-interest` and each FTA, allowing the estimated effect of `Financial self-interest` to vary by FTA. I refer to this as the *baseline model*.

To analyze the results, I focus on two quantities of interest (QOIs): predicted probabilities and the average expected effect of a first difference (AFD) (Ward and Ahlquist 2018). For a host of reasons, when calculating predicted probabilities, I focus on concrete

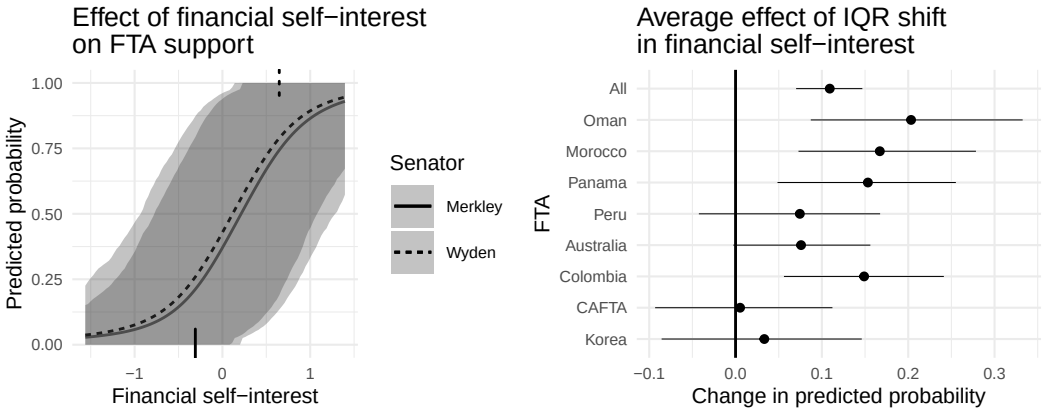


Figure 4.4: **FTA support increases with financial self-interest after accounting for confounders.** 95% credible intervals from 4000 posterior draws. *Left panel:* Predicted probabilities for Jeff Merkley and Ron Wyden supporting the Colombia FTA (H.R. 3078, 112$^{\text{th}}$). Tick marks show observed financial self-interest and vote outcomes, with support (opposition) on the ceiling (floor). *Right panel:* The AFD of an IQR shift in `Financial self-interest`.

examples.[11] I usually choose two senators from the same state and party voting on the same FTA *that split their votes*, mirroring the design of my overall analysis *and* highlighting the type of votes that drive the overall effects. Beyond the fact that I'm highlighting a senator pair that split its votes, the precise identities matter little; predicted probabilities for other vote-splitting pairs look similar in terms of the slope of the effect of `Financial self-interest`, with other variables simply shifting the intercept. I choose an FTA where the effect of `Financial self-interest` is neither extremely high nor low.

To provide a picture of the variation across FTAs, I use AFDs. AFDs minimize extrapolation and, crucially, incorporate all observations in the data (Ward and Ahlquist 2018)—not just vote splitters. To find the AFD of an IQR shift in `Financial self-interest`, I calculate the mean of the first differences for each observation given an IQR shift in `Financial self-interest`. Doing so across posterior draws provides credible intervals.

[11] Counterfactuals using an "average" actor or observation—setting the values of all variables to their means and/or medians—may result in a constructed observation that does not—and indeed cannot—exist (Gelman and Pardoe 2007). Using this constructed observation to interpret the model involves unnecessary extrapolation and possibly misleading results, particularly for non-linear models like logistic regression (Chang, Gelman, and Pagano 1982). Further, most models in this paper include random intercepts for senator pairs with no meaningful central tendency.

The *left panel* of Figure 4.4 shows the predicted probabilities for the votes of two Oregon senators, Jeff Merkley and Ron Wyden, on the Colombia FTA—illustrating how predictive `Financial self-interest` is when senators split their votes. To calculate the predicted probabilities, I move `Financial self-interest` from the lowest to the highest value in the data, stopping at 98 evenly spaced values in between, calculating a predicted probability at each. Highest posterior density intervals produce the 95% credible intervals shown. We see a strong, positive relationship between `Financial self-interest` and FTA support. Moving from the minimum to maximum value of `Financial self-interest`, the predictions for FTA support for both senators start at about 2% and rise to about 96%. Merkley's observed `Financial self-interest` (-.31) has about a .2 probability of supporting the FTA—which he didn't. Wyden's observed financial self-interest (.65) has about a .8 probability of supporting the FTA—which he did.

The *right panel* of Figure 4.4 shows an estimated AFD of about 11 percentage points—approximately 15% of the average level of support (72%). Oman, Morocco, Panama, and Colombia have the largest estimates, and CAFTA and Korea the smallest. The effect size decreases as a gravity model estimate of the size of the trading partner increases—suggesting that, as the size of a trade deal increases, senators' concerns about salience dominate their personal preferences. These results, overall, align with theoretical expectations.

`Financial self-interest` remains relatively unchanged when adding post-treatment, individual-level variables like ideology and campaign contributions (Appendix 4.7.6). Under different institutional features and using a different modeling approach in the House, the AFD of an IQR shift in `Financial self-interest` is about 4 percentage points (see Appendix 4.7.9). Though House models cannot account for constituency-level and other confounders as well as Senate models, other factors highlighted by the literature largely lack this cross-chamber consistency (Appendix 4.7.6).

4.4.2 Elections erode and retirement augments the effect

Senators facing reelection should expect more effective monitoring by voters, reducing the effect of `Financial self-interest`. Taking the *baseline model*, I interact `Facing election` with `Financial self-interest`. I calculate predicted probabilities for three senators (*top-left panel* of Figure 4.5). First, I compare Kent Conrad's (D-ND) Morocco and Oman votes—during the latter Conrad faced election. As expected, the effect of `Financial self-interest` disappears during the Oman vote, where both Conrad and his fellow North Dakotan, Byron Dorgan, voted against the FTA (this visualizes how the senator pair intercepts explain these votes). Next, I compare the predicted probabilities for Kirstin Gillibrand and Charles Schumer (Ds-NY) on the Panama FTA, the former facing reelection. Only for Schumer does the model put weight on `Financial self-interest`.

The *bottom-left panel* of Figure 4.5 shows the AFD of `Financial self-interest`, conditional on `Facing election`. When not facing election, `Financial self-interest` has a strong effect that disappears when elections loom. The difference between these quantities is about 15 percentage points.

The value of future office disappears with retirement, freeing senators to vote their `Financial self-interest`. To the *baseline model* I add an interaction between `Retirement` and `Financial self-interest`. While the model finds a positive effect of `Financial self-interest` if Jeff Bingaman (D-NM) were not retiring, the relationship pales compared to if he's retiring (*top-right panel* of Figure 4.5).

The estimate of the AFD of an IQR shift in `Financial-self interest`, shown in the *bottom-right panel* of Figure 4.5, also suggests retirement frees senators. Given there are only 28 observations for retiring members, we should not be surprised the estimates are noisy and the difference fails to meet conventional levels of statistical significance. The estimate for retiring legislators is large at about 20 percentage points. The estimate for Democrats is over 60 percentage points and the difference easily attains conventional levels of significance.

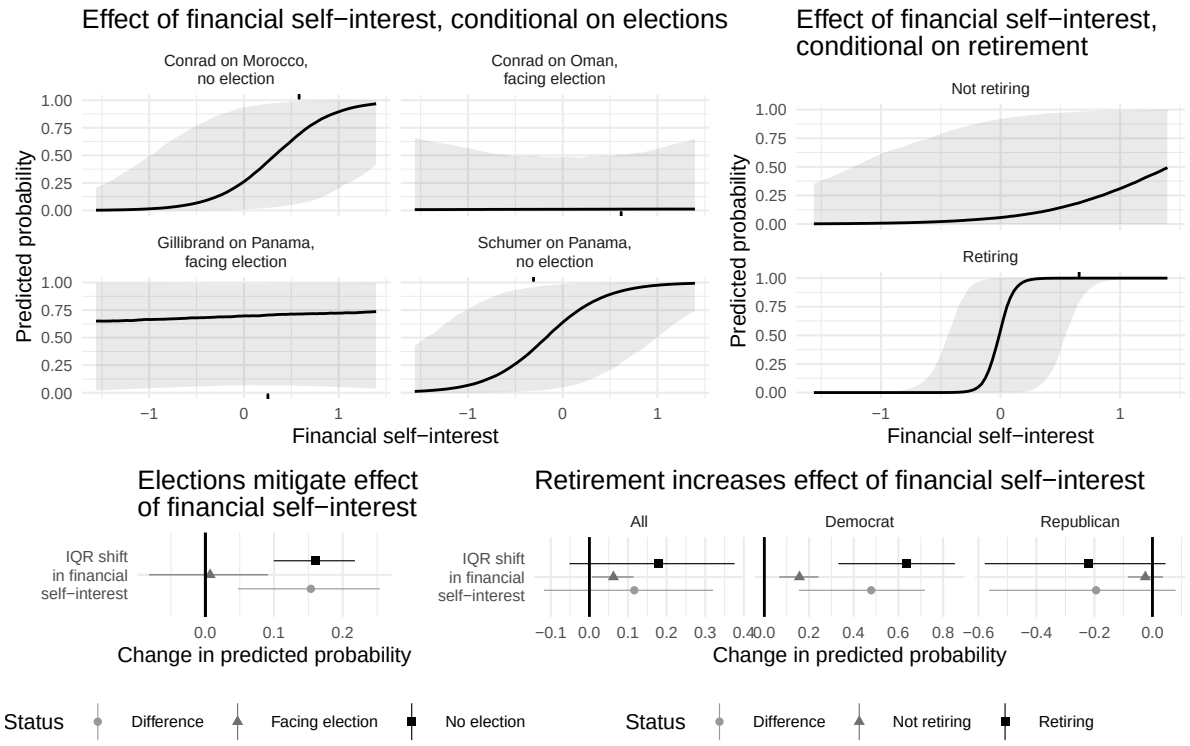


Figure 4.5: **The effect of financial self-interest decreases in electoral pressure.** 95% Bayesian high density credible intervals from 4000 posterior draws. *Top-left panel:* Predicted probabilities for Kent Conrad (D-ND) supporting the Morocco FTA (H.R.4842, 108$^{\text{th}}$) and the Oman FTA (H.R.5684, 109$^{\text{th}}$) and Kirsten Gillibrand (D-NY) and Charles Schumer (D-NY) supporting the Panama FTA (H.R. 3688, 110$^{\text{th}}$) as `Financial self-interest` increases, conditional on `Facing election`. *Top-right panel:* Predicted probabilities for Jeff Bingaman (D-NM) supporting the Colombia FTA (H.R. 3078, 112$^{\text{th}}$) as `Financial self-interest` increases, conditional on `Retirement`. *Bottom-left panel:* The AFD of `Financial self-interest`, conditional on `Facing election`. *Bottom-right panel:* The AFD of `Financial self-interest`, conditional on `Retirement`.

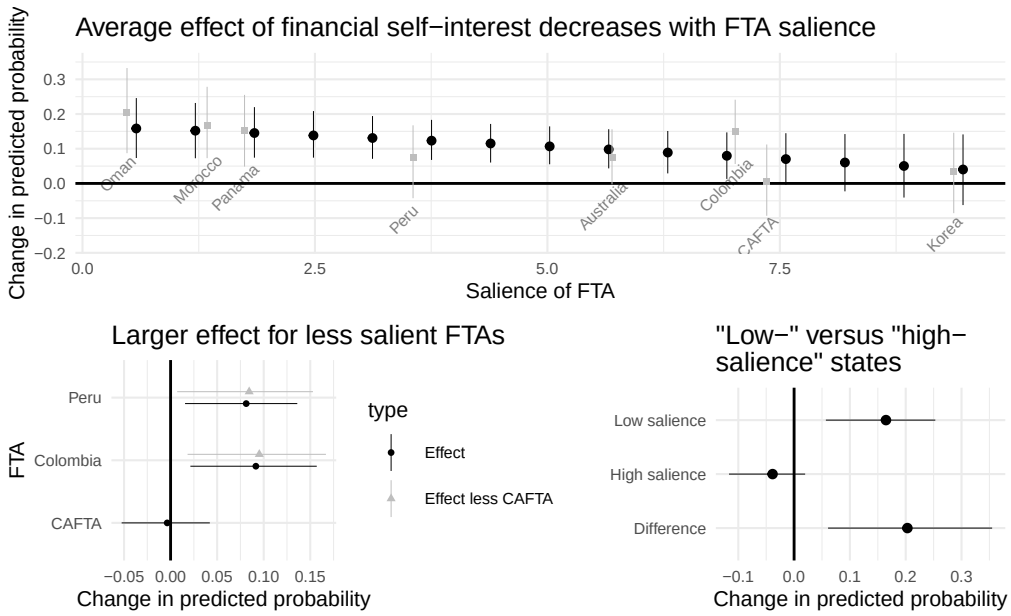


Figure 4.6: **The AFD of an IQR shift in financial self-interest decreases as salience increases.** 95% Bayesian highest density credible intervals from 4000 posterior draws. *Top panel:* Predicted trade flows measure `Salience`. FTA-specific effects from baseline model. *Bottom-left panel*: FTA `Salience` is the inverse of the proportion of "Don't know" CCES responses. CAFTA is more salient. *Bottom*-right panel*:* The AFD of an IQR shift in `Financial self-interest` conditional on `Salience`. `Salience` is the inverse of the proportion of "Don't know" CCES responses at the state-level—aggregating the 2006, 2007, and 2008 CCES FTA questions. "High" ("Low") `Salience` corresponds to setting `Salience` for all observations a standard deviation above (below) the mean state-level `Salience`.

4.4.3 Salience mitigates the effect

Financial self-interest should matter less when legislation matters more to voters. We can look for evidence across FTAs. Recall that, in the *right panel* of Figure 4.4, the effect decreased as the trading partner's importance increased—according to a gravity model of trade.[12] The more important an FTA, the more salient it is likely to be. The widespread opposition to CAFTA (Irwin 2017)—which has the second-highest latent `Salience` score—and NAFTA (Irwin 2017)—which would have an even larger score—attests to measurement validity.

[12]I use the meta-analysis of gravity model estimations by Head and Mayer (2014). Across structural gravity models, they report the median estimated distance coefficient is -1.14 and the median coefficient for the origin country's GDP is .86. I calculate a country's predicted trade flows with the US as $\propto \frac{\texttt{GDP}^{.86}}{\texttt{distance from US}^{1.14}}$.

I explicitly model the relationship between `Salience` and `Financial self-interest` by adding an interaction term to the *baseline model* and removing the FTA interaction terms.[13] I calculate the AFD of an IQR shift in `Financial self-interest` for 15 evenly-spaced levels of salience ranging from the minimum to the maximum value observed (*top panel* of Figure 4.6). I add, for comparison, the FTA-specific estimates from the *right panel* of Figure 4.4—colored grey and labeled by FTA. There is a clear downward trend in the effect of financial self-interest as salience increases.

While encouraging, this measure elides increases in `Salience` with increases in `Financial self-interest` across FTAs—while larger FTAs may matter more to voters, they may also increase legislators' financial self-interest. CCES data offers an alternate measure of `Salience` for a few FTAs. In 2006 and 2007 respondents reported whether they supported, opposed, or didn't know how they felt about CAFTA. In 2008 the same happened for "extending NAFTA" to include Peru *and* Colombia. I use the inverse of the proportion of respondents choosing "don't know" as a measure of `Salience`; if an FTA is salient, voters seemingly should have an opinion.

Helpfully, CAFTA and Colombia have nearly identical gravity estimates, so comparing their effects serves to hold the gravity estimate constant. Using the CCES's poststratification weights, 25% of respondents had no opinion on CAFTA, while 39% had no opinion on Colombia and Peru—*prima facia* confirmation that `Salience` reduces the impact of `Financial self-interest` since Colombia (and Peru) has a higher estimated effect (top panel of Figure 4.6). Ideally, the Colombia and Peru question would have been split into two and respondents would have been asked about Colombia closer to the time of the vote in 2011. Yet, if anything, the `Salience` of Colombia, if separated from Peru, would likely have been lower. That the CCES explicitly tied Colombia to NAFTA—which has been noted by scholars as being particularly salient—further suggests a more targeted question about Colombia would

[13]To facilitate convergence, I choose a shape parameter of 20 and a scale parameter of 10 for the gamma distribution for the variance of the random intercepts (cf. Appendix 4.7.2).

have elicited more "Don't know" responses.

Modeling the relationship between `Financial self-interest` and CCES `Salience` results in a statistically significant change in the effect of `Financial self-interest` conditional on `Salience`. Taking the *baseline model*, I add an interaction between CCES `Salience` and `Financial self-interest`—which I allow to vary by party. I control for the gravity `Salience`—which may also increase financial self-interest—by adding an interaction between it and `Financial self-interest`. I remove FTA interaction terms. The *bottom-left panel* of Figure 4.6 shows that `Financial self-interest` was significantly smaller for the more salient CAFTA. Removing Peru (or Colombia) from the model does not affect these results (Appendix 4.7.10).

The CCES data can be used to see if the effect of `Financial self-interest` decreases as CCES `Salience` increases across geographies; I estimate state-level `Salience` of FTAs using the CCES poststratification weights. I combine the 2006, 2007, and 2008 FTA responses—weighting by the number of respondents per survey—to construct the measure. I take the *baseline model* and interact `Financial self-interest` with state-level `Salience`—and with *party*, to ensure the findings hold within parties. The bottom *right panel* of Figure 4.6 shows that the AFD of an IQR shift in `Financial self-interest` in "low" `Salience` states (setting state-level `Salience` to a standard deviation below the mean) is about 17 percentage points greater than for "high" `Salience` states (setting state-level `Salience` to a standard deviation above the mean). These results only get stronger if we limit the analysis to those FTAs that occurred in the years of the CCES surveys (Appendix 4.7.10).

`Salience` should also vary across issues; since immigration appears more salient (Vavreck, Sides, and Tausanovitch 2019), `Financial self-interest` should have less impact. Appendix 4.7.12 shows an estimated effect for immigration about one third the size of for FTAs.

I also expect that salience will only mitigate the effect of financial self-interest when

legislators believe elections will be *competitive*—voters' concerns matter less to senators in safe seats. Appendix 4.7.11 shows that state-level `Salience` moderates `Financial self-interest` more when a senators' previous `Margin of victory` was small. Similarly, only when state-level `Salience` is high does the `Margin of victory` moderate the effect of `Financial self-interest`.

4.5 Alternate explanations and extensions

The most obvious threat to identification is individual-level confounders. To address this, first, I include post-treatment, individual-level variables, including `Labor/Corporate PAC` contributions, `DW-NOMINATE` scores, and `Career background`. Inclusion of these post-treatment variables may *understate* the effect of *personal preferences*. For instance, legislators with pro-FTA preferences and portfolios might support a range of legislation that affects `DW-NOMINATE` scores, causing these scores to predict FTA support. Yet, not only does the effect of `Financial self-interest` remain with their inclusion, but it is consistent across chambers *and* large relative to most of these possible confounders (Appendix 4.7.6).

Analyzing these votes *within senators* offers further evidence to address concerns about individual-level confounders. While short of conventional levels of significance—unsurprising given the small amount of variation of financial self-interest within senators (the mean and median variance are .05 and 0)[14]—`Financial self-interest`has a positive effect. Further, the *within-senator* election, retirement, and salience findings all point in the correct direction, are fairly large, and come close to conventional levels of statistical significance (Appendix 4.7.7). Since senators select into retirement, this result is particularly encouraging. Further, owning a firm predicted to gain from an FTA *at the time of the vote* is far more predictive

[14]Exceptions to this general rule may come to mind (e.g. Richard Burr). The fact that they come to mind—that is, find themselves in the news—shows one reason why legislators might refrain from frequently changing their investments. Further, simply changing stock doesn't create variation FTA-related financial self-interest if the new investments have similar levels of productivity and differentiation.

of FTA support than having *ever owned* such a firm. This all indicates that slow-changing, individual-level factors—including long-held *beliefs*—appear not to be the mechanism (nor any individual-level variables that do not correlate with `Financial self-interest` *within senators*).

Schiller (2000) argues same-party, same-state senators desire to cultivate different electoral constituencies, leading to differences in behavior. Could this explain my findings? It seems unlikely. First, Schiller expects (and finds) virtually no divergences on party votes. Separately modeling and estimating the AFD of an IQR shift in `Financial self-interest` for the three FTAs that are party votes—CAFTA, Colombia, and Oman—produces substantively indistinguishable results. Second, for non-party votes, Schiller expects (and finds) minimal divergence on distributional votes, which seems the appropriate category for FTAs (further, the results hold when including `DW-NOMINATE` scores to control for ideology—Schiller finds larger divergences on ideological votes). Third, Schiller expects maximal divergence *when a senator faces reelection* because legislators cultivate different constituencies to increase their reelection chances. My expectations *and* findings concerning elections run counter to this logic (the same goes for the retirement findings); personal preferences should have the greatest impact—and thus predict divergences between *senator pairs*—when electoral pressure is weak or absent.

Is my measure of `Financial self-interest` trade-specific? It poorly predicts unrelated votes—abortion, espionage, taxes, or financial regulation—attesting to the measure's validity (Appendix 4.7.13). That it does worse at predicting other business-related votes indicates that the personal preferences driving FTA support—whether due to beliefs or self-dealing—are not as broad as simply being "pro-business." Perhaps "pro-international" may describe them better.

Might wealth confound my results? I test this by creating a measure of the `Trade orientation` of each legislator's portfolio based on how much each asset should gain from

trade given its productivity and differentiation—but *not* the asset's dollar value—as well as a variable estimating each legislator's `Total assets`. `Trade orientation` better predicts FTA support. Further, the estimated effect of the interaction between these variables is positive, consistent with my argument that both the *direction* and *intensity* of personal preferences matter (Appendix 4.7.14).

In Appendix 4.7.15, I test another implication of my theory; `Financial self-interest` should not have an *appreciable* effect when voters favor FTAs since `Financial self-interest` at most leads legislators to tepid—not strong—opposition. This is because very few legislators invest in firms predicted to be hurt by FTAs; most have investments that should gain or investments that are not likely to be affected much. Voters—whose support is necessary for electoral success—form the main potential source of FTA opposition; legislators weakly opposed to FTAs due to *personal preferences* will support FTAs if their voters do, as will legislators strongly in favor of FTAs. Republicans—according to CCES responses—support FTAs more. As expected, financial self-interest matters little among GOP legislators. Second, using CCES to estimate state-level FTA preferences, the effect of `Financial self-interest` *within parties* is stronger the more CCES respondents oppose FTAs. Third, members of committees responsible for FTAs—inundated by reports that FTAs help voters (Lee and Osgood 2019)—also seem less affected by personal preferences.

4.6 Conclusion

Senators' trade-specific financial self-interest predicts their support of FTAs, indicating that their personal preferences have a meaningful impact on their public behavior. The design of the analysis—using dual-member districts and the supporting within-senator design—helps rule out many other possible explanations. The effect decreases when elections approach, increases with retirement, and is muted when FTAs become more salient—all consistent with

theoretical expectations.

Since my analysis compares senators voting on the same FTA, it does not directly address *national donor opinion* that Canes-Wrone and Gibson (2019) show predicts roll call voting—though it controls for it. Yet, my argument has possible implications for the relationship between donors and legislators. If legislators' *personal preferences* drive their voting behavior, donors may, in turn, respond by contributing to these legislators precisely because of the legislators' *personal preferences*; these donors may hope to help them not only win reelection but also obtain more powerful positions (cf. Cann 2008; Heberlig, Hetherington, and Larson 2006; Powell Forthcoming). This is similar to a sorting model (e.g. Lott and Bronars 1993), but where policy congruence between affluent legislators and affluent donors contributes to political success for these legislators.

The election- and salience-related findings—the fact that the effect decreases or vanishes when voters are more likely to effectively monitor or punish—indicate that legislators influenced by their personal preferences over FTAs engage in shirking. Unlike previous scholarship on election cycles, my approach predicts the direction of shirking. To link shirking to personal preferences, I construct an intuitive measure of financial self-interest grounded in empirically substantiated economic theory.

Of course, I've explored a single issue over a small period, focusing exclusively on legislators. Future work could consider other issues that have implications for legislators' portfolios. This, as well as probing whether investment portfolios predict the behavior of judges, state legislators, regulators, or other executive branch officials, would help delineate the breadth of the impact of personal preferences.

4.7 Appendix

4.7.1 Content analysis of LDA reports

LDA disclosure forms have a field for lobbyists to list specific legislation. For trade-related lobbying between 2000 and 2016, on roughly 80% of reports the lobbyists write something in this field. Sometimes they write specific bill numbers, but often lobbyists will refer to PTAs without reference to a bill number. In fact, much lobbying on PTAs takes place years before a bill is introduced (You 2020). Instead of matching bill numbers, I use a set of regular expressions to find PTAs—I developed this set of regular expressions by reading through about 20,000 of the 65,159 reports and noting the different ways PTAs were referenced throughout. While reading through, I also made note of other issues that came up frequently in reports and how they were referenced, allowing for quantitative comparison of the frequency of lobbying on these issues relative to PTA lobbying. Following Conconi, Facchini, and Zanardi (2014) I include legislation relating to Trade Promotion Authority, since Congress must grant this to allow the president to meaningfully negotiate PTAs.

While PNTR votes in Congress served essentially to establish a PTA with the country in question under that country's WTO accession agreement, I have not tried to capture this lobbying, meaning if anything the count of firms lobbying on PTA-related legislation should be higher that what I report. PTAs can be referred to by a number of names whereas the number of terms mentioned for most other major issues is far more restricted (that is, it's hard to lobby on China without mentioning "China" or the "PRC"). Below I list the regular expressions used for each topic in Figure 2.1.

PTAs: `(?i)FTA`, `(?i)TPA`, `(?i)Trade Promotion`, `(?i)fast track`, `(?i)Trade Negotiating Authority`, `(?i)Trade Facilitation Accord`, `(?i)Free.Trade Agreement`, `(?i)Multilateral Trade Agreement`, `(?i)Bilateral Trade Agreement`, `(?i)Free Trade Act`, `(?i)Columbia Free Trade`, `(?i)Free Trade of the Americas`, `(?i)TPP`,

`(?i)Trans-Pacific Partnership`, `(?i)TTIP`, `(?i)T-TIP`, and `(?i)Transatlantic Trade and Investment Partnership`. *China*: `(?i)China` and `(?i)PRC`. *MTBs*: `(?i)MTB`, `(?i)Miscellaneous Tariff Bill`, `(?i)Miscellaneous Trade`. *Regulations*: `(?i)regulation`, `(?i)standard`. *Tariffs*: `(?i)tariff`. *Farm Bill*: `(?i)Farm Bill`. *Japan*: `(?i)Japan`.

4.7.2 Notes on priors

I primarily choose weakly informative priors, ruling out unreasonably large estimates (be they positive or negative) (Gelman et al. 2008). Continuous variables are standardized to have mean 0 and standard deviation 0.5. For binary coefficients (PTA indicators, gender, business background, etc.), the priors are normal distributions with mean 0 and standard deviation of 2.5. For continuous variables—age and financial self-interest—the standard deviation is approximately 5 and increases to about 12.5 for the interaction terms (e.g. PTAs $\times$ financial self-interest).

The random intercepts for senator pairs are modeled as a multivariate normal with mean 0 (Gelman et al. 2013; Goodrich et al. 2020), whose covariance matrix is decomposed into a correlation matrix and variances, with the variances being decomposed into the product of a simplex vector and the trace of the matrix. To get the trace, the square of a scale parameter is multiplied by the order of the matrix. The trace equals the sum of the variances.

A large trace enables the parameter for each nest's intercept to easily take on relatively large values, with the random intercepts acting essentially as MLE fixed effects. Increasing the scale parameter increases the trace, the prior over which is a gamma distribution. In the *baseline model*, I set this gamma distribution's shape parameter to 50 and its scale parameter to 10 (the defaults are 1 and 1), resulting in a mean of 500.[15] Increasing the scale parameter much further creates convergence problems. These priors create a high expected sum of

[15]For within-senator models, I choose shape 20 and scale 20, for a mean of 400—attempting to make them less informative leads to convergence issues.

variances—$500^2 \times 243$, with 243 being the order of the covariance matrix (for other models I need to choose slightly more informative priors to ensure convergence, which I note in the paper when discussing these models).

Incidentally, these priors matter little for overall effects; `Financial self-interest` predicts *both* which pairs vote together (which a small trace weighs more heavily) and, when pairs split votes, which senator will vote in favor (which a larger trade weighs more heavily). This specification of priors, however, ensures we leverage the strength of the design and make comparisons within senator pairs.

4.7.3 Distribution of financial self-interest

Figure 4.7 shows the variable of interest, pre- and post-transformation, as well as the underlying distribution of assets for Senators in 2006. The shape of the distribution changes little across years.

Productivity is measured as $\frac{\text{net income}}{\text{employees}}$ and differentiation follows the definition from Broda and Weinstein (2006). When I multiply the value of assets by their productivity and differentiation—before summing by legislator—it is possible to have negative values, since firms' net income can be negative. Thus, I follow Gelman and Hill (2006) in transforming the data. For x less than or equalt to -1, I calculate the negative log of the absolute value of x; for x greater than or equal to 1, I take the log; and, for x less than 1 and greater than -1, I set x equal to 0. I then transform the variable to have mean 0 and standard deviation 0.5—the bottom-*right panel* of Figure 4.7. The tall "spike" in this panel represents senators with no investments in firms dealing in traded goods, with the few senators invested in firms with negative productivity falling to the left of this.

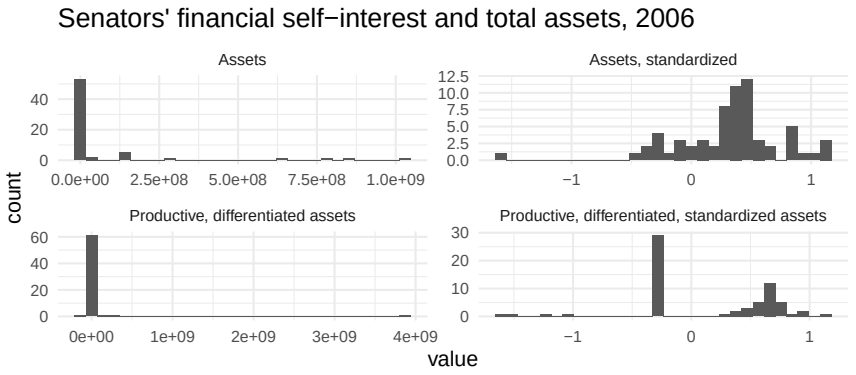


Figure 4.7: **Histograms of senators' `Financial self-interest` and related quantities, for 2006.**

4.7.4 Robust to alternative operationalizations

Substantive results hold using additional operationalizations of financial self-interest. I first classify as "productive" any firm that is above median labor-productivity (relative to other firms in the data) *and* produces internationally traded goods (according to firms' NAICS codes). All others I label "unproductive." While clearly some of these "unproductive" firms may be productive, if they are not involved in trade, NNTT does not predict they will have an interest in trade liberalizing policies. I then sum up all the value of a senators' shares in productive firms and in unproductive ones. I use the *baseline model* with these changes: I use MLE—perfect separation does not happen in this model; I use same-party, same-state, same-FTA fixed effects instead of random intercepts; I substitute these "productive" and "unproductive" measures for `Financial self-interest`. Figure 4.8 shows that the effect of this alternative measure of financial self-interest is large and significantly different from the unproductive firm measure by comparing the AFD of an IQR shift in each measure.

I do the same with differentiation; firms in industries where differentiation is greater than the median *and* that make traded goods are labeled "differentiated" and those not are labeled "undifferentiated." Replacing the "productive" and "unproductive" measures with these two measures, we find "differentiated" assets are more predictive of FTA support (Figure 4.8).

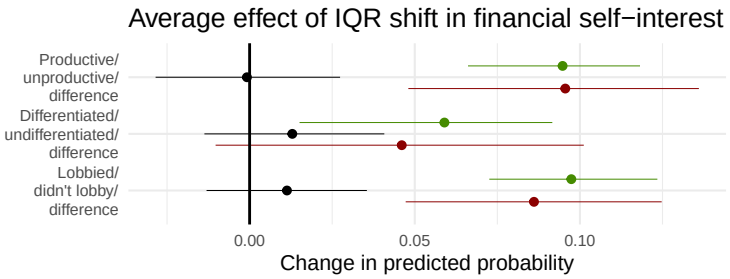


Figure 4.8: **Support for FTAs increases with different operationalizations of financial self-interest.** 95% confidence intervals from 1000 simulations.

I use firm lobbying on trade as an alternative approach to determining if firms—and thereby legislators—gain from FTAs; we know virtually all firms lobbying on FTAs support them (Blanga-Gubbay, Conconi, and Parenti 2020). I categorize whether each firm lobbied or not, and sum up the value of MCs' shares in firms that lobbied and those that didn't. I replace the differentiation measures with "lobbied" and "didn't lobby." The estimate for `Financial self-interest`, when lobbied, is large and significantly different from when firms didn't lobby, as shown in Figure 4.8. Appendix 4.7.14 has another operationalization.

4.7.5 Robust to dropping all classes of assets but public firms

The results do not change if we only use assets categorized as "public" firms by `OpenSecrets.org` to construct `Financial self-interest`, dropping all else, including mutual funds and private firms (Figure 4.9). Other combinations of categories of assets do not change the substantive results (results available on request). House estimates are based on the model discussed in Appendix 4.7.8. For the Senate results, I take the *baseline model* and use MLE—substituting fixed effects for random intercepts and dropping the FTA interactions.

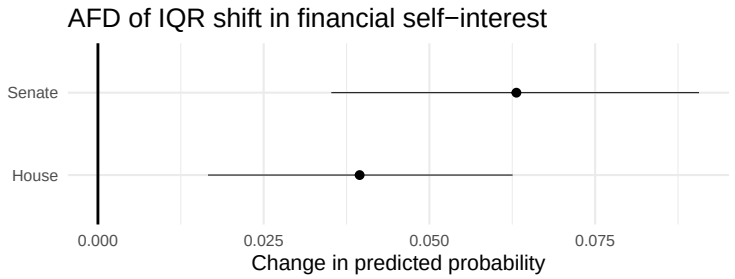


Figure 4.9: **Support for FTAs increases as financial self-interest increases when dropping private firms and/or mutual funds.** 95% confidence intervals from 1000 simulations.

4.7.6 Substantive effects relative to other variables

The magnitude of the effect of financial self-interest compares favorably with other important variables. Figure 4.10 shows partisanship has an estimated effect in the House (Senate) of 47 (31) percentage points.[16] The AFD of an IQR shift of `Financial self-interest` of 3 (11) percentage points amounts to 6% (35%) of this (Figures 4.4). While the House effects appear somewhat small, this is in part due to lower levels of support for FTAs in general and that Democrats drive the positive results. For instance, the estimated 9.5 percentage point effect of the AFD of an IQR shift in `Financial self-interest` on House Democrats is 22% of the mean of Democrat FTA support (Appendix 4.7.9)—nearing half the size of the effect of party. Smaller House estimates also cohere with the notion that, facing election every 2 years, reelection concerns temper representatives' personal preferences more.

Now I compare variables' effects within parties since large changes in ideology effectively represent changing parties. Figure 4.10 shows AFDs of within-party IQR shifts for `Financial self-interest`, `PAC contributions`, and `DW-NOMINATE` scores. In the House, `DW-NOMINATE` is the largest overall and for Democrats. `Corporate PAC` has a bit larger effect

[16] I use a model for the House described in Appendix 4.7.8 and a senator pair Bayesian model for the Senate that includes `Financial self-interest`, `Labor/Corporate PAC` contributions, `Career background`, `Gender`, `Age`, and `DW-NOMINATE`. I describe priors in Appendix 4.7.2. I calculate party AFDs by setting all observations' party to Republican and `DW-NOMINATE` to the Republican chamber median, calculating predicted probabilities. I subtract from these predicted probabilities the predicted probabilities that result from setting all observations to Democrat and assigning them the Democratic median `DW-NOMINATE` for the appropriate chamber.

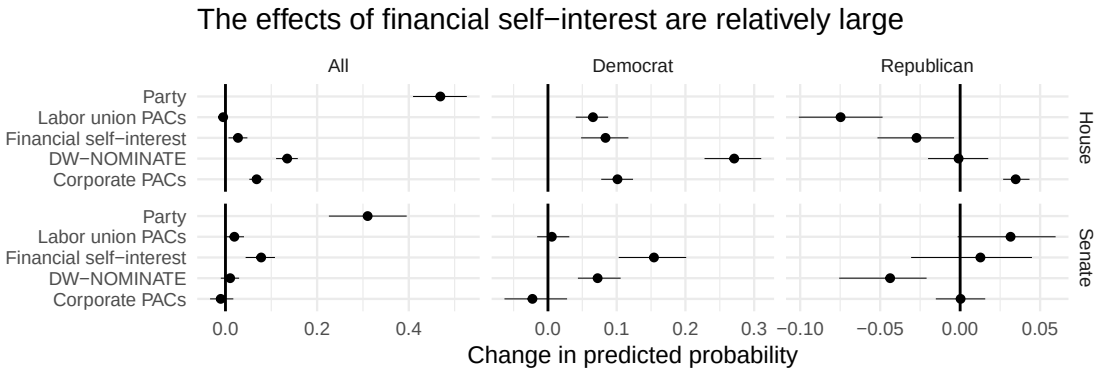


Figure 4.10: **Effect of `Financial self-interest` is relatively large.** AFD of a within-party IQR shift in select variables. House (Senate) 95% confidence (credible) intervals based on 1000 simulations (4000 posterior draws).

than `Financial self-interest`. `Labor PAC` has a negative (positive) effect on Republicans (Democrats). In the Senate, the PAC contribution effects—a focus of the literature on FTAs (e.g. Baldwin and Magee 2000)—basically disappear, showing no consistent effect across chambers. `Financial self-interest`'s estimate exceeds `DW-NOMINATE`'s in magnitude—for Democrats, it is roughly twice the size—and generally exhibits consistency across chambers. Since the design of the Senate model is less subject to omitted variable bias, the relative size of the effect of `Financial self-interest`—about one-third the effect of party and much larger than within-party ideology—attests to its substantive significance.

4.7.7 Within-senator analysis

I now offer some evidence that the relationship between financial self-interest and FTA support holds *within senators*, as well as that salience mitigates, retirement increases, and facing election erodes the relationship. The analysis is demanding with relatively few within-senator observations and little variation of `Financial self-interest`; imprecise estimates are to be expected. Bayesian analysis allows me to fit relatively complex models despite these challenges. I include individual-level variables that exhibit change over time: `PAC contributions`, `Margin of victory`, and `Copartisanship` with the president. While most

controls for constituents are relatively constant (Smith 1994), I include the ratio of a state's workers employed in import-competing versus exporting industries as this may have changed from 2004 to 2011. I control for the differences in effects between FTAs by adding an interaction between the gravity model-based measure of FTA importance (`Salience`) and `Financial self-interest`. I also interact `Financial self-interest` with whether a legislator faces election. For most terms, I use weakly informative priors as in the baseline model. The random intercepts for each senator are the exception (Appendix 4.7.2), which I allow to easily take on large values—mimicking MLE fixed effects.

Figure 4.11 shows the AFD of an IQR shift in `Financial self-interest` to be estimated at 3 percentage points, one-third the mean variance of FTA support within senators. When `Salience` is low (set 1 standard deviation below the mean), the effect is about 5 percentage points and when high (set 1 standard deviation above the mean), the estimate is 0. Likewise, the difference between `Facing election` (4 percentage points) and not (-4 percentage points) is about 8 percentage points and close to conventional statistical significance. The difference for `Retirement` is about 9 percentage points in the expected direction, but the relatively small number of retiring observations results in noisy estimates. When we condition on whether firms lobbied—taking this as an alternate measure of `Financial self-interest` in FTAs (Appendix 4.7.4)—we see similar effects in the expected direction. The direction of all these within-senator estimates suggests that changes in inancial self-interest, electoral pressure, and salience explain changes in individual senators' voting behavior.

4.7.8 Cross-validation for House model

I use information criteria and cross-validation to select the statistical model I use when analyzing FTA votes in the House. I must account for constituency differences. Scholars have identified several variables as important for trade votes (Conconi, Facchini, and Zanardi

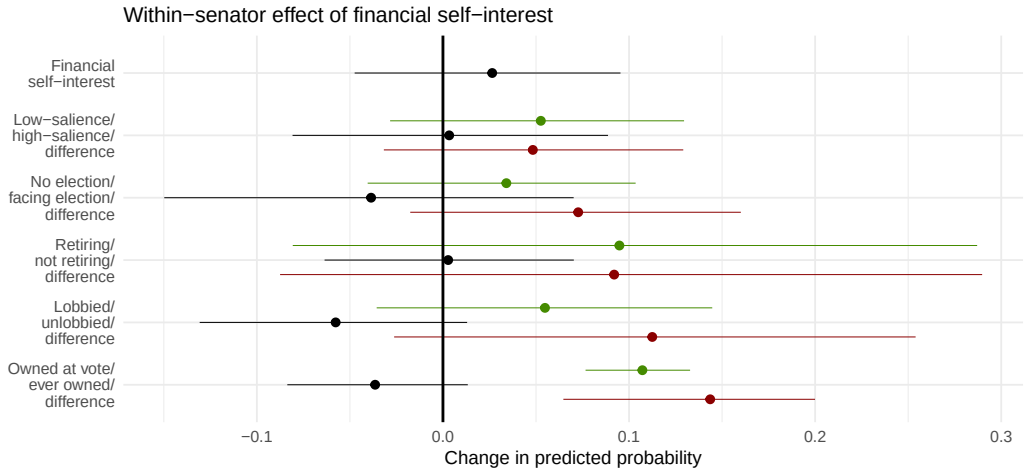


Figure 4.11: **Within-senator analysis largely confirms previous findings.** The AFDs of an IQR shift in '`Financial self-interest`, with the y-axis showing what variable is being conditioned upon. 95% Bayesian highest density credible intervals from 4000 posterior draws. The final result compares the impact of owning at least one firm that lobbied on an FTA at the time of the vote with having ever owned a firm that lobbied on an FTA and includes same-state, same-party, same-vote fixed effects, with 95% confidence intervals based on 1000 simulations.

2014; e.g. Milner and Tingley 2011): high skill workers (the proportion of the populace over 25 with at least a bachelors degree); the foreign-born, black, and Hispanic proportion of the population; median household income and unemployment; and the ratio of people employed in exporting industries over those employed in import-competing industries (*export ratio*). I include FTA fixed effects to account for the differences between these bills, as well as an interaction between `Financial self-interest` and the FTA fixed-effect to allow the estimated effect of `Financial self-interest` to vary by FTA. I also include all the individual-level confounders used in the paper—excepting those relating to election cycles, retirement, and salience.

There are a huge number of models I could attempt to run—particularly given all the potential constituency-level confounders—so I opt for predictive inference (Ward and Ahlquist 2018). I fit many models, testing if each model (1) does well at explaining the variation in the outcome for data on which the model was fit, (2) is not *needlessly* complex, and (3) is good at predicting out-of-sample observations on which the model was not trained.

I fit a logit model, with votes in support of an FTA coded as a 1, those against as 0, and excluding those that were not "yea" or "nay." I test many different specifications of the model, including interactions of important variables (Gelman and Hill, 2006) and squared terms of variables where it seemed appropriate. I used 5-fold cross-validation and a large number of model specifications. I selected the best performing models based on Akaike information criterion (AIC), Bayesian information criterion (BIC), and the logistic loss for the five-fold cross-validation. AIC and BIC are calculated without five-fold cross-validation. They both punish complexity, with BIC applying stricter penalties to additional terms than does AIC. Having identified some of the best performing models, I reran the five-fold cross-validation, this time calculating additional measures of predictive power: accuracy, precision, F1, and the area under the receiver operating characteristic curve (AUC). These metrics are calculated on the out-of-sample portion of the five-fold cross-validation for each iteration. I selected a model that performed well across all these metrics. Using this model, I explore the implications for the effect of financial self-interest. We can be confident that the estimates come from a model that excels at predicting observations on which it was not trained.

4.7.9 Main findings reproduced in the House

The main finding, that legislators should be more likely to support FTAs when their financial self-interest increases, holds in the House. Using the cross-validated model (see Appendix 4.7.8), estimating the AFD of an IQR shift in `Financial self-interest` produces Figure 4.12. The fact that the estimate is smaller than that for the Senate (cf. the top estimate in the *right panel* of Figure 4.4) coheres with the idea that House members, facing reelection more often, more closely vote their constituents' preferences—consistent with other principal-agent theories of roll call voting (e.g. Lindstädt and Vander Wielen 2011).

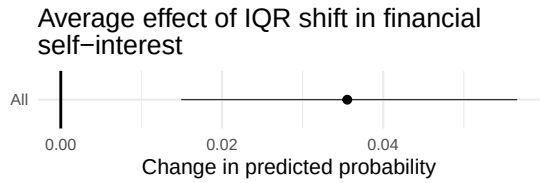


Figure 4.12: **In the House, support for FTAs increases as `Financial self-interest` increases.** MLE produces point estimates and 95% confidence intervals from 1000 simulations.

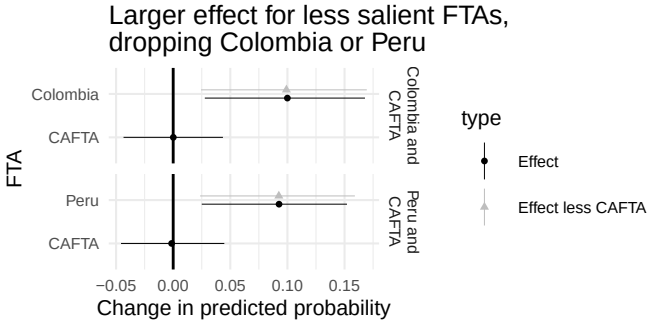


Figure 4.13: **Dropping either Colombia or Peru, the AFD of an IQR shift in `Financial self-interest` is larger for less salient FTAs compared to more salient CAFTA.** High-density intervals from 4000 posterior draws provide 95% credible intervals.

4.7.10 Salience findings robustness checks

In the paper, I used CCES responses to measure the national salience of specific FTAs to estimate how salience moderates the effect of financial self-interest. The 2008 CCES combined the Peru and Colombia FTAs in a single question. Figure 4.13 shows that dropping either Peru or Colombia before fitting the model does not change the substantive result: the effect of `Financial self-interest` is larger for either of these FTAs than for more salient CAFTA.

Given that the CCES questions on FTAs that I use to calculate state-level `Salience` were asked in 2006-2008, we may be worried these preferences changed over time, compromising the measure and its relationship to `Financial self-interest` and FTA support. If, before modeling, I drop votes before 2006 and/or after 2008, however, the results do not change—if anything, they grow stronger as the dates of the FTAs more closely match the

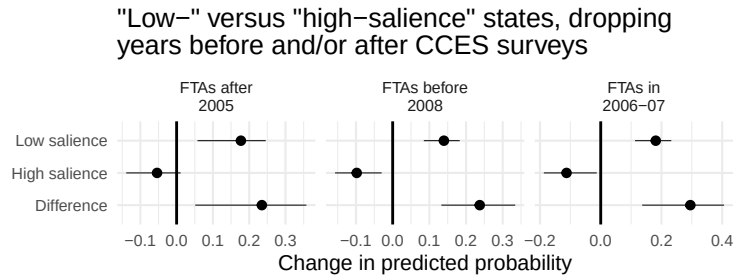


Figure 4.14: **Dropping years before and/or after the CCES FTA surveys, the AFD of an IQR shift in `Financial self-interest` remains larger in states where FTAs are less salient.** "Low-salience" ("high-salience") consists of setting state-level `Salience` 1 sd below (above) the mean. High-density intervals from 4000 posterior draws provide 95% credible intervals.

CCES surveys (Figure 4.14).

4.7.11 Salience and margin of victory interaction effects

Salience should only moderate the effect of financial self-interest to the degree that legislators face close elections. Likewise, a large margin of victory in the previous election should only weigh heavily in a senators' calculations about FTAs if FTAs are salient; a large margin of victory can free senators to vote their personal preferences despite salience. To test this, I take the *baseline model* and interact `Financial self-interest` with state-level `Salience` and a two-degree polynomial term of a senator's previous `Margin of victory`—the square term is added to allow a decreasing marginal effect of `Margin of victory`.

I then find the AFD of an IQR shift in `Financial self-interest` for all permutations of low- and high-`Salience` and small- and large-`Margin` counterfactuals—where the high/large (low/small) counterfactuals involve setting all observations values of the variable to one standard deviation above (below) its mean. The main QOIs are the "differences" of the AFDs as we move from low to high `Salience` and from a small to a large `Margin of victory`.

Row 1 of Figure 4.15 shows that financial self-interest has a larger effect in "low-salience" states *when* senators had a small margin of victory; *when* the `Margin of victory` is large—

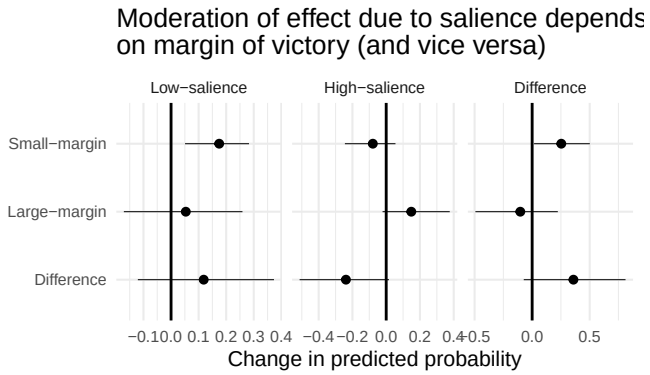


Figure 4.15: **Salience reduces the AFD of an IQR shift in financial self-interest when a senator's previous margin of victory was small.** The previous margin of victory moderates the AFD of an IQR shift in `Financial self-interest` in high-`Salience` states. High-`Salience` (low-`Salience`) consists of setting state-level `Salience` 1 sd above (below) the mean, and likewise for small-`Margin` (large-`Margin`) senators. 95% high-density credible intervals from 4000 posterior draws.

row 2—salience no longer has an appreciable role in moderating `Financial self-interest`. The bottom-right facet shows this difference between the differences in the AFD of an IQR in `Financial self-interest` when going from a low- to high-`Salience` state *conditional* on the `Margin of victory` is large and falls just shy of conventional levels of statistical significance.

Column 1 of Figure 4.15 shows that, in low-`Salience` states, the effect of `Financial self-interest` does not change with `Margin of victory` while column 2 shows that, in high-`Salience` states, `Financial self-interest` has a much larger effect when the prior `Margin of victory` was large. Again, the bottom-right facet shows the difference between the moderating role of the `Margin of victory` in high-`Salience` states compared to its role in low-`Salience` states is substantively large and close to conventional significance levels.

4.7.12 Immigration has smaller effects

Immigration policy, as opposed to FTAs, has simple implications for firms, all of which should gain from more immigration (Freeman 1995; Joppke 1998; Milner and Tingley 2015). To measure a legislator's financial self-interest in more open immigration, I sum up the value

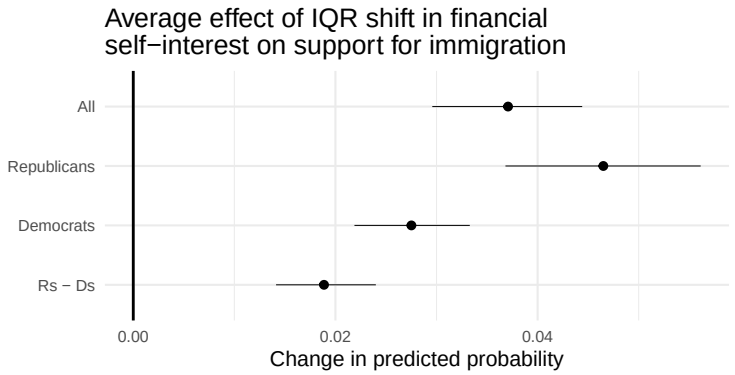


Figure 4.16: **Financial self-interest has less effect on immigration legislation.** The AFD of an IQR shift in immigration-specific financial self-interest on supporting more liberal immigration legislation. 95 percent confidence intervals from 1000 simulations.

of the firms they own. Using the same type of same-state, same-party, same-vote model for the Senate that I have throughout the paper—and including pre-treatment covariates—I estimate the effect of financial self-interest on immigration votes cast in the Senate from 2004 to 2014. I use the Comparative Agendas Project (`comparativeagndas.net`) to determine which were immigration votes. I categorize as pro- or anti-immigration each immigration roll call vote—of which there were 87—using the bill's text as well as resources like `GovTrack.us`, `congress.gov`, `voteview.com`, *CQ*, and the Comparative Agendas Project (`comparativeagndas.net`).[17] The estimates of the AFD of an IQR shift in financial self-interest are displayed in Figure 4.16. While positive and statistically significant, the effect size is about a third that for FTAs. We also see corroboration that the effects are stronger when senators face constituents that oppose a policy that a senator's financial self-interest supports, if we accept that Democratic voters were more pro-immigration than Republican voters.

4.7.13 Testing measurement validity

I download all final passage votes related to abortion, espionage/intelligence, financial regulation, and taxation (Issue codes "Abortion/Care of deformed newborns,"

[17]There were 5 votes I did not feel confident enough to classify as either pro- or anti-immigration.

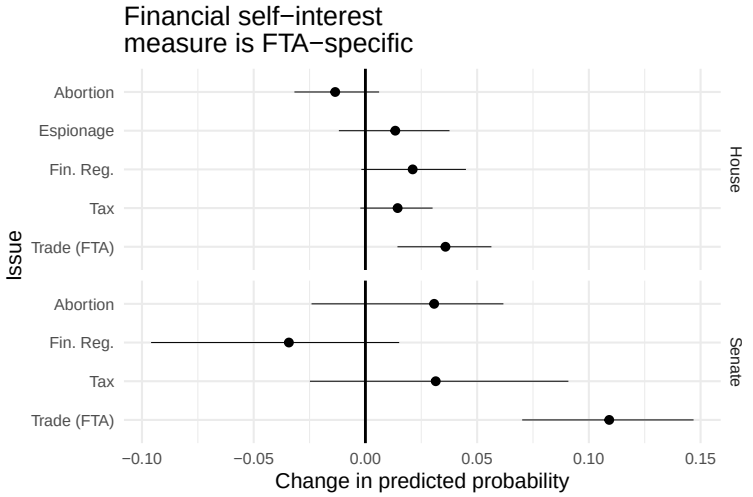


Figure 4.17: **Evidence of the validity of `Financial self-interest`.** House (Senate): AFD for an IQR shift in `Financial self-interest` across several issue areas during the same years as votes on FTAs. 95% confidence (credible) intervals from 1000 simulations (4000 posterior draws).

"CIA/Spying/Intelligence," "Banking and Finance," and "Tax rates") happening the same years as the FTA votes (`voteview.com`). Coding votes in favor of restricting abortion, supporting espionage, against financial regulation, and against taxes as 1,[18] I fit the initial House and Senate models with the new outcome variables. The left panel of Figure 4.17 shows the AFDs of an IQR shift in financial self-interest bear out expectations (no "espionage" votes happened in the Senate). The signs of the point estimates for abortion and financial regulation switch across chambers and are not different from zero at conventional levels of significance. Espionage votes do not achieve conventional significance either. The estimate for tax legislation is consistent across chambers but doesn't quite reach conventional levels of significance. We might think, however, that many of the firms that would gain from trade would have an interest in tax policy, so we should perhaps not be too surprised by this result.

[18]Though the models allow flexibility across bills, coding them all in a consistent direction allows coherent estimates when aggregating.

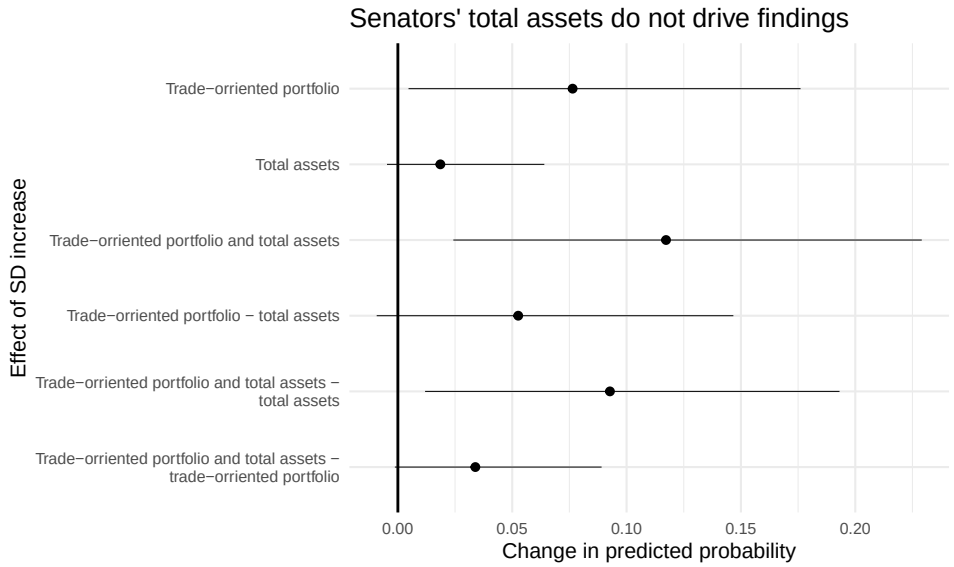


Figure 4.18: **Trade orrientation, not wealth, the main driver of FTA support.** The estimated AFD of an increase in a standard deviation (+ .5) for given variables. "Trade-oriented portfolio and total assets" increases both these variables by .5 and calculates the AFD relative to the status quo. Also included are differences between AFDs. 95% Bayesian highest density credible intervals from 4000 posterior draws.

4.7.14 Testing for a wealth effect

Do total assets—which could be seen as a sort of "wealthy senator effect"—drive the results? It makes sense to examine this possibility since my choice to weight the value of legislators' assets by their productivity and differentiation combines what might be considered a "total assets" or "wealth" effect—represented by the value of the asset—with the trade orientation of their portfolio—determined by the productivity and industry differentiation of the asset.

To test whether a senators' total assets drive the results, I create two new variables. The first measures a senators' `Total assets`—I sum the estimated value of a senators' assets by year. The second measures the `Trade-orientation` of a senators' portfolio; I multiply the productivity by the differentiation of each asset a senator owns; I then divide the result by the value-weighted proportion of the senator's portfolio that the asset comprises; and I sum the results by senator-year. Again, because I anticipate diminishing returns, I transform the variable to reduce skew. I standardize it to have mean 0 and standard deviation .5. I

also include an interaction term between the "trade-orientation" of senators' portfolios and their total assets. I fit a model like the *baseline model*, exchanging the measure of financial self-interest for the three variables introduced here.

My theory predicts that a more trade-oriented portfolio should increase a senators' probability of supporting FTAs. Further, to the extent that having more invested in firms that gain from trade reflects *more intense* trade-related preferences, the interaction term should be positive. And this is precisely what I find: the coefficient for the trade-oriented portfolio is 8.2, that for total assets is 3.1, and the interaction term is 12.8. The first two estimates are significant at the 95% level, while the interaction is nearly so.

To aid with interpretation, Figure 4.18 shows the AFD of a standard deviation increase in these variables (+ .5). The estimated effect for `Trade-orientation` is 7.5 percentage points, while that for `Total assets` is about 2, and the estimated difference between these of about 5 percentage points falls just short of conventional statistical significance. Further, the impact of the positive interaction effect can be seen in the estimated 12 percentage point effect of increasing both, which is larger than the effect of `Trade-orientation` or `Total assets` on their own. This supports my argument that legislators' portfolios reflect *both* the direction *and* intensity of their trade-related preferences.

4.7.15 Effect more appreciable when voters oppose FTAs

I expect that financial self-interest matters when voters oppose FTAs since, absent this opposition, most factors push legislators towards supporting FTAs. One way of testing this is by examining partisan differences.

The mean support for FTAs—using CCES responses to the questions about CAFTA (2006, 2007), Peru and Colombia (2008) and Korea (2012)—is 51.8% for Republican respondents and 41.4% for Democrats—I remove respondents choosing "Don't know" as that was not an option in the 2012 CCES question on the Korea FTA. Further, "Voters," is short-

hand for actors important for reelection. For the GOP, ties to the business community loom large (Hacker and Pierson 2010), including efforts by pro-FTA activist groups to influence primaries (Roth 2015). For instance, in 2004 the Club for Growth spent $2.3m trying to replace incumbent Arlen Specter with Pat Toomey; Specter switched parties to avoid a rematch (Hacker and Pierson 2010, 235). Specter didn't always support FTAs, which likely contributed to the Club for Growth's decision, illustrating how the pro-FTA business wing of the GOP can apply electoral pressure. Thus, I expect Republicans will not be much influenced by their personal preferences, since MCs, in terms of financial self-interest, either weakly oppose or strongly favor FTAs; Republicans' largely pro-FTA voter base and the pro-business elements in the party push those weakly opposed due to personal preferences to nevertheless vote for FTAs.

Conversely, Democrat senators have ties to labor unions that make campaign contributions and turn out the vote in primary and general elections (Bawn et al. 2015; Patterson 2018). Unions usually oppose FTAs (e.g. "Opposition to the central american free trade agreement" 2005). Democrats who depend on union support feel pressure to oppose FTAs. Under these circumstances, financial self-interest should manifest itself.

Statistical analysis shows Democrats drive the results. The top-left panel of Figure 4.19 shows predicted probabilities for Johnny Isakson and Tom Carper voting on the Colombia FTA. For Carper, there is a strong positive relationship and, for Isakson, virtually no effect, which is typical for most Republicans on most FTAs.

The average effect for Democrats is about 22 percentage points across all votes (top-right panel of Figure 4.19). The effect for the GOP is negative and noisy. We see that the negative relationship between the size of the effect and the importance of a trading partner appears to hold within parties. Further evidence that the effect of financial self-interest is stronger when a legislator's party's constituents oppose a policy can be seen in the immigration analysis, where financial self-interest has a stronger effect on Republicans (Appendix 4.7.12).

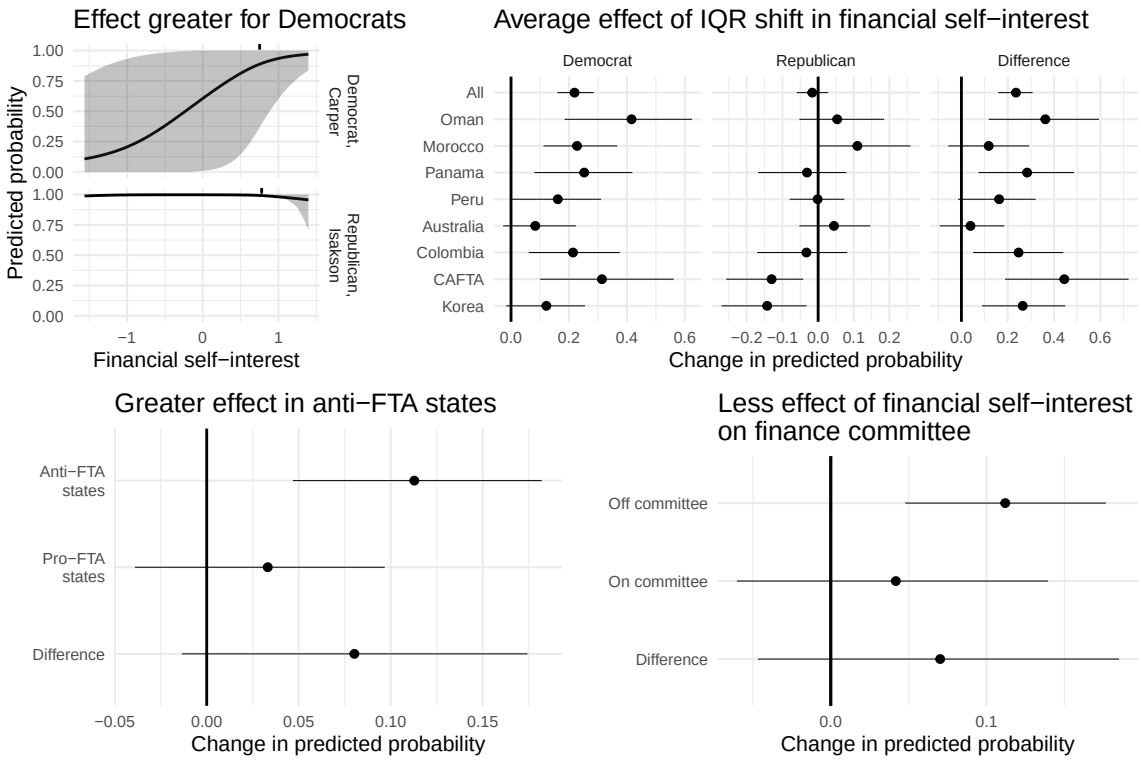


Figure 4.19: **The effect of financial self-interest increases when constituents oppose FTAs.** *All panels:* 95% high density credible intervals from 4,000 posterior draws. *Top-left panel:* Predicted probabilities for Johnny Isakson (R-GA) and Tom Carper (D-DE) supporting the Colombia FTA (H.R. 3078, 112$^{\text{th}}$). *Top-right panel:* AFD of an IQR shift in `Financial self-interest` by FTA. *Bottom-left panel:* AFD of an IQR shift in `Financial self-interest` for pro-FTA (anti-FTA) states, where pro-FTA (anti-FTA) consists of setting state-level FTA `Favorability` 1 sd above (below) its mean. *Bottom-right panel:* AFD of an IQR shift in `Financial self-interest`, conditional on being on the Finance Committee.

I use the CCES data to estimate a measure of state-level `Anti-FTA sentiment`, using the CCES postratification weights and pooling the available FTA questions. To the *baseline model*, I add an interaction term between `Financial self-interest` and state-level `Anti-FTA sentiment`, allowing these terms and their interaction to *vary by party*. The bottom-left panel of Figure 4.19 shows that setting state-level `Anti-FTA sentiment` to one standard deviation above the mean, the AFD of an IQR shift in financial self-interest is about 9 percentage points greater than if state-level `Anti-FTA sentiment` is set one standard deviation below the mean.

I also expect committee membership could impact the effect of financial self-interest if it influences how senators on these committees relate to their constituents. The Senate Committee on Finance is the primary committee that coordinates with the executive branch on FTAs. Members of this committee should, like Republicans, respond less to financial self-interest. Two factors contribute to this. First, they hear heavily slanted messages about the benefits of FTAs. For example, during Congressional hearings on FTAs, pro-trade committee chairs disproportionately choose pro-FTA witnesses, downplaying import competition and offshoring (Lee and Osgood 2019). Members of the Finance Committee are more likely to think voters' gain from the passage of FTAs.

Second, members of committees like this are expected to bring in campaign contributions (Powell and Grimmer 2016). Returning to the larger universe of actors legislators appease to win reelection, senators getting these contributions feel compelled to offer something in return, according to Bob Dole (Kaiser 2009, 148). Like Republicans, these committee members should see most forces favoring FTAs, leaving little room for financial self-interest.

Adding an interaction term between `Financial self-interest` and `Finance Committee` to the *baseline mode*, I produce the bottom-right panel of Figure 4.19). We see that the estimated effect for all members off the committee is about 11 percentage points compared to 4 percentage points on it, though the difference does not attain conventional

statistical significance.

Colophon

This document is set in EB Garamond, Source Code Pro and Lato. The body text is set at 11pt with *cmr*.

This document was typeset using the XeTeX typesetting system, and the University of Washington Thesis class class created by Jim Fox. Under the hood, the University of Washington Thesis LaTeX template is used to ensure that documents conform precisely to submission standards. Other elements of the document formatting source code have been taken from the Latex, Knitr, and RMarkdown templates for UC Berkeley's graduate thesis, and Dissertate: a LaTeX dissertation template to support the production and typesetting of a PhD dissertation at Harvard, Princeton, and NYU

The source files for this thesis, along with all the data files, have been organized into an R package, xxx, which is available at `https://github.com/xxx/xxx`. A hard copy of the thesis can be found in the University of Washington library.

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