The Antecedents of Federal Regulatory Legislation

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Abstract: Much has been written about the scope and consequences of the steady increase in federal regulation over the past half-century. However, there remains much to be known about the political and economic factors that drive this regulatory accumulation. Using new data on industry-level regulation, we create a novel dataset of regulatory legislation that quantifies the federal regulation that each legislator in U.S. House and Senate votes to authorize on each of 107 industries for each year between 1997 and 2012. We find varying levels of evidence that a legislator's constituency, ideology, and campaign finance significantly affect her propensity to vote for regulation on a given industry. We find that a legislator tends to vote for more regulation on an industry if that industry has a stronger presence within her state. We find that campaign contributions from an industry do not substantially deter a legislator from voting for regulation on the industry. In fact, Tobit estimates imply that contributions from an industry have a robust positive association with support for regulation on said industry, though this association diminishes as the legislator's reelection prospects become more secure. We find strong evidence that partisan support for regulation is consistent with the archetype of "anti-regulation Republicans" and "pro-regulations Democrats." However, ideological moderation is associated with the greatest support for regulation within a given party; conservative Democrats and liberal Republicans have the highest propensity to support regulation on a given industry.

Part I: Introduction

Discussions about regulation in popular media are often interwoven with broad narratives about market failure and government failure. A common narrative on the political left portrays regulatory rulemaking as a perpetual conflict between industry and technocrats. This is well exemplified in a 2010 op-ed by former Labor Secretary Robert Reich, in which he delivers a pessimistic assessment of the state of regulation in America:

> When shareholders demand the highest returns possible and executive pay is linked to stock performance, many companies will do whatever necessary to squeeze out added profits. And that will spell disaster - giant oil spills, terrible coal-mine disasters, and Wall Street meltdowns — unless the nation has tough regulations backed up by significant penalties, including jail terms for executives found guilty of recklessness, and vigilant enforcement.

In such regulatory narratives, firms employ nonmarket tactics such as political campaign contributions and lobbying to prevent or mitigate regulatory restrictions on their industry. Adherents to the narrative argue that regulations hinder these firms' ability to extract rents, preserve inefficient levels of market power, and freely induce negative environmental and social externalities. When firms do exhibit what is viewed as "socially responsible" behavior, their motives are often simply disingenuous attempts to curry favor with political elites.

In contrast, there runs a common narrative in the business community, and the political right in general, in which politicians impose regulation on an industry not out of careful cost-benefit considerations, but out of ideological whims or populist pandering. As of such, serious regulatory burdens pile up on business, while the intended public benefits fail to materialize. A 2012 article in *The Economist* reflects such concerns:

> Two forces make American laws too complex. One is hubris. Many lawmakers seem to believe that they can lay down rules to govern every eventuality. Examples range from the merely annoying (eg, a proposed code for nurseries in Colorado that specifies how many crayons each box must contain) to the delusional (eg, the conceit of Dodd-Frank that you can anticipate and ban every nasty trick financiers will dream up in the future). Far from preventing abuses, complexity creates loopholes that the shrewd can abuse with impunity.

The second "force" that *The Economist* cites is "lobbying," noting that "[w]hen a bill is hundreds of pages long, it is not hard for congressmen to slip in clauses that benefit their chums and campaign donors." Interestingly, such rhetoric regarding the pernicious influence of rent-seekers sounds remarkably similar to the fulminations against corporate political activity so often vented by writers on the left. In this sense, regulation is (miraculously) one of the few policy areas in which liberals, conservatives, Marxists, and libertarians alike can voice frustration on a similar set of concerns.

That said, regulatory policy is hardly uncontroversial. Survey results from the Pew Research Center in 2012 and 2016 hold that a strong majority of Republicans believe that regulation of business does more harm than good, while a strong majority of Democrats disagree. As both the "left" and "right" narratives of regulatory rule-making contain themes of regulatory capture by special interests, this partisan divide suggests that viewpoints on regulation may be largely attributable to one's preferred method of addressing regulatory capture. A common argument from the left holds that campaign finance and lobbying reforms are necessary to keep regulatory policy in the public interest; a common rebuttal on the right posits that the easiest way to eliminate rent-seeking is by shrinking the scope of regulatory policy, thereby reducing the incentives for "special interests" to seek influence.

Such arguments are often theoretical in nature, but they rely (usually implicitly) on assumptions about particular aspects of the political and economic system. The argument that campaign contributions should be limited relies on the proposition that contributions are effective in obtaining legislative or electoral outcomes. Similarly, arguments for legislative review of agency rulemaking rely on the proposition that legislators sometimes have a comparative advantage in making desirable choices regarding regulatory policy.

Such propositions about the American political system merit careful empirical analysis, even if they are often taken for granted by policymakers and political commentators. From the burgeoning text of the Code of Federal Regulations, one can empirically assert that federal regulation in the late twentieth and early twenty-first centuries has been trending upward. However, there is much to be known regarding why such an increase has occurred. Could it be, as *The Economist* suggested, that such growth is derivative of the "hubris" of well-meaning legislators? Or, as suggested by Reich, has this regulatory growth occurred despite the resistance of powerful industry interests?

In the following sections, we present an empirical analysis of such factors as they relate to regulatory policy authorized by the legislative branch. While administrative agencies are certainly no less important to the regulatory rule-making process, the legislature has a fundamentally different role in crafting regulation. Congressmen write general directives for regulatory policy, and executive agencies turn these directives into enforceable rules. Thus, in analyzing the determinants of a legislator's decision to authorize regulation an industry, we can obtain a clearer picture of the "inputs" to the very first step in the regulatory process. In the empirical analysis to follow, we focus on factors relating to legislator ideology, constituency, and campaign finance in particular.

Part II: Review of the Literature on the Political Economy of Regulation

In his seminal 1971 paper on the subject, George Stigler described the three goals of the economic theory of regulation as explaining "who will receive the benefits or burdens of regulation, what form regulation will take, and the effects of regulation upon the allocation of resources" (p. 3). Research in pursuit of this first goal has made its mark in the public conscience by advancing less idyllic (and often quite cynical) views of the motives behind regulatory policy. While models within classical economic and social theory frequently treat regulation as a social planner's remedy for market failure, Stigler asserts that the chaotic political processes that actually craft regulation hardly resemble the hand of a benevolent social planner. Between the rational ignorance of voters and the collective action problems associated with the concentrated benefits and diffuse costs of regulatory policy, regulatory institutions are ripe for capture by the very industries they are supposed to govern. Stigler goes as far to hypothesize that "every industry or occupation that has enough political power to utilize the state will seek to control entry" (p. 5).

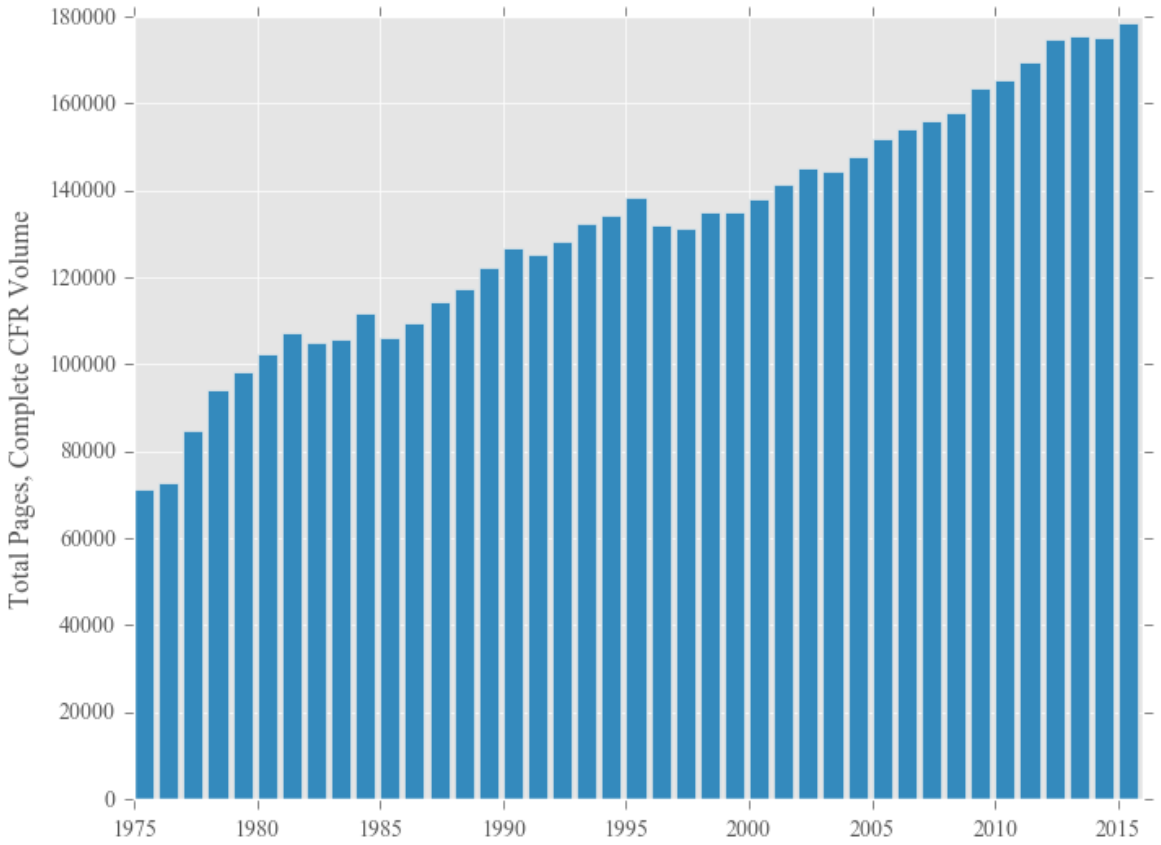
A number of scholars have disputed Stigler's description of the regulatory process as a Manichean struggle between rent-seeking and the common good. Many such rebuttals have been along the lines of Posner's (1974) argument that industries frequently fail to achieve desirable regulatory outcomes in practice. Barke and Riker (1982) note that instances of significant deregulation pose a quandary for the theory of regulatory capture. If an industry supports deregulation, why did it allow unfavorable regulation to be implemented in the first place? And if opposes such deregulation, how "captured" must the regulator actually be if the industry

cannot maintain its desired policy? Becker (1983) provides a model of regulatory rulemaking that emphasizes the significance of different interest groups' efficiency in producing political pressure, and Laffont and Tirole (1991) argue that principle-agent problems in the government and informational asymmetries between industries and their regulators are key determinants in industries' influence over the regulatory process. While Stigler's regulatory capture narrative might be too stark, it is clear that the "benevolent social planner" model of the regulator is far from cannon in modern social science. While the motives within the actual regulatory system must lie somewhere between these two disparate narratives, it remains an open empirical question just how close reality is to either pole.

The history of regulatory accumulation in the twentieth century provides a strong reason to investigate such motives. In the United States, regulation of industry occurs at the federal, state, and local levels. Regulation is traditionally authorized by a legislative body, and then handed down to administrative agencies and courts for interpretation and implementation. In practice, however, the bulk of regulatory rulemaking has been in the domain of administrative agencies since the turn of the century (Glaeser and Shleifer 2003). As agencies continuously roll out and revise regulations, active rules are annually catalogued in the Code of Federal Regulations and the various state administrative codes.

While administrative agencies have the authority to both add, revise, and delete regulations, they tend to utilize the first two options more than the latter. Between 1975 and 2015, the number of pages published in the annual Code of Federal Regulations has increased by 150%; the complete 2015 volume of the Code of Regulations contained nearly 180,000 pages (see Figure 1 below). McLaughlin and Williams (2014) attribute this substantial "regulatory accumulation" largely to the absence of a system to retroactively review outdated and dysfunctional rules. While regulatory agencies have plenty of procedures and guidelines to vet and adopt new rules, there are surprisingly few mechanisms to facilitate regulatory "garbage collection," so to speak.

Figure 1
Code of Federal Regulations: Page Counts 1975 - 2015



Data Source: George Washington University Regulatory Studies Center

The economics literature provides evidence that the burden of such accumulation is far from trivial. Dawson and Seater (2013) estimate an endogenous growth model that factors in the effect of regulation on national output. Using the number of pages published in the annual CFR as a proxy for federal regulation, the authors find that the accumulation of federal regulation between 1949 and 2005 reduced GDP growth by roughly 2 percentage points on average. Therefore, their model stipulates that, if regulation remained at 1949 levels, GDP at the end of 2011 would have been $53.9 trillion instead of $15.1 trillion. As hyperbolic as such a result may sound, other researchers have come to similar conclusions. Djankov, McLiesh, and Ramalho (2006) use measures of business regulations in 135 countries to test the effects of business regulation on growth; they find that moving from the bottom quartile in their business regulations index to the top quartile is associated with a 2.3 percentage point increase in GDP growth. Coffey, McLaughlin, and Peretto (2016) find that the increase in federal regulation

between 1980 and 2012 has led to a 0.8 percentage point decrease in the real growth rate. As for more specific measures of regulation, Jorgenson and Wilcoxen (1990) find that US federal environmental regulation was responsible for a decrease in GDP growth of 0.191 percentage points between 1974 and 1985 (p. 338). Loayza, Oviedo, and Serven (2005) likewise find that higher regulatory burden in developing and industrialized countries' product and labor markets significantly reduces economic growth.

Given the inherent risk that regulatory accumulation poses for growth and productivity, it's worth asking why regulators allow so many rules to pile up each year. The capture theory advanced by Stigler (1971) and others jumps out as a promising piece of the puzzle. However, the aforementioned large negative effects of regulation on overall growth, and the inability of many industries to "capture" their regulators, suggest that there may be more to the story. Do regulators make decisions mostly out of pecuniary self-interest? Or do professional reputation, ideology, public opinion, and electoral politics drive their decisions on regulatory policy?

In examining the incentives of regulators, it's critical to note the different roles that legislators and administrative agencies play in crafting regulation. At the federal level, Congress passes bills which become the public laws that authorize changes to regulatory policy. Along with regulatory directives from executive orders, these changes are sent to executive agencies for interpretation and implementation. After executive agencies convert these directives into enforceable, concrete regulations, they publish the new set of rules in the Code of Federal Regulations. Therefore, while agencies typically have wide latitude in the specific rules they write, their actions are all ultimately under the direction of Congress.

Barke and Riker (1982) note that firms seeking influence over the regulatory process could, in theory, approach either the legislature or a relevant agency, as both are needed to implement regulation. They suggest that legislators should, in principle, be less susceptible to regulatory capture as they are only involved in the beginning of the regulatory rulemaking process (pp. 77-78). However, administrative agencies are supposed to be agents of the legislators, and so Barke and Riker conclude that uncovering each group's share in the responsibility for regulation require careful empirical analysis (p. 78). In their own analysis, the authors find evidence that administrators act roughly in congruence with their instructions from

the legislature (p. 96). Regardless of whether this result holds true in general, we shall focus on Congressional incentives for the remainder of the paper.

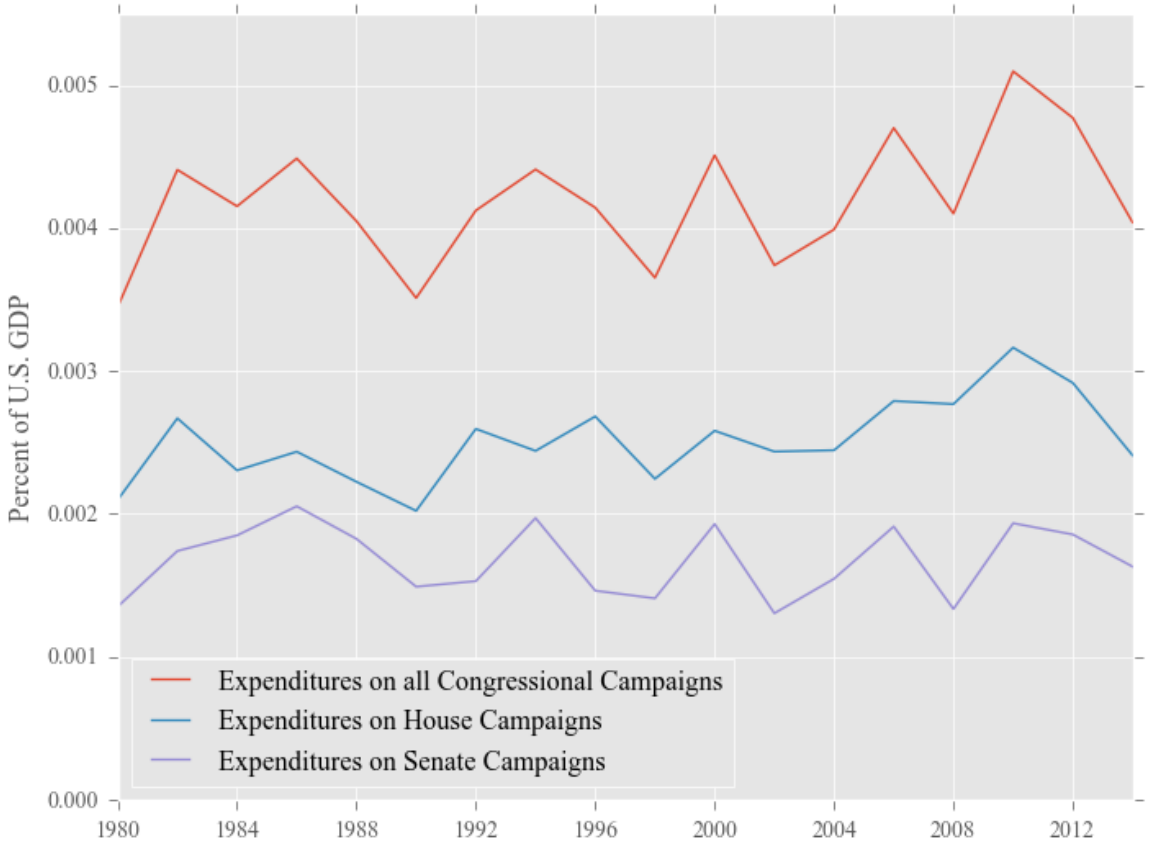
While firms have many methods to influence legislators, Stigler (1971) notes that nearly all non-market strategies boil down to providing "votes and resources" (p. 12). The first component of this combination is rather straightforward – industries employ a number of workers, which means they employ a number of voters. Therefore, legislators can try to cobble together a winning coalition of voters by crafting regulatory legislation that bestows benefits upon a certain collection of industries (and more specifically, the workers within these industries).

The provision of resources to legislators and political parties is a much more complicated channel of political influence. Overt bribes are generally frowned upon in modern American society, not to mention their gross illegality. Therefore, political transactions between legislators and industry tend to be at most *implicitly* quid-pro-quo. One of the most well-studied forms that such transactions may take is that of political campaign contributions. While public discussion of campaign finance has reached a fever-pitch since the 2010 landmark *Citizens United* ruling, social science research on the influence of campaign contributions goes back decades.

The archetypal research question for such studies involves the relationship between campaign contributions and roll-call votes in Congress. Coughlin (1985), Davis (1993), Frendreis and Waterman (1985), and Stratmann (1991) all find varying levels of evidence that contributions have a significant effect on roll call votes in Congress. Each of these researchers found a way to gauge firm or industry positions on specific bills proposed in Congress, and each found that increases in contributions were associated with a higher likelihood that particular congressmen vote in the firm or industry's favor. On the other hand, Chappell (1982), Grenzke (1989), and Wawro (2001) all fail to find evidence that contributions from interest groups (most often corporate and union PACs) affect voting decisions in the US Congress. Roscoe and Jenkins (2005) conduct a more formal meta-analysis of 30 studies on the topic; they find that 35.9% of the 357 tests extracted from these studies yield a statistically significant estimate (at 5%) of the effect of contributions on roll-call votes.

In 1972, Gordon Tullock famously inquired "why there is so little money in politics." Given the immense redistributive and regulatory power the state wields over the economy, one might expect that firms spend a substantial portion of their income on acquiring political power. However, as seen in Figure 2 below, the total spending on all congressional races has consistently hovered around four *thousandths* of a percent of U.S. GDP between 1980 and 2014.

Figure 2
Congressional Campaign Spending By Cycle: 1980-2014



Data Sources: Campaign Finance Institute analysis of Federal Election Commission data; Federal Reserve Bank of St. Louis Economic Research Division

In a 2003 empirical study, Ansolabehere, de Figueiredo and Snyder took up Tullock's question and concluded that that "campaign contributions should be viewed primarily as a type of consumption good, rather than as a market for buying political benefits" (p. 105). In a meta-analysis of studies on the relationship between contributions and legislative voting outcomes, the authors find that three quarters of quantitative studies on the topic either failed to yield a statistically significant relationship, or provided a coefficient estimate with the "wrong" sign, i.e. indicating that a marginal increase in contributions is associated with less desired voting

outcomes (p. 114). According to their subsequent analysis of contribution records, even many of the largest firms in their dataset refrained from setting up PACs or meeting the low contribution limits set out by law (pp. 108-109). Such findings cast doubt on the hypothesis that most firms actually do achieve high returns on political contributions.

If one rules out the far-fetched possibility that firms leave trillions of dollars on the table year after year, one might aptly reframe Tullock's puzzle as "why there is such a small return to money in politics." While Ansolabehere, de Figueiredo and Snyder (2003) conjecture that campaign contributions should be mostly viewed as consumption, they suggest the possibilities that either (a) some critical subset of donors expects a return on its contributions, or (b) interest groups contribute to politics for reasons other than swaying votes, such as affecting elections or buying access to (as opposed to direct influence over) legislators (p. 126). It therefore may be of use to take a more nuanced look at the interactions between congressmen and industries within the policymaking process, noting that campaign contributions may be a small, but significant, determinant of policy outcomes.

According to the empirical literature, legislator ideology, party affiliation, and constituent economic interest may fill in much of the rest of the picture. Chappell (1982) studies the determinants of roll call voting by members of the U.S. House of Representatives between 1974-1977; four of the seven votes that he analyzes are concerned primarily with regulation (p. 80). While unable to make a statistically significant inference about the effect on contributions on voting outcomes, he does find that legislator ideology, party affiliation, and indication of constituent interest are strong predictors of legislators' voting decisions (p. 81). Likewise, Frendreis and Waterman (1985) find that conservative ideology, Republican party affiliation, and industry PAC contributions all are associated with a greater likelihood of supporting trucking deregulation in 1988 (p. 407). McArthur and Marks (1988) find both constituent interest and ideology to be significant predictors of congressmen's votes on domestic content legislation in 1982, but they argue (theoretically and empirically) that there are strong tradeoffs between satisfying these two. Peltzman (1984) looks at Senate votes in 1979-1980 and finds that while ideology and constituent economic traits both have strong explanatory power on economic issues, constituent economic traits appear to be the stronger predictor. However, Peltzman argues that such factors tend to go hand-in-hand in practice. Given that there is usually much symmetry between voters' economic traits and ideology, voters tend to elect legislators who have little

difficulty reconciling their ideological preferences and their constituents' economic interests (p. 210).

While such "roll call studies" have come to some consensus on factors that do, and do not, affect legislative outcomes, the body of literature is not without shortcomings. In the view of Wawro (2001), two limitations of most roll call studies include (i) the narrowed, tailored datasets that researchers tend to use (which make it difficult to generalize the relationship to other types of legislation), and (ii) the lack measures of constituency interest that are specific enough to individual contributors (p. 565). Though not featured in Warwo's critique, another limitation is that such studies rarely focus on regulatory legislation in particular. Regulatory policy arguably differs from other types of economic policy (e.g. tax and spending policy) in a couple of key manners.

First of all, it's much less visible to the public at large, as most voters deal with regulation in a predominantly indirect manner. While every voter pays her taxes and sees projects funded by government spending (e.g. schools, highways, and Social Security), not many voters actually wrangle with the rules that pile up in the Code of Federal Regulations each year. Second, regulations are often more industry-specific than other types of policy. While taxes, immigration, and welfare affect the bottom lines of most industries, the regulatory process ensures that most regulations are tailored to specific industries or sectors of the economy. The Code of Federal Regulations is divided into fifty titles, one per executive agency. The names of many of these titles and agencies make it clear that their purpose is to govern some specific industry or set of industries; take, for instance, "Title 7: Agriculture," "Title 10: Energy," or "Title 47: Telecommunication."

Grier, Munger, and Roberts (1994) find that industries that stand to benefit more from government policy contribute more to political campaigns on average; however, such giving is significantly constrained by collective action problems. If one assumes that collective action problems are less salient when parties have a more common interest in a certain policy outcome, then it would stand to reason that industries employ different nonmarket strategies toward policies they agree on versus those they do not. Given the relatively narrow incidence of regulatory legislation, then, it may very well be that legislator-industry interactions on regulatory policy differ from such interactions regarding other policy areas. In the following two sections, we propose a model of the legislative side of the regulatory process that focuses on the

interactions between specific legislators and industries. We also introduce a novel dataset that makes at least marginal progress in mitigating the aforementioned problems with rollcall studies described by Wawro (2001).

Part III: A Model of Regulatory Legislation

We shall now propose a model of a legislator's choice to regulate an industry. In any given year, a legislator implement a number of regulatory restrictions on each industry. Adopting the rational choice framework, we assume that a legislator has two goals: implementing regulatory policy that is in line with her ideology and/or partisan affiliation, and winning reelection.

First, the legislator's decision to implement regulatory restrictions is constrained by her ability to pass legislation. As it is easier for legislators to pass legislation when their party is power, we control for whether the legislator's party controls the house, senate, and presidency. Moreover, we control for which chamber of congress that the legislator sits in, as this is relevant to which issues are most likely in her purview, as well as the amount of political influence she wields. To factor in the legislator's ideological and partisan affiliation, we shall control for the legislator's party affiliation and "ideal point" (i.e. ideology score) on a unidimensional (i.e. "left-right") policy spectrum.

To win reelection, politicians rely on voter enthusiasm and interest group support. We assume that the economic significance of an industry within a politician's state reflects the importance of said industry to voters and interest groups. Thus, the legislator's desire for reelection should, on the margin, drive her to support regulatory policy that is favorable to industries that are economically significant within her state. Therefore, we control for the proportion of firms, establishments, employees, and payroll attributable to a given industry. Moreover, one must note that a legislator needs funds to run future campaigns, if she is to successfully win reelection. Thus, we conjecture that, on the margin, a legislator would choose to regulate an industry more favorably if the industry provides more campaign contributions. We therefore control for the amount of campaign contributions made by the industry. However, there are tradeoffs between satisfying one's ideological preferences for regulatory policy and winning reelection. Since a legislator only needs one vote over 50% to be reelected, we hypothesize that the safer a legislator is in her reelection chances, the weaker the influence that campaign

contributions will have on her decision to regulate an industry. As of such, we control for the interaction effects between campaign contributions and vote share in the legislator's last election.

We may formalize this discussion with the following regression equation:

$$R_{l,i,t} = \alpha_t + \beta\, score_i + \gamma_1 P_{l,t} + \gamma_2 E_{l,i,t} + \delta_1 C_{l,i,t} + \delta_2 V_{l,t} + \delta_3 (C_{l,i,t} \times V_{l,i,t}) + \varepsilon_{l,i,t}$$

$R_{i,t,l}$ corresponds to the number of restrictions that legislator l imposes on industry i in year t. The legislator's ideology is given by $score_i$. The vector of indicator variables

$$P_{l,t} = (senator_{l,t}, controls\_senate_{l,t}, controls\_house_{l,t}, controls\_pres_{l,t})$$

controls for factors relating to the legislator's political attributes; $senator_{l,t}$ reflects the chamber of congress that the member belongs to, and $controls\_senate_{l,t}$, $controls\_house_{l,t}$, and $controls\_pres_{l,t}$ indicate whether the legislator's party controls the senate, house, and presidency, respectively.[1]

The vector $E_{l,i,t} = (firms_{l,i,t}, emp_{l,i,t})$ reflects the economic significance of industry i in the state of legislator l in year t. Specifically, $firms_{l,i,t}$ refers to the percentage of all firms in legislator l's state in year t that belong to the 3-digit NAICS industry that contains industry i. Likewise, and $emp_{l,i,t}$ refer to the percentage of employees that belong to the 3-digit NAICS industry that contains industry i.

The scalar $C_{l,i,t}$ stands for the amount of donations (in USD) that contributors affiliated with industry i gave to legislator l in a timespan ending in year t. The scalar $V_{l,t}$ stands for the legislator's share of the vote (as a percentage) in his or her last federal election. The interaction term $C_{l,i,t} \times V_{l,t}$ reflects the premium effect that contributions have on regulatory restrictions as electoral share increases.

In estimating this model, we shall examine the magnitude and scope of the legislature's role in creating new regulation, as well as the core antecedents of such regulatory legislation. Certain limitations of the model are immediately apparent. Notably, the model does not incorporate deregulation, as $R_{i,t,l}$ only captures new regulations authorized by a legislator in a given year. This poses two issues for inference, as the amount of regulation contained in each bill is censored at zero, and a piece of deregulatory legislation could effectively be interpreted as

[1] We also considered controlling for party as a political attribute; however, a legislator's party affiliation is very strongly correlated with her ideological score $score$, which could arguably reflect her "partisan" identity more strongly than her "ideological" identity. We formally consider the role of party membership in robustness checks in Part VI.

adding regulation on net if the bill authorizes a smaller set of regulatory restrictions to replace a larger set. There are methodological adjustments that we implement to deal with the censored regulation measure, such as Tobit modeling. However, the second issue is a much more serious concern for our conclusions. For example, if a bill authorizes the creation of 50 new regulatory restrictions to replace 100 old regulatory restrictions, the model simply treats the change as an addition of 50 new restrictions, despite the fact that 50 restriction were actually removed "on net." Thus, our analysis relies on the assumption that such instances are relatively rare. We discuss just how plausible such an assumption is in our explanation of our regulation measure in Part IV, and we discuss the implications of such measurement error in Part VII.

While not necessarily a limitation, it is also important to note that our consideration of regulation only extends to regulation that is actually implemented by regulatory agencies. We do not (and cannot) consider legislators' failed attempts at regulatory legislation. Since a legislator cannot pass regulation all by herself, this model does not allow us to make strong claims about legislators' intentions or preferences regarding regulation. However, there is something to be said for focusing on the regulation one *actually creates* versus legislation that one *intends to create*. It makes no economic difference whether a legislator refrains from authorizing regulations out of incompetence, lack of political capital, or simply a lack of desire to do so.

Part IV: Data on Regulatory Legislation

To estimate the proposed model of regulatory legislation, we compile a dataset that features the amount of regulation supported by each congressman on a panel of industries and years. Most research on regulatory legislation relies on Boolean measures of legislative outcomes, such as votes in favor of (or against) specific bills. Such measures of regulation tend to face several significant limitations.

First and foremost, these measures usually do not recognize any magnitude of regulation, instead treating all votes on regulation as equivalent in significance. For illustration, Public Law 94-163 (the "Energy Policy and Conservation Act") effectively banned for decades the export of crude oil produced in the United States; on the other hand, Public Law 101-74 prohibited drilling in the Cordell Bank National Marine Sanctuary. While both of these laws regulated the oil industry, the former has dwarfed the latter in terms of economic impact on the industry as a whole. A binary

measure of votes on energy policy, however, fails to discriminate between the significance of these two.

A second shortcoming of common measures of regulation arises from their limited specificity. Dawson and Seater (2013) use a continuous measure of regulation – pages published in the yearly Code of Federal Regulations – to estimate the impact of regulatory restrictions on economic growth. While such a measure may be useful in a macroeconomic context, its usefulness for studying the political economy of regulation is lacking, as most regulations only affect certain industries. The coordination problems that beset firms' nonmarket strategies imply that an industry's capability to affect policy outcomes deteriorates as the policy area becomes more general (i.e., as its benefits become less concentrated and its costs less diffuse). As of such, a robust model of regulatory rule-making requires an industry-level (or firm-level) measure of policy outcomes.

In addressing the two aforementioned measurement issues, researchers have tended to focus on data based on small sets of legislation (sometimes only a single bill) for which they can manually gather sufficient data on interest groups motives and actions. This has led to studies of regulatory legislation that are narrowly tailored to particular narratives of regulation. In doing so, researchers fail to account the wide spectrum of policy areas that lay outside of their very limited data. They also fail to recognize regulation authorized in less conventional contexts, such as bills that primarily create subsidies and appropriate funds.

To mitigate these issues in our analysis, we shall utilize the RegData 2.2 database of industry-level regulation restrictions (Al-Ubaydli and McLaughlin 2015). RegData quantifies federal regulation, as laid out in the Code of Federal Regulations, by industry for the period 1975-2014. The database has two significant novel features: its quantification of Federal regulation to a finer degree than previous measures (such as Dawson and Seater (2013)), and its classification of specific regulations according to the North American Industry Classification System (NAICS) industry.[2]

[2] RegData 2.2 classifies industries according to the 2007 set of NAICS codes. As of such, every reference to NAICS codes in this paper is a reference to the 2007 NAICS codes in particular. Variables that reflect industry classifications other than 2007 NAICS (such as SIC and other NAICS editions) have been translated to 2007 NAICS using the U.S. Census Bureau's official NAICS concordance documents, available at https://www.census.gov/eos/www/naics/concordances/concordances.html.

RegData's regulation measures rely on text analysis of the Code of Federal Regulations ("CFR") and the Federal Register (the federal government journal that announces new and proposed rules from federal agencies). To understand how such text analysis works, it's worth noting that the CFR has three key structural levels – the year, title, and part.[3] It's already been noted that each yearly publication of the CFR involves a collection of titles, each of which contains the regulations published by a certain agency or set of agencies. A further subdivision of the CFR is the "part," which features the details of a specific regulatory function or program. RegData produces a "restriction count" for each CFR year-title-part by counting up the number of restriction terms (phrases such as "must", "shall", "may not", "must not", and so on) found in the text. One can then measure the number of "regulatory restrictions" corresponding to a regulation by summing over the restriction terms found in all CFR parts associated with this regulation.

The second key component of the RegData dataset—industry classification—entails estimating the probability that each year-title-part of the CFR applies to a given NAICS industry.[4] RegData 2.2 employs a machine learning algorithm to estimate these probabilities. The algorithm analyzes "training documents" from the Federal Register that contain announcements of new regulations, as well as lists of the industries that these regulations affect. Given the combinations of regulatory text and industry classifications found in the training documents, the machine learning algorithm estimates a probability that the text in a given year-title-part of the CFR applies to a specific industry.[5] Therefore, an estimate of the number of regulatory restrictions issued on industry i by title t and part p of CFR in year y can be obtained via the equation

[3] Technically, the CFR has many different levels of organization, including the title, subtitle, chapter, subchapter, part, subpart, and section. However, not all of these degrees of refinement are always present for a given regulation, and only the year, title, and part number associated with a regulatory restriction are relevant to RegData's text analysis algorithms.

[4] NAICS assigns a numerical classification code between two and six digits to each industry – where the number of digits increases with specificity of the industry classification. Bayer CropScience, for instance, belongs to the six-digit industry NAICS 325320, "Pesticide and Other Agricultural Chemical Manufacturing." RegData 2.2 only features regulatory statistics for two, three, and four digit industries, so the regulatory restrictions relevant to Bayer CropScience would be listed in RegData 2.2 under NAICS 32 ("Manufacturing"), NAICS 325 ("Chemical Manufacturing"), or NAICS 3253 ("Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing").

[5] More details about the machine learning and text analysis algorithms used in producing RegData 2.2 can be found on the database's website http://regdata.org/, and in the downloadable dataset's README file.

$$R_{i,y,t,p} = R_{y,t,p} \times P_{i,y,t,p},$$

where $R_{y,t,p}$ is the number of restriction terms found in the year-title-part and $P_{i,y,t,p}$ is the estimated probability that this year-title-part applies to industry i.

There are several concerns that one might have regarding a measure of regulation based on text analysis of the Code of Federal Regulations. First, one may feel that simply counting up the number of restriction terms ("shall", "must", "may not", "must not") relating to an industry fails to account for rules that may be short but significant. For instance, one would say that the clause "firms may not export crude oil produced in the United States" is significantly more burdensome to the oil and gas industry than "firms must install X safety feature on new oil rigs."

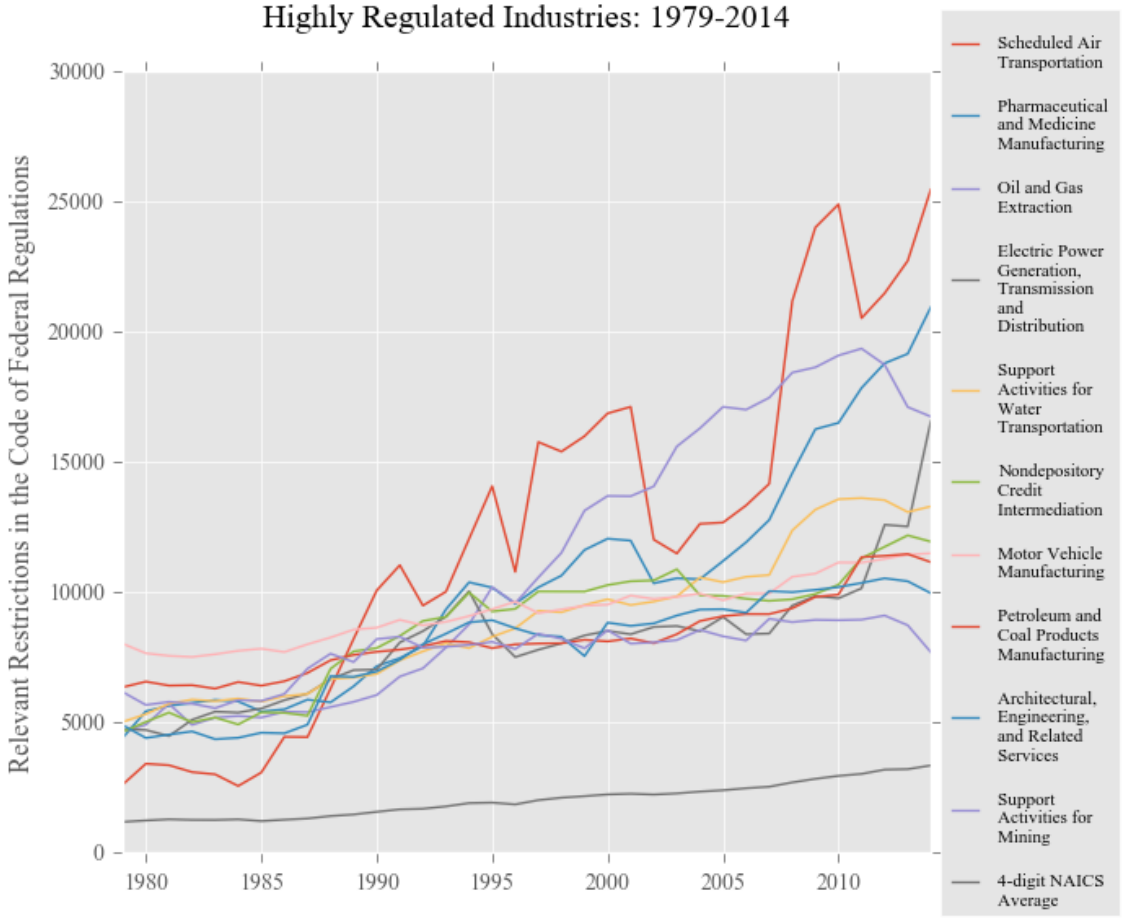
While this is undoubtedly an issue for quantifying regulation via text analysis, it's not an issue that any other researchers have satisfactorily solved to date. In simply using page counts from the yearly CFR, Dawson and Seater (2013) address the validity of their measure of regulation by noting that one should expect the number of CFR pages to be positively related to the complexity of regulation because, at least on average, "more complex regulations should require more page to describe" (p. 140). As more complex regulations tend to entail a greater number of regulatory restrictions, they posit that page count within the CFR "should capture whatever regulatory burden is reflected in the number of regulatory requirements" (p. 143).

While Dawson and Seater (2013) use page counts to proxy for regulatory requirements, RegData 2.2 actually measures the number of requirements. The measure of regulation in RegData 2.2 should therefore reflect regulatory burden at least as well, as its measure is more granular that the number of CFR pages, and it is industry specific. Furthermore, whatever regulatory burden may be inferred by the sheer amount of text in relevant regulations should be captured by our "restriction term" count measure, as the number of words in a regulation is highly correlated with the number of restriction terms. Between 1979 and 2014, the correlation between the number of words and the number of restriction terms in all CFR year-title-parts that regulate an industry varies between 0.954 and 0.983.

Perhaps a more persuasive case for our measure lies in the fact that the most regulated industries, in terms of the RegData restriction count metric, correspond to one's general intuition

regarding which industries are most regulated. Figure 3 below depicts the set of 4-digit NAICS industries that are most consistently highly regulated between 1979 and 2014.[6]

Figure 3
Highly Regulated Industries: 1979-2014



Data Source: RegData 2.2, a product of the Mercatus Center at George Mason University

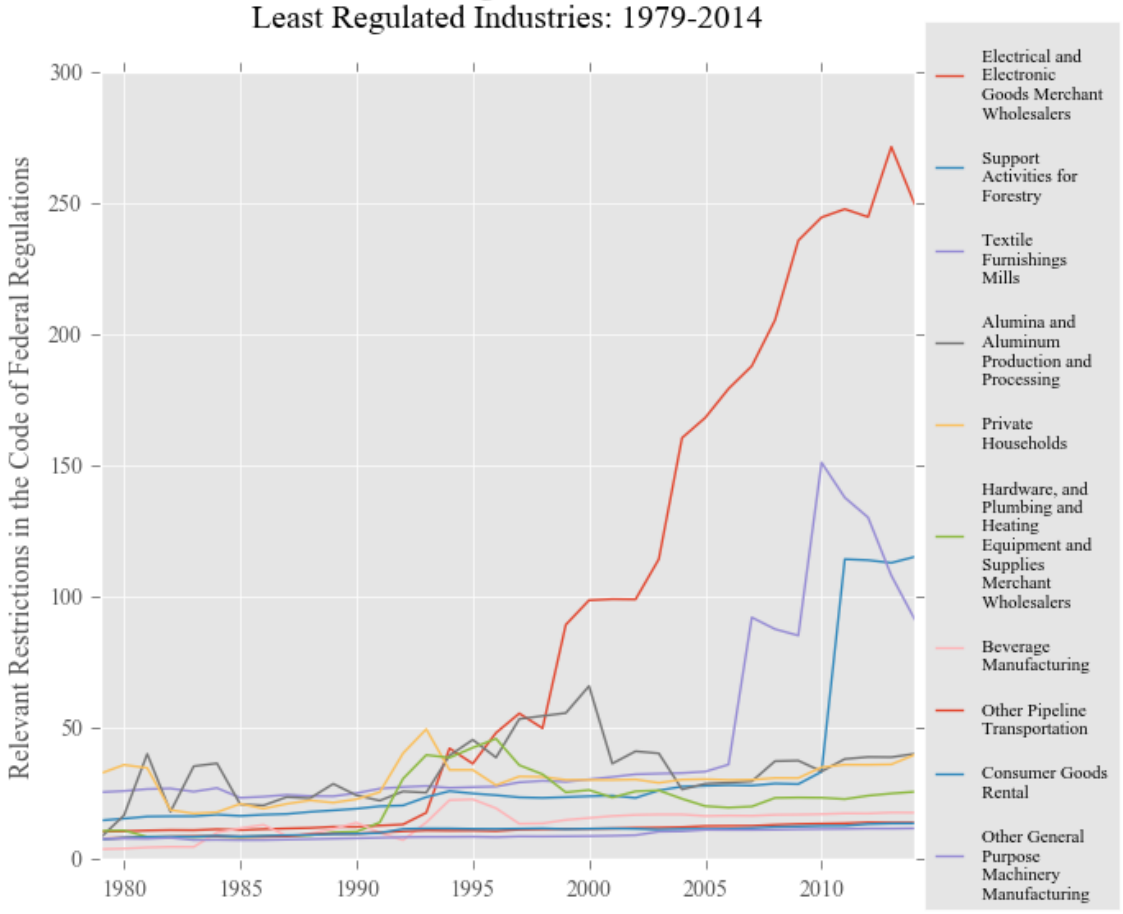
There exist entire literatures on the regulatory political economy of the pharmaceutical, airline, and fossil fuels industries. As of such, it seems quite appropriate that these industries are consistently among the most regulated according to our regulatory restriction metric. Considering regulators' often stated goals of mitigating negative externalities, deterring uncompetitive industry

[6] To find the set of most consistently highly regulated industries, we computed the number of years that each industry made the top ten for the highest number of regulations. Figure 3 depicts the ten industries that made it into the top ten the most frequently between 1979 and 2012. Out of the 107 industries for which RegData 2.2 quantifies regulation, only 15 ever make it into the top ten for one or more years. This lack of churn suggests that a relatively small class of industries may face a perpetually high level of regulation.

practices, and promoting consumer safety, it make sense that such industries would fall squarely within the sights of the executive agencies.

On the opposite end of the spectrum, one would expect that the industries that consistently face the least regulation are those that are least afflicted by the aforementioned issues. And, sure enough, the industries which consistently rank near the bottom according to our measure hardly seem to be the cause of grave public concern in terms of externalities, competition, or consumer safety. As depicted in Figure 4 below, the least regulated industries differ from the most regulated by two orders of magnitude in regulatory restrictions. However, when one ponders the potential rationales for regulating private households, consumer goods rental, and electronic wholesalers, this result seems quite consistent with one's expectations for regulators' priorities.

Figure 4
Least Regulated Industries: 1979-2014



Data Source: RegData 2.2, a product of the Mercatus Center at George Mason University

For our analysis, we focus on the 107 4-digit NAICS industries for which RegData produces restriction counts. Since each year-title-part within the CFR must be authorized by

congressional legislation, we traced each year-title-part back to congressional records on roll call votes, bill sponsorship, and bill cosponsorship. From these records, we constructed measures of the amount of regulation voted on, voted in favor of, sponsored, and cosponsored for each sitting congressman between 1979 and 2012. Please consult Appendix I for the details of how these measures were constructed.

The specific measures of regulatory outcomes that we used in the model estimation are as follows:

vote_regs [*years_out*]: Reflects the number of regulatory restrictions on industry i that legislator l voted for in year y that were in effect in Code of Federal Regulations for the year $y + years\_out$, where $years\_out \in \{1, 2, 3, 4, 5\}$.

vote_prop [*years_out*]: Reflects the proportion of regulatory restrictions (out of all of those voted on) on industry i that legislator l voted for in year y that were in effect in Code of Federal Regulations for the year $y + years\_out$, where $years\_out \in \{1, 2, 3, 4, 5\}$.

is_regulated [*years_out*]: Binary variable that reflects whether legislator l voted for regulatory restrictions on industry i in year y that were in effect in Code of Federal Regulations for the year $y + years\_out$, where $years\_out \in \{1, 2, 3, 4, 5\}$. This variable takes on a value of one if $vote\_regs\_[years\_out] \leq 1$, and a value of zero otherwise. The cutoff of 1 was chosen instead of 0 (as may be expected) because the vast majority of legislator-industry-years feature at least a miniscule fraction of regulatory restrictions.[7]

sponsor_regs [*years_out*]: Reflects the number of regulatory restrictions on industry i that legislator l sponsored in year y that were in effect in Code of Federal Regulations for the year $y + years\_out$, where $years\_out \in \{1, 2, 3, 4, 5\}$. "Sponsoring" a regulatory restriction entails sponsoring the congressional bill associated with the public law number cited by the given year-title-part in the CFR.

[7] This is because RegData's machine-learning algorithm (which computes the industry-relevance probabilities for CFR year-title-parts) is based on logarithmic regression. As of such, the probability that a bill applies to any of the 107 industry will almost always be strictly greater than zero, even if it is "effectively zero." Only 1.39% of observations for vote_regs_2 are exactly equal to zero. However, the variable vote_regs_2 takes on a value of less than 1 (i.e. there is "less than 1 estimated restriction on the industry") for roughly 53% of the industry-year-legislators combinations.

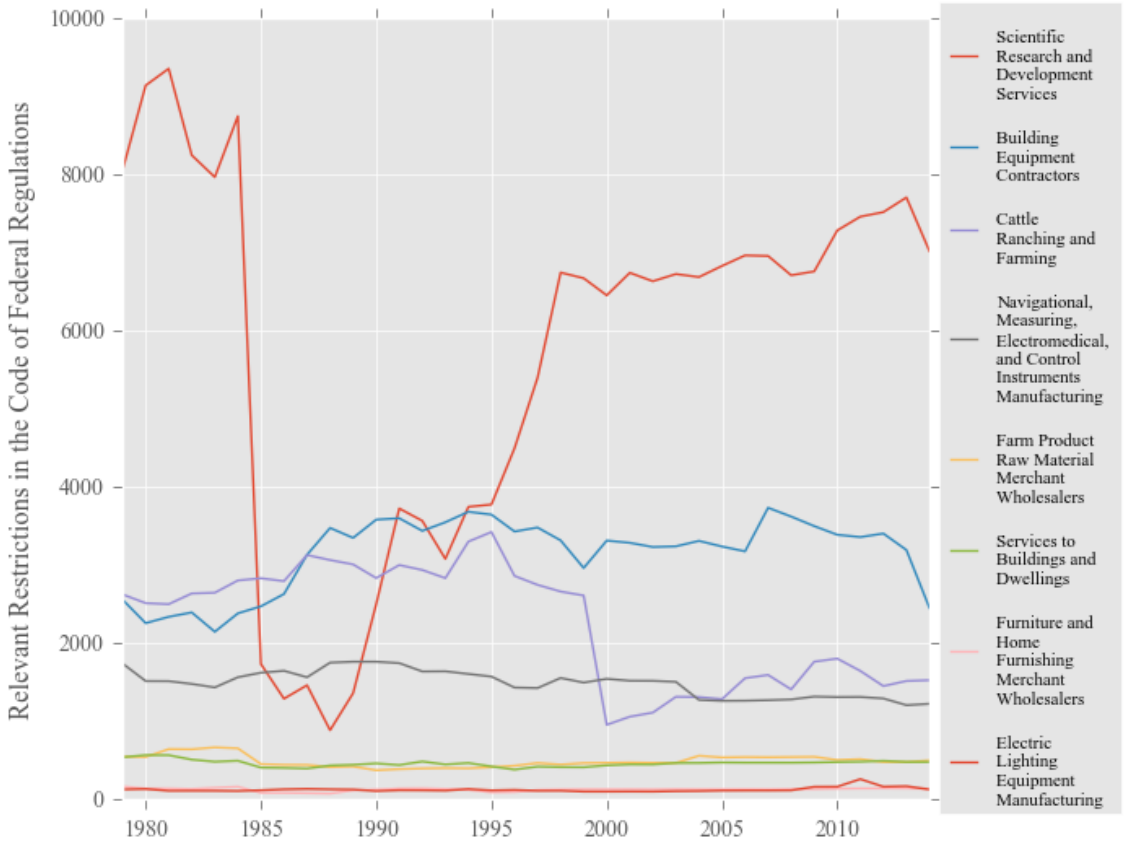
cosponsor_regs_[*years_out*]: Reflects the number of regulatory restrictions on industry i that legislator l cosponsored in year y that were in effect in Code of Federal Regulations for the year $y + years\_out$, where $years\_out \in \{1, 2, 3, 4, 5\}$. "Cosponsoring" a regulatory restriction requires that one is listed as a cosponsor on the congressional bill associated with the public law number cited by the given year-title-part in the CFR. Note that a bill can (and usually does) have many cosponsors; furthermore, this measure considers every sponsor to also be a cosponsor.

Table 5 features descriptive statistics for the first four regulatory measures; the distribution of restrictions according to **cosponsor_regs_[*years_out*]** is qualitatively similar to that of **sponsor_regs_[*years_out*]**. As discussed in Part III, a significant issue with measuring only the new regulations that legislators authorize is that our model cannot incorporate deregulation. While this necessarily leaves a gap in our understanding of the legislature's role in regulatory accumulation, we posit that, compared to the accumulation of new regulation, the presence of deregulation is relatively small. Only 8 of the 107 industries in our dataset experience net deregulation over the 1979-2014 timespan; Figure 6 displays their regulatory trends.

TABLE 5
DESCRIPTIVE STATISTICS FOR MEASURES OF REGULATORY LEGISLATION: 1997-2012

	Mean	St. Dev.	Min	25%	50%	75%	Max	Count
A. Quantity of Restrictions Voted For								
vote_regs_1	16.913	88.497	0	0.080	0.381	4.052	2,114	931,756
vote_regs_2	27.455	120.587	0	0.163	0.874	10.149	4,502	931,756
vote_regs_3	30.626	147.720	0	0.188	1.058	11.703	5,212	873,334
vote_regs_4	32.839	152.957	0	0.200	1.178	12.271	5,221	814,912
vote_regs_5	33.817	137.248	0	0.230	1.492	13.806	2,452	755,741
B. Proportion of Restrictions Voted For								
vote_prop_1	0.769	0.320	0	0.586	0.966	1	1	919,772
vote_prop_2	0.773	0.310	0	0.596	0.958	1	1	920,307
vote_prop_3	0.773	0.308	0	0.596	0.955	1	1	862,634
vote_prop_4	0.774	0.309	0	0.604	0.955	1	1	805,175
vote_prop_5	0.780	0.305	0	0.629	0.959	1	1	747,181
C. Voted for At Least One Restriction								
is_regulated_1	0.388	0.487	0	0	0	1	1	931,756
is_regulated_2	0.483	0.500	0	0	0	1	1	931,756
is_regulated_3	0.505	0.500	0	0	1	1	1	873,334
is_regulated_4	0.515	0.500	0	0	1	1	1	814,912
is_regulated_5	0.539	0.498	0	0	1	1	1	755,741
D. Quantity of Restrictions Sponsored								
sponsor_regs_1	0.097	5.778	0	0	0	0	2,050	931,756
sponsor_regs_2	0.118	8.344	0	0	0	0	4,492	931,756
sponsor_regs_3	0.121	8.269	0	0	0	0	4,500	873,334
sponsor_regs_4	0.124	6.981	0	0	0	0	1,986	814,912
sponsor_regs_5	0.120	6.887	0	0	0	0	1,911	755,741

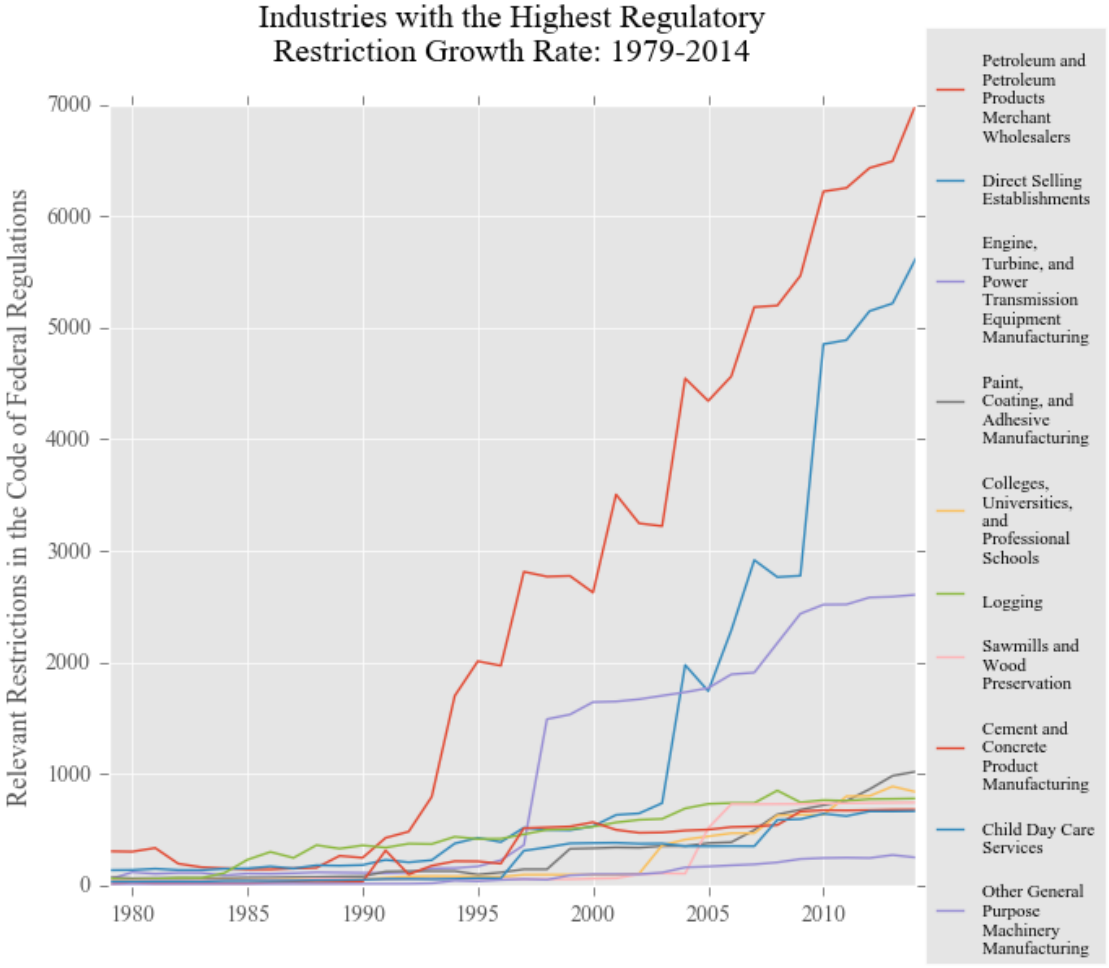
Figure 6
Industries Experiencing Net Deregulation: 1979-2014



Data Source: RegData 2.2, a product of the Mercatus Center at George Mason University

Even though these eight industries have the most negative regulatory growth rate of any in our sample, few of them appear to have sustained a significant deregulatory trend for very long. When comparing these trends to the overall increase in regulation (Figure 1), as well as with those in industries with the most positive regulatory growth rate (Figure 7, below), it seems like regulatory accumulation is by far the dominant trend throughout the timespan of our dataset, while periods of deregulation rarely appear to be more than temporary aberrations. If political actors truly do treat deregulation simply as "negative regulation," and deregulation is as modest as it appears, then it could plausibly be the case that the omission of deregulation simply attenuates our coefficient estimates. Nonetheless, we take seriously the potential for deregulation to significantly bias the estimates of our model coefficients, and so in Part VII we take measures to understand the scope and magnitude of such bias.

Figure 7
Industries with the Highest Regulatory Restriction Growth Rate: 1979-2014



Data Source: RegData 2.2, a product of the Mercatus Center at George Mason University

Part V: Data on Theoretical Predictors of Regulatory Legislation

In accounting for legislator ideology and partisanship, we utilize ideological scores from Bonica (2014). Bonica's "cfscore" is unidimensional ("left-right") ideal point measure constructed using an expansive database of campaign finance records across various types of political actors. This is a static measure based on campaign finance data going back to 1979; thus, a legislator's cfscore does not vary across time. A detailed discussion of Bonica's measurement and estimation techniques is well beyond the scope of this paper, so we encourage interested readers to consult his work directly.

We construct indicator variables to control for whether a legislator belongs to the Democratic or Republican parties, respectively, in a given year.[8] We do not directly incorporate this measure in our regression models, as a legislator's cfscore already accounts for her partisan leaning. Moreover, cfscore is very highly correlated with party membership. We construct the indicator variable "senator" to reflect which chamber of Congress in which a legislator serves in a given year. Congressional party and chamber membership records come from the GovTrack legislator database.

To control for the strength of a legislator's party, we construct binary variables that reflect whether a legislator's party is control of the Senate, House of Representatives, and presidency in a given year. A party is considered "in control" of the Senate if it claims at least 51 of the 100 senate seats, or if it claims 50 of the seats and controls the presidency. Similarly, a party is considered "in control" of the House if claims over 50% of the seats in the chamber. While in theory the presence of independent congressmen could cause no party to have control of the House or Senate, such an outcome never occurs during the time span covered by our database. House and Senate control records come from the Brookings Institution's Vital Statistics on Congress.

We use the percentage of the general election vote that the legislator won in her most recent election to control for a politician's electoral vulnerability. Records come from Bonica's 2013 Database on Ideology, Money in Politics, and Elections (DIME).

We use firm and employee statistics to measure the relative importance of a given industry to a legislator's constituency. Given that consistent data on these measures was unavailable at the 4-digit NAICS and congressional district levels, we used measures at the 3-digit NAICS and statewide levels. That is, our variables reflect the percentage of firms and employees[9], respectively, in the legislator's state that belong to the 3-digit NAICS industry that

[8] A legislator with both party membership variables set to zero is an independent. When conducting separate analyses based on party membership, we ignore the case of independents given that so few of them have served in Congress over the last several decades.

[9] Census Bureau data on the number of employees in a state-level industry is occasionally reported as an interval (e.g. "50-499") instead of an integer. Whenever the Census Bureau's Country Business Patterns dataset features a range, this measure uses the mean of the two endpoints of the interval.

contains the 4-digit NAICS industry in question.[10] All state level economic data used in this paper comes from the Census Bureau's Country Business Patterns dataset for the years 1997-2012.[11]

The generalization from a 3-digit NAICS industry to its 4-digit "child" industry does not seem to entail a great conceptual leap. If the state of the "Primary Metal Manufacturing" industry (NAICS 331) is important to a legislator's constituents, one would imagine there is significant overlap with their concerns regarding "Iron and Steel Mills and Ferroalloy Manufacturing" (NAICS 3311). While the jump from congressional district to state may appear more significant, there are good reasons to believe that legislators would be concerned about their states' overall industry activity. First, all U.S. Senators and a number of Representatives represent their entire state in congress. Second, a member of the House of Representatives must always prepare for the possibility that her district is redrawn in a future election, at which point she will have to vie for the approval of new constituents from neighboring parts of the state. A third—and perhaps most significant—reason is that members of the House of Representatives are often motivated by the prospects of running for higher office. A future run for governor or senate would require appealing to interests across the state.

We create measures of industry campaign contributions to a legislator in a given year based on several year spans, given the possibility that a sum of $5000 donated over the past five years may have a different effect on a legislator's behavior than a sum of $5000 donated over the past two years. Given a time span of $span$ years, $span \in \{1, 2, 3, 4, 5\}$, we created a variable to reflect the amount of campaign contributions (in thousands of USD) that the legislator receives over the previous $span$ calendar years that can be attributed to the given industry. Likewise, we created variables to reflect the total amount of contributions that the legislator receives. This is used to compute the proportion of contributions attributable to a given industry. If one assumes

[10] We also collected data on the percentage of establishments and the percentage of payroll (in thousands of USD) in the legislator's state that belong to the 3-digit NAICS industry that contains the 4-digit NAICS industry in question. However, the percentage of establishments is very highly correlated with the percentage of firms in a state, and the percentage of payroll attributable to an industry is very highly correlated with the percent of employees attributable to an industry. Since these variables caused significant issues of multicollinearity in our model estimation, and since they don't add any apparent theoretical value to our model, we excluded them from our regression analysis.

[11] See https://www.census.gov/programs-surveys/cbp/data/datasets.html

that a legislator experiences strictly diminishing marginal returns to campaign contributions, one may expect the proportion of the legislator's funds attributable to an industry to be a more relevant factor than the absolute magnitude of the contributions. Please note that contribution totals may occasionally be negative, given the possibility of candidate refunds to donors. When computing the proportion of contributions attributable to a given industry, we shall always treat the resulting value as "missing" if either the industry total or legislator total is negative.

Industry contribution amounts are aggregated across individual transactions listed in Bonica's DIME dataset; industry codings come from the Center for Responsive Politics (CRP). As the CRP uses its own internal set of industry codes, we manually produced a correspondence with the set of 2007 NAICS codes using the industry descriptions associated with each. See Appendix II for more details on how the contribution measures were computed for each legislator-industry-year.

See Table 8 on the following page for detailed descriptive statistics for all of the independent variables described in this section.

TABLE 8

DESCRIPTIVE STATISTICS FOR EXPLANATORY VARIABLES: 1997-2012

	Mean	St. Dev.	Min	25%	50%	75%	Max	Count
Ideology Score (Bonica cfscore)	0.056	0.834	-1.74	-0.725	0.177	0.875	1.570	921,056
Ideology Score (DW-NOMINATE)	0.110	0.489	-0.751	-0.356	0.057	0.559	1.361	906,504
Democrat	0.493	0.500	0	0	0	1	1	931,756
Senator	0.188	0.391	0	0	0	0	1	931,756
Controls Senate	0.525	0.499	0	0	1	1	1	931,756
Controls House	0.534	0.499	0	0	1	1	1	931,756
Controls Presidency	0.503	0.500	0	0	1	1	1	931,756
Industry % of firms out of state total	2.035	4.623	0	0.136	0.449	1.468	36.356	745,689
Industry % of employees out of state total	1.858	3.006	0	0.235	0.845	2.112	61.003	745,689
Industry contributions, current year plus last calendar year	3.350	33.807	-35.58	0	0.2	1.827	10,631.96	931,756
Industry contributions, current year plus last two calendar years	4.943	42.924	-35.50	0	0.5	2.900	10,674.36	931,756
Industry contributions, current year plus last three calendar years	6.360	50.600	-35.00	0	0.667	3.850	10,816.91	931,756
Industry contributions, current year plus last four calendar years	7.628	57.085	-35.00	0	0.917	4.733	10,835.86	931,756
Industry contributions, current year plus last five calendar years	8.705	59.753	-35.00	0	1.009	5.500	10,851.18	931,756
% of votes won in previous election	69.089	15.004	15.030	59.150	66.535	74.460	100	799,504

Notes:

1 All observations are unique legislator-year-industry combinations.

2 All contribution amounts are in units of $1000.

Part VI: Estimation of the Voting Propensity Model

A. Preliminary Diagnostics and OLS Estimates

We focus principally on the quantity of regulations that legislators vote in favor of, but we also consider the quantities of regulations authorized by bills that legislators sponsor and cosponsor. Tables 9 through 13 present the results of ordinary least squares estimations of the model with simple year effects. Please recall that, in every regression to follow, the unit of observation is a unique legislator-industry-year combination from the period 1997-2012.

Among the strongest predictors of voting in favor of regulation are whether a legislator's party controls the House of Representatives and whether a legislator's party controls the Senate. Across all five measures, there is a positive, statistically significant relationship between controlling the House of Representatives and the quantity of regulations supported. Given a 5-year horizon, the model predicts that legislators whose parties control both chambers of congress vote for about 22 more regulatory restrictions on a given industry than similarly situated legislators whose party controls neither chamber. As all dependent variables in this paper are measures of regulation that is actually implemented, and it takes significant political capital to push regulatory legislation through Congress, any qualitatively different result would be surprising. One would expect a legislature controlled by Democrats to pass regulation favored by Democrats, just as one would expect a legislature controlled by Republicans to pass regulation favored by Republicans.

In an interesting contrast, party control of the presidency does not have a positive relationship with regulations across all specifications of the regulation measure. The discrepancy between this result and the large, positive effects of party control in Congress may simply arise from the two institutions' different roles in the regulatory policy process. A president's only authority over regulatory legislation comes from his veto power, and so he is less able than congressional leaders to directly manage the details of legislation. Furthermore, a president can always exert influence further downstream via his executive agency picks, who are in charge of implementing policy based on laws passed by Congress. As of such, it may simply be the case that presidents don't exert much influence in this stage of the regulatory process.

TABLE 9
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION
QUANTITY OF REGULATIONS VOTED FOR (OLS WITH YEAR EFFECTS)

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score	-1.872*** (0.127)	-3.447*** (0.173)	-7.466*** (0.214)	-7.889*** (0.222)	-7.774*** (0.223)
Senator	-0.209 (0.242)	-6.894*** (0.329)	-9.089*** (0.416)	-12.446*** (0.444)	-12.874*** (0.414)
Controls Senate	1.104*** (0.311)	-2.028*** (0.423)	-0.365 (0.672)	10.940*** (0.181)	11.061*** (0.176)
Controls House	9.439*** (0.330)	17.378*** (0.449)	21.654*** (0.698)	10.940*** (0.181)	11.061*** (0.176)
Controls Presidency	-1.077*** (0.197)	0.249 (0.269)	1.696*** (0.329)	1.961*** (0.340)	2.076*** (0.320)
Percentage of Firms	0.059 (0.038)	-1.017*** (0.052)	-2.324*** (0.064)	-1.884*** (0.074)	-1.256*** (0.076)
Percentage of Employees	-0.068 (0.060)	1.838*** (0.082)	4.656*** (0.101)	5.357*** (0.116)	3.366*** (0.119)
Industry Contributions[1]	0.082*** (0.009)	0.183*** (0.012)	0.230*** (0.016)	0.385*** (0.018)	0.307*** (0.017)
Previous Election Vote Share	-0.019*** (0.007)	-0.027*** (0.009)	-0.008 (0.011)	-0.003 (0.012)	-0.014 (0.011)
Contributions ✕ Vote Share	-0.001*** (0.000)	-0.002*** (0.000)	-0.003*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)
Intercept	9.589*** (0.298)	12.892*** (0.406)	8.695*** (0.412)	8.726*** (0.437)	10.801*** (0.407)
Observations	931,756	931,756	873,334	814,912	755,741
R-squared	0.024	0.026	0.027	0.033	0.038

Notes:

1 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000

2 Missing values in dependent variables are controlled for using a set of dummy variables, one for each variable with missing values

3 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

TABLE 10
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION
PROPORTION OF REGULATORY RESTRICTIONS VOTED FOR (OLS WITH YEAR EFFECTS)

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_prop_1** (1)	**vote_prop_2** (2)	**vote_prop_3** (3)	**vote_prop_4** (4)	**vote_prop_5** (5)
Ideology Score	-0.0510*** (0.0004)	-0.0565*** (0.0004)	-0.0549*** (0.0004)	-0.0543*** (0.0004)	-0.0445*** (0.0004)
Senator	0.0744*** (0.0007)	0.0660*** (0.0007)	0.0618*** (0.0008)	0.0590*** (0.0008)	0.0727*** (0.0008)
Controls Senate	0.0308*** (0.0010)	-0.0225*** (0.0010)	-0.0271*** (0.0012)	0.1545*** (0.0003)	0.1471*** (0.0004)
Controls House	0.3260*** (0.0010)	0.3361*** (0.0010)	0.3381*** (0.0013)	0.1545*** (0.0003)	0.1471*** (0.0004)
Controls Presidency	-0.0248*** (0.0006)	-0.0106*** (0.0006)	-0.0159*** (0.0006)	-0.0181*** (0.0006)	-0.0298*** (0.0006)
Percentage of Firms	-0.0014*** (0.0001)	-0.0008*** (0.0001)	-0.0007*** (0.0001)	0.0006*** (0.0001)	0.0003** (0.0002)
Percentage of Employees	0.0008*** (0.0002)	0.0000 (0.0002)	-0.0001 (0.0002)	-0.0017*** (0.0002)	-0.0009*** (0.0002)
Industry Contributions[1]	-0.0003*** (0.0000)	-0.0002*** (0.0000)	-0.0003*** (0.0000)	-0.0003*** (0.0000)	-0.0003*** (0.0000)
Previous Election Vote Share	-0.0010*** (0.0000)	-0.0009*** (0.0000)	-0.0009*** (0.0000)	-0.0008*** (0.0000)	-0.0008*** (0.0000)
Contributions ✕ Vote Share	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)
Intercept	0.3178*** (0.0009)	0.3196*** (0.0009)	0.3240*** (0.0008)	0.3228*** (0.0008)	0.3312*** (0.0008)
Observations	919,772	920,307	862,634	805,175	747,181
R-squared	0.296	0.254	0.26	0.257	0.236

Notes:

1 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000

2 Missing values in dependent variables are controlled for using a set of dummy variables, one for each variable with missing values

3 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

TABLE 11
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION
PROBABILITY OF VOTING FOR REGULATORY RESTRICTIONS[1] (OLS WITH YEAR EFFECTS)

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**is_regulated_1** (1)	**is_regulated_2** (2)	**is_regulated_3** (3)	**is_regulated_4** (4)	**is_regulated_5** (5)
Ideology Score	-0.0188*** (0.0007)	-0.0182*** (0.0007)	-0.0176*** (0.0007)	-0.0173*** (0.0007)	-0.0182*** (0.0008)
Senator	-0.0535*** (0.0013)	-0.1007*** (0.0013)	-0.0943*** (0.0014)	-0.0995*** (0.0014)	-0.1005*** (0.0015)
Controls Senate	0.0098*** (0.0017)	-0.0004 (0.0017)	0.0142*** (0.0022)	0.0497*** (0.0006)	0.0498*** (0.0006)
Controls House	0.1003*** (0.0018)	0.0968*** (0.0018)	0.0856*** (0.0023)	0.0497*** (0.0006)	0.0498*** (0.0006)
Controls Presidency	-0.0252*** (0.0011)	-0.0190*** (0.0011)	-0.0199*** (0.0011)	-0.0208*** (0.0011)	-0.0219*** (0.0011)
Percentage of Firms	0.0080*** (0.0002)	0.0085*** (0.0002)	0.0079*** (0.0002)	0.0099*** (0.0002)	0.0097*** (0.0003)
Percentage of Employees	0.0048*** (0.0003)	0.0099*** (0.0003)	0.0102*** (0.0003)	0.0096*** (0.0004)	0.0158*** (0.0004)
Industry Contributions[2]	0.0029*** (0.0000)	0.0029*** (0.0001)	0.0029*** (0.0001)	0.0035*** (0.0001)	0.0033*** (0.0001)
Previous Election Vote Share	-0.0003*** (0.0000)	-0.0003*** (0.0000)	-0.0003*** (0.0000)	-0.0002*** (0.0000)	-0.0003*** (0.0000)
Contributions ✕ Vote Share	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)
Intercept	0.1807*** (0.0016)	0.1861*** (0.0016)	0.2278*** (0.0014)	0.2305*** (0.0014)	0.2391*** (0.0015)
Observations	931,756	931,756	873,334	814,912	755,741
R-squared	0.082	0.076	0.074	0.081	0.067

Notes:

1 The outcome variable takes a value of 1 if the legislator votes for at least one regulation on the industry, and 0 otherwise.

2 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000

3 Missing values in dependent variables are controlled for using a set of dummy variables, one for each variable with missing values

4 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

TABLE 12
DETERMINANTS OF SPONSORSHIP OF REGULATORY LEGISLATION
QUANTITY OF REGULATORY RESTRICTIONS SPONSORED (OLS WITH YEAR EFFECTS)

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**sponsor_regs_1** (1)	**sponsor_regs_2** (2)	**sponsor_regs_3** (3)	**sponsor_regs_4** (4)	**sponsor_regs_5** (5)
Ideology Score	-0.0097 (0.0084)	-0.0227* (0.0121)	-0.0212* (0.0121)	-0.0134 (0.0103)	-0.0066 (0.0114)
Senator	-0.0280* (0.0160)	-0.0452** (0.0230)	-0.0506** (0.0236)	-0.0444** (0.0206)	-0.0329 (0.0212)
Controls Senate	0.0434** (0.0205)	0.0137 (0.0296)	0.0689* (0.0381)	0.1126*** (0.0084)	0.1081*** (0.0090)
Controls House	0.1358*** (0.0218)	0.2052*** (0.0315)	0.1610*** (0.0396)	0.1126*** (0.0084)	0.1081*** (0.0090)
Controls Presidency	-0.0176 (0.0130)	0.0072 (0.0188)	0.0053 (0.0187)	0.0009 (0.0158)	-0.0026 (0.0164)
Percentage of Firms	-0.0034 (0.0025)	-0.0123*** (0.0036)	-0.0125*** (0.0036)	-0.0091*** (0.0034)	-0.0072* (0.0039)
Percentage of Employees	0.0026 (0.0040)	0.0184*** (0.0057)	0.0213*** (0.0057)	0.0155*** (0.0054)	0.0058 (0.0061)
Industry Contributions[1]	0.0010* (0.0006)	0.0015* (0.0009)	0.0005 (0.0009)	0.0015* (0.0008)	0.0021** (0.0009)
Previous Election Vote Share	0.0011** (0.0004)	0.0010 (0.0006)	0.0010 (0.0006)	0.0008 (0.0006)	0.0009 (0.0006)
Contributions ✕ Vote Share	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Intercept	0.0004 (0.0197)	-0.0013 (0.0284)	-0.0318 (0.0234)	-0.0243 (0.0203)	-0.0215 (0.0208)
Observations	931,756	931,756	873,334	814,912	755,741
R-squared	0	0	0	0	0

Notes:

1 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000

2 Missing values in dependent variables are controlled for using a set of dummy variables, one for each variable with missing values

3 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

TABLE 13
DETERMINANTS OF COSPONSORSHIP OF REGULATORY LEGISLATION
QUANTITY OF REGULATORY RESTRICTIONS COSPONSORED (OLS WITH YEAR EFFECTS)

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**cosponsor_regs_1** (1)	**cosponsor_regs_2** (2)	**cosponsor_regs_3** (3)	**cosponsor_regs_4** (4)	**cosponsor_regs_5** (5)
Ideology Score	-1.2162 (0.7396)	-1.3196* (0.7544)	-1.6449* (0.9620)	-1.6402 (1.0107)	-2.2916* (1.2143)
Senator	-2.6809* (1.4031)	-2.9354** (1.4312)	-3.8718** (1.8730)	-4.1255** (2.0247)	-4.5050** (2.2537)
Controls Senate	2.0106 (1.8045)	2.1338 (1.8406)	2.6042 (3.0289)	4.1061*** (0.8224)	4.5706*** (0.9576)
Controls House	4.3383** (1.9170)	4.7630** (1.9553)	5.3740* (3.1449)	4.1061*** (0.8224)	4.5706*** (0.9576)
Controls Presidency	-2.2656** (1.1471)	-2.3732** (1.1701)	-2.6654* (1.4829)	-2.8525* (1.5478)	-2.3512 (1.7410)
Percentage of Firms	-0.0489 (0.2219)	-0.0776 (0.2263)	-0.1086 (0.2881)	-0.1958 (0.3365)	-0.3253 (0.4160)
Percentage of Employees	0.1060 (0.3495)	0.1475 (0.3565)	0.2118 (0.4547)	0.2859 (0.5290)	0.2666 (0.6495)
Industry Contributions[1]	-0.0053 (0.0532)	-0.0054 (0.0542)	-0.0369 (0.0708)	-0.0198 (0.0828)	0.0229 (0.0925)
Previous Election Vote Share	-0.0073 (0.0383)	-0.0152 (0.0391)	-0.0255 (0.0509)	-0.0236 (0.0546)	-0.0235 (0.0604)
Contributions ✕ Vote Share	0.0002 (0.0007)	0.0003 (0.0007)	0.0008 (0.0009)	0.0006 (0.0011)	-0.0000 (0.0012)
Intercept	0.4220 (1.7307)	0.6554 (1.7653)	1.7454 (1.8561)	1.8099 (1.9910)	1.7388 (2.2178)
Observations	931,756	931,756	873,334	814,912	755,741
R-squared	0	0	0	0	0

Notes:

1 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000

2 Missing values in dependent variables are controlled for using a set of dummy variables, one for each variable with missing values

3 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

Despite the predictive strength of party control of the legislature, our main independent variables of interest are legislator ideology, industry campaign contributions, the percent of employment in a legislator's state attributable to an industry, and the percent of firms in a legislator's state that belong to an industry. Our theoretical model implies that, given a legislator's *ability* to pass regulation, these several factors affect her decisions regarding which industries to regulate and the extent to which they are regulated.

Bonica's ideology score has a significant, negative relationship with the amount of regulatory restrictions that a legislator votes for. Our model predicts that, all else equal, a legislator who is one standard deviation "more conservative" than another will vote for 6.48 fewer restrictions on an industry, given a five-year implementation horizon. This is qualitatively the case across all year horizons, and holds whether regulatory restrictions are specified by their quantity, as a proportion of restrictions passed through rollcall votes, or as a binary variable indicating whether the legislator voted for regulation on an industry. The coefficients on ideology are negative but not statistically significant for the quantity of regulatory restrictions sponsored, as well as the quantity cosponsored.

The association between industry contributions to a legislator and legislator regulation on said industry varies across specifications of the regulation measure. Greater industry contributions are positively associated with legislator propensity to vote for regulation. While the coefficient on contributions is statistically significant in a number of models, the actual effect size is quite small. Moreover, the interaction term between contributions and the legislator's vote share in the previous election significantly moderates this relationship; the positive effect of contributions on regulations diminishes as vote share increases (and the legislator becomes more secure in her seat). For illustration, suppose that a legislator won her most recent election with 66.5% of the vote (the median among legislators in our sample). Then, our model would predict that a $4000 increase in contributions is associated with only one extra regulatory restriction authorized over a five-year horizon. To put this into context, the average legislator votes for 33.8 regulatory restrictions on any given industry and year (given a 5-year horizon), with a standard deviation of 137 restrictions. It takes 218 votes in the House of Representatives to pass a bill, and so if campaign contributions were a quid-pro-quo transaction for regulations, it would cost roughly $120 million to compel the House of Representatives to vote for an extra standard

deviation of regulatory restrictions on a single industry. As of such, if campaign contributions do in fact buy regulation, it seems, prima facie, that regulation is not bought cheaply.

The proportion of firms and employees attributable to an industry have statistically significant coefficients in each of the models with vote-based regulation outcomes; however, these coefficients usually point in the opposite direction. This could be indicative of opposing political interests between firms and employees, but it could also plausibly be due to imperfect multicollinearity, as the correlation between the two is about 0.8.

While ideology, contributions, and industry presence within a legislator's state appear to be significant (if weak and sometimes inconsistent) predictors of legislators' voting on regulations, they have very little explanatory power when it comes to the quantity of regulations that a legislator sponsors or cosponsors. The coefficient of determination, R^2, is roughly zero in every model in which sponsored regulations or cosponsored regulations is the outcome measure. While R^2 is not the be-all and end-all of model usefulness, it seems that a legislator's decision to sponsor regulatory legislation is most likely not driven by the main factors that we are examining. It may be that such decisions are strongly associated with public interest in an issue, or a member's leadership status within her caucus. Regardless, given our dataset, we find it to be more fruitful to focus on voting for regulatory legislation, and so we shall spend the rest of the paper analyzing models that feature the quantity of regulations for which a legislator votes.[12] For convenience, we shall often refer to such regulation measures by their variable names ("$vote\_regs\_[x]$") from this point onward.

B. A Tobit Random-effects Model of Voting on Regulations

Given these preliminary results, we employ a Tobit random-effects model to enhance causal identification. As we wish to hold constant unobserved heterogeneity across individual legislators and industries, the set of unique legislator-industry pairs constitutes the panel id

[12] There are further practical reasons to focus on the quantity of restrictions that a legislator votes for. As a lack of a deregulation measure implies that the regulation authorized by each congressional bill is censored around zero, the primary models that we estimate in the rest of the paper are Tobit models. When the dependent variable is a binary measure (whether a legislator votes for regulation) or a proportion, a Tobit model is clearly not appropriate. Moreover, when the dependent variable is the number of restrictions sponsored or cosponsored, our Tobit estimator encounters discontinuous regions, and is unable to produce an estimate.

variable in our model. While a fixed-effects model would likely be theoretically preferable to a random-effects model, we elect to estimate a Tobit random-effects model over a similar fixed-effects model for two primary reasons. The first is mere practicality; according to the Stata documentation for "xttobit," Stata's random-effects Tobit model package, "there is no command for a parametric conditional fixed-effects model, as there does not exist a sufficient statistic allowing the fixed effects to be conditioned out of the likelihood." Moreover, "unconditional fixed-effects estimates are biased." Our interest in understanding the role of ideology in regulatory legislation provides the second reason for utilizing random-effects. Our measure of legislator ideology, Bonica's "cfscore," is constant across a legislator's political career, and thus would have to be omitted from a fixed-effects model.

Our censored regulatory outcome measures imply the need for a Tobit model in particular. As we're only considering new regulatory restrictions that are created by legislation, deregulation never enters our measure of regulatory restrictions. As such, the theoretical model is censored at zero. In practice, however, the properties of the RegData machine-learning algorithm ensure that this censoring occurs slightly above zero. While the choice is ultimately somewhat arbitrary, we elect to use $vote\_regs\_[x] = 1$ as our censoring threshold. See Footnote 7 more a more detailed explanation of this matter. Beyond the issues of deregulation and mismeasurement, a Tobit model is also appealing for its separation of the decision to regulate ($vote\_regs\_[x] \geq 1$) and the actual magnitude of the regulation measure above this threshold. Given that the legislative role in the regulatory process is not ongoing, unlike the role of administrative agencies, it seems plausible that certain regulatory issues may simply not be within legislators' dockets during certain years. Therefore, a legislator may not vote for regulations on an industry, even if she would prefer to do so, simply because no such bills are introduced to Congress during her term.

The results of a random-effects Tobit regression on our standard set of regressors on $vote\_regs$ are given in Table 14. Comparing these results with the previously discussed OLS estimates suggests that censoring has yielded substantially attenuated regression coefficients, as the Tobit point estimates are much larger than the corresponding OLS estimates. That said, the signs and statistical significance of the two sets of point estimates are remarkably similar. Both feature negative associations between conservative ideology and regulation; both feature positive relationships between campaign contributions and regulations that diminish as a legislator's

TABLE 14
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
QUANTITY OF REGULATIONS VOTED FOR
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score	-6.944*** (0.480)	-9.037*** (0.553)	-14.973*** (0.644)	-15.524*** (0.678)	-18.455*** (0.626)
Senator	-12.543*** (0.936)	-32.588*** (1.082)	-34.945*** (1.282)	-40.271*** (1.368)	-34.094*** (1.243)
Controls Senate	5.366*** (0.708)	-0.513 (0.799)	4.930*** (1.173)	62.524*** (0.652)	60.734*** (0.599)
Controls House	39.264*** (0.732)	49.014*** (0.822)	57.051*** (1.195)	(Omitted)	(Omitted)
Controls Presidency	-9.307*** (0.422)	-6.563*** (0.476)	-4.911*** (0.562)	-4.591*** (0.570)	-0.915* (0.517)
Percentage of Firms	1.145*** (0.103)	-0.090 (0.117)	-2.767*** (0.138)	-2.338*** (0.155)	-1.898*** (0.148)
Percentage of Employees	0.498*** (0.161)	2.703*** (0.182)	8.051*** (0.215)	10.386*** (0.241)	11.768*** (0.231)
Industry Contributions[2]	0.348*** (0.021)	0.416*** (0.025)	0.501*** (0.030)	0.776*** (0.038)	0.705*** (0.034)
Previous Election Vote Share	-0.075*** (0.017)	-0.036* (0.019)	-0.026 (0.023)	-0.045* (0.024)	-0.072*** (0.022)
Contributions ✕ Vote Share	-0.004*** (0.0003)	-0.005*** (0.0003)	-0.006*** (0.0004)	-0.009*** (0.0005)	-0.008*** (0.0004)
Left-Censored Observations	570,272	481,322	432,586	395,096	348,613
Uncensored Observations	361,484	450,434	440,748	419,816	407,128
Total Observations	931,756	931,756	873,334	814,912	755,741

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.

2 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000.

3 Missing values in dependent variables are controlled for using a set of indicator variables.

4 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

electoral position becomes more secure; and, both feature positive associations between industry employment in the legislator's state which are undercut by negative associations between industry firm presence in the legislator's state. In the sections that follow, we discuss each of these three categories of effects in more detail.

C. Further Analysis of the Effects of Political Ideology and Partisan Identity

According to the Tobit random-effects model, conditional on a legislator L voting for regulation on an industry I, a standard deviation increase in legislator ideology score (and thus, a standard deviation increase in "conservatism") is associated with L voting for 15.4 fewer regulatory restrictions on industry I on a five-year horizon. This is quite substantial, given that the mean quantity of regulatory restrictions among legislator-industry-year combinations, given a five-year horizon, is only 33.8.

While these results do seem to line up well with the archetype of "anti-regulation conservatives" and "pro-regulations liberals," this clean dichotomy does not hold up when one separates ideology from party membership. As shown in Table 15, introducing controls for party membership causes the sign of the ideology score coefficient to flip from negative to positive. At first glance, this seems as if it could be simply attributable to imperfect multicollinearity, as ideology and party affiliation are highly correlated; the correlation between ideology score and Democratic party membership is -0.913, and the correlation between ideology score and Republican party membership is 0.923. However, this effect holds when the model is estimated separately by party.

Tables 16 and 17 feature the results of the model estimated separately for Democratic and Republican congressmen, respectively.[13] The effects of ideology differ severely from the effect estimated on the full sample. Within the Democratic party membership, ideology is positively associated with regulation, suggesting that the most liberal Democrats are the *least* likely to vote for regulation on a given industry. At first glance, one might simply credit this paradoxical result to the manner in which regulation fits into the model; after all, $vote\_regs\_[x]$ only measures the

[13] There are too few independent members of Congress to run a separate regression for political independents. That said, even if one could get a model estimate for such a subset, it would likely not be an enlightening result. Excluding those congressmen, such as Lisa Murkowski and Joe Lieberman, who reluctantly ran as independents after losing a party primary, there are only seven members of Congress in our panel who were ever officially independent.

TABLE 15
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
QUANTITY OF REGULATIONS VOTED FOR, WITH CONTROLS FOR POLITICAL PARTY
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score	4.194*** (1.112)	5.245*** (1.280)	3.834** (1.507)	4.581*** (1.597)	1.990 (1.448)
Democrat[2]	-5.922 (4.073)	-23.716*** (4.635)	-29.713*** (5.482)	-27.895*** (5.696)	-22.152*** (5.085)
Republican[2]	-26.364*** (4.233)	-49.840*** (4.807)	-63.982*** (5.688)	-64.195*** (5.899)	-59.267*** (5.257)
Senator	-11.943*** (0.937)	-31.972*** (1.084)	-34.143*** (1.284)	-39.340*** (1.372)	-33.148*** (1.245)
Controls Senate	5.676*** (0.708)	-0.143 (0.799)	5.488*** (1.173)	63.964*** (0.666)	62.457*** (0.613)
Controls House	39.714*** (0.738)	49.666*** (0.829)	57.925*** (1.201)	(Omitted)	(Omitted)
Controls Presidency	-9.233*** (0.422)	-6.376*** (0.477)	-4.676*** (0.563)	-4.369*** (0.571)	-0.495 (0.518)
Percentage of Firms	1.150*** (0.103)	-0.083 (0.117)	-2.757*** (0.138)	-2.330*** (0.155)	-1.888*** (0.148)
Percentage of Employees	0.486*** (0.161)	2.690*** (0.182)	8.034*** (0.215)	10.376*** (0.241)	11.755*** (0.231)
Industry Contributions[3]	0.350*** (0.021)	0.420*** (0.025)	0.506*** (0.030)	0.785*** (0.038)	0.712*** (0.034)
Previous Election Vote Share	-0.048*** (0.018)	-0.005 (0.020)	0.005 (0.025)	-0.017 (0.026)	-0.051** (0.023)
Contributions ✕ Vote Share	-0.004*** (0.0003)	-0.005*** (0.0003)	-0.006*** (0.0004)	-0.009*** (0.0005)	-0.008*** (0.0004)
Left-Censored Observations	570,272	481,322	432,586	395,096	348,613
Uncensored Observations	361,484	450,434	440,748	419,816	407,128
Total Observations	931,756	931,756	873,334	814,912	755,741

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.

2 There are two indicator variables for party membership (instead of one) because our dataset includes a small number of independent congressmen. For such members, **Democrat** and **Republican** both take a value of zero.

3 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000.

4 Missing values in dependent variables are controlled for using a set of indicator variables.

5 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

TABLE 16
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
DEMOCRATIC MEMBERS OF CONGRESS
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

EXPLANATORY VARIABLE	DEPENDENT VARIABLE				
	vote_regs_1 (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score (Bonica)	9.469*** (1.495)	8.819*** (1.791)	6.769*** (2.539)	9.849*** (2.621)	4.634** (2.182)
Senator	-2.683** (1.341)	-20.368*** (1.612)	-31.328*** (2.297)	-41.804*** (2.377)	-34.811*** (1.977)
Controls Senate	-5.960*** (1.029)	0.077 (1.188)	-3.447 (2.175)	82.487*** (1.179)	100.467*** (0.970)
Controls House	45.349*** (1.040)	52.539*** (1.196)	81.241*** (2.113)	(Omitted)	(Omitted)
Controls Presidency	-32.166*** (0.581)	-39.998*** (0.677)	-44.973*** (0.975)	-43.906*** (0.973)	-15.573*** (0.792)
Percentage of Firms	0.621*** (0.139)	-2.044*** (0.165)	-6.667*** (0.238)	-6.308*** (0.254)	-4.544*** (0.220)
Percentage of Employees	2.650*** (0.222)	6.331*** (0.264)	15.730*** (0.381)	17.754*** (0.407)	13.207*** (0.353)
Industry Contributions[2]	0.328*** (0.033)	0.423*** (0.039)	0.667*** (0.057)	0.713*** (0.058)	0.520*** (0.048)
Previous Election Vote Share	-0.169*** (0.024)	-0.154*** (0.028)	-0.186*** (0.041)	-0.198*** (0.042)	-0.119*** (0.033)
Contributions ✕ Vote Share	-0.004*** (0.0004)	-0.005*** (0.0005)	-0.007*** (0.001)	-0.007*** (0.001)	-0.005*** (0.001)
Left-Censored Observations	286,054	241,056	217,070	198,547	172,533
Uncensored Observations	172,976	217,974	214,996	206,555	197,687
Total Observations	459,030	459,030	432,066	405,102	370,220

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.

2 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000.

3 Missing values in dependent variables are controlled for using a set of indicator variables.

4 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

TABLE 17
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
REPUBLICAN MEMBERS OF CONGRESS
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score (Bonica)	-1.255 (1.922)	1.225 (2.149)	1.580 (1.886)	-1.360 (2.091)	2.042 (2.236)
Senator	-23.323*** (1.327)	-46.671*** (1.482)	-37.840*** (1.309)	-41.993*** (1.459)	-40.114*** (1.566)
Controls Senate	12.004*** (1.024)	-5.754*** (1.122)	-1.114 (1.231)	32.104*** (0.843)	13.986*** (0.940)
Controls House	34.987*** (1.116)	48.352*** (1.202)	36.320*** (1.240)	(Omitted)	(Omitted)
Controls Presidency	12.987*** (0.627)	27.149*** (0.689)	24.434*** (0.596)	24.922*** (0.633)	11.930*** (0.697)
Percentage of Firms	1.512*** (0.152)	1.773*** (0.165)	0.499*** (0.144)	1.724*** (0.174)	1.264*** (0.198)
Percentage of Employees	-0.203 (0.247)	0.144 (0.267)	1.380*** (0.234)	1.160*** (0.283)	3.390*** (0.320)
Industry Contributions[2]	0.395*** (0.029)	0.437*** (0.033)	0.396*** (0.029)	0.882*** (0.046)	0.969*** (0.052)
Previous Election Vote Share	-0.194*** (0.025)	-0.156*** (0.027)	-0.108*** (0.024)	-0.086*** (0.027)	-0.067** (0.029)
Contributions ✕ Vote Share	-0.005*** (0.0004)	-0.005*** (0.0004)	-0.005*** (0.0004)	-0.011*** (0.001)	-0.012*** (0.001)
Left-Censored Observations	281,125	237,658	213,144	194,324	174,001
Uncensored Observations	186,893	230,360	223,630	211,206	207,454
Total Observations	468,018	468,018	436,774	405,530	381,455

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.

2 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000.

3 Missing values in dependent variables are controlled for using a set of indicator variables.

4 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

regulatory legislation that (a) passes a vote on the floor of Congress, and (b) is successfully implemented in the Code of Federal Regulations. This raises the possibility that extreme members of the party simply refuse to vote for such bills because they are not liberal enough for their ideological preferences. However, if this were the entire story, one would expect the same to occur on the Republican side of the aisle. However, legislator ideology has no statistically significant effect on propensity to vote for regulations within the Republican party. As one can see in Table 17, the Tobit estimates for the coefficient on ideology score differ in sign across the different implementation horizons, and none of the five estimates are statistically significant at any common confidence levels.

This apparent disconnect between party and ideology is certainly a puzzle. The most obvious candidates for an explanation, such as industry representation within the legislator's district and industry campaign contributions, are already controlled for in the model. We've already noted that an association between ideological moderation and support for successful legislation is consistent with results for the Democratic subset. However, for this "moderation hypothesis" to hold in general, we would need an explanation for the lack of an ideological effect within the Republican caucus.

The most convenient explanation for this asymmetry between the parties would lie in the measure of ideology itself. Ideology on the (American) political left is generally easier to describe along a single dimension than ideology on the political right. Typically, the more "liberal" an American politician is, the more likely she is to support increased government intervention in the economy. However, the interaction between nationalism and free market ideology makes it more difficult to coherently map a "conservative" to a point on a unidimensional spectrum. In popular discourse, free market policy positions, such as support for lower taxation and regulation, are often considered core conservative principles. However, there are a number of key economic nationalist positions which are often considered "conservative," even though they directly conflict with the core principles that underlie free market ideology. Examples of such policies include support for immigration restrictions, programs to promote energy independence, support for domestic manufacturing, opposition to recreational drug use, and protectionist trade policies.

Bonica's ideology score is estimated using contribution records from 3.93 million individuals and 261,828 committees and organizations (Bonica 2013, p. 370). If "economic

nationalist" Republican donors give in rough congruence with their "free market" Republican peers, the asymmetric effects of ideology within the two parties could be explained along such a cleavage in conservative ideology. To further investigate whether such is the case, we estimate the model with a separate measure of legislator ideology that could more plausibly constitute a unidimensional measure of conservative economic ideology. Lewis, Poole, and Rosenthal estimate ideal points for each legislator in the 1st to 113th U.S. Congresses using rollcall voting data that spans a legislator's voting history. A legislator's "DW-NOMINATE" ideal point can be broken into two dimensions. The first is a measure of "liberal-conservative" views on government intervention in the economy, while the second is a measure of legislator views on the major social issues of the legislator's historical period. As the first DW-NOMINATE dimension is restricted to reflect the level of government intervention in the economy, it gives us a plausible test of whether social factors are influencing the estimates of the effect of ideology on regulation.

The results of Republican and Democratic-restricted models, with DW-DOMINATE first-dimension scores used in place of Bonica ideology scores, are presented in Tables 18 and 19. The results appear to be broadly consistent with our "moderation hypothesis." Conditional on voting to regulate an industry, conservative economic ideology within the Democratic party is associated with increased support for regulation on said industry. And, in contrast with our results using the Bonica ideology measure, liberal ideology within the Republican caucus has a strong, negative association with support for industry regulation at the one, two, three, and four-year implementation horizons.[14]

[14] It is actually quite remarkable that the results for the Republican subset differ so significantly when Bonica's ideology score is replaced with the first-dimension DW-NOMINATE score, as these two measures are very highly correlated. The measures have a correlation of 0.93 across all observations in our 1997-2012 panel, and a correlation of 0.91 across all observations in the full 1979-2012 dataset (which includes all congressmen for which Bonica has computed an ideal point). Bonica (2013) claims that, despite the high correlation between the two measure, his intent is to create a measure of ideology that complements DW-NOMIANTE, rather than replace it. He notes that his score is a "measure of ideological giving, while [DW-NOMINATE] is a measure of ideological voting" (p. 372). Our results therefore suggest that the same conflicting factors that drive some staunch "conservatives" to support regulation while others oppose regulation may be some of the key factors that separate "ideological giving" from "ideological voting."

TABLE 18
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
DEMOCRATIC MEMBERS OF CONGRESS (FEATURING DW-NOMINATE IDEOLOGY SCORES)
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score (DW-NOMINATE)	52.823*** (3.924)	61.150*** (4.680)	68.550*** (6.643)	61.239*** (6.811)	64.529*** (5.641)
Senator	-0.508 (1.348)	-17.586*** (1.620)	-27.297*** (2.312)	-37.720*** (2.394)	-32.023*** (1.987)
Controls Senate	-3.801*** (1.033)	2.817** (1.192)	0.172 (2.180)	82.335*** (1.175)	100.237*** (0.967)
Controls House	42.867*** (1.049)	49.612*** (1.207)	77.654*** (2.128)	(Omitted)	(Omitted)
Controls Presidency	-31.898*** (0.581)	-39.671*** (0.678)	-44.478*** (0.977)	-43.412*** (0.975)	-15.375*** (0.793)
Percentage of Firms	0.616*** (0.139)	-2.054*** (0.166)	-6.695*** (0.239)	-6.334*** (0.254)	-4.556*** (0.220)
Percentage of Employees	2.681*** (0.223)	6.373*** (0.264)	15.814*** (0.382)	17.839*** (0.408)	13.257*** (0.353)
Industry Contributions[2]	0.296*** (0.033)	0.382*** (0.039)	0.615*** (0.057)	0.671*** (0.058)	0.493*** (0.048)
Previous Election Vote Share	-0.062** (0.026)	-0.036 (0.030)	-0.037 (0.044)	-0.068 (0.045)	-0.007 (0.036)
Contributions ✕ Vote Share	-0.003*** (0.0004)	-0.004*** (0.0005)	-0.006*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)
Left-Censored Observations	286,054	241,056	217,070	198,547	172,533
Uncensored Observations	172,976	217,974	214,996	206,555	197,687
Total Observations	459,030	459,030	432,066	405,102	370,220

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.

2 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000.

3 Missing values in dependent variables are controlled for using a set of indicator variables.

4 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

TABLE 19
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
REPUBLICAN MEMBERS OF CONGRESS (FEATURING DW-NOMINATE IDEOLOGY SCORES)
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score (DW-NOMINATE)	-16.818*** (2.857)	-18.643*** (3.173)	-16.674*** (2.814)	-14.378*** (3.163)	9.375*** (3.430)
Senator	-24.415*** (1.383)	-47.821*** (1.544)	-38.839*** (1.363)	-42.464*** (1.517)	-37.445*** (1.629)
Controls Senate	10.397*** (1.073)	-7.692*** (1.175)	-2.828** (1.269)	30.585*** (0.871)	13.797*** (0.967)
Controls House	35.177*** (1.127)	48.619*** (1.214)	36.410*** (1.248)	(Omitted)	(Omitted)
Controls Presidency	13.443*** (0.635)	27.661*** (0.696)	24.858*** (0.602)	25.184*** (0.640)	11.391*** (0.707)
Percentage of Firms	1.519*** (0.152)	1.782*** (0.165)	0.506*** (0.144)	1.730*** (0.174)	1.263*** (0.198)
Percentage of Employees	-0.204 (0.247)	0.142 (0.267)	1.381*** (0.234)	1.164*** (0.283)	3.389*** (0.320)
Industry Contributions[2]	0.388*** (0.029)	0.426*** (0.033)	0.388*** (0.029)	0.871*** (0.047)	0.959*** (0.052)
Previous Election Vote Share	-0.145*** (0.026)	-0.099*** (0.028)	-0.050** (0.025)	-0.022 (0.027)	0.007 (0.030)
Contributions ✕ Vote Share	-0.005*** (0.0004)	-0.005*** (0.0004)	-0.005*** (0.0004)	-0.011*** (0.001)	-0.012*** (0.001)
Left-Censored Observations	281,125	237,658	213,144	194,324	174,001
Uncensored Observations	186,893	230,360	223,630	211,206	207,454
Total Observations	468,018	468,018	436,774	405,530	381,455

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.
2 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000.
3 Missing values in dependent variables are controlled for using a set of indicator variables.
4 Coefficient standard errors are in parentheses.
***** Significantly different from zero at 90 percent confidence.
****** Significantly different from zero at 95 percent confidence.
******* Significantly different from zero at 99 percent confidence.

While such results allow us to reconcile our findings with the "moderation hypothesis" in some capacity, it's critical to note that there still exists a large asymmetry between the effects of ideology within each subset. For one, the magnitude of the ideology effect is much greater within the Democratic caucus. For Democrats, the average estimated coefficient on ideology across the five implementation horizons is 61.7, while for Republicans the mean coefficient is -11.4. Moreover, it is quite puzzling that the coefficient on DW-NOMINATE for Republicans at a five-year horizon is positive and statistically significant. Thus, it seems that there may be some factor outside of social issues that causes ideological moderation in the Republican caucus to be a less significant predictor of support for regulation. Such factors could plausibly include the strength of party leadership, levels of party unity, or other constituency characteristics missing from our set of controls. On the other hand, it could simply be the case that economic conservatism, on an empirical level, does not manifest as support for pure laissez-faire capitalism.

Breaking the analysis down by industry suggests that this latter hypothesis may have some merit. Tables 20 and 21 depict the results of "ranking" the set of industries according to the estimated effect of ideology on regulatory outcomes. For each industry with a sufficient number of uncensored observations, we run a Tobit model with year-effects and then record the resulting point estimate for the coefficient on ideology. Table 20 records the resulting rankings when Bonica's ideology score is used, and Table 21 features rankings according to the estimated coefficient on DW-NOMINATE. Despite the incongruity between the two measures' estimates for the Republican subset, the rankings are remarkably similar.

The vast majority of the industries in this set of rankings reflect the expected ideological dichotomy—liberalism is associated with voting for more regulation on 45 of the 56 industries (47 if you use DW-NOMINATE). However, there are eleven industries for which ideological liberalism is associated with voting for less regulation, and oddly enough "Oil and Gas Extraction" is the industry in which this unexpected direction is the strongest. Oil and gas extraction is not the only industry in this group of eleven misfits to have ties to fossil fuels; "Pipeline Transportation of Natural Gas" and "Electric Power Generation, Transmission and Distribution" take the silver and bronze medals for the industries in which conservatism is most associated with voting for higher levels of regulation. Conservatism also has a positive, statistically significant association with voting for more regulation on "natural gas distribution."

TABLE 20

INDUSTRIES RANKED BY ESTIMATED IDEOLOGY EFFECT (BONICA IDEOLOGY SCORE)

Rank	Industry Description	Ideology Coefficient Estimate
1	Depository Credit Intermediation	-296.723*** (10.660)
2	Nondepository Credit Intermediation	-159.423*** (5.228)
3	Petroleum and Coal Products Manufacturing	-95.483*** (5.596)
4	Petroleum and Petroleum Products Merchant Wholesalers	-70.164*** (8.923)
5	Activities Related to Credit Intermediation	-38.236*** (1.368)
6	Outpatient Care Centers	-35.725*** (0.891)
7	Insurance Carriers	-35.243*** (0.734)
8	Architectural, Engineering, and Related Services	-13.635*** (0.761)
9	Child Day Care Services	-10.124*** (1.239)
10	Scheduled Air Transportation	-9.116*** (1.733)
11	Other Ambulatory Health Care Services	-8.730*** (0.338)
12	Motor Vehicle Manufacturing	-8.646*** (1.309)
13	Scientific Research and Development Services	-7.515 (5.432)
14	Building Equipment Contractors	-6.440*** (0.404)
15	Other Amusement and Recreation Industries	-6.371*** (0.306)
16	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	-6.158*** (0.301)
17	Pharmaceutical and Medicine Manufacturing	-5.423*** (1.507)
18	Medical Equipment and Supplies Manufacturing	-5.161*** (0.337)
19	Grocery and Related Product Merchant Wholesalers	-4.994*** (0.319)
20	Motor Vehicle Body and Trailer Manufacturing	-4.318*** (0.514)
21	Support Activities for Mining	-4.000*** (0.878)
22	Support Activities for Air Transportation	-3.826*** (0.332)
23	Nonscheduled Air Transportation	-3.763*** (0.734)
24	Support Activities for Water Transportation	-3.038*** (1.032)
25	Motor Vehicle Parts Manufacturing	-3.034*** (0.264)
26	Personal and Household Goods Repair and Maintenance	-2.944*** (0.110)
27	Remediation and Other Waste Management Services	-2.912*** (0.354)
28	Basic Chemical Manufacturing	-2.720*** (0.640)
29	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	-2.668*** (0.186)
30	Health and Personal Care Stores	-2.423*** (0.152)
31	Accounting, Tax Preparation, Bookkeeping, and Payroll Services	-2.112*** (0.070)
32	Technical and Trade Schools	-1.923*** (0.449)
33	Warehousing and Storage	-1.438*** (0.341)
34	Freight Transportation Arrangement	-1.289*** (0.092)
35	Securities and Commodity Contracts Intermediation and Brokerage	-1.134*** (0.131)
36	Other Investment Pools and Funds	-0.934*** (0.102)
37	Deep Sea, Coastal, and Great Lakes Water Transportation	-0.570 (0.858)
38	Home Health Care Services	-0.466*** (0.088)
39	Couriers and Express Delivery Services	-0.343*** (0.048)
40	Ship and Boat Building	-0.326 (0.320)
41	Other General Merchandise Stores	-0.279*** (0.039)
42	Specialized Freight Trucking	-0.212 (0.155)
43	Services to Buildings and Dwellings	-0.188*** (0.034)
44	Fishing	-0.061 (0.455)
45	Support Activities for Crop Production	-0.007 (1.003)
46	Waste Treatment and Disposal	0.057 (0.608)
47	Pulp, Paper, and Paperboard Mills	0.151 (0.101)
48	Management, Scientific, and Technical Consulting Services	0.287** (0.131)
49	Natural Gas Distribution	0.865*** (0.062)
50	Inland Water Transportation	0.954** (0.425)
51	Electrical Equipment Manufacturing	1.227 (1.427)
52	Wired Telecommunications Carriers	1.275** (0.636)
53	Engine, Turbine, and Power Transmission Equipment Manufacturing	3.454*** (0.983)
54	Electric Power Generation, Transmission and Distribution	5.265*** (0.797)
55	Pipeline Transportation of Natural Gas	11.650*** (1.732)
56	Oil and Gas Extraction	13.724*** (1.474)

Notes:

1 Ideology effects are estimated by running Tobit models with year effects on individual industry subsets of the panel. The outcome variable in each case was vote_regs_3, and the standard set of regressors from the main Tobit model was utilized. Running a panel Tobit model, such as random effects, for each of the 107 subset proved to be computationally infeasible.

2 While the panel includes 107 NAICS 4-digit industries, a scarcity of uncensored observations in roughly half of the industries caused a lack of convergence in the first stage of the Tobit model. As of such, we were only able to produce estimates for 56 of the 107 industry subsets.

TABLE 21

INDUSTRIES RANKED BY ESTIMATED IDEOLOGY EFFECT (DW-NOMINATE SCORE)

Rank	Industry Description	Ideology Coefficient Estimate
1	Depository Credit Intermediation	-538.779*** (18.569)
2	Nondepository Credit Intermediation	-291.710*** (9.142)
3	Petroleum and Coal Products Manufacturing	-173.059*** (9.727)
4	Petroleum and Petroleum Products Merchant Wholesalers	-144.866*** (15.444)
5	Activities Related to Credit Intermediation	-70.335*** (2.409)
6	Outpatient Care Centers	-64.728*** (1.556)
7	Insurance Carriers	-63.710*** (1.261)
8	Architectural, Engineering, and Related Services	-25.217*** (1.332)
9	Scientific Research and Development Services	-23.215** (9.649)
10	Motor Vehicle Manufacturing	-17.804*** (2.296)
11	Child Day Care Services	-17.216*** (2.205)
12	Scheduled Air Transportation	-17.026*** (3.044)
13	Other Ambulatory Health Care Services	-16.141*** (0.596)
14	Other Amusement and Recreation Industries	-12.279*** (0.537)
15	Building Equipment Contractors	-12.252*** (0.711)
16	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	-12.010*** (0.524)
17	Pharmaceutical and Medicine Manufacturing	-10.112*** (2.633)
18	Grocery and Related Product Merchant Wholesalers	-9.639*** (0.558)
19	Medical Equipment and Supplies Manufacturing	-9.522*** (0.588)
20	Support Activities for Mining	-9.192*** (1.528)
21	Motor Vehicle Body and Trailer Manufacturing	-8.412*** (0.892)
22	Nonscheduled Air Transportation	-7.278*** (1.283)
23	Support Activities for Air Transportation	-7.150*** (0.582)
24	Support Activities for Water Transportation	-6.312*** (1.800)
25	Motor Vehicle Parts Manufacturing	-6.028*** (0.481)
26	Electrical Equipment Manufacturing	-5.998** (2.513)
27	Basic Chemical Manufacturing	-5.885*** (1.116)
28	Personal and Household Goods Repair and Maintenance	-5.301*** (0.192)
29	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	-4.948*** (0.322)
30	Remediation and Other Waste Management Services	-4.909*** (0.623)
31	Health and Personal Care Stores	-4.353*** (0.264)
32	Warehousing and Storage	-4.036*** (0.662)
33	Accounting, Tax Preparation, Bookkeeping, and Payroll Services	-3.934*** (0.122)
34	Technical and Trade Schools	-3.201*** (0.783)
35	Freight Transportation Arrangement	-2.503*** (0.158)
36	Securities and Commodity Contracts Intermediation and Brokerage	-2.201*** (0.230)
37	Deep Sea, Coastal, and Great Lakes Water Transportation	-1.905 (1.503)
38	Other Investment Pools and Funds	-1.859*** (0.179)
39	Fishing	-1.600** (0.801)
40	Support Activities for Crop Production	-1.483 (1.762)
41	Specialized Freight Trucking	-1.304*** (0.268)
42	Home Health Care Services	-0.949*** (0.155)
43	Ship and Boat Building	-0.858* (0.502)
44	Couriers and Express Delivery Services	-0.660*** (0.084)
45	Other General Merchandise Stores	-0.545*** (0.068)
46	Services to Buildings and Dwellings	-0.414*** (0.059)
47	Pulp, Paper, and Paperboard Mills	-0.055 (0.172)
48	Waste Treatment and Disposal	0.072 (1.070)
49	Management, Scientific, and Technical Consulting Services	0.272 (0.231)
50	Inland Water Transportation	1.438* (0.740)
51	Natural Gas Distribution	1.438*** (0.107)
52	Wired Telecommunications Carriers	1.955* (1.120)
53	Engine, Turbine, and Power Transmission Equipment Manufacturing	4.371** (1.704)
54	Electric Power Generation, Transmission and Distribution	9.027*** (1.387)
55	Pipeline Transportation of Natural Gas	17.574*** (3.009)
56	Oil and Gas Extraction	21.982*** (2.564)

Notes:

1 Ideology effects are estimated by running Tobit models with year effects on individual industry subsets of the panel. The outcome variable in each case was vote_regs_3, and the standard set of regressors from the main Tobit model was utilized. Running a panel Tobit model, such as random effects, for each of the 107 subset proved to be computationally infeasible.

2 While the panel includes 107 NAICS 4-digit industries, a scarcity of uncensored observations in roughly half of the industries caused a lack of convergence in the first stage of the Tobit model. As of such, we were only able to produce estimates for 56 of the 107 industry subsets.

What makes this particularly odd is that not all fossil fuel industries are in the same boat. Specifically, liberal ideology has the third and fourth strongest associations with regulation in the "Petroleum and Coal Products Manufacturing" and "Petroleum and Petroleum Products Merchant Wholesalers" industries, respectively. We consider two plausible explanations: (a) liberalism is negatively associated with regulating alternate energies and natural gas, but positively associated with regulating oil and coal products, and (b) conservatism is positively associated with regulating sources of domestic energy production, but negatively associated with regulation on other fossil fuel industries.

Anecdotal evidence within the dataset suggests that the latter explanation might have more purchase. In the set of eleven industries in which conservative ideology is positively associated with regulation, the coefficient on ideology is substantially diminished when one omits observations from the year 2005, when the Energy Policy Act of 2005 was passed. Among bills passed between 1997 and 2012, this bill is the single greatest contributor to regulation on the "Oil and Gas Extraction" industry, but it doesn't resemble anything that environmental activists or the Pigou Club would champion. Rather, in addition to a number of new regulations on the energy sector, it involves generous subsidies and tax breaks for various energy producers, as well as a loosening of certain regulations on energy production. Thus, even though the bill passed the House of Representatives with a majority of Democrats opposed[15], it is quite difficult to pin down where such a piece of legislation could be placed on an axis of "big-government liberalism versus small-government conservatism." In an early 2005 interview before the bill was passed, Joe Barton, the Republican sponsor of the bill, declared himself "a strong proponent of any kind of energy resource that can be market-competitive at some point in time," impressing upon the need to "subsidize some of the newer sources till they get up to speed." As justification for such a position, he warned that "there is a finite amount of oil in the world and we are pushing the limits of production right now" (Edsal and Blum, 2005).

While the content of the bill and Joe Barton's comments may or may not represent a pro-business or economic nationalist position, they are certainly not manifestations of laissez-faire capitalism. At the same time, such economic policies seem to be a poor fit with standard "left-liberal" ideology, which is likely why a majority of House Democrats voted against the bill. It's

[15] See http://clerk.house.gov/evs/2005/roll132.xml.

worth noting that, while removing the year 2005 does decrease the coefficient on ideology within each of the four domestic energy production industries that we mentioned above, the coefficient in each case remains positive and very statistically significant. Thus, this type of "conservativism," and the combination of subsidies and regulation, may help explain the asymmetrical effects of political ideology within the Democratic and Republican parties. However, further research is required to determine whether the Energy Policy Act of 2005 is simply an interesting outlier, or a reflection of a more general property of economic conservatism in practice.

D. Further Analysis of the Effects of Industry Contributions

Recall that the set of regressors includes both the amount of industry contributions and an interaction term between the amount of contributions and the legislator's vote share in her last election. As the point estimates for contribution amount and the interaction term are both statistically significant, the marginal effect of an increase in contributions (conditional on a legislator voting for regulation on an industry) is given by the coefficient on the contributions variable plus the coefficient on the interaction term multiplied by the legislator's vote share. As the estimated coefficient on contributions is positive across all implementation horizons, and the coefficient on the interaction term is likewise negative across all horizons, the effect of contributions on a legislator's propensity to vote for regulations is positive, but decreasing in the strength of the legislator's electoral position. This is consistent with the theory that legislators face tangible tradeoffs between reelection and implementing preferred policies.

This tradeoff appears to be salient at any substantial level of electoral competition. Consider the estimates $\hat{\beta}_{contr}$ and $\hat{\beta}_{contr\times share}$ of the coefficients on contributions and the interaction term, respectively, as well as a legislator's previous election vote share, $share$. To find the threshold value of $share$ at which the marginal impact of contributions diminishes to zero, we compute the following for each of the five implementation horizons:

$$threshold = \hat{\beta}_{contr} - \hat{\beta}_{contr\times share} share.$$

From this equation, we find that, conditional on a legislator voting for regulation on an industry, the positive impact of industry campaign contributions on the legislator's propensity to vote for regulatory restrictions diminishes to zero as a legislator's previous election share climbs into the mid-eighties. The lowest such threshold calculated was 83%, and the highest was 87%. As truly

competitive elections are almost never won by such margins, contributions appear to have a positive effect whenever a legislator's reelection prospects are in doubt.

The positive effect of campaign contributions, and negative moderating effect of electoral security, are robust across a variety of specifications of the campaign contributions variable. As shown in Tables 22 through 24, these qualitative results hold if a quadratic relationship is specified for contributions, if industry contributions are specified as a percentage of the legislator's total, or if industry contributions are specified according to whether they fall into the bottom, middle, or upper third of the distribution across all industry-legislator-years.

The robustness of these results gives us confidence in finding a positive association between contributions and regulations for congressmen in competitive seats. However, the extent to which these contributions *cause* increases in regulatory legislation is not clear. If it was clear that industries preferred more regulation to less in general, then it might make sense to treat campaign contributions in our model as the "price" of new regulation to some extent.[16] However, even though the estimated effect of contributions is generally positive, it is not necessarily the case that this actually constitutes a revealed preference. First and foremost, there are a variety of reasons for which industries could donate to political campaigns. Common explanations for industry contributions include viewing donations as instruments for influencing legislator behavior, attempts to affect electoral outcomes, and simple consumption ("warm glow giving").

In reality, some combination of these possibilities is likely the best explanation. However, as prominent as the second explanation is in popular discourse, there are strong theoretical and empirical reasons to doubt that industries' predominant political strategy is to elect candidates who fully agree with them on policy matters. First of all, heterogeneous firm interests make it difficult to coordinate industry political strategy while avoiding the free rider problems that beset nearly all electoral behavior. On an empirical level, if industry contributions were made predominantly to support candidates with similar policy interests, it does not make sense that candidates in completely safe seats would receive significant levels of industry contributions. Yet, among all legislator-industry-year combinations in our 1997-2012 sample,

[16] Even if one could show that industries preferred more regulation to less regulation, campaign contributions could be used to obtain many things beside regulation, including subsidies, tax breaks, or project contracts. In any such case, it's not clear what proportion of the total contributions would be "buying" extra regulation, in particular.

TABLE 22
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
QUADRATIC SPECIFICATION OF CAMPAIGN CONTRIBUTION EFFECTS
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score	-7.009*** (0.479)	-9.121*** (0.552)	-15.095*** (0.643)	-15.665*** (0.676)	-18.578*** (0.624)
Senator	-13.194*** (0.936)	-33.406*** (1.082)	-36.175*** (1.281)	-41.492*** (1.367)	-35.204*** (1.242)
Controls Senate	5.424*** (0.708)	-0.453 (0.798)	5.053*** (1.172)	62.478*** (0.652)	60.679*** (0.599)
Controls House	39.184*** (0.732)	48.930*** (0.822)	56.887*** (1.195)	(Omitted)	(Omitted)
Controls Presidency	-9.312*** (0.422)	-6.565*** (0.476)	-4.912*** (0.562)	-4.590*** (0.570)	-0.919* (0.517)
Percentage of Firms	1.153*** (0.103)	-0.081 (0.117)	-2.749*** (0.138)	-2.315*** (0.155)	-1.875*** (0.148)
Percentage of Employees	0.452*** (0.161)	2.653*** (0.182)	7.970*** (0.215)	10.284*** (0.241)	11.673*** (0.231)
Industry Contributions[2]	0.397*** (0.021)	0.481*** (0.025)	0.601*** (0.030)	0.837*** (0.037)	0.771*** (0.034)
Industry Contributions Squared	-1.2E-05*** (1.00E-06)	-1.5E-05*** (1.18E-06)	-2.2E-05*** (1.41E-06)	-2.6E-05*** (1.52E-06)	-2.4E-05*** (1.44E-06)
Previous Election Vote Share	-0.079*** (0.017)	-0.040** (0.019)	-0.031 (0.023)	-0.056** (0.024)	-0.080*** (0.022)
Contributions ✕ Vote Share	-0.004*** (0.0003)	-0.004*** (0.0003)	-0.005*** (0.0004)	-0.007*** (0.0005)	-0.007*** (0.0004)
Left-Censored Observations	570,272	481,322	432,586	395,096	348,613
Uncensored Observations	361,484	450,434	440,748	419,816	407,128
Total Observations	931,756	931,756	873,334	814,912	755,741

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.

2 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000.

3 Missing values in dependent variables are controlled for using a set of indicator variables.

4 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

TABLE 23
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
INDUSTRY CAMPAIGN CONTRIBUTIONS AS A PROPORTION OF TOTAL CONTRIBUTIONS
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score	-6.893*** (0.481)	-8.947*** (0.555)	-14.814*** (0.647)	-15.155*** (0.682)	-18.128*** (0.629)
Senator	-10.038*** (0.940)	-29.061*** (1.087)	-30.697*** (1.289)	-35.401*** (1.378)	-29.826*** (1.251)
Controls Senate	5.754*** (0.709)	0.037 (0.800)	5.546*** (1.174)	61.894*** (0.655)	60.274*** (0.602)
Controls House	38.476*** (0.736)	47.932*** (0.826)	55.795*** (1.198)	(Omitted)	(Omitted)
Controls Presidency	-9.212*** (0.422)	-6.456*** (0.476)	-4.781*** (0.562)	-4.440*** (0.571)	-0.847 (0.517)
Percentage of Firms	1.136*** (0.103)	-0.101 (0.117)	-2.792*** (0.139)	-2.381*** (0.155)	-1.936*** (0.149)
Percentage of Employees	0.585*** (0.161)	2.806*** (0.183)	8.221*** (0.215)	10.638*** (0.242)	11.974*** (0.231)
Industry Proportion of Contributions[2]	0.442*** (0.061)	0.303*** (0.072)	0.518*** (0.088)	0.618*** (0.091)	0.416*** (0.081)
Previous Election Vote Share	-0.061*** (0.018)	-0.017 (0.020)	0.002 (0.024)	-0.039 (0.026)	-0.066*** (0.023)
Contributions Proportion ✕ Vote Share	5.00E-05*** (1.76E-05)	5.36E-05** (2.10E-05)	6.63E-05*** (2.49E-05)	6.46E-05** (2.54E-05)	5.08E-05** (2.21E-05)
Left-Censored Observations	570,272	481,322	432,586	395,096	348,613
Uncensored Observations	361,484	450,434	440,748	419,816	407,128
Total Observations	931,756	931,756	873,334	814,912	755,741

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.

2 [Industry contributions to legislator over past three years] / [All contributions to legislator over last three years] ✕ 100. Negative contribution totals (i.e. net refunds to donors) by industry and/or legislator are treated as missing.

3 Missing values in dependent variables are controlled for using a set of indicator variables.

4 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

TABLE 24
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
"THREE-BIN" SPECIFICATION OF CAMPAIGN CONTRIBUTION EFFECTS
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score	-9.120*** (0.473)	-11.558*** (0.545)	-17.927*** (0.635)	-18.467*** (0.668)	-21.056*** (0.618)
Senator	-16.525*** (0.923)	-37.239*** (1.069)	-40.663*** (1.265)	-45.196*** (1.349)	-38.686*** (1.228)
Controls Senate	4.892*** (0.706)	-1.130 (0.797)	4.035*** (1.171)	61.005*** (0.651)	59.483*** (0.598)
Controls House	38.706*** (0.731)	48.442*** (0.821)	56.467*** (1.194)	(Omitted)	(Omitted)
Controls Presidency	-9.430*** (0.421)	-6.706*** (0.476)	-5.123*** (0.562)	-4.836*** (0.570)	-1.056** (0.517)
Percentage of Firms	1.236*** (0.102)	0.002 (0.116)	-2.612*** (0.137)	-2.170*** (0.154)	-1.732*** (0.148)
Percentage of Employees	0.180 (0.161)	2.377*** (0.181)	7.580*** (0.214)	9.874*** (0.240)	11.287*** (0.230)
Middle Third (Contributions)[2]	14.783*** (1.312)	15.949*** (1.473)	16.081*** (1.790)	13.440*** (1.923)	11.327*** (1.725)
Middle Third ✕ Vote Share	-0.085*** (0.019)	-0.085*** (0.022)	-0.089*** (0.026)	-0.068** (0.028)	-0.083*** (0.025)
Upper Third (Contributions)[2]	33.197*** (1.289)	36.721*** (1.466)	42.133*** (1.789)	42.208*** (1.924)	39.895*** (1.736)
Upper Third ✕ Vote Share	-0.124*** (0.019)	-0.112*** (0.022)	-0.058** (0.027)	-0.009 (0.028)	-0.030 (0.026)
Previous Election Vote Share	0.022 (0.020)	0.056** (0.023)	0.054** (0.028)	-0.010 (0.029)	-0.020 (0.026)
Left-Censored Observations	570,272	481,322	432,586	395,096	348,613
Uncensored Observations	361,484	450,434	440,748	419,816	407,128
Total Observations	931,756	931,756	873,334	814,912	755,741

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.

2 Industry contributions are classified by whether they fall into the bottom, middle, or top third of the distribution of industry contributions to legislators. Contribution figures reflect the total received in the current year, plus the past three calendar years.

3 Missing values in dependent variables are controlled for using a set of indicator variables.

4 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

the average industry contribution to legislators whose previous election share was at least 80% is $5,014, compared to an average industry contribution of $6,942 among legislators whose previous election share was below 80%. While this difference ($1928) is certainly substantial, it's hardly absolute. A previous election vote share of at least 80% implies that reelection is virtually assured, excepting the possibility of a major scandal or a political earthquake. Given the range of congressional candidates in more competitive races, it seems doubtful that there would be no other race in which an industry could spend its $5,014 to greater electoral effect.

Likewise, "contributions as consumption" seems to provide a weak explanation for industry contributions, as such a theory is hard to reconcile with the positive effect of contributions on a legislator's propensity to vote for regulation, as well as the decrease in this effect as a legislator gains vote share. In the absence of more plausible theories, this suggests that industries contribute to legislators with at least some intention of influencing their behavior on public policy. The strong positive association of contributions with future regulation, meanwhile, suggest that regulatory policy is at least part of this mix.

Contributor influence might come by treating contributions as implicit quid-pro-quo transactions for policy outcomes, or by using contributions to obtain access to a legislator. On the other hand, these contributions could simply correlate with more general nonmarket strategies aimed at influencing legislators on regulation. If such is indeed the case, our results would suggest that, on average, industries' nonmarket strategies regarding regulation tend to lead to the creation of more regulation.

While the positive association between contributions and regulations is robust across various specifications of contributions, we must note that not all model specifications yield this qualitative result. Specifically, a linear legislator-industry fixed-effects model yields estimates with the opposite signs for the coefficients on industry contributions and the contribution-vote share. The results of Hausman tests for each implementation horizon imply that we must reject the hypothesis that the legislator-industry-level effects are adequately modeled by a random-effects model. Fortunately, the coefficients on contributions and the contributions-vote share interaction term are the only estimates that experience a "sign flip" between fixed-effect and random-effect model specifications.

This casts some doubt on the Tobit random-effects estimates of the effect of campaign contributions models, but since estimation of a Tobit fixed-effects model is not feasible (as we

explained in further detail in Section B above), we must urge caution in interpreting the direction of the effect of campaign contributions. That said, there is reason to believe that, even if one believes the linear fixed-effect model is preferable to Tobit random-effects model, there is not a substantial negative effect of contributions on voting for regulation. The coefficient on contributions is only statistically significant in the linear fixed-effects model for the two, three, and four-years horizons. Moreover, the moderating effect of previous election vote share acts against the effect of contributions, just as it did in all of the Tobit models. In fact, the estimated marginal effect of contributions in the linear fixed-effects model diminishes in vote share to zero at just 56.6% for the five-year implementation horizon.

E. Further Analysis of the Effects of Industry Presence in the Legislator's State

While industry employment and firm count within the legislator's state both have statistically significant associations with $vote\_regs$, their effects tend to point in opposite directions. Employment has a positive, statistically significant relationship with regulations across all five time horizons, while the percentage of firms attributable to an industry has a negative, statistically significant association with regulations at the 3, 4, and 5-year horizons. The two effects only have the same sign for the one-year implementation horizon.

While it may seem, *prima facie*, that the overall presence of an industry within a legislator's state has an indeterminate effect on a legislator's votes on regulation, we found that the employment effect tends to dominate the firm effect in practice. For each of our 745,689 legislator-industry-year combinations with non-missing values for these variables, we computed whether the employment effect was stronger than the firm effect for each observation using the following inequality:

$$|\hat{\beta}_{emp} \times emp| > |\hat{\beta}_{firms} \times firms|,$$

where emp is the percentage of employees in the legislator's state that belong to the industry in question, $firms$ is the percentage of firms in the legislator's state that belong to the industry, and $\hat{\beta}_{emp}$ and $\hat{\beta}_{firms}$ are the Tobit coefficient estimates of each of these variables, respectively. As shown below in Table 25, this inequality is satisfied for the vast majority of these observations. It therefore seems safe to conclude that, according to the estimates of our model, higher levels of industry presence within a legislator's state are associated with a stronger propensity to vote in favor of regulation on said industry.

Table 25: Employee Effects vs. Firm Effects on Legislator Regulation		
Implementation Time Horizon	Number of Observations in which Employment Effect Dominates	Percent of Observations in which Employment Effect Dominates
Two Years Out	738,181	98.99
Three Years Out	680,709	91.29
Four Years Out	713,222	95.65
Five Years Out	724,645	97.18

Despite the clashing effect signs, the combined effect of employment and firm presence within a legislator's state has a strong positive effect on the legislator's votes for regulatory restrictions. Conditional on a legislator voting to regulate an industry, a standard deviation increase in both the percentage of firms and the percentage of employees is associated with voting to authorize 26.6 more regulatory restrictions on said industry.

Part VII: Robustness of Results to the Presence of Deregulation

Having discussed the associations between ideology, industry contributions, and industry presence within a legislator's state, we attempt to address the omitted variable whose specter hangs over each piece of our analysis: deregulation. While we argue in Part IV that significant deregulation is both relatively rare and small in magnitude in comparison to the new regulation created each year, it is nonetheless difficult to disregard the attention that deregulation receives in both the academic literature and political discourse on regulatory policy.

The bias introduced by lack of a deregulation measure arises in two types of cases. Consider an arbitrary legislator and industry. In the first case, the legislator votes for at least one bill that only deregulates the industry, and none that regulate the industry, in a given year. Then, the total quantity of regulatory restrictions on the industry that she votes for in that year is zero, when it should, in fact, be negative.[17] In the second case, a legislator votes for at least one bill that deregulates an industry, as well as at least one bill that regulates said industry. In such a

[17] Technically, given the nature of RegData's machine-learning algorithm, this number of regulations would be "roughly" zero. Regardless, our Tobit models would be able to avoid any omitted variable bias present for this one observation.

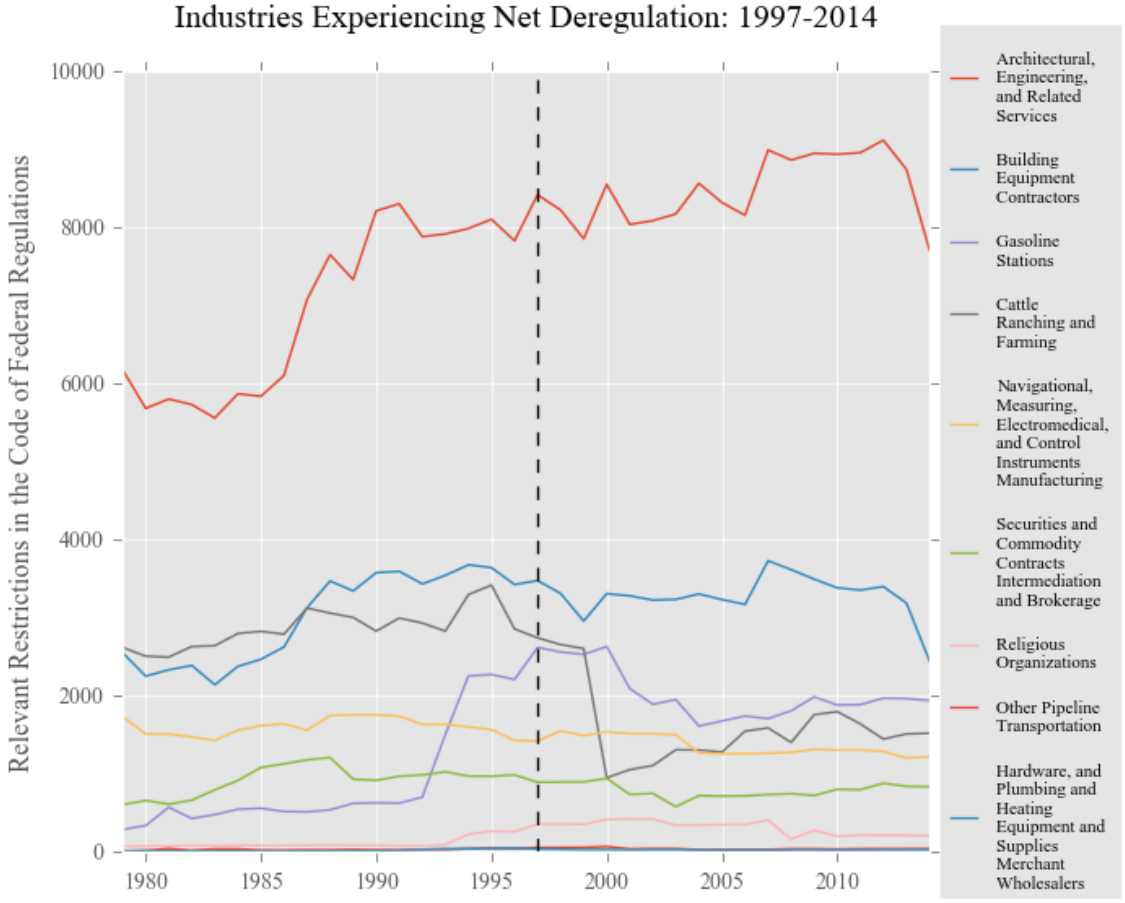
case, the quantity of regulation measured will be strictly positive and biased upward. By setting the left-censoring threshold appropriately, the first case can be appropriately dealt with via the use of Tobit models. However, observations that reflect deregulation of the second type will yield regulation measurements above the censoring threshold, and thus will bias the set of Tobit estimates.

As there are observations of the second type in our panel, our use of Tobit models almost certainly fails to adequately account for the bias of deregulation. Unfortunately, we cannot directly control for deregulation, as we have no way of connecting year-to-year reductions in industry-level regulation to bills voted on by legislators. We cannot use RegData's restriction counts to compute such a measure, as the Code of Federal Regulations does not include public law number citations for rules that have been eliminated according to Congressional decree.

However, RegData does provide counts of aggregate industry-level regulation by year, so we can measure year-to-year net deregulation by examining decreases in the aggregate amount of industry regulation from the previous year. As of such, we investigate the degree to which our results hold in industries that experience net deregulation over the dataset time span, as well as those that experiment net increases in regulation.

Figure 26 depicts the nine industries that experience net deregulation between 1997 and 2014, the CFR years reflected in the dependent variables used in our regressions. Note that only three members of this set of industries overlap with the set of eight industries that faced net deregulation between 1979 and 2014 (see Figure 6); even the most significant instances of deregulation among our set of 107 industries tend to be only transitory.

Figure 26
Industries Experiencing Net Deregulation: 1997-2014



Data Source: RegData 2.2, a product of the Mercatus Center at George Mason University

Tables 27 and 28 below present the results of our Tobit random-effects estimation for the set of industries experiencing net increases in regulation and the set of industries experiencing net decreases in regulation, respectively. If we consider the set of industries in Figure 26 to reflect the subset of observations most afflicted by deregulation bias, then comparisons of the results between Tables 14, 27, and 28 suggest that deregulation results in attenuated Tobit estimates. The estimated coefficients on all regressors of interest are of a greater magnitude when the set of observations is restricted to those industries facing net increases in regulation between 1997 and 2014. Moreover, as seen in Table 28, restricting the set of observations to only those industries that face net deregulation yields severely attenuated coefficients for **Ideology**, **Industry Contributions**, and **Contributions × Vote Share**. Interestingly, the signs on **Percentage of Firms** and **Percentage of Employees** both flip in comparison to Table 14. However, the overall effect of industry presence is still positive, though also attenuated.

TABLE 27
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
INDUSTRIES EXPERIENCING A NET INCREASE IN REGULATION
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score	-7.326*** (0.520)	-9.124*** (0.591)	-15.766*** (0.690)	-16.572*** (0.726)	-19.479*** (0.671)
Senator	-12.503*** (1.016)	-34.256*** (1.162)	-36.135*** (1.376)	-41.799*** (1.471)	-35.243*** (1.337)
Controls Senate	5.582*** (0.777)	-0.682 (0.869)	4.588*** (1.274)	65.266*** (0.710)	63.234*** (0.651)
Controls House	40.911*** (0.805)	50.837*** (0.896)	59.997*** (1.300)	(Omitted)	(Omitted)
Controls Presidency	-9.518*** (0.463)	-6.662*** (0.519)	-4.906*** (0.613)	-4.617*** (0.622)	-1.008* (0.563)
Percentage of Firms	0.110 (0.118)	-1.011*** (0.133)	-3.862*** (0.157)	-2.854*** (0.176)	-2.142*** (0.168)
Percentage of Employees	1.264*** (0.177)	3.448*** (0.199)	9.098*** (0.234)	11.152*** (0.263)	12.617*** (0.252)
Industry Contributions[2]	0.391*** (0.025)	0.470*** (0.029)	0.568*** (0.035)	0.880*** (0.044)	0.806*** (0.041)
Previous Election Vote Share	-0.079*** (0.019)	-0.045** (0.021)	-0.026 (0.025)	-0.043 (0.026)	-0.070*** (0.024)
Contributions ✕ Vote Share	-0.005*** (0.0003)	-0.006*** (0.0004)	-0.007*** (0.0005)	-0.010*** (0.001)	-0.009*** (0.001)
Left-Censored Observations	527,815	443,523	398,334	364,065	321,024
Uncensored Observations	325,569	409,861	401,542	382,303	371,150
Total Observations	853,384	853,384	799,876	746,368	692,174

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.

2 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000.

3 Missing values in dependent variables are controlled for using a set of indicator variables.

4 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

TABLE 28
DETERMINANTS OF VOTING ON REGULATORY LEGISLATION (1997-2012)
INDUSTRIES EXPERIENCING A NET DECREASE IN REGULATION
TOBIT WITH LEGISLATOR-INDUSTRY RANDOM EFFECTS[1]

	DEPENDENT VARIABLE				
EXPLANATORY VARIABLE	**vote_regs_1** (1)	**vote_regs_2** (2)	**vote_regs_3** (3)	**vote_regs_4** (4)	**vote_regs_5** (5)
Ideology Score	-3.593*** (0.712)	-7.683*** (0.914)	-6.838*** (1.055)	-4.556*** (1.139)	-6.687*** (1.067)
Senator	-9.372*** (1.264)	-16.276*** (1.464)	-21.447*** (1.793)	-22.539*** (1.969)	-20.896*** (1.881)
Controls Senate	1.060 (0.753)	1.335* (0.778)	4.259*** (1.195)	29.889*** (0.680)	29.744*** (0.678)
Controls House	21.664*** (0.766)	27.353*** (0.788)	26.438*** (1.203)	(Omitted)	(Omitted)
Controls Presidency	-3.294*** (0.439)	-2.377*** (0.446)	-2.428*** (0.545)	-2.510*** (0.575)	-0.146 (0.569)
Percentage of Firms	3.005*** (0.096)	2.625*** (0.099)	2.103*** (0.125)	1.681*** (0.140)	2.379*** (0.143)
Percentage of Employees	-0.872*** (0.189)	-0.922*** (0.194)	-1.606*** (0.243)	-1.268*** (0.268)	-1.459*** (0.267)
Industry Contributions[2]	0.056*** (0.014)	0.051*** (0.015)	0.051*** (0.018)	0.081*** (0.025)	0.079*** (0.025)
Previous Election Vote Share	0.031 (0.020)	0.086*** (0.020)	0.024 (0.025)	0.008 (0.027)	-0.011 (0.026)
Contributions ✕ Vote Share	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0003)	-0.001*** (0.0003)
Left-Censored Observations	42,457	37,799	34,252	31,031	27,589
Uncensored Observations	35,915	40,573	39,206	37,513	35,978
Total Observations	78,372	78,372	73,458	68,544	63,567

Notes:

1 Each Tobit model supposes that the unobserved latent variable coincides with the outcome measure for **vote_regs_[x]** > 1.

2 Industry contributions to a legislator in the current year, plus the past three calendar years; contribution units are $1000.

3 Missing values in dependent variables are controlled for using a set of indicator variables.

4 Coefficient standard errors are in parentheses.

***** Significantly different from zero at 90 percent confidence.

****** Significantly different from zero at 95 percent confidence.

******* Significantly different from zero at 99 percent confidence.

Such a comparison does not offer a panacea for the bias caused by deregulation. Deregulation is still present in various extents in most of the 107 industries, even the 98 that experienced net increases in regulation between 1997 and 2014. However, if the bias of deregulation tends to only attenuate the Tobit estimates, then one would expect that each true coefficient is of even greater magnitude. Thus, while the exact magnitude of our coefficients of interest might be somewhat off, we find it unlikely that the qualitative results (i.e. the estimate signs and significance) for our regressors of interest are altered because of omitted variables bias from deregulation.

Part VIII: Conclusion

This paper aims to give a partial explanation of the substantial amount of regulatory accumulation that has occurred over the past half-century. In creating a novel dataset of regulatory legislation by legislator, industry, and year, we provide evidence that a legislator's constituency, ideology, and campaign finance significantly affect her propensity to vote for regulation on a given industry. Some of our findings fit conventional narratives on regulation: all else equal, Democrats tend to vote for more regulation than Republicans, and the proportion of firms in a legislator's state that belong to an industry is negatively associated with the legislator's propensity to vote for regulations on said industry.

That said, there seems to be surprisingly little evidence that regulatory policy is the product of a Manichean struggle between the forces of populism and public welfare on one side, and industry interests and laissez-faire capitalism on the other. All else equal, it's moderate Democrats in Congress, not liberal ideologues, that tend to vote for the most regulation. Moreover, the evidence that conservative Republicans are actually more anti-regulation than their colleagues is decidedly mixed, and depends highly on how legislator ideal points are estimated. In contrast to the idea that industries mitigate regulation with campaign contributions, Tobit estimates of the effect of campaign contributions on voting for regulation suggest a robust positive relationship. Even if one gives more credence to the linear fixed-effect estimates of the effect of contributions, the moderating effect of vote share renders any negative effect of contributions minimal. And finally, while the percentage of firms in a legislator's state that belong to a given industry is negatively associated with regulation on said industry, the overall

presence of an industry within a legislator's state (that is, the combined effect of firm and employee presence) is positively associated with industry regulation.

Thus, a regulatory narrative of bomb throwing and political warfare between anti-regulation industry forces and pro-regulation progressive forces hardly seems to be empirically founded. Quite to the contrary, the best narrative regarding regulatory legislation would likely be one of logrolling, compromise, and delegation to administrative agencies.

However, more research is still needed to glean a more refined understanding of industries' nonmarket strategies regarding regulation. This paper only addresses the legislative side of the regulatory process; as legislators hand off directions for the executive agencies to perpetually administer, there may be much more to say about the antecedents of regulatory rulemaking within the administrative agencies. This seems to be confirmed by a generally mediocre level of model fit across our various different specifications of regulatory outcomes. While there is no statistic for Tobit models that is equivalent to R^2 for linear models, the extremely low R^2 values that our preliminary OLS regressions produced suggest that focusing on congressional actions leaves out much of the story when it comes to regulatory accumulation.

There are still plenty of further ways to investigate the determinants of regulation from a legislative angle, however. Other instruments of nonmarket strategy, such as lobbying and employee mobilization, could be significant predictors of regulation. The RegData project and Bonica's DIME dataset allow researchers to obtain valuable insights into regulatory policy and campaign finance, but regulatory legislation has many more determinants and outcomes than campaign contributions and regulatory restrictions, respectively. Better data on legislative outcomes would allow researchers to partial out the effects of regulation, taxation, and subsidies contained in a single bill.

The implications of this research are potentially useful from an institutional design perspective. If industry political activity and political compromise do play a large role in regulatory accumulation, then the literature on regulation and growth suggest that the economy as a whole may be under a state of "capture." As of such, further legislative transparency and more robust regulatory cost-benefit analysis may be effective tools to mitigate a costly political phenomenon. We urge caution, however, in reading causality into these results. More refined data on a broader range of political and economic factors, further empirical analysis, and careful case studies are seriously needed to elucidate precise causal channels.

Appendix I: Constructing a Dataset of Regulatory Legislation

While it is ultimately the executive agencies who write regulatory restrictions in the CFR, the stipulations of each year-title-part must be authorized by a bill from Congress. As of such, each year-title-part cites an authorizing provision (or set of provisions) from the U.S. Code. These citations of authorizing statutes allow us to produce a dataset of regulatory legislation that contains the number of regulatory restrictions associated with each member of Congress to take office between 1979 and 2012. To obtain such a measurement, we attempted to trace back each year-title-part in the CFR between 1979 and 2014 in the following manner:

(1) from each year-title-part to its authorizing statutes in the U.S. Code,

(2) to the public law numbers associated with each given statute in the U.S. Code,

(3) to the bill numbers of the legislation passed in the House of Representatives and Senate that became each given public law,

(4) to the roll-call voting, sponsorship, and cosponsorship records for each bill in question.

Steps (1) and (2) were accomplished within RegData 2.2, which includes a dataset matching year-title-parts in the CFR to their authorizing public law numbers. From these matches, we mapped each public law number to a two-dimensional array of regulatory restrictions (i.e., a matrix with entries $A_{i,y}$ that indicate the number of restrictions authorized on industry i in year y).[18] For each public law in this mapping, we looked up the associated bill number (e.g. "S.3266" or "H.R.2006") in the official congressional public law website.[19] This process resulted in 2,602 bills passed between 1979 and 2012, each associated with a matrix of regulatory restrictions on 107 industries

[18] The relationship between public law numbers and CFR year-title-parts is not one-to-one in either direction; a single public law can authorize multiple year-title-parts, and a single year-title-part can be authorized by multiple public laws. If a year-title-part containing R restrictions on industry i was authorized by N public laws, we attributed R/N of these restrictions to each of the N public laws. This, in principle, ensures that the number of restrictions authorized by public laws matches up with the number restrictions contained in CFR year-title-parts. In practice, however, RegData 2.2 features restriction counts and industry relevance probabilities for 261,567 year-title-parts published between 1979 and 2015, but 111,434 (42.6%) of these cannot be connected to a public law number for a public law passed between 1979 and 2015. Most of this disparity appears to be attributable to (a) the large number of CFR parts authorized by public laws passed before 1979, and (b) CFR parts that contain zero restriction terms (and thus may reflect internal guidance for administrative agencies, instead of publicly applicable regulatory text).

[19] See https://www.congress.gov/public-laws/

in each year from 1979 to 2015. From each bill's entry on the congressional website, we extracted data on the bill's sponsor, cosponsors, and method of passage (e.g. vote by roll-call, voice vote, unanimous consent, etc.).

From GovTrack's legislator database[20], we then constructed a panel of all congressmen that served between 1979 and 2012. This panel featured a unique ID number for each congressman, as well as the congressman's party, state, district, and chamber of congress for each year served. We then merged this legislator dataset with the previously described dataset of bills and regulatory restrictions (the "bill dataset") in the following manner:

- We compiled lists of bills sponsored and cosponsored by each legislator by matching legislator names to the lists of sponsors and cosponsors associated with each bill in the bill dataset. Then, we created for each year a matrix of "sponsored regulations" and "cosponsored regulations" for each legislator by summing over the regulation matrices associated with each bill. As each legislator ostensibly sponsored multiple bills in each year of his multiple-year career, we constructed a three-dimensional array $(S_{Y,i,y})$ for each congressman that reflects the number of regulations sponsored in year Y that affect industry i in year y.[21]
- For each legislator, we compiled a list of bills voted on by matching legislator names to bills in the bill dataset that were passed by roll-call. Using GovTrack's roll-call voting records[22], and the regulation matrices associated with each of these bills, we constructed three-dimensional arrays of "regulations voted for" and "regulations voted on" for each legislator.

This process yields measures of regulation voted on, voted for, sponsored, and cosponsored, for each legislator-legislative year-CFR year-industry combination. To apply this measure to in the more parsimonious context of our model, we construct measures of regulatory restrictions at the legislator-legislative year-industry level by sampling various time spans out from the legislative

[20] See https://www.govtrack.us/congress/members

[21] As a single law can authorize regulations for decades to come, and because a regulatory law tends to "grow" in its number of regulations over time, there's no general way to condense this three-dimensional array into a one or two-dimensional measure of regulation without introducing severe temporal bias. In the interest of parsimony, however, we shall later describe our method of simplifying this measure for our particular model of regulatory legislation.

[22] See https://www.govtrack.us/congress/votes

year. Thus, for each type of restriction measure (restrictions voted for, restrictions sponsored, etc.), we create separate measures of the restrictions that a legislator authorized in legislative year Y on industry i in the CFR year $Y + s$, $s \in \{1, 2, 3, 4, 5\}$. Therefore, an observation within our dataset is a unique legislator-year-industry combination, with measures of regulation implemented s years out, $s \in \{1, 2, 3, 4, 5\}$.

Appendix II: Details Regarding Industry Contribution Data

To make a mapping between CRP codes and 4-digit NAICS codes, we started by taking an unofficial list of pairings posted online in a Center for Responsive Politics campaign finance data forum.[23] We then manually checked this CRP-NAICS crosswalk, making sure that each correspondence was plausible. As we discovered, it is impossible to make an accurate one-to-one mapping in either direction, though the great majority of codes could be paired up in a reasonable fashion. We verified this correspondence by testing it against the CRP-NAICS pairings featured in Drutman's dataset on the lobbying history of firms in the S&P 500 between 1981 and 2006.[24] For each CRP-NAICS pair, we examined whether the CRP-NAICS correspondence that we used captured the appropriate NAICS code in the "image" of the CRP code. Whenever a CRP code in Drutman was paired with a NAICS code, but our crosswalk did not account for this correspondence, we manually reviewed the match to see if it made sense conceptually. If so, we added the NAICS code to the correspondence "image" of the CRP code. We refrained from adding the following pairings to the general set of correspondences:

CRP Code	CRP Description	NAICS Code	NAICS Description
B5000	Building materials	3119	Other Food Manufacturing
C2200	Cable & satellite TV production	3339	Other General Purpose Machinery Manufacturing
E1110	Major (multinational) oil & gas producers	5259	Other Investment Pools and Funds

[23] See https://groups.google.com/forum/#!topic/opensecrets-open-data/nXYSeFrtwxk.
[24] See http://www.leedrutman.org/data/.

E1140	Natural Gas transmission & distribution	4247	Petroleum and Petroleum Products Merchant Wholesalers
E1210	Coal mining	2379	Other Heavy and Civil Engineering Construction
E1700	Power plant construction & equipment	3366	Ship and Boat Building
G4300	Department, variety & convenience stores	3359	Other Electrical Equipment and Component Manufacturing
G4600	Miscellaneous retail stores	5222	Nondepository Credit Intermediation
G5200	Business services	5622	Waste Treatment and Disposal
G5270	Management consultants & services	3341	Computer and Peripheral Equipment Manufacturing
H4100	Medical Devices & Supplies	6221	General Medical and Surgical Hospitals
H4300	Pharmaceutical manufacturing	5241	Insurance Carriers
M1500	Plastics & Rubber processing & products	3399	Other Miscellaneous Manufacturing
T2200	Truck/Automotive parts & accessories	6221	General Medical and Surgical Hospitals
T6100	Ship building & repair	3336	Engine, Turbine, and Power Transmission Equipment Manufacturing
T8200	Motor homes & camper trailers	3219	Other Wood Product Manufacturing
Y4000	Employer listed but category unknown	3339	Other General Purpose Machinery Manufacturing

After making the previously described alterations to the set of correspondences, our CRP-NAICS map is consistent with the pairings in Drutman's dataset for 13,341 out of the 13,665 firm-year observations, or 97.6% of the total.

Given this set of correspondences, we "mapped" each contribution from a CRP industry to congressman into a set of NAICS industries. For many CRP industries, this transformation was one-to-one. For the rest, we attributed to each corresponding NAICS industry the amount of the contribution divided by the number of NAICS industries that corresponded to the CRP industry. The choice to uniformly apportion the contributions from a CRP industry among its the corresponding NAICS industries is admittedly arbitrary; oftentimes, it is clear that a CRP industry fits "better" with one of its corresponding NAICS industries than it does with another. That said, it is difficult and arbitrary to judge what the "best correspondence" between CRP and NAICS industries are in any case, and so we found equal apportionment to be the least arbitrary method of converting contributions to NAICS given our data.[25]

We computed the amount of contributions made by each NAICS industry to a given congressman in a year by summing over all such transactions. For our model, we created contribution variables to measure donations of various time-spans. Specifically, we computed the measure $ind\_contrib\_[span]$, which reflects the total amount of contributions a legislator receives from an industry over the previous $span$ years, $span \in \{1, 2, 3, 4, 5\}$. This measure always includes the current years contributions; for example, $ind\_contrib\_1_{l,i,t}$ is the sum of all contributions made by industry i to legislator l in the current year t and the previous year $t-1$.

[25] Ideally, we would use a machine learning algorithm to map CRP industry codes to NAICS industry codes, as this would be less tainted by subjective human error. Moreover, we would be able to attribute contributions in the case of multiple matches in a more appropriate manner than equal apportionment, which unfortunately imposes a uniform distribution that is almost certainly inaccurate. However, to the best of our knowledge, there is not a sufficient set of "trainers" for such an algorithm. We would need a large set of pre-matched firm-contributor pairings that includes CRP codes and NAICS codes for each firm and contributor, respectively. The best candidate for such a trainer set that was available to us is Drutman's dataset on lobbying histories of firms in the S&P 500 between 1981 and 2006. However, this dataset doesn't cover all CRP codes or NAICS, and does not appear to be representative of the full span of industry donors.

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