Measuring Corporate Regulation

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January, 2023

ABSTRACT: We use textual analysis of mandatory accounting filings to develop firm-level, time-varying measures of exposure to individual regulatory agencies. The measures vary predictably across industries and with broad regulatory interventions, but also include substantial firm-specific, time-varying components. These components positively relate to undisclosed regulatory investigations and regulator financial statement downloads, suggesting the measures capture an otherwise nonpublic dimension of regulation. Consistent with regulation imposing net costs on firms, firms' overall exposure to regulation negatively relates to their profitability and more regulated firms earn higher future returns. Consistent with a causal interpretation of these results, we find that the positive stock market reaction to the surprise election of Donald Trump, who promised to reduce regulation, positively varies with firms' *ex ante* exposure to regulation. The negative relation between regulation and profitability is particularly significant for certain regulators, highlighting the benefits of a regulator-specific measure of regulation. Highlighting the benefits of a firm-year measure of regulation, we find that firms' profitability positively relates to their competitors' exposure to regulation, consistent with re-allocative effects of regulation within industries.

Keywords: Corporate regulation, disclosure, corporate profitability, employment.

JEL classification: D82; D83; M41

We appreciate helpful comments and suggestions from Sutirtha Bagchi, Dane Christensen, Mark Lang, Robert Holthausen, and James Omartian, as well as from workshop participants at the University of North Carolina at Chapel Hill.

1. Introduction

We develop and validate firm- and regulator-specific measures of regulation based on firms' mandatory accounting disclosures, and examine how the measures relate to corporate outcomes such as profitability and stock returns. We take a broad stance and define regulation as potential or realized actions taken by federal agencies that affect behavior and outcomes (see Hart 2009, for a similar definition). Consistent with this definition, the U.S. has a vast array of regulators that monitor and constrain corporate behavior in order to protect various stakeholders, including consumers, health care recipients, financial market participants, employees, and countless others.

Given the ubiquitous nature of regulation, a large literature in economics, business, and political science examines how regulators affect corporate outcomes. This literature largely studies singular regulations and regulators, or cross-industry differences in regulation.[1] While this literature provides important insights, it does not paint a complete picture of the effects of regulation, for example because it ignores potential granular differences in the effects of regulation on firms. Additionally, examining regulation broadly ignores the potential re-allocative effects of regulation within industries or countries (Posner 1971). We address the challenges of examining granular effects of regulation by constructing and validating time-varying, firm-level measures of exposure to individual U.S. regulatory agencies.

We construct our measures of regulation using textual analysis of public firms' annual financial statements. By Securities and Exchange Commission (SEC) mandate, public firm financial statements include discussions of exposure to risk factors and descriptions of management strategy, future plans, compliance with government mandates, and factors affecting

[1] This literature largely focuses on individual regulatory interventions, such as the Sarbanes Oxley Act (e.g., Zhang 2007), Dodd-Frank (e.g., Dimitrov et al. 2015), and state-level governance laws (Larcker et al. 2011), or cross-country differences in a single type of regulator (such as utilities (Dal Bó 2006)), or regulators that oversee firm entry (Djankov et al. 2002).

financial performance. These discussions frequently explain how government regulators change, or may change, the firm's operations and how the firm's management intends to navigate exposure to regulators. We search these discussions for references to specific agencies in conjunction with regulation action words (e.g., audit, compliance, etc.). Similar to Hoberg and Phillips (2016), a strength of our approach is its simplicity: regulatory agencies have standardized titles and almost universally accepted acronyms (e.g., the Internal Revenue Service [IRS] or the Department of Justice [DOJ]). These standardized titles and acronyms allow us to identify references to specific federal regulators with little potential measurement error or bias, and in turn construct regulator- and firm-specific measures of regulation. In our tests, we examine the measures individually and by combining them into a measure of overall regulation.

We validate the accuracy of the measures in several ways. Consistent with the increasing length of the Code of Federal Regulations (CFR), our measure of overall regulation increases over time. Our measures of exposure to certain regulators are greater in certain industries, exactly as one would predict based on that regulator's purview. For example, exposure to the Food and Drug Administration (FDA) is greater in the pharmaceutical industry. Further, overall regulation changes as anticipated around meaningful changes in regulation. For example, following the Sarbanes Oxley Act (SOX), firms' overall regulation increases.

Descriptively, we find firms' exposures to regulation vary over time and include a significant idiosyncratic component, highlighting the need for time-varying, firm-level measures of regulation. In particular, Shapely value tests suggest that industry fixed effects explain 10.5% of the variation in overall regulator exposure, year fixed effects explain 4.7%, firm fixed effects explain 66.9%, and 16.5% is both time-varying and firm-specific. Moreover, industry-year fixed

effects only explain 17.8% of the variation in overall regulation, while firm fixed effects still explain 64.4%, further emphasizing the benefits of firm-specific measures of regulatory exposure.

We next turn to the possibility that the time-varying, firm-specific variation in our measures are due to random differences in managers' propensities to discuss regulators in their financial statements or other idiosyncratic factors. To address this possibility, we show that our measures predict undisclosed regulator attention, after conditioning on industry-year and firm fixed effects. First, we show that our measure of SEC exposure predicts undisclosed SEC investigations identified *ex post* using Freedom of Information Act requests (Blackburne et al. 2021). Second, we show that our measures of exposure to different regulators predict downloads of firm financial statements by the different regulators (Bozanic et al. 2017). In total, we conclude that our measure captures a time-varying, firm-specific, and otherwise nonpublic dimension of regulator attention.[2] Moreover, we conclude that the measures capture *ex ante* regulator attention, in addition to *ex post* regulatory interventions (e.g., Hail et al. 2018).

Having validated our measures of exposure to regulators, we use them to explore the fundamental question of how regulation imposes net costs on firms. We begin by examining how regulation relates to firm profitability. We estimate specifications with and without year, industry-year, and firm fixed effects to capture different dimensions of regulation. Across all specifications, we find a significant negative relation between overall regulation and pretax return on assets. In our most stringent specification including firm and industry-year fixed effects, we find that a one standard deviation increase in regulation within an industry-year associates with a 1.8 percentage point reduction in pre-tax return on assets. These reductions highlight that the time-varying, firm specific component of regulation have an economically significant relation to firm profitability.

[2] Managers are aware of regulator investigations due to regulator inquiries (Blackburne et al. 2021).

Given the negative relation between regulation and profitability, we next examine how regulation relates to future stock returns. If regulators affect profitability, investors may demand and receive a risk premium for holding shares in firms exposed to regulation, in particular if they cannot diversify regulatory risk due to the ubiquitous nature of regulation. Consistent with regulation imposing undiversifiable risk on investors, we find that firms in the top quintile of overall regulatory exposure earn an equal-weighted return premium of 40 basis points per month. This return premium declines with the quintile of regulatory exposure and persists when value-weighting premiums.

While the association between regulation and firm profitability and returns is suggestive, we recognize that other explanations may exist for these associations. For example, regulators may target firms for regulation based on their profitability. We attempt to address these alternative explanations in our prior tests by including controls for determinants of regulation and by including firm and industry-year fixed effects. Further, we take advantage of a natural experiment to provide evidence on the causality of these associations. In particular, we use the surprise election of Donald Trump to President as a source of unexpected variation in market expectations about future regulation. Donald Trump's campaign was predicated, in part, on decreasing regulation (Popovich et al. 2019; Crews 2021; Belton and Graham 2020). Trump was not expected to win the election (Wagner et al. 2018b; Wagner et al. 2018a; Gaertner et al. 2020) and as a result his election win represents a discrete, unexpected change in expected future regulation. Consistent with regulation imposing costs on firms, we find that highly regulated firms earned higher equity market returns around the Trump election, relative to their less regulated counterparts.

Having documented that overall regulation negatively relates to firm profitability, we next turn to the question of whether there is significant heterogeneity among regulators. To do so, we

repeat our prior profitability tests for each of the most commonly mentioned regulators in our sample, separately and concurrently, while controlling for the remaining component of overall regulation. We find that oversight by the FDA, SEC, and Federal Communications Commission (FCC) all significantly associate with lower profitability, while oversight by many other regulators, such as the Environmental Protection Agency (EPA), does not appear to meaningfully associate with profitability. This result highlights the value of our regulator-specific measure of regulation.

Having established the direct costs to a firm of regulation from different regulators, we next consider whether regulation reallocates resources among firms. Posner (1971) and Rotemberg (2019) argue that state intervention can reallocate resources from regulated firms to less regulated firms by imposing costs on the former that the latter do not have to bear. Consistent with their arguments, we find that the level of overall regulation faced by a firm's industry competitors positively relates to that firm's profitability, after controlling for the level of regulation facing the firm itself. In total, we provide suggestive evidence that regulation reallocates resources. These results highlight the value of a firm-specific measure of regulation.

Lastly, we turn to the association between regulation and employment. Despite the negative effects of regulation on firms' profitability, supporters argue that regulation will nonetheless not affect employment, or even increase employment, due to the additional workers required to manage compliance.[3] Counter to these arguments, we document a negative relation between overall regulation and firm-level employment.

We contribute to the literature by examining one of the primary questions about corporate regulation: whether and how regulation affects corporate outcomes. Using our measures, we are

[3] For example, the Washington Post assures readers, "Does government regulation really kill jobs? Economists say overall effect is minimal (Yang 2011)." See also Porter and van der Linde (1995), Morgenstern et al. (2002), and Coglianese et al. (2014).

able to examine the relation between regulation and corporate outcomes, and separate the relation into components based on types of corporations and regulators, advancing our understanding of how regulation affects firms. One stream of related prior research studies the effects of individual regulations and cooperation among regulators on capital market outcomes (Grout and Zalewska 2006; Duarte et al. 2008; Christensen et al. 2016; Lang et al. 2020; Hutton et al. 2021; Silvers 2021). A second stream examines how transparency regulations reallocate resources among firms (Breuer et al. 2019; Breuer and Breuer 2020; Glaeser and Omartian 2022; Kim and Olbert 2021; Kim and Valentine 2021; Breuer 2021). A third stream examines the effects of political uncertainty or connections on corporate outcomes and decisions (Baker et al. 2016; Wellman 2017; Hassan et al. 2019; Nagar et al. 2019; Christensen et al. 2022; Godsell 2021; Christensen et al. 2022; Ferracuti et al. 2022). We build on these literatures by developing and validating a firm-level measure of exposure to individual regulators and documenting how firm-level exposure to regulators, separately and in the aggregate, relates to firm profitability, employment, market returns, and competitor profitability.

Our measures may also be useful to other researchers. Most directly, researchers interested in the effects of different regulators and regulations, or wanting to control for the effects of regulation, can benefit from our measures (Leuz 2007).[4] Moreover, our measures can allow researchers to draw distinctions between aggregate, sector-level, and firm-level exposure to regulation, as well as between different regulators and the interactions among them. Finally, the measures can allow researchers to draw deeper inferences in settings where firms' regulatory environments can moderate the effect of other economic forces. In this regard, our paper also relates to a burgeoning literature on firm-level compliance costs (Trebbi and Zhang, 2022;

[4] These data are available upon request and we plan to make them publicly available in the future.

Kalmenovitz, 2023). This literature develops measures of the direct compliance costs of regulation (e.g., the costs of hiring compliance officers). We build on this literature by developing a holistic measure of regulatory exposure that goes beyond direct compliance costs by also capturing potential indirect costs, such as constraining firms' actions.

2. Background

Similar to Hart (2009), we define regulation as potential or realized actions taken by federal government agencies that directly or indirectly affect corporate behavior and outcomes. This definition is quite broad and encompasses the regulations enforced by regulatory agencies and the oversight and interventions of regulatory agencies. A firm can be more regulated than other firms by being subject to a higher quantity of regulations, or an equal quantity of regulations that have a larger effect on the firm.

Regulation is designed to overcome problems that result from monopolies, market failures, asymmetric information, and other undesirable outcomes (Stiglitz 1993).[5] Regulators allegedly correct these problems and protect individual people in their various capacities (as investors, consumers, healthcare patients, breathers of air, etc.). While regulation is intended to benefit society, regulation may do this by imposing a net cost on the regulated corporation. Whether the regulation imposes net costs on a particular corporation depends on the nature of the regulation, and the relationship between the regulator and the regulated. For example, if firms would produce goods in lower-cost ways that pollute more in the absence of regulation from the EPA, the existence and involvement of the EPA may increase costs at firms, thereby reducing profits.

[5] While market failures may justify regulation, Leftwich (1980) notes that even in the case of a market failure, the net benefit of regulation may not be positive, and regulation is not justified unless there is a net benefit.

However, the net cost of regulation certainly varies by firm, and in some cases, may be negative (a net benefit to a particular firm). For example, regulation can benefit firms that capture regulators. Firms, through a variety of means including lobbying of regulators (e.g., Blau et al. 2013; Lambert 2018) and hiring former regulators (Hendricks et al. 2021), may seek to change regulation in favor of the firm, including by harming the firm's competitors. Regulatory capture has been widely studied in the case of specific regulators in a variety of empirical settings (for a review, see Dal Bó 2006), and has been modeled extensively (for example, see Laffont and Tirole 1991). For example, various papers examine regulatory capture among auditing regulators (Hendricks et al. 2021), banking regulators (Hardy 2006; Igan and Lambert 2019), environmental regulators (Dillon et al. 2018), and patent examiners (Tabakovic and Wollmann 2018).[6] Regulation can also benefit firms by containing managers' actions and prevent the pursuit of opportunistic behavior (Haw et al. 2004; Warfield et al. 1995). As such, regulators can monitor firm managers and partially replace the monitoring role of managerial ownership or stakeholder oversight and thereby increase firm value (Warfield et al. 1995). In total, regulation could both benefit and harm firms, suggesting an ambiguous relation between regulation and firm outcomes.

Based on the ambiguous relation between regulation and firm outcomes, a vast empirical literature examines how regulation affects firms. This literature focuses on specific regulatory interventions, such as the Sarbanes Oxley Act (e.g., Zhang 2007), Dodd-Frank (e.g., Dimitrov et al. 2015), or Regulation Fair Disclosure (Jorion et al. 2005), or that target certain firm aspects, such as corporate governance (Larcker et al. 2011), monopolies (Joskow 2007), and entry (Klapper et al. 2006). However, examining individual regulatory interventions paints an incomplete picture of regulation because these interventions are frequently reactions to distinct economic events, and

[6] Regulatory capture sometimes leads to less effective regulation (Tabakovic and Wollmann 2018; Dillon et al. 2018), but sometimes leads to more efficient regulation (Hardy 2006).

because regulatory oversight may affect outcomes without the need for intervention (e.g., Hail et al. 2018). For example, SEC oversight may deter firms from misreporting in the first place, without the need for an Accounting and Auditing Enforcement Release. We address these challenges by constructing and validating time-varying firm-level measures of exposure to individual regulatory agencies that do not depend on specific regulatory interventions.

By developing firm-level, time-varying measures of exposure to regulation, our work is conceptually similar to Hassan et al. (2019), who develop a firm-level, time-varying measure of political risk. They define political risks as "risks of a political nature" and use textual analysis of political science textbooks and newspaper articles to identify political discussions in conference calls. We measure a distinct construct from political risk. Our measures capture exposure to individual regulators, while their measure captures the overall risk of political instability or change as a result of many different factors, very few of which are regulatory. For example, of the top 120 political topics Hassan et al. (2019) use to construct their measure, three are regulatory in nature (the FAA, EPA, and Federal Reserve). The other 117 include topics such as "the states," "first amendment," "public opinion," and "the Taliban." Further, the mean value of their political risk measure varies with the election cycle and peaks and then subsides around identifiably risky political events (the financial crisis, wars, bank failures, etc.). In contrast, the mean value of our measure trends steadily upward (consistent with the steady upward trend in overall regulation).

3. Methodology

3.1. Measures of Regulatory Exposure

Regulation can be complex and difficult to measure. Many prior studies measure firm regulation as an indicator variable based on industry membership (Kasznik and Lev 1995; Baginski

et al. 2002; Baginski et al. 2004; Hutton et al. 2012; Guan et al. 2020). Additionally, even with time-varying measures, regulation is often attributed to the industry level (Goldschlag and Tabarrok 2018). New laws may be created to affect certain industries as a whole, but regulatory compliance and monitoring are determined at the firm level based on firm-specific behavior and attributes. Industry-based measures of regulation ignore potentially important variation within industries and within firms. Additionally, some firms operate in multiple industries, further complicating the classification. Using a measure that varies by firm-year can address these challenges and allow researchers to draw deeper inferences.

To create a firm-specific, time-varying measure of regulation, we turn to 10-K disclosures of U.S. incorporated firms. Section 17(a)(2) of the Securities Act of 1933 prevents firms from disclosing misleading facts and omitting material facts from their financial statements. Thus, when audited financial statements discuss how government regulators affect, or may affect, firms' operations, it is likely costly for firms to misrepresent the material effect regulation has on their outcomes and operations. Firms and managers may behave strategically with respect to disclosure, which is a limitation of this measure.[7] This approach of accepting the 10-K disclosures at face value is consistent with several other textual analysis studies (Loughran and McDonald 2011; Li et al. 2013; Hoberg and Phillips 2016; Glaeser 2018).

Discussions of regulation occur in several places in firms' 10-K filings. Item 1 Business and Item 1A Risk Factors are the most common sections for these disclosures, but there are many others, including Item 3 Legal Proceedings and Note 13 Income Taxes. For this reason, we examine all disclosures made throughout the 10-K instead of focusing on a specific section. Appendix B provides several illustrative examples of 10-K discussions of regulation, of which we

[7] For example, Gleason and Mills (2002) document firms strategically underreporting their exposure to IRS audits.

discuss the first four. The first two examples from 22nd Century Group and Biomerica Inc. are standard references to regulators in the business items and risk factors sections of firms' annual filings. The third example discloses an investigation by the Department of Labor into BPP Liquidating Trust's employee 401(k) plan. The fourth example from Microsoft discusses the company evaluating the effect of IRS proposed regulations.

Several prior papers develop measures through observing frequencies of words in firms' annual filings. Hoberg and Philips (2016) create a measure of product similarity between two firms based on the similarity of words used in firms' business descriptions. Loughran and McDonald (2011) develop a measure of tone by counting occurrences of "positive tone" and "negative tone" words in disclosures. Li et al. (2013) develop a measure of competition based on the number of times the word "competition" occurs in 10-K filings.

Following a similar approach, we compute text-based measures of regulation by counting the number of sentences in firms' 10-Ks that reference federal agencies and any form of the following regulation-related words: regulation, jurisdiction, authority, examination, audit, enforce, and investigation, among others (see Appendix B for the complete list of words). We obtain the comprehensive list of federal agency names from the U.S. government's website and count mentions of all agencies with regulation-related words.[8] We require sentences to include a regulation word because firms interact with agencies in ways that are not in the spirit of regulation. For example, firms often reference the Consumer Price Index (CPI), which is a Department of Labor–Bureau of Labor Statistics report, but references to the CPI do not indicate regulation by the Department of Labor. If a sentence includes a regulation word but not an agency name, or vice versa, we do not count it as a regulation sentence. Our text-based measure of overall regulation,

[8] The comprehensive list of federal agency names can be found at https://www.usa.gov/federalagencies.

Total Regulation, is the number of these regulation-related sentences scaled by the total number of sentences in a 10-K filing following Li et al. (2013).

Following De la Parra Hurtado (2021), we construct *Total Regulation* at the sentence level because "the close connection between thoughts and sentences makes sentences a natural place to see meaning flowing from thought to language" (Perry 1994). We focus on federal regulatory agencies because we expect the large U.S. public firms that we study to be subject to intense scrutiny from federal regulators. However, we acknowledge that state regulatory agencies can also affect corporate outcomes (Bagchi and Sivadasan 2017). We expect individual state regulators are significantly less salient and important for public firms than are federal regulators because public firms typically operate in many, or all, U.S. states.

The strengths of this approach are its simplicity and its ability to identify regulation from individual federal regulatory agencies. Federal agency names are standardized with easily identified titles and widely accepted acronyms (e.g., The Internal Revenue Service [IRS] or the Department of Justice [DOJ]). These highly standardized regulator names provide an easy, clean way to measure regulation. Additionally, using these names, *Total Regulation* can be disaggregated into regulator-specific measures to draw regulator-specific inferences. In our empirical tests, we disaggregate *Total Regulation* into regulation from each of the top 10 regulators that are most frequently mentioned in firms' 10-Ks, and overall regulation from the remaining regulators.

3.2 Data

The sample includes U.S. incorporated firms from 1998 through 2019. The sample period begins in 1998 because the Census started using the NAICS definition of industry during 1997, and we define industries using the NAICS definition to be consistent with how many regulators

view industries. We focus on firms incorporated in the United States because *Total Regulation* measures exposure to U.S. regulators and regulations. We impose minimal data requirements, only removing observations with missing data or negative revenue. We require firms to have at least 2 years of data to avoid singleton observations. All variables are winsorized at the 1 and 99 percent levels. The final sample is comprised of 4,541 firms and 46,197 firm-year observations. Appendix A defines all variables and data sources.

4. Descriptive Statistics and Measure Validation

4.1 Descriptive Statistics

Table 1 reports the descriptive statistics for our sample. We include the following variables that may affect regulation as controls: *Size*, *Book-to-Market Ratio*, *Revenue Growth*, and *Leverage*. All variables are defined in Appendix A. Statistics for these controls are in line with prior work that examine similar samples (e.g., Hoitash and Mkrtchyan 2022). The mean value of *Total Regulation* is 1%. *Total Regulation* includes regulation by all federal agencies, not just the top 10 that we look at separately in later tests. Given that the average 10-K sentence has 23 words (Loughran and Mcdonald 2014), a *Total Regulation* value of 1% is roughly equivalent to 0.438 regulation discussions per thousand words in the 10-K. This is very comparable to the Li et al. (2013) competition measure, which has a mean of 0.583 words per thousand, suggesting that most 10-Ks devote a similar amount of space to discussing regulation as to discussing competition. Panel B reports correlations between *Total Regulation* and our controls and dependent variables. Despite a weakly positive correlation with firm size, *Total Regulation* negatively correlates with the natural logarithm of employment, *ln(Employment)*, and pre-tax net income scaled by assets, *Pre-tax Return on Assets*. We log employment due to significant right skew, and because we expect

employment to respond to changes in regulation proportionally (e.g., by 10% rather than 10,000 employees).

We find that there is substantial variation in *Total Regulation*. The first quartile value of *Total Regulation* is 0.3% and the third quartile value is 1.2%. The average difference between the maximum and minimum values of *Total Regulation* within a given firm is 1.08%. This suggests that there is a nontrivial amount of variation in regulation even within a firm, further highlighting the need for a time-varying firm-level measure of regulation.

The trend in *Total Regulation* over time is consistent with the trend in the number of pages in the Code of Federal Regulations. The Code of Federal Regulations codifies the rules published by the different agencies of the federal government. Figure 1 shows that both the mean and median values of *Total Regulation* increase over time, much like the pages in the Code of Federal Regulations, which increase from 131,060 pages in 1997 to 185,984 pages in 2019.[9] The similarity in these trends provides evidence that *Total Regulation* is reflecting the broadly defined construct regulation. The increasing trends in Figure 1 suggest that firms have become more regulated over time. Additionally, the increasing distance between the mean and median suggests that the variation in regulation among firms is also increasing over time. Note that these increases are not merely due to increases in disclosure. While it is true that 10-Ks have become much longer of this time period, because our measure of disclosure is scaled by the length of the 10-K, this trend is not a product of simple increases in 10-K length.

Figure 2 Panel A presents the 10 most frequently discussed federal agencies. The FDA and SEC are mentioned more often than the eight remaining agencies. Unsurprisingly, the FDA and SEC are the most commonly mentioned regulators, while the IRS, Centers for Medicare and

[9] Source: https://regulatorystudies.columbian.gwu.edu/reg-stats

Medicaid Services (CMS), FCC, and EPA are the next most commonly mentioned. Because the 10-K is a document regulated by the SEC, a potential concern is that the SEC may mechanically be mentioned more often. In light of this potential concern, we examine SEC mentions and find no evidence that our measure identifies boilerplate references to the SEC as regulator mentions, likely due to the requirement that the a regulator action word appear in the same sentence as the regulator mention. Nonetheless, we note that any mechanical effect due to boilerplate mentions should be common to all firms, and hence not affect inference.

Panel B of Figure 2 presents mean values of *Total Regulation* by 2-digit NAICS industries. Although utilities (NAICS 22) and financial institutions (NAICS 52) are among the top tercile of most regulated industries, the three industries with the highest *Total Regulation* are educational services (NAICS 61), health services (NAICS 62), and chemical manufacturing (NAICS 32). Interestingly, none of the top three industries by mean *Total Regulation* are considered regulated industries per the classification in Kasznik and Lev (1995). This suggests that the conventional binary measure of regulation may not capture the full breadth of industries that are subject to significant regulation.

We next examine whether our measures of exposure to certain regulators are greater in certain industries in a predictable manner. Figure 3 shows the top industries regulated by each agency. Consistent with expectations, the industry most regulated by the FDA is the pharmaceutical industry (i.e., chemical manufacturing). Health care firms are the most regulated by the CMS, and those most regulated by the FCC are in the information industry. The EPA regulates firms in the utilities and mining industries, and the DOJ regulates firms in social assistance. The Department of Health and Human Services (HHS) most heavily regulates health

care firms and the Federal Reserve heavily regulates financial and insurance firms. In total, our measures vary in a predictable manner across industries, further validating their accuracy.

Despite the industry commonalities in regulator exposures, we find that a significant portion of the exposures are time-varying and firm-specific. We use Shapley values to examine the percentage of variation explained by several sets of fixed effects (Huettner and Sunder 2012; Grömping 2007).[10] Shapley values are calculated by considering each permutation of the full set of regressors after removing regressors one by one. When a regressor is removed, the change in R-squared represents that regressor's marginal contribution in that permutation. All permutations are considered equally probable, so the Shapley value is equal to a regressor's average marginal contribution across all permutations.

Figure 4 presents the Shapley values. Panel A shows that industry fixed effects explain 11% of the total variation in *Total Regulation*, firm fixed effects explain 67%, and year fixed effects explain 5%. 17% of the variation is unexplained by the fixed effects and controls. This variation is time-varying and firm-specific, suggesting that firm-year differences are significant determinants of the regulation faced by firms and highlighting the need for a time-varying, firm-level measure.

In Panel B, we repeat the same process as Panel A, but use industry-year fixed effects instead of industry and year fixed effects separately. We are able to do this because we measure *Total Regulation* at the firm-year level instead of the industry-year level. We find that industry-

[10] Shapley values produce superior results, especially when examining corporations, than other methods like hierarchical linear modeling, sequential ANOVA, or variance components analysis because it uses an iterative process and considers all permutations of a full regression model, instead of producing estimates that are dependent on the order and nesting of covariates (Sharapov et al. 2020; Belnap et al. 2022).

year fixed effects explain 18% of the total variation in *Total Regulation*, and firm fixed effects explain 64%. As in Panel A, 17% of the variation is unexplained by the fixed effects and controls.

4.2 Changes in Total Regulation in response to significant changes in regulation

To further validate *Total Regulation*, we examine how it varies with widespread regulatory interventions. The Sarbanes-Oxley Act was passed in 2002 and imposed significant new regulations on listed companies (Hart 2009). We examine whether *Total Regulation* changes around the passage of this act in a manner that is consistent with changes in regulation. Figure 5 plots the mean values of *Total Regulation* by year along with 95% confidence intervals. There is a sharp and lasting increase in *Total Regulation* after the passage of SOX in July 2002. This suggests that the measure is reflecting regulation. The mean value of *Total Regulation* is .0065 in 2001 and .0075 in 2003, indicating that firms increased the proportion of sentences in the 10-K discussing regulation by 15% after the passage of the act, consistent with *Total Regulation* reflecting major changes in regulation. In untabulated results, we find that this increase in regulation is mainly driven by an increase in SEC regulation.

4.3 Regulatory Exposure and Undisclosed Regulation

We next examine whether our measures of exposure to individual regulators relates to undisclosed regulatory interventions. Doing so addresses the possibility that time-varying, firm-specific differences in regulator exposures reflect random in managers' propensities to discuss regulators, or other idiosyncratic factors. Further, doing so allows us to document whether our measures of regulation capture otherwise nonpublic regulator attention.

First, we examine whether exposure to the SEC predicts SEC investigations that were never publicly disclosed.[11] We obtain raw data on all closed SEC investigations between January 1, 2000

[11] Managers are directly aware of SEC investigations due to SEC inquiries (Blackburne et al., 2021).

and August 2, 2017 from Blackburne et al. (2021), which identifies these investigations using Freedom of Information Act requests submitted to the SEC. We estimate the following specification:

$$\begin{aligned} \textit{Undisclosed SEC Investigation}_{i,t} = \alpha_0 + \alpha_1\, \textit{SEC Regulation}_{i,t} + \beta\, \textit{Controls}_{i,t-1} + \\ \alpha_2\, \textit{Other Regulation}_{i,t} + \delta_{j,t} + \gamma_i + \varepsilon_{i,t} \end{aligned} \tag{1}$$

where *i* indexes firms, *t* indexes years, and *j* indexes industries. *Undisclosed SEC Investigation* is an indicator variable for whether the firm had an open, undisclosed investigation by the SEC during that year (Blackburne et al. 2021). *SEC Regulation* is our measure of regulatory exposure by the SEC. The vector of controls includes lagged values of Size, *Book-to-Market Ratio*, *Revenue Growth*, and *Leverage*. We include *Other Regulation*, defined as *Total Regulation* calculated excluding the SEC, as an additional control for our measure of regulatory exposure to non-SEC regulators. We also include industry-year fixed effects, and sometimes include firm fixed effects. Across all of our results, we define industry at the 4-digit NAICS level, and cluster standard errors by industry-year.

We report the result of estimating Eq. (1) in Table 2. Across all specifications, *SEC Regulation* associates with a higher likelihood of *Undisclosed SEC Investigation*. The magnitudes of the coefficients are similar, so we focus on the coefficient in our preferred specification with all controls and fixed effects reported in column 4. A one standard deviation increase in *SEC Regulation* within an industry-year and firm fixed effect is 0.0016. Thus, the interpretation of the main coefficient in column 4 is that a one standard deviation increase in firm-specific regulation by the SEC associates with a 1.3 percentage point higher likelihood of being under an SEC investigation (DeHaan 2021). The mean value of *Undisclosed SEC Investigation* is 11.6 percentage points, so a one standard deviation increase in *SEC Regulation* corresponds to an 11%

increase in the overall likelihood of an undisclosed investigation. Overall, we find that our measure of exposure to the SEC predicts otherwise undisclosed investigations by the SEC.

Next, we show that exposure to individual regulators associates with general undisclosed regulatory interest by those same agencies.[12] Bozanic et al. (2017) finds that the IRS commonly downloads 10-Ks as part of their regulatory mission.[13] While Bozanic et al. (2017) focus on IRS downloads, the dataset they use includes EDGAR downloads by a number of regulatory bodies. Using this same dataset, we examine whether exposure to the SEC, IRS, FCC, EPA, DOJ, FTC, HHS, and Federal Reserve predicts downloads of 10-Ks by these regulators. In particular we estimate the following specification:[14]

$$ln(Regulator\ Downloads)_{r,i,t} = \alpha_0 + \alpha_1\ Regulation_{r,i,t} + \beta\ Controls_{i,t-1} + \alpha_2\ ln(Other\ Regulator\ Downloads)_{i,t} + \delta_{j,t} + \gamma_i + \varepsilon_{r,i,t} \quad (2)$$

where *r* indexes individual regulators. *ln(Regulator Downloads)* is the natural logarithm of the total number of EDGAR downloads by each individual regulator, and *ln(Other Regulator Downloads)* is the natural logarithm of the total number of EDGAR downloads by all other regulators for which we have data. We log the number of regulator downloads due to significant right skew. We have regulator download data for eight of the top ten regulators in our sample, because two of the top regulators (FDA and CMS) are not covered in the data used by Bozanic et al. (2017). All other variables are as defined in Eq. (1).

[12] Managers may be directly aware of regulator interest due to regulator inquiries, or indirectly aware due to their knowledge of the conditions that likely give rise to regulator interest.

[13] The SEC released the EDGAR download data ending in 2017. The authors have contacted the SEC for updates to this data, but, were told that because the data "disclose techniques and procedures for law enforcement investigations or prosecutions", it cannot be updated, which confirms that the SEC believes this measure captures regulatory scrutiny. See http://jeffreyhoopes.com/data/finalresponse.pdf.

[14] While the download data is useful, our measure contributes over it for two major reasons. First, our measure is available for all regulators, instead of the select few with IP addresses that we can identify from EDGAR log files. Second, the SEC has stopped publishing log files as of June 2017, while our measure should be available as long as firms produce financial statements.

We tabulate the results of estimating Eq. (2) in Table 3. Panel A reports the results including just industry-year fixed effects. For 7 out of the 8 regulators, regulator exposure significantly associates with a higher number of regulator financial statement downloads by that regulator. When we also include firm fixed effects in Panel B, most of the significant effects persist. For simplicity, we interpret economic magnitudes based the results reported in Panel A columns (1) and (2). A one within-fixed effect standard deviation increase in *SEC Regulation* associates with a 1.3% increase in SEC attention. Similarly, a one within-fixed effect standard deviation increase in *IRS Regulation* associates with a 7.2% increase in IRS attention. In total, we conclude that our measures of exposure to individual regulators predict otherwise undisclosed attention by these regulators, suggesting that the measure captures meaningful variation in *ex ante*, non-public regulatory oversight.

5. How Does Regulation Affect Corporate Outcomes?

As an initial application of our measure, we examine how regulation relates to firms' profitability, equity returns, and employment. To examine profitability and employment, we estimate the following specifications:

$$\textit{Pre-tax Return on Assets}_{i,t} \text{ or } \textit{ln(Employment)}_{i,t} = \alpha_0 + \alpha_1 \textit{ Total Regulation}_{i,t} + \beta \textit{ Controls}_{i,t-1} + \delta_{j,t} + \gamma_i + \varepsilon_{i,t} \quad (3)$$

We examine pre-tax return on assets to avoid a potentially mechanical relation between IRS regulation and post-tax return on assets. Eq. (3) includes industry-year fixed effects to control for all common productivity shocks, regulatory shocks, etc. common to an industry in a given year. These common shocks include many potential threats to the validity of our design, such as the financial crisis both affecting the regulation and profitability of banks. We also include firm fixed

effects so that we estimate how deviations in regulation relate to deviations in profitability. To examine the relation between equity returns and corporate regulation we use portfolio analyses.

5.1 Overall Regulation and Firm Profitability

We tabulate the result of estimating Eq. (3) with *Pre-tax Return on Assets* as the dependent variable in Table 4. Across all specifications, *Total Regulation* associates with lower values of *Pre-tax Return on Assets*. We focus on column 4, which is our preferred specification with all controls and fixed effects. A one standard deviation increase in *Total Regulation* within an industry-year and firm fixed effect is 0.0044. Accordingly, a one standard deviation increase in *Total Regulation* within an industry-year and firm fixed effect associates with a 0.3 percentage point reduction in *Pre-tax Return on Assets*. In total, Table 4 reports consistent evidence that regulation negatively relates to firm profitability in an economically significant manner.[15]

5.1.1 Regulation and Future Stock Returns

Having documented a negative relation between regulation and profitability, we next examine how regulation relates to future stock returns. To the extent that regulators impose costs on firms, investors may demand a premium for holding shares in firms more exposed to regulation as compensation for bearing regulatory risk. Investors would demand this premium especially if they are unable to diversify the risk of regulatory exposure because of the ubiquitous nature of regulation.

To examine how regulation relates to future returns, we estimate monthly average Fama-French five-factor alphas for five portfolios formed on quintiles of *Total Regulation* within 2-digit

[15] In untabulated tests, we find that this result holds even after controlling for the Hassan et al. (2019) measure of political risk. However, doing so reduces our sample by half, so we do not use political risk as a standard control in all of our tests.

NAICS industry codes.[16] The sample period for this test is from 2011 to 2016. We rebalance portfolios every June, and then calculate monthly returns from July to the following June. We estimate five-factor alphas using the following specification:

$$(r_{i,t} - r_{f,t}) = \alpha + \beta_1 (r_{m,t} - r_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_5 CMA_t + \varepsilon_{i,t} \quad (4)$$

where $r_{i,t}$ is portfolio *i*'s return, $r_{f,t}$ is the risk-free rate, and $r_{m,t}$ is the market return, all in month *t*. SMB_t is the size factor, HML_t is the book-to-market factor, RMW_t is the investment factor, CMA_t is the profitability factor, and α is the five-factor alpha.[17]

Table 5 Panels B and C present alphas from the equal-weighted and value-weighted portfolios of *Total Regulation*, respectively. Across both panels, we find that alphas are greater in the higher *Total Regulation* portfolios. Further, alphas in the high-minus-low portfolio are positive and statistically significant at the 5% level. The high-minus-low portfolio alpha in Panel B indicates that taking a long position in firms in the highest quintile of *Total Regulation* while taking a short position in firms in the lowest quintile yields an additional 5.3% annual return.[18] Overall, the results from the portfolio analysis are consistent with regulation imposing undiversifiable risk on investors.

5.1.2 Donald Trump Election Event Study Natural Experiment

The evidence in Tables 4 and 5 that regulation negatively relates to subsequent profitability and positively relates to future stock returns suggest that regulation imposes costs on firms by lowering their expected future profitability and increasing their undiversifiable risk. A potential concern with this interpretation is that the results in Tables 4 and 5 are endogenous. For example,

[16] We form portfolios within 2-digit NAICS codes rather than 4-digit NAICS codes because there are too few firms in many 4-digit NAICS code industries to create meaningful portfolio sorts. The sample period for this test is from 2011 to 2016. We end in June 2016 to avoid overlap with the Trump election tests and begin in 2011 to ensure five years of data.

[17] We obtain factor data from Ken French's website: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[18] 1.0043^12 – 1 = 0.0528.

regulators may target firms that they expect to be more profitable. We attempt to address this concern by including firm fixed effects and examining profitability in the year of the regulator attention. Consequently, for endogenous selection to explain our results, regulators must target firms based on concurrent changes in profitability. While we believe this is unlikely, in this section, we examine a source of plausibly exogenous variation in expected regulation created by Donald Trump's 2016 election to President.

Donald Trump campaigned heavily against government regulation and to some extent, carried out those promises (Popovich et al. 2019; Crews 2021; Belton and Graham 2020). While campaigning, Trump promised a 70% reduction in regulation (Kaufman 2016). Steve Bannon, one-time advisor to Donald Trump, noted that it was the Trump administration's mission to fight for a "deconstruction of the administrative state" (Rucker and Costa 2017). Consequently, the election of Donald Trump created a discrete change in expected future regulation. Moreover, Donald Trump's election victory was unexpected, allowing us to cleanly identify the stock market's reaction to an expected decline in regulation (Wagner et al. 2018b; Wagner et al. 2018a; Gaertner et al. 2020). On November 8, 2016, the morning of the election, the New York Times and the 538 prediction models assessed Hillary Clinton's probability of winning at 85 and 71 percent respectively.[19]

Table 6 presents cumulative abnormal returns for firms around the presidential election based on the degree of regulation facing the firm prior to the election. Firms are grouped into quintiles of *Total Regulation* based on the 10-K that was most recently filed. Abnormal returns are the difference between a firm's return and the equal (value) weighted market return on a given day. Panel B (C) presents results for equal (value) weighted portfolios of *Total Regulation*. Event days

[19] Source: https://www.voanews.com/usa/us-politics/election-experts-puzzled-over-surprise-trump-victory

are listed relative to November 8, 2016: the date of the presidential election. We find that starting from the day after the election, highly regulated firms experienced significantly higher market returns in response to Donald Trump's election win relative to less regulated firms. For clarity, the cumulative abnormal returns of the top and bottom quintiles are presented in Figure 6. Panel B indicates that by five trading days after the presidential election, High *Total Regulation* firms outperformed Low *Total Regulation* firms by 3.05 percentage points over the 11 trading-day event window (Panel C similarly indicates that they outperformed Low *Total Regulation* firms by 2.23 percentage points when value weighting). Assuming that share prices rationally anticipate and impound the expected effect of future changes in regulation on firm profitability, these results are consistent with regulation lowering firm value.[20]

5.2 Individual regulators and firm profitability

We next estimate several descriptive extensions of our profitability tests, both to further understand the effect of regulation on profitability and to highlight benefits and potential uses of our measures.[21] We begin re-estimating Eq. (3) after disaggregating *Total Regulation* into separate measures for each of the top 10 most frequently mentioned regulators. The results are tabulated in Table 7. Columns 1-10 examine the effect of each regulator separately, while controlling for all other regulators in one term: *Other Total Regulation*. Column 11 examines the effect of all ten regulators while controlling for all other regulators that are not in the top 10 most mentioned. The

[20] A potential concern with these results is that President Trump also promised to lower taxes. If *IRS regulation* correlates with the benefits of lower taxes, this relation could drive our results. For example, if the IRS pays less attention to firms with higher effective tax rates, and these firms benefit more from tax cuts, than our results may not reflect the full effect of regulation. To address the potential concern that *IRS regulation* drives our results, we exclude *IRS regulation* from our measure of overall regulation and re-estimate results. The results are virtually unchanged (the coefficient estimate for *Total Regulation* becomes 2.91 with a t-statistic of 3.82 when removing *IRS regulation*). We also find that a firm's *Total Regulation* does not significantly correlate with its tax rate benefit from the Tax Cuts and Jobs Act (the change in its cash effective tax rate from 2016 to 2019).

[21] We focus on our profitability tests for parsimony and because our portfolio sort tests are less amenable to these extensions (for example because the variation in exposure to individual regulators is frequently binary).

results suggest that regulation by the FDA, SEC, FCC, and, to some extent, the DOJ negatively relates to firm profitability. A one within industry-year and firm fixed effects standard deviation increase in regulation by the FDA, SEC, and FCC associates with a 0.27, 0.17, and 0.14 percentage point reduction in *Pre-tax Return on Assets*, respectively. The results suggest that the FDA, SEC, and FCC are the most prominent regulators driving the negative effect of regulation on firms' profitability. These results highlight the benefits and potential uses of a regulator-specific measure of firm-year regulation.

5.3 Profitability and competitor regulation

One of the benefits of a firm-level measure of regulation is that we can examine how regulation reallocates resources among firms, in an industry. To do so, we re-estimate Eq. (3) after including the revenue-weighted average of the independent variables for firms in the same 4-digit NAICS industry as the focal firm (e.g., *Competitor Size*, *Competitor Total Regulation*, etc.). Because these additional independent variables are an industry weighted average, excluding only the focal firm, they are almost perfectly collinear with the industry-year fixed effects. Consequently, we replace the industry-year fixed effects with year fixed effects.

We tabulate the results in Table 8. Consistent with the arguments of Posner (1971) and Rotemberg (2019), we find that firm profitability increases in the degree its competitors are regulated, after holding its own degree of regulation fixed. The results of our preferred specification in column 2 suggest that a one within year and firm fixed effects standard deviation increase in competitors' regulation associates with a 0.25 percentage point increase in *Pre-tax Return on Assets*. A one within year and firm fixed effects standard deviation increase in a focal firm's own regulation associates with a 0.22 percentage point decrease in *Pre-tax Return on*

Assets.[22] Together these results highlight how regulation can benefit a firm by harming its competitors, even while it may also directly harm the focal firm. These results also highlight the benefits of a firm-year measure of regulation.

5.4 Overall regulation and firm employment

We next examine the relation between total regulation and employment. Despite the negative effects of regulation on firm profitability, prior work argues that regulation may nonetheless increase employment (Porter and van der Linde 1995; Morgenstern et al. 2002; Coglianese et al. 2014). Additionally, the Washington Post assures readers, "Does government regulation really kill jobs? Economists say overall effect is minimal."[23] We explore these arguments by estimating Eq. (3) with *ln(Employment)* as the dependent variable. Table 9 tabulates the results. We find a consistent negative relation between overall regulation and firm employment. The results of our preferred specification reported in column (4) suggests that a one within industry-year and firm fixed effects standard deviation increase in *Total Regulation* is associated with a 0.24% reduction in employment. The average firm in our sample has about 10,000 employees, so this 0.24% reduction is equivalent to 24 fewer employees per firm.

6. Conclusion

We build on a large literature on the effects of regulation by developing firm-level, regulator specific measures of exposure to regulation. We validate the measures by demonstrating that they vary with significant regulatory interventions and across industries in a predictable

[22] The net of these two effects suggests the on-average effect of regulation when accounting for intra-industry spillovers is small (p-values of 0.39 and 0.36 in columns 1 and 2 when testing the statistical significance of *Total Regulation* and *Competitor Total Regulation*.

[23] https://www.washingtonpost.com/business/economy/does-government-regulation-really-kill-jobs-economists-say-overall-effect-minimal/2011/10/19/gIQALRF5IN_story.html; first accessed April 22, 2022.

manner. Moreover, we demonstrate that they capture otherwise undisclosed regulator attention by demonstrating that the measures vary with undisclosed SEC investigations and regulator downloads of firm financial statements. Using the measures, we find that overall regulation negatively relates to firms' future profitability and employment, and positively relates to future stock returns, consistent with regulation imposing costs on firms. Consistent with regulation causing these costs, we find that more regulated firms earned higher returns than their less regulated counterparts following the surprise presidential election of anti-regulation candidate Donald Trump.

We take advantage of the regulator-specific nature of our measures to document which regulators drive the negative relation between overall regulation and future profitability, and the firm-specific nature of our measures to document that regulation increases competitor profitability. Our tests are by no means comprehensive and, for the most part, document associations. However, we believe our measures will be of use to future researchers interested in further exploring the effects of regulation, or drawing deeper inferences in situations where regulation, or exposure to specific regulators, should moderate outcomes. For example, researchers can use our measures to explore how regulation affects innovation, market power, competition, taxation, how and whether different types of regulators interact to affect firms, and many other important questions.

Appendix A. Variable Definitions

Variable	Description
[Agency] Regulation	The text-based measure of regulation for a specific federal agency
Total Regulation	The sum of *Regulation* for all federal agencies
Pre-tax Return on Assets	Pretax income scaled by total assets
ln(Employment)	The natural log of one plus the number of employees at a firm
Size	The natural log of one plus total assets, lagged
Book-to-Market Ratio	The ratio of book to market values of equity, lagged
Revenue Growth	Revenue growth for a firm, lagged
Leverage	The sum of current liabilities and long term debt, scaled by total assets, lagged
Undisclosed SEC Investigation	An indicator variable for whether the firm was under an undisclosed SEC investigation during that year (obtained from Blackburne et al. 2021)
Other Regulation	The sum of *Regulation* for all federal agencies that are not separately included in a particular regression
ln(Regulator Downloads)	The total number of times a 10-K is downloaded by a particular regulator (i.e. SEC, IRS, FCC, EPA, DOJ, FTC, HHS, or Federal Reserve) for a specific firm
ln(Other Regulator Downloads)	The total number of times a 10-K is downloaded by all other regulators (i.e. SEC, IRS, FCC, EPA, DOJ, FTC, HHS, or Federal Reserve) that are not separately included in a particular regression
Competitor Total Regulation	A revenue-weighted average of *Total Regulation* for firms in the same 4-digit NAICS industry as a focal firm
Competitor Size, Book-to-Market Ratio, Revenue Growth, Leverage	A revenue-weighted average of *Size, Book-to-Market Ratio, Revenue Growth,* or *Leverage* for firms in the same 4-digit NAICS industry as a focal firm

Agency abbreviations for top 10 regulators:

Abbreviation	Agency name
FDA	Food and Drug Administration
SEC	Securities and Exchange Commission
IRS	Internal Revenue Service
CMS	Centers for Medicare and Medicaid Services
FCC	Federal Communications Commission
EPA	Environmental Protection Agency
DOJ	Department of Justice
FTC	Federal Trade Commission
HHS	Department of Health and Human Services
Federal Reserve	Federal Reserve System

Appendix B. Measuring Regulatory Exposure

After obtaining and cleaning 10-K filings from EDGAR, we use the Python NLTK sentence tokenizer to split each filing into sentences. A regulation sentence is one that includes both a federal agency name and a regulation action word. Following Li et al. (2013), we remove instances where the word "not" precedes the regulation word by three words or fewer in the same sentence. *Total Regulation* is the number of regulation sentences in a 10-K filing scaled by the total number of sentences. We obtain the comprehensive list of federal agency names from: https://www.usa.gov/federalagencies.

To obtain a list of regulation words, we obtain a random list of 200 sentences from 10-Ks that include a federal agency name. We read each sentence and manually determine whether it references being subject to a federal agency's rules, regulations, or monitoring. Some examples are:

1. "In the event the U.S. **Department of Justice** begins strict enforcement of the CSA in states that have laws legalizing medical and/or adult recreational cannabis/- marijuana, there may be a direct and adverse impact to any future potential business or prospects that we may have in the cannabis/marijuana business." [**22nd Century Group Inc, 2017, Item 1. Business**]
2. "Biomerica's immunodiagnostic products are regulated in the United States as medical devices primarily by the **FDA** and as such, require regulatory clearance or approval prior to commercialization in the United States." [**Biomerica Inc., 2016, Item 1A. Risk Factors**]
3. "The Trust has been advised that the U.S. **Department of Labor** has investigated the Company's decision to suspend trading of shares of Company common stock held by employees in the Company's 401(k) Plan... and that the Department of Labor believes the Company's decision was inappropriate." [**BPP Liquidating Trust, 2004, Item 3. Legal Proceedings**]
4. "On August 1, 2018, the **Internal Revenue Service** published on its website proposed regulations relating to the transition tax imposed by the TCJA... We are currently evaluating the impact of the proposed regulations." [**Microsoft Corp, 2018, Note 13. Income Taxes**]
5. "Sales of these commodities are, however, subject to laws and to regulations issued by the **Federal Trade Commission** (FTC) prohibiting manipulative or fraudulent conduct in the wholesale petroleum market." [**Sandridge Mississippian Trust I, 2019, Item 1. Business**]
6. "Following the approval of applications that the Company filed with the Board of Governors of the Federal Reserve System and the Bank filed with the **Office of the Comptroller of the Currency** ("OCC"), the Company became a bank holding company and the Bank became a national bank on November 30, 2016. " [**BankFinancial Corp, 2016, Item 1. Business**]
7. "The U.S. **Department of Labor** and its agencies... regulate our employment practices and standards for workers." [**US Foods Holding Corp, 2018, Item 1. Business**]
8. "In January 1999, the Company received notice of a proposed adjustment pursuant to an examination by the **Internal Revenue Service** of the Company's fiscal 1995 and 1996 tax returns, disallowing the utilization of $4.6 million capital loss carryforward to partially

offset the gain recognized by the Company in connection with the sale of its health care operations in July 1996." [**Heico Corp, 2000, Item 3. Legal Proceedings**]

9. "Federal regulations require that a hospice program satisfy certain Conditions of Participation ("COP") to be certified and receive **Medicare** payment for the services it provides." [**Chemed Corp, 2011, Item 1. Business]**

For each sentence that we deem to be about regulation, we identify the key word or words that make it a regulation sentence. This process yields the following regulation words:
Words that start with:

regulat, jurisdiction, investigat, inspec, enforce, authorit, comply, complie, compliance, violat, examin, approv, ruling [24]

Or any of the following words:

rule, rules, law, laws, audit, audits, audited, auditor, auditors, auditing

We require sentences to include a regulation word because firms interact with agencies in ways that are not in the spirit of regulation. For example, firms often reference the Consumer Price Index (CPI), which is a Department of Labor—Bureau of Labor Statistics report, but references to the CPI do not indicate regulation by the Department of Labor.

[24] We verify that these prefixes detect only the words we are interested in studying by checking them against The Free Dictionary's "words that start with" search function.

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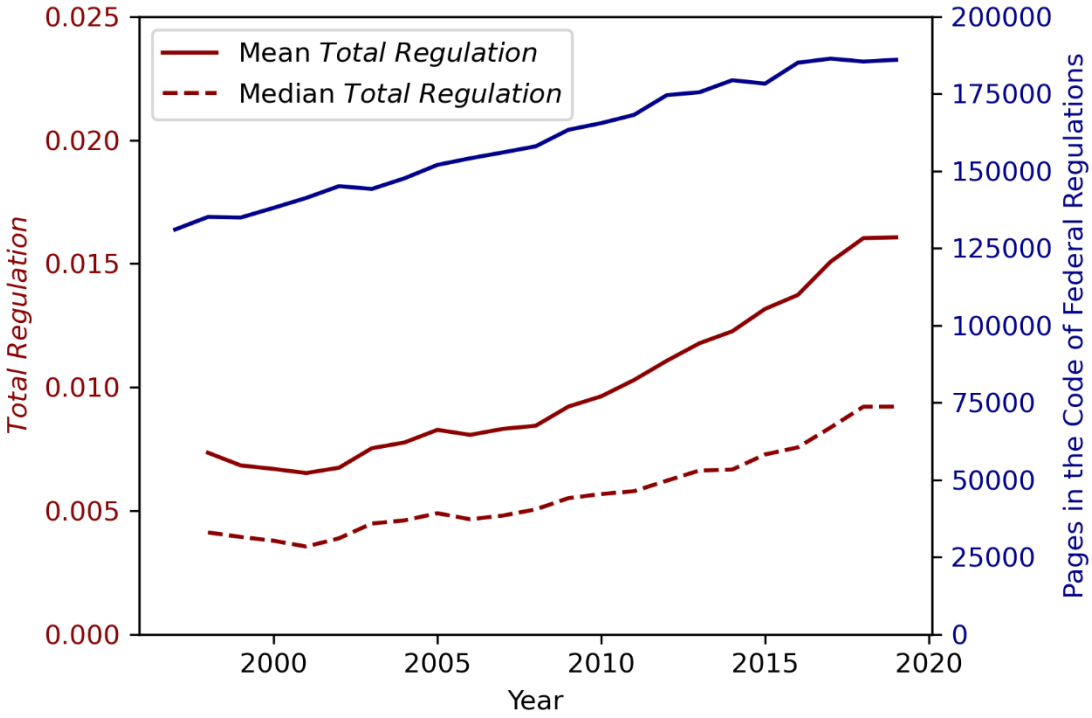
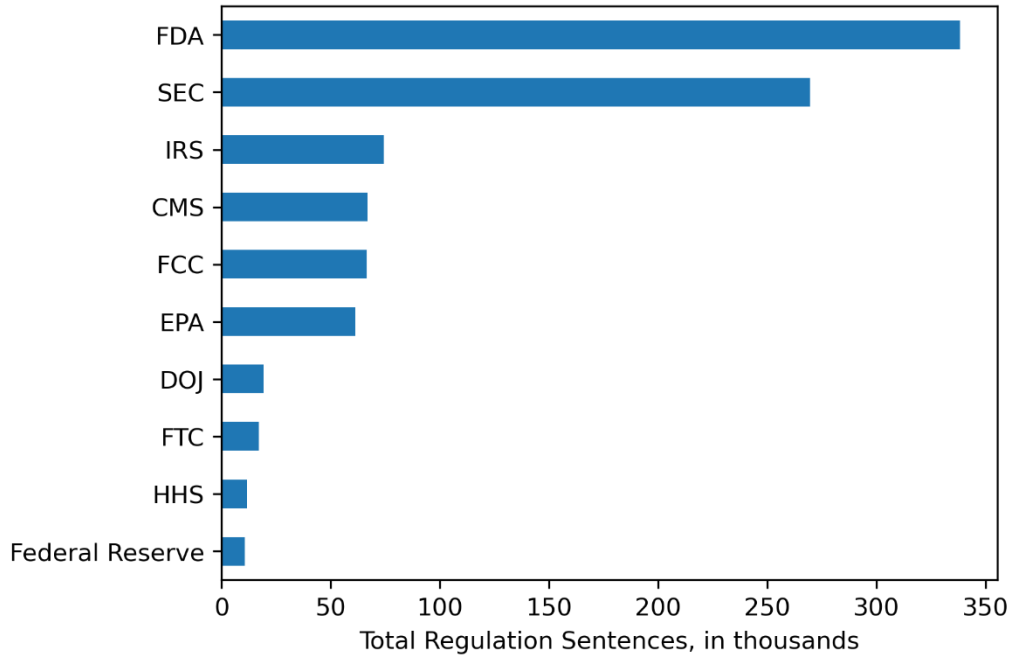
Figure 1: *Total Regulation* and the number of pages in the Code of Federal Regulations

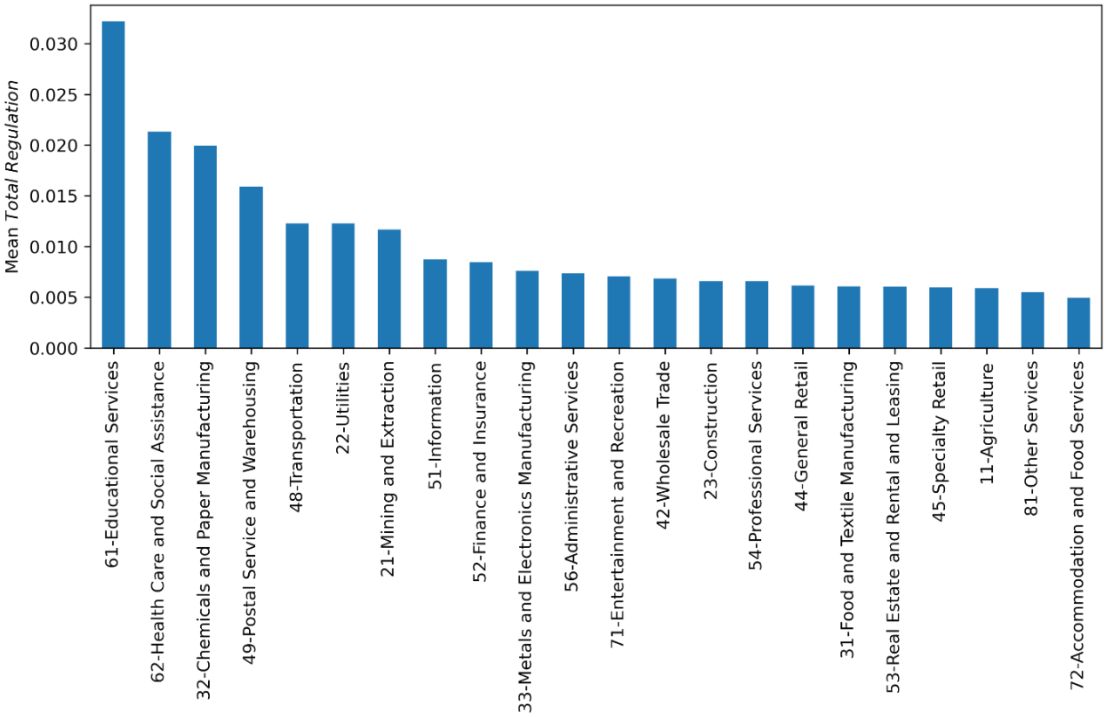


Notes: The graph depicts the mean and median of our measure of overall regulation, *Total Regulation*, for the years 1998-2019 (graphed on the left hand axis), and the number of pages in the Code of Federal Regulations (graphed on the right hand axis).

Figure 2. Total Regulation Sentences by Regulator and Industry
Panel A. Total number of regulation sentences by each of the top 10 regulators

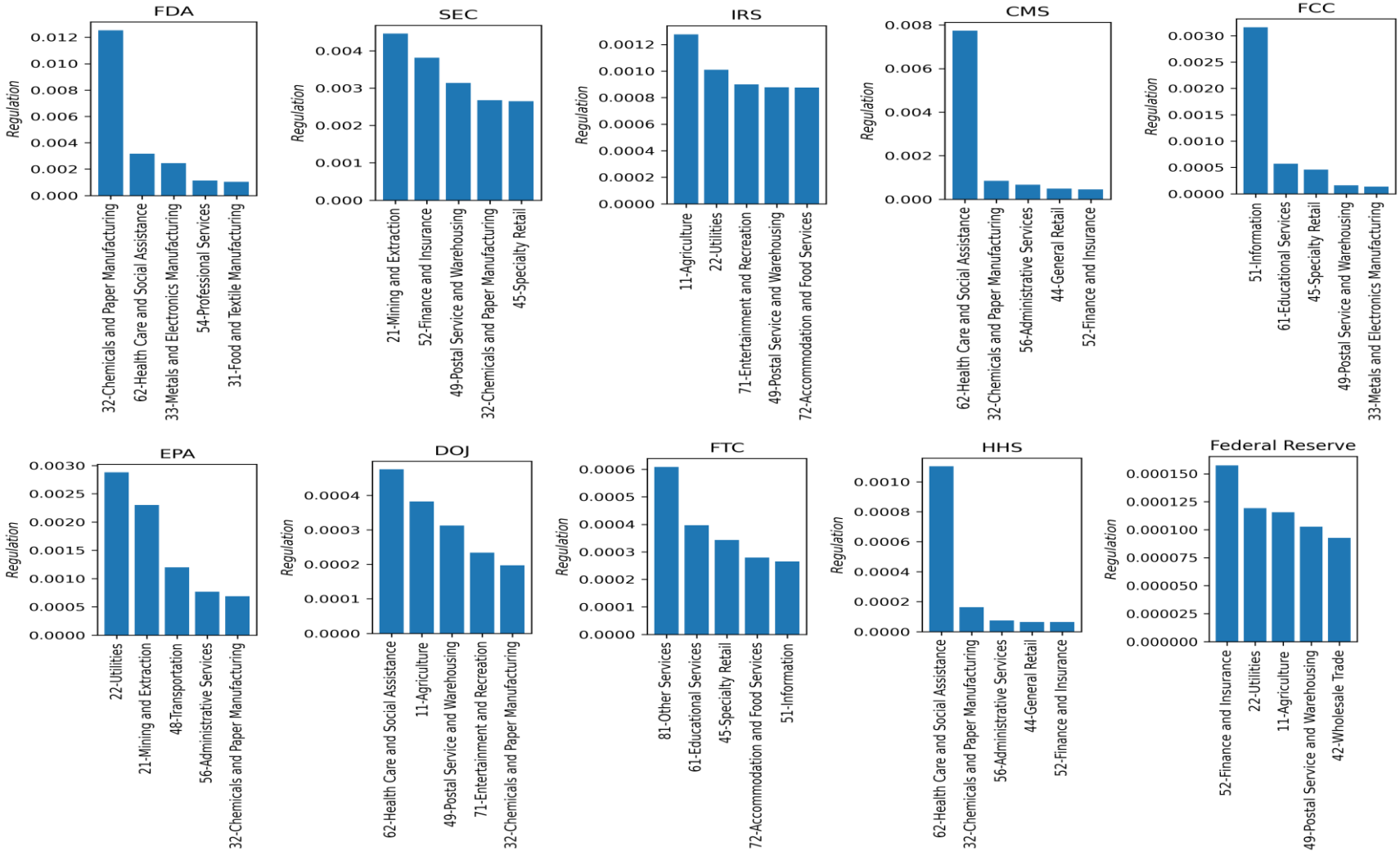


Panel B. Mean *Total Regulation* by 2 digit NAICS industry



Notes: These graphs present information about Total Regulation. Panel A graphs the total number of regulation sentences—sentences in firms' 10-Ks that mention a federal agency and a regulation word—by regulator across all firm-years in the sample. Panel B presents the average values of *Total Regulation* by 2-digit NAICS industry, in order of highest to lowest.

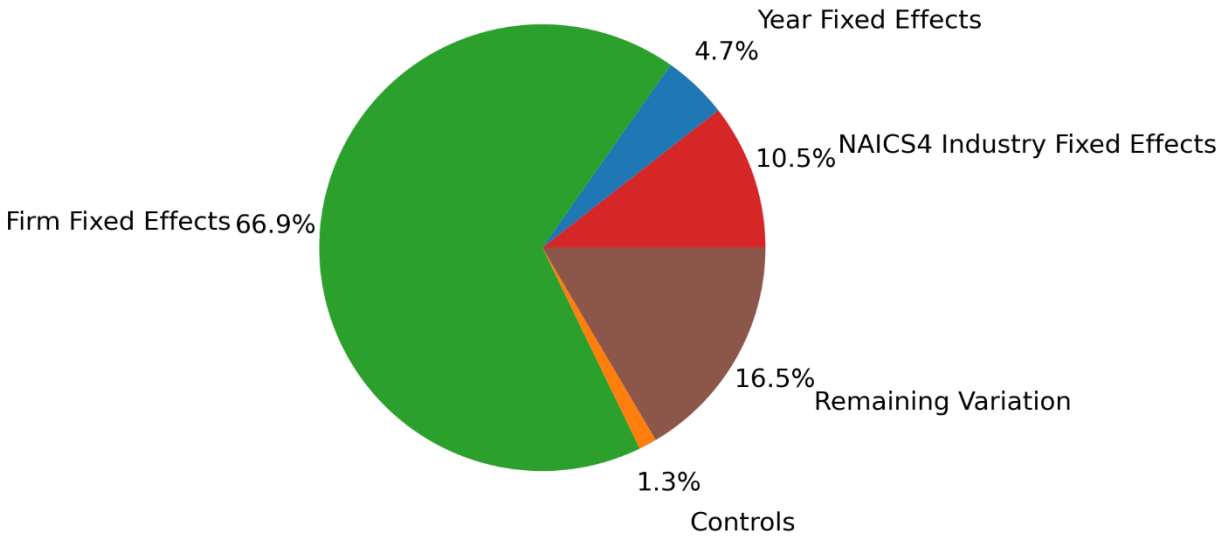
Figure 3. Main Industries for each of the top 10 Regulators



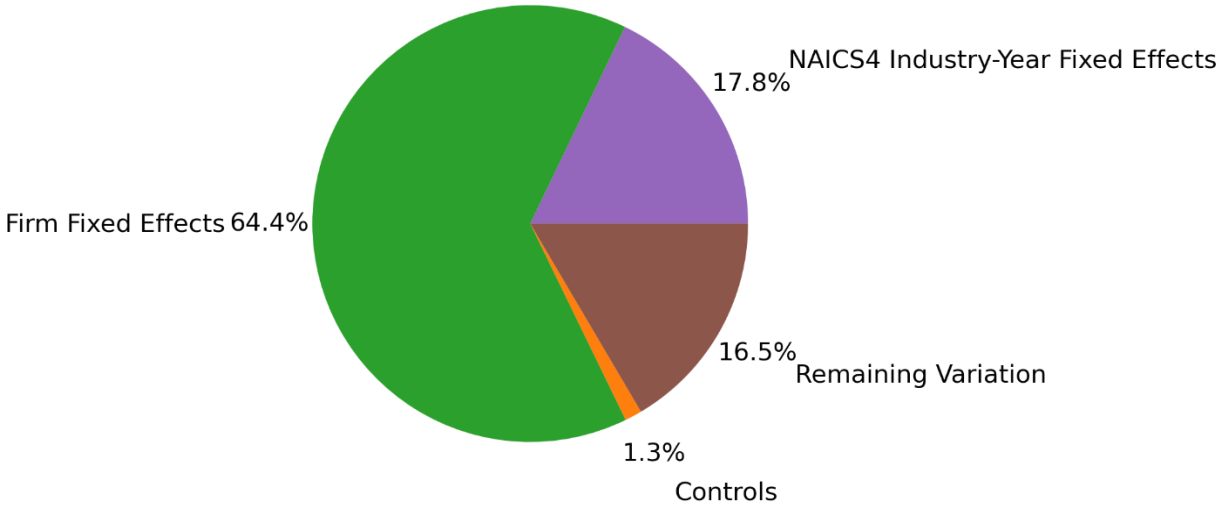
Notes: These graphs present the top five 2-digit NAICS industries with the highest mean *Regulation* for each regulator. The ten graphs correspond to the top 10 most frequently mentioned regulators in firms' 10-Ks.

Figure 4: Shapley values of *Total Regulation* with different Fixed Effects levels

Panel A: With Industry Fixed Effects

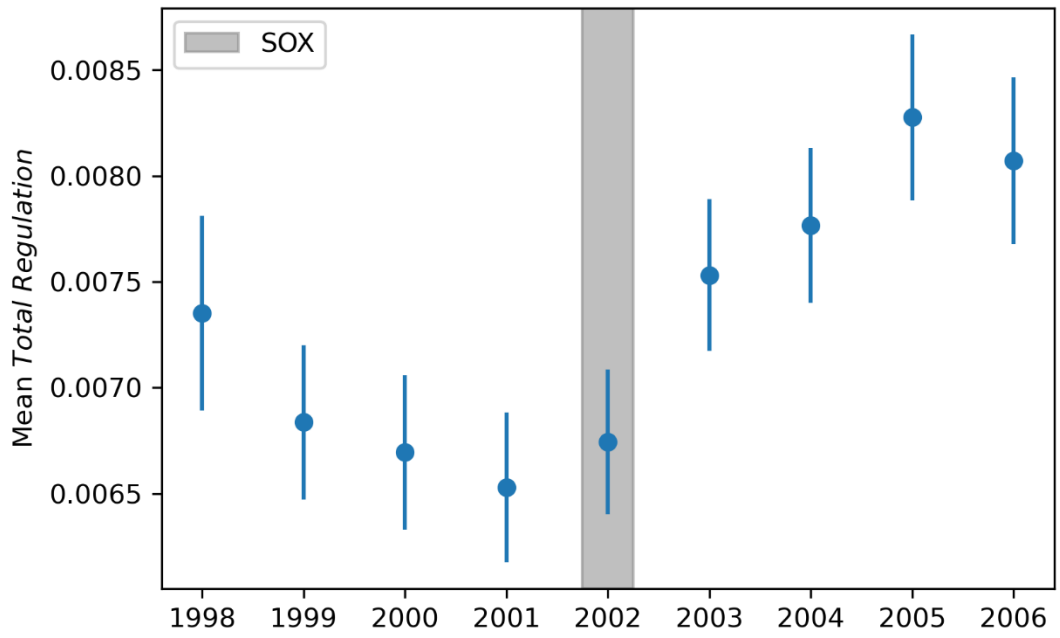


Panel B: With Industry-Year Fixed Effects



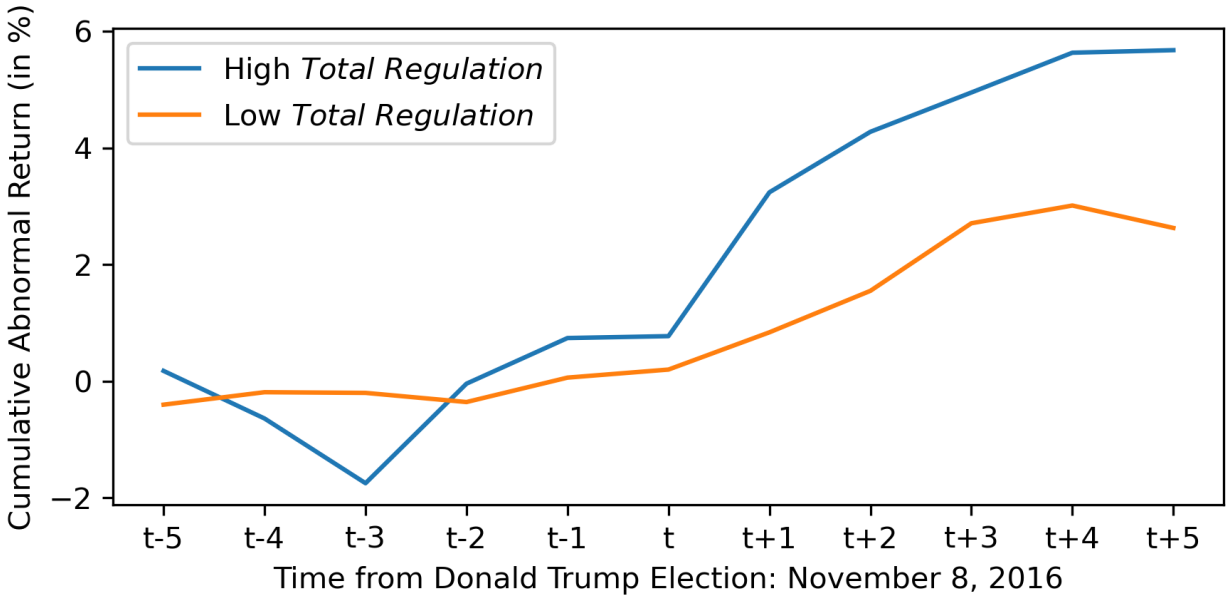
Notes: These graphs present a disaggregation of the R-squared for *Total Regulation* into various fixed effects levels and the control variables from equation (3). We estimate the R-squared for various regressors by using each variable's Shapley value, which is calculated by considering each permutation of the full set of regressors and removing regressors one by one. When a regressor is removed, the change in R-squared represents that regressor's marginal contribution in that permutation. All permutations are considered equally probable, so the Shapley value is equal to a regressor's average marginal contribution across all permutations. Panel A examines industry and year fixed effects separately, and Panel B examines industry-year fixed effects.

Figure 5. Changes in *Total Regulation* in response to Sarbanes Oxley

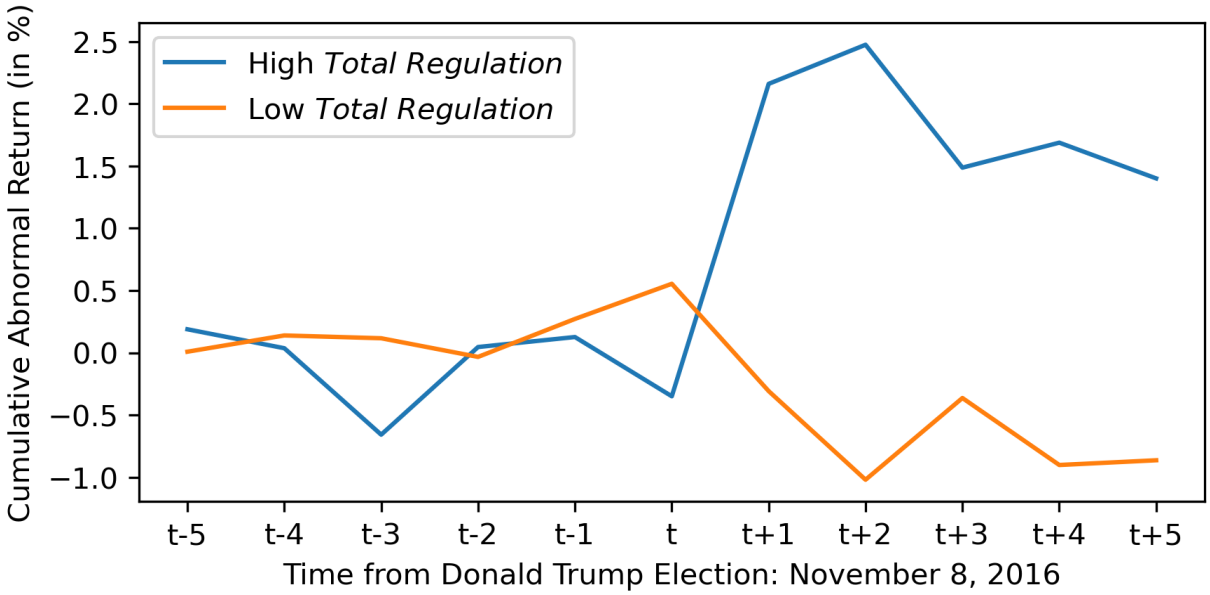


Notes: This graph presents mean values of *Total Regulation* by year around the passage of Sarbanes-Oxley in 2002. Lines indicate 95% confidence intervals.

Figure 6: Donald Trump Election Event Study Natural Experiment
Panel A: Equal-weighted portfolios



Panel B: Value-weighted portfolios



Notes: Panel A(B) presents the daily average cumulative abnormal returns for the top and bottom quintiles of equal (value) weighted portfolios of *Total Regulation* around the presidential election of Donald Trump, which is tabulated in Table 6. Abnormal returns are calculated as returns in excess of the equal (value)weighted market return. Cumulative abnormal returns are the sum of abnormal returns from t-5 through the relevant date. Event Time is denoted relative to the presidential election date: November 8, 2016.

Table 1: Descriptive statistics

Panel A: Descriptive statistics for main regressors

	N	Mean	Std.	P25	P50	P75
Total Regulation	46215	0.010	0.012	0.003	0.006	0.012
Pre-tax Return on Assets	46215	0.002	0.220	-0.023	0.051	0.108
ln(Employment)	46215	1.390	1.266	0.337	1.026	2.128
Size	46215	20.160	1.996	18.728	20.129	21.487
Book-to-Market Ratio	46215	0.561	0.540	0.241	0.438	0.730
Revenue Growth	46215	0.177	0.516	-0.015	0.079	0.218
Leverage	46215	0.212	0.210	0.012	0.173	0.335
Undisclosed SEC Investigation	46215	0.116	0.320	0.000	0.000	0.000
ln(Regulator Downloads)	46215	1.587	1.500	0.000	1.609	2.708

Panel B: Correlations for main regressors

	(1)	(2)	(3)	(4)	(5)	(6)
(1) *Total Regulation*	-	-	-	-	-	-
(2) *Pre-tax Return on Assets*	-0.27***	-	-	-	-	-
(3) *ln(Employment)*	-0.14***	0.31***	-	-	-	-
(4) *Size*	0.01*	0.3***	0.72***	-	-	-
(5) *Book-to-Market Ratio*	-0.11***	-0.07***	-0.11***	-0.39***	-	-
(6) *Revenue Growth*	0.12***	-0.15***	-0.12***	0.01**	-0.12***	-
(7) *Leverage*	0.05***	0.01***	0.21***	0.14***	-0.10***	-0.04***

Notes: This table presents descriptive statistics (Panel A) and correlations (Panel B) for the variables used in our study. The sample consists of firm-years with non-missing variables from 1998-2019. All variables are defined in Appendix A. The final sample consists of 46,215 firm-year observations.

Table 2. Regulatory Exposure and Undisclosed Regulation: Undisclosed SEC Investigations

	(1)	(2)	(3)	(4)
VARIABLES	*Undisclosed SEC Investigation*			
SEC Regulation	8.68***	8.06***	8.62***	8.00***
	(11.26)	(9.73)	(11.20)	(9.59)
Size	0.03***	0.02***	0.03***	0.02***
	(23.65)	(6.71)	(23.68)	(6.66)
Book-to-Market Ratio	0.03***	0.02***	0.03***	0.02***
	(8.41)	(4.20)	(8.46)	(4.18)
Revenue Growth	-0.00	-0.01***	-0.01	-0.01***
	(-1.45)	(-3.38)	(-1.58)	(-3.36)
Leverage	0.08***	0.05***	0.08***	0.05***
	(9.32)	(4.26)	(9.33)	(4.25)
Other Regulation			0.37*	0.26
			(1.78)	(0.84)
Observations	46,215	46,215	46,215	46,215
R-squared	0.16	0.46	0.16	0.46
Fixed Effects:	Industry-Year	Industry-Year and Firm	Industry-Year	Industry-Year and Firm
Adj. R-squared	0.08	0.34	0.08	0.34

Notes: This table reports ordinary least squares regressions examining the association between *SEC Regulation* and whether a firm had an undisclosed SEC investigation. All variables are as defined in Appendix A. For *SEC Regulation*, one standard deviation within industry-year and firm fixed effects is 0.0016. The *t*-statistics are in parentheses, and standard errors are clustered at the industry year level in every regression. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tailed tests.

Table 3: Regulatory Exposure and Undisclosed Regulation: Regulator downloads of Financial Statements

Panel A. Mean Values of Ln(Regulator Downloads) by Various Regulatory Agencies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	SEC	*IRS*	*FCC*	*EPA*	*DOJ*	*FTC*	*HHS*	*Federal Reserve*
Mean	0.609	0.946	0.014	0.042	0.169	0.101	0.003	0.131

Panel B: Regressions Explaining Regulator Downloads Including Industry-Year Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				ln(Regulator Downloads) from				
VARIABLES	*SEC*	*IRS*	*FCC*	*EPA*	*DOJ*	*FTC*	*HHS*	*Federal Reserve*
Regulation	5.79***	80.12***	12.21***	5.97***	131.35***	59.63***	5.67*	7.60
	(5.74)	(16.71)	(5.41)	(3.60)	(12.76)	(8.30)	(1.81)	(1.10)
Size	0.02***	0.13***	0.00***	0.01***	0.05***	0.04***	0.00***	0.04***
	(11.00)	(26.87)	(5.43)	(11.00)	(20.38)	(16.92)	(4.16)	(15.00)
Book-to-Market Ratio	0.01*	0.13***	0.01**	0.01***	0.04***	0.04***	0.00	0.03***
	(1.90)	(13.95)	(2.13)	(4.56)	(6.40)	(7.99)	(1.13)	(5.85)
Revenue Growth	0.01***	-0.06***	0.00**	-0.00	-0.01**	-0.01**	0.00	-0.02***
	(3.40)	(-8.31)	(1.97)	(-1.63)	(-2.14)	(-2.31)	(0.36)	(-5.19)
Leverage	0.06***	0.11***	0.00	-0.01**	0.09***	0.06***	-0.00	0.03***
	(3.39)	(5.65)	(0.50)	(-2.47)	(5.93)	(6.15)	(-0.57)	(3.11)
ln(Other Regulator Downloads)	0.06***	0.14***	0.01***	0.02***	0.10***	0.07***	0.00***	0.06***
	(12.34)	(22.78)	(6.54)	(8.21)	(21.04)	(15.14)	(3.76)	(14.09)
Observations	46,215	46,215	46,215	46,215	46,215	46,215	46,215	46,215
R-squared	0.84	0.65	0.35	0.22	0.27	0.25	0.22	0.28
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.82	0.61	0.29	0.15	0.20	0.18	0.15	0.22

Panel C: Regressions Explaining Regulator Downloads Including Industry-year and Firm FE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				ln(Regulator Downloads) from				
VARIABLES	*SEC*	*IRS*	*FCC*	*EPA*	*DOJ*	*FTC*	*HHS*	*Federal Reserve*
Regulation	5.77***	58.07***	6.09	8.50***	102.97***	78.50***	0.25	9.60
	(4.17)	(11.01)	(1.60)	(3.23)	(9.64)	(5.68)	(0.06)	(1.23)
Size	0.03***	0.04***	-0.00	0.00	0.00	0.02***	0.00*	0.01*
	(6.17)	(7.12)	(-0.42)	(1.40)	(0.78)	(4.75)	(1.66)	(1.71)
Book-to-Market Ratio	0.02***	0.08***	-0.00	0.01***	-0.00	0.02***	0.00	0.01
	(2.75)	(7.59)	(-0.69)	(2.62)	(-0.38)	(3.19)	(0.94)	(1.28)
Revenue Growth	0.00	-0.02**	0.00	0.00	-0.01	-0.00	0.00	0.00
	(0.63)	(-2.44)	(1.49)	(1.43)	(-1.19)	(-0.63)	(0.50)	(0.23)
Leverage	0.05**	0.06**	-0.01	-0.01	0.05*	-0.02	0.00	0.02
	(2.14)	(2.01)	(-1.51)	(-1.21)	(1.90)	(-1.00)	(0.64)	(1.21)
ln(Other Regulator Downloads)	0.06***	0.10***	0.01***	0.01***	0.07***	0.05***	0.00***	0.04***
	(11.33)	(15.50)	(5.35)	(5.73)	(14.80)	(11.76)	(3.15)	(10.21)
Observations	46,215	46,215	46,215	46,215	46,215	46,215	46,215	46,215
R-squared	0.86	0.71	0.53	0.34	0.42	0.38	0.33	0.37
Industry-Year and Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.82	0.64	0.42	0.19	0.28	0.24	0.18	0.23

Notes: This table reports ordinary least squares regressions examining the association between regulation and firm 10-K downloads by certain regulators. Panel A presents estimates using industry-year fixed effects, and Panel B presents estimates with industry-year and firm fixed effects. Industries are defined at the 4-digit NAICS level. All variables are as defined in Appendix A. For *SEC Regulation*, one standard deviation within industry-year fixed effects is 0.0023. For *IRS Regulation*, it is 0.0009. The *t*-statistics are in parentheses, and standard errors are clustered at the industry year level in every regression. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tailed tests.

Table 4: Overall Regulation and Firm Profitability

VARIABLES	(1)	(2)	(3)	(4)
	Pre-tax Return on Assets			
Total Regulation	-4.70***	-4.41***	-2.32***	-0.71***
	(-11.02)	(-11.83)	(-10.09)	(-3.91)
Size	0.03***	0.04***	0.03***	0.02***
	(21.39)	(22.11)	(20.94)	(6.88)
Book-to-Market Ratio	0.00	0.01	-0.01***	-0.06***
	(0.64)	(1.13)	(-2.72)	(-15.99)
Revenue Growth	-0.05***	-0.05***	-0.04***	-0.00
	(-7.98)	(-9.10)	(-7.80)	(-0.68)
Leverage	-0.02***	-0.02**	-0.08***	-0.07***
	(-3.05)	(-2.40)	(-12.56)	(-7.92)
Observations	46,215	46,215	46,215	46,215
R-squared	0.18	0.20	0.34	0.69
Fixed Effects:	None	Year	Industry-Year	Industry-Year and Firm
Adj. R-squared	0.18	0.20	0.27	0.62

Notes: This table reports ordinary least squares regressions examining the association between firm regulation and pre-tax return on assets. Industries are defined at the 4-digit NAICS level. All variables are as defined in Appendix A. For *Total Regulation*, one standard deviation within industry-year and firm fixed effects is 0.0044. The *t*-statistics are in parentheses, and standard errors are clustered at the industry year level in every regression. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tailed tests.

Table 5: Portfolio Analysis of Regulation and Future Stock Returns

Panel A: Summary Statistics for Portfolios of *Total Regulation*

	L	2	3	4	H
Number of firms	434	418	415	417	429
Mean Return ($r_{i,t}$)	0.892	0.880	0.971	0.983	1. 140
Mean Market Capitalization	5896	7427	8706	6602	5653

Panel B: Equal-weighted portfolios	L	2	3	4	H	H-L
Fama-French five-factor alpha	-0.029	0.027	0.147	0.170	0.402***	0.429**
	(-0.22)	(0.20)	(1.12)	(1.53)	(3.03)	(2.40)

Panel C: Value-weighted portfolios	L	2	3	4	H	H-L
Fama-French five-factor alpha	-0.196	-0.128	-0.160	-0.003	0.286**	0.479**
	(-1.46)	(-0.94)	(-1.19)	(-0.03)	(2.26)	(2.52)

Notes: This table reports monthly average Fama-French five-factor alphas (in percentages) for five portfolios formed on quintiles of *Total Regulation* within 2-digit NAICS industry codes. We rebalance portfolios every June, and then calculate monthly returns from July to the following June. Panel A reports descriptive statistics on the portfolios, with mean monthly returns in percentages and market capitalization in millions. Panel B reports equal-weighted portfolio alphas and Panel C reports value-weighted portfolio alphas. The sample period is from 2011 to 2016. The *t*-statistics are in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tailed tests.

Table 6: Donald Trump Election Event Study Natural Experiment

Panel A: Summary Statistics for Portfolios of Total Regulation

	L	2	3	4	H
Number of firms	407	406	406	406	406
Mean Abnormal Return (equal)	0.239	0.252	0.188	0.187	0.516
Mean Abnormal Return (value)	0.320	0.333	0.269	0.268	0.597

Panel B: Cumulative Abnormal Returns for equal-weighted portfolios

	Portfolio of *Total Regulation*					
Event Time	L	2	3	4	H	H-L
t-5	-0.403***	-0.262**	-0.457***	-0.275**	0.176	0.579***
	(-3.96)	(-2.45)	(-3.72)	(-2.07)	(1.26)	(3.36)
t-4	-0.189	-0.001	-0.401**	-0.510***	-0.641***	-0.452*
	(-1.20)	(-0.01)	(-2.31)	(-2.60)	(-3.10)	(-1.74)
t-3	-0.201	-0.091	-0.258	-0.401*	-1.750***	-1.549***
	(-0.88)	(-0.39)	(-1.09)	(-1.68)	(-5.82)	(-4.10)
t-2	-0.358	0.078	-0.201	-0.265	-0.043	0.315
	(-1.34)	(0.30)	(-0.76)	(-0.95)	(-0.14)	(0.77)
t-1	0.060	0.576**	0.084	-0.017	0.739**	0.679
	(0.20)	(2.08)	(0.30)	(-0.05)	(2.13)	(1.49)
t	0.198	0.409	0.169	0.151	0.772**	0.574
	(0.64)	(1.39)	(0.58)	(0.45)	(1.98)	(1.15)
t+1	0.837**	0.967***	0.705**	1.002**	3.238***	2.401***
	(2.45)	(2.87)	(2.06)	(2.47)	(6.35)	(3.92)
t+2	1.548***	1.533***	1.243***	1.313***	4.275***	2.727***
	(3.88)	(3.75)	(3.07)	(2.74)	(7.55)	(3.94)
t+3	2.707***	2.532***	2.419***	1.968***	4.949***	2.242***
	(6.26)	(5.49)	(5.22)	(3.81)	(8.29)	(3.04)
t+4	3.011***	2.943***	2.562***	2.187***	5.630***	2.619***
	(6.31)	(5.96)	(4.94)	(3.95)	(8.92)	(3.31)
t+5	2.626***	2.771***	2.068***	2.053***	5.674***	3.048***
	(5.74)	(5.55)	(4.04)	(3.76)	(9.20)	(3.97)

Panel C: Cumulative Abnormal Returns for value-weighted portfolios

	Portfolio of *Total Regulation*					
Event Time	L	2	3	4	H	H-L
t-5	0.008***	-0.181***	-0.229***	0.176***	0.189	0.181***
	(-4.65)	(-3.11)	(-4.31)	(-2.61)	(0.77)	(3.37)
t-4	0.139***	-0.028**	-0.005***	0.415***	0.037***	-0.102*
	(-3.42)	(-2.16)	(-4.33)	(-4.39)	(-4.78)	(-1.73)
t-3	0.117***	-0.368***	0.251***	0.488***	-0.658***	-0.775***
	(-3.74)	(-3.19)	(-3.86)	(-4.44)	(-8.00)	(-4.09)
t-2	-0.033***	-0.571	0.366**	0.714***	0.046	0.079
	(-3.07)	(-1.45)	(-2.50)	(-2.60)	(-1.61)	(0.78)
t-1	0.272***	-0.597	0.225***	0.819***	0.126	-0.146
	(-2.99)	(-1.34)	(-3.12)	(-3.04)	(-0.59)	(1.49)
t	0.554***	-0.469**	0.348***	1.043***	-0.350	-0.904
	(-2.74)	(-2.19)	(-3.02)	(-2.68)	(-0.71)	(1.15)
t+1	-0.308	-1.372	-0.110	1.155	2.160***	2.468***
	(0.44)	(0.83)	(0.05)	(0.78)	(5.01)	(3.92)
t+2	-1.020***	-2.622***	-0.170**	1.161**	2.475***	3.495***
	(3.17)	(3.06)	(2.38)	(2.15)	(7.06)	(3.94)
t+3	-0.364***	-2.506***	-0.014***	1.249***	1.487***	1.851***
	(7.57)	(6.71)	(6.43)	(4.92)	(9.24)	(3.04)
t+4	-0.902***	-3.490***	-0.312***	1.212***	1.688***	2.590***
	(8.24)	(7.81)	(6.70)	(5.62)	(10.38)	(3.31)
t+5	-0.864***	-3.067***	-0.602***	1.384***	1.401***	2.265***
	(7.69)	(7.33)	(5.78)	(5.40)	(10.65)	(3.97)

Notes: This table reports daily average cumulative abnormal returns (in percentages) for five portfolios formed on quintiles of *Total Regulation* around the presidential election of Donald Trump. Panel A reports descriptive statistics on the portfolios, with mean abnormal daily returns in percentages. Panel B (C) presents equal (value) weighted returns by portfolio. Abnormal returns are calculated as returns in excess of the equal (value) weighted market return. Cumulative abnormal returns are the sum of abnormal returns from t-5 through the relevant date. Event Time is denoted relative to the presidential election date: November 8, 2016. The *t*-statistics are in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tailed tests.

Table 7: Individual Regulators and Firm Profitability

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Pre-tax Return on Assets										
FDA	-1.16**										-1.29**
	(-2.37)										(-2.54)
SEC		-1.06**									-1.12***
		(-2.44)									(-2.62)
IRS			0.62								0.49
			(0.88)								(0.69)
CMS				0.61							0.91
				(0.49)							(0.71)
FCC					-2.19*						-2.38**
					(-1.83)						(-1.99)
EPA						-0.55					-0.78
						(-0.58)					(-0.82)
DOJ							-2.99				-3.67**
							(-1.58)				(-1.99)
FTC								2.01			2.00
								(0.68)			(0.68)
HHS									1.02		0.67
									(0.25)		(0.16)
Federal Reserve										-2.13	-3.10
										(-1.03)	(-1.49)
Other Total Regulation	-0.51***	-0.64***	-0.76***	-0.77***	-0.67***	-0.72***	-0.66***	-0.73***	-0.72***	-0.70***	-0.07
	(-2.59)	(-3.08)	(-4.02)	(-3.92)	(-3.63)	(-3.79)	(-3.35)	(-4.01)	(-3.85)	(-3.78)	(-0.22)
Observations	46,215	46,215	46,215	46,215	46,215	46,215	46,215	46,215	46,215	46,215	46,215
R-squared	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year and Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62

Notes: This table reports ordinary least squares regressions examining the association between firm regulation by 10 different agencies and pre-tax return on assets. Columns 1-10 examine each regulator separately, and column 11 examines the effect for all ten regulators. Industries are defined at the 4-digit NAICS level. All variables are as defined in Appendix A. For *IRS Regulation*, one standard deviation within industry-year and firm fixed effects is 0.0023. For *SEC Regulation*, it is 0.0016. For *FCC Regulation*, it is 0.0006. The *t*-statistics are in parentheses, and standard errors are clustered at the industry year level in every regression. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tailed tests.

Table 8: Profitability and competitor regulation

VARIABLES	(1) *Pre-tax Return on Assets*	(2) *Pre-tax Return on Assets*
Competitor Total Regulation	0.89**	0.93**
	(2.09)	(2.22)
Total Regulation	-0.45**	-0.45**
	(-2.25)	(-2.31)
Size	0.01***	0.01***
	(5.42)	(5.49)
Book-to-Market Ratio	-0.07***	-0.07***
	(-14.68)	(-14.97)
Revenue Growth	-0.01	-0.01
	(-1.16)	(-1.31)
Leverage	-0.07***	-0.07***
	(-7.37)	(-7.49)
Competitor Size		-0.00
		(-1.01)
Competitor Book-to-Market Ratio		-0.00
		(-0.44)
Competitor Revenue Growth		0.02*
		(1.68)
Competitor Leverage		0.05***
		(3.14)
Observations	46,215	46,215
R-squared	0.64	0.64
Year and Firm Fixed Effects	Yes	Yes
Adj. R-squared	0.60	0.60

Notes: This table reports ordinary least squares regressions examining the association between competitor firms' regulation and pre-tax return on assets. All variables are as defined in Appendix A. Industries are defined at the 4-digit NAICS level. For *Competitor Total Regulation*, one standard deviation within year and firm fixed effects is 0.0027. For *Total Regulation*, one standard deviation within year and firm fixed effects is 0.0049. The *t*-statistics are in parentheses, and standard errors are clustered at the industry year level in every regression. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tailed tests.

Table 9: Overall Regulation and Firm Employment

VARIABLES	(1)	(2)	(3)	(4)
	ln(Employment)			
Total Regulation	-13.18***	-11.84***	-5.14***	-0.54**
	(-15.10)	(-14.39)	(-10.42)	(-2.28)
Size	0.49***	0.50***	0.48***	0.22***
	(93.61)	(96.89)	(95.29)	(43.59)
Book-to-Market Ratio	0.42***	0.41***	0.38***	0.18***
	(26.23)	(26.43)	(35.05)	(32.28)
Revenue Growth	-0.21***	-0.22***	-0.14***	-0.01***
	(-13.66)	(-14.50)	(-13.54)	(-3.68)
Leverage	0.77***	0.77***	0.76***	0.31***
	(21.25)	(20.68)	(25.12)	(17.14)
Observations	46,215	46,215	46,215	46,215
R-squared	0.59	0.59	0.78	0.97
Fixed Effects:	None	Year	Industry-Year	Industry-Year and Firm
Adj. R-squared	0.59	0.59	0.76	0.97

Notes: This table reports ordinary least squares regressions examining the association between firm regulation and employment. Industries are defined at the 4-digit NAICS level. All variables are as defined in Appendix A. For *Total Regulation*, one standard deviation within industry-year and firm fixed effects is 0.0044. The *t*-statistics are in parentheses, and standard errors are clustered at the industry year level in every regression. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tailed tests.