Regulatory Policy Enforcement and Corporate Performance

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Abstract

We study the influence of regulatory agencies' activities on firm performance. We eschew both firm-centric language about such activities as well as narrow focus on specific components of these activities. Instead, we build a broad measure of activity from the regulatory agency perspective. Using Exploratory Factor Analysis (EFA) we combine six agency-perspective variables, including actions, budget variables, and regulation-verbiage (from the Code of Federal Regulations) into a single annual Agency Activity Index (AAI). Constructing this measure separately for each of four major agencies (EPA, FDA, OSHA and SEC), we find stronger agency activity is associated with lower firm operating performance. Greater firm exposure to the agency strengthens the relationship. Firm-specific violations imposed (from Violation Tracker) are also associated with weaker firm performance. Finally, we conduct several event studies to underline our results. The passages of SOX and Dodd-Frank associate with worse CARs among more-exposed firms. The Supreme Court's agreement to revisit the "Chevron-doctrine", that signaled potential limits to agency influence, associated with positive CARs among most of these same firms.

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I. Introduction

Government can influence corporate performance in numerous ways. Prior studies of the relationship find mixed results, while primarily focusing on federal legislation or the "political lean" of the legislature and executive branches. For example, Santa-Clara and Valkanov (2003) find higher returns under Democrat presidents while Snowberg et al. (2007) find higher equity prices and exchange rates under Republicans. These mixed results may be partially due to the omission of a major channel through which the rulemaking and enforcement processes now operate. Over time, the importance of executive agencies for corporations has increased. Thus, we submit that prior tests are looking in the wrong place. We analyze government influence on firm performance while recognizing variation in both agency-wide activities and firm exposure to agencies. We find both factors matter to the affected firms' accounting performance.

When federal legislation is passed, implementation is left to executive agencies that interpret the legislation through regulations and rules that enter the Code of Federal Regulations (CFR). Agencies write these rules and monitor and enforce firms' compliance. Naturally, a less (more) aggressive agency will regulate and enforce less (more) frequently/forcefully. Thus, agency enforcement and rulemaking tendencies matter for the influence of government on corporate revenue and costs, and thus profitability. Furthermore, equally important to agency enforcement and rulemaking tendencies is a firm's exposure to an agency. Despite firms operating in multiple industries and/or product markets, not all firms are equally exposed to each agency. For example, makers of cars are not subject to FDA enforcement (rules, regulations, or actions). However, all public firms are subject to SEC enforcement, albeit to varying levels.

Firms may act strategically with respect to the regulatory environment because agency enforcement and rulemaking, as well as firm exposure to the agency, are important. Thus, the effect of additional regulation is not clear ex ante. For example, Stigler (1971) noted that regulation may be sought by firms to disadvantage competitors; larger firms may leverage political power to influence regulators (known as regulatory capture). Consistent with this theory, Singla (2023) finds that even though regulatory costs have increased overall in the U.S., not all firms have been hit with the same costs: larger firms push some costs to small firms. Correia (2014) also finds that political donations and lobbying benefit firms through lower enforcement costs from the Securities and Exchange Commission. Our question differs in that we examine the *average* cost of regulation and how the most highly affected firms fare from an operating perspective.[1]

We begin by constructing a single measure of agency activity (i.e., encompassing rulemaking and enforcement activity), separately for each of four major agencies in the executive branch that are highly

[1] Regardless of political lean's influence on legislation (or lack thereof in the case of gridlock), agencies implement and enforce only passed laws. Regulations are passed to implement laws, and more regulations (or more detailed/restrictive regulations) are more likely to hinder corporate performance. Stronger enforcement should also have a larger effect on performance. Our recognition of firm exposure to an agency is designed to focus attention on where it will be most likely to reveal such effects.

involved in regulating corporations: the Food and Drug Administration (FDA), which enforces laws and regulations related to the safety of drugs, food, and medical products (based on the Federal Food, Drug, and Cosmetic Act); the Environmental Protection Agency (EPA), which enforces regulations related to the environment (for example, through the Clean Air Act and Clean Water Act); the Occupational Safety and Health Agency (OSHA) which monitors and enforces workplace safety; and the Securities and Exchange Commission (SEC), which oversees the enforcement of laws and regulations for securities markets and investors.[2] This first measure is the *Agency's Activity Index (AAI),* which is the first principal factor from exploratory factor analysis of six agency policy regulation and enforcement-related variables: two *Action* variables, agency *Budget*, agency *FTE*, and two *Regulation* variables. The *Index* is measured at the agency-year level, based on underlying data reporting.

Given that not all firms are equally exposed to agency attention, we construct a second "exposure-weighted" measure of agency influence on firm performance that recognizes such variation, built at both industry and firm levels. We build these exposure measures using the regulatory data (RegData) database (McLaughlin et al., 2022). RegData measures a probability that a "CFR part" is related to a specific industry (6-digit NAICS) in a particular year, based on a machine learning algorithm (Al-Ubaydli and McLaughlin, 2017). We average this probability across all years in our dataset (1980 – 2019), creating a time-invariant industry exposure-to-agency variable. We use a time-invariant measure to reduce measurement noise due to imprecision in potential annual exposure measures.[3] This also focuses the time-series variation of influences on corporate performance, in our *Agency Activity Index*. We also extend this industry-agency exposure measure to the firm level (agency-firm exposure) by factoring in each firm's market share.

There are several benefits to the joint recognition and measurement of both agency activity and exposure. Primarily, we provide a supply-side (i.e., agency-driven) measure. The sparse literature on government regulations' influence on firm performance focuses on the demand side. In other words, these studies typically measure firm responses through hiring or description of their own reactions (see Calomiris et al., 2020; Trebbi and Zhang, 2022; Kalmenovitz, 2023; Armstrong et al., 2024). Given their firm-level focus, none of these measures identify the influence of individual agencies.[4] Moreover, each firm-level response is potentially contaminated (as a measure of enforcement/regulation severity potential) by the firm's own assessment of regulation and response to that concern. This combined effect is difficult to separate into distinguishable pieces, whereas our agency activity proxy is "from the source" in that we

[2] For example, through the Securities Act of 1933, the Securities Exchange Act of 1934, the Sarbanes-Oxley Act of 2002 and the Dodd-Frank Act.
[3] Time-series variation in "exposure" is low, with a coefficient of variation at 0.33 or higher for three agencies.
[4] This is especially true when firms have operations in multiple sectors, exposing them to regulatory fragmentation (Kalmenovitz et al., 2024).

measure individual-agency inputs to enforcement/regulation activity and industry exposure.[5]

Our main result is best thought of in three layers. Beginning with the analysis of *Agency Activity Index* stand-alone, we find that higher agency activity is associated with weaker firm performance among highly exposed (to the agency) firms. Operating income (before depreciation and taxes) is declining in the *Agency Activity Index* for firms in the 95th or higher percentile of exposure to an agency.[6] This result is robust across all four agencies and is statistically and economically significant. For a one standard deviation change in our independent variable, we observe a change of between 2.4 (OSHA) and 4.5 (EPA) percentage points in operating performance. The second layer employs our industry-exposure-weighted measure of agency activity, for the full sample of firms. The results from this layer continue to show that the effect of regulatory agencies on operating performance is stronger in firms in industries that are highly exposed to each agency. The third layer confirms the second layer by using firm-exposure to an industry (which is exposed to the agency) via the firm's share of industry revenues. Overall, our main result indicates greater agency activity is costly to the operation income of highly exposed firms.

We then explore two channels of agency activity effects on firm performance. First, we decompose operating performance into asset turnover and cost efficiency (operating income to sales). Consistent with the view that enforcement and regulation activity increases costs, our results are concentrated in the influence of agency activity on operating income relative to sales. Second, we assess the empirical content of each of an agency's six activity "levers" on the performance of exposed firms, separately. The relative importance of *Actions* vs. *Budget and FTE* vs. *Regulations* varies across agencies, highlighting the importance of our factor analysis to pick up the latent agency activity component across all six. If we had instead focused on strictly CFR and related rules – perhaps along with firm responses to them that prior work contemplates – we may have missed the importance of other agency enforcement activities.

Nevertheless, one may be concerned that the agglomeration of agency activities into a single latent factor, paints with a very broad brush (even when we exposure-weight). We therefore also test for effects of targeted firm-level enforcement by using Violation Tracker data. We again find firm performance to be weaker when enforcement occurs (or carries a larger penalty). Another advantage of these tests is the joint time-series and cross-sectional variation in the regressor.

Finally, we seek to allay remaining concerns regarding endogeneity (via selection) of our results in several ways. First, we study the effects of Sarbanes-Oxley (SOX) and [separately] of Dodd-Frank (DF) on firms' operating performance in difference-in-differences regressions. For SOX, the treated firms are U.S. firms highly exposed to the SEC, while the control firms are Canadian-listed from the same industries.

[5] The firm-response endogeneity is particularly thorny given recent evidence of strategic managerial disclosure in the face of competition worries (e.g., Durnev and Mangen, 2020).

[6] For example, results with respect to the FDA are concentrated in firms operating in the food, medical products, and cosmetics sectors, while results for the SEC are concentrated in investment and brokerage companies.

Operating performance in the three years following implementation of SOX is worse for treated than control firms, relative to the three years preceding. For DF, treated firms are U.S. and highly exposed, while control firms are U.S. and less exposed. Again, operating performance in the three years following implementation of the Act is worse for treated than control firms, relative to the three years preceding. We conclude that Acts designed to increase agency influence on firms causally affect firm performance.

Second, we conduct event studies around the passage dates of the Acts. Highly exposed firms experience significantly negative CARs in the days surrounding each Act's signature-date. In the case of DF we also show that less exposed firms experience positive CARs around the event.

Third, we again take an event study perspective, but around the recent Supreme Court hearing of the "Chevron doctrine" case. The willingness of the Court to hear the case – which they announced on May 1, 2023 – suggested strong potential to overturn the original doctrine and federal agencies' influence on businesses (e.g. Katz et al. 2017)[7] If agency activity is costly to exposed firm performance, these firms would be expected to benefit, and the event should associate with positive CARs. We find this for firms exposed to the EPA, the FDA, and OSHA, but not to highly-exposed-to-SEC firms. We view the latter as due to much of the influence of the SEC on highly exposed firms being viewed positively by investors.[8]

Overall, we conclude that government affects firm performance through agency activities (enforcement and rulemaking). This is notable because agencies may enforce existing regulations even in the presence of political gridlock. Our results point to at least one efficiency in regulation of firms – targeting firms (industries) that the agency is most closely linked with (i.e., high exposure industries). Additionally, our results are concentrated where one would expect – in firms with the most exposure to regulatory scrutiny (i.e., industries above the 95th percentile of exposure). While it may generally seem undesirable that regulation reduces operating performance, the fact that results are concentrated in a relative handful of firms indicates that regulators are likely concentrating resources where appropriate.

We contribute to the political economy literature with the first analysis of agency-level activity accompanied by industry exposure to agencies, on firm performance. The focus on agencies instead of political partisanship sidesteps the concern that new laws are passed only when one party dominates Congress and the Presidency. Moreover, our analysis of the four major federal agencies – as opposed to focus on only one – allows us to compare magnitudes of agencies' effects on corporate performance.

We also contribute to the nascent literature's focus on regulation effects, but which largely takes a

[7] The Q&A during the hearing also suggested that agencies may become more limited, and the SCOTUS decision on June 28, 2024 largely overturned the original doctrine. Measurement of the final decision's effect on highly exposed firms is complicated by additional economic news of several other high-profile decisions by the Court released on that same day. We therefore eschew analysis of CARs on June 28, 2024 and focus on the 'agreement-to-hear' day CARs.
[8] The SEC's mandate is to protect investors, whereas other agencies protect individuals who may not necessarily (also) be investors.

demand-side view of firms' actions or discussions that are deemed responses to regulatory concerns. Kalmenovitz (2023) studies regulatory burden, building the measure from firm-language in its 10-k. We side-step selection concerns that some firms may not mention enforcement topics/concerns for other (perhaps competitive) reasons, by simply measuring agency activity.[9] Calomiris et al. (2020) and Simkovic and Zhang (2020) also take a demand-side perspective by focusing on earnings calls (Natural Language Processing [NLP] regulation-words) and expenditures on regulatory-related jobs, respectively. Kalmenovitz et al. (2024) focus on fragmentation or the cross-agency mention of topics of regulation. Firms with high fragmentation are exposed to more agencies. Armstrong et al. (2024) implicitly recognize this by building a firm-level exposure-to-agencies measure, but it is still overall – averaged across all agencies – and requires firm 10k descriptions which could be endogenous. By contrast, our focus is on situations where firms are highly exposed to a particular agency, enabling an agency-centric measure of their activities that doesn't rely on firm language, mitigating one strand of endogeneity concerns. Overall, our supply-side perspective where agencies' activities can vary across their toolkits offers a different view on the government-corporate performance relationship.

II. Data and Variables

A. Agency-level Variables

We use six agency-level variables, each representing part of the activity of an agency, to build an overall measure of the activity intensity. The variables are: *Action1*, *Action2, Budget*, *FTE*, *Regulation1*, and *Regulation2*. Our data period (described below in II.D.) is 1980-2019. We focus on four major government agencies: EPA, FDA, OSHA, and SEC.[10] Table IA.I provides detailed data on each variable's value for each agency in each year of our sample.

A.1 Action

Action1 and *Action2* represent the direct enforcement actions carried out by each agency annually. Each agency uses different actions to enforce its regulations, such as warning letters, inspections, issuing penalties, and referring the violators to the department of justice (DOJ). The data availability differs for each action type. For example, the EPA has inspection data available only from 1994 onwards. Further, the way each action data is reported or computed is not always consistent during different periods. For example, the SEC changed the methodology for counting its contempt civil cases in 2013, resulting in a clear drop in the total number of enforcement actions from 2013 onwards. Thus, there is a trade-off between including

[9] Nevertheless, given potential overlap between regulatory intensity and regulatory burden, we perform additional tests to ensure we are finding a separate effect. His measure of regulatory burden is based primarily on compliance costs due to paperwork requirements. We make two important findings. First, our agency activity index continues to influence corporate performance in the sub-sample where he finds low paperwork compliance costs. Second, our results are generally robust to including his measure, although this reduces sample size substantially.

[10] We have data for agencies starting in 1980. We do not include 2020 onwards in our analysis to exclude the social and economic shocks due to the Covid pandemic.

all action variables and ensuring time-series availability and reliability. To maximize time-series variation and consistency across all agencies, we focused solely on variables that were consistently counted and had data available from 1980, resulting in two action variables for each agency.

Given varying types of enforcement *actions* for each agency, we group them by our (realized ex-post) evidence on actions that correlate more or less strongly with our index. *Action1* carries higher loading while *Action2* carries lower loading. For EPA, *Action1* is the number of administrative actions initiated,[11] while *Action2* is the number of civil case referrals to the DOJ (same source). For FDA, the *Action1* and *Action2* variables represent the number of recalls sent out and inspections conducted by the FDA every year. These data are reported on FDA's Enforcement Statistics Report through FDA.gov. OSHA's *Action1* and *Action2* are the amount of penalties (in constant 2012 inflation-adjusted dollars) issued and the total number of inspections conducted by OSHA in each year. We obtain the data for OSHA from DOL.gov. Finally, the SEC's *Action1* variable represents the annual number of administrative proceedings, while *Action2* is the number of civil injunctions (excluding contempt cases) against violators of regulations. These data are available annually in the Select SEC and Market Data Report from SEC.gov.

Table A.II provides summary statistics for *Action1* and *Action2*, for each agency. It is clear that actions vary in scale both across and within agencies. For example, EPA's average number of civil cases (*Action2*) is 244 while its administrative actions (*Action1*) mean is 3,024 per year – an order of magnitude larger. Similarly, FDA has an average of 4,625 recalls compared to 21,016 inspections per year, highlighting the substantial within-agency variation in the scale of these variables. This pattern of variation in the scale of action variables is evident across agencies too. For instance, OSHA's *Action1* mean is in the millions, whereas SEC's action variables are in the hundreds.

The observed scale difference across variables demonstrates that agencies employ a variety of enforcement tactics. In addition to the heterogeneous nature of variables, the large time series standard deviation of the variables indicates that each of them varies heterogeneously across the years. For example, FDA's recalls count shows an annual standard deviation of about 2,800 illustrating how widely FDA recalls vary each year.[12] Similarly, other agencies' action variables exhibit significant annual fluctuations (Table IA.I). Overall, the data reveals that agencies use a variety of enforcement techniques, and they do not carry out these actions homogenously across time. This high variability encourages our use of explanatory factor analysis to pick up latent enforcement activity, especially given below-noted tradeoffs in agency emphases across enforcement proxies as explanation for the variation.

A.2 Budget and FTE

[11] As reported on EPA's Enforcement Annual Results.

[12] This finding is supported by detailed yearly recall data in Table IA.I, which shows that the FDA issued 4563 recalls in the year 2000, almost doubling to 9469 in 2009 followed by a sharp drop to 7894 in 2019.

The third and fourth agency-level proxies for activity intensity are *Budget* and Full-time equivalent (*FTE*). These measure, respectively, the monetary and workforce resources at the agency's disposal for carrying out its enforcement and rulemaking responsibilities. *Budget* is the spending in million dollars (constant 2012 dollars, adjusted for inflation) by each agency every year. Full-time equivalent (*FTE*) is the total number of hours worked divided by the number of compensable hours applicable to each fiscal year and agency. These two variables are often leveraged by different administrations[13] to control an agency's enforcement and rulemaking productivity because agencies' functionalities depend heavily on their annual budget and human capital. Put differently, an agency would have difficulty expanding its enforcement actions without funding for investigations or lawsuits (see Carpenter 1996; Olson 1996).[14]

We retrieve *Budget* and *FTE* data from Weidenbaum Center on the Economy, Government, and Public Policy (Washington University in St. Louis) (Febrizio and Warren 2020) that is built from US annual budget reports. Table A.II presents summary statistics. EPA and FDA are the two largest agencies with average annual budgets of $5.06 and $2.04 billion, respectively, and have the largest number of employees.[15] In recent years this trend has shifted, with the FDA's *Budget* and *FTE* surpassing the EPA's since 2019 and 2015 respectively (Table IA.I). SEC is the third largest agency with its average Budget and *FTE* slightly larger than OSHA (OSHA had a larger *Budget* and *FTE* than SEC in 1980 but OSHA has seen diminished *Budget* and FTE, while the SEC's *Budget* and *FTE* have increased consistently). Overall, the time series and cross-sectional variation in resources available for enforcement, encourages both our study of multiple drivers as well as the factor analysis to pick up latent enforcement tendencies.

A.3 Regulation

The last two agency-level activity variables are *Regulation1* and *Regulation2* representing the intensity and amount of regulations enforced by the agency each year. We build these measures through analysis of words in the Code of Federal Regulations (CFR). In general, agencies may issue new regulations or revise current regulations (to be stricter) through the rule-making process. This translates into harsher enforcement of policies related to laws.[16] For example, EPA issued a new regulation in 2017 that was named the "Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act" rule. This new regulation that established new requirements for chemical facilities to prevent and respond

[13] Congress also plays a crucial role in determining the budget of federal agencies. For example, the Trump administration's 2018 budget proposal cut $871 million from the FDA's budget authority appropriations. This was not included in the bill approved by Congress.
[14] Olson (1996) shows that FDA decreased its inspections due to budget cuts during the Reagan administration.
[15] EPA average *FTE* is 15,611 and the FDA's *FTE* mean is around 10,258.
[16] Rulemaking is the process that the executive and independent agencies use to create or promulgate regulations. First, the agency introduces the proposed rule to the public and provides a time window (from two to several months) for the public to comment on the proposed rule. Once this period ends, the proposed rule may become a final rule.

to accidental releases of hazardous substances, led to an increase in EPA's civil litigation cases.[17]

Regulatory activities are reflected in the agency's Code of Federal Register's (CFR) parts every year. The CFR is divided into 50 titles (covering a variety of subjects such as agriculture, banking, energy, environment, food and drugs, foreign relations, immigration, labor, securities exchanges, and more), and each title is further divided into various chapters, some of which are specifically devoted to an agency. For example, chapter II under title 17 of the CFR is called Securities and Exchange Commission which includes parts 200 to 399. These parts cover regulations issued and maintained by the SEC every year. We use the RegData (Al-Ubaydli and McLaughlin 2017; McLaughlin et al. 2022) database that provides the number of total and restricting (i.e., shall, must, may not, required, and prohibited) words that appeared in each CFR part every year, to build the agency-level variables related to regulatory activity.

Regulation1 is the sum of restricting words that appeared in each of the CFR parts that are devoted to an agency. It represents the intensity/strictness of the regulations related to that agency in each year. Similarly, *Regulation2* is the sum of all words in the parts related to each agency. It captures the volume of the agency's regulation in each year. Table A.II shows that EPA's CFR rules have the largest annual mean in the number of restrictive (*Regulation1*) and total (*Regulation2*) words among all four agencies. This is because EPA is the largest agency with the highest average *Budget* and *FTE* and it enforces the largest number of laws passed by Congress.[18] By comparison, the FDA's overall CFR volume (mean of *Regulation2*), is greater than that of OSHA and SEC. This corresponds to the FDA's ranking as the second-largest agency in terms of average *Budget* and *FTE* (Table A.II). Notably, while the FDA has approximately five times the average Budget and 1.5 times the average *Regulation2* of OSHA, OSHA's annual average number of restrictive words (*Regulation1*) is significantly larger (32,908) than the FDA's *Regulation1* (mean of 22,188). The likely explanation for this disparity is that OSHA relies more heavily on *Regulation1* as an enforcement tool compared to FDA. Table II provides some evidence supporting this explanation. The factor loading on *Regulation1* for OSHA is 0.936, much larger than the FDA's loading of 0.720. Moreover, the uniqueness for OSHA's *Regulation1* is less than one-third of the FDA's implying that OSHA's *Regulation1* varies more closely with its activity intensity compared to FDA.

B. Violation Tracker Data

Our set of firm-level enforcement data comes from Violation Tracker, maintained by the Corporate Research Project of Good Jobs First. It tracks corporate misconduct in the United States from 2000 to 2019.

[17] One notable case is the civil injunction complaint filed against Tpc Group in 2021 by EPA through the department of justice seeking civil penalties and injunctive relief for alleged violations of the Risk Management Program rule.

An agency can also revise current regulation to change enforcement. An example is the SEC's "Disclosure Update and Simplification" rule, which amended regulations on disclosure of executive compensation in company filings. The revised regulation resulted in several enforcement actions.

[18] EPA is responsible over a wide range of federal environmental and health-related laws. By contrast, the FDA's regulatory authority is focused primarily on food, drugs, and medical devices.

The data provides detailed information on more than 500,000 enforcement cases related to more than 400 federal, state, and local regulatory agencies at the firm-year level. The authors of the data use agency websites, press releases, and court records to compile the Violation Tracker database from the enforcement cases (including civil and criminal litigation cases) that resulted in a penalty amount larger than $5,000. They also link each violator (subsidiary) firm in the data to their parent company name, resulting in more than 3,000 parent companies (both private and public) in their database. We limit our use of the Violation Tracker data to publicly traded companies and match 1,791 parent companies to our sample of firms (Compustat) representing 13,168 firm-year violation observations [out of our main sample total of 88,074 firm-year observations from 2000 to 2019]. We use Violation Tracker data to define two firm-level enforcement variables. The first variable is *Violation dummy*, which is a dummy variable equal to one if an enforcement case was taken against the firm in that year. The second variable is *Penalty*, which is the natural logarithm of one plus the dollar amount of penalty (if any) the firm was issued in a year.

C. Firm Financials and Macroeconomic Variables

We obtain annual information on various firm accounting characteristics from Compustat for the period 1980-2019. We use operating income before depreciation and taxes [scaled by 1-year-lagged firm total assets] to proxy firm accounting *Performance*. We include several firm-level controls found in the extant accounting literature, in our regressions. These variables are *Size*, *CAPEX + R&D, Leverage*, *Sales growth, and Industry performance.* Table A.I defines these variables. Given a few outliers, we winsorize firm performance and financial variables at 1% and 99%. Table I, Panels A, B, and D show the summary statistics for these variables for different samples in our analysis. Finally, Panel C presents summary statistics for our macro controls, including *GDP growth, inflation, unemployment, and president party.* These data come from Federal Reserve Economic Data (FRED).

D. Sample Construction

We use three different criteria to construct samples. In our first approach, we focus on firms from industries that are *meaningfully* touched by an agency. We use the *RS's* 95th percentile value from all the industries (6-digit NAICS) that have an *RS* more than 0 [for an agency], as the threshold for dropping or keeping industries for this analysis.[19] In this way, we exclude industries that are only nominally affected by an agency.[20] Table I, panel A shows the summary statistics for the sample of high *RS* firms for each agency. The statistics are reported for firm samples from 1980 to 2019. The number of firms in the sample for EPA, FDA, OSHA, and SEC respectively is 18,906, 8,289, 6,087, and 18,585 respectively. Firm-level financial variables are similar and comparable across all agencies, indicating that each sample contains a well-

[19] Results are robust to this sampling criteria since the 93rd and 97th percentiles as the threshold give similar results.
[20] We manually check the high RS industries (using agency websites and CFR text) for each agency to ensure the classifications were correct. We found no mismatches for the EPA, FDA, and OSHA. There was a small number of issues, mostly because of the word "security," for the SEC. We excluded these from the sample to maintain accuracy.

distributed (based on firm characteristics), balanced firm population.

In our second approach, we build a full sample of firms that is invariant across the agencies. Given the high variation in exposure of firms to an agency (in such a broad sample), we take advantage of *RS* variation across industries for our analysis that relies on the wider sample (see Table IV)[21]. In this case, we require each 6-digit NAICS industry to have at least 5 firms each year, since our *RS* treatment level is at the 6-digit NAICS.[22] This sample has 149,279 firm-year observations for the period 1980-2019. Table I, Panel B shows the summary statistics for this sample of firms.

In our third approach, we limit our sample to firms from 2000-2019 to coincide with the Violation Tracker Data. Table I, Panel D shows the summary statistics for this sample.

III. Methodology

A. Constructing Agency-level Activity (AAI)

Agency Activity intensity is difficult to measure because it happens through different channels and in different forms for each agency. For example, regulatory bodies could issue new rules or modify existing ones to compel firms to file compliance reports or adhere to operational restrictions. Alternatively, regulatory agencies could enforce regulations through ex-ante guidance and warning notices (i.e., soft enforcement) or by imposing monetary penalties and operation suspensions (i.e., hard enforcement) (Jr (2007). For example, an administrative enforcement action (*Action1*) by EPA can take the form of an action directive (to clean up a site) which may or may not be accompanied by financial penalties. Similarly, EPA's civil court litigation against businesses may result in hefty financial fines, injunctions compelling them to take corrective action, or a combination of financial penalties and corrective measures.

This variety in the form of agency activity mechanisms highlights the difficulty in choosing a single agency-level variable as a measure of activity intensity. Put differently, it is crucial to account for all activity variables to build a measure for activity intensity. For example, in the early 1980s, the FDA faced budget cuts and increased industry demand (based on more drug approval applications). In response to these changes, the agency devised more effective enforcement strategies rather than reducing its enforcement or regulatory oversight. The FDA altered its enforcement strategy by shifting its focus from inspections—an expensive and less effective procedure—to recalls, a less costly yet effective alternative (Olson 1996). However, if a research study solely relied on inspections to measure the FDA's enforcement activity, it might incorrectly perceive a decrease in enforcement activity while the FDA was adapting its strategy toward a more effective and cost-efficient mechanism.

Another example is seen in OSHA's contradictory trends in inspections and penalties from 2010 to 2019 (Berkowitz 2019). OSHA's workplace safety inspections decreased by about 20% while the total

[21] We assign the lowest RS score to the High RS firms that were mismatched for the SEC.
[22] Changing the criteria to three firms does not affect our results.

amount of annual penalties increased by around 95% for the same period (Table IA.I). This trend could be attributed to various factors. One potential explanation was the decrease in the number of full-time equivalent (FTE) employees and budget at OSHA between 2010 and 2019, leading to a shift in OSHA's enforcement towards targeting specific industries. In other words, OSHA adjusted to the decreased resources by identifying industries with a high risk of violating safety regulations and focusing its inspections on those industries. This change in enforcement strategy decreased total inspections conducted by OSHA but increased the number of inspections that resulted in penalties, thereby raising the amount of total penalties issued. Essentially, OSHA shifted its resources from a costly enforcement mechanism towards a more cost-efficient and effective enforcement strategy that maximizes its regulatory oversight. However, an alternative explanation for the upward trend in penalties could be the increase in OSHA's maximum penalty threshold due to its new final rule published in 2015. It is also possible that a combination of these factors contributed to the observed trend. Regardless, it is not ex-ante clear how to interpret this variation regarding enforcement intensity nor which variable to choose as proxy for activity intensity.[23] These conflicting findings highlight the importance of identifying the correct measure of activity intensity that accurately captures its impact on firm performance.

Overall, one needs to consider multiple possible channels of enforcement and rule-making together, to build a measure of overall activity, since focusing on only one channel may be misleading. We thus take a broad view and study multiple channels, each representing some form of activity by an agency. We combine them to build a single time-series measure of activity intensity *at the agency level* via exploratory factor analysis (EFA). From the six time-series agency-level variables described above, we derive the latent variable (activity intensity) representing the common variation between the six main variables, for that agency. EFA is a multivariate statistical method that is widely used in social sciences. The goal of EFA is to explain the matrix of explanatory variables' covariances with a much smaller number of hypothetical latent variates which are called factors. The main assumption in EFA is that there exists a latent variable that is linearly correlated with each of the explanatory variables to some extent (Lawley and Maxwell 1962). In other words, the joint variation of the explanatory variables is due to the variation of a latent variable.[24]

EFA only uses the variance that each observed variable shares with other observed variables for analysis and stores the variable-specific variation (i.e. that is unique to the variable) in a residual term. This makes EFA a suitable method to build a measure for activity intensity using different channels of enforcement and regulatory activity, because each channel varies with agency activity to some extent. For example, *Action* variables vary with the enforcement behavior of an agency since the agency commissioners

[23] Further, Table IA.VI shows *Action2* is positively correlated with firm accounting performance while *Action1* regression coefficient is negative (-0.015) for firms heavily regulated by OSHA.
[24] For a more comprehensive discussion of EFA refer to Appendix A.

often adjust the agency enforcement intensity through its direct enforcement actions. *Budget* and *FTE* represent the input resources to an agency that are often altered by the executive branch (or sometimes Congress) whenever they want to change the enforcement and rule-making activity intensity of an agency. Thus, they closely fluctuate with an agency's capacity to enforce and regulate. Finally, *Regulation* variables represent agency's regulatory activity intensity and its intent to enforce the regulations when unconstrained by (for example) *Budget* or *FTE*. *Regulation1* and *Regulation2* capture the intensity and quantity of rules published by an agency, picking up variation in the agency's soft and hard enforcement-related verbiage.

We use exploratory factor analysis to find the fewest factors accounting for the common variance (correlation) of the Six variables. The factor loadings are computed using the squared multiple correlations as estimates of the communality. We only retain the first factor from factor analysis because it is the only factor with an eigenvalue greater than one (Kaiser criterion) for all the agencies, indicating most of the variation is explained by this factor (Kaiser 1960). Table II, Panel A shows the eigenvalues for all the extracted factors. Factor1 is the largest across all the agencies.

Table II, Panel B shows the factor loading and uniqueness of the six variables for the retained factor. The factor loading of a variable quantifies the extent to which the variable is correlated with a given factor. Uniqueness shows the variation in a variable not explained by the factor. The high factor loadings and low uniqueness for the *Budget*, *FTE*, and *Regulation* variables imply that these variables move closely with the latent variable, and a significant amount of their variation is explained by the first factor.

The factor loadings and uniqueness values around *Actions* are more nuanced. EPA's *Action2* has a low factor loading and uniqueness close to 1, indicating that it does not vary closely with the latent variable and most of its variation is not explained by it. This may be because EPA's *Action2*, which represents civil cases, is a secondary step enforcement action that can take a significant amount of time to settle.[25] This can create a time gap between the violation date and the penalty or conviction date, which could explain why *Action2*'s variation does not closely track contemporaneous changes in activity intensity. FDA's *Action2* and OSHA's *Action2* have negative loadings on factor1 showing that they vary in the opposite direction of the agency activity. This implies that these agencies adjust their enforcement strategies by shifting away from these variables when they want to *achieve a more effective and cost-efficient* enforcement mechanism (Berkowitz 2019; Olson 1996).[26]

For our time series index measure of agency activity, we use the least square regression method

[25] For example, in 2020, the EPA settled a civil case with a Florida-based company called Tuning LLC over violations of the Clean Air Act. The violation occurred in 2016. The EPA filed the case in 2019, and the investigation continued until the settlement was reached in 2020. This illustrates how civil cases represented by EPA's *Action2* can involve a significant time gap between the violation date and the resolution of enforcement actions.

[26] An example of such a shift during our sample period was made by OSHA (for budget reasons) to fewer inspections. Thus, it appears that the factors capture enforcement strategy shifts.

(Thurstone 1935) to predict factor scores. This method results in standardized factor scores with a mean near zero and a standard deviation of 1. These factor scores become our *AAI* index variable. We use *AAI* as an agency-level time-series proxy for the rulemaking and enforcement intensity for each agency annually.

B. Constructing Industry-exposure-weighted AAI

Exposure to each agency varies by industry. For example, pharmaceutical firms are not affected by EPA in the same way that petroleum refinery firms are. To account for this heterogeneity, we interact our agency-level activity index with a measure of each industry's relatedness to that agency. We proxy this relatedness with **industry relevance estimates** from the RegData database (McLaughlin et al. 2022) accessed from QuantGov, for the years 1980 through 2019.

The RegData provides a probability estimate that a "CFR part" is related to a specific industry (6-digit NAICS) in each year. The probability estimates are calculated as follows. They begin with textual analysis of all the published rules in CFR along with all industries' descriptions in NAICS. Then they train specific machine learning algorithms to link each CFR part to an industry, by a probability (Al-Ubaydli and McLaughlin 2017). We first average these probability estimates across the specific CFR parts related to an agency (e.g., CFR parts 1-1099 and 1400-1500 under title 40 are related to the EPA), to create an annual industry relevance score that matches each 6-digit NAICS industry to a government agency. Then we average each industry relevance score (*RS*) over time (years) to obtain a unique *RS* for each industry.

To develop a measure that distinguishes the exposure of industries to different regulatory agencies, we are primarily interested in cross-sectional variation. For instance, Petroleum refineries are regulated by the EPA and are highly exposed to the agency. This is evident in the Relevance score data, but this data shows minimal annual variation. In general (for all four agencies), the time-series variation of the median industry's Relevance score is less than 20% of the mean time-series value, and often less than 10% of the mean. Thus, we use the time-series average of the Relevance score (*RS)* to identify the effect of cross-sectional variation in industry exposure to regulatory agencies. We can then multiply *AAI* by *RS* to obtain *Industry-exposure-weighted AAI*. In this way, the *Industry-exposure-weighted AAI's* time-series variation is only due to the agency activity intensity. Equation (1) summarizes our computation of relevance score:

$$RS_i = \frac{\sum_t \sum_p Pr_{i,t,p}}{N \times M} \quad (1)$$

where *i*, *t,* and *p* index industries at the 6-digit NAICS level, year, and the part in the CFR respectively. *Pr* is the probability of the part *p* in CFR being related to the industry *i* at year *t*. N is the total number CFR parts corresponding to the agency. *M* is the total number of years from 1980 to 2019.

Table IA.II shows the relevance scores and the titles for the 15 industries (6-digit NAICS) with the highest and lowest relevance scores to EPA, FDA, OSHA, and SEC. The data in this table indicate that *RS* does a good job of classifying sensitive industries to each agency. For example, the top industry for EPA is

Other Nonhazardous Waste Treatment and Disposal, which is not surprising given EPA's mission to protect the environment. The same story goes for FDA, with the most sensitive industry being Dog and Cat Food Manufacturing.[27] *RS* classifies the OSHA's most regulated industry to be the Pipeline Transportation of Natural Gas, which aligns with reports indicating that pipeline construction is among the most hazardous occupations with high fatality rates.[28] Finally, the SEC's top *RS* industry is Investment advice, which falls in line with the agency's primary mission to regulate and protect investors.

Table I, panel B provides summary statistics of *RS* under each agency for our full sample of firms. The *RS* mean for EPA, FDA, OSHA, and SEC is 0.010, 0.004, 0.003, and 0.003 respectively. EPA has the largest *RS* mean among all four agencies, indicating that the number of heavily-regulated industries is larger for EPA compared to the other agencies. This finding is consistent with the fact that EPA has the largest average volume of CFR (*Regulation2*) compared to other agencies, as demonstrated in Table A.II.

We compute the exposure-weighted activity index (*Industry-exposure-weighted AAI*), which is a measure of annual activity intensity by an agency for each specific industry, as the product of *AAI* and each industry's *RS*:

$$\textit{Industry-exposure-weighted } AAI_{i,\,t} = AAI_t \times RS_i \tag{2}$$

where *i* denotes industries (6-digit NAICS) and t represents the year.

C. Constructing Firm-exposure-weighted AAI

Industry-exposure-weighted AAI assumes uniform exposure of all firms within an industry to regulatory agencies. This presumption may not hold in scenarios where regulatory agencies target firms with previous violations, those with more extensive operations, or those offering a wider range of products. Constructing a Firm-Exposure-Weighted Adjusted Agency Activity Index is challenging because there is no available measurable variable that captures the heterogeneity of firm exposure to an agency within an industry. We address this challenge by using firm market share (MS) (firms' total sales scaled by the 6-digit NAICS total sales in each year) as a proxy for a firm's exposure to an agency, based on the assumption that firms with larger market shares—and thus presumably more operations and visibility—are more likely to interact with regulatory agencies. We calculate the *Firm-exposure-weighted AAI* as the product of *Industry-exposure-weighted AAI* and the firm's market share within the 6-digit NAICS industry.

$$\textit{Firm-exposure-weighted } AAI_{i,\,j,\,t} = AAI_t \times RS_i \times MS_{i,j,t} \tag{3}$$

[27] One may wonder why Petroleum Refineries is not the industry with the highest *RS* under EPA (or why Pharmaceutical Preparation Manufacturing is not for FDA). This is because even though some industries may be smaller in size than others, they receive more complex and detailed regulations from the regulatory agency to reduce the specific risks associated with their operations. As a result, the agency sets up standard procedures that are unique to these industries, leading to a higher *RS* score.

[28] As one example among many, a report that was published in Pacific standards revealed that in 2014, the rate of workplace fatalities for oil and gas pipeline workers was seven times greater than that of the average worker.

where *i* denotes industries (6-digit NAICS), *j* denotes firms, and t represents the year.

IV. Empirical Setting and Identification

A. Regression Models

We use several regression models with our principal independent variable measured at three different levels: agency, agency-industry, and agency-firm, to capture the impact of agency activities on operating performance. Our identification strategy leverages the externality of (supply-side) *AAI* variable on firm-level characteristics compared to firm-driven (demand-side) regulatory variables. Specifically, we measure *AAI* independently of firm-level activities, which mitigates concerns related to endogeneity arising from selection bias or reverse causality. For instance, firms may engage in lobbying activities to avoid being targeted by agencies. This would lead to biased results if enforcement was measured at the firm level because certain non-lobbying firms would experience more enforcement cost.[29] Also, underperforming firms may violate regulations more frequently and receive more enforcement, creating reverse causality bias in a measure of firm-level enforcement effects. Our approach is neutral towards the specific firms receiving enforcement because we measure enforcement intensity at the source (i.e. the agencies), rather than from the firm-level activities. This both minimizes endogeneity concerns and highlights one of our main contributions to the extant literature that relies on firm 10-K reports and NLP to measure enforcement.

Our first set of regressions are of firm accounting performance on *AAI*, for each agency separately. Since *AAI* varies only in the time-series, we run the regression on the sample of firms that are heavily regulated by each agency. Specifically, we create a panel of firms with an *RS* value above the 95th percentile of all firms exposed to an agency. This helps to further identify the effect by focusing on within-firm variation and allowing absorption of time-invariant firm effects, for a more homogeneous sample in the first place – those heavily affected by that agency's shocks. We use the following regression specification:

$$Performance_{i,j,t} = \alpha + \beta . AAI_t + \boldsymbol{\gamma_1 . X_{i,t}} + \boldsymbol{\gamma_2 . Z_t} + \gamma_3 . Industry\ performance_{j,t} + \mu_i + \epsilon_{i,t} \quad (4)$$

where *i, j,* and *t* denote firm, industry (6-digit NAICS) and year, respectively. The dependent variable, $Performance_{i,j,t}$, measures firm operating performance each year. The main independent variable AAI_t is the activity intensity for each agency, each year. *AAI* by construction is external to firm-level characteristics. The error term, $\epsilon_{i,t}$, is double clustered at the firm and year levels. The firm-level clustering is to account for the potential within-firm heteroskedasticity (Petersen 2008). The year-level clustering is to ensure our standard errors are not biased due to firms being subject to similar shocks in each year. $\boldsymbol{X_{i,t}}$ is a vector of control variables that contain firm-level attributes including *Size*, *CAPEX + R&D*, *Leverage*, and *Sales growth* to control for common factors that have an independent effect on firm performance. μ_i

[29] Indeed, unreported results from our own analysis indicate a mitigating effect of lobbying on the correlation between firm performance and agency enforcement. However, we eschew reporting given these endogeneity concerns.

represents firm fixed effects to account for time-invariant differences between firms.

We do not include time fixed effects in the regression since the *AAI* is an agency-level (yearly) time-series variable that would be absorbed by year dummies. Instead, we use *GDP growth, inflation*, *unemployment, and President party* to control for economic conditions that are uniform across all firms in each year. Furthermore, we include a control for *Industry performance* to ensure our results are not driven by industry time trends. The coefficient of interest, β, measures how a firm's accounting performance responds to a change in activity intensity of policies by each agency (EPA, FDA, OSHA, and SEC).

In our second set of analyses, we regress firm performance on the Industry-*exposure-weighted AAI*, which varies by industry (6-digit NAICS) and year. We use this between-industry variation by running the regression on our full sample of firms (Compustat) to identify the effect of activity intensity at the agency-industry level on firm performance. Thus, our panel of firms is the universe of Compustat firms (1980 to 2019) with the independent variable varying both across years and industries. In this specification, we are able to include year dummies to control for time-varying shocks that may affect all firms in a given year, since different industries may respond to such aggregate shocks varyingly. Our regression specification is:

$$Performance_{i,j,t} = \alpha + \beta.Industry\text{-}exposure\text{-}weighted\ AAI_{j,t} + \boldsymbol{\gamma.X_{i,t}} + \mu_{k,t} + \epsilon_{i,t} \quad (5)$$

where *i, j, k,* and *t* denote firm, industry (6-digit NAICS), industry (2-digit NAICS) and years respectively. The dependent variable, $Performance_{i,j,t}$, captures the firm operating performance for each year. The main independent variable $Industry-exposure-weighted\ AAI_{j,t}$ is the activity intensity for each of the agencies EPA, FDA, OSHA, and SEC at the 6-digit NAICS level in each year. $Industry-exposure-weighted\ AAI_{j,t}$ by construction is external to firm-level characteristics. The firm-level control variables are the same as regression 3. $\mu_{k,t}$ represents year × industry (2-digit NAICS) fixed effects[30]. The error term, $\epsilon_{i,t}$, is clustered at the 6-digit NAICS industry since our main independent variable varies at the industry level. The regression coefficient β shows the effect of agency activity on firm performance considering the firm's industry exposure to the agency in charge of the enforcement.

In the third set of regressions, we transition from agency-industry exposure to agency-firm specific exposure to evaluate the impact of agency activities on firm performance. Our panel of firms is the universe of Compustat firms from 1980 to 2019. We regress *operating performance* on *Firm-exposure-weighted AAI*, which varies both across years and among firms. This between- and within-firm variation enables us to include both firm and year fixed effects to control for unobserved time-invariant firm characteristics and annual common factors, which provides us with improved identification of how agency enforcement and

[30] We exclude firm and 6-digit NAICS fixed effects from our analysis due to the constant value of *RS* for each industry across all years (i.e., industry exposure to an agency does not vary over time). Including these fixed effects would absorb all the between-industry variation (i.e, the heterogeneity of exposure to an agency among different industries), making it impossible to identify the effect of activity intensity at the agency-industry level on firm performance.

rulemaking activities at each individual firm affect the firm's performance. Our regression specification is:

$$Performance_{i,t} = \alpha + \beta.Firm - exposure - weighted\ AAI_{i,t} + \boldsymbol{\gamma.X_{i,t}} + \mu_i + \mu_t + \epsilon_{i,t} \quad (6)$$

where *i* and *t* denote firm and year, respectively. $Performance_{i,j,t}$, captures the firm operating performance each year. The main independent variable $Firm - exposure - weighted\ AAI_{i,t}$ is the activity intensity for each agency at the firm level each year. This variable by construction is external to firm-level characteristics. The firm-level control variables are the same as regression 3. μ_i and μ_t represent firm and year fixed effects respectively. The error term $\epsilon_{i,t}$ is clustered by firm. The regression coefficient β shows the effect of agency enforcement and rulemaking activity on firm performance considering the firm's exposure to the agency in charge of the enforcement.

Our final analysis examines the link between firm-level experiences of enforcement and their performance. We regress the Violation Tracker data firm-level enforcement variables, *Violation dummy* and *penalty*, on firm performance for our full sample of firms (Compsutat) for 2001-2019. We use the following simple linear regression specification:

$$Performance_{i,t} = \alpha + \beta.Enforcement_{i,t} + \boldsymbol{\gamma.X_{i,t}} + \mu_i + \mu_t + \epsilon_{it} \quad (7)$$

where *i* and *t* denote firm and year. The dependent variable, $Performance_{i,t}$, captures the firm operating performance for each year. The main independent variable $Enforcement_{i,t}$ is the enforcement at the firm-level, and it could be either the *Violation dummy* or *Penalty* variable from the Violation Tracker data. Firm controls are the same as previous regression specifications. μ_i and μ_t represent firm (or industry) and year fixed effects respectively. The error term ϵ_{it} is clustered by firm. The Coefficient β measures how enforcement at the firm-level affects firm performance.

B. Regulatory Shocks

The Agency Activity Index (AAI) was designed to be external to firm-level characteristics and industry trends. However, due to the inherently endogenous nature of firm-regulation interactions, we utilize regulatory exogenous shocks to address endogeneity concerns in case any variables used to construct the *AAI* were influenced by firm outcomes or industry trends. We begin with two major SEC-related laws—the Sarbanes-Oxley Act and the Dodd-Frank Act—which led to increased agency activities. We employ a difference-in-differences (DiD) approach to identify how firms regulated by the SEC are affected by these enforcement and regulation shocks in comparison to unregulated firms. We also conduct event studies on market reactions to these legislative changes to determine if investors respond significantly to the increase in regulation, providing further evidence of the impact of agency activities on firms.

B.1 Sarbanes Oxley Act

The Sarbanes-Oxley Act (SOX), enacted in 2002, represents a significant reform in corporate governance and financial practices for public companies in the United States. The legislation was a response

to major corporate and accounting scandals, including those involving Enron and WorldCom, which shook investor confidence and called for stricter regulations.

SOX affected all public companies by introducing rigorous new requirements for public companies. Notably, it mandated enhanced internal controls on financial reporting, required top executives to personally certify the accuracy of financial statements, and significantly expanded the role of audit committees. The act also increased SEC enforcement for its highly regulated (e.g., financial industries) industries by inducing tougher (civil and criminal) penalties for securities fraud and violations of The Securities and Exchange Act of 1934.

SOX represents a significant, sudden regulatory change motivated by external circumstances (i.e., high-profile corporate scandals). The legislative process was much faster than the usual timeline for similar laws and left firms with little time to anticipate or adjust to the new regulations before their implementation. In addition to the element of surprise, SOX is exogenous to individual firm behavior, as it was enacted in response to a few major corporate scandals across different industries. Thus, for nearly all firms the enforcement changes it mandated are not a result of firms' prior actions or choices but are externally imposed. This suddenness and exogeneity help establish causality by distinguishing the effects of SOX from other factors that might simultaneously affect firm performance.

We use SOX as a natural experiment to investigate firms' performance responses to an increase in agency activity using a difference-in-differences regression. We set the period from 2001 to 2003 as the pre-treatment period, establishing a baseline of firm performance before SOX's full implementation. The years 2004 to 2006 serve as the post-treatment period. Although the Sarbanes-Oxley Act was enacted in July 2002, many of its key provisions (e.g, auditor internal control reporting) and related governance reforms related to independent boards passed by the major stock exchanges were implemented during 2003-04 (e.g., Donelson et al., 2016). These reforms have been shown to be related to financial reporting fraud, which was the key triggering event for SOX and the related reforms (Donelson et al., 2016; 2017).

Our treatment group consists of firms in industries that are highly regulated by the SEC with *RS* scores above the 95th percentile (or separately the 90th percentile) of all SEC-regulated firms in our sample (excluding foreign firms as well as any cross-listed on U.S. exchanges). Given SOX imposed significant regulatory changes on all U.S. public firms, we select Canadian firms – that are not cross-listed in the U.S. and thus not subject to SOX mandates – as our control sample. This selection criterion ensures that the control firms operate under similar economic conditions but without the changed regulatory influence of SOX, providing a cleaner comparison. To build our control group, we find a match for each of our treatment firms from this control sample based on industry (2-digit NAICS), size (within 30%), and performance

(within 10%).[31] We emphasize matching firm performance closely so that we end up with a control group that satisfies the assumption that treatment and control firms would exhibit similar performance trends, absent the treatment. We use the following DiD specification:

$$Performance_{i,t} = \alpha + \beta.Treated_i \times Post_t + \boldsymbol{\gamma.X_{i,t}} + \mu_i + \mu_t + \epsilon_{i,t} \quad (8)$$

where *i* and *t* denote firm and year. The dependent variable, $Performance_{i,t}$ captures the firm operating performance for each year. $Treated_i$ is a dummy variable that takes the value of one for our treatment firms (High RS) and zero for the control firms. $Post_t$ is a dummy variable that takes the value of one for post-treatment years and zero otherwise. The Coefficient β measures how implementation of SOX affects treatment firm performance compared to the control firms. Firm controls are the same as previous models. μ_i and μ_t represent firm and year fixed effects respectively. The error term $\epsilon_{i,t}$ is clustered by firm.

We also conduct an event study on treated firms around the enactment of Sarbanes-Oxley (SOX). This provides insight into how investors anticipate the impact of increased enforcement from SOX on firm value.[32] We measure market response to SOX as the average across treated firms of the cumulative abnormal returns (CAR) over windows [-1, +1] and [-3, +3], with day 0 being the passage date on July 25, 2002. CARs are computed as the sum of daily Abnormal Returns (AR) for each firm during these windows:

$$CAR_i = \sum_{t=t_1}^{t_2} AR_{i,t} \quad (9)$$

where i represents the firm, and t represents the day in the event window. The daily abnormal return $AR_{i,t}$ for firm *i* is the difference between the firm's actual return and its expected return on day t:

$$AR_{i,t} = R_{i,t} - \widehat{R_{i,t}} \quad (10)$$

where $\widehat{R_{i,t}}$ is the estimated expected return for firm i on event day t, calculated using a Fama-French (FF) 3-factor model. The FF expected return (for firm *i* on day *t*) is estimated as follows:

$$\widehat{R_{i,t}} = R_{f,t} + \widehat{\alpha_i} + \widehat{\beta_{iM}}(R_{m,t} - R_{f,t}) + \widehat{\beta_{iSMB}}SMB_t + \widehat{\beta_{iHML}}HML_t \quad (11)$$

where $R_{f,t}$ is the risk free rate, $R_{m,t}$ is the return on the market portfolio at time t, SMB_t is the size factor measuring the excess returns of small-cap stocks over large-cap stocks, and HML_t is the value factor measuring the excess returns of stocks with high book-to-market values over those with low values. $\widehat{\beta_{iM}}$, $\widehat{\beta_{iSMB}}$, $\widehat{\beta_{iHML}}$ are the estimated regression coefficients from the firm's return regressed on the market factor,

[31] At the start of the pre-treatment period for each treatment firm, we search our control sample for a match that shares the same 2-digit NAICS, has a size within 30% of the treatment firm, and shows performance within 10% of the treatment firm. If no match is found, we relax the industry requirement and search again. If we still find no match, we select the control firm that most closely matches the performance of the treatment firm.

[32] Zhang (2007) documents significant market reactions throughout the legislative process leading up to the passage of SOX, emphasizing the uncertainty surrounding the Act's enactment and the inclusion of specific provisions.

size factor, and value factor, respectively, during the estimation window of [-150, -50].[33]

B.2 Dodd Frank Act

The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, enacted in response to the 2008 financial crisis, is a comprehensive piece of legislation designed to increase transparency and oversight in the financial industry. Aimed at preventing future economic downturns caused by unchecked financial practices, it introduced a range of new requirements across various sectors. For banking, it imposed stricter capital requirements and risk management protocols. In derivatives trading, it mandated centralized clearing and exchange trading to reduce systemic risk. For hedge funds and other private funds, it required registration with the SEC and increased disclosure. It expanded the SEC's enforcement toolkit by allowing the SEC to impose civil penalties in administrative proceedings.

The Act also established the Consumer Financial Protection Bureau to oversee consumer finance products and practices, and a whistleblower program to encourage reporting of violations, with financial incentives for successful enforcement outcomes. These changes collectively aimed to strengthen financial stability and protect consumers, reshaping the regulatory landscape for multiple industries within the financial sector. Given that the Dodd-Frank Act was external to firm actions and aimed at industries highly regulated by SEC, it serves as an ideal exogenous shock for studying the impact of SEC enforcement and regulatory activity changes on the performance of affected firms.[34]

We employ the same DID methodology and specifications as outlined in Equation (8) to examine the impact of the Dodd-Frank regulatory shock on firm performance. Our treatment group includes firms from industries that are highly regulated by the SEC with RS scores above the 95th percentile (or in separate tests, the 90th percentile) among all SEC-regulated firms in our dataset. Given that Dodd-Frank primarily targeted specific financial industries, our control sample comprises firms that are subject to lighter SEC regulation, which we identify with RS scores below the median for all firms in our sample. To ensure a robust comparative analysis, we construct our control group by finding matches for each of our treatment firms based on industry (2-digit NAICS), size (within 30%), and performance (within 10%). The pre-treatment period spans from 2008 to 2010, while the post-treatment period extends from 2011 to 2013.

Similar to our analysis for SOX, we also conduct an event study to examine the market reactions of treated firms to Dodd-Frank. These reactions provide important evidence of how investors anticipate the impact of increased enforcement from Dodd-Frank on firm value. We measure the market response to the passage of Dodd-Frank by calculating the CARs for treated firms over the event windows [-1, +1] and [-3, +3], with day 0 marking the Act's passage on July 15, 2010. To underline our interpretation, we offer a

[33] We implement a 50-day gap between the end of the estimation window and the event window to minimize the risk of contaminating the model parameters with event-induced effects on returns.

[34] The Dodd-Frank Act was exogenous to firm actions because it was legislation designed to address systemic flaws in the financial system revealed by the financial crisis of 2008.

second (placebo-like) event study test on a control sample of firms with minimal exposure to the SEC (*RS* below the 15th percentile). Our analysis follows the same methodology and specifications outlined in Equations (9), (10), and (11).

B.3 Supreme Court Deliberation on Federal Agencies' Rulemaking Authority

In 1984, the U.S. Supreme Court issued a ruling in the case of Chevron U.S.A., Inc. vs. Natural Resources Defense Council, Inc., which established the Chevron doctrine[35]. This principle grants regulatory agencies significant leeway to interpret ambiguous statutes, thereby shaping the implementation of federal laws. This doctrine has had far-reaching effects on policy enforcement and regulatory activity by federal agencies across various sectors, from environmental law to financial regulation.

Recently, the Chevron doctrine was challenged in Loper Bright Enterprises v. Raimondo, and on May 1, 2023 the Supreme Court agreed to hear it. The Supreme Court's willingness indicated a potential inclination to revise or reverse the 1984 ruling.[36] Such a decision could fundamentally alter the scope of agencies' regulatory authority. For instance, agencies may face increased challenges in courts when issuing regulations or enforcing both existing and upcoming legislation. This regulatory shock differs significantly from the other two shocks we studied, which involved introducing new legislation leading to increased regulation and enforcement. In contrast, this shock could impact the foundational ability of agencies to freely enforce existing laws.

We consider this an ideal shock due to its surprising nature (a potential reversal of a previous decision) and its significant impact on the ability of agencies to regulate and enforce laws. Given its recency, there is no feasible way to conduct a DiD on performance; we must resort to event study. We examine how investors respond to the news that the Supreme Court agreed to hear the case – the signal that a reversal might be forthcoming. We eschew event study of the actual decision (in favor of Loper Bright, overturning the precedent of the Chevron doctrine) for two reasons: there is clear anticipation – as we show shortly; and the Court released two other major decisions related to regulation on the same day (June 28, 2024), muddying any interpretation of stock returns.

We establish a treatment group for each of our agencies—EPA, FDA, OSHA, and SEC—comprising firms with *RS* scores above the 95th percentile for that agency. Additionally, we form a control group for each treatment group, consisting of firms with *RS* scores below the 15th percentile for that agency while also less than the 90th percentile for all other agencies. We measure the market reactions of the treated and control firms to the announcement of the Supreme Court's agreement to hear the case, by calculating the cumulative abnormal returns (CAR) of the firms over the event windows [-1, +1] and [-3, +3], with day

[35] The Chevron doctrine (or Chevron deference) is a legal principle that compels federal courts to defer to a federal agency's interpretation of an ambiguous or unclear statute that Congress has delegated to the agency to administer.
[36] See Katz et al. (2017) for evidence that agreement to hear a case helps predict their decision. Indeed, on June 28, 2024, the Court sided with Loper Bright.

0 marked as the announcement date on May 1, 2023. Our analysis follows the same methodology and specifications outlined in Equations (9), (10), and (11).

V. Results

This section presents regression results linking firm performance to government agency activity. We measure firm performance as operating income before depreciation and taxes, divided by lagged (one year) total assets. We separately explore agency activity effects either weighted by firm exposure to the agency or unweighted (i.e. strictly the time-series of activity index).[37] Results are presented separately by agency. The regression-based results vary by how we handle exposure weighting. Table III selects on firms belonging to industries that are "highly exposed" (*RS*>95th percentile) to the agency studied, to emphasize the importance of enforcement on performance of firms most likely to be sensitive. Table IV studies all firms but weights the activity index by the industry's exposure to the agency.[38]

A. Regressions of Performance on Enforcement

A.1 Highly Exposed Firms

Table III selects on firms that belong to industries with high exposure to the focal agency. For example, the regression analysis in column (1) of Table III contains only firms with RS > 95th percentile of all firms with measurable exposure (i.e. RS > 0) to the EPA. In other words, these firms belong to industries such as waste management and petroleum refineries (6-digit NAICS = 562211 and 324110) which has very high exposure to the EPA. Under this example, the variation in the regressor (*EPA AAI*) is time-series [annual] variation in the activity index (the first factor described in Table II) for the EPA.

Table III presents results from four regressions, one for each agency (EPA, FDA, OSHA, and SEC). The regressions are at the firm/year level, to allow more variation in control variable values. Nevertheless, they also include firm fixed effects to absorb unmeasurable time-invariant firm characteristics.[39]

The regressions indicate consistent detrimental effects of agency activity on firm performance. For firms belonging to highly-exposed-to-EPA industries, the coefficient on the activity index is -0.045; a one standard deviation increase in the activity index reduces highly-exposed (to EPA) firms' average operating performance by 4.5%. Similar performance effects are seen in the FDA regression (-4.4%), while the effect is somewhat muted in the SEC regression (-3.3%). For firms highly exposed to OSHA regulations, the effect is further muted (-2.4%) but still statistically significant. The pattern of economic effects is consistent with higher potential costliness of regulations and enforcement by EPA and FDA, with lower costs from OSHA activities. Overall, stronger enforcement and rulemaking activity by an agency associates with weaker operating performance of highly exposed (to that agency's regulations) firms in the following year.

[37] We emphasize the exposure-weighted activity results which capture both channels of influence.
[38] The firm's exposure to the agency is the same, for all firms belonging to the industry. Section III.B discusses.
[39] As discussed in section IV.A, these are time-series regressions. There is thus no reason to include year fixed effects.

While not a causal statement, the results suggest government enforcement of congressional intent is an important element of a firm's operating environment when that firm is strongly exposed to the agency.

Several other coefficients in Table III regressions are of interest. The usual controls (e.g., Fairfield and Yohn, 2001) are significant. Larger firms show better performance, and firm-level performance is highly correlated with the industry's (6-digit NAICS) performance.[40] By contrast, the more typical macro indicators appear unrelated to firm performance (after controlling for industry performance). *GDP growth*, *inflation*, *unemployment* (weakly significant in only two regressions), and particularly *President party*, carry mostly insignificant (with only occasionally marginally significant) coefficients. The mostly insignificant coefficients on the dummy variable for *President party* (0 for Republican, 1 for Democrat) highlight the difficulty that prior research has in establishing a link between political-lean (of the country and/or who is in power) and corporate performance. Nevertheless, we hasten to add that this is a highly specialized sample of firms with the greatest exposure to an agency. Also, the tests include firm fixed effects which are possible when the activity variable is agency-level (not firm-varying).

A.2 Full Sample Analysis of Industry-exposure-weighted Agency Activity Effects on Operating Performance

Since agency enforcement and rulemaking activity's effect is potentially driven by two forms of variation – agency efforts as well as firm exposure to such – we now incorporate both in the regressions. We use the exposure-weighted activity variable which equals the activity index (first factor from six key agency enforcement and regulation variables) multiplied by the industry's exposure to that agency (*RS* is the time-series average of the 6-digit NAICS industry's annual relevance score). Including all firms carries trade-offs. The greater power from more observations and additional variation in the main regressor must be balanced against the nature of the exposure-weighting. Recall that the exposure is at the industry level, and that our measure of *RS* has no time-series variation (as we discussed in section IV.A). It's worth noting that if we do not take the time-series average *RS* of an industry to an agency, and instead use the yearly relevance scores, our results are not affected since the relevance scores do not vary much across time. This is consistent with the fact that an industry and the firms within it are always exposed to an agency. In other words, exposure is largely a time-invariant industry characteristic. Overall, we have zero within-firm time-series variation in the exposure variable, which means we cannot include firm fixed effects in our regression.[41] However, we do include 2-digit NAICS industry × year fixed effects.

Table V presents results from estimating equation (4). Again, our main inference prevails in that

[40] Industry performance for each year is the median firm's *operating performance* from the 6-digit NAICS industry in that year.

[41] The purpose of this regression is to capture how the variation between industries, due to their differing exposures to an agency, influences the impact of agency activity on firm performance. Including firm or 6-digit NAICS dummies, however, would eliminate this between-industry variation.

stronger agency activity associates with weaker firm performance. The coefficient on the exposure-weighted agency activity variable is reliably negative across all four agency regressions. Generally, these coefficients are in the -1% neighborhood, implying that a one standard deviation increase in exposure-weighted activity associates with a 1% reduction in operating performance.[42] More specifically for the EPA regression, the coefficient of -0.007 can be interpreted economically as follows. Given EPA's *Exposure-weighted AAI* standard deviation of 2.141 (see Table I), the firm performance decreases by about 0.7 percentage points for a unit increase (corresponds to about half its standard deviation) in EPA *Exposure-weighted AAI.* Similar calculations for the other agencies imply 1.2%, 1.5%, and 1.8% reductions in performance for a unit increase in *Exposure-weighted AAI* for FDA, OSHA, AND SEC, respectively.

The regressions in Table V include year fixed effects. This is made possible by the structure of the key regressor (exposure-weighted activity index). This construction allows for variation that is independent of year-to-year changes in enforcement. While the inclusion of year fixed effects increases confidence in our estimates of an enforcement-performance relationship, it comes at the cost of removing macro controls that only vary by year. Robustness checks suggest this cost is low. Even if we remove the year fixed effects to insert macro controls, and despite the revealed importance of these macro controls, the importance of exposure-weighted enforcement persists. Overall, the absorption of unobservable time-varying but cross-sectionally invariant effects, lends credence to our main inference: stronger agency enforcement associates with weaker firm performance.

A.3 Full Sample Analysis of Firm-exposure-weighted Agency Activity Effects on Operating Performance

We expand our analysis from industry-level treatment to firm-level by employing firm market share as a proxy for a firm's exposure to its regulatory agency. This approach is based on the premise that firms with larger market shares are more exposed to regulatory scrutiny compared to their smaller counterparts, due to their larger operational scales and the corresponding increased exposure risk to regulations. We build our measure of *Firm-exposure-Weighted Agency Activity* by multiplying the *Industry-exposure weighted AAI* by the firm's market share within the 6-digit NAICS industry, which varies each year.

The results are detailed in Table V, which reports the impacts of this firm-exposure-weighted agency activity on firm operating performance. We observe consistently negative effects across the regulatory agencies analyzed. For instance, the firm-exposure-weighted FDA activity shows a significant reduction in operating performance, with a coefficient of -0.014, indicating that heightened agency activity correlates with a decrease in firm performance. Similar patterns are evident for other agencies such as OSHA and SEC, where the enforcement activity inversely affects firm performance. However, the EPA's activities do not exhibit a significant impact, which might suggest that market share is not a robust proxy

[42] The exception is firms with exposure to the SEC. The coefficient on the exposure-weighted SEC enforcement index is -2.3%.

for regulatory exposure in all contexts. This insignificance could be attributed to the EPA's possibly random enforcement across firms regardless of their market share, contrasting with the FDA and OSHA's more strategic, targeted enforcement practices over the years. To ensure robustness in our findings, we include both firm and year fixed effects in our regression models. This allows us to control for inherent firm characteristics that might affect performance, as well as to capture the specific effects of agency activity, independent of other temporal or firm-specific variables.

B. Regulatory Event Studies

B.1 Sarbanes-Oxley Act of 2002

Our analysis under the Sarbanes-Oxley Act (SOX) of 2002 examines the impact of this significant regulatory change on the operating performance of firms heavily exposed to the SEC's enforcement and regulations. Panel A from Table VII presents the difference-in-difference (DiD) regression results, focusing on the interaction term between the post-treatment period (2004 to 2006) and the treatment indicator (firms with high RS scores). The results indicate a statistically significant decline in operating performance post-SOX enactment, with coefficients of -0.040 and -0.036 for firms above the 95th and 90th percentiles in RS, respectively. This suggests that the regulatory shock negatively impacted the operating performance reflecting possible costs associated with compliance to the new regulations. The control variables such as firm size (positive and significant at the 1% level), and leverage (negative and significant at the 5% level) also influence performance, corroborating their relevance in financial modeling.

Panel B reports the average cumulative abnormal returns (CARs) around the enactment of SOX on July 25, 2002. The CARs (-0.013 and -0.015) are significantly negative over the event windows [-1, +1] and [-3, +3] respectively, for firms with RS above the 95th percentile. This suggests investors anticipated the costs of compliance to outweigh the benefits of improved transparency and governance standards.

B.2 Dodd-Frank Act of 2010

Similar to our analysis for SOX, we assess the impact of the Dodd-Frank Act on firm performance through a DiD approach (Table VIII, Panel A). The results show a smaller - yet still significant - negative impact on the operating performance for treated firms (relative to controls) with coefficients of -0.021 and -0.022 on the Treated x Post dummy. Firms heavily regulated by the SEC also faced performance challenges post-Dodd-Frank, likely due to increased compliance demands and operational adjustments. These findings indicates that new regulatory measures, while aimed at enhancing transparency and stability, impose significant interpretative and financial burdens on firms, leading to a negative impact on performance.

The CARs response to Dodd-Frank was consistently negative for the heavily regulated firms, with significant negative returns of -0.014 and -0.019 over the event windows [-1, +1] and [-3, +3] respectively. Interestingly, the control sample of firms with minimal SEC exposure exhibited positive CARs. This differential response highlights the negative impact perceived by investors for firms under heavier

regulatory scrutiny in the financial sector.

B3. U.S. Supreme Court Deliberation on Federal Agencies' Rulemaking Authority

Table IX details the stock market reactions of treated firms surrounding the Supreme Court's consideration of a case potentially revising the Chevron doctrine, which could restrict federal agencies' enforcement abilities. The event windows [-1,1] and [-3,3] reveal mostly consistent reactions across different agencies. The average CARs for firms regulated by the EPA, FDA, and OSHA were positive, as expected for highly exposed firms to agencies that may see their enforcement power reduced. For these sectors, which include pharmaceuticals, biotechnology, and manufacturing, a less stringent regulatory environment could decrease the risk of penalties and reduce the regulatory burden. Investors view the potential for reduced agency oversight as a positive development that could enhance profitability and operational efficiency in industries where physical operations and high risks of violations are prevalent.

Conversely, the reaction among firms highly exposed to SEC regulations (i.e. with high RS scores), shows significant negative CARs. This indicates that investors perceive the SEC and its regulatory framework differently from other agencies. The negative market response among these firms may stem from historical contexts, such as past financial scandals and the resultant crises. These events may have shaped a preference for strong regulatory oversight within the financial sector. Investors may thus be concerned that reduced SEC authority could lead to a regulatory environment where past issues could resurface, potentially leading to instability and uncertainty in financial markets. Put differently, investors in these firms now see the robust enforcement of existing regulations as beneficial to maintaining market order and investor confidence. Finally, the apprehension about reduced SEC authority could also reflect fears that lowering barriers to entry could increase competition by allowing new firms to enter the market without facing the stringent compliance standards currently in place.

C. Mechanisms / Channels

C.1 TATO and Profit Margin

Operating performance is a function of two margins – asset margin and (operating) profit margin. Agency enforcement may reasonably have different effects on the two. We explore this possibility in our Internet Appendix Table IA.III. The table separately studies each agency (EPA, FDA, OSHA, and SEC respectively). There are eight regressions, four each for the two margins, varying by agency. The sample for each regression is the set of firms highly exposed to the agency ($RS > 95\%$). We measure asset margin as revenues divided by one year lagged total assets, which generally proxies firm efficiency of sales generation from existing assets (Fairfield and Yohn 2001). We measure operating profit margin as operating income before depreciation and taxes, divided by (contemporaneous) revenues. This proxies firm cost management efficiency (Fairfield and Yohn 2001).

The regression results suggest agency activities' association with worse operating performance is

driven by cost. The negative coefficient on the agency activity index only appears significant in the profit margin regressions. This is intuitive since agency enforcement and rulemaking is typically considered to increase costs, through required expenditures to fix a regulator's concern(s).

By contrast, the effect of agency activity on asset margin is never negative and sometimes positive. Also, firms highly exposed to the SEC show better asset efficiency in years of more pronounced activity. Thus, stronger enforcement and regulation by the agency encourages more efficient usage of assets for sales, or perhaps erects barriers to entry that enable greater market share-grab by incumbents. We explore one perspective on the latter, in section V.D. below. The control variables carry logical coefficients. Industry median asset (profit) margin positively associates with firm-level values of the same. Capex and R&D expenditures lower both margins while sales growth raises both.

C.2 Pieces of Activity Index

The influence of agency activity on performance also raises the question of which aspects of agency activity matter most to the firms highly exposed to them. Since our activity index is the first principal factor from six variables, each of which captures different agency levers that they can pull to influence companies, there may be important variation in the influence of these variables across agencies. For example, the EPA is known for its costly administrative actions while not typically bringing many civil cases. They also write more restrictive language in the CFR. The results in Table II suggest EPA's activity effect on firms is likely coming from its *Action1* (instead of *Action2*), as well as *Budget, FTE* and *Regulation* variables. On the other hand, the FDA uses its product recall ability heavily but does not show as-strong CFR restrictive verbiage effect on *AAI*, while higher FDA *Budgets* and *FTE* associate with higher *AAI*. OSHA's activity intensity effect on firms mostly comes from its issued penalties and CFR regulations strictness. OSHA's *Budget* also affects its *AAI* while *FTE* carries negative weight. SEC shows a more consistent pattern with all the activity proxies (except *Action2*) contributing to the agency activity intensity effect.[43]

We explore the influence of each of the six variables driving the agency activity index, on firm performance in the internet appendix tables IA.IV through IA.VII (EPA, FDA, OSHA, and SEC respectively). All regressions include the usual controls as well as firm fixed effects. Again, our sample is the set of highly exposed firms to the agency ($RS > 95\%$). Broadly, the six variables are *Action1*, *Action2*, *Budget*, *FTE*, *Regulation1* and *Regulation2*.

Across all four agencies, larger budgets associate with enforcement and rulemaking which is more costly to firm performance. This is not an indictment of government regulation because enforcement reflects Congressional intent, and Congress also sets the budgets for agencies. A second common result (except FDA-highly-exposed firms) is that CFR verbiage matters to firm performance. In general, more verbiage

[43] This variation in channels for the effect of activity intensity on firm performances highlights the importance of using factor analysis to capture the effect of all these variables.

and more restrictive verbiage associate with weaker operating performance.

Actions (as noted in section II.A1) are harder to define consistently across agencies. Nevertheless, we can use the results from Table II to inform our expectations regarding which *Action* is likely to have a more detrimental effect on performance. For the EPA, FDA, OSHA and SEC, *Action1* carries a more positive loading on the first factor compared to the *Action2* variable. In Tables IA.IV through IA.VII, the coefficients on the *Action1* variable (i.e. those actions with the higher loading in Table II), are all significantly negative. The *Actions* that carry more weight in the agency's activity index are also the ones more detrimental to (highly exposed) firm performance.

D. Alternative Explanations - Kalmenovitz paperwork regulations

Recent work by Kalmenovitz (2023) examines firm estimates of regulatory burden by studying their filings of OIRA form 83-I. He then links these estimates to firm costs and investment behaviors. The form 83-I targets paperwork burden. We differ by allowing for any common correlate across six agency variables, to influence firm performance. Moreover, sampling on form 83-I restricts the eventual firm performance data-panel. Nevertheless, we attempt to further distinguish our inferences from those in Kalmenovitz (2023) as follows.

We collect the "Regulatory Intensity" (*RegIn*) variable from Kalmenovitz's website. We then sub-sample on firms with low *RegIn* burden and re-run our main (Table III) analyses. We present the results in Table A.III. Our conclusions remain for firms highly exposed to EPA, FDA, and SEC, but not for OSHA. In general, our results highlight that there is important variation in our latent agency activity proxy which is orthogonal to the regulatory burden tied to paperwork.

Moreover, we attempt to distinguish *RegIn's* effect on performance from that of our activity variable by simply including it as a regressor in Table A.IV (again for firms highly exposed to an agency). When both *RegIn* and our agency activity index (AAI) are included in the usual regression, then *AAI* carries a significant negative coefficient in the FDA and SEC regressions, while *RegIn* only carries a significant coefficient in the FDA regression.

Next, in Table A.V we do not restrict the sample to highly exposed firms and instead run our regression on the full sample (that also has non-missing RegIn). The coefficient on *Industry-exposure-weighted AAI* is significantly negative in all but the EPA regression. By contrast, the coefficient on *RegIn* is never significant.

Finally, in Table A.VI, we extend our analysis to the firm level, incorporating both our Agency Activity Index (AAI) and the Regulatory Intensity (RegIn) from Kalmenovitz. *AAI* continues to show a significant negative coefficient on firm performance, underscoring that the impacts of agency activities are distinct and orthogonal to the regulatory paperwork burdens measured by RegIn.

The paperwork burden of *RegIn* may also have a countervailing influence on firm performance; it

could serve as a barrier to entry. We offer one view of this through untabulated results exploring industry concentration as a function of *RegIn*. Though the sample is small (1,248 industry-year observations), *RegIn* is positively associated with Herfindahl-Hirschman Index (computed as the sum of squared market shares, with market shares computed using firms' sales). This aligns with the inferences in Singla (2023).

E. Violation Tracker Regression

The results thus far focus on broad agency activity proxies. Despite our targeting attempts using highly exposed firms ($RS > 95\%$), we lack a precise indication of a specific firm being "hit" by a regulatory agency. To assuage this identification doubt we turn to data provided by Violation Tracker (described in section II.B).

We regress operating performance on the two measures of enforcement from Violation Tracker; the dummy indicator for an enforced violation in that year, and the penalty amount (logged). We include year fixed effects and varying industry or firm fixed effects. The panel is at the firm-year level. Table VI presents our results.

Enforcement of a specific firm associates with worse operating performance in that year. Across all four specifications (two each for the violation variables, varying industry vs. firm fixed effects), the coefficient on the violation variable is significantly negative. We conclude that enforcement is an important economic component of regulatory influence on firms.

VI. Conclusion

The effect of government on industry is many-faceted and offers conflicting inferences. We offer a new perspective by focusing on government agencies where much of the governing intended through law is implemented. Moreover, this implementation can vary under different administrations even as political gridlock hampers legislative shifting of priorities. Thus, we avoid the complications of identifying political lean by relying on party dominance or weakness in the legislature, executive branch, and courts. We solely focus on enforcement of standing laws as a decision by agencies with long-standing mandate and a stable set of exposed constituent firms. This approach is decidedly "push" with attendant smaller concerns about firm endogenous responses that are likely related to their competitive position.

We measure time-varying agency activity via a latent variable derived from six proxies typically considered as agency levers. These include two regulation variables based on CFR verbiage, a budget variable and FTE variable, and two action-oriented variables. The six proxies are well-correlated with the activity index. The effect of stronger activity is to lower firm operating performance. This presents in the sub-sample of highly exposed firms and in the more general sample with an exposure weight. This is not an indictment of government enforcement; it recognizes that laws are to be interpreted and implemented by an agency and that the agency is doing its job.

Our work deliberately deviates from prior analysis that ignores agencies' roles. Moreover, we

distinguish ourselves from recent agency-oriented research by noting that extant papers focus on firm responses to regulation (primarily CFR) through their disclosures – 10k's, MD&As, conference calls, and the like. Our main results appear to carry significance even when orthogonal to many of these extant papers' measures. Moreover, our activity index admits more than CFR regulation; it includes important drivers such as agency budgets and actions (which we show individually matter as well for firm performance). Future research – both theoretical as well as archival – into the endogenous choice of firm disclosures with respect to government enforcement while recognizing competitive tradeoffs, may prove fruitful.

One may be concerned that the recent Supreme Court decision overturning the Chevron doctrine undermines our conclusions and even the importance of agencies overall. We believe this is unlikely for two reasons. First, the decision does not address agency Actions that represent enforcement of well-accepted rules, but rather focuses on agencies' interpretations of laws (via the CFR). This likely increases the implications of our work relative to the extant literature due to the importance of enforcement in our measure. Second, agencies have shown a willingness and ability to shift emphases as budget difficulties hinder one 'lever' of their available portfolio of activities. Thus, our AAI latent factor is likely to become even more relevant in the future.

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Appendix A

Exploratory Factor Analysis (EFA) is a statistical technique used to identify underlying factors or latent variables that explain the relationships among a set of observed variables. The mathematical formula for EFA can be written as follows:

$x_i = \sum_{n=1}^{r} a_{in} f_n + e_i$ (i = 1,2,…,p)

Where *i* and n *index variates and factors* respectively. a_{in} represent the loading of the i-th variables on the n-th factor. f_n is the n-th common factor. e_i is residual representing the part of the observed variable x_i that cannot be explained by the factors. This equation is often solved through the maximum likelihood approach. It's important to note that Exploratory Factor Analysis (EFA) and Principal Component Analysis (PCA) are distinct techniques and should not be confused with one another. Unlike EFA, PCA does not distinguish between common and unique variance, but rather aims to account for the variance in the observed measures, without explicitly considering the correlations among them. In other words, all variance, including error and unique variance for each observed variable, is distributed across components in PCA. In contrast, only the variance that each observed variable shares with other observed variables is analyzed in EFA. While PCA focuses on extracting maximum variance from a data set with a few orthogonal components, the goal of EFA is to reproduce the correlation matrix with a few orthogonal factors. Additionally, PCA requires that variables be on the same scale, while EFA does not have this limitation. When the goal is to obtain a theoretical solution that is not influenced by unique and error variability and the study is based on underlying constructs that are expected to produce scores on the observed variables, EFA is the more appropriate choice.

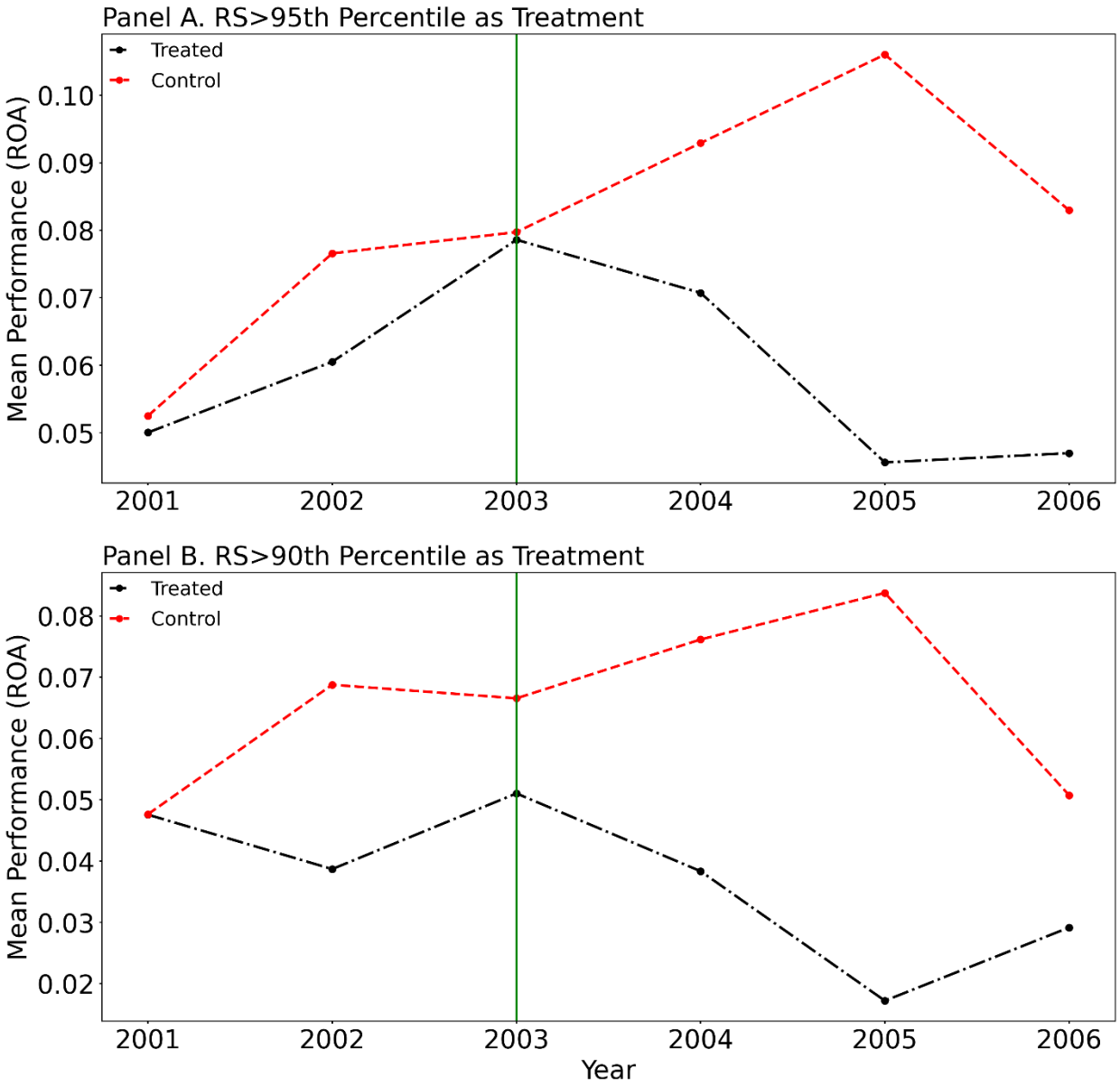

Figure 1. Parallel Trend Assumption (Sarbanes-Oxley Shock)

This figure plots the time series of the mean operating performance, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets, for the three years before and after the implementation of the Sarbanes-Oxley Act. The green line indicates the end of the pre-treatment period. The treated group consists of firms (excluding foreign firms not listed on US exchanges) with SEC RS scores above the 95th (Panel A) or 90th (Panel B) percentiles, while the control group comprises Canadian firms (not listed on US exchanges) matched to the treated group based on industry (2-digit NAICS), *size* (within 30%), and *operating performance* (within 10%).

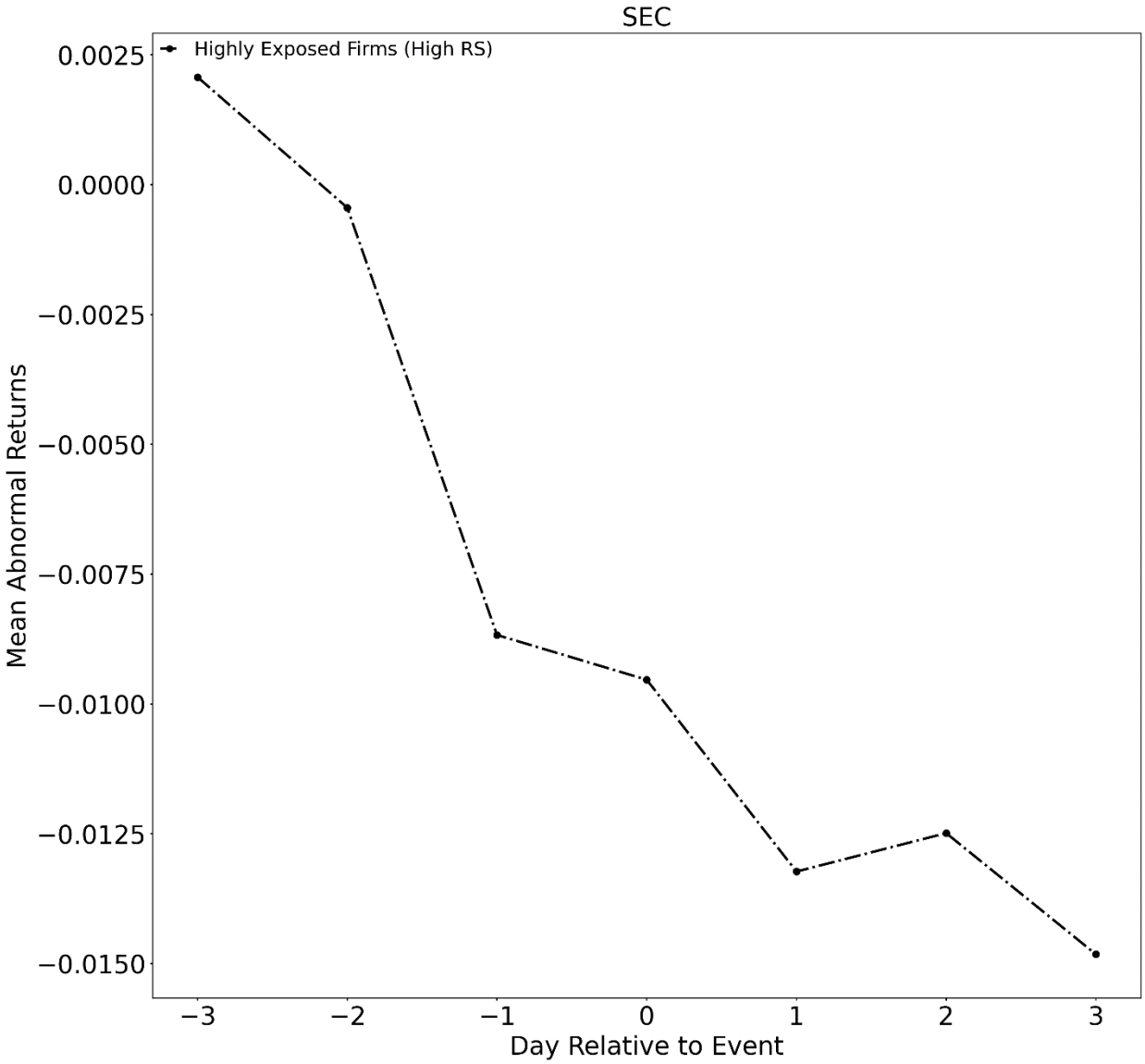

Figure 2. Daily Abnormal Return (Sarbanes-Oxley Shock)

This figure displays the time series of the mean Abnormal Returns of the treated firms over a six-day period surrounding the enactment of the Sarbanes-Oxley Act on July 25, 2002. The Abnormal Return is calculated as the difference between the actual return and the return predicted by the Fama-French 3-factor model. The model is estimated over the pre-event window [-150, -50]. The sample consists of highly exposed firms to SEC with an RS above the 95th percentile.

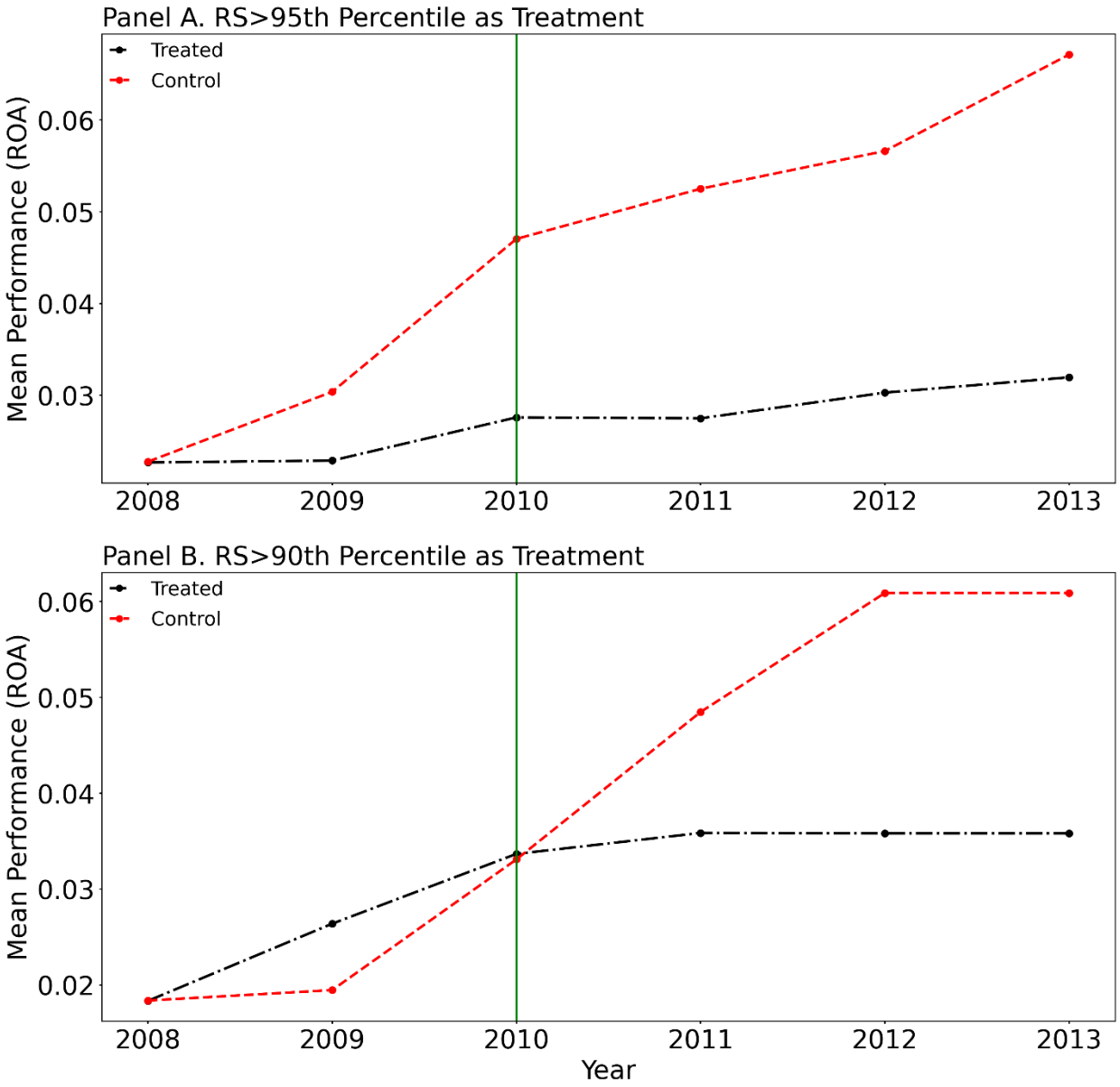

Figure 3. Parallel Trend Assumption (Dodd-Frank Shock)

This figure plots the time series of the mean operating performance, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets, for the three years before and after the implementation of the Dodd-Frank Act. The green line indicates the end of the pre-treatment period. The treated group consists of firms with SEC RS scores above the 95th (Panel A) or 90th (Panel B) percentiles, while the control group comprises firms with SEC RS scores below the 50th percentile, matched to the treated group based on industry (2-digit NAICS), *size* (within 30%), and *operating performance* (within 10%).

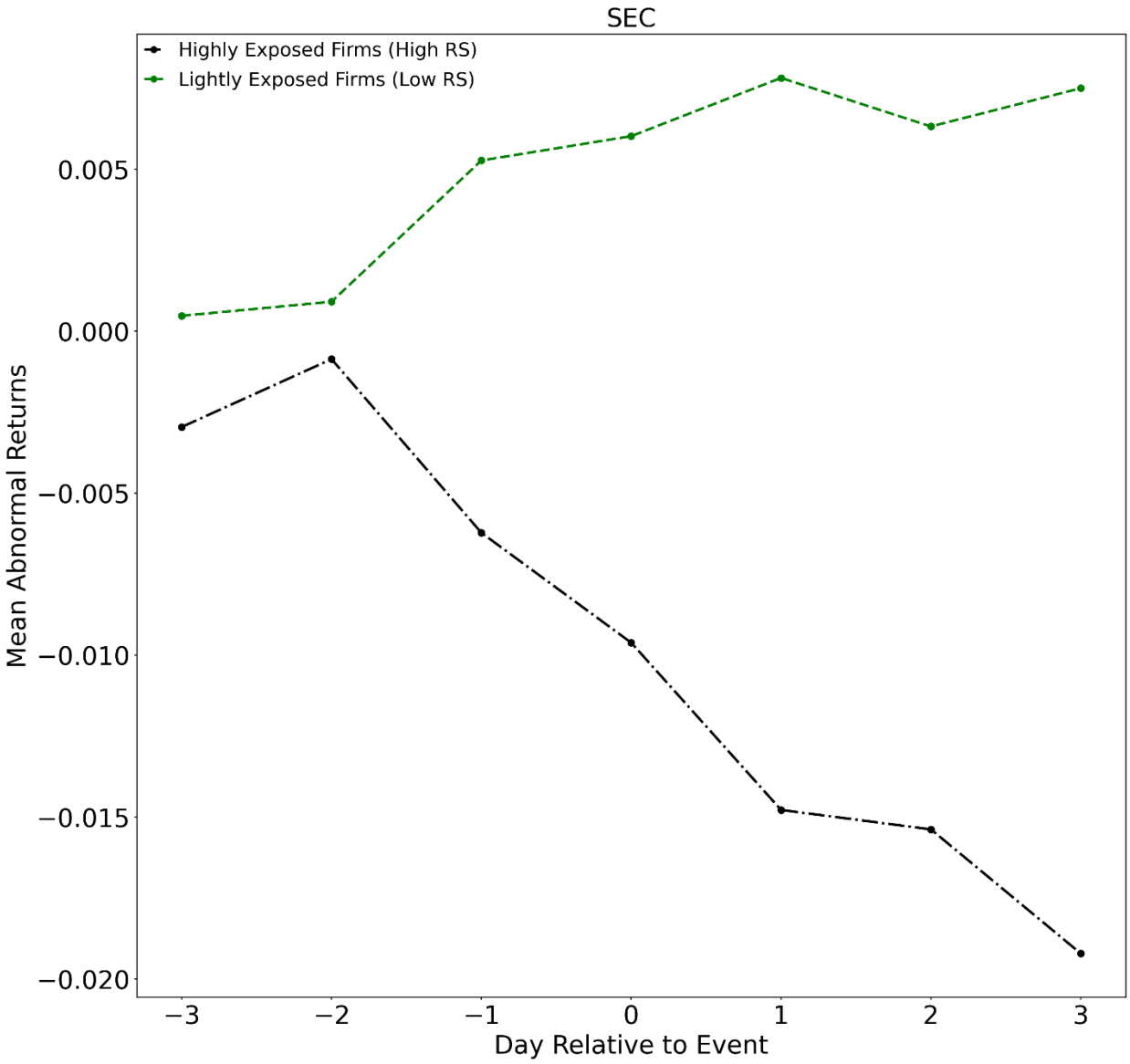

Figure 4. Daily Abnormal Return (Dodd-Frank Shock)

This figure displays the time series of the mean Abnormal Returns of the treated and placebo firms over a six-day period surrounding the enactment of the Dodd-Frank Act on July 15, 2010. The Abnormal Return is calculated as the difference between the actual return and the return predicted by the Fama-French 3-factor model. The model is estimated over the pre-event window [-150, -50]. The treated sample consists of highly exposed firms to SEC with an RS above the 95th percentile. While the control sample consists of lightly exposed firms to SEC with an RS below the 15th percentile.

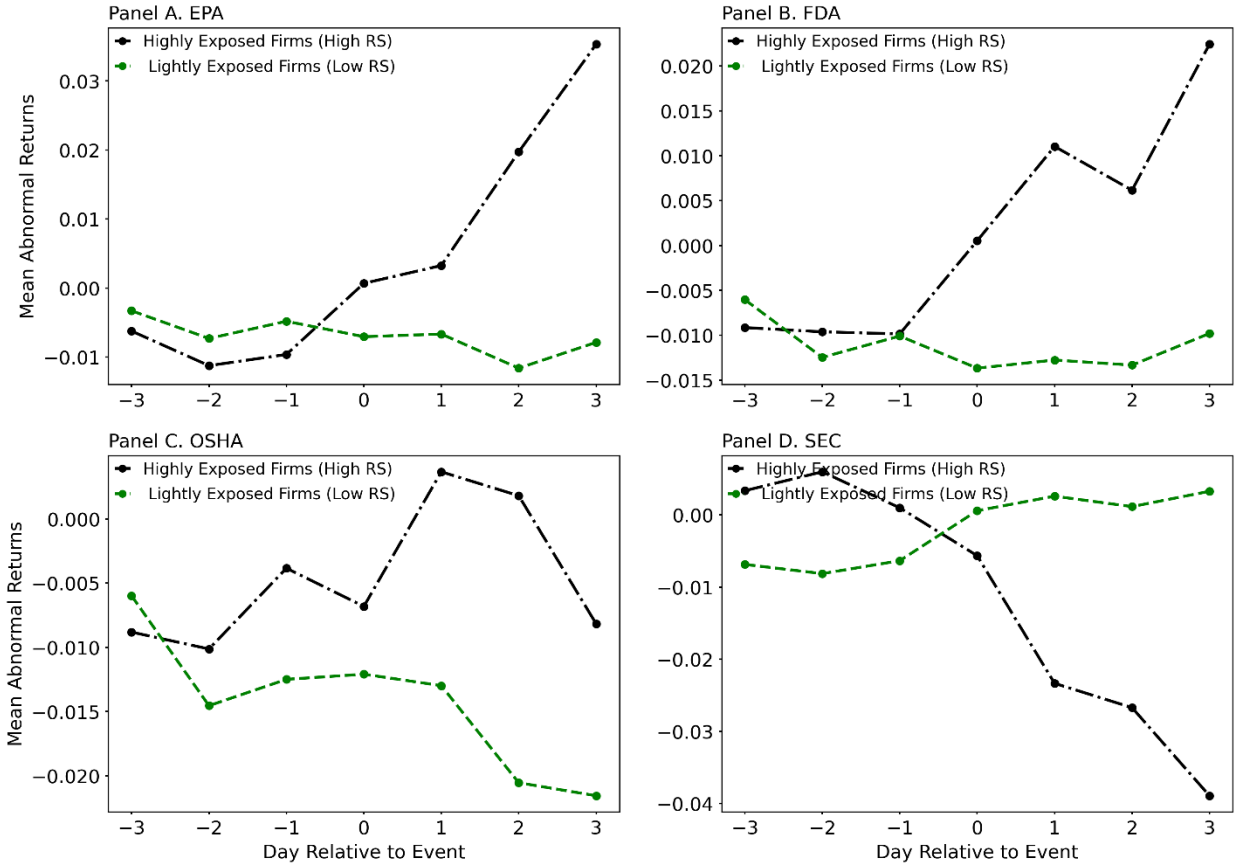

Figure 5. Daily Abnormal Return (Supreme Court Shock)

This figure displays the time series of the mean Abnormal Returns of the treated and placebo firms over a six-day period surrounding the hearing of the Supreme Court case about federal agency rule-making authority (Loper Bright Enterprises, et al., Petitioners vs. Gina Raimondo, Secretary of Commerce, et al.) on May 1, 2023. The Abnormal Return is calculated as the difference between the actual return and the return predicted by the Fama-French 3-factor model. The model is estimated over the pre-event window [-150, -50]. The treated sample consists of highly exposed firms to an agency (Panels A, B, C, and D represent EPA, FDA, OHA, and SEC respectively) with an RS above the 95th percentile While the control sample consists of lightly exposed firms to an agency (Panels A, B, C, and D represent EPA, FDA, OHA, and SEC respectively) with an RS below the 15th percentile.

Table I

Summary Statistics

This table reports the number of observations, mean, median, and standard deviation for the main variables used in this study. Panel A shows the summary statistics of variables for firm samples regulated by each agency separately from 1980 to 2019. Columns under each agency in Panel A represent the statistics for the sample of firms with an *RS* value higher than the 95% percentile *RS* of all the firms affected by that agency. O*perating performance* is measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. *Size* is the natural logarithm of a firm's total assets. *CAPX + R&D* is calculated as the capital expenditure plus R&D spending scaled by the firm's total assets. *Leverage* is the ratio of total debt and total assets. *Sales growth* represents the growth rate in sales from last year. Market-to-book is market value of equity divided by book value of equity. These aforementioned firm financial variables are winsorized at 1% and 99%. *Industry performance* is measured as the *operating performance* of the median firm within each 6-digit NAICS industry each year. Panel B shows summary statistics for the sample of all (Compustat) firms with *Exposure-weighted AAI* values available from 1980 to 2019. *RS* is the 6-digit NAICS industry's annual relevance score (1980 to 2019) for each agency calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) each year. *Industry-exposure-weighted AAI* is calculated as the multiplication of *AAI* and *the* natural logarithm of *RS* transformed to start from zero. *Firm-exposure-weighted AAI* is calculated as the multiplication of *Industry-exposure-weighted AAI* and *MS* (firm's market share calculated as the ratio of firm sales divided by its 6-digit NAICS industry total sales in each year). Other firm-level variable definitions are the same as Panel A. Panel C represents the macro-level time series used in this study. *AAI* is the annual (1980 to 2019) time-series agency activity index for each agency representing the enforcement and rulemaking activity intensity calculated as the latent variable from explanatory factor analysis. Macro-economic time series (through 1980 to 2019) variables are *GDP growth* (the percentage change in GDP from last year), *Inflation* (the annual inflation percentage rate), *Unemployment* (the annual unemployment percentage rate), and *President party* (dummy variable taking the value of 0 when the President is Republican and 1 when Democrat). Panel D shows the statistics for the firm-level enforcement data from ViolationTracker. *Violation dummy* is a dummy variable taking the value of one if a firm has been enforced (by any federal or state enforcement agency) for a violation of regulations annually from 2000 to 2019. *Penalty* is calculated as the natural logarithm of one plus the penalty dollar amount a firm was issued (by any federal or state enforcement agency) for a violation of regulations annually from 2000 to 2019.

Panel A. Agency-Specific																
	EPA				FDA				OSHA				SEC			
Variable	N	Mean	Med	SD	N	Mean	Med	SD	N	Mean	Med	SD	N	Mean	Med	SD
Operating performance	18906	-0.246	-0.022	0.690	8289	-0.168	0.048	0.638	6087	0.098	0.115	0.234	18585	0.032	0.024	0.214
Size	18906	4.592	4.299	2.704	8289	4.553	4.255	2.528	6087	6.305	6.533	2.350	18585	7.199	7.06	2.379
CAPX + R&D	18906	0.226	0.136	0.235	8289	0.193	0.117	0.216	6087	0.088	0.059	0.093	18585	0.011	0.002	0.036
Leverage	18906	0.269	0.142	0.435	8289	0.268	0.153	0.399	6087	0.343	0.325	0.260	18585	0.141	0.088	0.204
Sales growth	18906	0.476	0.091	1.596	8289	0.462	0.098	1.519	6087	0.201	0.085	0.677	18585	0.159	0.070	0.658
Market-to-book	18906	3.176	1.966	4.180	8289	3.129	1.986	4.022	6087	1.236	0.827	1.894	18585	0.572	0.187	1.470
Industry performance	18906	-0.086	-0.066	0.206	8289	-0.015	-0.04	0.113	6087	0.120	0.112	0.042	18585	0.044	0.023	0.052
Panel B. Full Sample																
RS	149279	0.010	0.001	0.023	149279	0.004	0.000	0.010	149279	0.003	0.001	0.009	149279	0.002	0.000	0.010
Industry-exposure-weighted AAI	149279	0.431	0.455	2.177	149279	0.153	-0.070	1.962	149279	0.534	0.640	2.350	149279	0.523	0.000	2.132
Firm-exposure-weighted AAI	149279	0.012	0.001	0.286	149279	-0.002	0.000	0.235	149279	0.011	0.001	0.314	149279	0.007	0.000	0.246

Table I-Continued

	EPA				FDA				OSHA				SEC			
Variable	N	Mean	Med	SD	N	Mean	Med	SD	N	Mean	Med	SD	N	Mean	Med	SD
MS	149279	0.053	0.005	0.120	149279	0.053	0.005	0.120	149279	0.053	0.005	0.120	149279	0.053	0.005	0.120
Operating performance	149279	-0.011	0.082	0.470	149279	-0.011	0.082	0.470	149279	-0.011	0.082	0.470	149279	-0.011	0.082	0.470
Size	149279	5.089	4.997	2.574	149279	5.089	4.997	2.574	149279	5.089	4.997	2.574	149279	5.089	4.997	2.574
CAPX + R&D	149279	0.114	0.066	0.15	149279	0.114	0.066	0.15	149279	0.114	0.066	0.15	149279	0.114	0.066	0.15
Leverage	149279	0.261	0.176	0.343	149279	0.261	0.176	0.343	149279	0.261	0.176	0.343	149279	0.261	0.176	0.343
Market-to-book	149279	1.846	1.031	2.964	149279	1.846	1.031	2.964	149279	1.846	1.031	2.964	149279	1.846	1.031	2.964
Sales growth	149279	0.283	0.0850	1.072	149279	0.283	0.0850	1.072	149279	0.283	0.0850	1.072	149279	0.283	0.0850	1.072
Panel C. Macro Variables																
AAI	40	0.046	0.435	0.959	40	0.039	-0.095	0.977	40	0.041	0.262	0.963	40	0.038	-0.123	0.983
GDP growth	40	2.635	2.750	1.823	40	2.635	2.750	1.823	40	2.635	2.750	1.823	40	2.635	2.750	1.823
Inflation	40	3.225	2.839	2.415	40	3.225	2.839	2.415	40	3.225	2.839	2.415	40	3.225	2.839	2.415
Unemployment	40	6.199	5.792	1.674	40	6.199	5.792	1.674	40	6.199	5.792	1.674	40	6.199	5.792	1.674
President party	40	0.425	0.000	0.501	40	0.425	0.000	0.501	40	0.425	0.000	0.501	40	0.425	0.000	0.501
Panel D. ViolationTracker																
Violation dummy	81249	0.070	0.000	0.256	81249	0.070	0.000	0.256	81249	0.070	0.000	0.256	81249	0.070	0.000	0.256
Penalty	81249	0.854	0.000	3.203	81249	0.854	0.000	3.203	81249	0.854	0.000	3.203	81249	0.854	0.000	3.203
Operating performance	81249	-0.068	0.050	0.537	81249	-0.068	0.050	0.537	81249	-0.068	0.050	0.537	81249	-0.068	0.050	0.537
Size	81249	5.686	5.809	2.6818	81249	5.686	5.809	2.6818	81249	5.686	5.809	2.6818	81249	5.686	5.809	2.6818
CAPX + R&D	81249	0.107	0.048	0.164	81249	0.107	0.048	0.164	81249	0.107	0.048	0.164	81249	0.107	0.048	0.164
Leverage	81249	0.265	0.150	0.392	88074	0.2654	0.150	0.392	88074	0.2654	0.150	0.392	88074	0.2654	0.150	0.392
Market-to-book	81249	1.789	0.971	3.111	81249	1.789	0.971	3.111	81249	1.789	0.971	3.111	81249	1.789	0.971	3.111
Sales growth	81249	0.2604	0.069	1.094	81249	0.2604	0.069	1.094	81249	0.2604	0.069	1.094	81249	0.2604	0.069	1.094

Table II

Exploratory Factor Analysis for Each Agency

This table shows the result of the exploratory factor analysis of six agency rulemaking and policy enforcement (activity) variables *Action1*, *Action2*, *Budget*, *FTE*, *Regulation1,* and *Regulation2* for EPA, FDA, OSHA, and SEC. *Action1* is the number of annual administrative actions by EPA, recalls by FDA, the annual amount of penalty in constant (2012 inflation-adjusted) dollars by OSHA, and administrative proceedings by SEC. EPA, FDA, OSHA and SEC's *Action2* is the number of annual civil cases, inspections, inspections, and civil injunctions respectively. *Budget* is the spending in constant (2012, adjusted for inflation) million dollars by each agency every year. *FTE* (or Full-time equivalent) represents the total number of full-time employees on each agency's staff every year calculated as the total number of hours worked divided by the number of compensable hours for each agency every year. *Regulation1* is the total number of restrictive words (e.g., must or should) present in the Code of Federal Register (CFR) parts related to an agency each year. *Regulation2* is the total number of words in an agency's CFR parts. Panel A shows all the extracted factors from each agency's factor analysis, with each column representing the eigenvalues for the factors related to each agency. Eigenvalue shows the amount of variation in the total sample accounted for by each factor. The first factor will account for the most variance, the second will account for the second-highest amount of variance, and so on. In Panel B, the Loading columns present the factor1 loadings for each variable and agency. This factor loading shows correlation between each of the agency activity variables and Factor1 for each agency separately. Uniqueness is the variance of each variable for each agency that is not explained by the factor.

Panel A. Extracted Factors

	EPA	FDA	OSHA	SEC
Factor	Eigenvalue	Eigenvalue	Eigenvalue	Eigenvalue
Factor1	3.205	3.988	3.218	5.117
Factor2	1.894	1.155	0.793	0.333
Factor3	0.212	0.392	0.434	0.022
Factor4	-0.002	0.002	0.029	-0.003

Panel B. Main Variables Factor Loadings and Uniqueness for The First Factor

	EPA		FDA		OSHA		SEC	
Variable	Loading	Uniqueness	Loading	Uniqueness	Loading	Uniqueness	Loading	Uniqueness
Action1	0.525	0.725	0.876	0.233	0.828	0.315	0.938	0.119
Action2	0.038	0.999	-0.377	0.858	-0.299	0.910	0.564	0.682
Budget	0.905	0.181	0.952	0.094	0.559	0.687	0.974	0.052
FTE	0.867	0.249	0.945	0.108	-0.616	0.620	0.990	0.020
Regulation1	0.823	0.323	0.873	0.238	0.935	0.126	0.997	0.007
Regulation2	0.825	0.319	0.720	0.482	0.936	0.123	0.999	0.002

Table III

Agency-level Activity and Operating Performance of Highly Exposed Firms

This table examines the impact of policy enforcement and rulemaking activity by each agency (EPA, FDA, OSHA, and SEC) on the performance of firms that are regulated by that agency from 1980 to 2019. Columns 1,2,3, and 4 represent the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by the EPA, FDA, OSHA, and SEC respectively. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *AAI,* is an annual time-series variable at the agency level representing the (enforcement and rulemaking) activity intensity by that agency. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), *Sales growth* (growth rate in sales from last year), *Industry performance* (*operating performance* of the median firm within each 6-digit NAICS in each year), *GDP growth* (the percentage change in GDP from last year), *Inflation* (the annual inflation percentage rate), *Unemployment* (the annual unemployment percentage rate), and *President party* (dummy variable taking the value of 0 when the President is Republican and 1 when Democrat). All columns include firm fixed effects. Statistical significance is based on the heteroskedasticity robust double-clustered (year and firm) standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)
Dependent variable		*Operating performance*		
EPA AAI	-0.045***			
	(0.014)			
FDA AAI		-0.044**		
		(0.018)		
OSHA AAI			-0.024**	
			(0.009)	
SEC AAI				-0.033***
				(0.011)
Size	0.081***	0.089***	0.016**	0.028**
	(0.009)	(0.013)	(0.007)	(0.011)
CAPX + R&D	-0.284***	-0.316***	-0.093	-0.159
	(0.049)	(0.059)	(0.108)	(0.268)
Leverage	-0.163***	-0.198***	-0.115	-0.125**
	(0.031)	(0.045)	(0.081)	(0.055)
Market-to-book	-0.013***	-0.009***	-0.009	0.009
	(0.002)	(0.002)	(0.007)	(0.006)
Sales growth	0.002	0.000	0.020	-0.002
	(0.003)	(0.005)	(0.017)	(0.010)
Industry performance	0.559***	0.653***	1.117***	0.802***
	(0.099)	(0.150)	(0.139)	(0.231)
GDP growth	-0.004	-0.000	-0.000	0.001
	(0.003)	(0.003)	(0.001)	(0.001)
Inflation	0.001	-0.001	0.002	0.001
	(0.003)	(0.003)	(0.001)	(0.002)
Unemployment	-0.011**	-0.012**	-0.000	0.000
	(0.005)	(0.006)	(0.002)	(0.002)
President party	0.012	-0.006	0.015*	-0.010
	(0.016)	(0.015)	(0.008)	(0.007)
Constant	-0.338***	-0.335***	-0.089*	-0.169**
	(0.058)	(0.076)	(0.049)	(0.077)
Observations	18,746	8,219	6,054	18,406
R-squared	0.665	0.656	0.570	0.576
Firm FE	YES	YES	YES	YES

Table IV

Industry-exposure-weighted Agency-level Activity and Corporate Performance

This table examines the impact of Industry-exposure-weighted (by the relevance score) agency activity by EPA, FDA, OSHA, and SEC on the performance of firms from 1980 to 2019. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *Industry-exposure-weighted AAI*, is calculated as the multiplication of *AAI* and the natural logarithm of *RS* (transformed to zero) where *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually and *RS* represents the relevance of each (6-digit NAICS) industry to the agency working as the industry-exposure (to that agency) weights (the heavily regulated industries have higher *RS*). *RS* for each agency is calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) each year. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). All Columns include year × industry (2-digit NAICS) fixed effects. Statistical significance is based on the heteroskedasticity robust industry-clustered standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)
Dependent variable	*Operating performance*			
Industry-exposure-weighted EPA AAI	-0.007**			
	(0.004)			
Industry-exposure-weighted FDA AAI		-0.014***		
		(0.005)		
Industry-exposure-weighted OSHA AAI			-0.018***	
			(0.004)	
Industry-exposure-weighted SEC AAI				-0.026***
				(0.009)
Size	0.059***	0.059***	0.059***	0.059***
	(0.005)	(0.005)	(0.005)	(0.005)
CAPX + R&D	-0.735***	-0.736***	-0.736***	-0.737***
	(0.060)	(0.060)	(0.059)	(0.059)
Leverage	-0.339***	-0.339***	-0.340***	-0.341***
	(0.027)	(0.027)	(0.027)	(0.027)
Market-to-book	-0.031***	-0.031***	-0.031***	-0.031***
	(0.007)	(0.007)	(0.007)	(0.007)
Sales growth	-0.018***	-0.018***	-0.018***	-0.018***
	(0.002)	(0.002)	(0.002)	(0.002)
Constant	-0.095***	-0.096***	-0.088***	-0.085***
	(0.025)	(0.025)	(0.025)	(0.026)
Observations	149,279	149,279	149,279	149,279
R-squared	0.354	0.355	0.355	0.355
Industry × Year FE	YES	YES	YES	YES

Table V

Firm-exposure-weighted Agency-level Activity and Corporate Performance

This table examines the impact of *Firm*-exposure-weighted (by the relevance score and firm's market share) activity by EPA, FDA, OSHA, and SEC on the performance of firms from 1980 to 2019. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *Firm*-e*xposure-weighted AAI*, is calculated as the multiplication of *AAI,* the natural logarithm of *RS* (transformed to zero) and the firm's market (*MS*) share in its industry (calculated as firm's total sale scaled by its 6-digit NAICS industry total sale in each year) where *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually and *RS* represents the relevance of each (6-digit NAICS) industry to the agency working as the industry-exposure (to that agency) weights (the heavily regulated industries have higher *RS*). *RS* for each agency is calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) each year. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). All Columns include year and firm fixed effects. Statistical significance is based on the heteroskedasticity robust firm-clustered standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)
Dependent variable	*Operating performance*			
Firm-exposure-weighted EPA AAI	0.004			
	(0.003)			
Firm-exposure-weighted FDA AAI		-0.014***		
		(0.004)		
Firm-exposure-weighted OSHA AAI			-0.006*	
			(0.003)	
Firm-exposure-weighted SEC AAI				-0.015**
				(0.006)
Size	0.048***	0.048***	0.048***	0.048***
	(0.003)	(0.003)	(0.003)	(0.003)
CAPX + R&D	-0.334***	-0.334***	-0.334***	-0.334***
	(0.027)	(0.027)	(0.027)	(0.027)
Leverage	-0.161***	-0.160***	-0.160***	-0.161***
	(0.012)	(0.012)	(0.012)	(0.012)
Market-to-book	-0.008***	-0.008***	-0.008***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)
Sales growth	-0.005**	-0.005**	-0.005**	-0.005**
	(0.002)	(0.002)	(0.002)	(0.002)
Constant	-0.154***	-0.155***	-0.154***	-0.155***
	(0.014)	(0.014)	(0.014)	(0.014)
Observations	147,932	147,932	147,932	147,932
R-squared	0.665	0.665	0.665	0.665
Year FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Table VI

Violator-firm Enforcement by Agencies and Corporate Performance

This table examines the impact of enforcement of firms violating the laws by all the federal and state enforcement agencies on their accounting performance for the period 2000 to 2019. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest in columns (1) and (2), *Violation dummy*, is a dummy variable taking the value of one if a firm has been enforced for a violation in that year. *penalty* in columns (2) and (3) represents the natural logarithm of one plus the dollar amount of penalty a violator-firm was issued in that year. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). All Columns include year fixed effects. Columns (1) and (3) include industry (6-digit NAICS) fixed effects while columns (2) and (4) include firm fixed effects. Statistical significance is based on the heteroskedasticity robust firm-clustered standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)
Dependent variable		*Operating performance*		
Violation dummy	-0.100***	-0.006**		
	(0.008)	(0.003)		
Penalty			-0.009***	-0.001***
			(0.001)	(0.000)
Size	0.076***	0.059***	0.076***	0.059***
	(0.002)	(0.005)	(0.002)	(0.005)
CAPX + R&D	-0.743***	-0.337***	-0.743***	-0.337***
	(0.034)	(0.037)	(0.034)	(0.037)
Leverage	-0.416***	-0.152***	-0.415***	-0.152***
	(0.016)	(0.016)	(0.016)	(0.016)
Market-to-book	-0.022***	-0.009***	-0.022***	-0.009***
	(0.002)	(0.001)	(0.002)	(0.001)
Sales growth	-0.040***	-0.010***	-0.040***	-0.010***
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	-0.255***	-0.305***	-0.257***	-0.305***
	(0.012)	(0.027)	(0.012)	(0.027)
Observations	81,249	79,958	81,249	79,958
R-squared	0.429	0.728	0.429	0.728
Year FE	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Table VII

Sarbanes-Oxley Act of 2002

Panel A reports the difference-in-difference regression analysis examining the impact of the SEC enforcement/regulation shock (Sarbanes-Oxley Act of 2002) on firm *operating performance* (measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets). Pre-treatment years are 2001, 2002, and 2003 while post-treatment years are 2004 to 2006. Treated firms are the ones (excluding foreign firms not listed on US exchanges) heavily exposed to the SEC. Columns (1) and (2) represent treated firms with *RS* above the 95th and 90th percentiles respectively. Control firms are the Canadian firms (not listed on US exchanges) that are matched to each treated firm based on the industry (2-digit NAICS), *size* (within 30%), and operating *performance* (within 10%). The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). All Columns include year and firm fixed effects. Statistical significance is based on the heteroskedasticity robust firm-clustered standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively. Panel B reports the cumulative abnormal returns (CARs) for treated firms over the event windows [-1,1] and [-3,3] around the enactment of the Sarbanes-Oxley Act on July 25, 2002. The CAR is the sum of abnormal returns (ARs) for each firm during the event window. The AR is calculated as the difference between the actual return and the return predicted by the Fama-French 3-factor model. The model is estimated over the pre-event window [-150, -50]. *High RS* represents the treated sample consisting of highly exposed firms to SEC with an *RS* above the 95th percentile.

Panel A. Difference-in-Difference Regression		
	(1)	(2)
Dependent variable	*Operating performance*	
Post × Treatment	-0.040*	-0.036*
	(0.021)	(0.021)
Size	0.055***	0.053***
	(0.016)	(0.018)
Expenditure + R&D	-0.175	-0.141
	(0.206)	(0.190)
Leverage	-0.237**	-0.207**
	(0.095)	(0.080)
Market-to-book	0.015	-0.006
	(0.013)	(0.009)
Sales growth	0.021*	0.024**
	(0.012)	(0.012)
Constant	-0.236**	-0.198*
	(0.106)	(0.107)
Observations	2,220	3,204
R-squared	0.688	0.685
Year FE	YES	YES
Firm FE	YES	YES

Panel B. Market Reactions	
Variable	*High RS*
CAR[-1,1]	-0.013***
	(-2.73)
CAR[-3,3]	-0.015**
	(-2.39)

Table VIII

Dodd-Frank Act of 2010

Panel A reports the difference-in-difference regression analysis examining the impact of the SEC enforcement/regulation shock (Dodd-Frank Act of 2010) on firm *operating performance* (measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets). Pre-treatment years are 2008, 2009, and 2010 while post-treatment years are 2011 to 2013. Treated firms are the ones heavily exposed to the SEC. Columns (1) and (2) represent treated firms with *RS* above the 95th and 90th percentiles respectively. Control firms are the ones that are lightly exposed to SEC (*RS* less than 50th percentile) and matched to each treated firm based on the industry (2-digit NAICS), *size* (within 30%), and *operating performance* (within 10%). The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). All Columns include year and firm fixed effects. Statistical significance is based on the heteroskedasticity robust firm-clustered standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively. Panel B reports the cumulative abnormal returns (CARs) for treated and placebo firms over the event windows [-1,1] and [-3,3] around the enactment of the Dodd-Frank Act on July 15, 2010. The CAR is the sum of abnormal returns (ARs) for each firm during the event window. The AR is calculated as the difference between the actual return and the return predicted by the Fama-French 3-factor model. The model is estimated over the pre-event window [-150, -50]. *High RS* represents the treated sample consisting of highly exposed firms to SEC with an *RS* above the 95th percentile. *Low RS* represents the control sample consisting of lightly exposed firms to SEC with an *RS* below the 15th percentile.

Panel A. Difference-in-Difference Regression		
	(1)	(2)
Dependent variable	*Operating performance*	
Post × Treatment	-0.021*	-0.022**
	(0.011)	(0.011)
Size	0.045***	0.059***
	(0.016)	(0.016)
CAPX + R&D	-0.278**	-0.354***
	(0.132)	(0.133)
Leverage	-0.115***	-0.089**
	(0.036)	(0.038)
Market-to-book	0.023***	-0.010
	(0.005)	(0.007)
Sales growth	0.004	0.020***
	(0.007)	(0.007)
Constant	-0.239**	-0.314***
	(0.109)	(0.104)
Observations	7,284	8,676
R-squared	0.669	0.716
Year FE	YES	YES
Firm FE	YES	YES
Panel B. Market Reactions		
Variable	*High RS*	*Low RS*
CAR[-1,1]	-0.014***	0.007**
	(-6.39)	(2.88)
CAR[-3,3]	-0.019***	0.008**
	(-7.21)	(2.08)

Table IX

U.S. Supreme Court Deliberation on Federal Agencies' Rulemaking Authority

This table presents the cumulative abnormal returns (CARs) for both treated and control firms over the event windows [-1,1] and [-3,3] surrounding the hearing of the Supreme Court case regarding federal agency rulemaking authority (Loper Bright Enterprises, et al., Petitioners vs. Gina Raimondo, Secretary of Commerce, et al.) on May 1, 2023. The CAR is the sum of abnormal returns (ARs) for each firm during the event window. The AR is calculated as the difference between the actual return and the return predicted by the Fama-French 3-factor model. The model is estimated over the pre-event window [-150, -50]. *High RS* represents the treated sample consisting of highly exposed firms to an agency with an *RS* above the 95th percentile of that agency. *Low RS* represents the control sample consisting of lightly exposed firms to an agency with an *RS* below the 15th percentile of that agency (and below 90th percentile of all other agencies).

	EPA		FDA		OSHA		SEC	
Variable	*High RS*	*Low RS*	*High RS*	*Low RS*	*High RS*	*Low RS*	*High RS*	*Low RS*
CAR[-1,1]	0.010***	-0.001	0.022***	0.001	0.016***	0.001	-0.031***	0.012
	(4.21)	(-0.41)	(2.75)	(0.30)	(3.31)	(0.22)	(-8.25)	(1.42)
CAR[-3,3]	0.032***	-0.008	0.022*	-0.01	-0.01	-0.024***	-0.039***	0.003
	(3.96)	(-1.2)	(1.81)	(-1.28)	(-1.12)	(-3.03)	(-7.35)	(0.32)

Appendix

Table A.I

Variable Definition

This table lists and describes the variables used in this paper.

Variable	Definition	Source
AAI	Time series (1979 to 2019) activity index for each agency calculated as the latent variable from factor analysis of the main six agency-level policy enforcement and rulemaking variables (*Action1*, *Action2*, *Budget*, *FTE*, and *Regulation1, Regulation2*)	
RS	The time-series average of the industry's annual (1980 to 2019) relevance score for each agency which is calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) averaged over years.	RegData
Industry_exposure_weighted AAI	*AAI* × *RS*	
Firm_exposure_weighted AAI	*AAI* × *RS* × *MS*	
Violation Dummy	A dummy variable taking the value of one if a firm has been enforced (by any federal or state enforcement agency) for a violation of regulations annually from 2000 to 2019	ViolationTracker
Penalty	Natural logarithm of one plus the penalty dollar amount a firm was issued (by any federal or state enforcement agency) for a violation of regulations annually from 2000 to 2019	ViolationTracker
Lobbying	Natural logarithm of one plus the lobbying in dollars spent by each firm to lobby Congress and federal agencies each year from 1998 to 2019	OpenSecrets
MS	The Proportion of firm's total sales to its 6-digit NIACS industry total sales in each year	Compustat
Operating Performance	The proportion of a firm's operating income before tax and depreciation to its previous year total assets ($\mathrm{OIBDP_t}$ / $\mathrm{AT_{t-1}}$)	Compustat
Size	Natural logarithm of total assets (log (AT)	Compustat
Expenditure + R&D	The proportion of capital expenditure plus R&D to total assets (CAPX/AT)	Compustat
Leverage	The Proportion of total debt to total assets (DT/AT)	Compustat
Market-to-book	The Proportion of market value of equity to book value of equity (PRCCF×CSHO/CEQ)	Compustat
Sales growth	Growth in sales from year t-1 to year t (($\mathrm{SALE_t}$ – $\mathrm{SALE_{t-1}}$)/ $\mathrm{SALE_{t-1}}$))	Compustat

Table A.I-Continued

Industry performance	The median *operating performance* of firms in each 6-digit NAICS industry each year	Compustat
GDP growth	Percentage growth in real GDP from year t − 1 to year t $((GDP_t - GDP_{t-1})\times 100/GDP_{t-1})$	Compustat
Inflation	Annual inflation percentage rate	FRED
Variable	Definition	Source
Unemployment	Annual unemployment percentage rate	FRED
President party	Dummy variable taking value of zero when the President is from the Republican party and one when the President is from the Democrat party	
Action1	EPA, FDA, and SEC's *Action1* is the number of annual administrative actions, recalls, and administrative proceedings respectively. OSHA's Action1 is the annual amount of penalty in constant (2012 inflation-adjusted) dollars	EPA.gov, FDA.gov, OSHA.gov, SEC.gov
Action2	EPA, FDA, OSHA, and SEC's *Action2* is the number of annual civil cases, inspections, inspections, and civil injunctions respectively	EPA.gov, FDA.gov, OSHA.gov, SEC.gov
Budget	Agency's spending in constant (2012 inflation-adjusted) million dollars	Weidenbaum Center on the Economy, Government, and Public Policy
FTE	The total number of hours worked divided by the number of compensable hours applicable to each fiscal year for an agency.	Weidenbaum Center on the Economy, Government, and Public Policy
Regulation1	The count number of restrictive words restrictive (e.g., may not, must, prohibit, require, and shall) appeared each year in the CFR parts related to an agency	RegData
Regulation2	The count number of all words appeared each year in the CFR parts related to an agency	RegData

Table A.II

Agency-level Activity Proxies Summary Statistics

This table reports the number of observations, mean, median, and standard deviation for the agency-level activity variables for each agency separately (1980-2019). *Action1* and *Action2* represent the direct actions taken by the agency to conduct their enforcement job. EPA's *Action1* represents the number of administrative actions initiated by EPA which is constituted of the total number of penalty orders, compliance orders, and field citations every year. EPA's *Action2* is the number of civil cases referred (by the EPA) to the Department of Justice (DOJ) each year. FDA's *Action1* represents the number of recalls sent out by the FDA every year. FDA's *Action2* shows the number of inspections conducted by the FDA every year. OSHA's *Action1* shows the amount of penalty in constant (2012, adjusted for inflation) dollars issued by OSHA every year. OSHA's *Action2* represents the total number of inspections conducted by OSHA every year. SEC's *Action1* and *Action2* represent the number of administrative proceedings and civil injunctions taken by the SEC against violators of regulations every year respectively. *Budget* is the spending in constant (2012, adjusted for inflation) million dollars by each agency every year. FTE (or Full-time equivalent) represents the total number of full-time employees on each agency's staff every year calculated as the total number of hours worked divided by the number of compensable hours for each agency every year. *Regulation1* and *Regulation2* represent the count number of restrictive (e.g., may not, must, prohibit, require, and shall) and total words present in the Code of Federal Register's (CFR) parts related to an agency each year respectively.

	EPA				FDA				OSHA				SEC			
Variable	N	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD
Action1	40	3024.67	3159.000	1071.722	40	4625.241	3726.000	2799.027	40	1.157e+08	94588577.652	99114567	40	304.125	283.000	172.402
Action2	40	244.070	255.500	87.106	40	21016.7	20000.500	6125.126	40	105919.820	104867.000	19124.687	40	196.825	190.000	51.748
Budget	40	5060.799	5466.433	993.552	40	2044.101	1565.688	1295.472	40	489.179	488.369	55.520	40	679.923	468.167	468.103
FTE	40	15611.525	16634.000	2036.814	40	10258.35	9171.500	3092.57	40	2234.600	2197.500	205.213	40	3026.925	2809.000	881.358
Regulation1	40	118894.7	125322.000	57861.622	40	22188.775	21790.000	2383.893	40	32908.450	34349.000	6686.702	40	13588.075	13599.500	3053.980
Regulation2	40	9772851.1	9848461.500	4656795.7	40	2259665.9	2277926	172740.610	40	1596482.100	1695021	396392.720	40	1030458	984867.500	231867.550

Table A.III

Agency-level Activity and Corporate Performance for Highly Exposed Firms with Low Paperwork Regulation Burden

This table examines the impact of enforcement and rulemaking activity by each agency (EPA, FDA, OSHA, and SEC) on the performance of firms that are regulated by that agency from 1980 to 2019. Columns 1,2,3, and 4 represent the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by the EPA, FDA, OSHA, and SEC respectively. Please note the sample of firms is limited to firms with Kalmenovitz's (2019) paperwork regulation intensity lower than the median of all firms' paperwork regulation intensity in that year. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *AAI,* is an annual time-series variable at the agency level representing the (enforcement and rulemaking) activity intensity by that agency. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), *Sales growth* (growth rate in sales from last year), *Industry performance* (*operating performance* of the median firm within each 6-digit NAICS in each year), *GDP growth* (the percentage change in GDP from last year), *Inflation* (the annual inflation percentage rate), *Unemployment* (the annual unemployment percentage rate), and *President party* (dummy variable taking the value of 0 when the President is Republican and 1 when Democrat). All columns include firm fixed effects. Statistical significance is based on the heteroskedasticity robust double-clustered (year and firm) standard errors that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)
Dependent variable		*Operating performance*		
EPA AAI	-0.069*			
	(0.038)			
FDA AAI		-0.056**		
		(0.021)		
OSHA AAI			-0.016	
			(0.013)	
SEC AAI				-0.028**
				(0.013)
Size	0.080***	0.102***	0.023**	0.021*
	(0.014)	(0.021)	(0.010)	(0.011)
CAPX + R&D	-0.273**	-0.298**	-0.105	0.067
	(0.101)	(0.120)	(0.211)	(0.274)
Leverage	-0.175***	-0.218***	-0.090**	-0.194**
	(0.050)	(0.056)	(0.042)	(0.093)
Market-to-book	-0.012***	-0.004	0.010**	0.036***
	(0.004)	(0.004)	(0.005)	(0.011)
Sales growth	-0.004	0.002	0.022	0.011
	(0.006)	(0.010)	(0.031)	(0.016)
Industry performance	0.595***	0.591**	0.708***	0.302**
	(0.139)	(0.229)	(0.174)	(0.111)
GDP growth	0.005	-0.001	-0.000	0.001
	(0.006)	(0.006)	(0.004)	(0.002)
Inflation	-0.003	-0.005	-0.008*	-0.004
	(0.010)	(0.009)	(0.004)	(0.005)
Unemployment	0.004	-0.009	-0.009**	-0.005*
	(0.011)	(0.011)	(0.004)	(0.003)
President party	-0.007	0.000	0.039***	0.008
	(0.036)	(0.034)	(0.012)	(0.013)
Constant	-0.325***	-0.363**	-0.055	-0.046
	(0.099)	(0.139)	(0.068)	(0.083)
Observations	3,922	1,841	984	1,116

Table A.IX-Continued

	(1)	(2)	(3)	(4)
Dependent variable		*Operating performance*		
R-squared	0.651	0.669	0.685	0.737
Firm FE	YES	YES	YES	YES

Table A.IV

Agency-level Activity, Paperwork Regulation Intensity, and Corporate Performance for Highly Exposed Firms

This table examines the impact of rulemaking and policy enforcement activity by each agency (EPA, FDA, OSHA, and SEC) on the performance of firms that are regulated by that agency from 1980 to 2019 after controlling for firm-level paperwork regulation intensity. Columns 1,2,3, and 4 represent the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by the EPA, FDA, OSHA, and SEC respectively. Please note the sample of firms is limited to firms with available paperwork regulation intensity from Kalmenovitz (2019). The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *AAI,* is an annual time-series variable at the agency level representing the (enforcement and rulemaking) activity intensity by that agency. *RegIn* controls for paperwork regulatory intensity based on active regulations from Kalmenovitz (2019). *RegIn* is scaled by its standard deviation. Other control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), *Sales growth* (growth rate in sales from last year), *Industry performance* (*operating performance* of the median firm within each 6-digit NAICS in each year), *GDP growth* (the percentage change in GDP from last year), *Inflation* (the annual inflation percentage rate), *Unemployment* (the annual unemployment percentage rate), and *President party* (dummy variable taking the value of 0 when the President is Republican and 1 when Democrat). All columns include firm fixed effects. Statistical significance is based on the heteroskedasticity robust double-clustered (year and firm) standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)
Dependent variable		*Operating performance*		
EPA AAI	-0.042			
	(0.038)			
FDA AAI		-0.036**		
		(0.018)		
OSHA AAI			-0.007	
			(0.012)	
SEC AAI				-0.031***
				(0.011)
RegIn	-0.018	-0.028*	-0.004	-0.002
	(0.013)	(0.016)	(0.007)	(0.007)
Size	0.087***	0.106***	0.027*	0.041***
	(0.013)	(0.017)	(0.015)	(0.014)
CAPX + R&D	-0.399***	-0.473***	-0.191	-0.298
	(0.073)	(0.099)	(0.255)	(0.263)
Leverage	-0.183***	-0.291***	-0.164	-0.175***
	(0.041)	(0.058)	(0.099)	(0.052)
Market-to-book	-0.014***	-0.005	-0.004	0.021***
	(0.003)	(0.003)	(0.013)	(0.006)
Sales growth	-0.001	0.006	0.012	-0.011
	(0.005)	(0.007)	(0.028)	(0.013)
Industry performance	0.588***	0.751***	1.324***	0.681
	(0.127)	(0.178)	(0.205)	(0.403)
GDP growth	0.004	0.006	-0.005*	0.003
	(0.005)	(0.004)	(0.002)	(0.004)
Inflation	-0.006	-0.010	0.004	-0.010*
	(0.008)	(0.006)	(0.004)	(0.006)
Unemployment	-0.000	-0.005	-0.007**	0.004
	(0.008)	(0.007)	(0.003)	(0.004)
President party	-0.016	-0.047**	0.050***	-0.037*

Table A.IX-Continued

	(1)	(2)	(3)	(4)
Dependent variable		*Operating performance*		
	(0.027)	(0.019)	(0.014)	(0.022)
Constant	-0.194**	-0.163	-0.117	-0.188*
	(0.081)	(0.115)	(0.090)	(0.101)
Observations	8,011	3,701	2,340	2,238
R-squared	0.611	0.646	0.498	0.545
Firm FE	YES	YES	YES	YES

Table A.V

Industry-exposure-weighted Agency-level Activity, Paperwork Regulation Intensity, and Corporate Performance

This table examines the impact of industry-exposure-weighted (by the relevance score) rulemaking and policy enforcement activity by EPA, FDA, OSHA, and SEC on the performance of firms from 1980 to 2019 after controlling for firm-level paperwork regulation intensity. Please note the sample of firms is limited to firms with available paperwork regulation intensity from Kalmenovitz (2019). The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, Industry-e*xposure-weighted AAI*, is calculated as the multiplication of *AAI* and the natural logarithm of *RS* (transformed to zero) where *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually and *RS* represents the relevance of each (6-digit NAICS) industry to the agency working as the industry-exposure (to that agency) weights (the heavily regulated industries have higher *RS*). *RS* is the time-series average of the 6-digit NAICS industry's annual relevance score (1980 to 2019) where an industry's annual relevance score for each agency is calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) each year. *RegIn* controls for paperwork regulatory intensity based on active regulations from Kalmenovitz (2019). *RegIn* is scaled by its standard deviation. Other control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). All Columns include year × industry (2-digit NAICS) fixed effects. Statistical significance is based on the heteroskedasticity robust industry-clustered standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)
Dependent variable	*Operating performance*			
Industry-exposure-weighted EPA AAI	-0.006			
	(0.006)			
Industry-exposure-weighted FDA AAI		-0.016***		
		(0.005)		
Industry-exposure-weighted OSHA AAI			-0.025***	
			(0.007)	
Industry-exposure-weighted SEC AAI				-0.013**
				(0.006)
RegIn	-0.002	-0.001	-0.001	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)
Size	0.053***	0.053***	0.053***	0.053***
	(0.004)	(0.004)	(0.004)	(0.004)
CAPX + R&D	-0.768***	-0.769***	-0.771***	-0.771***
	(0.083)	(0.084)	(0.083)	(0.084)
Leverage	-0.215***	-0.216***	-0.217***	-0.216***
	(0.024)	(0.024)	(0.024)	(0.024)
Market-to-book	-0.005**	-0.004**	-0.004**	-0.005**
	(0.002)	(0.002)	(0.002)	(0.002)
Sales growth	-0.038***	-0.038***	-0.039***	-0.039***
	(0.010)	(0.010)	(0.010)	(0.010)
Constant	-0.073**	-0.074**	-0.048	-0.072**
	(0.036)	(0.035)	(0.036)	(0.036)
Observations	59,470	59,470	59,470	59,470
R-squared	0.310	0.310	0.311	0.310
Year × Industry FE	YES	YES	YES	YES

Table A.VI

Firm-exposure-weighted Agency-level Activity, Paperwork Regulation Intensity, and Corporate Performance

This table examines the impact of *Firm*-exposure-weighted (by the relevance score and firm's market share) activity by EPA, FDA, OSHA, and SEC on the performance of firms from 1980 to 2019 after controlling for firm-level paperwork regulation intensity. Please note the sample of firms is limited to firms with available paperwork regulation intensity from Kalmenovitz (2019). The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *Firm-exposure-weighted AAI*, is calculated as the multiplication of *AAI,* the natural logarithm of *RS* (transformed to zero) and the firm's market (*MS*) share in its industry (calculated as firm's total sale scaled by its 6-digit NAICS industry total sale in each year) where *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually and *RS* represents the relevance of each (6-digit NAICS) industry to the agency working as the industry-exposure (to that agency) weights (the heavily regulated industries have higher *RS*). *RS* is the time-series average of the 6-digit NAICS industry's annual relevance score (1980 to 2019) where an industry's annual relevance score for each agency is calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) each year. *RegIn* controls for paperwork regulatory intensity based on active regulations from Kalmenovitz (2019). *RegIn* is scaled by its standard deviation. Other control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). All Columns include year and firm fixed effects. Statistical significance is based on the heteroskedasticity robust firm-clustered standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)
Dependent variable		*Operating performance*		
Firm-exposure-weighted EPA AAI	-0.008			
	(0.009)			
Firm-exposure-weighted FDA AAI		-0.028***		
		(0.006)		
Firm-exposure-weighted OSHA AAI			-0.034***	
			(0.007)	
Firm-exposure-weighted SEC AAI				-0.046***
				(0.012)
RegIn	0.007*	0.007*	0.007*	0.007*
	(0.004)	(0.004)	(0.004)	(0.004)
Size	0.049***	0.049***	0.050***	0.050***
	(0.005)	(0.005)	(0.005)	(0.005)
CAPX + R&D	-0.474***	-0.473***	-0.472***	-0.472***
	(0.040)	(0.040)	(0.040)	(0.040)
Leverage	-0.162***	-0.162***	-0.162***	-0.162***
	(0.018)	(0.018)	(0.018)	(0.018)
Market-to-book	-0.003**	-0.003**	-0.003**	-0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
Sales growth	-0.021***	-0.021***	-0.021***	-0.021***
	(0.004)	(0.004)	(0.004)	(0.004)
Constant	-0.172***	-0.177***	-0.175***	-0.175***
	(0.035)	(0.035)	(0.035)	(0.035)
Observations	59,361	59,361	59,361	59,361
R-squared	0.562	0.563	0.562	0.563
Year FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Internet Appendix

Table IA.I

Enforcement Data Sample

This table shows the data for agency-level activity variables from 1980 to 2019. These variables represent each agency's different channels of policy enforcement and rulemaking. Panel A shows the data for EPA and FDA while panel B shows the data for OSHA and SEC. *Action1* and *Action2* represent the direct actions taken by the agency to conduct their enforcement job. For example, EPA's *Action1* represents the number of administrative actions initiated by EPA which is constituted of the total number of penalty orders, compliance orders, and field citations every year. EPA's *Action2* is the number of civil cases referred (by the EPA) to the Department of Justice (DOJ) each year. FDA's *Action1* represents the number of recalls sent out by the FDA every year. FDA's *Action2* shows the number of inspections conducted by the FDA every year. OSHA's *Action1* shows the amount of penalty in constant (2012, adjusted for inflation) dollars issued by OSHA every year. OSHA's *Action2* represents the total number of inspections conducted by OSHA every year. SEC's *Action1* and *Action2* represent the number of administrative proceedings and civil injunctions taken by the SEC against violators of regulations every year respectively. *Budget* is the spending in constant (2012, adjusted for inflation) million dollars by each agency every year. FTE (or Full-time equivalent) represents the total number of full-time employees on each agency's staff every year calculated as the total number of hours worked divided by the number of compensable hours for each agency every year. *Regulation1* and *Regulation2* represent the count number of restrictive (e.g., may not, must, prohibit, require, and shall) and total words present in the Code of Federal Register's (CFR) parts related to an agency each year respectively.

Panel A. EPA and FDA

	EPA						FDA					
Year	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*
1980	901	210	3449	13045	37465	2894078	836	46458	878	8045	20320	1874779
1981	1107	118	3372	12720	40179	3100990	629	36883	818	7705	19409	1836639
1982	864	112	3071	11402	40811	3148071	719	30220	775	7260	20386	1939737
1983	1848	165	2972	10940	39619	3234308	820	28595	782	7261	21106	2067276
1984	3124	251	3010	11562	41283	3429925	1414	25876	799	7234	20750	2121408
1985	2609	276	3283	12590	42911	3777344	2097	24260	826	7156	21236	2196305
1986	2626	342	3450	13115	46423	4357666	3646	22189	807	6966	21238	2199373
1987	3194	304	3811	13649	51163	4608116	2412	20298	794	6918	21226	2232824
1988	3085	372	4432	14078	54623	4831628	1541	20198	842	7168	21819	2315300
1989	4136	364	4638	14539	60018	5096125	2188	18592	893	7349	21761	2324809
1990	3804	375	4991	15587	65904	5494506	2373	17849	954	7764	21655	2315985
1991	3925	353	5600	16241	69021	5982926	2871	18609	1083	8418	21832	2336530
1992	3667	321	5985	16874	70329	6176655	2937	17064	1201	8952	21868	2348633
1993	3808	338	6117	18131	77959	6745691	2375	17315	1179	8977	22119	2401927
1994	3544	350	6156	17414	87826	7433600	3250	15179	1299	9194	22183	2440831
1995	2969	145	6269	17326	89715	7495475	2999	15011	1383	9242	22366	2460786
1996	2171	225	5565	17028	85909	8163787	3012	15230	1390	9172	19889	2485193
1997	3427	370	5869	16789	104143	8220198	3625	15506	1387	9171	22677	2449088

Table IA.I-Continued

	EPA						FDA					
Year	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*
1998	3381	320	5630	17510	110093	9182013	3532	18185	1385	8904	22958	2456474
1999	3481	323	5918	17875	122663	9628104	3736	16920	1525	8896	19407	2051776
2000	5343	250	5806	17310	127981	10068819	3716	15146	1607	8900	19509	2077934
2001	3226	238	5751	17262	135309	10695908	4563	18649	1712	9063	19967	2116811
2002	2830	252	5790	17216	143195	11093575	5025	18572	1856	8888	20064	2120632
2003	3544	268	5656	17354	150564	11747792	4627	22543	2153	10318	20130	2131632
2004	3929	265	5523	18736	148439	11864301	4670	21805	2146	10210	20488	2166903
2005	4145	259	5590	17235	154454	12463061	5338	19803	2018	9980	20975	2184147
2006	6085	286	5827	17029	161588	13108103	4266	17641	2152	9777	21316	2201075
2007	3484	278	5346	16739	162601	13195949	5585	15581	2024	9643	21479	2209643
2008	3446	280	5070	16575	165865	13548178	5778	15245	2170	9889	22344	2249718
2009	3502	277	5410	16693	171654	13988154	8065	17591	2697	11369	22384	2256349
2010	3203	233	5628	16857	174016	14240659	9361	21503	3160	12467	22812	2279201
2011	3084	199	5679	16999	180857	14796918	9288	25471	3326	13266	22851	2276651
2012	2848	179	5727	16738	184827	15661040	9469	24725	3337	13484	23055	2285822
2013	2847	138	5217	15591	188579	15964759	8044	21506	3419	14092	23043	2292560
2014	2160	118	6116	15406	184643	15374242	8061	20400	3808	14682	23534	2296958
2015	2233	141	5000	14715	187138	15647851	9178	20416	4231	15620	24555	2334188
2016	2262	152	5162	14947	193208	16138016	8305	20773	4511	16517	26415	2439324
2017	1820	110	5097	14804	199807	15944511	9199	21901	4716	17471	28102	2511905
2018	1728	110	4801	14184	201028	16147368	7559	21667	4622	17043	28926	2540863
2019	1597	96	4650	13656	201978	16223634	7894	19293	5098	15903	29397	2558645

Panel B. OSHA and SEC

	OSHA						SEC					
Year	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*
1980	4311629	68221	485	2950	21343	934498	74	103	199	2050	9325	680279
1981	2378866	59167	483	2734	21696	941148	72	115	189	1990	9408	697890
1982	2506267	92058	442	2314	21572	925729	106	136	178	1882	9671	719787
1983	3483526	119963	429	2238	21695	934833	94	151	193	1923	9752	738246
1984	4627223	139854	424	2289	23013	978532	114	179	189	1885	9673	751034
1985	5946269	139282	415	2205	22792	985251	122	143	204	1940	9818	760640
1986	7776386	134700	410	2199	23972	1041743	136	163	201	1898	9678	768602
1987	13557770	130385	405	2167	24912	1095176	146	144	203	1930	10124	776942
1988	20493543	125532	411	2344	26675	1214044	109	125	229	2048	10204	789423
1989	32555473	123213	420	2410	27277	1259132	155	140	245	2053	10498	805955
1990	37722415	135531	468	2431	27650	1297911	111	186	262	2130	10558	829517
1991	79286331	138184	430	2472	27776	1294509	139	191	293	2301	10836	837473
1992	81038663	125333	479	2473	28182	1320206	226	156	358	2492	11104	847356
1993	78308156	112697	428	2571	42091	2083576	229	172	365	2675	12055	914441

Table IA.I-Continued

	OSHA						SEC					
Year	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*
1994	101803862	112476	442	2295	43703	2223923	268	196	387	2652	12074	932152
1995	65491680	96848	428	2196	44997	2314554	292	171	405	2705	12282	959295
1996	67539691	92358	412	2069	44968	2312892	241	180	403	2773	12282	959295
1997	78075598	104625	448	2118	35188	1756001	286	189	420	2777	13167	951558
1998	83889711	101231	470	2171	33908	1663296	248	241	415	2774	13224	966799
1999	90340494	102792	478	2154	33615	1657138	298	198	462	2777	13515	979968
2000	95213045	100089	492	2160	33625	1663051	244	223	474	2841	13684	989767
2001	93964110	103554	535	2177	34180	1687305	248	205	543	2936	13826	1021932
2002	99054082	111094	557	2257	34128	1686475	280	270	610	3009	14107	1044856
2003	101249753	108899	577	2286	34085	1686608	365	271	582	3060	14525	1085182
2004	103389367	107290	568	2227	34302	1692104	375	243	856	3550	14937	1112793
2005	126090447	105109	533	2155	34396	1697938	294	312	1011	3851	15473	1160925
2006	116434934	107562	534	2096	34746	1712524	356	197	985	3695	15585	1178978
2007	125079983	103896	520	2059	35583	1749591	394	250	911	3465	15927	1207024
2008	136998114	106376	525	2089	35150	1730445	386	275	934	3511	16317	1237465
2009	154111121	111434	539	2055	35251	1733057	352	297	1011	3642	16133	1218460
2010	193082037	109487	556	2189	35257	1739030	429	234	1047	3748	16371	1243828
2011	234459615	103716	576	2273	36839	1784761	469	252	1184	3844	16376	1242991
2012	203453901	101966	558	2242	36704	1805327	462	263	1180	3793	15826	1210781
2013	211827621	98054	549	2226	36692	1845003	469	207	1268	4023	16116	1232345
2014	218165733	92344	537	2170	38273	1958851	610	145	1257	4150	16595	1299224
2015	241606921	86411	539	2135	37423	1919103	645	162	1374	4301	17470	1367794
2016	289072720	81784	538	2049	37790	1888081	692	176	1567	4554	17839	1395641
2017	312732093	81740	527	2015	38287	1880722	390	168	1571	4616	18880	1424717
2018	335658574	79730	500	1882	38288	1881696	578	243	1533	4483	18912	1428389
2019	375733484	81808	501	1842	38314	1883521	661	201	1500	4350	19376	1448612

Table IA.II

Agencies Regulated Industries based on the RegData

This table shows the 6-digit NAICS, title, and average Relevance Score (*RS*) for the 15 industries with the highest *RS* to each agency (Top 15). *RS* is the time-series average of the annual *RS* where an industry's annual *RS* for each agency is calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) each year. Panels A shows the industries' *RS* for EPA and FDA while Panel B represents the *RS* for OSHA and SEC.

Panel A. EPA and FDA

EPA			FDA		
NAICS	Title	*RS*	NAICS	Title	*RS*
562211	Hazardous Waste Treatment and Disposal	0.1743958	311920	Coffee and Tea Manufacturing	0.0483507
324110	Petroleum Refineries	0.0888571	311340	Nonchocolate Confectionery Manufacturing	0.0478406
325320	Pesticide and Other Agricultural Chemical Manufacturing	0.0833795	325412	Pharmaceutical Preparation Manufacturing	0.0475893
325612	Polish and Other Sanitation Good Manufacturing	0.0837735	311812	Commercial Bakeries	0.0458779
325411	Medicinal and Botanical Manufacturing	0.0796734	311611	Animal (except Poultry) Slaughtering	0.0427466
325193	Ethyl Alcohol Manufacturing	0.0767241	311513	Cheese Manufacturing	0.0416202
325199	All Other Basic Organic Chemical Manufacturing	0.0710925	311612	Meat Processed from Carcasses	0.0372278
325611	Soap and Other Detergent Manufacturing	0.0682874	311615	Poultry Processing	0.0365713
325120	Industrial Gas Manufacturing	0.0664096	311999	All Other Miscellaneous Food Manufacturing	0.0360184
325992	Photographic Film, Paper, Plate, and Chemical Manufacturing	0.0661813	311821	Cookie and Cracker Manufacturing	0.0358228
325413	In-Vitro Diagnostic Substance Manufacturing	0.0649013	311421	Fruit and Vegetable Canning	0.0310040
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing	0.0647502	311211	Flour Milling	0.0296526
325110	Petrochemical Manufacturing	0.0618419	325411	Medicinal and Botanical Manufacturing	0.0284132
325222	Noncellulosic Organic Fiber Manufacturing	0.0610222	445120	Convenience Stores	0.0249356
325211	Plastics Material and Resin Manufacturing	0.0600747	562211	Hazardous Waste Treatment and Disposal	0.0230587

Panel B. OSHA and SEC

OSHA			SEC		
NAICS	Title	*RS*	NAICS	Title	*RS*
486210	Pipeline Transportation of Natural Gas	0.0745174	523930	Investment Advice	0.1175149
486910	Pipeline Transportation of Refined Petroleum Products	0.0725092	523920	Portfolio Management	0.1097037
481211	Nonscheduled Chartered Passenger Air Transportation	0.0670158	523120	Securities Brokerage	0.0635717
481111	Scheduled Passenger Air Transportation	0.0660279	541810	Advertising Agencies	0.046183
486110	Pipeline Transportation of Crude Oil	0.0567931	524127	Direct Title Insurance Carriers	0.0235776
515112	Radio Stations	0.0384265	541860	Direct Mail Advertising	0.0215081

Table IA.II-Continued

OSHA			SEC		
NAICS	Title	*RS*	NAICS	Title	*RS*
482111	Line-Haul Railroads	0.0292765	515120	Television Broadcasting	0.0213937
445120	Convenience Stores	0.0292679	524114	Direct Health and Medical Insurance Carriers	0.0144078
541330	Engineering Services	0.0217322	524113	Direct Life Insurance Carriers	0.0120947
325211	Plastics Material and Resin Manufacturing	0.0205379	524130	Reinsurance Carriers	0.0118328
488390	Other Support Activities for Water Transportation	0.0197620	522110	Commercial Banking	0.0095798
441120	Used Car Dealers	0.0196733	524126	Direct Property and Casualty Insurance Carriers	0.0088823
483111	Deep Sea Freight Transportation	0.0156096	561510	Travel Agencies	0.0084510
561312	Executive Search Services	0.0345496	522120	Savings Institutions	0.0053388
484122	General Freight Trucking, Long-Distance, Less Than Truckload	0.0148800	524292	Pharmacy Benefit Management and Other Third Party Administration of Insurance and Pension Funds	0.0051670

Table IA.III

Agency-level Activity and Corporate Performance Components (Asset Turnover and Profit Margins)

This table examines the impact of policy enforcement and rulemaking activity by each agency (EPA, FDA, OSHA, and SEC) on the asset and profit margins of firms that are regulated by that agency from 1980 to 2019. These are the firms with an *RS* value higher than the 95% percentile *RS* of all firms affected by the EPA (columns 1 and 5), FDA (columns 2 and 6), OSHA (columns 3 and 7), and SEC (columns 4 and 8). The dependent variable in columns (1) through (4) is the firm *asset turnover*, measured as the total sales divided by 1-year-lagged total assets. The dependent variable in columns (4) through (8) is the firm *profit margin*, measured as the operating income before depreciation and taxes divided by total sales. The main variable of interest, *AAI,* is an annual time-series variable at the agency level representing the (enforcement and rulemaking) activity intensity by that agency. Firm controls are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). Macro controls are *GDP growth* (the percentage change in GDP from last year), *Inflation* (the annual inflation percentage rate), *Unemployment* (the annual unemployment percentage rate), and *President party* (dummy variable taking the value of 0 when the President is Republican and 1 when Democrat). All Columns include industry (6-digit NICS) fixed effects. Statistical significance is based on the double-clustered (year and firm) standard errors that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

Dependent variable	(1) *Asset turnover*	(2) *Asset turnover*	(3) *Asset turnover*	(4) *Asset turnover*	(5) *Profit margin*	(6) *Profit margin*	(7) *Profit margin*	(8) *Profit margin*
EPA AAI	0.014				-0.805***			
	(0.021)				(0.191)			
FDA AAI		-0.028				-0.929***		
		(0.023)				(0.214)		
OSHA AAI			0.030				-0.133*	
			(0.025)				(0.071)	
SEC AAI				0.035*				-0.110***
				(0.018)				(0.039)
Industry asset turnover	0.801***	0.718***	0.653***	0.612***				
	(0.064)	(0.075)	(0.085)	(0.076)				
Industry profit margin					2.610***	5.009***	1.629***	1.367***
					(0.311)	(1.028)	(0.491)	(0.249)
Constant	0.556***	0.817***	1.1337***	0.436***	-2.798**	-2.963***	-0.503**	-0.709***
	(0.072)	(0.137)	(0.212)	(0.067)	(1.202)	(0.642)	(0.242)	(0.155)
Observations	18,488	8,136	6,070	18,558	18,488	8,136	6,070	18,558
R-squared	0.321	0.433	0.622	0.521	0.223	0.205	0.067	0.088
Firm Controls	YES	YES	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES

Table IA.IV

EPA's Activity Variables and Operating Performance of Highly Exposed Firms

This table examines the impact of policy enforcement and rulemaking activity variables by EPA on the performance of firms that are regulated by that agency from 1980 to 2019. The sample here represents the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by EPA. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variables of interest are *Action1* (number of annual administrative actions by EPA), *Action2* (number of annual civil cases by EPA), *Budget* (spending in constant 2012 million dollars by EPA every year), *FTE* or Full-time equivalent (total number of full-time employees on EPA's staff every year calculated as the total number of hours worked divided by the number of compensable hours for each agency every year), *Regulation1* (total number of restrictive words present in the Code of Federal Register parts related to EPA each year), and *Regulation2* (total number of all words present in an EPA's CFR parts). These variables are all scaled by their standard deviations. Firm controls are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). Macro controls are *GDP growth* (the percentage change in GDP from last year), *Inflation* (the annual inflation percentage rate), *Unemployment* (the annual unemployment percentage rate), and *President party* (dummy variable taking the value of 0 when the President is Republican and 1 when Democrat). All Columns include firm fixed effects. Statistical significance is based on the double-clustered (year and firm) standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*Operating performance*						
Action1	-0.015**						-0.022***
	(0.007)						(0.007)
Action2		0.011					0.017*
		(0.008)					(0.010)
Budget			-0.022**				-0.021
			(0.009)				(0.014)
FTE				-0.014			0.011
				(0.009)			(0.016)
Regulation1					-0.058***		-0.045**
					(0.018)		(0.021)
Regulation2						-0.064***	
						(0.018)	
Industry performance	0.600***	0.607***	0.596***	0.606***	0.527***	0.517***	0.490***
	(0.105)	(0.106)	(0.102)	(0.105)	(0.098)	(0.097)	(0.095)
Constant	-0.301***	-0.399***	-0.220***	-0.236***	-0.264***	-0.256***	-0.255***
	(0.061)	(0.069)	(0.073)	(0.084)	(0.063)	(0.063)	(0.086)
Observations	18,746	18,746	18,746	18,746	18,746	18,746	18,746
R-squared	0.666	0.666	0.666	0.666	0.667	0.667	0.668
Firm Controls	YES	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES

Table IA.V

FDA's Activity Variables and Operating Performance of Highly Exposed Firms

This table examines the impact of policy enforcement and rulemaking activity variables by FDA on the performance of firms that are regulated by that agency from 1980 to 2019. The sample here represents the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by FDA. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variables of interest are *Action1* (number of recalls sent out by the FDA), *Action2* (number of inspections conducted by the FDA every year), *Budget* (spending in constant 2012 million dollars by FDA every year), *FTE* or Full-time equivalent (total number of full-time employees on FDA's staff every year calculated as the total number of hours worked divided by the number of compensable hours for each agency every year), *Regulation1* (total number of restrictive words present in the Code of Federal Register parts related to FDA each year), and *Regulation2* (total number of all words present in an FDA's CFR parts). These variables are all scaled by their standard deviations Firm controls are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). Macro controls are *GDP growth* (the percentage change in GDP from last year), *Inflation* (the annual inflation percentage rate), *Unemployment* (the annual unemployment percentage rate), and *President party* (dummy variable taking the value of 0 when the President is Republican and 1 when Democrat). All Columns include firm fixed effects. Statistical significance is based on the double-clustered (year and firm) standard errors that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*Operating performance*						
Action1	-0.056**						-0.040*
	(0.021)						(0.022)
Action2		0.004					0.047***
		(0.015)					(0.012)
Budget			-0.043**				0.054*
			(0.019)				(0.030)
FTE				-0.044**			-0.125***
				(0.018)			(0.025)
Regulation1					-0.010		0.040***
					(0.011)		(0.011)
Regulation2						-0.011	
						(0.008)	
Industry performance	0.576***	0.568***	0.627***	0.632***	0.620***	0.607***	0.411***
	(0.138)	(0.147)	(0.146)	(0.144)	(0.157)	(0.145)	(0.133)
Constant	-0.315***	-0.328***	-0.294***	-0.223***	-0.230*	-0.164	-0.494***
	(0.073)	(0.078)	(0.073)	(0.077)	(0.125)	(0.136)	(0.128)
Observations	8,219	8,219	8,219	8,219	8,219	8,219	8,219
R-squared	0.658	0.656	0.657	0.657	0.656	0.656	0.659
Firm Controls	YES	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES

Table IA.VI

OSHA's Activity Variables and Operating Performance of Highly Exposed Firms

This table examines the impact of policy enforcement and rulemaking activity variables by OSHA on the performance of firms that are regulated by that agency from 1980 to 2019. The sample here represents the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by OSHA. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variables of interest are *Action1* (the amount of penalty in constant 2012 dollars issued by OSHA), *Action2* (inspections by OSHA), *Budget* (spending in constant 2012 million dollars by OSHA every year), *FTE* or Full-time equivalent (total number of full-time employees on OSHA's staff every year calculated as the total number of hours worked divided by the number of compensable hours for each agency every year), *Regulation1* (total number of restrictive words present in the Code of Federal Register parts related to OSHA each year), and *Regulation2* (total number of all words present in an OSHA's CFR parts). These variables are all scaled by their standard deviations. Firm controls are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). Macro controls are *GDP growth* (the percentage change in GDP from last year), *Inflation* (the annual inflation percentage rate), *Unemployment* (the annual unemployment percentage rate), and *President party* (dummy variable taking the value of 0 when the President is Republican and 1 when Democrat). All Columns include firm fixed effects. Statistical significance is based on the double-clustered (year and firm) standard errors that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*Operating performance*						
Action1	-0.015**						-0.005
	(0.006)						(0.006)
Action2		0.012**					0.001
		(0.005)					(0.004)
Budget			-0.023***				-0.022***
			(0.007)				(0.008)
FTE				-0.004			0.001
				(0.005)			(0.005)
Regulation1					-0.012*		-0.010*
					(0.006)		(0.005)
Regulation2						-0.013*	
						(0.007)	
Industry performance	1.113***	1.143***	1.014***	1.121***	1.137***	1.136***	1.021***
	(0.139)	(0.142)	(0.115)	(0.140)	(0.143)	(0.142)	(0.120)
Constant	-0.096*	-0.171**	0.068	-0.054	-0.023	-0.027	0.101
	(0.051)	(0.072)	(0.056)	(0.064)	(0.054)	(0.052)	(0.063)
Observations	6,054	6,054	6,054	6,054	6,054	6,054	6,054
R-squared	0.577	0.577	0.580	0.577	0.577	0.577	0.581
Firm Controls	YES	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES

Table IA.VII

SEC's Activity Variables and Operating Performance of Highly Exposed Firms

This table examines the impact of policy enforcement and rulemaking activity variables by SEC on the performance of firms that are regulated by that agency from 1980 to 2019. The sample here represents the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by SEC. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variables of interest are *Action1* (number of annual administrative proceedings by SEC), *Action2* (civil injunctions by SEC), *Budget* (spending in constant 2012 million dollars by SEC every year), *FTE* or Full-time equivalent (total number of full-time employees on SEC's staff every year calculated as the total number of hours worked divided by the number of compensable hours for each agency every year), *Regulation1* (total number of restrictive words present in the Code of Federal Register parts related to SEC each year), and *Regulation2* (total number of all words present in an SEC's CFR parts). These variables are all scaled by their standard deviations. Firm controls are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *Market-to-book* (ratio of market value of equity to book value of equity), and *Sales growth* (growth rate in sales from last year). Macro controls are *GDP growth* (the percentage change in GDP from last year), *Inflation* (the annual inflation percentage rate), *Unemployment* (the annual unemployment percentage rate), and *President party* (dummy variable taking the value of 0 when the President is Republican and 1 when Democrat). All Columns include firm fixed effects. Statistical significance is based on the double-clustered (year and firm) standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*Operating performance*						
Action1	-0.011*						0.006*
	(0.006)						(0.003)
Action2		-0.005					-0.003
		(0.004)					(0.003)
Budget			-0.023***				0.007
			(0.008)				(0.018)
FTE				-0.029***			-0.017
				(0.010)			(0.019)
Regulation1					-0.035***		-0.032*
					(0.013)		(0.016)
Regulation2						-0.032***	
						(0.011)	
Industry performance	0.824***	0.826***	0.812***	0.810***	0.795***	0.801***	0.792***
	(0.232)	(0.229)	(0.231)	(0.232)	(0.230)	(0.232)	(0.230)
Constant	-0.128*	-0.127*	-0.139*	-0.074	-0.018	-0.027	0.011
	(0.069)	(0.066)	(0.070)	(0.060)	(0.051)	(0.054)	(0.070)
Observations	18,406	18,406	18,406	18,406	18,406	18,406	18,406
R-squared	0.560	0.559	0.561	0.562	0.562	0.562	0.563
Firm Controls	YES	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES