Federal Agencies and Corporate Performance

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We examine how regulatory agencies influence firm performance through an agency-centered lens. Using Exploratory Factor Analysis on six agency-level variables—enforcement actions, budget variables, and regulatory text—we construct an annual *Agency Activity Index (AAI)* for the EPA, FDA, OSHA, and SEC. Higher *AAI* scores predict weaker firm operating performance. Greater firm exposure to the agency strengthens the relationship. To identify causality, we apply difference-in-differences analyses using regulatory and deregulatory shocks that generate shifts in *AAI*. Finally, we conduct event studies on the Supreme Court's review of the Chevron doctrine, capturing market reactions to potential limits on agency authority.

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ABSTRACT

We examine how regulatory agencies influence firm performance through an agency-centered lens. Using Exploratory Factor Analysis on six agency-level variables—enforcement actions, budget variables, and regulatory text—we construct an annual *Agency Activity Index (AAI)* for the EPA, FDA, OSHA, and SEC. Higher *AAI* scores predict weaker firm operating performance. Greater firm exposure to the agency strengthens the relationship. To identify causality, we apply difference-in-differences analyses using regulatory and deregulatory shocks that generate shifts in *AAI*. Finally, we conduct event studies on the Supreme Court's review of the Chevron doctrine, capturing market reactions to potential limits on agency authority.

Agencies matter. Despite the focus of most studies on the three branches of government, agencies interpret and implement the legislation Congress passes, and their policies, rules and actions touch individuals and organizations. Recent actions by the second Trump administration have highlighted the importance of agencies, and their effect on a remarkable cross-section of society, in its first few months. One prominent example is DOGE (the Department of Governmental Efficiency), providing insight on how to view agency influence. The number of news articles detailing influence on issues such as immigration, DEI, science funding, social security, and international affairs, increased 190% year-over-year in the first six months of the Trump administration, with 30% of articles referring to DOGE. The number of news stories regarding DOGE highlights that policy adjustment is now much more expeditious to carry out through agencies. In other words, given the challenges of passing legislation through Congress and the time it often takes to do so, the speedy influence of the Trump Administration is working through a more prosaic channel: agencies.[1]

We offer two perspectives on the influence of agencies and with respect to corporations. One perspective is that agencies might be viewed as "costly", while the other is that agencies are "protective". We do not take a firm stand on the relative tradeoff. Rather, we show the complexity of measurement and leave it to the reader to decide. This evaluation is important because government can influence corporate performance in numerous ways, and prior studies find mixed results.[2] These mixed results may be partially due to the omission of a major channel through

[1] For example, the EPA has proposed to rescind a finding that provides the basis for regulating greenhouse gas emissions (Associated Press and Sharma (2025)).

[2] These studies primarily focus 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, Wolfers, and Zitzewitz (2007) find higher equity prices and exchange rates under Republicans.

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' operating performance.

Firms may act strategically regarding the regulatory environment because of agency enforcement and rulemaking. Thus, the effect of additional agency dynamism 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. We implicitly recognize these potential variations and ask the broader question: does an agency's activities influence firm performance, regardless of whether a firm anticipates and reacts to – or simply experiences – agency regulation or enforcement. We further evaluate how the most highly affected firms fare from an operating perspective.[3]

We begin by constructing a first measure of agency activity that *encompasses* rulemaking and enforcement activity, separately for each of four major agencies in the executive branch that

[3] 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.

are highly involved in regulating corporations. These are: the Environmental Protection Agency (EPA), which enforces regulations related to the environment (for example, through the Clean Air Act and Clean Water Act); 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 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.[4] 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 *Full-Time Equivalent* (*FTE)*, and two *Regulation* variables. The *Index* is measured at the agency-year level, based on underlying data reporting.

Our Agency Activity Index (AII) is constructed to admit that different agencies touch entities in different ways. Some use rulemaking (through the CFR), some take actions (such as enforcement actions), some rely on monitoring (which takes money and workers). We measure each of these "pillars" and then combine them using Factor Analysis into a single index. Even then, the AAI is unlikely to touch each organization (such as a corporation) with similar weight. The EPA focuses more on companies in industries more likely to pollute, while the FDA focuses more on food-production-industry and drug-industry companies. We admit this varying influence and incorporate it into our tests as follows.

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

[4] 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 of 2010.

variation, built at both industry and firm levels. We build these exposure measures using Relevance Scores (RS) from the regulatory data (RegData) database (Ampaabeng, McLaughlin, and Chambers (2022)). RegData measures the 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 use firm market share (of industry sales) to extend this agency-industry exposure measure to the firm level (agency-firm exposure).

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, Mamaysky, and Yang (2024), Trebbi, Zhang, Simkovic (2024), Kalmenovitz (2023), Armstrong, Glaeser, and Hoopes (2025)). Given their firm-level focus, none of these measures identify the influence of individual agencies.[5] 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 measure individual-agency inputs to enforcement/regulation activity and industry exposure.[6]

Our main result is best thought of in three layers. Beginning with the analysis of *AAI* stand-alone, we find that higher agency activity is associated with weaker firm performance among

[5] This is especially true when firms have operations in multiple sectors, exposing them to regulatory fragmentation (Kalmenovitz, Lowry, and Volkova (2024)).

[6] 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)).

highly exposed (to the agency) firms. Operating income (before depreciation and taxes) is declining in the *AAI* for firms in the 95th or higher percentile of exposure to an agency.[7] 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 1.9 (OSHA) and 7.5 (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 among 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 operating income of highly exposed firms.

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. This data tracks corporate misconduct as proxied by enforcement cases with monetary awards above $5,000. 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, enabling the use of firm and year fixed effects.

We then seek to allay remaining concerns regarding endogeneity (via selection) of our results in two ways. First, we examine the impact of three major shocks to *AAI* on firm operating performance using difference-in-differences regressions: the EPA's Superfund Tax Expiration

[7] 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.

(deregulatory), the FDA Modernization Act (FDAMA, deregulatory), and the Sarbanes-Oxley Act (SOX, regulatory). Treated firms for the EPA shock are those subject to the superfund tax burden; for FDAMA, firms affected by the Act's regulatory relaxation; and for SOX, U.S. firms highly exposed to the SEC. To isolate each agency's effect, we exclude from the treatment group any firm that is also highly exposed to other agencies. Control firms for the EPA and FDA shocks are those with low exposure to the respective agency, while SOX controls consist of Canadian firms not traded on U.S. exchanges (as SOX applied to all U.S.-listed firms). Results show that treated firms' operating performance improves following the EPA and FDA deregulatory shocks, and declines following SOX, relative to pre-treatment periods. We conclude that Acts designed to alter agency influence on firms causally affect firm performance.

Second, we take an event study perspective 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, Bommarito, and Blackman (2017))[8]. 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 for 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.[9]

[8] 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.

[9] The SEC's mandate is to protect investors, whereas other agencies protect individuals who may not necessarily (also) be investors.

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 increase 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 only focused on strictly CFR and related rules – perhaps along with firm responses that prior work contemplates – we may have missed the importance of other agency enforcement activities.

Finally, we compare our AAI with the demand-side measure in Kalmenovitz (2023), which primarily captures regulatory paperwork activity. First, we show *AAI* strongly predicts realized firm-level enforcement actions recorded in Violation Tracker data, and this predictive power remains significant even after controlling for Kalmenovitz's measure. This is consistent with the fact that our index captures a broader set of agency activities—beyond regulatory filings—encompassing enforcement actions, budgets, staffing, and rulemaking intensity, thereby reflecting more variation in actual regulatory pressure. Second, our core results remain robust after controlling for Kalmenovitz's measure, further supporting that *AAI's* comprehensive design effectively captures the government's impact on firm performance.

Overall, we conclude that the 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

government influence on firms – targeting firms (industries) that the agency is most closely linked with (i.e., high exposure industries). 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.

I. Related Literature

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 recent concern that new laws are passed seemingly 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 and provides us with agency-specific regulatory and deregulatory shocks for causally identifying the impact of federal agencies on firms.

We also contribute to the nascent literature's focus on regulation effects, but which largely takes a 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.[10]

[10] 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.

Calomiris et al. (2020), Armstrong et al. (2024), and Simkovic and Zhang (2020) also take a demand-side perspective by focusing on earnings calls (Natural Language Processing [NLP] regulation-words), 10k filings, and expenditures on regulatory-related jobs, respectively. Kalmenovitz, Lowry, and Volkova (2024) focus on fragmentation or the cross-agency mention of topics of regulation. Firms with high fragmentation are exposed to more agencies.

The closest study to ours is Armstrong et al. (2024), who construct a firm-level "exposure-to-all-agencies" index. Their measure can, in principle, be extended to individual agencies, but they do not construct any agency-specific measures. Instead, they primarily build and validate a measure averaged across all agencies and analyze how it correlates with firm performance. Like other demand-side papers, their approach relies on firm-sourced text, which introduces potential endogeneity. They document empirical associations between firm performance and their index, but do not offer a causal identification strategy, nor do they examine how the activities of specific agencies affect corporate performance.

In contrast, our paper develops a conceptually and structurally different, agency-centric measure at four major federal agencies. By focusing on situations in which firms are highly exposed to a particular agency, we construct a measure grounded in the agency's own actions, rather than firms' descriptions of those actions. This design mitigates one major strand of endogeneity concerns inherent in demand-side, firm-language-based approaches. Our supply-side perspective where agencies' activities vary across their toolkits offers a fundamentally different lens on the government–corporate performance relationship.

We further distinguish our contribution by identifying the causal relationship between federal agencies activites and firm performance using both regulatory and deregulatory shocks.

These shocks are captured directly through our measure and then linked to firm's performance, thereby providing the long-missing causal connection between government regulatory activity and corporate performance in the literature. Finally, we complement our identification with an event-study of the Supreme Court's *Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc.,* ruling, an external shift that weakened federal agencies' regulatory authority and, consequently, altered expectations about future enforcement risk.

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 agency's activity intensity. The variables are: *Action1*, *Action2, Budget*, *Full-time Equivalent* (*FTE)*, *Regulation1*, and *Regulation2*. Our data period (described below in Section II.D) is 1973-2022. We focus on four major government agencies: EPA, FDA, OSHA, and SEC.[11] We select these four agencies because they are highly representative of the federal government's overall enforcement activity and exhibit broad regulatory reach across the U.S. economy. Specifically, they account for more than 50% of all federal firm-level enforcement actions reported in Violation Tracker. Moreover, their influence is not confined to a narrow set of one or two industries but extends broadly across diverse sectors of the economy (environment, natural resources, health, manufacturing, and financial). For instance, using the Relevance Scores (*RS*) from RegData to measure industry exposure, we find that approximately 80% of all industries in our sample have *RS* values above the 50th percentile for at least one of these agencies. Even when the *RS* threshold is raised to the 75th percentile, the resulting set of industries still comprises

[11] We have data for agencies starting in 1972.

more than 50% of the industries in our dataset. This evidence demonstrates that the four agencies collectively represent a strong proxy for studying the impact of government oversight on the population of firms in 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 issuing warning letters, conducting 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's 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 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 1972, 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 (in our exploratory factor analysis). For EPA, *Action1* is the number of administrative actions initiated, which is constituted as the total number of penalty orders, compliance orders, and field citations every year. EPA's *Action2* is the number of civil case referrals to the DOJ.[12] For the FDA, the *Action1* and *Action2* variables

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

represent the number of recalls sent out and inspections conducted (respectively) by the FDA every year. These data are reported on FDA's Enforcement Statistics Report through FDA.gov. OSHA's *Action1* and *Action2* are (respectively) 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 SEC annual reports from SEC.gov.

Action variables vary in scale both across and within agencies. For example, EPA's average number of civil cases (*Action2*) is 211 while its administrative actions (*Action1*) mean is 2,754 per year – an order of magnitude larger. Similarly, FDA has an average of 4,121 recalls compared to 21,979 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 millions, whereas SEC's action variables are in hundreds. Table IA.III in the Internet Appendix provides summary statistics for these variables.

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 years. For example, FDA's recalls-count shows an annual standard deviation of about 2,864 illustrating how widely FDA recalls vary each year.[13] Similarly, other agencies' action variables exhibit

[13] This finding is supported by detailed yearly recall data in Table IA.II, which shows that the FDA issued 3,716 recalls in the year 2000, more than doubled to 9,361 in 2010, followed by a sharp drop to 7,894 in 2019.

significant annual fluctuations. The detailed annual data on all agency variables are presented in Table IA.II. Overall, the data reveal that agencies use a variety of enforcement techniques, and they do not carry out these actions homogenously across time. This high variability encourages use of exploratory 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

The third and fourth agency-level proxies for activity intensity are *Budget* and *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 (outlays) in million dollars (constant 2012 dollars, adjusted for inflation) by each agency every year. *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[14] 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) and Olson (1996)).[15]

We obtain *Budget* and *FTE* data from annual budget reports published by the Office of Management and Budget (OMB). EPA and FDA are the two largest agencies with average annual budgets of $10.9 and $2.1 billion, respectively, and have the largest number of employees.[16]. SEC

[14] Congress also plays a crucial role in determining the budget of federal agencies. For example, the Trump administration's 2018 budget proposal sought to cut $871 million from the FDA's budget authority appropriations. However, this was not included in the bill approved by Congress.

[15] Olson (1996) shows that FDA decreased its inspections due to budget cuts during the Reagan administration.

[16] EPA average *FTE* is 14,744 and the FDA's *FTE* mean is around 10,282.

is the third largest agency with its average *Budget* and *FTE* slightly larger than OSHA. OSHA once had a larger *Budget* and *FTE* than SEC until the late 1990s but it 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 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 amend current regulations (to be stricter) through the rule-making process. This translates into harsher enforcement of policies related to laws.[17] 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 to accidental releases of hazardous substances, led to an increase in EPA's civil litigation cases.[18]

Regulatory activities are reflected in the 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

[17] 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.

[18] 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 amendment, which resulted in several enforcement actions.

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 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 each 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. EPA's CFR rules have the largest annual mean in the number of restrictive (*Regulation1*) and total (*Regulation2*) words among all four agencies (Table IA.III). 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.[19] 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*. 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 (30,931) than the FDA's *Regulation1* (mean of 21,546). The likely explanation for this disparity is that OSHA relies more heavily on *Regulation1* as an enforcement tool compared to FDA.

B. Violation Tracker Data

[19] 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.

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 2022. 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 2,266 parent companies to our sample of firms (Compustat) representing 7,644 firm-year violation observations [out of our main sample total of 85,665 firm-year observations from 2001 to 2022]. We use Violation Tracker data to define two firm-level enforcement variables. The first variable is *Violation*, which is a dummy variable equal to one if an enforcement case was taken against the firm in the previous 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 the previous year.

C. Firm Financials and Macroeconomic Variables

We obtain annual information on various firm accounting characteristics from Compustat for the period 1973-2022. We use operating income before depreciation and taxes [scaled by one-year-lagged firm total assets] to proxy firm *Operating Performance*. We include several firm-level controls found in the extant literature in our regressions. These variables are *Size* (natural logarithm of total assets), *CAPEX + R&D* (ratio of capital expenditure plus R&D to the previous year total

assets), *Leverage* (ratio of total debt to to the previous year total assets), *Market-to-book* (ratio of market value of equity to book value of equity), *Sales Growth* (annual sales increase from the previous year to the current year), and *Industry Performance* (*Operating Performance* of the median firm within the focal firm's 6-digit NAICS in that year). We also include macro control variables including *GDP Growth* (annual percentage increase in real GDP from the previous year), *Inflation* (annual percentage rate), *Unemployment* (annual percentage rate), and *President Party* (a dummy variable equal to zero when the President is Republican and one when Democrat) obtained from Federal Reserve Economic Data (FRED).[20] To reduce the influence ofoutliers, we winsorize firm performance and financial variables at the 1% and 99% levels.

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. To identify these industries, we use the 95th percentile of the average industry *Relevance Score (RS)* (from RegData) across all 6-digit NAICS industries with *RS* greater than zero for that agency, as the cutoff.[21] In this way, we exclude industries that are only nominally affected by an agency, and end up with a unique sample of firms that are highly exposed to that agency.[22] Each sample covers the period from 1973 to 2022. The number of highly-exposed firm-years in the sample for EPA, FDA, OSHA, and SEC is 22,321, 9,421, 7,541, and 20,917, respectively. Firm-level financial variables are similar and comparable

[20] Table IA.I provides detailed definitions of these variables. Table IA.IV, Panels A, B, C, and D show the summary statistics for firm-level and macro variables for different samples in our analysis.

[21] Results are robust to this sampling criterion since the 93rd and 97th percentiles as the threshold give similar results.

[22] 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 and FDA, and only 2 mismatches for OSHA. There was a small number of mismatches for SEC, mostly because of the word "security". We assign the lowest *RS* to these mismatched industries to maintain accuracy.

across all agencies, indicating that each sample contains a well-distributed (based on firm characteristics), balanced firm population. Table IA.IV provides detailed summary statistics for each sample.

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. This sample has 183,163 firm-year observations for the period 1973-2022.

In our third sample, we limit our sample to firms from 2001-2022 to coincide with the Violation Tracker Data. This sample has 85,665 firm-year observations. For all samples, we require each 6-digit NAICS industry to have at least 3 firms each year, since our *RS* treatment and *Industry Performance* variable are at the 6-digit NAICS level.[23]

III. Methodology

A. Constructing Agency Activity Index (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

[23] Changing the criteria to five firms does not affect our results.

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 47% while the total amount of annual penalties increased by around 24% for the same period (Table IA.II). 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 focused 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 maximized 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.[24] 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

[24] Further, Table IA.XII shows *Action2* is not correlated with firm accounting performance while *Action1* regression coefficient is negative (-0.014) for firms heavily regulated by OSHA.

variation of a latent variable.[25]

EFA only uses the variance that each observed variable shares with other observed variables for analysis and stores the variable-specific variation (that is unique to that 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 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*.

We use EFA 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 I, Panel A shows the eigenvalues for all the extracted factors. Factor1 is the largest across all the agencies.

Table I, 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

[25] For a more comprehensive discussion of EFA refer to Internet Appendix Section I.

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* (except for EPA), *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.

EPA's *Budget* 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. A plausible explanation is that EPA has by far one of the largest budgets among regulatory agencies, and its responsibilities extend well beyond rulemaking and enforcement. Unlike agencies whose budgets are more directly tied to compliance oversight, a significant share of EPA's budget spending funds programs unrelated to enforcement. For instance, more than one-third of the EPA's annual budget is allocated to "State and Tribal Assistance Grants," which primarily support state-level environmental and public health initiatives aimed at improving overall environmental quality rather than enforcing federal regulations.

The factor loadings and uniqueness values around *Actions* are more nuanced. 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 result is consistent with earlier examples of how the FDA and OSHA adjust their enforcement strategies by shifting away from extensive but costly inspections toward *a more targeted and cost-efficient* enforcement mechanism (Berkowitz (2019) and Olson (1996)).

For our time series index measure of agency activity, we use the least-squares regression method (Thurstone (1935)) to predict factor scores. This method generates standardized factor scores with a mean near zero and a standard deviation of 1, which results in both negative and

positive values. Since agency activity cannot be negative in practice, we transform the factor scores to start from zero. These transformed factor scores become our *Agency Activity Index (AAI)* variable. We use *AAI* as an agency-level time-series proxy for the rulemaking and enforcement intensity for each agency annually.

Figure 1, Panels A, B, C, and D plot the *AAI* time series for EPA, FDA, OSHA, and SEC, respectively. Overall, *AAI* for EPA and OSHA exhibits a steady upward trend from their inception in 1970s through the late 1990s, reflecting the natural evolution of regulatory agencies as they adopt new statutes, amendments, and enforcement responsibilities.[26] After 2000, however, their trajectories flatten and show more nuanced fluctuations, whereas FDA and SEC maintain strong upward momentum through 2022—likely driven by industry demand and technological innovations in the pharmaceutical and financial sectors.

The *AAI* successfully captures both regulatory and deregulatory changes in each agency. For example, EPA shows a rise in activity after the 1983 resignation of Administrator Anne Gorsuch Burford following a Superfund scandal. Her successor, William Ruckelshaus, was reinstated to bolster enforcement credibility, driving increased agency activity. The *AAI* also captures a sharp decline in EPA activity coinciding with the 1995 expiration of the Superfund Excise Tax, reflecting reduced spending and enforcement activity. This was followed by a rebound spurred by the 1996 Food Quality Protection Act and more stringent ozone regulation updates. Another significant spike occurred around 2005, driven by the Energy Policy Act, which expanded the EPA's oversight in energy-related sectors. The *AAI* for the FDA reveals a structural break following the passage of the FDA Modernization Act (FDAMA) of 1997, signed into law by

[26] EPA was established by Congress in 1970, and OSHA was created shortly thereafter in 1971.

President Bill Clinton, which was a landmark deregulatory reform designed to streamline approval processes. OSHA displays a sharp increase in the early 1990s coinciding with the introduction of several major workplace safety standards, most notably the Process Safety Management (PSM) standard (1992) and the Permit-Required Confined Spaces (PRCS) standard (1993), both of which added new language to the CFR. These standards were enacted in response to a series of catastrophic chemical plant explosions and worker fatalities. Finally, SEC's *AAI* captures the impact of the Sarbanes-Oxley Act (SOX) of 2002, signed by President George W. Bush in response to corporate scandals such as Enron and WorldCom. SOX imposed strict new governance and internal control requirements. Overall, Figure 1 illustrates the ability of *AAI* to capture meaningful variation in agency activity, including responses to both regulatory expansions and deregulatory reforms.

B. Constructing Industry-exposure-weighted AAI

Exposure to each agency varies by industry. For example, investment 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 accessed from QuantGov, available for the years 1972 through 2022.

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 a 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. We 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 (RS)* that matches each 6-digit NAICS industry to a government agency. Equation (1) summarizes our computation of relevance score:

$$RS_{i,t} = \frac{\sum_p Pr_{i,t,p}}{N} \quad (1)$$

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 of CFR parts corresponding to the agency.

We validate the *RS* measure through manual checks and find 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. Similar 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 IA.V shows the *RS* and the titles for the 15 industries (6-digit NAICS) with the highest *RS* to EPA, FDA, OSHA, and SEC.

The *RS* mean in our our full sample of firms for EPA, FDA, OSHA, and SEC is 0.011,

[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*.

[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.

0.004, 0.003, and 0.003, respectively (Table IA.IV). 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 described in section II.A. To account for industry-specific regulatory exposure, we construct the *Industry-exposure-weighted AAI*, as the product of *AAI* and natural logarithm of each industry's *RS*:[29]

$$Industry - exposure - weighted\ AAI_{i,t} = AAI_t \times\ ln(RS_{i,t}) \quad (2)$$

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 *AAI* 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's *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.

[29] The *RS* exhibits strong left-skewness. The logarithmic transformation mitigates this skewness, improves its distribution, and preserves meaningful variation across industries. We further transform *ln (RS)* to start from zero since a negative exposure is not interpretable.

$$Firm - exposure - weighted\ AAI_{i,j,t} = AAI_t \times\ ln(RS_{i,t})\ \times\ MS_{i,j,t} \quad (3)$$

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's *variation* 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. 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 (more) 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 average

RS value above the 95th percentile of all firms exposed to an agency.[30] 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:

$$Performance_{i,j,t} = \alpha + \beta . AAI_{t-1} + \gamma_1 . X_{i,t} + \gamma_2 . Z_t + \gamma_3 . Industry\ Performance_{j,t} + \mu_i + \epsilon_{i,t} \quad (4)$$

where *i, j,* and *t* denote firm, industry (6-digit NAICS) and year, respectively. The dependent variable, $Performance_{i,j,t}$, measures firm's *Operating Performance* each year. The main independent variable AAI_{t-1} is the activity intensity for each agency, lagged by one 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. The year-level clustering is to ensure our standard errors are not biased due to firms being subject to similar shocks in each year. $X_{i,t}$ is a vector of control variables that contain firm-level attributes including *Size*, *CAPEX + R&D*, *Leverage*, *Market-to-book*, and *Sales Growth* to control for common factors that have an independent effect on firm performance. μ_i 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* (all in Z_t) to control for economic conditions that are uniform across all firms in each year. Furthermore, we include a control for

[30] Average *RS* is the time-series average of the annual *RS*.

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 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 (1973 to 2022) 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:

$$Performance_{i,j,t} = \alpha + \beta.Industry\text{-}exposure\text{-}weighted\ AAI_{j,t-1} + \gamma.X_{i,t} + \mu_{k,t} + \epsilon_{i,t} \quad (5)$$

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's *Operating Performance* for each year. The main independent variable $Industry-exposure-weighted\ AAI_{j,t-1}$ is the activity intensity for each of the agencies EPA, FDA, OSHA, and SEC at the 6-digit NAICS level lagged by one year. *Industry-exposure-weighted AAI* by construction is external to firm-level characteristics. The firm-level control variables are the same as regression (4). $\mu_{k,t}$ represents year × industry (2-digit NAICS) fixed effects[31]. The error term, $\epsilon_{i,t}$, is clustered

[31] We eschew firm or 6-digit NAICS fixed effects from our analysis because the time series variation in *RS* is low, with an average coefficient of variation less than 10% for all four agencies. Including these fixed effects would absorb all the between-industry variation making it impossible to identify the effect of activity intensity at the agency-industry level on firm performance.

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 1973 to 2022. 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, providing us with improved identification of how agency enforcement and rulemaking activities affect firm-level performance. Our regression specification is:

$$Performance_{i,t} = \alpha + \beta.Firm - exposure - weighted\ AAI_{i,t-1} + \gamma.X_{i,t} + \mu_i + \mu_t + \epsilon_{i,t} \quad (6)$$

where *i* and *t* denote firm and year, respectively. $Performance_{i,j,t}$, captures the firm's *Operating Performance* each year. The main independent variable $Firm - exposure - weighted\ AAI_{i,t-1}$ is the activity intensity for each agency at the firm level lagged by one year. The firm-level control variables are the same as regression (4). 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 firm performance on the Violation Tracker data firm-level enforcement variables, *Violation* and *Penalty*, for our full sample of firms (Compsutat) for 2001-

2022. We use the following simple linear regression specifications:

$$Performance_{i,t} = \alpha + \beta.Violation_{i,t-1} + \gamma.X_{i,t} + \mu_i + \mu_t + \epsilon_{i,t} \quad (7a)$$

$$Performance_{i,t} = \alpha + \beta.Penalty_{i,t-1} + \gamma.X_{i,t} + \mu_i + \mu_t + \epsilon_{i,t} \quad (7b)$$

where *i* and *t* denote firm and year. The dependent variable, $Performance_{i,t}$, captures the firm's *Operating Performance* for each year. The key independent variables are $Violation_{i,t-1}$, a dummy equal to one if the firm received a violation in the prior year, and $Penalty_{i,t-1}$, the monetary value of penalties imposed on the firm in the prior year. Firm controls are the same as the 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 Events

The *AAI* was designed to be external to firm-level characteristics and industry trends. However, given the inherently endogenous nature of firm–regulation interactions, we use regulatory exogenous shocks to address potential endogeneity concerns, in case any variables used to construct the *AAI* were influenced by firm outcomes or industry conditions. We identify such shocks by examining sharp shifts in the *AAI* time series, as captured in Figure 1. These substantial changes in agency activity are plausibly driven by external regulatory and enforcement-related events. Specifically, we identify deregulatory shocks that led to decreased agency activity for the EPA and FDA, and a regulatory shock that increased agency activity for the SEC. These events include the expiration of the EPA Superfund Excise Tax in 1995, the FDA Modernization Act of 1997, and the SEC's Sarbanes-Oxley Act of 2002. We employ a difference-in-differences (DiD) approach to estimate the impact of these shocks by comparing firms that are regulated under the

agency and directly affected by the respective regulatory/enforcement change, to firms not subject to that agency's oversight. In addition, we conduct event studies on market reactions to the recent Supreme Court hearing in "Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc.," which significantly limits agencies' rulemaking authority, to determine whether investors respond to anticipated reductions in regulatory/enforcement power—providing further evidence of the impact of agency activities on firms.

B.1. EPA Superfund Excise Tax Expiration

The EPA Superfund tax was established under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. Under this act, Congress imposed excise taxes on the production and importation of 42 specific chemicals, primarily petrochemical derivatives and metals. The law explicitly mentions crude oil, petrochemical, and chemical industries. For example, 26 U.S.C. § 4611 imposes a tax on domestic crude oil that is received at a U.S. refinery or exported from the United States. Similarly, 26 U.S. Code § 4661 states: "There is hereby imposed a tax on any taxable chemical sold by the manufacturer, producer, or importer thereof" referring to the designated list of chemical feedstocks. The Congressional Research Service estimated the revenues from the Superfund to be around 1.45 billion dollars annually. Revenue from these taxes was allocated to the Superfund, which the EPA used to finance environmental remediation activities such as the cleanup of hazardous waste sites where no responsible party could be identified. The fund also supported enforcement actions aimed at holding potentially responsible parties accountable for pollution and contamination.

However, the taxing authority for the Superfund was set to expire in 1995, and efforts to extend it failed when H.R. 3800 stalled in Congress in 1994. The impact of this policy shift is

captured by our *AAI* measure, with the EPA subsequently adjusting its enforcement activities in response (Table IA.II). For example, EPA's *Action1* and *Action2* declined from 3,808 and 338 in 1993 to 2,171 (a 43% reduction) and 225 (a 33% reduction), respectively, by 1996.

The timing and magnitude of the EPA's enforcement adjustments, which were driven by the anticipated expiration of the Superfund tax rather than by changes in industry conditions, make this event an exogenous deregulatory shock for studying how corporate performance responds to a decline in agency activity. We employ a difference-in-differences regression framework to analyze this effect. The years 1992 to 1994 define the pre-treatment period, capturing firm behavior prior to the expiration. The years 1995 and 1996 serve as the post-treatment period.[32]

To identify the affected industries, we rely on EPA's Toxics Release Inventory (TRI) Program reports, which identify industries with the highest releases of CERCLA hazardous substances (the 42 taxed chemicals). The TRI reports designate mining (NAICS 21), utilities (NAICS 22), chemicals (NAICS 32), primary metals (NAICS 33), and waste management (NAICS 56) as the sectors with the largest volume of reported toxic chemical releases. We construct our treatment group by selecting firms within these sectors that exhibit an EPA average *RS* above the 50th percentile. Since *RS* is constructed at the six-digit NAICS level, imposing this *RS* threshold enables us to identify firms that are both involved with these hazardous chemicals and subject to active EPA oversight by filtering out unrelated or weakly exposed industries from the treatment group. We exclude from our sample highly exposed firms (average *RS* above the 95th percentile) to other agencies (FDA, OSHA, SEC) to improve the quality of the treatment and better isolate the

[32] We exclude 1997 from the analysis due to increased EPA activity following the passage of the Food Quality Protection Act in 1996 and the implementation of stricter ozone regulations in 1997, which could confound the deregulatory effect.

effect. For example, we exclude pharmaceutical firms (NAICS 3254) due to their being heavily regulated by the FDA, which could confound the EPA-specific effect. Our control sample consists of firms with average *RS* below the 50th percentile representing industries with light exposure to EPA oversight. 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 *Operating Performance* (within 10%).[33] 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:

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

where *i* and *t* denote firm and year. The dependent variable, $Performance_{i,t}$ captures the firm's *Operating Performance* for each year. $Treated_i$ is a dummy variable that takes the value of one for our treatment firms 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 captures the effect of the EPA enforcement and tax burden reduction on treatment firms' performance relative to 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.

B.2. FDA Modernization Act

The Food and Drug Administration Modernization Act (FDAMA) of 1997 was a deregulatory reform aimed at modernizing and streamlining the FDA's regulatory framework. FDAMA revised outdated provisions by codifying harmonized approval procedures for drugs,

[33] 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.

biologics, and medical devices including streamlined clinical trial requirements (e.g., allowing single trials in certain cases), eliminating separate license applications for well-characterized biologics, exempting low-risk devices from extensive premarket reviews, and outsourcing some of the device review responsibilities to accredited third parties. It also established a formal fast-track approval process for drugs treating life-threatening conditions. The Act reauthorized the Prescription Drug User Fee Act of 1992, allowing the FDA to collect additional user fees from industry, which provided the financial resources to hire qualified reviewers and commit to transparent and predictable review timelines. FDAMA permitted pharmaceutical companies to distribute peer-reviewed journal articles discussing off-label uses and benefits of their approved drugs, providing a competitive edge for their product in the market. In the food sector, it relaxed burdensome packaging regulations, enabling faster market entry for food products, and revised food labeling standards to permit more aggressive health-related claims, especially for dietary supplements. The FDAMA provisions are implemented by the FDA in the same way any statutory mandate is carried out by a federal agency. When a law is passed that affects an agency, the agency implements it through the rulemaking process by amending its regulations in the CFR. The FDA's implementation of the FDAMA deregulatory statutes is reflected in our FDA *AAI*, which shows a trough in the index from 1997 to 1999. This sharp decline is driven by a 14% percent reduction in the number of restrictive words in FDA regulations (from 22,677 to 19,407) and a 16% percent reduction in the total word count of FDA regulations (from 2,449,088 to 2,051,776) between 1997 and 1999 (Table IA.II).

FDAMA was motivated by the need to modernize outdated FDA regulations and was part of the Clinton Administration's broader "Reinventing Government" initiative, which aimed to

increase the efficiency and responsiveness of federal agencies by cutting unnecessary regulatory burdens and improving administrative procedures. Its origins lie in political and institutional reform rather than firm-level conditions, making the shock plausibly exogenous to firm performance. This reform also caused a clear structural break in our FDA *AAI*, reflecting FDAMA's significant and abrupt impact on FDA activity. Given both its exogeneity and the large magnitude of its effect on the *AAI*, FDAMA provides a plausible quasi-experimental shock for identifying the causal effect of changes in FDA activity intensity on corporate performance. We employ a difference-in-differences regression framework, same as in Equation (8), to analyze this effect. We define 1996 through 1998 as the pre-treatment period and 1999 to 2001 as the post-treatment period.[34] We use the FDAMA's provisions to identify the affected industries. The statutory changes directly impacted laws governing drug and biologics products, medical devices, research and development, and food products. As a result, we define affected firms as those in pharmaceutical and medicine manufacturing (NAICS 3254), food and beverage manufacturing (NAICS 311 & 312), and scientific research and development services (NAICS 5417). The treatment group includes firms in these sectors with an FDA-average-*RS* above the 50th percentile, excluding FDA-unregulated industries. We also exclude from our treatment group, firms with average *RS* above the 95th percentile to other agencies (EPA, OSHA, SEC) to prevent confounding effects in our treatment identification. The control group comprises firms with average *RS* below the 50th percentile, matched to treatment firms by industry (2-digit NAICS), *Size* (within 30%), and *Operating Performance* (within 10%), following the same matching procedure as the EPA

[34] The FDAMA was signed into law on November 21, 1997. FDA interpreted the law and adjusted regulations in 1998, with provisions fully implemented by April 1, 1999.

Superfund tax excise expiration shock.

B.3. 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 quasi-experimental shock to investigate firms' performance responses to

an increase in agency activity using a difference-in-differences regression (Equation (8)). We set the years 2001 thtrough 2003 as the pre-treatment period, establishing a baseline of firm performance before SOX's full implementation. The years 2004 thtrough 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 2003-2004 (e.g., Donelson, McInnis, and Mergenthaler (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, Ege, and McInnis (2017)).

Since SOX significantly expanded SEC oversight and imposed stricter requirements on disclosure, auditing, and internal controls, we form our treatment group from industries where these provisions had the most substantial impact. We focus on the *Finance and Insurance* sector (NAICS 52) (excluding foreign firms as well as any cross-listed on U.S. exchanges) because firms in this sector face highly complex financial reporting, depend heavily on audited financial statements, and are highly regulated by SEC. Therefore, firms in NAICS 52 are more directly exposed to the regulatory changes introduced by SOX than firms in most other indsutries. Similar to the previous shocks, we exclude from our treatment group firms highly exposed to other agencies (EPA, OSHA, SEC) to prevent confounding effects in our treatment identification.

Given that SOX imposed significant regulatory changes on U.S. public firms in all industries, not just the financial industry, we refrain from using the US firms to create our control sample. Instead, 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 *Operating Performance* (within 10%).

B.4. 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 three shocks we studied, which involved introducing new legislation leading to decreased/increased regulation and enforcement. In contrast, this shock could impact the foundational ability of agencies to freely enforce existing laws.

[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, Bommarito, and Blackman (2017) for evidence that agreement to hear a case helps predict their decision. Indeed, on June 28, 2024, the Court sided with Loper Bright.

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 an event study. We examine how investors responded 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 average *RS* scores above the 95th percentile for that agency. Additionally, we form a control group for each treatment group, consisting of firms with average *RS* scores below the 50th percentile for all the agencies. This ensures our control sample consists of firms that are not heavily regulated by any of the affected 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 (CARs) of the firms over the event windows [-1, +1] and [-3, +3], with day 0 marked as the announcement date on May 1, 2023. CARs are computed as the sum of daily Abnormal Returns (ARs) for each firm during these windows:

$$CAR_i = \sum_{t=t_1}^{t_2} AR_{i,t} \tag{9}$$

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:

$$AR_{i,t} = R_{i,t} - \widehat{R_{i,t}} \tag{10}$$

where $\widehat{R_{i,t}}$ is the estimated expected return for firm i on event day t, calculated using Fama-French (FF) 4-factor model. The FF expected return (for firm *i* on day *t*) is estimated as follows:

$$\widehat{R_{i,t}} = R_{f,t} + \hat{\alpha}_i + \widehat{\beta_{iM}}(R_{m,t} - R_{f,t}) + \widehat{\beta_{iSMB}}SMB_t + \widehat{\beta_{iHML}}HML_t + \widehat{\beta_{iMOM}}MOM_t \qquad (11)$$

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, HML_t is the value factor measuring the excess returns of stocks with high book-to-market values over those with low values, and MOM_t is the momentum factor measuring the excess return of past winners over past losers. $\widehat{\beta_{iM}}$, $\widehat{\beta_{iSMB}}$, $\widehat{\beta_{iHML}}$, and $\widehat{\beta_{iMOM}}$ are the estimated regression coefficients from the firm's return regressed on the market factor, size factor, value factor, and momentum factor, respectively, during the estimation window of [-150, -50].[37]

V. Results

This section presents regression results linking firm performance to government agency activity. In Section V.A we explore agency activity effects on firm performance with simple OLS. Section V.B conducts quais-natural experiments and event studies on major regulatory changes (EPA Superfund, FDAMA, SOX, and Supreme Court deliberations). Section V.C explores mechanisms driving these effects, focusing on asset and profit margins and specific agency activity components. Section V.D distinguishes our findings from alternative explanations, such as Kalmenovitz's (2023) paperwork burden. Results consistently show that stronger agency enforcement and rulemaking – enabled by larger budgets and FTE workforces – associate with reduced firm performance, particularly for highly exposed firms.

[37] 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.

A. Regressions of Performance on Enforcement

A.1. Highly Exposed Firms

Table II selects on firms that belong to industries with high exposure to the focal agency. For example, the regression analysis in column (1) of Table II contains only firms with average $RS > 95^{th}$ 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 have very high exposure to the EPA. Under this example, the variation in the regressor (*EPA AAI*) is a time series [annual] variation in the activity index (the first factor described in Table I) for the EPA.

Table II presents results from four regressions (Equation (4)), 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.[38]

The regressions indicate consistent detrimental effects of agency activity on firm operating performance. For firms belonging to highly-exposed-to-EPA industries, the coefficient on the activity index is -0.075; a one standard deviation increase in the activity index reduces highly-exposed (to EPA) firms' average operating performance by 7.5%. Similar performance effects are seen in the FDA regression (-6.9%), while the effect is somewhat muted in the SEC regression (-4.0%). For firms highly exposed to OSHA regulations, the effect is further muted (-1.9%) 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

[38] As discussed in section IV.A, these are time series regressions. There is thus no reason to include year fixed effects.

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. 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.[39]

Several other coefficients in Table II 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* (significant in only two regressions), and particularly *President Party*, carry mostly insignificant (with only one 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 AAI 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

[39] We re-estimate the regression using six-digit NAICS industry-level *Operating Performance* as the dependent variable and obtain similar results (Table IA.VI).

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

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*). 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 little time-series variation (as we discussed in section IV.A). This is because in most cases an industry and the firms within it are always exposed (or not 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 III presents results from estimating Equation (5). Again, our main inference prevails in that 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.

The regressions in Table III 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

[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.

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.[42]

A.3. Full Sample Analysis of Firm-exposure-weighted AAI 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 IV, 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 EPA activity shows a significant reduction in operating performance, with a coefficient of -0.013, indicating that heightened agency activity correlates with a decrease in firm performance. Similar patterns are evident for other agencies where the enforcement activity inversely affects firm performance. To ensure robustness in our findings, we include both firm and year fixed effects in our regression

[42] We re-estimate the regression using six-digit NAICS industry-level *Operating Performance* as the dependent variable and obtain similar results (Table IA.VII).

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.

A.4. 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 the previous year, and its penalty amount (logged). We include year fixed effects and varying industry or firm fixed effects. The panel is at the firm-year level. Table V presents our results.

Enforcement of a specific firm associates with worse operating performance. 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.

B. Regulatory Events

B.1. Regulatory and Deregulatory Shocks

Our analysis uses three major regulatory events to assess their impact on firm operating performance: the expiration of the EPA Superfund Excise Tax in 1995 (deregulatory), the FDA Modernization of 1997 (deregulatory), and the SEC SOX of 2002 (regulatory). Table VI, Panel A reports difference-in-differences (DiD) results from Equation (8), focusing on the interaction

between the post-treatment period and a treatment indicator for exposed firms. The findings indicate a statistically significant improvement in operating performance following the two deregulatory shocks, with coefficients of 0.015 for EPA and 0.037 for FDA. In contrast, we observe a significant decline in performance after SOX, with a coefficient of -0.040, consistent with compliance costs imposed by heightened SEC oversight. The opposite signs for deregulatory versus regulatory shocks strengthen the inference that agency activity materially influences firm outcomes. All regressions include the same firm-level controls as earlier models, along with firm and year fixed effects.

To validate our identification strategy, we first examine the parallel trends assumption of the DiD models. We interact annual dummies with the treatment indicator and plot the coefficients relative to the year before treatment in Figure 2, Panels A, B, and C for EPA, FDA, and SEC, respectively. Pre-treatment coefficients are close to zero and statistically insignificant, indicating no significant difference in performance trends between treated and control firms prior to the event. Post-treatment, the trajectories diverge as expected, showing the causal impact of the shocks. We also conduct placebo tests (untabulated) using two alternative post-treatment windows for all our agencies (1992–1993 and 1997–1998 for EPA; 1996–1998 and 2003–2005 for FDA; 2001–2003 and 2007–2009 for SEC). These placebo analyses yield no significant results associated with the observed positive or negative effects of the shocks.

B.2. U.S. Supreme Court Deliberation on Federal Agencies' Rulemaking Authority

Table VI, Panel B details the stock market reactions of treated firms (*RS*>95%) 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 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 likely 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. Asset Turnover and Profit Margin

Operating performance is a function of two margins – asset margin and (operating) profit

margin. Agency activity may reasonably have different effects on the two. We explore this possibility in Table VII. 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 for 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 for firm cost management efficiency.

The regression results suggest that agency activities' association with worse operating performance is driven by cost. The negative coefficient on the agency activity index mostly appears significant in the profit margin regressions. This is intuitive since agency enforcement and rulemaking are typically considered to increase costs, through required expenditures to fix a regulator's concern(s).[43]

By contrast, the effect of agency activity on asset margin is small and sometimes positive. 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.

C.2. Pieces of AAI

[43] We perform the same analysis at the industry-exposure level (Table IA.VIII) and the firm-exposure level (Table IA.IX) and find similar results.

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. Table I provides some clues. For instance, CFR-related variables consistently load highly on the *AAI*, signaling their strong contribution. Among the other components, *Action1* and *Budget* exhibit consistently high loadings and low uniqueness across the FDA, OSHA, and SEC. *FTE* follows next in explanatory strength, while *Action2* contributes the least, with the lowest loadings across agencies.[44]

To examine how these components individually relate to firm performance, we estimate regressions using each of the six variables separately. We report the results in Internet Appendix Tables IA.X through IA.XIII for the EPA, FDA, OSHA, and SEC, respectively. All models include the usual controls and firm fixed effects, and the sample is restricted to firms highly exposed to the agency ($RS > 95\%$). The six components are *Action1*, *Action2*, *Budget*, *FTE*, *Regulation1*, and *Regulation2*.

Several patterns emerge. First, CFR-related measures matter across all agencies: greater regulatory text and more restrictive language consistently correlate with weaker operating performance. However, for the FDA and OSHA, the impact of regulation variables is generally smaller than that of *Action1* and *Budget.*

Second, across three agencies, larger budgets associate with enforcement and rulemaking that is more costly to firm performance. This is not an indictment of government regulation because

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

enforcement reflects Congressional intent, and Congress also sets the budgets for agencies.

Finally, *Actions* are harder to define consistently across agencies (see II.A). Nevertheless, we can use the results from Table I to inform our expectations regarding which *Action* is likely to have a more detrimental effect on performance.. Table I indicates that *Action1* loads more strongly on the first factor than *Action2* for all four agencies. Consistent with this, Tables IA.X–IA.XIII show significantly negative coefficients for *Action1* across three agencies, whereas *Action2* effects are weaker or insignificant. In short, the components that weigh most heavily in the *AAI* are also those most detrimental to the operating performance of highly exposed firms.

D. Alternative Explanations

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, available at both the firm-year level and the annual time series level (*Annual RegIn*). First, we benchmark the total number of firm-level violations an agency issued in a year (*Agency Violation*) from Violation Tracker – as a realized output of agency activity – and test whether *AAI* predicts these outcomes after controlling for *Annual RegIn*. Table VIII shows a strong positive correlation between *AAI* and realized enforcement for EPA, OSHA, and SEC, which persists even after

controlling for *Annual RegIn*.[45] This result is expected since *AAI* captures multiple aspects of agency activity, while *RegIn* focuses primarily on paperwork regulations. We also visualize this relationship by plotting *AAI* versus *Agency Violation* for each year for these three agencies in Figure IA.2, which shows similar time series paths for both measures. In the Internet Appendix, we repeat this analysis at the firm-exposure level and find similar results: *Firm-exposure-weighted AAI* significantly predicts violations at the firm-year level even after controlling for *RegIn* (Table IA.XIV).

Next, we examine whether *RegIn* explains performance differently from *AAI* by including both variables in the same regression (see Table X, for firms highly exposed to an agency). When both one-year-lagged *RegIn* and *AAI* are included, *AAI* retains a significantly negative coefficient for EPA, FDA, and SEC, indicating that our latent agency activity proxy captures variation orthogonal to the paperwork burden reflected in *RegIn.*

We further explore robustness in the Internet Appendix by controlling for *RegIn* in multiple ways. First we sub-sample firms with low *RegIn* burden and re-run our main analysis from Table II (see Table IA.XV).[46] The results remain consistent for firms highly exposed to EPA, FDA, and SEC, but not for OSHA. Next, in Table IA.XVI 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* values). The coefficient on *Industry-exposure-weighted AAI* is significantly negative in all columns in the regression. By contrast, the coefficient on *RegIn* is never significant. Next, in Table IA.XVII, we extend our analysis to the firm level, where *Firm-exposure-weighted AAI* continues to show a

[45] We exclude FDA from this analysis because Violation Tracker contains too few observations for FDA to support a meaningful analysis.

[46] We use the *Regin* median to choose the firms with *Regin* below that threshold.

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).

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 regulatory-interpretation and 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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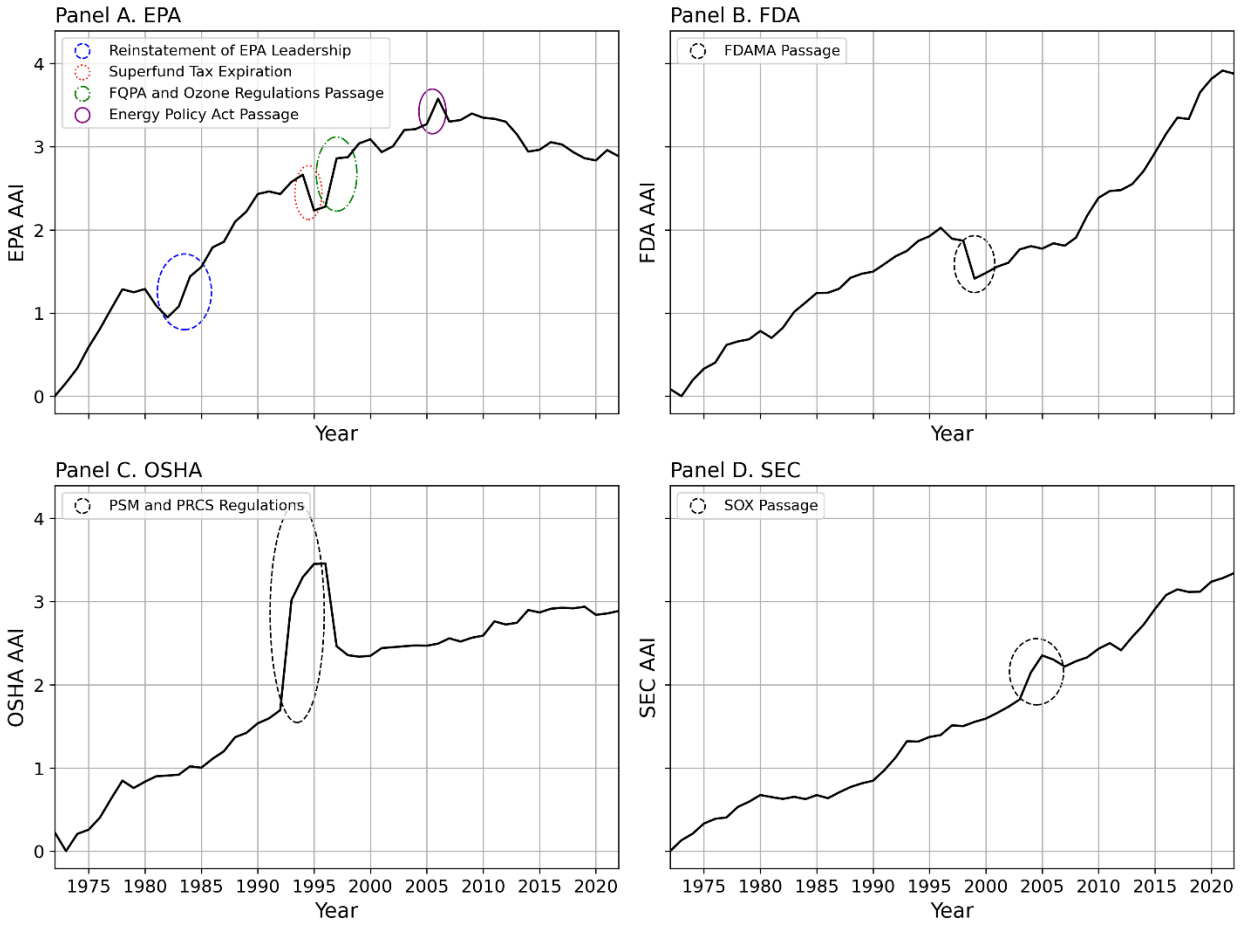

Figure 1. Time Series of *Agency Activity Intensity* (*AAI*) and Major Regulatory Events

This figure presents the annual *Agency Activity Intensity (AAI)* for the EPA, FDA, OSHA, and SEC from 1972 to 2022, with each panel highlighting key regulatory and legislative events associated with changes in agency activity. Panel A shows *EPA AAI* with annotations for the Reinstatement of EPA Leadership, Superfund Tax Expiration, Food Quality Protection Act (FQPA) and Ozone Regulations Passage, and the Energy Policy Act. Panel B displays *FDA AAI* and marks the passage of the Food and Drug Administration Modernization Act (FDAMA). Panel C illustrates *OSHA AAI*, highlighting the introduction of the Process Safety Management (PSM) and Permit-required Confined Spaces (PRCS) regulations. Panel D presents *SEC AAI* and indicates the passage of the Sarbanes-Oxley Act (SOX).

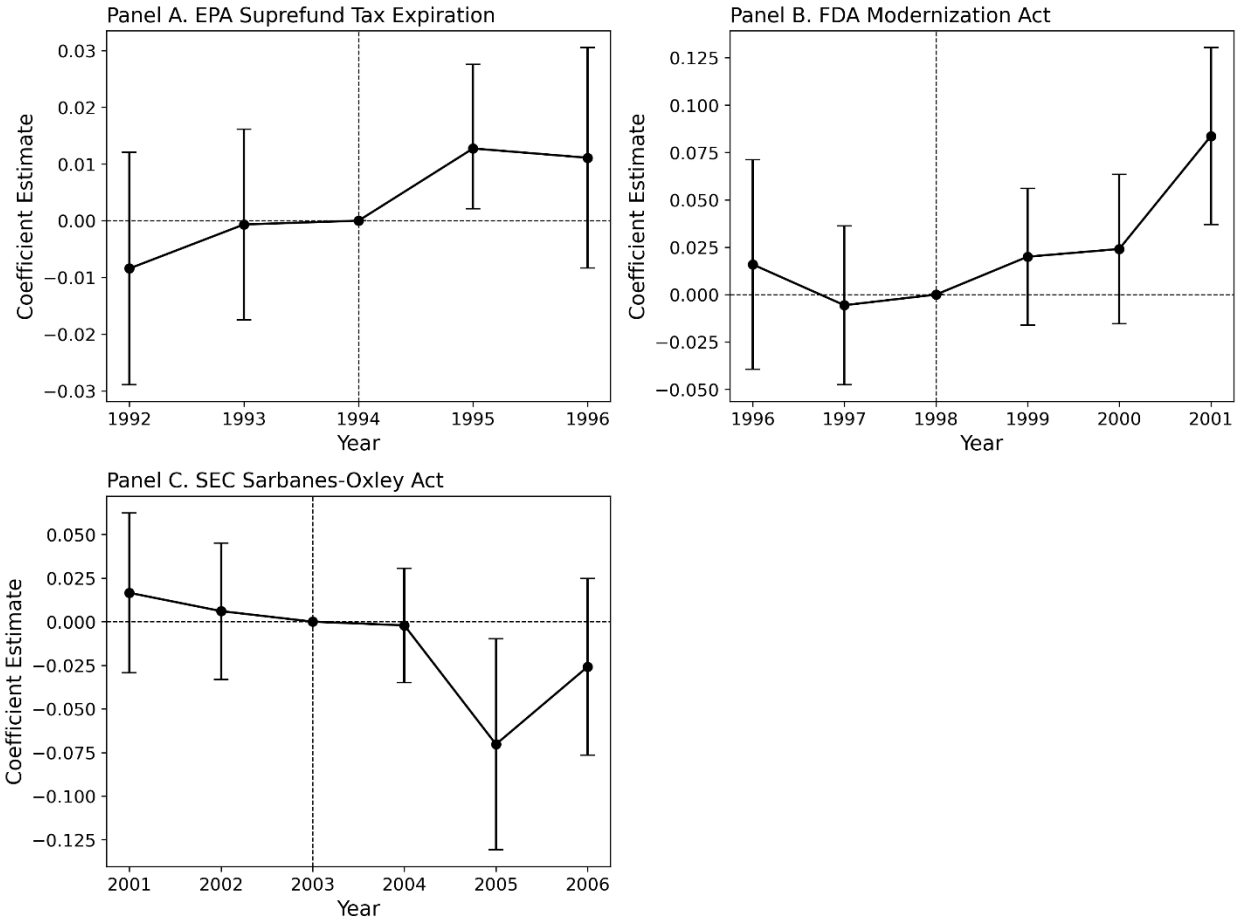

Figure 2. Parallel Trend

This figure tests the parallel trend assumption for the effect of regulatory shocks on firm operating performance. Figure plots the coefficient estimates and 95% confidence intervals for the impact of the shock on *Operating Performance* for each year, relative to the year before treatment, with a vertical dashed line marking the treatment period. Panel A, B, and C display the coefficient estimates and 95% confidence intervals for the effect of EPA's Superfund Excise Tax Expiration, FDA Modernization Act, and SEC Sarbanes-Oxley, respectively. In all panels, the regressions interact annual dummy variables with a binary indicator for treated firms to capture the effect over time. The regressions control for firm size, capital expenditures, leverage, market-to-book ratio, and sales growth, and include firm and year fixed effects, with standard errors clustered at the firm level.

Table I

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) million 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 (outlays) in constant (2012 inflation-adjusted) 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., may not, must, prohibit, require, and shall) 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 the first four 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 the 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	2.693	4.600	3.567	5.007
Factor2	1.549	0.674	0.775	0.186
Factor3	0.075	0.225	0.226	0.058
Factor4	-0.002	0.012	0.035	-0.002

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	0.520	0.729	0.813	0.339	0.869	0.245	0.890	0.208
Action2	0.403	0.837	-0.787	0.380	-0.638	0.593	0.596	0.645
Budget	0.086	0.993	0.928	0.140	0.597	0.643	0.963	0.072
FTE	0.875	0.235	0.932	0.131	-0.327	0.893	0.993	0.014
Regulation1	0.862	0.257	0.926	0.142	0.985	0.029	0.987	0.026
Regulation2	0.862	0.256	0.856	0.268	0.985	0.029	0.986	0.027

Table II

Agency-level Activity and Corporate 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 regulated by that agency from 1973 to 2022. Columns 1–4 represent firms in (6-digit NAICS) industries with average *RS* values above the 95th percentile average *RS* of all industries affected by the respective agency. Average *RS* is calculated as the time-series mean of annual *RS* values for each 6-digit NAICS industry. *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 each year. The dependent variable in all columns is the firm's *Operating Performance*, measured as 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 enforcement and rulemaking activity intensity by that agency lagged by one year. Control variables include *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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* (percentage change in real GDP from last year), *Inflation* (annual inflation percentage rate), *Unemployment* (annual unemployment percentage rate), and *President Party* (dummy = 0 when President is Republican, 1 when Democrat). All columns include firm fixed effects. Statistical significance is based on heteroskedasticity-robust double-clustered (year and firm) standard errors reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)
Dependent variable		*Operating Performance*		
EPA AAI	-0.075***			
	(0.013)			
FDA AAI		-0.069***		
		(0.017)		
OSHA AAI			-0.019**	
			(0.009)	
SEC AAI				-0.040***
				(0.015)
Size	0.069***	0.070***	0.015**	0.027**
	(0.008)	(0.011)	(0.007)	(0.010)
CAPX + R&D	-1.081***	-0.940***	0.033	-0.503**
	(0.036)	(0.051)	(0.082)	(0.239)
Leverage	-0.186***	-0.189***	-0.075	-0.082**
	(0.021)	(0.036)	(0.047)	(0.040)
Market-to-book	0.002***	0.003**	0.001	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
Sales Growth	0.023***	0.020***	0.038***	0.011
	(0.003)	(0.005)	(0.013)	(0.009)
Industry Performance	0.414***	0.266**	0.961***	0.845***
	(0.074)	(0.125)	(0.093)	(0.133)
GDP Growth	-0.002	0.007**	0.0001	0.001
	(0.002)	(0.003)	(0.001)	(0.001)
Inflation	0.005*	0.009***	0.001	0.002
	(0.003)	(0.003)	(0.001)	(0.001)
Unemployment	-0.004	0.004	0.002	0.001
	(0.004)	(0.005)	(0.002)	(0.001)
President Party	0.010	0.0004	0.012**	-0.007
	(0.010)	(0.012)	(0.006)	(0.004)
Constant	0.005	-0.158**	-0.068	-0.108**
	(0.049)	(0.061)	(0.042)	(0.049)
Observations	22,321	9,421	7,541	20,917
R-squared	0.760	0.731	0.587	0.550
Firm FE	YES	YES	YES	YES

Table III

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 1973 to 2022. The dependent variable in all the columns is the firm's *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 lagged by one year and calculated as the product of *AAI* and the natural logarithm of *RS* (transformed to start from zero). *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually. *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 each year. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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***			
	(0.002)			
Industry-exposure-weighted FDA AAI		-0.015***		
		(0.004)		
Industry-exposure-weighted OSHA AAI			-0.011***	
			(0.002)	
Industry-exposure-weighted SEC AAI				-0.014***
				(0.004)
Size	0.064***	0.063***	0.064***	0.065***
	(0.005)	(0.005)	(0.005)	(0.005)
CAPX + R&D	-0.771***	-0.765***	-0.778***	-0.779***
	(0.099)	(0.100)	(0.098)	(0.099)
Leverage	-0.236***	-0.240***	-0.239***	-0.240***
	(0.023)	(0.022)	(0.022)	(0.022)
Market-to-book	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Sales Growth	0.005	0.005	0.005	0.005
	(0.005)	(0.005)	(0.005)	(0.005)
Constant	-0.117***	-0.092***	-0.091***	-0.102***
	(0.028)	(0.028)	(0.025)	(0.026)
Observations	183,163	183,163	183,163	183,163
R-squared	0.382	0.384	0.383	0.382
Industry × Year FE	YES	YES	YES	YES

Table IV

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 1973 to 2022. The dependent variable in all the columns is the firm's *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 lagged by one year and constructed as the product of *AAI*, the natural logarithm of *RS* (transformed to start from zero), and firm market share (*MS*). Here, *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually. *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 each year. *MS* is calculated as the firm's total sales scaled by its 6-digit NAICS industry total sales in each year. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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	-0.013***			
	(0.002)			
Firm-exposure-weighted FDA AAI		-0.016***		
		(0.002)		
Firm-exposure-weighted OSHA AAI			-0.018***	
			(0.002)	
Firm-exposure-weighted SEC AAI				-0.024***
				(0.003)
Size	0.056***	0.056***	0.057***	0.056***
	(0.003)	(0.003)	(0.003)	(0.003)
CAPX + R&D	-0.641***	-0.640***	-0.641***	-0.640***
	(0.021)	(0.021)	(0.021)	(0.021)
Leverage	-0.122***	-0.122***	-0.122***	-0.122***
	(0.008)	(0.008)	(0.008)	(0.008)
Market-to-book	0.002***	0.002***	0.002***	0.002***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Sales Growth	0.021***	0.021***	0.021***	0.021***
	(0.002)	(0.002)	(0.002)	(0.002)
Constant	-0.171***	-0.170***	-0.172***	-0.172***
	(0.013)	(0.013)	(0.013)	(0.013)
Observations	181,694	181,694	181,694	181,694
R-squared	0.699	0.699	0.699	0.699
Year FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Table V

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 2001 to 2022. The dependent variable in all the columns is the firm's *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*, is a dummy variable taking the value of one if a firm has been enforced for a violation in the previous 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 the previous year. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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	-0.089***	-0.013***		
	(0.006)	(0.002)		
Penalty			-0.008***	-0.001***
			(0.001)	(0.0002)
Size	0.073***	0.072***	0.073***	0.073***
	(0.002)	(0.004)	(0.002)	(0.004)
CAPX + R&D	-0.931***	-0.774***	-0.931***	-0.774***
	(0.036)	(0.036)	(0.036)	(0.036)
Leverage	-0.324***	-0.166***	-0.324***	-0.166***
	(0.014)	(0.012)	(0.014)	(0.012)
Market-to-book	0.004***	0.002***	0.004***	0.002***
	(0.001)	(0.0004)	(0.001)	(0.0004)
Sales Growth	0.016***	0.027***	0.015***	0.027***
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	-0.280***	-0.344***	-0.282***	-0.344***
	(0.011)	(0.024)	(0.012)	(0.024)
Observations	85,665	84,260	85,665	84,260
R-squared	0.477	0.779	0.478	0.779
Year FE	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Table VI

Regulatory and Deregulatory Shocks, Firm Performance, and Stock Market Reactions

Panel A reports difference-in-differences regression estimates examining the impact of three regulatory events on the firm's *Operating Performance*, measured as operating income before depreciation and taxes divided by 1-year-lagged total assets. Column (1) analyzes the 1995 EPA Superfund Excise Tax Expiration (pre-treatment: 1992–1994; post-treatment: 1995–1996). Treated firms are in industries associated with Superfund tax liabilities and chemical release risk (NAICS 32, 21, 22, 33, 56) and EPA average *RS* values above the 50th percentile. Column (2) examines the 1997 FDA Modernization Act (pre-treatment: 1996–1998; post-treatment: 1999–2001), with treated firms in affected industries (NAICS 3254, 311, 312, 5417) and average *RS* values above the 50th percentile. Column (3) evaluates the 2002 Sarbanes-Oxley Act (pre-treatment: 2001–2003; post-treatment: 2004–2006). Treated firms are those in Finance and Insurance (NAICS 52) (excluding foreign firms not listed on U.S. exchanges). Control firms are matched by industry (2-digit NAICS), *Size* (within 30%), and *Operating Performance* (within 10%). Control samples are drawn from firms with average *RS* values below the 50th percentile for the EPA and FDA analyses, and from Canadian firms not listed on U.S. exchanges for the SOX analysis. The firm control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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 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 4-factor model. The model is estimated over the pre-event window [-150, -50]. RS_{High} represents the treated sample consisting of highly exposed firms to an agency with an average *RS* above the 95th percentile of that agency. RS_{Low} represents the control sample consisting of lightly exposed firms to all agencies with an average *RS* below the 50th percentile of all agencies. *Diff* shows the CAR difference between RS_{High} and RS_{Low}.

Panel A. Regulatory and Deregulatory Shocks

	EPA Superfund (1995)	FDAMA (1997)	SEC SOX (2002)
Dependent variable	(1)	(2)	(3)
Post × Treatment	0.015*	0.037**	-0.040**
Observations	6,450	3,539	2,688
R-squared	0.705	0.789	0.670
Firm Controls	YES	YES	YES
Year FE	YES	YES	YES
Firm FE	YES	YES	YES

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

	Control	EPA		FDA		OSHA		SEC	
Variable	RS_{Low}	RS_{High}	*Diff*	RS_{High}	*Diff*	RS_{High}	*Diff*	RS_{High}	*Diff*
CAR[-1,1]	0.006	0.023***	0.017***	0.015*	0.009	0.028***	0.022***	-0.034***	-0.040***
	(1.52)	(5.22)	(2.95)	(1.82)	(1.00)	(4.92)	(3.25)	(-11.13)	(-8.15)
CAR[-3,3]	-0.0002	0.040***	0.040***	0.028*	0.029*	0.016	-0. 0002	-0.051***	-0.051***
	(-0.026)	(4.86)	4.00)	(1.84)	(1.75)	(1.49)	(-0.026)	(-7.04)	(-5.50)

Table VII

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

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 1973 to 2022. These are the firms in the industries (6-digit NAICS) with average *RS* values larger than the 95% percentile average *RS* of all industries affected by the EPA (columns 1 and 5), FDA (columns 2 and 6), OSHA (columns 3 and 7), and SEC (columns 4 and 8). Average *RS* is calculated as the time-series mean of annual *RS* values for each 6-digit NAICS industry. *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 each year. The dependent variable in columns (1) through (4) is the firm's *Asset* T*urnover*, measured as the total sales divided by 1-year-lagged total assets. The dependent variable in columns (4) through (8) is the firm's *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 lagged by one year. Firm controls are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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), *Ind Asset Turnover* (*Asset Turnover* of the median firm within each 6-digit NAICS in each year), *Ind Profit Margin* (*Profit Margin* of the median firm within each 6-digit NAICS in each year). Macro controls are *GDP Growth* (the percentage change in real 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.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Asset	*Asset*	*Asset*	*Asset*	*Profit*	*Profit*	*Profit*	*Profit*
Dependent variable	*Turnover*	*Turnover*	*Turnover*	*Turnover*	*Margin*	*Margin*	*Margin*	*Margin*
EPA AAI	-0.005				-1.249***			
	(0.024)				(0.238)			
FDA AAI		-0.044*				-0.903***		
		(0.023)				(0.199)		
OSHA AAI			0.043				-0.110*	
			(0.026)				(0.064)	
SEC AAI				0.050**				-0.136***
				(0.022)				(0.042)
Ind Asset Turnover	0.887***	0.754***	0.725***	0.632***				
	(0.056)	(0.081)	(0.066)	(0.077)				
Ind Profit Margin					2.551***	3.611***	1.340***	1.296***
					(0.239)	(0.924)	(0.372)	(0.233)
Constant	0.247***	0.505***	0.881***	0.468***	-3.391***	-4.596***	-0.755***	-0.859***
	(0.065)	(0.111)	(0.173)	(0.069)	(0.861)	(0.642)	(0.270)	(0.184)
Observations	21,827	9,258	7,523	20,889	21,827	9,258	7,523	20,889
R-squared	0.354	0.499	0.621	0.526	0.234	0.181	0.053	0.083
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 VIII

Agency Activity Intensity and Annual Enforcement Outcomes

This table examines the correlation between the *Agency Activity Index (AAI)* measure and realized annual enforcement outcomes obtained from Violation Tracker. The sample includes annual observations from 2000 to 2020 since Violation Tracker data is only available from 2000. The dependent variable, *Agency Violation*, shows the total number of enforcement actions received in a given year from the EPA (columns 1–2), OSHA (columns 3–4), and SEC (columns 5–6). Our primary explanatory variable, *Agency AAI*, is an annual time series variable at the agency level representing the (enforcement and rulemaking) activity intensity by that agency. We also control for *Annual RegIn*, an annual time series measure of paperwork regulatory intensity based on Kalmenovitz (2023), capturing the burden of active regulations applicable to the firms in each year. Statistical significance is based on heteroskedasticity-robust standard errors. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	EPA Violation		*OSHA Violation*		*SEC Violation*	
Dependent variable Variable	(1)	(2)	(3)	(4)	(5)	(6)
EPA AAI	2.382***	2.485***				
	(0.788)	(0.729)				
OSHA AAI			4.719***	5.338***		
			(0.440)	(0.805)		
SEC AAI					1.690***	1.922***
					(0.236)	(0.416)
Annual RegIn		0.194		-0.151		-0.163
		(0.231)		(0.143)		(0.191)
Constant	-0.428	-4.843	-10.439***	-8.883***	-2.414***	0.464
	(2.512)	(5.775)	(1.134)	(1.543)	(0.551)	(3.256)
Observations	21	21	21	21	21	21
R-squared	0.232	0.269	0.896	0.904	0.739	0.752

Table IX

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 1994 to 2020 after controlling for firm-level paperwork regulation intensity. Please note that the sample of firms is limited to firms with available paperwork regulation intensity from Kalmenovitz (2023). Columns 1,2,3, and 4 represent the firms in (6-digit NAICS) industries with average *RS* values larger than the 95% percentile average *RS* of all industries affected by the EPA, FDA, OSHA, and SEC, respectively. Average *RS* is is calculated as the time-series mean of annual *RS* values for each 6-digit NAICS industry. *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 each 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 lagged by one year. *RegIn* controls for one-year lagged paperwork regulatory intensity based on active regulations from Kalmenovitz (2023). *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 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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	-0.049**			
	(0.018)			
FDA AAI		-0.039*		
		(0.021)		
OSHA AAI			0.001	
			(0.016)	
SEC AAI				-0.038***
				(0.012)
RegIn	-0.033***	-0.042***	-0.006	0.002
	(0.011)	(0.012)	(0.008)	(0.006)
Observations	7,661	3,391	2,334	2,134
R-squared	0.724	0.698	0.542	0.601
Macro Controls	YES	YES	YES	YES
Firm Controls	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Internet Appendix

Federal Agencies and Corporate Performance

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I. Exploratory Factor Analysis vs. Principal Component Analysis

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 Maximum-Liklihood 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. The mathematical formula for PCA can be written as follows:

$C_n = \sum_{n=1}^{r} w_{in} X_i$ (i = 1,2,…,p)

Where *i* and n index variates and components respectively. w_{in} represents the weight of the i-th variable for the n-th component. C_n is the n-th common component. PCA distributes all variance, including error and unique variance for each observed variable, across components. 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 (e.g., standardized), whereas EFA does not impose this restriction. When the objective is to uncover underlying theoretical constructs and isolate the common variance while minimizing the influence of unique and error variance, EFA is the more appropriate analytical approach. Figure A1 visually illustrates these differences between EFA and PCA.

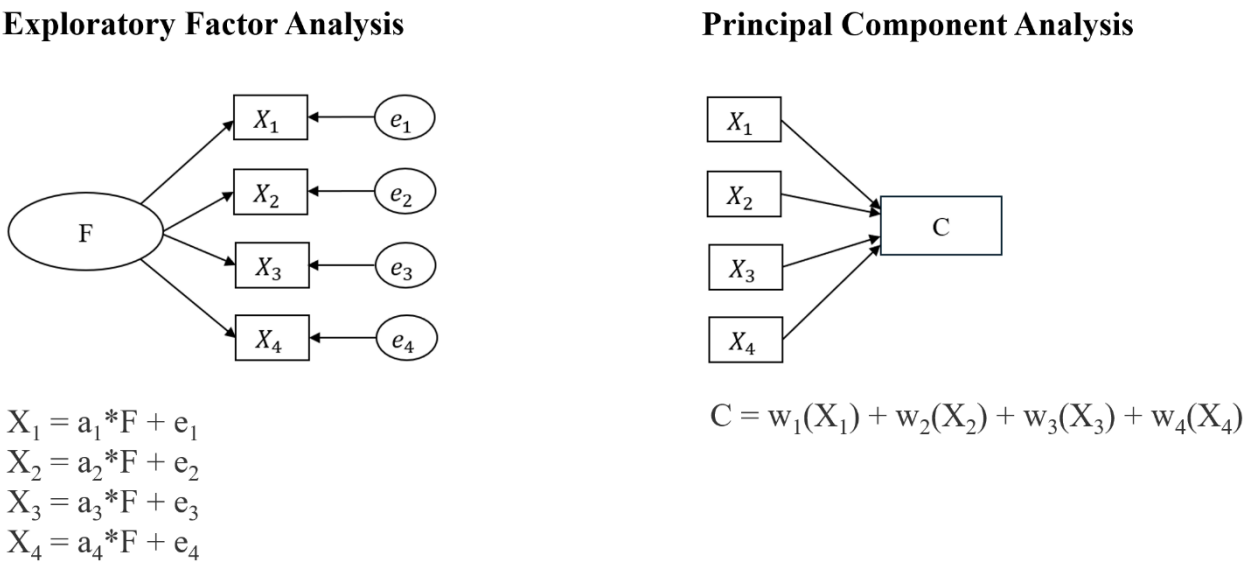

Figure IA.1 Comparison of Exploratory Factor Analysis and Principal Component Analysis

This figure illustrates the key structural differences between Exploratory Factor Analysis (EFA) and Principal Component Analysis (PCA). In EFA (left panel), a latent factor F explains the shared variance among observed variables X_1 to X_4 with each variable also containing unique variance e_i. In PCA (right panel), the observed variables contribute directly to the component C, which captures the total variance—including both shared and unique components—through weighted linear combinations.

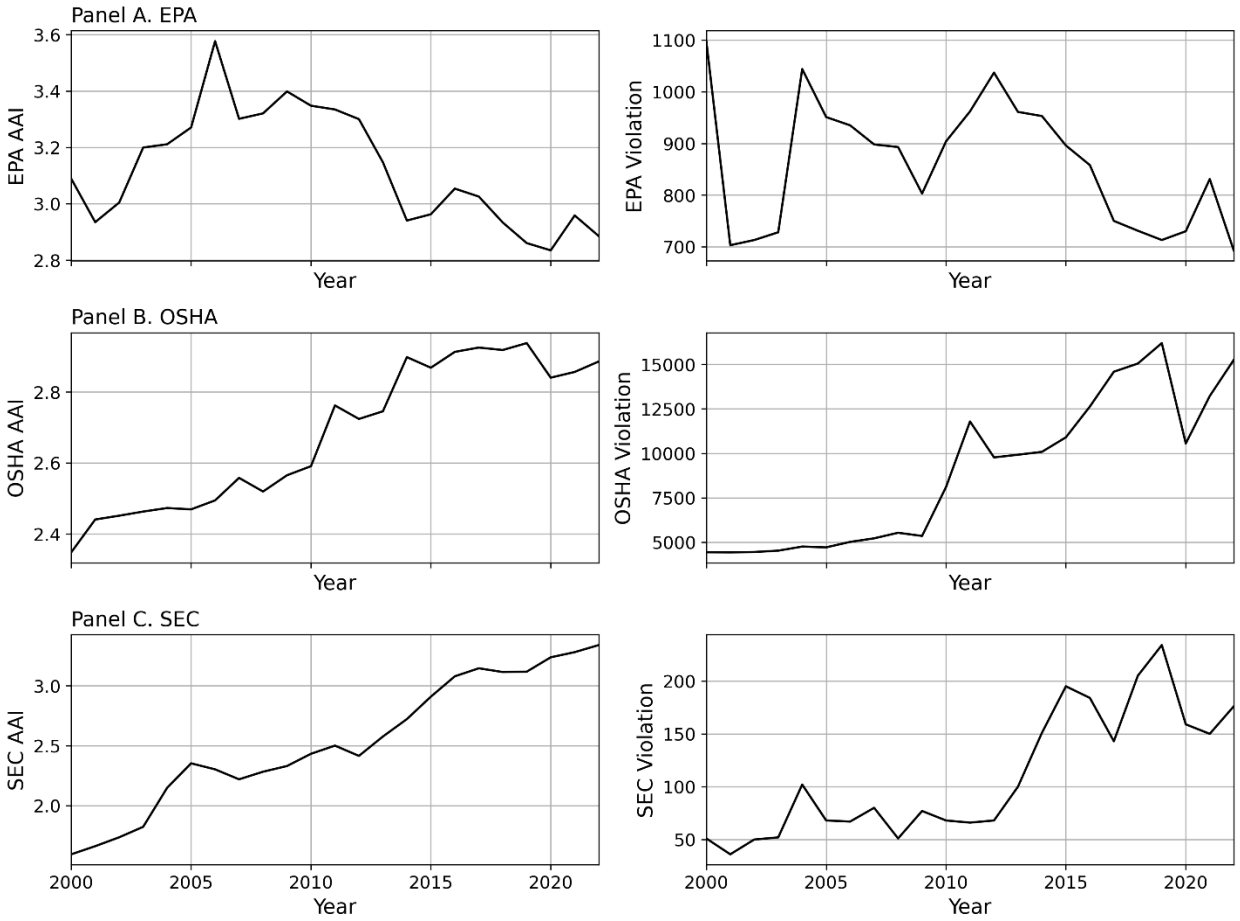

Figure IA.2 Agency Activity Intensity (*AAI*) and Annual Enforcement Actions

This figure presents the annual time series of *Agency Activity Intensity* (*AAI*) and total enforcement actions for the EPA, OSHA, and SEC from 2000 to 2022. Panel A shows the *EPA AAI* (left) alongside the number of EPA violations issued by EPA each year (right). Panel B displays the same for OSHA, and Panel C presents the corresponding trends for the SEC.

Table IA.I

Variable Definition

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

Variable	Definition	Source
AAI	Time series (1972 to 2022) activity index (standardized to start at zero) 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	Annual relevance score (1973–2022) for each agency by 6-digit NAICS industry calculated as the average probability that the industry relates to the agency's sections in the CFR	RegData
Industry-exposure-weighted AAI	*AAI × ln (RS)*	
Firm-exposure-weighted AAI	*AAI × ln (RS) × MS*	
Violation	One-year lagged dummy variable set to one if a firm has been enforced (by any federal or state enforcement agency) for a violation of regulations annually from 2001 to 2022	ViolationTracker
Penalty	One-year lagged natural logarithm of one plus the penalty dollar amount a firm was issued (by any federal or state enforcement agency) for a violation annually from 2001 to 2022	ViolationTracker
MS	The proportion of firm's total sales to its 6-digit NAICS industry total sales in each year	Compustat
Operating Performance	The proportion of a firm's operating income before depreciation and tax to its previous year total assets *($OIBDP_t$ / AT_{t-1})*	Compustat
Size	Natural logarithm of total assets *(ln (AT))*	Compustat
Expenditure + R&D	The proportion of capital expenditure plus R&D to the previous year total assets *(($CAPX_t + XRD_t$) /AT_{t-1})*	Compustat
Leverage	The Proportion of total debt to to the previous year total assets (($DLC_t + DLTT_t$) / AT_{t-1}))	Compustat
Market-to-book	The proportion of market value of equity to book value of equity *(PRCCF×CSHO)/(SEQ + TXDITC - PSTKRV or PSTKL or PSTK)*	Compustat
Sales growth	Growth in sales from year t-1 to year t *(($SALE_t$ – $SALE_{t-1}$)/ $SALE_{t-1}$))*	Compustat
Asset Turover	Total sales divided by 1-year-lagged total assets *($SALE_t$) /AT_{t-1})*	
Profit Margin	Operating income before depreciation and tax divided by total sales *($OIBDP_t$ / $SALE_t$)*	
GDP Growth	Growth in real GDP from year t-1 to year t	*GDP Growth*
Inflation	Annual inflation percentage rate	*Inflation*
Unemployment	Annual unemployment percentage rate	*Unemployment*
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	*President Party*

(Continued)

Table IA.I-*Continued*

Variable	Definition	Source
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) million 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	Office of Management and Budget (OMB)
FTE	The total number of hours worked divided by the number of compensable hours applicable to each fiscal year for an agency.	Office of Management and Budget (OMB)
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
Agency Violation	Total number of enforcement actions received in a given year from each agency annually	Violation Tracker
Agency Violation-firm	A dummy variable taking the value of one if a firm has been enforced by the agency for a violation of regulations each year.	Violation Tracker
RegIn	Paperwork regulatory intensity at the firm-year level based on active regulations	Kalmenovitz (2023)
Annual RegIn	Paperwork regulatory intensity at the year level based on active regulations	Kalmenovitz (2023)

Table IA.II

Agency Variables Data Sample

This table shows the data for agency-level activity variables from 1972 to 2022. 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 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 total amount of penalties issued by OSHA every year in constant (2012 inflation-adjusted) million dollars. 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 (outlays) in constant (2012 inflation-adjusted) 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 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*
1972	860	1	4190	8358	2937	287426	1029	20118	579	5833	12159	1353859
1973	1274	4	5756	9077	7087	608502	1549	43778	738	7172	12656	1308019
1974	1387	3	9452	9743	15122	1173856	881	33511	768	6593	12811	1416645
1975	2352	25	10794	10438	19582	1598563	948	32533	857	6686	13369	1492693
1976	3613	82	12573	9481	23817	1913150	865	32757	878	6918	14706	1555282
1977	2644	143	16533	11315	25600	2060650	890	32733	928	7896	17486	1709830
1978	1622	262	14329	11986	29726	2360651	1370	31732	971	8134	18665	1738599
1979	1185	242	15184	12160	32178	2523115	1290	32787	948	8550	20265	1782435
1980	901	210	15613	13078	37465	2894078	864	32778	908	8045	20320	1874779
1981	1107	118	13276	12667	40179	3100990	657	36258	851	7705	19409	1836639
1982	864	112	12153	11402	40811	3148071	909	31359	817	7260	20386	1939737
1983	1848	165	10034	10832	39619	3234308	820	28595	838	7261	21106	2067276
1984	3124	251	9108	11420	41283	3429925	1414	25876	861	7234	20750	2121408
1985	2609	276	9690	12410	42911	3777344	2097	24260	891	7156	21236	2196305
1986	2626	342	10634	12892	46423	4357666	3086	22189	872	6966	21238	2199373
1987	3194	304	11031	13442	51163	4608116	2398	20298	853	6918	21226	2232824
1988	3085	372	10034	14442	54623	4831628	1526	20198	898	7168	21819	2315300
1989	4136	364	9502	14370	60018	5096125	2183	18592	944	7349	21761	2324809
1990	3804	375	9312	16318	65904	5494506	2352	17849	986	7764	21655	2315985

(Continued)

Table IA.II-*Continued*

	EPA						FDA					
Year	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*
1991	3925	353	11434	16415	69021	5982926	1162	18609	1115	8418	21832	2336530
1992	3667	321	10795	17010	70329	6176655	2922	18330	1257	8952	21868	2348633
1993	3808	338	10292	17280	77959	6745691	2375	18226	1233	8977	22119	2401927
1994	3544	350	10015	17106	87826	7433600	3250	15786	1347	9194	22183	2440831
1995	2969	145	10754	17508	89715	7495475	2999	15513	1433	9242	22366	2460786
1996	2171	225	10087	17082	85909	8163787	3012	15207	1433	9172	19889	2485193
1997	3427	370	10586	17152	104143	8220198	3625	15506	1426	9171	22677	2449088
1998	3381	320	10172	17739	110093	9182013	3532	18185	1414	8904	22958	2456474
1999	3481	323	10743	18110	122663	9628104	3736	16920	1542	8896	19407	2051776
2000	5343	250	11468	17726	127981	10068819	3716	15146	1607	8900	19509	2077934
2001	3226	238	11619	17558	135309	10695908	4563	18649	1714	9063	19967	2116811
2002	2830	252	11315	17590	143195	11093575	5025	18572	1857	8888	20064	2120632
2003	3544	268	11624	17741	150564	11747792	4627	22543	2166	10318	20130	2131632
2004	3929	265	12402	17611	148439	11864301	4670	21805	2158	10210	20488	2166903
2005	4145	259	11685	17495	154454	12463061	5338	19803	2031	9980	20975	2184147
2006	6085	286	12071	17355	161588	13108103	4266	17641	2170	9777	21316	2201075
2007	3484	278	11312	17072	162601	13195949	5585	15581	2040	9643	21479	2209643
2008	3446	280	10539	16916	165865	13548178	5778	15245	2179	9889	22344	2249718
2009	3502	277	11416	17049	171654	13988154	8065	14627	2717	11369	22384	2256349
2010	3203	233	14307	17278	174016	14240659	9361	17576	3161	12467	22812	2279201
2011	3084	199	13085	17359	180857	14796918	9288	18302	3328	13266	22851	2276651
2012	2848	179	11957	17106	184827	15661040	9469	19958	3335	13484	23055	2285822
2013	2847	138	10917	15913	188579	15964759	8044	14784	3380	14092	23043	2292560
2014	2160	118	9834	15408	184643	15374242	8061	16626	3804	14682	23534	2296958
2015	2233	141	9090	14725	187138	15647851	9178	16672	4230	15620	24555	2334188
2016	2262	152	8597	14779	193208	16138016	8305	17137	4491	16517	26415	2439324
2017	1820	110	8966	15408	199807	15944511	9199	17847	4702	17471	27859	2520700
2018	1728	110	8760	14206	201028	16147368	7559	17863	4655	17043	28666	2549683
2019	1597	96	8849	13690	201978	16223634	7894	16296	5482	17214	29132	2567756
2020	1484	68	9279	13942	202547	16692654	7253	7950	5710	17623	29294	2588382
2021	1464	98	8953	14053	207864	17095858	5309	6875	5830	18621	29599	2606441
2022	1574	88	12294	14264	197018	16489302	5862	11927	5549	18687	31047	2687972

(Continued)

Table IA.II-*Continued*

Panel B. OSHA and SEC

	OSHA						SEC					
Year	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*
1972	7987998	49265	281	1693	15806	546518	168	119	142	1448	5767	412507
1973	30312675	224677	193	1699	15970	609400	198	178	154	1564	6405	458815
1974	29050601	313434	323	1830	17755	696995	175	148	161	1696	6542	471286
1975	37198260	375192	384	2435	18921	761372	142	174	189	1917	6703	494913
1976	38384224	324424	441	2494	19189	781937	129	158	204	1993	6882	515756
1977	36420630	181272	483	2717	19669	815258	142	166	203	1918	7369	549237
1978	48733466	149169	519	2817	21101	893910	122	135	216	2032	7997	583889
1979	47253485	149922	490	2911	20587	880017	81	108	209	2048	8582	634063
1980	33485241	151353	497	2950	21343	934498	74	103	207	2050	9325	680279
1981	15164016	125825	493	2734	21696	941148	72	115	197	1990	9408	697890
1982	14176338	116118	461	2314	21572	925729	106	136	187	1882	9671	719787
1983	18515585	130540	462	2238	21695	934833	94	151	207	1923	9752	738246
1984	22578808	136144	458	2289	23013	978532	114	179	203	1885	9673	751034
1985	27071432	144338	448	2205	22792	985251	122	143	220	1940	9818	760640
1986	34065996	148300	441	2199	23972	1041743	136	163	217	1898	9678	768602
1987	55359965	162807	433	2167	24912	1095176	146	144	219	1930	10124	776942
1988	77218625	182831	438	2344	26675	1214044	109	125	244	2048	10204	789423
1989	111706901	217599	443	2410	27277	1259132	155	140	259	2053	10498	805955
1990	116470732	200556	483	2431	27650	1297911	111	186	271	2130	10558	829517
1991	225397297	176883	444	2472	27776	1294509	139	191	303	2301	10836	837473
1992	216978811	179662	501	2473	28182	1320206	226	156	374	2492	11104	847356
1993	197748794	173972	449	2571	42091	2083576	229	172	381	2675	12055	914441
1994	244237174	175388	459	2295	43703	2223923	268	196	401	2652	12074	932152
1995	148663292	95427	444	2196	44997	2314554	292	171	420	2705	12282	959295
1996	144688595	79282	424	2069	44968	2312892	241	180	416	2773	12282	959295
1997	159705943	115920	461	2118	35188	1756001	286	189	432	2777	13167	951558
1998	166410126	101567	480	2171	33908	1663296	248	241	424	2774	13224	966799
1999	171597873	106001	484	2154	33615	1657138	298	198	467	2777	13515	979968
2000	169263887	108042	493	2160	33625	1663051	244	223	476	2841	13684	989767
2001	158016253	105757	536	2177	34180	1687305	248	205	543	2936	13826	1021932
2002	161384151	108584	558	2257	34128	1686475	280	270	610	3009	14107	1044856
2003	157633790	113108	580	2286	34085	1686608	365	271	624	3060	14525	1085182
2004	152708978	114362	571	2227	34302	1692104	375	243	989	3550	14937	1112793
2005	174308411	112412	536	2155	34396	1697938	294	312	1192	3851	15473	1160925

(Continued)

Table IA.II-*Continued*

	OSHA						SEC					
Year	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*	*Action1*	*Action2*	*Budget*	*FTE*	*Regulation1*	*Regulation2*
2006	151068785	113381	539	2096	34746	1712524	356	197	1168	3695	15585	1178978
2007	153354003	117247	524	2059	35583	1749591	394	250	1081	3465	15927	1207024
2008	155848232	116715	527	2089	35150	1730445	386	275	1102	3511	16317	1237465
2009	176444937	115763	542	2055	35251	1733057	352	297	1209	3642	16133	1218460
2010	214001533	124578	561	2189	35257	1739030	429	234	1264	3748	16371	1243828
2011	241612857	113902	577	2273	36839	1784761	469	252	1417	3844	16376	1242991
2012	189169789	103189	558	2242	36704	1805327	462	263	1447	3793	15826	1210781
2013	191016259	99977	549	2226	36692	1845003	469	207	1558	4023	16116	1232345
2014	190006464	94620	517	2170	38273	1958851	610	145	1579	4150	16595	1299224
2015	202963581	84632	541	2135	37423	1919103	645	162	1724	4301	17470	1367794
2016	233410015	72514	537	2049	37790	1888081	692	176	1646	4554	17839	1395641
2017	241821905	68923	523	2015	37940	1894603	390	168	1650	4616	18685	1428609
2018	246441399	65814	496	1882	37941	1895576	578	243	1658	4483	18717	1432297
2019	264915329	68422	497	1842	37970	1897400	661	201	1663	4350	19173	1452377
2020	169177118	43217	507	1820	37638	1819170	510	205	1708	4411	20266	1544582
2021	211290481	44141	486	1837	37757	1828152	351	226	2028	4459	20509	1558393
2022	251775182	51863	497	1920	37799	1834769	400	231	1855	4547	20687	1575972

Table IA.III

Agency-level Activity Proxies Summary Statistics

This table reports the number of observations, mean, and standard deviation for the agency-level activity variables for each agency separately (1972-2022). *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 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 total amount of penalties issued by OSHA every year in constant (2012 inflation-adjusted) million dollars. 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 (outlays) in constant (2012 inflation-adjusted) 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 parts related to an agency each year respectively.

	EPA			FDA			OSHA			SEC		
Variable	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Action1	51	2,754	1,138	51	4,121	2,864	51	136	80	51	286	168
Action2	51	211	107	51	20,979	7,569	51	134,294	16,345	51	191	51
Budget	51	10,871	2,171	51	2,096	1,535	51	482	72	51	740	605
FTE	51	14,774	2,768	51	10,282	3,645	51	2,227	281	51	2,924	979
Regulation1	51	108,221	67,167	51	21,546	4,064	51	30,931	8,078	51	12,954	4,073
Regulation2	51	8,896,427	5,471,131	51	2,169,677	331,673	51	1,477,812	478,709	51	980,967	315,689

Table IA.IV

Summary Statistics

This table reports the number of observations, mean, 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 1973 to 2022. Columns under each agency in Panel A represent the statistics for the sample of firms with an average *RS* value larger than the 95% percentile avergae *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 1-year-lagged total assets. *Leverage* is the ratio of total debt and 1-year-lagged 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 from 1973 to 2022. *RS* is the 6-digit NAICS industry's annual *Relevance Score* (1973 to 2022) 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 each year. *Industry*-e*xposure-weighted AAI* is calculated as the multiplication of *AAI* and the natural logarithm of (one-year lagged) *RS* transformed to start from zero. *Firm*-e*xposure-weighted AAI* is calculated as the multiplication of *Industry*-e*xposure-weighted AAI* and (one-year lagged) *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 one-year lagged annual (1973 to 2022) time-series *Agency Activity Index* for each agency representing the enforcement and rulemaking activity intensity. It is calculated as the latent variable from exploratory factor analysis. Macro-economic time series (through 1973 to 2022) variables are *GDP Growth* (the percentage change in real 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 Violation Tracker data. *Violation* is a one-year lagged 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 2001 to 2022. *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, lagged by one year.

Panel A. Agency-Specific

	EPA			FDA			OSHA			SEC		
Variable	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Operating Performance	22321	-0.220	0.651	9421	-0.127	0.589	7541	0.106	0.212	20917	0.035	0.198
Size	22321	4.780	2.720	9421	4.696	2.528	7541	6.336	2.306	20917	7.280	2.373
CAPX + R&D	22321	0.248	0.261	9421	0.209	0.238	7541	0.108	0.132	20917	0.014	0.056
Leverage	22321	0.308	0.486	9421	0.305	0.445	7541	0.404	0.335	20917	0.159	0.254
Market-to-book	22321	3.654	7.669	9421	3.561	7.27	7541	1.775	4.178	20917	1.613	2.899
Sales Growth	22321	0.465	1.535	9421	0.425	1.402	7541	0.198	0.644	20917	0.153	0.620
Industry Performance	22321	-0.076	0.215	9421	0.005	0.142	7541	0.123	0.054	20917	0.044	0.050

(Continued)

Table IA.IV-*Continued*

Panel B. Full Sample

	EPA			FDA			OSHA			SEC		
Variable	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
RS	183163	0.011	0.025	183163	0.004	0.011	183163	0.003	0.009	183163	0.003	0.011
Industry-exposure-weighted AAI	183163	7.776	5.593	183163	4.775	3.959	183163	6.887	4.51	183163	4.78	4.144
Firm-exposure-weighted AAI	183163	0.48	1.345	183163	0.301	0.905	183163	0.419	1.232	183163	0.265	0.748
MS	183163	0.068	0.15	183163	0.068	0.15	183163	0.068	0.15	183163	0.068	0.15
Operating Performance	183163	0.002	0.442	183163	0.002	0.442	183163	0.002	0.442	183163	0.002	0.442
Size	183163	5.16	2.556	183163	5.16	2.556	183163	5.16	2.556	183163	5.16	2.556
CAPX + R&D	183163	0.13	0.181	183163	0.13	0.181	183163	0.13	0.181	183163	0.13	0.181
Leverage	183163	0.307	0.404	183163	0.307	0.404	183163	0.307	0.404	183163	0.307	0.404
Market-to-book	183163	2.448	5.539	183163	2.448	5.539	183163	2.448	5.539	183163	2.448	5.539
Sales Growth	183163	0.271	1.012	183163	0.271	1.012	183163	0.271	1.012	183163	0.271	1.012
Panel C. Macro Variables												
AAI	50	2.314	0.989	50	1.721	0.959	50	1.96	0.993	50	1.546	0.976
GDP Growth	50	2.733	2.069	50	2.733	2.069	50	2.733	2.069	50	2.733	2.069
Inflation	50	4.006	2.971	50	4.006	2.971	50	4.006	2.971	50	4.006	2.971
Unemployment	50	6.222	1.632	50	6.222	1.632	50	6.222	1.632	50	6.222	1.632
President Party	50	0.44	0.501	50	0.44	0.501	50	0.44	0.501	50	0.44	0.501
Panel D. ViolationTracker												
Violation	85665	0.089	0.285	85665	0.089	0.285	85665	0.089	0.285	85665	0.089	0.285
Penalty	85665	1.053	3.467	85665	1.053	3.467	85665	1.053	3.467	85665	1.053	3.467
Operating Performance	85665	-0.036	0.454	85665	-0.036	0.454	85665	-0.036	0.454	85665	-0.036	0.454
Size	85665	5.94	2.659	85665	5.94	2.659	85665	5.94	2.659	85665	5.94	2.659
CAPX + R&D	85665	0.105	0.161	85665	0.105	0.161	85665	0.105	0.161	85665	0.105	0.161
Leverage	85665	0.293	0.426	85665	0.293	0.426	85665	0.293	0.426	85665	0.293	0.426
Market-to-book	85665	2.381	5.738	85665	2.381	5.738	85665	2.381	5.738	85665	2.381	5.738
Sales Growth	85665	0.19	0.892	85665	0.19	0.892	85665	0.19	0.892	85665	0.19	0.892

Table IA.V

Agencies Regulated Industries based on the RegData

This table shows the 6-digit NAICS, title, and average *RS* for the 15 industries with the highest average *RS* to each agency (Top 15). Average *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 each year. Panel A shows the industries' avergae *RS* for EPA and FDA while Panel B represents the average *RS* for OSHA and SEC.

Panel A. EPA and FDA

EPA			FDA		
NAICS	Title	*Average RS*	NAICS	Title	*Avergae RS*
562219	Other Nonhazardous Waste Treatment and Disposal	0.165	311111	Dog and Cat Food Manufacturing	0.060
562211	Hazardous Waste Treatment and Disposal	0.165	311712	Fresh and Frozen Seafood Processing	0.049
324110	Petroleum Refineries	0.084	311942	Spice and Extract Manufacturing	0.049
325320	Pesticide and Other Agricultural Chemical Manufacturing	0.075	325412	Pharmaceutical Preparation Manufacturing	0.047
325612	Polish and Other Sanitation Good Manufacturing	0.074	311340	Nonchocolate Confectionery Manufacturing	0.047
325411	Medicinal and Botanical Manufacturing	0.071	311920	Coffee and Tea Manufacturing	0.046
325193	Ethyl Alcohol Manufacturing	0.069	311812	Commercial Bakeries	0.044
325510	Paint and Coating Manufacturing	0.065	311611	Animal (except Poultry) Slaughtering	0.042
325199	All Other Basic Organic Chemical Manufacturing	0.063	311513	Cheese Manufacturing	0.040
325611	Soap and Other Detergent Manufacturing	0.061	311221	Wet Corn Milling	0.039
325613	Surface Active Agent Manufacturing	0.059	311822	Flour Mixes and Dough Manufacturing from Purchased Flour	0.037
325120	Industrial Gas Manufacturing	0.059	311612	Meat Processed from Carcasses	0.037
325992	Photographic Film, Paper, Plate, and Chemical Manufacturing	0.059	311821	Cookie and Cracker Manufacturing	0.035
325413	In-Vitro Diagnostic Substance Manufacturing	0.058	311615	Poultry Processing	0.035
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing	0.058	311930	Flavoring Syrup and Concentrate Manufacturing	0.034

Panel B: OSHA and SEC

OSHA			SEC		
NAICS	Title	*Average RS*	NAICS	Title	*Average RS*
486210	Pipeline Transportation of Natural Gas	0.075	523930	Investment Advice	0.124
486910	Pipeline Transportation of Refined Petroleum Products	0.073	523920	Portfolio Management	0.113
481211	Nonscheduled Chartered Passenger Air Transportation	0.063	523120	Securities Brokerage	0.063
481111	Scheduled Passenger Air Transportation	0.063	541810	Advertising Agencies	0.045

(Continued)

Table IA.V-*Continued*

OSHA			SEC		
NAICS	Title	*Average RS*	NAICS	Title	*Average RS*
481112	Scheduled Freight Air Transportation	0.056	515120	Television Broadcasting	0.025
486110	Pipeline Transportation of Crude Oil	0.056	524127	Direct Title Insurance Carriers	0.022
488320	Marine Cargo Handling	0.048	541860	Direct Mail Advertising	0.018
321918	Other Millwork (including Flooring)	0.034	524114	Direct Health and Medical Insurance Carriers	0.014
561312	Executive Search Services	0.034	524113	Direct Life Insurance Carriers	0.012
482111	Line-Haul Railroads	0.028	524130	Reinsurance Carriers	0.012
445120	Convenience Stores	0.027	522110	Commercial Banking	0.010
483113	Coastal and Great Lakes Freight Transportation	0.023	524126	Direct Property and Casualty Insurance Carriers	0.009
441120	Used Car Dealers	0.022	541110	Offices of Lawyers	0.009
541330	Engineering Services	0.020	561510	Travel Agencies	0.008
488390	Other Support Activities for Water Transportation	0.020	524292	Third Party Administration of Insurance and Pension Funds	0.006

Table IA.VI

Agency-level Activity and Industry Operating Performance of Highly Exposed Industries

This table examines the impact of policy enforcement and rulemaking activity by each agency (EPA, FDA, OSHA, and SEC) on the performance of industries that are regulated by that agency from 1973 to 2022. Columns (1), (2), (3), and (4) represent the industries (6-digit NAICS) with average *RS* values larger than the 95th percentile of the average *RS* for all industries regulated by the EPA, FDA, OSHA, and SEC, respectively. Average *RS* is calculated as the time series mean of annual *RS* values for each 6-digit NAICS industry. *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 dependent variable in all columns is industry-level *Operating Performance*, measured as the *Operating Performance* of the median firm within each 6-digit NAICS in each year. *Operating performance* is calculated as 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 lagged by one year. Industry-level control variables are constructed by taking the median value across firms within each 6-digit NAICS industry per year. These include *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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). Additional macroeconomic controls include *GDP Growth* (the percentage change in real 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 NAICS) fixed effects. Statistical significance is based on the heteroskedasticity robust double-clustered (industry and year) 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***			
	(0.013)			
FDA AAI		-0.082***		
		(0.020)		
OSHA AAI			-0.016***	
			(0.005)	
SEC AAI				-0.022***
				(0.007)
Size	0.007	0.071**	-0.002	-0.001
	(0.006)	(0.030)	(0.004)	(0.005)
CAPX + R&D	-0.664*	0.059	0.366***	-0.614
	(0.348)	(0.498)	(0.034)	(0.374)
Leverage	-0.144	-0.262	0.020	0.037
	(0.127)	(0.192)	(0.033)	(0.029)
Market-to-book	0.023**	-0.034	0.006*	0.009*
	(0.009)	(0.034)	(0.003)	(0.005)
Sales Growth	0.095**	-0.009	0.077**	-0.076
	(0.039)	(0.095)	(0.031)	(0.071)
GDP Growth	0.0004	0.010**	-0.0002	0.003**
	(0.003)	(0.005)	(0.001)	(0.002)
Inflation	0.005	0.005	-0.0003	0.001
	(0.004)	(0.003)	(0.002)	(0.001)
Unemployment	0.007	0.005	-0.003**	0.001
	(0.004)	(0.004)	(0.001)	(0.002)
President Party	0.015	-0.016	0.008	0.006
	(0.010)	(0.027)	(0.007)	(0.006)
Constant	0.140	-0.054	0.137***	0.111***
	(0.098)	(0.043)	(0.034)	(0.028)
Observations	908	560	658	777

(Continued)

Table IA.VI-*Continued*

	(1)	(2)	(3)	(4)
Dependent variable		*Operating Performance*		
R-squared	0.720	0.377	0.487	0.454
Industry FE	YES	YES	YES	YES

Table IA.VII

Industry-exposure-weighted Agency-level Activity and Industry 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 1973 to 2022. The dependent variable in all the columns is the industry-level *Operating Performance*, defined as the *Operating Performance* of the median firm within each 6-digit NAICS in each year. *Operating Performance* is calculated as operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *Industry-exposure-weighted AAI*, is lagged by one year and calculated as the product of *AAI* and the natural logarithm of *RS* (transformed to start from zero). *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually. *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 each year. Industry-level control variables are constructed by taking the median value across firms within each 6-digit NAICS industry per year. These include *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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). 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	-0.003***			
	(0.001)			
Industry-exposure-weighted FDA AAI		-0.006***		
		(0.002)		
Industry-exposure-weighted OSHA AAI			-0.002*	
			(0.001)	
Industry-exposure-weighted SEC AAI				-0.003*
				(0.002)
Size	0.020***	0.020***	0.020***	0.020***
	(0.003)	(0.003)	(0.003)	(0.003)
CAPX + R&D	-0.211	-0.217*	-0.234*	-0.238*
	(0.131)	(0.131)	(0.137)	(0.138)
Leverage	-0.033	-0.040	-0.037	-0.038
	(0.025)	(0.025)	(0.025)	(0.025)
Market-to-book	0.007***	0.007***	0.007***	0.007***
	(0.003)	(0.003)	(0.003)	(0.003)
Sales Growth	0.035*	0.034*	0.035*	0.036*
	(0.020)	(0.020)	(0.020)	(0.020)
Constant	0.036***	0.044***	0.029*	0.030**
	(0.014)	(0.015)	(0.015)	(0.015)
Observations	13,938	13,938	13,938	13,938
R-squared	0.240	0.240	0.232	0.233
Industry × Year FE	YES	YES	YES	YES

Table IA.VIII

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

This table examines the impact of Industry-exposure-weighted (by the relevance score) agency activity by EPA, FDA, OSHA, and SEC on the asset and profit margins of firms from 1973 to 2022. The dependent variable in columns (1) through (4) is the firm's *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's *Profit Margin*, measured as the operating income before depreciation and taxes divided by total sales. The main variable of interest, *Industry-exposure-weighted AAI*, is lagged by one year and calculated as the product of *AAI* and the natural logarithm of *RS* (transformed to start from zero). *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually. *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 each year. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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)	(5)	(6)	(7)	(8)
Dependent variable	*Asset turnover*	*Asset turnover*	*Asset turnover*	*Asset turnover*	*Profit margin*	*Profit margin*	*Profit margin*	*Profit margin*
Industry-exposure-weighted EPA AAI	-0.025***				-0.073***			
	(0.002)				(0.008)			
Industry-exposure-weighted FDA AAI		-0.035***				-0.174***		
		(0.004)				(0.015)		
Industry-exposure-weighted OSHA AAI			0.058***				-0.091***	
			(0.007)				(0.015)	
Industry-exposure-weighted SEC AAI				0.079***				-0.139***
				(0.009)				(0.019)
Size	-0.035***	-0.037***	-0.045***	-0.045***	0.439***	0.431***	0.451***	0.451***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.014)	(0.013)	(0.014)	(0.014)
CAPX + R&D	0.210***	0.207***	0.194***	0.188***	-6.014***	-5.950***	-6.157***	-6.151***
	(0.033)	(0.032)	(0.033)	(0.033)	(0.257)	(0.255)	(0.259)	(0.259)
Leverage	0.204***	0.196***	0.201***	0.200***	-0.529***	-0.569***	-0.522***	-0.520***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.092)	(0.092)	(0.092)	(0.092)
Market-to-book	0.006***	0.006***	0.005***	0.005***	0.011**	0.012**	0.011**	0.011**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)	(0.005)	(0.005)
Sales Growth	0.111***	0.111***	0.112***	0.112***	0.319***	0.323***	0.315***	0.315***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.026)	(0.026)	(0.026)	(0.026)
Constant	1.376***	1.361***	1.217***	1.217***	-1.699***	-1.398***	-2.271***	-2.276***
	(0.026)	(0.025)	(0.018)	(0.018)	(0.098)	(0.100)	(0.083)	(0.083)
Observations	181,823	181,823	181,823	181,823	181,823	181,823	181,823	181,823
R-squared	0.351	0.351	0.350	0.350	0.173	0.175	0.172	0.172
Industry × Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Table IA.IX

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

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 asset and profit margins of firms from 1973 to 2022. The dependent variable in columns (1) through (4) is the firm's *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's *Profit Margin*, measured as the operating income before depreciation and taxes divided by total sales. The main variable of interest, *Firm-exposure-weighted AAI*, is lagged by one year and constructed as the product of *AAI*, the natural logarithm of RS (transformed to start from zero), and firm market share (*MS*). Here, *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually. *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 each year. *MS* is calculated as firm's total sales scaled by its 6-digit NAICS industry total sales in each year. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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.

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*
Firm-exposure-weighted EPA AAI	-0.007				-0.022**			
	(0.006)				(0.010)			
Firm-exposure-weighted FDA AAI		-0.028***				-0.035***		
		(0.007)				(0.014)		
Firm-exposure-weighted OSHA AAI			-0.009				-0.024**	
			(0.006)				(0.011)	
Firm-exposure-weighted SEC AAI				-0.027***				-0.040**
				(0.008)				(0.019)
Size	-0.086***	-0.085***	-0.086***	-0.085***	0.331***	0.331***	0.330***	0.331***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.033)	(0.032)	(0.033)	(0.032)
CAPX + R&D	1.065***	1.066***	1.065***	1.066***	-3.009***	-3.008***	-3.010***	-3.008***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.216)	(0.216)	(0.216)	(0.216)
Leverage	0.305***	0.305***	0.305***	0.304***	-0.160*	-0.159*	-0.159*	-0.160*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.088)	(0.088)	(0.088)	(0.088)
Market-to-book	0.005***	0.006***	0.005***	0.005***	-0.003	-0.003	-0.003	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)	(0.004)	(0.004)
Sales Growth	0.141***	0.141***	0.141***	0.141***	0.694***	0.694***	0.694***	0.694***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.028)	(0.028)	(0.028)	(0.028)
Constant	1.307***	1.304***	1.307***	1.304***	-2.237***	-2.238***	-2.237***	-2.238***
	(0.032)	(0.032)	(0.032)	(0.032)	(0.163)	(0.163)	(0.163)	(0.163)

(Continued)

Table IA.IX-*Continued*

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*
Observations	180,395	180,395	180,395	180,395	180,395	180,395	180,395	180,395
R-squared	0.758	0.758	0.758	0.758	0.580	0.580	0.580	0.580
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES

Table IA.X

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 1973 to 2022. The sample here represents the firms in (6-digit NAICS) industries with average *RS* values larger than the 95th percentile of the average *RS* for all industries regulated by the EPA. *Average RS* is calculated as the time series mean of annual *RS* values for each 6-digit NAICS industry. *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 dependent variable in all the columns is the firm's *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 Eequivalent* (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 CFR 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 and lagged by one year. Firm controls are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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)
Dependent variable						
Action1	0.002					
	(0.006)					
Action2		0.013				
		(0.008)				
Budget			-0.008			
			(0.008)			
FTE				-0.015		
				(0.010)		
Regulation1					-0.117***	
					(0.015)	
Regulation2						-0.123***
						(0.015)
Industry performance	0.498***	0.489***	0.488***	0.479***	0.345***	0.339***
	(0.078)	(0.076)	(0.078)	(0.077)	(0.066)	(0.065)
Constant	-0.203***	-0.239***	-0.170***	-0.101	-0.062	-0.054
	(0.053)	(0.055)	(0.048)	(0.065)	(0.039)	(0.038)
Observations	22,321	22,321	22,321	22,321	22,321	22,321
R-squared	0.758	0.758	0.758	0.758	0.762	0.763
Firm Controls	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table IA.XI

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 1973 to 2022. The sample here represents the firms in (6-digit NAICS) industries with average *RS* values larger than the 95th percentile of the average *RS* for all industries regulated by the FDA. Average *RS* is calculated as the time series mean of annual *RS* values for each 6-digit NAICS industry. *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 dependent variable in all the columns is the firm's *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 CFR 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 and lagged by one year. Firm controls are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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)
Dependent variable						
Action1	-0.074***					
	(0.015)					
Action2		0.035***				
		(0.011)				
Budget			-0.060***			
			(0.016)			
FTE				-0.057***		
				(0.015)		
Regulation1					-0.030***	
					(0.009)	
Regulation2						-0.025***
						(0.009)
Industry performance	0.264**	0.257**	0.270**	0.274**	0.281**	0.268**
	(0.125)	(0.121)	(0.127)	(0.128)	(0.127)	(0.123)
Constant	-0.205***	-0.315***	-0.231***	-0.130*	-0.089	-0.065
	(0.062)	(0.074)	(0.065)	(0.066)	(0.074)	(0.085)
Observations	9,421	9,421	9,421	9,421	9,421	9,421
R-squared	0.732	0.729	0.731	0.731	0.729	0.729
Firm Controls	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table IA.XII

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 1973 to 2022. The sample here represents the firms in (6-digit NAICS) industries with average *RS* values larger than the 95th percentile of the average *RS* for all industries regulated by the OSHA. Average *RS* is calculated as the time-series mean of annual *RS* values for each 6-digit NAICS industry. *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 dependent variable in all the columns is the firm's *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* (total amount of penalties in constant 2012 million issued by OSHA every year), *Action2* (number of annual inspections conducted 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 CFR 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 and lagged by one year. Firm controls are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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)
Dependent variable						
Action1	-0.014**					
	(0.006)					
Action2		0.009				
		(0.006)				
Budget			-0.017***			
			(0.006)			
FTE				-0.002		
				(0.003)		
Regulation1					-0.013*	
					(0.007)	
Regulation2						-0.013*
						(0.007)
Industry performance	0.942***	0.953***	0.937***	0.965***	0.966***	0.966***
	(0.089)	(0.091)	(0.085)	(0.093)	(0.094)	(0.094)
Constant	-0.084*	-0.134**	-0.033	-0.098*	-0.057	-0.063
	(0.046)	(0.057)	(0.041)	(0.055)	(0.045)	(0.044)
Observations	7,541	7,541	7,541	7,541	7,541	7,541
R-squared	0.587	0.587	0.588	0.586	0.587	0.587
Firm Controls	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table IA.XIII

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 1973 to 2022. The sample here represents the firms in (6-digit NAICS) industries with average *RS* values larger than the 95th percentile of the average *RS* for all industries regulated by the SEC respectively. Average *RS* is calculated as the time-series mean of annual *RS* values for each 6-digit NAICS industry. *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 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 CFR 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 and lagged by one year. Firm controls are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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)
Dependent variable						
Action1	-0.013***					
	(0.005)					
Action2		-0.007				
		(0.005)				
Budget			-0.023***			
			(0.008)			
FTE				-0.033***		
				(0.012)		
Regulation1					-0.043**	
					(0.017)	
Regulation2						-0.040**
						(0.016)
Industry performance	0.880***	0.866***	0.863***	0.861***	0.823***	0.834***
	(0.133)	(0.134)	(0.133)	(0.133)	(0.134)	(0.133)
Constant	-0.100*	-0.103**	-0.125**	-0.056	-0.047	-0.050
	(0.052)	(0.050)	(0.056)	(0.039)	(0.034)	(0.034)
Observations	20,917	20,917	20,917	20,917	20,917	20,917
R-squared	0.547	0.546	0.548	0.549	0.550	0.550
Firm Controls	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table IA.XIV

Firm-exposure-weighted Agency-level Activity and Firm-level Enforcement Outcomes

This table examines the correlation between our *Firm-exposure-weighted Agency Activity Index* (*AAI*) measure for the EPA, OSHA, and SEC, and realized firm-level enforcement outcomes obtained from Violation Tracker. The sample consists of publicly traded firms from 2000 to 2020, limited to those with available regulatory intensity measure data from Kalmenovtiz's (2023). The dependent variable, *Agency Violation-firm*, is a binary indicator equal to one if a firm received an enforcement action in a given year from the EPA (columns 1–2), OSHA (columns 3–4), and SEC (columns 5–6). Our primary explanatory variable, *Firm-exposure-weighted AAI*, is computed as the product of the agency's annual enforcement and rulemaking activity (*AAI*), the natural logarithm of the industry relevance score (*RS*, transformed to start from zero), and the firm's market share (*MS*). *RS* reflects how closely a firm's 6-digit NAICS industry aligns with the agency's regulatory scope, based on annual probabilities derived from the Code of Federal Regulations. *MS* is defined as the firm's total sales divided by the total industry sales at the 6-digit NAICS level. We also control for *RegIn*, a measure of firm-level paperwork regulatory intensity based on Kalmenovitz (2023), capturing the burden of active regulations applicable to the firm. Statistical significance is based on heteroskedasticity-robust standard errors clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	EPA Violation-firm		*OSHA Violation-firm*		*SEC Violation-firm*	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
Firm-exposure-weighted EPA AAI	0.0069***	0.0070***				
	(0.0007)	(0.0007)				
Firm-exposure-weighted OSHA AAI			0.0426***	0.0422***		
			(0.0037)	(0.0037)		
Firm-exposure-weighted SEC AAI					0.0008***	0.0007***
					(0.0003)	(0.0003)
RegIn		-0.0014*		0.0166***		0.0008***
		(0.0008)		(0.0020)		(0.0002)
Constant	0.0062***	0.0166***	0.0316***	-0.0912***	0.0013***	-0.0050***
	(0.0007)	(0.0060)	(0.0024)	(0.0144)	(0.0002)	(0.0016)
Observations	46,364	46,364	46,364	46,364	46,364	46,364
R-squared	0.0151	0.0152	0.0621	0.0648	0.0004	0.0006

Table IA.XV

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

This table analyzes the impact of enforcement and rulemaking activities by the EPA, FDA, OSHA, and SEC on the performance of firms in highly regulated industries with low paperwork burden from 1994 to 2020. Columns (1), (2), (3), and (4) represent the firms in (6-digit NAICS) industries with average *RS* values larger than the 95th percentile of the average *RS* for all industries regulated by the EPA, FDA, OSHA, and SEC, respectively. Average *RS* is calculated as the time-series mean of annual *RS* values for each 6-digit NAICS industry. *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 each year. Please note the sample of firms is limited to firms with Kalmenovitz's (2023) 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's *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 lagged by one year. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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 real 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	-0.086***			
	(0.031)			
FDA AAI		-0.076**		
		(0.029)		
OSHA AAI			-0.010	
			(0.008)	
SEC AAI				-0.042***
				(0.014)
Size	0.078***	0.081***	0.015	0.021
	(0.013)	(0.018)	(0.010)	(0.013)
CAPX + R&D	-0.931***	-0.818***	0.055	0.457**
	(0.077)	(0.080)	(0.124)	(0.181)
Leverage	-0.166***	-0.101**	-0.017	-0.041
	(0.038)	(0.043)	(0.032)	(0.082)
Market-to-book	0.001	0.003**	0.003	0.005***
	(0.001)	(0.001)	(0.003)	(0.002)
Sales Growth	0.010	0.023**	0.029	0.014
	(0.007)	(0.008)	(0.025)	(0.012)
Industry Performance	0.377***	0.038	0.763***	0.530***
	(0.124)	(0.126)	(0.149)	(0.146)
GDP Growth	-0.001	0.008	0.002	0.003
	(0.006)	(0.007)	(0.003)	(0.002)
Inflation	0.017*	0.003	-0.008**	-0.002
	(0.008)	(0.008)	(0.004)	(0.007)
Unemployment	0.002	0.002	-0.006*	-0.003
	(0.008)	(0.011)	(0.004)	(0.004)
President Party	0.024	0.026	0.034***	0.011
	(0.025)	(0.032)	(0.011)	(0.013)

(Continued)

Table IA.XV-*Continued*

	(1)	(2)	(3)	(4)
Dependent variable		*Operating performance*		
Constant	-0.063	-0.203*	-0.031	-0.014
	(0.101)	(0.119)	(0.062)	(0.095)
Observations	4,194	1,914	1,101	1,204
R-squared	0.737	0.704	0.673	0.702
Firm FE	YES	YES	YES	YES

Table A.XVI

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) agency activity by EPA, FDA, OSHA, and SEC on the performance of firms from 1994 to 2020 after controlling for firm-level paperwork regulation intensity. Please note that the sample of firms is limited to firms with available paperwork regulation intensity from Kalmenovitz (2023). The dependent variable in all the columns is the firm's O*perating 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 lagged by one year and calculated as the product of *AAI* and the natural logarithm of *RS* (transformed to start from zero). *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually. *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. *RegIn* controls for one-year lagged paperwork regulatory intensity based on active regulations from Kalmenovitz (2023). *RegIn* is scaled by its standard deviation. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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	-0.003***			
	(0.001)			
Industry-exposure-weighted FDA AAI		-0.008***		
		(0.002)		
Industry-exposure-weighted OSHA AAI			-0.005***	
			(0.002)	
Industry-exposure-weighted SEC AAI				-0.007***
				(0.003)
RegIn	-0.001	-0.0001	0.00003	-0.0001
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	-0.107***	-0.093***	-0.098***	-0.105***
	(0.032)	(0.030)	(0.031)	(0.033)
Observations	60,855	60,855	60,855	60,855
Firm Controls	YES	YES	YES	YES
R-squared	0.332	0.333	0.332	0.332
Year × Industry FE	YES	YES	YES	YES

Table A.XVII

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 1994 to 2020 after controlling for firm-level paperwork regulation intensity. Please note that the sample of firms is limited to firms with available paperwork regulation intensity from Kalmenovitz (2023). The dependent variable in all the columns is the firm's *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 lagged by one year and constructed as the product of *AAI*, the natural logarithm of *RS* (transformed to start from zero), and firm market share (*MS*). Here, *AAI* represents the (enforcement and rulemaking) activity intensity by an agency annually. *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 each year. *MS* is calculated as the firm's total sales scaled by its 6-digit NAICS industry total sales in each year. *RegIn* controls for one-year lagged paperwork regulatory intensity based on active regulations from Kalmenovitz (2023). *RegIn* is scaled by its standard deviation. The control variables are *Size* (natural logarithm of total assets), *CAPX + R&D* (capital expenditure plus R&D spending scaled by 1-year-lagged total assets), *Leverage* (ratio of total debt and 1-year-lagged 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	-0.014***			
	(0.002)			
Firm-exposure-weighted FDA AAI		-0.016***		
		(0.003)		
Firm-exposure-weighted OSHA AAI			-0.020***	
			(0.002)	
Firm-exposure-weighted SEC AAI				-0.028***
				(0.003)
RegIn	0.007**	0.007**	0.007**	0.007**
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	-0.263***	-0.264***	-0.262***	-0.265***
	(0.030)	(0.030)	(0.030)	(0.030)
Observations	60,703	60,703	60,703	60,703
R-squared	0.644	0.644	0.644	0.644
Firm Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES