Regulatory Policy Enforcement and Corporate Performance

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Abstract

Government influence on private industry is thought to be substantial. However, the channels of that influence and even the consistency of an effect, are unclear. Prior studies primarily approach the question of this influence based on legislation or political parties, and this has led to decidedly mixed results. We approach the problem differently. We recognize that until very recently, the literature largely ignored the reality that much political work is done by executive agencies. Moreover, the recent literature that does examine regulatory agencies focuses exclusively on firm responses. In contrast, we build a broad measure of policy enforcement from the regulatory agency perspective. That is, we construct six agency-perspective variables, including actions, budget variables, and regulation-verbiage (from the Code of Federal Regulations). We combine the six measures in exploratory factor analysis to obtain a latent *Enforcement Index* variable. Applying this measure to firms exposed to four major agencies (EPA, FDA, OSHA and SEC), we find stronger regulatory enforcement is associated with lower firm operating performance. We also (logically) find that greater firm exposure to the agency strengthens the relationship. There is significant cross-agency heterogeneity in enforcement's influence. We document that the channel most likely driving the relationship is a cost channel, as opposed to an asset-(in)efficiency channel. We also highlight the importance of studying six agency variables, by showing heterogeneity across them in the influence on firm performance. Our results are largely orthogonal to recent findings (by Kalmenovitz in several papers, as well as other papers/scholars) that focus strictly on CFR-related firm-expressed-concerns. At a more granular enforcement level, we also find that firm-specific violations imposed (from Violation Tracker) are associated with weaker firm performance. We conclude that executive-branch enforcement is an important contributor to the cost of regulation, regardless of firm attention to it as expressed through their own disclosures.

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I. Introduction

Government can influence corporate performance in numerous ways. Research into these channels has traditionally focused on either federal legislation or the "political lean" of the legislature and executive branches. The conclusions from these studies are mixed. 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 Republican presidencies. These mixed results may be due, at least in part, to the omission of a major channel through which the rulemaking and enforcement processes relevant to corporations in the U.S. now operates. Over time, the importance of executive agencies has increased greatly. Thus, we submit that prior tests are looking in the wrong place. We offer analyses of government influence on firm performance that recognize variation in both firm exposure and (especially) *agency* enforcement behavior. We find both factors matter to the affected firms' accounting performance.

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

Since both agency enforcement tendencies and firm exposure to the agency are important, they may be used strategically by firms. Thus, the effects of additional regulations are not clear ex ante. For example, Stigler (1971) noted that regulation may be sought by firms to disadvantage competitors. In particular, larger firms are generally able to leverage political power in order to influence regulators (known as regulatory capture). Consistent with this theory, Singla (2023) finds that even though regulatory costs have increased greatly in the U.S. over the last several decades, not all firms have been hit with the same costs: larger firms have been able to push some costs against small firms. Earlier work by Correia (2014) finds that congressional political donations and lobbying face lower enforcement costs from the Securities and Exchange Commission. Our question is different as we examine the *average* cost of regulation and how the most highly affected firms fare from an operating perspective.

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 additional recognition of firm exposure to an agency is designed to focus attention on where it will be most likely to reveal such effects.

We construct a separate measure of agency enforcement for each of four major agencies in the executive branch: the Food and Drug Administration (FDA), which enforces laws and regulations related to the safety of drugs, food, and medical products (based on the Federal Food, Drug, and Cosmetic Act); the Environmental Protection Agency (EPA), which enforces regulations related to the environment (for example, through the Clean Air Act and Clean Water Act); the Occupational Safety and Health Agency (OSHA) which monitors and enforces workplace safety; and the Securities and Exchange Commission (SEC), which oversees the enforcement of laws and regulations related to securities markets and investors.[1] Each agency's *Enforcement Index* measure is the first principal factor from factor analysis of six of the agency's policy enforcement-related variables: two *Action* variables, agency *Budget*, agency *FTE*, and two *Regulation* variables. The *Index* is measured at the agency-year level, due to underlying data reporting.

Our measure of exposure to agency regulation is completed at the industry-level. We build this measure from the regulatory data (RegData) database described in McLaughlin, Jonathan and Powers (2022). Briefly, RegData measures a probability that a "CFR part" is related to a specific industry (6-digit NAICS) in a particular year, based on a machine learning algorithm (see Al-Ubaydli and McLaughlin (2017)). We average this probability across all years in our dataset (1980 – 2019), creating a time-invariant industry exposure-to-agency variable. We use a time-invariant measure to reduce measurement noise due to imprecision in potential annual exposure measures. This also focuses the time-series variation of influences on corporate performance, in our agency enforcement variable (the *Enforcement Index*, described above).

There are several benefits to the joint recognition and measurement of both enforcement and exposure. Primarily, we provide a supply-side (i.e., agency-driven) measure. The sparse literature on government regulations of firms 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 (2020); Kalmenovitz (2023); Trebbi and Zhang (2022)). Given their firm-level focus, none of these measures separately identify the influence of individual agencies. Moreover, each firm-level response is potentially contaminated (as a measure of enforcement severity potential) by the firm's own assessment of concern. This combined effect is difficult to separate into distinguishable pieces, whereas our enforcement proxy is "from the source" in that we measure individual agency inputs to enforcement and industry exposure.

We find that stronger enforcement associates with weaker firm performance. Operating income

[1] 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.

(before depreciation and taxes) is declining in the *Enforcement Index*. This result is robust across all four agencies and is statistically and economically significant. For a one standard deviation change in our independent variable, we observe a change of between 2.4 (OSHA) and 4.4 (FDA) percentage points in operating performance. Further, our results regarding the effect of regulatory agencies on operating performance are concentrated in firms that belong to industries which are highly exposed to specific agencies. For example, results with respect to the FDA are concentrated in firms operating in the food, medical products, and cosmetics sectors, while results with respect to the SEC are concentrated in investment and brokerage companies.

We then explore two channels of agency enforcement effects on firm performance. First we decompose operating performance into an asset use efficiency margin (asset turnover) and a cost efficiency margin (operating income to sales). Consistent with the view that enforcement increases costs, our results are concentrated in the influence of enforcement on operating income relative to sales. Second, we assess the empirical content of each of an agency's six enforcement "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 enforcement component across all six. If we had instead focused on strictly CFR and related rules – perhaps along with firm endogenous responses to them – we could potentially miss the importance of other action-oriented enforcement mechanism of agencies.

As our main analysis is rather high-level (agency and/or industry variation drives firm outcomes), a natural question is whether firm-level enforcement can be measured. We rely on Violation Tracker data for more granular tests. We again find firm performance to be weaker when enforcement occurs (or carries a larger penalty). Another advantage of these tests is the joint time-series and cross-sectional variation in the regressor.

Finally, given potential overlap between our measure of regulatory intensity and the measure of regulatory burden from Kalmenovitz (2023), we perform additional analysis to ensure that we are finding a separate effect on firm performance. Kalmenovitz (2023) measures regulatory burden based primarily on compliance costs due to paperwork requirements. We document two important results. First, we continue to find that our enforcement index influences corporate performance in the sub-sample where he shows low paperwork compliance costs. Second our results are generally robust to including his measure, although this reduces sample size substantially.

Overall, we conclude that regulatory agencies affect firm performance through enforcement. At one level this is comforting because agencies may still enforce existing regulations even in the presence of political gridlock. Moreover, our results point to at least one efficiency of government regulation of firms – targeting firms (industries) that the agency is most closely linked with (i.e., high exposure industries).

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

We also contribute to the nascent literature's focus on enforcement effects, but which largely takes a demand-side view of firms' actions or discussions that are deemed responses to regulatory concerns. Specifically, Kalmenovitz, Lowry and Volkova (2022) explore firm descriptions of their attention to agency-keywords in their annual reports. We attempt to side-step selection concerns that some firms may not mention enforcement topics/concerns for other (perhaps competitive) reasons, by simply measuring agency enforcement. Moreover, Kalmenovitz, Lowry and Volkova (2022) focus on fragmentation or the cross-agency mention of topics of regulation. Firms with high fragmentation are exposed to more agencies, while our focus is on situations where firms are highly exposed to a particular agency. This ameliorates one of the tradeoffs in Kalmenovitz, Lowry and Volkova (2022) that sample firms may "shop around" for lower enforcement. Also, Calomiris, Mamaysky and Yang (2020) and Simkovic and Zhang (2020) take the demand-side perspective by focusing on corporate earnings calls (NLP regulation-words) and expenditures on regulatory-related jobs, respectively. Thus, the enforcement literature has largely focused on responder perspectives to costly regulation, while we submit that this potentially endogenizes a key metric.

II. Data and Variables

A. Agency-level Variables

We use six agency-level variables, each representing part of the enforcement activity of an agency, to build an overall measure of the enforcement intensity. The variables are: *Action1*, *Action2, Budget*, *FTE*, *Regulation1*, and *Regulation2*. Our data period (described below in II.D.) is 1980-2019. We focus on four major government agencies: EPA, FDA, OSHA, and SEC.[2] Table IA.I provides detailed data on each variable's value for each agency in each year of our sample.

A.1 Action

Action1 and *Action2* represent the direct enforcement actions carried out by each agency annually.

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

Each agency uses different types of actions to enforce its regulations, such as sending out 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. Furthermore, the way each action data is reported or computed is not always consistent during different periods. For example, the SEC changed the methodology for counting its contempt civil cases in 2013, resulting in a clear drop in the total number of enforcement actions from 2013 onwards.

Given varying types of enforcement *actions* available to each agency, we group them according to our (realized ex-post) evidence on actions that correlate more vs. less strongly with our index. *Action1* carries higher loading while *Action2* carries lower loading. For EPA, *Action1* is the number of administrative actions initiated,[3] while *Action2* is the number of civil case referrals to the DOJ (same source). For FDA, the *Action1* and *Action2* variables (respectively) represent the number of recalls sent out and inspections conducted by the FDA every year. These data are reported on FDA's Enforcement Statistics Report through FDA.gov. OSHA's *Action1* and *Action2* are (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 Select SEC and Market Data Report from SEC.gov.

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

The observed scale difference across variables demonstrates that agencies employ a variety of enforcement tactics that are extremely diverse in character. In addition to the heterogeneous nature of variables, the large time series standard deviation of the variables indicates that each of them varies heterogenously across the years. For example, FDA's recalls count shows an annual standard deviation of about 2,800 illustrating how widely FDA recalls vary each year.[4] Similarly, other agencies' action variables exhibit significant annual fluctuations (Table IA.I). Overall, the data reveals that agencies use a variety of

[3] As reported on EPA's Enforcement Annual Results

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

enforcement techniques, and they do not carry out these actions homogenously across time. This high variability encourages our use of explanatory factor analysis to pick up latent enforcement, 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 enforcement intensity are *Budget* and Full-time equivalent (*FTE*). These measure, respectively, the monetary and workforce resources at the agency's disposal for carrying out its enforcement responsibilities. *Budget* is the spending in million dollars (constant 2012 dollar, adjusted for inflation) by each agency every year. Full-time equivalent (*FTE*) is the total number of hours worked divided by the number of compensatable hours applicable to each fiscal year and agency. These two variables are often leveraged by different administrations[5] to control an agency's enforcement 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 both Carpenter (1996) and Olson (1996)) .[6]

We retrieve *Budget* and *FTE* data from Weidenbaum Center on the Economy, Government, and Public Policy (Washington University in St. Louis) (Febrizio and Warren (2020)) that is built from US annual budget reports. Table A.II presents summary statistics. EPA and FDA are the two largest agencies with average annual budgets of $5,060 and $2,044 million respectively, and also have the largest number of employees.[7] However, in recent years this trend has shifted, with the FDA's *Budget* and *FTE* surpassing the EPA's since 2019 and 2015 respectively (Table IA.I). SEC ranks the third largest agency with its average Budget and *FTE* slightly larger than OSHA's. Finally, despite Table IA.I indicating that OSHA had a larger *Budget* and *FTE* in 1980, over time OSHA has seen diminished *Budget* and FTE. This contrasts with the SEC whose *Budget* and *FTE* have increased consistently. Overall, the time series and cross sectional variation in resources available for enforcement, encourages both our study of multiple drivers as well as the factor analysis to pick up latent enforcement tendencies.

A.3 Regulation

The last two agency-level enforcement variables are *Regulation1* and *Regulation2* representing the intensity and amount of regulations enforced by the agency each year. We build these measures through

[5] Congress also plays a crucial role in determining the budget of federal agencies. For example, the Trump administration's 2018 budget proposal cut $871 million from the FDA's budget authority appropriations. This was not included in the bill approved by Congress.
[6] Olson (1996) shows that FDA decreased its inspections due to budget cuts during the Reagan administration.
[7] EPA average *FTE* is 15,611 and the FDA's *FTE* mean is around 10,258.

analysis of words in the Code of Federal Regulations (CFR). In general, agencies may issue new regulations or revise current regulations (to be stricter) through the rule-making process. This translates into harsher enforcement of policies related to laws.[8] 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.[9]

Similarly, an agency can revise current regulation to change enforcement. An example is the SEC's "Disclosure Update and Simplification" rule, which amended the SEC's existing regulation governing the disclosure of executive compensation in public company filings. The revised regulation resulted in several enforcement actions.[10]

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

Regulation1 is the sum of restricting words that appeared in each of the CFR parts that are devoted to an agency. It represents the intensity/strictness of the regulations related to that agency in each year. Similarly, *Regulation2* is the sum of all words in the parts related to each agency. It captures the volume of the agency's regulation in each year. Table A.II shows that EPA's CFR rules have the largest annual mean in the number of restrictive (*Regulation1*) and total (*Regulation2*) words among all four agencies. This is because EPA is the largest agency with the highest average *Budget* and *FTE* and it enforces the largest number of laws passed by Congress.[11] 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-

[8] 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 2 to several months) for the public to comment on the proposed rule. Once this period ends, the proposed rule may become a final rule.
[9] 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.
[10] The SEC's administrative proceedings enforcement against Argo Group and Apache Corporation in 2019 as a result of their understated CEO-employee compensation ratio are two of the numerous cases that stand out.
[11] 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.

largest agency in terms of average *Budget* and *FTE* (Table A.II). Notably, while the FDA has approximately five times the average Budget and 1.5 times the average *Regulation2* of OSHA, OSHA's annual average number of restrictive words (*Regulation1*) is significantly larger (32,908) than the FDA's *Regulation1* (mean of 22,188). The likely explanation for this disparity is that OSHA relies more heavily on *Regulation1* as an enforcement tool compared to FDA. Table II provides some evidence supporting this explanation. The factor loading on *Regulation1* for OSHA is 0.936, much larger than the FDA's loading of 0.720. Moreover, the uniqueness for OSHA's *Regulation1* is less than one-third of the FDA's implying that OSHA's *Regulation1* varies more closely with its enforcement intensity compared to FDA.

B. Violation Tracker Data

Our set of firm-level enforcement data comes from Violation Tracker, maintained by the Corporate Research Project of Good Jobs First. It tracks corporate misconduct of regulations in the United States from 2000 to 2019. 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 (at both national and local levels) 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 violater (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 only publicly traded companies and are able to match 1,791 parent companies to our sample of firms (Compustat) representing 13,168 firm-year violation observations [out of our main analysis sample total of 88,074 firm-year observations from 2000 to 2019]. We use Violation Tracker data to define two firm-level enforcement variables. The first variable is *Violation dummy* - a dummy variable equal to one if an enforcement case was taken against the firm in that year. The second variable *Penalty* is the natural logarithm of one plus the dollar amount of penalty (if any) the firm was issued in a year.

C. Firm Financials and Macroeconomic Variables

We obtain annual information on various firm accounting characteristics from Compustat for the period 1980-2019. We use operating income before depreciation and taxes [scaled by 1-year-lagged firm total assets] to proxy firm accounting *Performance*. We include several firm-level controls found in the extant accounting literature, in our regressions. These variables are *Size*, *CAPEX + R&D, Leverage*, *Sales growth, and Industry performance.* Table A.I defines these variables. Given a few outliers, we winsorize firm performance and financial variables at 1% and 99%. Table I, Panels A, B, and D show the summary

statistics for these variables for different samples in our analysis. Finally, Panel C presents summary statistics for our macro controls, including *GDP growth, inflation, unemployment, and president party.* These data come from Federal Reserve Economic Data (FRED).

D. Sample Construction

We use three different criteria to construct samples for our analysis. In our first approach, we focus on firms from industries that are *meaningfully* touched by an agency. We use the *RS's* 95th percentile value obtained from all the industries (6-digit NAICS) that have an *RS* more than 0 [for an agency], as the threshold for dropping or keeping industries for this analysis.[12] In this way, we very likely don't include industries that are only nominally affected by an agency, in our analysis. Table I, panel A shows the summary statistics for the sample of high *RS* firms for each agency. The statistics are reported for firm samples from 1980 to 2019. The number of firms in the sample for EPA, FDA, OSHA, and SEC respectively is 18908, 8401, 6433, and 24335 respectively. Firm-level financial variables are similar and comparable across all agencies, indicating that each sample contains a well-distributed (firm characteristics) balanced firm population.

In our second approach, we build a full sample of firms that is invariant across the agencies. Given the high variation in exposure of firms to any particular agency (in such a broad sample), we take advantage of *RS* variation across industries for our analysis that relies on the wider sample (see Table IV). In this case, we require each 6-digit NAICS industry to have at least 5 firms each year, since our *RS* treatment level is at the 6-digit NAICS.[13] This sample has 157,913 firm-year observations for the period 1980-2019. Table I, Panel B shows the summary statistics for this sample of firms.

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

III. Methodology

A. Constructing Agency-level EI

Enforcement intensity is hard to measure because it happens through different channels and in different forms for each agency. For example, regulatory agencies could enforce the regulations through ex-ante guidance and warning notices (i.e., soft enforcement) or by imposing monetary penalties and

[12] The main results are robust to this sampling criteria since the 93rd and 97th percentiles as the threshold give similar results.
[13] Changing the criteria to three firms does not affect our results.

operation suspensions (i.e., hard enforcement) (Coffee (2007)) . For example, an administrative enforcement action (*Action1*) by EPA can take the form of an action directive (to clean up a site) which may or may not be accompanied by financial penalties. Similarly, EPA's civil court litigation against businesses may result in hefty financial fines, injunctions compelling them to take corrective action, or a combination of financial penalties and corrective measures.

This variety in the form of enforcement mechanisms highlights the difficulty in choosing a single agency-level variable as a measure of enforcement intensity. Put differently, it is crucial to take into account all variables that could vary with enforcement, to build a measure for enforcement intensity. Contextually, consider the FDA's budget cuts imposed by the Reagan administration in 1992 to decrease the agency's level of enforcement. The FDA changed its enforcement strategy to shift its enforcement focus from inspections - a costly enforcement procedure - to recalls, a less costly one (Olson (1996)). If a research study were to only use recalls as the FDA's enforcement intensity, they would see an increase in the FDA's enforcement intensity during that period, while in reality the FDA was adjusting its enforcement strategy towards a less intense and more cost-efficient mechanism.

Another example is seen in OSHA's contradictory trends in inspections and penalties from 2010 to 2019 (Berkowitz (2019)). OSHA's workplace safety inspections decreased by about 20% while the total amount of annual penalties increased by around 95% for the same period (Table IA.I). This trend could be attributed to various factors. One potential explanation was the decrease in the number of full-time equivalent (FTE) employees and budget at OSHA between 2010 and 2019, leading to a shift in OSHA's enforcement towards targeting specific industries. In other words, OSHA adjusted to the decreased resources by identifying industries with a high risk of violating safety regulations and focusing its inspections on those industries. This change in enforcement strategy decreased total inspections conducted by OSHA, but increased the number of inspections that resulted in penalties, thereby raising the amount of total penalties issued. But an alternative explanation for the upward penalty trend was the increase in OSHA's maximum penalty threshold [due to its new final rules] 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 enforcement intensity.[14] These conflicting findings highlight the importance of identifying the correct measure of enforcement intensity that accurately captures its impact on firm performance.

Overall, one needs to consider multiple possible channels of enforcement together to build a measure of overall enforcement, since focusing on only one channel may be misleading. This is why we take a broad view and study multiple channels, each representing some form of enforcement by an agency.

[14] Further pouring gas on the fire, Table IA.VI shows *Action2* is positively correlated with firm accounting performance while *Action1* regression coefficient is negative (-0.016) for firms heavily regulated by OSHA.

We combine them to build a single time-series measure of enforcement 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 (enforcement intensity) representing the common variation between the six main variables. EFA is a multivariate statistical method that is widely used in social sciences. The goal of EFA is to explain the matrix of explanatory variables' covariances with a much smaller number of hypothetical latent variates which are called factors. The main assumption in EFA is that there exists a latent variable that is linearly correlated with each of the explanatory variables to some extent (Lawley and Maxwell (1962)). In other words, the joint variation of the explanatory variables is due to the variation of a latent variable.[15]

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 the variable) in a residual term. This makes EFA a suitable method to build a measure for enforcement intensity using different channels of enforcement because each channel varies with enforcement intensity 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 intensity of an agency. Thus, they closely fluctuate with an agency's capacity to enforce. Finally, *Regulation* variables represent the intent of an agency to enforce when unconstrained by (for example) *Budget* or *FTE*. *Regulation1* and *Regulation2* capture the intensity and quantity of rules published by an agency, picking up variation in the agency's soft and hard enforcement-related verbiage.

We use exploratory factor analysis to find the fewest factors accounting for the common variance (correlation) of the Six variables. The factor loadings are computed using the squared multiple correlations as estimates of the communality. We only retain the first factor from factor analysis because it is the only factor with an eigenvalue greater than 1 (Kaiser criterion) for all the agencies, indicating most of the variation is explained by this factor (Kaiser (1960)). Table II, Panel A shows the eigenvalues for all the extracted factors. Factor1 is the largest across all the agencies.

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

[15] For a more comprehensive discussion of EFA refer to Appendix A.

The factor loadings and uniqueness values around *Actions* are more nuanced. EPA's *Action2* has a low factor loading and uniqueness close to 1, indicating that it does not vary closely with the latent variable and most of its variation is not explained by it. This may be because EPA's *Action2*, which represents civil cases, is a secondary step enforcement action that can take a significant amount of time to settle.[16] This can create a time gap between the violation date and the penalty or conviction date, which could explain why *Action2*'s variation does not closely track contemporaneous changes in enforcement intensity. FDA's *Action2* and OSHA's *Action2* have negative loadings on factor1 showing that they vary in the opposite direction of the enforcement intensity. This implies that these agencies adjust their enforcement strategies by focusing on these variables when they want to *decrease* enforcement intensity (Berkowitz (2019)); Olson (1996)).

To build our time series index measure of agency (latent) enforcement we use the least square regression method (Thurstone (1935)) to predict factor scores. The regression method results in standardized factor scores with a mean close to zero and a standard deviation of 1. These factor scores become our *Agency EI* index variable. We use *Agency EI* as an agency-level time-series proxy for the enforcement intensity for each agency annually.

B. Constructing Exposure-weighted Agency EI

Different industries are differentially exposed to each agency. For example, pharmaceutical and medicine manufacturing firms are not affected by EPA the same way that petroleum refinery firms are. To account for this heterogeneity, we interact our agency-level enforcement index with a measure of each industry's relatedness to that agency. We proxy this relatedness with **industry relevance estimates** from the RegData database (McLaughlin, Jonathan and Powers (2022)) accessed from QuantGov, for the years 1980 through 2019.

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

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

average each industry relevance score (*RS*) over time (years) to obtain a unique *RS* for each industry.

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

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

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

Table IA.II shows the relevance scores and the titles for the 15 industries (6-digit NAICS) with the highest and lowest relevance scores to EPA, FDA, OSHA, and SEC. The data in this table indicate that *RS* does a good job of classifying sensitive industries to each agency. For example, the top industry for EPA is Other Nonhazardous Waste Treatment and Disposal, which is not surprising given EPA's mission to protect the environment. The same story goes for FDA, with the most sensitive industry being Dog and Cat Food Manufacturing.[17] *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.[18] Finally, the SEC's top *RS* industry is Investment advice, which falls in line with the agency's primary mission to regulate and protect investors.

Table I, panel B provides insights into the summary statistics of *RS* under each agency for our full-sample of firms. The *RS* mean for EPA, FDA, OSHA, and SEC is 0.010, 0.004, 0.003, and 0.003 respectively. EPA has the largest *RS* mean among all four agencies, indicating that the number of heavily-

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

[18] 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.

regulated industries is larger for EPA compared to the other agencies. This finding is consistent with the fact that EPA has the largest average volume of CFR (*Regulation2*) compared to other agencies, as demonstrated in Table A.II.

In the end, we compute exposure-weighted enforcement index (*Exposure-weighted Agency EI*), which is a measure of annual enforcement intensity by an agency for each specific industry, as the product of *Agency EI* and each industry's *RS*:

$$Exposure-weighted\ Agency\ EI_{i,t} = Agency\ EI_t \times RS_i \quad (2)$$

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

C. Identification and Empirical Model

Our identification strategy leverages the externality of *Agency EI* on firm-level characteristics. Specifically, we measure *Agency EI* 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 end up experiencing more of the cost of enforcement.[19] Additionally, underperforming firms may violate regulations more frequently and receive more enforcement, creating reverse causality bias in a firm-level enforcement measure. Our approach is neutral towards the specific firms receiving enforcement because we measure enforcement intensity at the source (i.e. the agencies), rather than from the firm-level activities. This both minimizes endogeneity concerns and highlights one of our main contributions to the extant literature that relies on firm 10k reports and NLP to measure enforcement.

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

$$Performance_{i,j,t} = \alpha + \beta.Agency\ EI_t + \boldsymbol{\gamma_1.X_{it}} + \boldsymbol{\gamma_2.Z_t} + \gamma_3.Industry\ performance_{\ j,t} + \mu_i + \epsilon_{it} \quad (3)$$

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

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

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

In our second set of analyses, we regress firm performance on the *Exposure-weighted Agency EI*, which varies by industry and year. We utilize this between-variation by running the regression on our full sample of firms (Compustat) to identify the effect of enforcement intensity at the agency-industry level on firm performance. In other words, our panel of firms is the universe of Compustat firms (1980 to 2019) with the independent variable varying both across years and indsutries. 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:

$$Performance_{i,j,t} = \alpha + \beta.Exposure - weighted\ Agency\ EI_{j,t} + \boldsymbol{\gamma.X_{it}} + \mu_{k,t} + \epsilon_{it} \quad (4)$$

where *i, j, k,* and *t* denote firm, industry (6-digit NAICS), industry (2-digit NAICS) and years respectively. The dependent variable, $Performance_{i,j,t}$, captures the firm operating performance for each year. The main independent variable $Exposure - weighted\ Agency\ EI_{j,t}$ is the enforcement intensity for each of the agencies EPA, FDA, OSHA, and SEC at the 6-digit NAICS level in each year. $Exposure - weighted\ Agency\ EI_{j,t}$ by construction is external to firm-level characteristics. The firm-level control

variables are the same as regression 3. $\mu_{k,t}$ represents year × industry (2-digit NAICS) fixed effects.[20] The error term, ϵ_{it}, is clustered at the 6-digit NAICS industry since our main independent variable varies at the industry level. The regression coefficient β shows the effect of enforcement 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 enforcement and performance. We want to be sure that the effect of firm-level enforcement is consistent with our findings using agency-level enforcement measures for each agency. We regress the Violation Tracker data firm-level enforcement variables, *Violation dummy* and *penalty*, on firm performance for our full sample of firms (Compsutat) for 2001-2019. We use the following simple linear regression specification:

$$Performance_{i,t} = \alpha + \beta . Enforcement_{i,t} + \boldsymbol{\gamma . X_{it}} + \mu_i + \mu_t + \epsilon_{it} \quad (5)$$

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

IV. Results

This section presents both univariate and regression results linking firm performance to government agency enforcement. We measure firm performance as operating income before depreciation and taxes, divided by lagged (one year) total assets. We separately explore enforcement effects either weighted by firm exposure to the agency or unweighted (i.e. strictly the time-series of enforcement index).[21] Results are presented separately by agency. Table III illustrates simple univariate differences in performance across high vs. low exposure-weighted enforcement.[22] The regression-based results vary by how we handle exposure weighting. Table IV selects on firms belonging to industries that are "highly exposed" (*RS*>95th percentile) to the agency studied, to emphasize the importance of enforcement on performance of firms most likely to be sensitive. Table V studies all firms but weights the enforcement index by the firm's

[20] We were unable to include firm or 6-digit NAICS fixed effects in our analysis due to the constant value of *RS* for each industry across all years. Including these fixed effects would absorb all the between-variation, making it impossible to identify the effect of enforcement intensity at the agency-industry level on firm performance.
[21] We emphasize the exposure-weighted enforcement results which capture both channels of influence.
[22] We offer unweighted enforcement effect univariate results in Appendix Table A.III.

exposure to the agency.[23]

A. Univariate Differences in Performance Across High vs. Low Enforcement

Table III Panel A reports differences in mean operating performance for firms with high vs. low exposure-weighted enforcement. For each agency, a firm is bucketed into the high (low) group if it has a value of exposure-weighted enforcement above (below) the median value across all firm-years.[24] For each agency, firms experiencing stronger enforcement see worse operating performance. The effect varies from 4% performance gap (with the FDA as the enforcing agency) to nearly 10% (SEC), but all are statistically significant and economically meaningful. In Panel B of Table III, we repeat the analyses but using median operating performance as the dependent variable. The inferences are the same while results show less variation across agencies.[25] Overall, firms experiencing stronger enforcement of regulations through agency intensity and/or greater firm exposure to that agency, show weaker operating performance.

Appendix Table A.III presents univariate results of different performance across high vs. low enforcement indices (unweighted by *RS*), for each agency. The bucketing of high vs. low enforcement observations is based on the annual measure of the enforcement index (EI); whether it is above or below the time-series median for that agency. The test focuses on time-series variation in agency enforcement as opposed to also including cross-sectional firm exposure to an agency.[26] Results are similar and inferences persist. Stronger enforcement by an agency associates with weaker operating performance among (exposed, $RS > 0$) firms.

B. Regressions of Performance on Enforcement

B.1 Highly Exposed Firms

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

[23] The firm's exposure to the agency is actually the same across all firms belonging to the industry, with the industry's exposure serving as proxy.
[24] Our sample consists of all firms with available Compustat data and also exhibiting RS > 0. We have 16,366 such firms (both active and inactive), corresponding to 157,913 firm-years.
[25] The test for differences in median performance across high vs. low exposure-weighted enforcement are from quantile regressions with focus on the median.
[26] Again, panel A reports means and their differences, while panel B studies medians.

[annual] variation in the enforcement index (the first principal factor described in Table II) for the EPA.

Table IV presents results from four regressions, one for each agency (EPA, FDA, OSHA, and SEC). The regressions are at the firm/year level, to allow more variation in control variable values. Nevertheless, they also include firm fixed effects to absorb unmeasurable time-invariant firm characteristics.[27]

The regressions indicate consistent detrimental effects of enforcement on firm performance. For firms belonging to highly-exposed-to-EPA industries, the coefficient on the enforcement index is -0.043; a one standard deviation increase in the enforcement index reduces highly-exposed (to EPA) firms' average operating performance by 4.3%. Very similar performance effects are seen in the FDA regression and SEC regression. For firms highly exposed to OSHA regulations, the effect is muted (-2.4%) but still statistically significant. Overall, stronger enforcement 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.

Several other coefficients in the Table IV regressions are of interest. The usual controls (see for example, Fairfield and Yohn (2001)) pass the sanity check. Larger firms show better performance, and firm-level performance is highly correlated with the industry's (6-digit NAICS) performance[28]. By contrast, the more typical macro indicators appear unrelated to firm performance (admittedly after controlling for industry performance). *GDP growth*, *inflation*, *unemployment* (weakly significant in only two regressions), and particularly *Presidential party*, carry mostly insignificant (with only occasionally marginally significant) coefficients. The mostly insignificant coefficients on the dummy variable for Presidential 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 enforcement is agency-level (not firm-varying).

B.2 Full Sample Analysis of Exposure-Weighted Enforcement Effects on Firm Operating Performance

Since enforcement's effect is potentially driven by two forms of variation – agency efforts as well as firm exposure to such – we now incorporate both in the regressions. We use the exposure-weighted enforcement variable which equals enforcement index (first principal factor from six key agency

[27] As discussed in section III.C, these are time-series regressions. There is no justifiable reason to include year fixed effects in the regressions.
[28] Industry's performance for each year is the median firm's *operating performance* from the 6-digit NAICS industry in that year.

enforcement variables) multiplied by the industry's exposure to that agency (*RS* is the time-series average of the 6-digit NAICS industry's annual relevance score). Including all firms carries trade-offs. The greater power from more observations and additional variation in the main regressor must be balanced against the nature of the exposure-weighting. Recall that the exposure is at the industry level, and that our measure of *RS* has no time-series variation (as we discussed in section III.B). It's worth noting that if we do not take the time-series average *RS* of an industry to an agency, and instead use the yearly relevance scores instead, our results are not affected since the relevance scores do not vary much across time. This is consistent with the fact that an industry and the firms within it are always exposed to an agency. In other words, exposure is largely a time-invariant industry characteristic. Overall, we have zero within-firm time-series variation in the exposure variable, which means we cannot include firm fixed effects in our regression. However, we hasten to add that we do include 2-digit NAICS industry × year fixed effects.

Table V presents results from estimating equation (4). Again our main inference prevails; stronger enforcement associates with weaker firm performance. The coefficient on the exposure-weighted agency enforcement 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 enforcement associates with a 1% reduction in operating performance.[29] More specifically for the EPA regression, the coefficient of -0.007 can be interpreted economically as follows. Given *Exposure-weighted EPA EI* standard deviation of 2.141 (see Table I), the firm performance decreases about 0.7 percentage points for a unit increase (corresponds to about half its standard deviation) in EPA *Exposure-weighted agency EI.* Similar calculations for the other agencies imply 1.2%, 1.5%, and 1.8% reductions in performance for a unit increase in *Exposure-weighted agency EI* for FDA, OSHA, AND SEC, respectively.

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

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

C. Mechanisms / Channels

C.1 TATO and Profit Margin

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

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

By contrast, the effect of enforcement on asset margin is never negative and sometimes positive. Also, firms highly exposed to the SEC show better asset efficiency in years of stronger enforcement. Thus stronger enforcement 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 IV.D. below.

The control variables carry logical coefficients. Industry median asset (profit) margin positively associates with firm-level values of the same. Capex and R&D expenditures lower both margins while sales growth raises both.

C.2 Pieces of Enforcement Index

The documented influence of enforcement on performance also raises the question of which aspects of agency enforcement matter most to the firms highly exposed to them. Since our enforcement index is the first principal factor from six variables, each of which captures different agency levers that they can pull to influence companies, there may be important variation in the influence of these variables across agencies. For example, the EPA is known for its costly administrative actions while not typically bringing many civil cases. They also write more restrictive language in the CFR. Thus it seems EPA's enforcement effect on firms is likely coming from its *Action1* and *Regulation* variables. On the other hand, the FDA uses their

product recall ability heavily but does not seem to raise costs through CFR restrictive verbiage. Also, higher FDA *Budgets* and *FTE* translate to lower firm performance. OSHA's enforcement intensity effect on firms mostly comes from its issued penalties and CFR regulations strictness. OSHA's *Budget* affects firm performance while *FTE* seems to not carry much weight on firm performance. SEC shows a more consistent pattern with all the enforcement proxies (except *Action2*) contributing to the enforcement intensity effect on firm performance.[30]

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

Across all four agencies, larger budgets associate with enforcement that is more costly to firm performance. This is not an indictment of government regulation. Recall that enforcement is of Congressional intent, and Congress also sets the budgets for agencies. But the significant relationship across our full sample implies a certain amount of efficiency as opposed to the mantra of "fraud, waste and abuse."

A second common result (with the exception of FDA-highly-exposed firms) is that CFR verbiage matters to firm performance. In general, more verbiage and more restrictive verbiage associate with weaker operating performance.

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

D. Alternative Explanations - Kalmenovitz paperwork regulations

Recent work by Kalmenovitz (2023) examines firm estimates of regulatory burden by studying their filings of OIRA form 83-I. He then links these estimates to firm costs and investment behaviors. The form 83-I targets paperwork burden. We differ by allowing for any common correlate across six agency

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

variables, to influence firm performance. Moreover, sampling on form 83-I restricts the eventual firm performance data-panel. Nevertheless, we attempt to further distinguish our inferences from those in Kalmenovitz (2023) as follows.

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

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

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

To close, we note that the paperwork burden of *RegIn* may also have a countervailing influence on firm performance; it could serve as a barrier to entry. We offer one view of this through untabulated results exploring industry concentration as a function of *RegIn*. Though the sample is small (1,248 industry-year observations), *RegIn* is positively associated with Herfindahl-Hirschman Index (computed as the sum of squared market shares, with market shares computed using firms' sales). This aligns with the inferences in Singla (2023).

E. Violation Tracker Regression

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

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

Enforcement of a specific firm associates with worse operating performance in that year. Across all four specifications (two each for the violation variables, varying industry vs. firm fixed effects), the coefficient on the violation variable is significantly negative. Focusing on the specifications with firm fixed effects, a violation associates with roughly 70 bp decline in operating performance and about 27 bps per dollar of penalty. We conclude that enforcement is an important economic component of regulatory influence on firms.

V. 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 actually implemented. Moreover, this implementation can vary under different administrations even as political gridlock hampers legislative shifting of priorities. Thus we avoid the complications of identifying political lean by relying on party dominance or weakness in the legislature, executive branch and courts. We solely focus on enforcement of standing laws as a decision by agencies with long-standing manadate 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 enforcement 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 enforcement index.

The effect of stronger enforcement 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 – 10Ks, MD&As, conference calls, and the like. Our main results appear to carry significance even when orthogonal to these extant papers' measures. Moreover, our enforcement 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.

References

Al-Ubaydli, Omar, and Patrick A. McLaughlin, 2017, Regdata: A numerical database on industry-specific regulations for all united states industries and federal regulations, 1997–2012, *Regulation & Governance* 11, 109-123.

Berkowitz, Debbie, 2019, Workplace safety & health enforcement falls to lowest levels in decades, (National Employment Law Project).

Calomiris, Charles W, Harry Mamaysky, and Ruoke Yang, 2020, Measuring the cost of regulation: A text-based approach, (National Bureau of Economic Research).

Carpenter, Daniel P., 1996, Adaptive signal processing, hierarchy, and budgetary control in federal regulation, *American Political Science Review* 90, 283-302.

Correia, Maria M., 2014, Political connections and sec enforcement, *Journal of Accounting and Economics* 57, 241-262.

Fairfield, Patricia M., and Teri Lombardi Yohn, 2001, Using asset turnover and profit margin to forecast changes in profitability, *Review of Accounting Studies* 6, 371-385.

Febrizio, Mark, and Melinda Warren, 2020, Regulators' budget: Overall spending and staffing remain stable, (Washington University in S.t Louise, Weidenbaum Center on the Economy, Government, and Public Policy).

Jr, John C. Coffee, 2007, Law and the market: The impact of enforcement, *University of Pennsylvania Law Review* 156.

Kaiser, Henry F., 1960, The application of electronic computers to factor analysis, *Educational and Psychological Measurement* 20, 141-151.

Kalmenovitz, Joseph, 2023, Regulatory intensity and firm-specific exposure, *The Review of Financial Studies*.

Kalmenovitz, Joseph, Michelle B. Lowry, and Ekaterina Volkova, 2022, Regulatory fragmentation, *SSRN Working Paper*.

Lawley, D. N., and A. E. Maxwell, 1962, Factor analysis as a statistical method, *Journal of the Royal Statistical Society. Series D (The Statistician)* 12, 209-229.

McLaughlin, Patrick, Nelson Jonathan, and Thurston Powers, 2022, Regdata u.S. 4.1, in Mercatus Center at George Mason University QuantGov, Arlington, VA, ed.

Olson, Mary, 1996, Substitution in regulatory agencies: Fda enforcement alternatives, *The Journal of Law, Economics, and Organization* 12, 376-407.

Petersen, Mitchell A., 2008, Estimating standard errors in finance panel data sets: Comparing approaches, *The Review of Financial Studies* 22, 435-480.

Santa-Clara, Pedro, and Rossen Valkanov, 2003, The presidential puzzle: Political cycles and the stock market, *The Journal of Finance* 58, 1841-1872.

Simkovic, Michael, and Miao Ben Zhang, 2020, Regulation and technology-driven entry: Measurement and micro-evidence, *Available at SSRN 3205589*.

Singla, Shikhar, 2023, Regulatory costs and market power, *SSRN Working paper*.

Snowberg, Erik, Justin Wolfers, and Eric Zitzewitz, 2007, Partisan impacts on the economy: Evidence from prediction markets and close elections*, *The Quarterly Journal of Economics* 122, 807-829.

Stigler, George J., 1971, The theory of economic regulation, *The Bell Journal of Economics and Management Science* 2, 3-21.

Thurstone, L. L., 1935. *The vectors of mind* (Chicago, University of Chicago Press).

Trebbi, Francesco, and Miao Ben Zhang, 2022, The cost of regulatory compliance in the united states, (National Bureau of Economic Research).

Appendix A

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

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

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. In other words, all variance, including error and unique variance for each observed variable, is distributed across components in PCA. In contrast, only the variance that each observed variable shares with other observed variables is analyzed in EFA. While PCA focuses on extracting maximum variance from a data set with a few orthogonal components, the goal of EFA is to reproduce the correlation matrix with a few orthogonal factors. Additionally, PCA requires that variables be on the same scale, while EFA does not have this limitation. When the goal is to obtain a theoretical solution that is not influenced by unique and error variability and the study is based on underlying constructs that are expected to produce scores on the observed variables, EFA is the more appropriate choice.

Table I

Summary Statistics

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

Panel A. Agency-Specific High *RS* firms																
	EPA				FDA				OSHA				SEC			
Variable	N	Mean	Med	SD	N	Mean	Med	SD	N	Mean	Med	SD	N	Mean	Med	SD
Operating performance	18908	-0.246	-0.020	0.691	8401	-0.162	0.056	0.635	6433	0.099	0.114	0.230	24335	0.044	0.027	0.235
Size	18908	4.611	4.309	2.727	8401	4.594	4.302	2.536	6433	6.310	6.524	2.336	24335	6.963	6.932	2.480
CAPEX + R&D	18908	0.225	0.136	0.235	8401	0.192	0.116	0.214	6433	0.086	0.058	0.093	24335	0.021	0.003	0.054
Leverage	18908	0.270	0.144	0.433	8401	0.266	0.156	0.391	6433	0.349	0.330	0.263	24335	0.173	0.105	0.229
Sales growth	18908	0.468	0.091	1.564	8401	0.452	0.098	1.478	6433	0.203	0.083	0.684	24335	0.164	0.073	0.650
Industry performance	18908	-0.086	-0.066	0.207	8401	-0.009	-0.026	0.112	6433	0.120	0.112	0.044	24335	0.059	0.026	0.060
Panel B. Full Sample																
RS	157913	0.010	0.001	0.022	157913	0.004	0.000	0.010	157913	0.003	0.001	0.009	157913	0.003	0.000	0.012
Exposure-weighted Agency EI	157913	0.452	0.455	2.141	157913	0.189	-0.061	1.955	157913	0.591	0.684	2.336	157913	0.582	0.082	2.283
Operating performance	157913	-0.009	0.083	0.469	157913	-0.009	0.083	0.469	157913	-0.009	0.083	0.469	157913	-0.009	0.083	0.469
Size	157913	5.153	5.077	2.597	157913	5.153	5.077	2.597	157913	5.153	5.077	2.597	157913	5.153	5.077	2.597
CAPEX + R&D	157913	0.112	0.065	0.149	157913	0.112	0.065	0.149	157913	0.112	0.065	0.149	157913	0.112	0.065	0.149

Table I-Continued

	EPA				FDA				OSHA				SEC			
Variable	N	Mean	Med	SD	N	Mean	Med	SD	N	Mean	Med	SD	N	Mean	Med	SD
Leverage	157913	0.261	0.176	0.343	157913	0.261	0.176	0.343	157913	0.261	0.176	0.343	157913	0.261	0.176	0.343
Sales growth	157913	0.278	0.0850	1.045	157913	0.278	0.0850	1.045	157913	0.278	0.0850	1.045	157913	0.278	0.0850	1.045
Panel C. Macro Variables																
Agency EI	40	0.046	0.435	0.959	40	0.039	-0.095	0.977	40	0.041	0.262	0.963	40	0.038	-0.123	0.983
GDP growth	40	2.635	2.750	1.823	40	2.635	2.750	1.823	40	2.635	2.750	1.823	40	2.635	2.750	1.823
Inflation	40	3.225	2.839	2.415	40	3.225	2.839	2.415	40	3.225	2.839	2.415	40	3.225	2.839	2.415
Unemployment	40	6.199	5.792	1.674	40	6.199	5.792	1.674	40	6.199	5.792	1.674	40	6.199	5.792	1.674
President party	40	0.420	0.000	0.500	40	0.420	0.000	0.500	40	0.420	0.000	0.500	40	0.420	0.000	0.500
Panel D. ViolationTracker																
Violation dummy	88074	0.074	0.000	0.262	88074	0.076	0.000	0.266	88074	0.076	0.000	0.266	88074	0.076	0.000	0.266
Penalty	88074	0.907	0.000	3.304	88074	0.810	0.000	2.919	88074	0.810	0.000	2.919	88074	0.810	0.000	2.919
Operating performance	88074	-0.062	0.053	0.533	88074	-0.062	0.053	0.533	88074	-0.062	0.053	0.533	88074	-0.062	0.053	0.533
Size	88074	5.741	5.867	2.698	88074	5.741	5.867	2.698	88074	5.741	5.867	2.698	88074	5.741	5.867	2.698
CAPEX + R&D	88074	0.105	0.049	0.161	88074	0.105	0.049	0.161	88074	0.105	0.049	0.161	88074	0.105	0.049	0.161
Leverage	88074	0.264	0.150	0.390	88074	0.264	0.150	0.390	88074	0.264	0.150	0.390	88074	0.264	0.150	0.390
Sales growth	88074	0.254	0.069	1.061	88074	0.254	0.069	1.061	88074	0.254	0.069	1.061	88074	0.254	0.069	1.061

Table II

Explanatory Factor Analysis for Each Agency

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

Panel A. Extracted Factors

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

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

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

Table III

Tests for Differences in Operating Performance Means and Medians of Full Sample Firms with High or Low Exposure-Weighted Agency EI

This table reports the univariate results comparing *Operating performance* means and medians for firms with an *Exposure-weighted Agency EI* value less than the *Threshold_EI* (defined as the median *Exposure-weighted Agency EI* of all firms) under column EI_{Low} to firms with an *Exposure-weighted Agency EI* value more than the *Threshold_EI* under column EI_{High}. *Exposure-weighted Agency EI* is calculated as the multiplication of *Agency EI* and the natural logarithm of *RS* (transformed to zero) where *Agency EI* represents the enforcement intensity by an agency annually and *RS* represents the relevance of each (6-digit NAICS) industry to the agency working as the industry-exposure (to that agency) weights (the heavily regulated industries have higher *RS*). *RS* is the time-series average of the 6-digit NAICS industry's annual relevance score (1980 to 2019) where an industry's annual relevance score for each agency is calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) each year. Columns N_firms, N_obs, Mean_Performance, and Median_Performance represent the number of unique firms, total number of firm/year observations, *operating performance* mean, and *operating performance* median respectively. *Operating* p*erformance* is defined as operating income before depreciation and taxes divided by 1-year-lagged total assets. Panel A shows the T-test result for differences in *Operating performance* means between firms with low and high *Exposure-weighted Agency EI* under column Difference. Panel B shows the quantile regression result for differences in *Operating* p*erformance* median between firms with low and high *Exposure-weighted Agency EI* under column Difference. Each row in each panel shows the results for each of the agencies EPA, FDA, OSHA, and SEC. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

Panel A. Differences in Operating Performance Means

		EI_{Low}			EI_{High}			
Agency	*Threshold_EI*	N_firms	N_obs	Mean_performance	N_firms	N_obs	Mean_performance	Difference
EPA	0.455	12148	78638	0.026	10434	79275	-0.043	0.069***
								(0.003)
FDA	-0.061	12072	78953	0.012	12751	78960	-0.030	0.042***
								(0.003)
OSHA	0.683	11297	78967	0.022	12392	78946	-0.040	0.061***
								(0.003)
SEC	0.082	10767	78950	0.040	10264	78963	-0.058	0.098***
								(0.003)

Panel B. Differences in Operating Performance Medians

		EI_{Low}			EI_{High}			
Agency	Threshold_EI	N_firms	N_obs	Median_performance	N_firms	N_obs	Median_performance	Difference
EPA	0.455	12148	78638	0.099	10434	79275	0.063	0.036***
								(0.001)
FDA	-0.061	12072	78953	0.101	12751	78960	0.064	0.037***
								(0.001)
OSHA	0.683	11297	78967	0.103	12392	78946	0.060	0.044***
								(0.001)
SEC	0.082	10767	78950	0.112	10264	78963	0.052	0.060***
								(0.001)

Table IV

Agency-level Policy Enforcement and Operating Performance of Highly Exposed Firms

This table examines the impact of policy enforcement by each agency (EPA, FDA, OSHA, and SEC) on the performance of firms that are regulated by that agency from 1980 to 2019. Columns 1,2,3, and 4 represent the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by the EPA, FDA, OSHA, and SEC respectively. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *Agency EI,* is an annual time-series variable at the agency level representing the enforcement intensity by that agency. The control variables are *Size* (natural logarithm of total assets), *CAPEX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *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 EI	-0.043***			
	(0.014)			
FDA EI		-0.044**		
		(0.018)		
OSHA EI			-0.024**	
			(0.009)	
SEC EI				-0.041***
				(0.010)
Size	0.085***	0.090***	0.018**	0.032***
	(0.010)	(0.014)	(0.008)	(0.009)
CAPEX + R&D	-0.317***	-0.348***	-0.123	-0.205
	(0.051)	(0.059)	(0.111)	(0.177)
Leverage	-0.128***	-0.183***	-0.088	-0.169***
	(0.029)	(0.046)	(0.073)	(0.047)
Sales growth	0.001	-0.001	0.018	0.003
	(0.003)	(0.006)	(0.015)	(0.009)
Industry performance	0.563***	0.610***	1.060***	0.892***
	(0.101)	(0.148)	(0.125)	(0.161)
GDP growth	-0.004	0.000	-0.000	0.001
	(0.003)	(0.003)	(0.001)	(0.001)
Inflation	0.002	-0.000	0.003*	0.002
	(0.003)	(0.003)	(0.001)	(0.002)
Unemployment	-0.009*	-0.009*	-0.000	-0.000
	(0.005)	(0.005)	(0.002)	(0.002)
President party	0.009	-0.007	0.017**	-0.007
	(0.017)	(0.016)	(0.008)	(0.007)
Constant	-0.412***	-0.386***	-0.114**	-0.178***
	(0.059)	(0.075)	(0.056)	(0.062)
Observations	18,745	8,335	6,400	24,130
R-squared	0.665	0.656	0.570	0.576
Firm FE	YES	YES	YES	YES

Table V

Exposure-weighted Agency-level Policy Enforcement and Corporate Performance

This table examines the impact of exposure-weighted (by the relevance score) policy enforcement by EPA, FDA, OSHA, and SEC on the performance of firms from 1980 to 2019. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *Exposure-weighted Agency EI*, is calculated as the multiplication of *Agency EI* and the natural logarithm of *RS* (transformed to zero) where *Agency EI* represents the enforcement intensity by an agency annually and *RS* represents the relevance of each (6-digit NAICS) industry to the agency working as the industry-exposure (to that agency) weights (the heavily regulated industries have higher *RS*). *RS* is the time-series average of the 6-digit NAICS industry's annual relevance score (1980 to 2019) where an industry's annual relevance score for each agency is calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) each year. The control variables are *Size* (natural logarithm of total assets), *CAPEX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), 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*		
Exposure-weighted EPA EI	-0.007*			
	(0.004)			
Exposure-weighted FDA EI		-0.012***		
		(0.005)		
Exposure-weighted OSHA EI			-0.015***	
			(0.004)	
Exposure-weighted SEC EI				-0.018**
				(0.008)
Size	0.061***	0.061***	0.061***	0.062***
	(0.005)	(0.005)	(0.005)	(0.005)
CAPEX + R&D	-0.792***	-0.792***	-0.792***	-0.793***
	(0.062)	(0.063)	(0.062)	(0.062)
Leverage	-0.320***	-0.320***	-0.320***	-0.321***
	(0.026)	(0.026)	(0.026)	(0.026)
Sales growth	-0.037***	-0.037***	-0.037***	-0.037***
	(0.008)	(0.008)	(0.008)	(0.008)
Constant	-0.140***	-0.140***	-0.133***	-0.132***
	(0.027)	(0.027)	(0.027)	(0.028)
Observations	157,913	157,913	157,913	157,913
R-squared	0.343	0.344	0.344	0.344
Year × Industry FE	YES	YES	YES	YES

Table VI

Violator-firm Enforcement by Agencies and Corporate Performance

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

	(1)	(2)	(3)	(4)
Dependent variable		*Operating performance*		
Violation dummy	-0.106***	-0.007***		
	(0.007)	(0.003)		
Penalty			-0.009***	-0.001***
			(0.001)	(0.000)
Size	0.078***	0.060***	0.078***	0.060***
	(0.002)	(0.005)	(0.002)	(0.005)
CAPEX + R&D	-0.788***	-0.361***	-0.788***	-0.361***
	(0.035)	(0.036)	(0.035)	(0.036)
Leverage	-0.382***	-0.132***	-0.382***	-0.132***
	(0.015)	(0.015)	(0.015)	(0.015)
Sales growth	-0.045***	-0.012***	-0.045***	-0.012***
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	-0.306***	-0.325***	-0.308***	-0.325***
	(0.013)	(0.027)	(0.013)	(0.027)
Observations	88,074	86,736	88,074	86,736
R-squared	0.414	0.723	0.414	0.723
Year FE	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Table VII

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

This table examines the impact of policy enforcement by each agency (EPA, FDA, OSHA, and SEC) on the performance of firms that are regulated by that agency from 1980 to 2019. Columns 1,2,3, and 4 represent the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by the EPA, FDA, OSHA, and SEC respectively. Please note the sample of firms is limited to firms with Kalmenovitz's (2019) paperwork regulation intensity lower than the median of all firms' paperwork regulation intensity in that year. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *Agency EI,* is an annual time-series variable at the agency level representing the enforcement intensity by that agency. The control variables are *Size* (natural logarithm of total assets), *CAPEX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *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 EI	-0.077*			
	(0.039)			
FDA EI		-0.058**		
		(0.021)		
OSHA EI			-0.008	
			(0.012)	
SEC EI				-0.036**
				(0.013)
Size	0.085***	0.101***	0.022*	0.031**
	(0.015)	(0.021)	(0.011)	(0.014)
CAPEX + R&D	-0.315***	-0.318**	0.011	-0.104
	(0.108)	(0.115)	(0.212)	(0.168)
Leverage	-0.149***	-0.215***	-0.051	-0.229*
	(0.047)	(0.056)	(0.042)	(0.116)
Sales growth	-0.006	0.002	0.007	-0.003
	(0.006)	(0.011)	(0.025)	(0.026)
Industry performance	0.593***	0.537**	0.717***	0.569***
	(0.149)	(0.219)	(0.139)	(0.155)
GDP growth	0.005	-0.001	-0.000	-0.000
	(0.007)	(0.006)	(0.003)	(0.003)
Inflation	-0.002	-0.004	-0.006	-0.004
	(0.011)	(0.009)	(0.004)	(0.003)
Unemployment	0.007	-0.007	-0.008*	-0.011***
	(0.011)	(0.010)	(0.004)	(0.003)
President party	-0.011	-0.004	0.041***	0.029**
	(0.036)	(0.033)	(0.012)	(0.012)
Constant	-0.399***	-0.378**	-0.061	-0.028
	(0.101)	(0.136)	(0.077)	(0.076)
Observations	3,934	1,898	1,152	2,194
R-squared	0.647	0.669	0.653	0.596
Firm FE	YES	YES	YES	YES

Table VIII

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

This table examines the impact of policy enforcement by each agency (EPA, FDA, OSHA, and SEC) on the performance of firms that are regulated by that agency from 1980 to 2019 after controlling for firm-level paperwork regulation intensity. Columns 1,2,3, and 4 represent the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by the EPA, FDA, OSHA, and SEC respectively. Please note the sample of firms is limited to firms with available paperwork regulation intensity from Kalmenovitz (2019). The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *Agency EI,* is an annual time-series variable at the agency level representing the enforcement intensity by that agency. *RegIn* controls for paperwork regulatory intensity based on active regulations from Kalmenovitz (2019). *RegIn* is scaled by its standard deviation. Other control variables are *Size* (natural logarithm of total assets), *CAPEX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *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 EI	-0.052			
	(0.039)			
FDA EI		-0.038**		
		(0.018)		
OSHA EI			-0.004	
			(0.012)	
SEC EI				-0.037***
				(0.011)
RegIn	-0.021	-0.026*	-0.004	0.002
	(0.013)	(0.015)	(0.006)	(0.006)
Size	0.090***	0.101***	0.028	0.040***
	(0.014)	(0.017)	(0.017)	(0.012)
CAPEX + R&D	-0.446***	-0.496***	-0.191	-0.250
	(0.076)	(0.095)	(0.256)	(0.300)
Leverage	-0.155***	-0.286***	-0.116	-0.221***
	(0.040)	(0.059)	(0.089)	(0.068)
Sales growth	-0.004	0.006	0.008	-0.011
	(0.005)	(0.008)	(0.022)	(0.015)
Industry performance	0.563***	0.724***	1.177***	0.954***
	(0.129)	(0.165)	(0.200)	(0.309)
GDP growth	0.003	0.005	-0.004	-0.001
	(0.005)	(0.004)	(0.002)	(0.003)
Inflation	-0.005	-0.009	0.007	-0.004
	(0.009)	(0.007)	(0.005)	(0.005)
Unemployment	0.003	-0.005	-0.006**	-0.007*
	(0.008)	(0.006)	(0.003)	(0.003)
President party	-0.022	-0.048**	0.052***	0.011
	(0.027)	(0.018)	(0.016)	(0.019)
Constant	-0.248***	-0.168	-0.141	-0.146
	(0.082)	(0.114)	(0.100)	(0.090)

Table VIII-Continued

	(1)	(2)	(3)	(4)
Dependent variable		*Operating performance*		
Observations	8,053	3,816	2,633	4,509
R-squared	0.605	0.646	0.489	0.508
Firm FE	YES	YES	YES	YES

Table IX

Exposure-weighted Agency-level Policy Enforcement, Paperwork Regulation Intensity, and Corporate Performance

This table examines the impact of exposure-weighted (by the relevance score) policy enforcement by EPA, FDA, OSHA, and SEC on the performance of firms from 1980 to 2019 after controlling for firm-level paperwork regulation intensity. Please note the sample of firms is limited to firms with available paperwork regulation intensity from Kalmenovitz (2019). The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *Exposure-weighted Agency EI*, is calculated as the multiplication of *Agency EI* and the natural logarithm of *RS* (transformed to zero) where *Agency EI* represents the enforcement intensity by an agency annually and *RS* represents the relevance of each (6-digit NAICS) industry to the agency working as the industry-exposure (to that agency) weights (the heavily regulated industries have higher *RS*). *RS* is the time-series average of the 6-digit NAICS industry's annual relevance score (1980 to 2019) where an industry's annual relevance score for each agency is calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) each year. *RegIn* controls for paperwork regulatory intensity based on active regulations from Kalmenovitz (2019). *RegIn* is scaled by its standard deviation. Other control variables are *Size* (natural logarithm of total assets), *CAPEX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), 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*		
Exposure-weighted EPA EI	-0.006			
	(0.006)			
Exposure-weighted FDA EI		-0.015***		
		(0.004)		
Exposure-weighted OSHA EI			-0.022***	
			(0.007)	
Exposure-weighted SEC EI				-0.016***
				(0.005)
RegIn	-0.002	-0.002	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.004)
Size	0.052***	0.052***	0.052***	0.053***
	(0.004)	(0.004)	(0.004)	(0.004)
CAPEX + R&D	-0.778***	-0.778***	-0.780***	-0.782***
	(0.086)	(0.087)	(0.085)	(0.087)
Leverage	-0.209***	-0.209***	-0.209***	-0.209***
	(0.023)	(0.023)	(0.023)	(0.023)
Sales growth	-0.042***	-0.042***	-0.042***	-0.042***
	(0.010)	(0.010)	(0.010)	(0.010)
Constant	-0.076**	-0.077**	-0.055	-0.072*
	(0.037)	(0.037)	(0.038)	(0.037)
Observations	63,722	63,722	63,722	63,722
R-squared	0.303	0.303	0.304	0.303
Year × Industry FE	YES	YES	YES	YES

Appendix

Table A.I

Variable Definition

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

Variable	Definition	Source
Agency EI	Time series (1979 to 2019) enforcement index for each agency calculated as the latent variable from factor analysis of the main six agency-level policy enforcement variables (*Action1, Action2, Budget, FTE, Regulation1*, and *Regulation2*)	
RS	The time-series average of the industry's annual (1980 to 2019) relevance score for each agency which is calculated as the mean of the probabilities of the industry being related to that agency's parts in the Code of Federal Register (CFR) averaged over years.	RegData
Exposure-weighted Agency EI	*Agency EI* × *RS*	
Violation Dummy	A dummy variable taking the value of one if a firm has been enforced (by any federal or state enforcement agency) for a violation of regulations annually from 2000 to 2019	ViolationTracker
Penalty	Natural logarithm of one plus the penalty dollar amount a firm was issued (by any federal or state enforcement agency) for a violation of regulations annually from 2000 to 2019	ViolationTracker
Operating Performance	The proportion of a firm's operating income before tax and depreciation to its previous year total assets ($\mathrm{OIBDP_t}$ / $\mathrm{AT_{t-1}}$)	Compustat
Size	Natural logarithm of total assets (log (AT))	Compustat
CAPEX + R&D	The proportion of capital expenditure plus R&D to total assets (CAPX/AT)	Compustat
Leverage	The Proportion of total debt to total assets (DT/AT)	Compustat
Sales growth	Growth in sales from year t-1 to year t (($\mathrm{SALE_t}$ − $\mathrm{SALE_{t-1}}$)/ $\mathrm{SALE_{t-1}}$))	Compustat
Industry performance	The median *operating performance* of firms in each 6-digit NAICS industry each year	Compustat
Asset turnover (TATO)	Total sales scaled by 1-year-lagged total assets	Compustat
Profit margin	Operating income before depreciation and taxes scaled by contomporaneous total sales	Compustat
Industry asset turnover	The median *asset turnover* of firms in each 6-digit NAICS industry each year	Compustat
Industry profit margin	The median *profit margin* of firms in each 6-digit NAICS industry each year	Compustat
GDP growth	Percentage growth in real GDP from year t − 1 to year t (($\mathrm{GDP_t}$ − $\mathrm{GDP_{t-1}}$)×100/$\mathrm{GDP_{t-1}}$)	Compustat
Inflation	Annual inflation percentage rate	FRED
Unemployment	Annual unemployment percentage rate	FRED

Table A.I-Continued

Variable	Definition	Source
President party	Dummy variable taking value of zero when the President is from the Republican party and one when the President is from the Democrat party	
Action1	EPA, FDA, and SEC's *Action1* is the number of annual administrative actions, recalls, and administrative proceedings respectively. OSHA's *Action1* is the annual amount of penalty in constant (2012 inflation-adjusted) dollars	EPA.gov, FDA.gov, OSHA.gov, SEC.gov
Action2	EPA, FDA, OSHA, and SEC's *Action2* is the number of annual civil cases, inspections, inspections, and civil injunctions respectively.	EPA.gov, FDA.gov, OSHA.gov, SEC.gov
Budget	Agency's spending in constant (2012 inflation-adjusted) million dollars	Weidenbaum Center on the Economy, Government, and Public Policy
FTE	The total number of hours worked divided by the number of compensable hours applicable to each fiscal year for an agency.	Weidenbaum Center on the Economy, Government, and Public Policy
Regulation1	The count number of restrictive words restrictive (e.g., may not, must, prohibit, require, and shall) appeared each year in the CFR parts related to an agency	RegData
Regulation2	The count number of all words appeared each year in the CFR parts related to an agency	RegData

Table A.II

Agency-level Enforcement Proxies Summary Statistics

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

	EPA				FDA				OSHA				SEC			
Variable	N	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD
Action1	40	3024.67	3159.000	1071.722	40	4625.241	3726.000	2799.027	40	1.157e+08	94588577.652	99114567	40	304.125	283.000	172.402
Action2	40	244.070	255.500	87.106	40	21016.700	20000.500	6125.126	40	105919.820	104867.000	19124.687	40	196.825	190.000	51.748
Budget	40	5060.799	5466.433	993.552	40	2044.101	1565.688	1295.472	40	489.179	488.369	55.520	40	679.923	468.167	468.103
FTE	40	15611.525	16634.000	2036.814	40	10258.35	9171.500	3092.57	40	2234.600	2197.500	205.213	40	3026.925	2809.000	881.358
Regulation1	40	118894.7	125322.000	57861.622	40	22188.775	21790.000	2383.893	40	32908.450	34349.000	6686.702	40	13588.075	13599.500	3053.980
Regulation2	40	9772851.1	9848461.500	4656795.7	40	2259665.9	2277926	172740.610	40	1596482.100	1695021	396392.720	40	1030458	984867.500	231867.550

Table A.III

Tests for Differences in Operating Performance Means and Medians of Full Sample Firms with High or Low Agency EI

This table reports the univariate results comparing *Operating performance* means and medians for firms with an *Agency EI* value less than the *Threshold_EI* (defined as the median *Agency EI* of all years) under column EI_{Low} to firms with an *Agency EI* value more than the *Threshold_EI* under column EI_{High}. *Agency EI* represents the enforcement intensity by an agency annually. Columns N_firms, N_obs, Mean_Performance, and Median_Performance represent the number of unique firms, total number of firm/year observations, *operating performance* mean, and *operating performance* median respectively. *Operating* p*erformance* is defined as operating income before depreciation and taxes divided by 1-year-lagged total assets. Panel A shows the T-test result for differences in *Operating performance* means between firms with low and high *Exposure-weighted Agency EI* under column Difference. Panel B shows the quantile regression result for differences in *Operating* p*erformance* median between firms with low and high *Exposure-weighted Agency EI* under column Difference. Each row in each panel shows the results for each of the agencies EPA, FDA, OSHA, and SEC. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

Panel A. Differences in Operating Performance Means

		EI_{Low}			EI_{High}			
Agency	*Threshold_EI*	N_firms	N_obs	Mean_performance	N_firms	N_obs	Mean_performance	Difference
EPA	0.435	12001	67135	0.055	11935	90778	-0.056	0.111***
								(0.002)
FDA	-0.095	11630	69624	0.018	13226	88289	-0.029	0.047***
								(0.002)
OSHA	0.262	10819	71312	0.022	12958	86601	-0.034	0.056***
								(0.003)
SEC	-0.123	9910	69839	0.059	11262	88074	-0.063	0.122***
								(0.003)

Panel B. Differences in Operating Performance Medians

		EI_{Low}			EI_{High}			
Agency	Threshold_EI	N_firms	N_obs	Median_performance	N_firms	N_obs	Median_performance	Difference
EPA	0.435	12001	67135	0.112	11935	90778	0.060	0.052***
								(0.001)
FDA	-0.095	11630	69624	0.100	13226	88289	0.068	0.032***
								(0.001)
OSHA	0.262	10819	71312	0.103	12958	86601	0.066	0.037***
								(0.001)
SEC	-0.123	9910	69839	0.118	11262	88074	0.053	0.065***
								(0.001)

Table A.IV

Agency-level Policy Enforcement and Operating Performance of Highly Exposed Firms

This table examines the impact of policy enforcement by each agency (EPA, FDA, OSHA, and SEC) on the performance of firms that are regulated by that agency from 1980 to 2019. Columns 1,2,3, and 4 represent the firms with an average *RS* value higher than the 95% percentile *RS* of all firms affected by the EPA, FDA, OSHA, and SEC respectively. The dependent variable in all the columns is the firm *operating performance*, measured as the operating income before depreciation and taxes divided by 1-year-lagged total assets. The main variable of interest, *Agency EI,* is an annual time-series variable at the agency level representing the enforcement intensity by that agency. The control variables are *Size* (natural logarithm of total assets), *CAPEX + R&D* (capital expenditure plus R&D spending scaled by total assets), *Leverage* (ratio of total debt and total assets), *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 industry (6-digit NAICS) 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 EI	-0.052***			
	(0.015)			
FDA EI		-0.096***		
		(0.013)		
OSHA EI			-0.033***	
			(0.010)	
SEC EI				-0.029***
				(0.006)
Size	0.101***	0.098***	0.028***	0.021***
	(0.006)	(0.007)	(0.005)	(0.002)
CAPEX + R&D	-0.822***	-0.833***	-0.209	-0.424*
	(0.048)	(0.063)	(0.128)	(0.211)
Leverage	-0.307***	-0.329***	-0.150***	-0.307***
	(0.032)	(0.052)	(0.050)	(0.038)
Sales growth	-0.016***	-0.020***	-0.006	-0.030**
	(0.004)	(0.006)	(0.019)	(0.011)
Industry performance	0.832***	0.826***	1.221***	1.079***
	(0.123)	(0.118)	(0.120)	(0.105)
GDP growth	0.007	0.000	0.001	0.000
	(0.008)	(0.004)	(0.001)	(0.001)
Inflation	0.015*	-0.002	0.002	0.002
	(0.008)	(0.003)	(0.002)	(0.002)
Unemployment	0.002	-0.012*	-0.002	0.000
	(0.009)	(0.006)	(0.002)	(0.002)
President party	0.012	0.015	0.024**	-0.005
	(0.028)	(0.018)	(0.010)	(0.007)
Constant	-0.422***	-0.264***	-0.154***	-0.087***
	(0.090)	(0.055)	(0.036)	(0.021)
Observations	18,908	8,401	6,433	24,335
R-squared	0.435	0.415	0.170	0.213
Industry FE	YES	YES	YES	YES

Internet Appendix

Table IA.I

Enforcement Data Sample

This table shows the data for agency-level enforcement variables from 1979 to 2019. These variables represent each agency's different channels of policy enforcement. Panel A shows the data for EPA and FDA while panel B shows the data for OSHA and SEC. *Action1* and *Action2* represent the direct actions taken by the agency to conduct their enforcement job. For example, EPA's *Action1* represents the number of administrative actions initiated by EPA which is constituted of the total number of penalty orders, compliance orders, and field citations every year. EPA's *Action2* is the number of civil cases referred (by the EPA) to the Department of Justice (DOJ) each year. FDA's *Action1* shows the number of inspections conducted by the FDA every year. FDA's *Action2* represents the number of recalls sent out by the FDA every year. OSHA's *Action1* shows the amount of penalty in constant (2012, adjusted for inflation) dollars issued by OSHA every year. OSHA's *Action1* represents the total number of inspections conducted by OSHA every year. SEC's *Action1* and *Action2* represent the number of administrative proceedings and civil injunctions taken by the SEC against violators of regulations every year respectively. *Budget* is the spending in constant (2012, adjusted for inflation) million dollars by each agency every year. FTE (or Full-time equivalent) represents the total number of full-time employees on each agency's staff every year calculated as the total number of hours worked divided by the number of compensable hours for each agency every year. *Regulation1* and *Regulation2* represent the count number of restrictive (e.g., may not, must, prohibit, require, and shall) and total words present in the Code of Federal Register's (CFR) parts related to an agency each year respectively.

Panel A. EPA and FDA

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

Table IA.I-Continued

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

Panel B. OSHA and SEC

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

Table IA.I-Continued

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

Table IA.II

Agencies Regulated Industries based on the RegData

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

Panel A. EPA

Top 15			Bottom 15		
NAICS	Title	*RS*	NAICS	Title	*RS*
562219	Other Nonhazardous Waste Treatment and Disposal	0.1785288	812930	Parking Lots and Garages	0.0002583
562211	Hazardous Waste Treatment and Disposal	0.1743958	812990	All Other Personal Services	0.0002561
324110	Petroleum Refineries	0.0888571	713940	Fitness and Recreational Sports Centers	0.0002477
325612	Polish and Other Sanitation Good Manufacturing	0.0837735	511191	Greeting Card Publishers	0.0002475
325320	Pesticide and Other Agricultural Chemical Manufacturing	0.0833795	525990	Other Financial Vehicles	0.0002457
325411	Medicinal and Botanical Manufacturing	0.0796734	512110	Motion Picture and Video Production	0.0002393
325193	Ethyl Alcohol Manufacturing	0.0767241	531190	Lessors of Other Real Estate Property	0.0002365
325510	Paint and Coating Manufacturing	0.0728942	531390	Other Activities Related to Real Estate	0.0002332
325199	All Other Basic Organic Chemical Manufacturing	0.0710925	323111	Commercial Printing (except Screen and Books)	0.0002328
325611	Soap and Other Detergent Manufacturing	0.0682874	512199	Other Motion Picture and Video Industries	0.0002306
325613	Surface Active Agent Manufacturing	0.0666926	523930	Investment Advice	0.0002305
325120	Industrial Gas Manufacturing	0.0664096	713290	Other Gambling Industries	0.0002262
325992	Photographic Film, Paper, Plate, and Chemical Manufacturing	0.0661813	523910	Miscellaneous Intermediation	0.0002179
325413	In-Vitro Diagnostic Substance Manufacturing	0.0649013	531210	Offices of Real Estate Agents and Brokers	0.0002153
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing	0.0647502	515210	Cable and Other Subscription Programming	0.0002133

Panel B. FDA

Top 15			Bottom 15		
NAICS	Title	*RS*	NAICS	Title	*RS*
311111	Dog and Cat Food Manufacturing	0.0607412	515210	Cable and Other Subscription Programming	0.0002328
311712	Seafood dinners, frozen, manufacturing	0.0504451	334413	Semiconductor and Related Device Manufacturing	0.0002327
311942	Spice and Extract Manufacturing	0.0496979	523210	Securities and Commodity Exchanges	0.0002246
311920	Coffee and Tea Manufacturing	0.0483507	611519	Other Technical and Trade Schools	0.0002208
311340	Nonchocolate Confectionery Manufacturing	0.0478406	522291	Consumer Lending	0.0002165
325412	Pharmaceutical Preparation Manufacturing	0.0475893	541613	Marketing Consulting Services	0.0002164

Table IA.II-Continued

Top 15			Bottom 15		
NAICS	Title	*RS*	NAICS	Title	*RS*
311812	Commercial Bakeries	0.0458779	531190	Lessors of Other Real Estate Property	0.0002155
311611	Animal (except Poultry) Slaughtering	0.0427466	524210	Insurance Agencies and Brokerages	0.0002149
311513	Cheese Manufacturing	0.0416202	212234	Copper, Nickel, Lead, and Zinc Mining	0.0002136
311221	Wet Corn Milling	0.0408273	522390	Other Activities Related to Credit Intermediation	0.0002061
311822	Batters, prepared, made from purchased flour	0.0388012	522298	All Other Nondepository Credit Intermediation	0.0001744
311612	Meat Processed from Carcasses	0.0372278	522320	Financial Transactions Processing, Reserve, and Clearinghouse Activities	0.0001739
311615	Poultry Processing	0.0365713	523910	Miscellaneous Intermediation	0.0001626
311999	All Other Miscellaneous Food Manufacturing	0.0360184	522292	Real Estate Credit	0.0001588
311821	Cookie and Cracker Manufacturing	0.0358228	525990	Other Financial Vehicles	0.0001508

Panel C. OSHA

Top 15			Bottom 15		
NAICS	Title	*RS*	NAICS	Title	*RS*
486210	Pipeline Transportation of Natural Gas	0.0745174	621498	All Other Outpatient Care Centers	0.0001603
486910	Pipeline Transportation of Refined Petroleum Products	0.0725092	211111	Crude Petroleum and Natural Gas Extraction	0.0001584
481211	Nonscheduled Chartered Passenger Air Transportation	0.0670158	336211	Motor Vehicle Body Manufacturing	0.0001534
481111	Scheduled Passenger Air Transportation	0.0660279	722310	Food Service Contractors	0.0001475
481112	Scheduled Freight Air Transportation	0.0597384	331315	Aluminum Sheet, Plate, and Foil Manufacturing	0.000147
486110	Pipeline Transportation of Crude Oil	0.0567931	336414	Guided Missile and Space Vehicle Manufacturing	0.0001441
488320	Marine Cargo Handling	0.0484136	522390	Other Activities Related to Credit Intermediation	0.000144
515112	Radio Stations	0.0384265	336999	All Other Transportation Equipment Manufacturing	0.0001405
321918	Other Millwork (including Flooring)	0.0351345	621511	Medical Laboratories	0.0001371
561312	Executive Search Services	0.0345496	336212	Truck Trailer Manufacturing	0.0001291
482111	Line-Haul Railroads	0.0292765	336991	Motorcycle, Bicycle, and Parts Manufacturing	0.0001111
445120	Convenience Stores	0.0292679	336370	Motor Vehicle Metal Stamping	0.0001015
483113	Coastal and Great Lakes Freight Transportation	0.0239695	336214	Travel Trailer and Camper Manufacturing	0.0001008
541330	Engineering Services	0.0217322	336112	Light Truck and Utility Vehicle Manufacturing	0.0001
325211	Plastics Material and Resin Manufacturing	0.0205379	336412	Aircraft Engine and Engine Parts Manufacturing	0.0000712

Panel D. SEC

Top 15			Bottom 15		
NAICS	Title	*RS*	NAICS	Title	*RS*
523930	Investment Advice	0.0607412	336120	Heavy Duty Truck Manufacturing	0.0002299
523920	Portfolio Management	0.1097037	325520	Adhesive Manufacturing	0.0002261

Table IA.II-Continued

Top 15			Bottom 15		
NAICS	Title	*RS*	NAICS	Title	*RS*
523120	Securities Brokerage	0.0635717	334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	0.000222
541810	Advertising Agencies	0.046183	325613	Surface Active Agent Manufacturing	0.0002177
541330	Engineering Services	0.0294333	221111	Hydroelectric Power Generation	0.0002176
524127	Direct Title Insurance Carriers	0.0235776	621498	All Other Outpatient Care Centers	0.000216
541860	Direct Mail Advertising	0.0215081	531390	Other Activities Related to Real Estate	0.0002152
515120	Television Broadcasting	0.0213937	336411	Aircraft Manufacturing	0.0002104
524114	Direct Health and Medical Insurance Carriers	0.0144078	621910	Ambulance Services	0.0002098
524113	Direct Life Insurance Carriers	0.0120947	325199	All Other Basic Organic Chemical Manufacturing	0.0002078
524130	Reinsurance Carriers	0.0118328	336112	Light Truck and Utility Vehicle Manufacturing	0.0001801
522110	Commercial Banking	0.0095798	621511	Medical Laboratories	0.0001735
541110	Offices of Lawyers	0.0094699	211111	Crude Petroleum and Natural Gas Extraction	0.0001648
523130	Commodity Contracts Dealing	0.0092934	221119	Other electric power generation	0.0001042
524126	Direct Property and Casualty Insurance Carriers	0.0088823	221112	Fossil Fuel Electric Power Generation	0.0000772

Table IA.III

Agency-level Policy Enforcement and Corporate Performance Components (Asset Turnover and Profit Margins) of Highly Exposed Firms

This table examines the impact of policy enforcement by each agency (EPA, FDA, OSHA, and SEC) on the asset and profit margins of firms that are regulated by that agency from 1980 to 2019. These are the firms with an *RS* value higher than the 95% percentile *RS* of all firms affected by the EPA (columns 1 and 5), FDA (columns 2 and 6), OSHA (columns 3 and 7), and SEC (columns 4 and 8). The dependent variable in columns (1) through (4) is the firm *asset turnover*, measured as the total sales divided by 1-year-lagged total assets. The dependent variable in columns (4) through (8) is the firm *profit margin*, measured as the operating income before depreciation and taxes divided by total sales. The main variable of interest, *Agency EI,* is an annual time-series variable at the agency level representing the enforcement intensity by that agency. Firm controls are *Size* (natural logarithm of total assets), *CAPEX + R&D* (capital expenditure plus R&D spending scaled by total assets), and *Leverage* (ratio of total debt and total assets). 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). *Industry asset turnover* and *Industry profit margin* are ,respectively, *asset turnover* and *profit margin* of the median firm within each 6-digit NAICS in each year. All Columns include industry (6-digit NICS) fixed effects. Statistical significance is based on the double-clustered (year and firm) standard errors that are reported in parentheses. ∗∗∗, ∗∗, and ∗ indicate significance at the 1%, 5%, and 10% levels respectively.

Dependent variable	(1) *Asset turnover*	(2) *Asset turnover*	(3) *Asset turnover*	(4) *Asset turnover*	(5) *Profit margin*	(6) *Profit margin*	(7) *Profit margin*	(8) *Profit margin*
EPA EI	0.016				-0.783***			
	(0.021)				(0.181)			
FDA EI		-0.026				-0.827***		
		(0.022)				(0.190)		
OSHA EI			0.031				-0.131*	
			(0.025)				(0.071)	
SEC EI				0.038**				-0.142***
				(0.016)				(0.038)
Industry asset turnover	0.825***	0.688***	0.675***	0.654***				
	(0.065)	(0.076)	(0.085)	(0.058)				
Industry profit margin					2.487***	5.022***	1.340***	1.488***
					(0.300)	(1.026)	(0.414)	(0.202)
Constant	0.574***	0.910***	1.177***	0.713***	-2.888**	-2.646***	-0.540**	-0.709***
	(0.070)	(0.127)	(0.197)	(0.080)	(1.105)	(0.595)	(0.231)	(0.155)
Observations	18,493	8,248	6,416	24,288	18,493	8,248	6,416	24,288
R-squared	0.324	0.440	0.623	0.634	0.229	0.216	0.062	0.084
Firm Controls	YES	YES	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES

Table IA.IV

EPA's Policy Enforcement Variables and Operating Performance of Highly Exposed Firms

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*Operating performance*						
Action1	-0.015**						-0.026***
	(0.007)						(0.007)
Action2		0.014					0.021*
		(0.008)					(0.011)
Budget			-0.021**				-0.021
			(0.010)				(0.016)
FTE				-0.012			0.014
				(0.010)			(0.018)
Regulation1					-0.060***		-0.044*
					(0.019)		(0.022)
Regulation2						-0.066***	
						(0.019)	
Industry performance	0.603***	0.601***	0.597***	0.608***	0.524***	0.513***	0.488***
	(0.108)	(0.106)	(0.104)	(0.107)	(0.099)	(0.098)	(0.096)
Constant	-0.482***	-0.371***	-0.300***	-0.326***	-0.334***	-0.326***	-0.353***
	(0.071)	(0.061)	(0.075)	(0.086)	(0.063)	(0.063)	(0.088)
Observations	18,745	18,745	18,745	18,745	18,745	18,745	18,745
R-squared	0.664	0.664	0.664	0.664	0.665	0.665	0.666
Firm Controls	YES	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES

Table IA.V

FDA's Policy Enforcement Variables and Operating Performance of Highly Exposed Firms

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*Operating performance*						
Action1	-0.055**						-0.032
	(0.021)						(0.021)
Action2		0.002					0.047***
		(0.016)					(0.012)
Budget			-0.045**				0.049
			(0.020)				(0.031)
FTE				-0.046**			-0.130***
				(0.018)			(0.026)
Regulation1					-0.009		0.042***
					(0.011)		(0.011)
Regulation2						-0.010	
						(0.008)	
Industry performance	0.530***	0.528***	0.587***	0.592***	0.574***	0.558***	0.368***
	(0.137)	(0.149)	(0.145)	(0.143)	(0.155)	(0.144)	(0.130)
Constant	-0.366***	-0.377***	-0.343***	-0.269***	-0.283**	-0.235*	-0.554***
	(0.072)	(0.076)	(0.071)	(0.072)	(0.117)	(0.132)	(0.126)
Observations	8,335	8,335	8,335	8,335	8,335	8,335	8,335
R-squared	0.657	0.655	0.657	0.657	0.656	0.656	0.658
Firm Controls	YES	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES

Table IA.VI

OSHA's Policy Enforcement Variables and Operating Performance of Highly Exposed Firms

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*Operating performance*						
Action1	-0.016**						-0.007
	(0.006)						(0.006)
Action2		0.012**					0.001
		(0.005)					(0.004)
Budget			-0.024***				-0.022***
			(0.007)				(0.008)
FTE				-0.004			0.001
				(0.004)			(0.005)
Regulation1					-0.011*		-0.009*
					(0.006)		(0.005)
Regulation2						-0.013*	
						(0.007)	
Industry performance	1.081***	1.055***	0.960***	1.062***	1.077***	1.076***	0.965***
	(0.128)	(0.126)	(0.100)	(0.125)	(0.128)	(0.128)	(0.106)
Constant	-0.194**	-0.121**	0.045	-0.079	-0.051	-0.055	0.078
	(0.078)	(0.058)	(0.056)	(0.068)	(0.057)	(0.055)	(0.062)
Observations	6,400	6,400	6,400	6,400	6,400	6,400	6,400
R-squared	0.569	0.570	0.572	0.568	0.569	0.569	0.573
Firm Controls	YES	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES

Table IA.VII

SEC's Policy Enforcement Variables and Operating Performance of Highly Exposed Firms

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*Operating performance*						
Action1	-0.017***						0.002
	(0.006)						(0.004)
Action2		-0.007					-0.004
		(0.004)					(0.003)
Budget			-0.029***				0.022
			(0.007)				(0.018)
FTE				-0.037***			-0.039*
				(0.009)			(0.019)
Regulation1					-0.043***		-0.030**
					(0.011)		(0.015)
Regulation2						-0.040***	
						(0.010)	
Industry performance	0.919***	0.917***	0.909***	0.895***	0.883***	0.891***	0.867***
	(0.160)	(0.162)	(0.162)	(0.162)	(0.160)	(0.161)	(0.162)
Constant	-0.126**	-0.126**	-0.143**	-0.059	0.010	0.001	0.063
	(0.055)	(0.057)	(0.057)	(0.049)	(0.044)	(0.045)	(0.063)
Observations	24,130	24,130	24,130	24,130	24,130	24,130	24,130
R-squared	0.573	0.573	0.575	0.576	0.577	0.576	0.577
Firm Controls	YES	YES	YES	YES	YES	YES	YES
Macro Controls	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES