



Department of Finance
Faculty of Business and Economics

Working Paper Series

The Government Agenda and the Effects of Regulatory
Dispersion

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Working Paper No. 20/21
July 2021

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Abstract

The agenda of the U.S. government extends across a myriad of agencies, topics, and regulatory stages. Using novel data from the Federal Register, we quantify the entire government agenda. We find that many regulatory topics are handled by multiple government agencies. For each firm, we measure firm-specific regulatory dispersion based on the number of agencies that regulate each topic, weighted by the relevance of each topic to the firm. We find that higher regulatory dispersion relates to higher subsequent SG&A costs and to lower productivity, profitability, and growth. Overall, the results highlight the economic price companies pay when regulatory oversight is fragmented across multiple government agencies.

JEL Classifications: E22, G18, G28, G31

Keywords: regulation, government agenda, productivity

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1. Introduction

The federal government is arguably the most influential actor in the entire United States economy. Recognizing its outsized importance, many studies document how the regulatory burden imposed by the federal government affects a wide range of corporate outcomes. In this paper, we posit that companies are affected not only by the quantity of regulation but also by the dispersion of regulatory activity across federal agencies. To examine this conjecture, we quantify the dispersion of the federal government's entire agenda across 121 unique agencies, where this agenda includes developing new rules, supervising transactions, and many more activities.

The dispersion of government activities is likely to affect firm operations, and it is often a subject of intense policy debates. The direction of the impact on companies, though, is not clear. The *Benefits of Regulatory Dispersion* hypothesis posits that companies benefit from the flexibility that arises from being overseen by multiple agencies. In the early stages of regulation, firms can focus on the agency with which they expect to have the most influence. Moreover, after the final rules are set, firms can choose to follow the least restrictive set of regulations, analogous to firms benefiting from choice of court venue (see, e.g., Bebchuk and Hamdani (2002)). Both dimensions potentially contribute to a race to the bottom in regulation, in ways that can benefit firms. The alternative *Benefits of Regulatory Concentration* hypothesis posits that companies benefit if their businesses are regulated by fewer government agencies. The company faces less regulatory uncertainty and more clarity on which regulator it must satisfy. The firm can focus on influencing a smaller number of agencies, which leads to a better ability to shape the regulatory environment. Consequently, new regulations are less likely to surprise the firm and there is a higher probability that the final regulations are better aligned with firms' economic interests. A recent report by the U.S. Department of Treasury makes a similar point, arguing that fragmentation and overlap could

potentially lead to “ineffective regulatory oversight and inefficiencies that are costly to ... businesses.”¹

To empirically assess the competing hypotheses, we source a novel data set from the Federal Register (FR). The FR is the official daily publication of the U.S. government, which details the activities of all federal agencies. We use a machine learning technique, Latent Dirichlet Analysis (“LDA”), to categorize FR activities into 100 topics and to assign economic meaning to each of these topics. We find that topics are often distributed across many federal agencies.

For each topic-year, we calculate the portion of the total FR words that were written by each federal agency, and we define dispersion as one minus the sum of these squared percentages (analogous to one minus an HHI). The values range from 0.34 to 0.95, highlighting the extent of heterogeneity across topics. For example, the least dispersed – and hence the most concentrated – topic is “Securities: investment companies,” a highly specialized topic that is regulated by only a handful of financial agencies.

Companies differ in the relative importance they attach to each of the 100 topics. Continuing with the above example, the topic “Securities: investment companies” is arguably more relevant for the financial industry than it is for the hospitality industry. Therefore, the concentration of this topic would affect financial companies more than it would affect hospitality companies. We formalize this intuition with a firm-specific measure of regulatory dispersion. Intuitively, our measure is a weighted average of the dispersion that the company is facing. To obtain those weights, we identify the fraction of each company-year annual report dedicated to each LDA topic. We then compute the weighted average across topics within each company-year: the weights

¹ <https://www.treasury.gov/press-center/press-releases/Documents/A%20Financial%20System.pdf>.

reflect how important the topic is for the company, and we multiply these weights by the dispersion of each topic across agencies. The measure varies within-firm over time, due to changes in the topic dispersion across agencies, combined with changes in the relative weights the company assigns to each topic.

With the firm-specific measure of regulatory dispersion at hand, we are able to study its potential impact on companies. A broad set of empirical tests indicates that higher regulatory dispersion is detrimental to the firm, consistent with the Benefits of Regulatory Concentration hypothesis. Specifically, we find that higher regulatory dispersion leads to higher sales, general, and administrative costs (SG&A). We also find that higher regulatory dispersion leads to lower total factor productivity (TFP) and lower profitability. Overall, the evidence highlights the costs of regulatory dispersion. When a firm must answer to a greater number of government agencies, it must devote more resources to satisfy regulatory requirements. Higher dispersion imposes a heavier burden on firms, who must divert resources away from more value-increasing efforts.

To the extent that greater regulatory dispersion requires firms to devote resources to satisfying a greater number of government agencies, it should cause fewer projects to have a positive net present value. This suggests that firm growth will decrease. Results support this prediction. We find a significant negative relation between regulatory dispersion and both sales growth and asset growth. It is less clear, however, how this regulatory burden would affect hiring decisions. On the one hand, the lower number of new projects arguably causes firms to hire fewer people (Averch and Johnson (1962); Stigler (1971); Peltzman (1976); Kalmenovitz (2019); Calomiris, Mamaysky, and Yang (2020)). However, firms must also hire people to satisfy regulatory demands (Alesina, Ardagna, Nicoletti, and Schiantarelli (2005); Gong and Yannelis (2018)), which suggests that increased regulatory dispersion would have a positive effect on

employment. Our findings suggest that the latter channel represents the dominant effect. Firms with higher regulatory dispersion have significantly higher employment, and these findings are again significant both across and within-firm and even controlling for industry trends.²

Identifying the economic impact of regulation is a notoriously difficult challenge, as regulation is not randomly assigned across companies. We address some obvious concerns with a large set of controls and saturated fixed-effects specifications. To disentangle regulatory dispersion from the sheer quantity of regulation, we proxy for the latter using the number of words in the FR devoted to each regulatory topic. Large, diversified companies must tackle many legal challenges handled by multiple agencies, and to address this we control for the company's size (total assets), number of business segments, and the dispersion of regulatory topics as discussed in the firm's 10-K. A sinking company might adopt suspicious practices that draw the attention of multiple regulators, and to address this potential concern we control for known determinants of investment opportunities (Tobin's Q and cash flows). We include firm and year fixed effects, and the highly significant results suggest that these effects occur at the firm level and are identified within-firm over time. In the tightest specification we add year×industry fixed effects, removing industry trends and comparing two companies from the same industry who face different levels of regulatory dispersion. Companies within the same industry face different regulatory environments, and these differences are significantly related to company operations.

A unique feature of our regulatory measure is that it captures the total flow of regulatory activity, not only the stock of existing rules. We take advantage of this breadth of data to address several follow-on questions. First, we contrast the effects across different stages of regulatory

² Kalmenovitz (2019) finds that federal paperwork regulations reduce investment and employment, potentially due to the "dead weight" they impose on the company's operations.

activity. Our analysis reveals that final rules represent only 32% of the government agenda. The earlier stages of rulemaking account for an additional 24%, and the remaining 44% includes various actions such as hearings, public meetings, transaction approvals, and grant applications (all classified as “notices”). Strikingly, we find that the negative effects of regulatory dispersion exist within each stage of regulatory activity. Second, we contrast the dispersion across new rules to the dispersion across rule modifications. We find that both have similar significant negative effects on underlying firms. In aggregate, our findings highlight how firms are influenced by the many different types of regulatory activity; firms must incur costs to stay abreast of upcoming regulatory activity, to comply with new regulations, and to adapt to changes in existing regulations.

There is a growing recognition of the need to better understand how regulation in all its forms affects economic activity. The literature currently offers several methods to measure regulation (La Porta et al. (1998); Botero et al. (2004); Bandiera et al. (2000); Nicoletti and Scarpetta (2003); Djankov et al. (2006); Mulligan and Shleifer (2005); Dawson and Seater (2013); Al-Ubaydli and McLaughlin (2017); Simkovic and Zhang (2019); Gong and Yannelis (2018); Calomiris et al. (2020); Kalmenovitz (2019)). Relative to these other measures, ours has the advantages of varying both within firm and over time, and of enabling classification by any combination of topic, agency, or regulatory type (e.g., notice, proposed rule, or final rule). Moreover, it is based on publicly available data sources and is thus replicable. Conceptually, we offer four contributions. First, we capture the intensity of the entire government’s agenda, not only final rules or subsets of the regulatory code. Second, we link the “industrial organization” of the federal government to firms’ regulatory burden. The burden borne by companies depends not only on the sheer quantity of regulations, but also on the number of agencies who are involved in the design and implementation of those regulations. Third, studies typically focus on either the time-

series of regulation (without differentiating between firms) or firm-specific exposure (without an analysis of what is driving changes in regulation). Our empirical approach maps the inter-agency time-series variation of the government's agenda to the cross-section of firms, breaking down the firm's burden by topics and by agencies. Fourth, we demonstrate how the application of advanced linguistic tools to a long-established but little-used administrative dataset can shed light on important economic questions.

The fact that our measure both incorporates the entire government agenda (rather than just final rules), and captures the influence of each distinct government agency, enables us to add new insight into the real economic impacts of regulation. Classic theories on this topic range from public interest (Pigou (1938); Joskow and Rose (1989); Demsetz (1974); Melody (2016)) to public choice (Tullock (1967); Stigler (1971); Krueger (1974); Posner (1974); Peltzman (1976); Becker (1983); Baumol (1986); Olson (2009)). Our results indicate that the intensity of the regulatory burden depends not only on final rules, but on broader constructs of government activity. Conditional on the magnitude of this activity, the organization of this activity across government agencies is paramount. Greater regulatory dispersion is associated with significant increases in costs and significant decreases in productivity, growth and profitability. Overall, these results are more consistent with public choice theories, which argue that greater exposure to the government's agenda is associated with significant real and financial costs.

Finally, we contribute to the literature on regulatory capture. Earlier studies argued that greater affinity between the regulator and the regulated entities might lead to lax oversight (Stigler (1971), Peltzman (1976), Eckert (1981)). Empirical literature on this issue provides contradictory evidence (Bar-Isaac and Shapiro (2011); Lucca et al. (2014); Agarwal et al. (2014); Kedia et al. (2015); Shive and Forster (2016); versus Cornaggia et al. (2016); Kempf (2017); Tabakovic and

Wollmann (2018)). The finding that firms benefit when they are beholden to fewer government agencies provides a different perspective on regulatory capture. Whether the benefits are direct or indirect, for example lower administrative costs or greater potential to influence legislation, greater regulatory focus allows companies to free resources and sustain a faster growth rate.

2. Data

2.1 *The Federal Register and The Code of Federal Regulation*

We rely on the Federal Register (FR) as our primary measure of the government agenda. Often described as the daily journal of the Federal Government, the FR is published every business day by the National Archives and Records Administration.³ The documents in the FR open a window into the government's daily activities. The FR is divided into four sections. *Notices* include announcements such as hearings and public meetings, grant applications, and administrative orders.⁴ *Proposed rules* include petitions for rulemaking, drafts of pending regulations, and other advanced proposals. *Rules and Regulations* include the final version of the rules and policy statements and interpretations of existing rules. *Presidential Document* includes executive orders and proclamations.

Each federal agency is required to publish designated documents in the Federal Register. This includes activity related to previously passed rules (e.g., details regarding rule implementation and company-specific actions), activity unrelated to rules (e.g., grant applications and hearings), and activity related to new rulemaking. With respect to new rulemaking, this at a minimum

³ The most current version of the Register can be found here: <https://www.federalregister.gov/documents/current>.

⁴ An example of a notice can be found here: <https://www.federalregister.gov/documents/2019/09/30/2019-21097/self-regulatory-organizations-nyse-arca-inc-order-instituting-proceedings-to-determine-whether-to>.

includes the proposed rule and the final version of the rule, but in many cases it also includes various related notices, for example notices of meetings and solicitation of comments. When the rulemaking process is finished, the new regulation is incorporated into the Code of Federal Regulations (CFR). The CFR is the codification of all federal regulations. It includes all rules issued across all federal agencies, and it is updated several times a year to include all new rules as well as any modifications of earlier rules.

Consistent with the Federal Register representing one step in the rulemaking process that leads to revisions to the CFR, these two sources are linked to each other. First, every proposed rule and final rule in the Federal Register denotes the affected CFR title and part. Second, every proposed rule and final rule in the Federal Register includes a list of subjects for each CFR part that it affects. In total there are 826 CFR subjects, and there is an ongoing effort to standardize the subjects and ensure all agencies use a common vocabulary.⁵

2.2. *Sample*

We collect all documents in the Federal Register from the Rules and Regulations, Proposed rules, and Notices sections, over the 1994-2019 period.⁶ For each of these documents, we download the category of the document (rule, proposed rule, or notice), the Agency that submitted the document, and the entire text of the document. For proposed rules and final rules, we additionally collect the CFR structure (title and part) and the CFR subject.

Notices represent the greatest portion of government activity and final rules the lowest

⁵ The government provides a dictionary of the subjects here and here. There is also an attempt to document the relations between subjects. For instance, the three subjects “Accounting,” “Business and Industry,” and “Uniform Systems of Accounts” are all substantively connected to each other.

⁶ We do not include in our analysis Presidential Documents (less than 0.8% of the Federal Register universe) since those are handled directly by the Executive Office of the President and not by any specific agency.

portion. On average over the whole sample period, notices present 44% of the words in the FR, proposed rules represent 24%, and final rules represent 32%.⁷ The fact that notices are the biggest category is consistent with these being the broadest measure of the day-to-day activities of the government. As described above, they include details on the many hearings and meetings.

There has been a general upward trend in all three series (notices, proposed rules, and rules) through 2016, as shown in Figure 1. This is followed by a marked drop starting in 2017, the beginning of Donald Trump's presidency. This is consistent with his stated intent of decreasing the role of the government. There are similar drops each time a new president takes office, for example in 2001 and 2009, though the magnitude of these drops is smaller. This pattern is consistent with a typical stand-off between the newly elected president and many agencies, as it takes a while for a president to exercise his control over the executive branch. Interestingly, there also tends to be an increase in the Rules section in the last year of a president's term: 2000 (last year of Bill Clinton's presidency), 2008 (last year of George W. Bush's presidency), and 2016 (last year of Barack Obama's presidency). This is consistent with the natural desire of any outgoing administration to make a last-minute attempt to implement its regulatory agenda.

3. Empirical Strategy and descriptive statistics

Our overarching goal is to explore how public companies respond to the government's agenda. A time-series measure of the government's agenda, based on the FR, is an important first

⁷ Notices represent an even greater share of all documents in the FR (79%). This is consistent with the fact that notices are much shorter than rules and proposed rules. Rules are frequently quite lengthy, and documents that pertain to rules typically include detailed discussions of the rule's merits as well as a summary of the comments submitted by the public.

step. Incremental to this, it is also informative to examine cross-sectional variation in the exposure of companies to that agenda. To this end, we propose a novel empirical approach that analyzes the textual similarity between the government's agenda (Federal Register) and each company's business description (Form 10-K). We use machine learning to represent the government's agenda as a collection of 100 topics, and each company's operations as a collection of the same 100 topics. The weights of each company on each topic capture the company's unique exposure to the government's agenda.

3.1. Regulatory Topics in the FR

To identify topics in the FR, we employ Latent Dirichlet Allocation (LDA). The LDA's output is a set of topics, where each topic is a cluster of words that tend to appear jointly in the text. In addition, LDA provides an estimate of the topic's importance, measured as the share of each document that is dedicated to each topic. Compared to other strategies such as "bag of words," LDA does not rely on user-defined word lists. By relying on the machine to define topics, we mitigate biases that might arrive from manually defining topics, for example through word lists. Chang et al (2009) show that LDA output corresponds to human ability to detect topics, while also being objective and replicable.⁸

To carry out the LDA analysis, we are required to define the number of topics. By way of comparison, Lowry, Michaely and Volkova (2020) identify 30 topics in firms' prospectuses and 8 topics in the SEC's comment letters pertaining to these prospectuses. Naturally, the government's agenda is much broader and covers a wide range of topics and agencies. We therefore chose 100

⁸ LDA is increasingly recognized in finance as a powerful tool for textual analysis. Recent papers employing this methodology include Hoberg and Lewis (2017), Bellstam, Bhagat and Cookson (2019), Ganglmair and Wardlaw (2017), and Lowry, Michaely and Volkova (2020).

topics as our baseline. As described in more depth later, in robustness checks we consolidate these 100 topics into a smaller number and the results remain qualitatively similar.

Figure 2 illustrates the topic clouds for four common topics, out of the total set of 100. Casual observation of these clouds reveals that words which are commonly used together in the FR tend to be grouped into one LDA topic. For example, the most salient words in Topic 3 (Panel A) are “special, habitat, population, area, list,” whereas the most salient words in Topic 5 (Panel B) are “rule, exchange, change, commission, proposal.”

While the LDA topic clouds clearly represent different subjects, it is not immediately apparent what those subjects are. Giving an economic interpretation to the LDA topics is useful because it facilitates interpretation of the empirical patterns observed in the data.⁹ To achieve that goal we rely on the fact that each rule and proposed rule in the FR includes a list of the relevant CFR subjects. The CFR subject list classifies regulations by their economic substance in a consistent manner that applies equally to all federal agencies. It can therefore help us define the economic interpretation of the LDA topics. Specifically, for each Federal Register rule and proposed rule, we determine the percent of the document that belongs to each of our 100 LDA topics. Next, for each LDA topic, we retain the 1,000 documents within which the LDA topic was most common. Finally, we label the LDA topic based on the CFR subjects of the topic’s 1000 documents. We distinguish between three cases:

- Case 1 (77 topics): at least 20% of the 1000 documents list a certain CFR subject. For these cases, we label the topic as belonging to these subject(s). For most topics (49 of the 72 topics), there are a total of three or fewer CFR subjects that meet these criteria. A small

⁹ While labeling LDA topics is informative, the construction of our main empirical measures (as described below) is independent of how we choose to interpret individual topics.

number of topics have a much larger number of matched CFR subjects (for example, five topics have 6 CFR subjects and two topics have 7).

- Case 2 (21 cases): The most common CFR subject(s) are listed in more than 10% of documents but less than 20%. For these cases, we label the topic according to the CFR subject(s) represented in 10% or more of documents.
- Case 3 (2 topics): The most common CFR subject(s) are listed in less than 10% of documents. These two topics do not have a clear common theme, and thus we label both as “miscellaneous.”

For each topic, we then assign a label based on these CFR subject(s).¹⁰ Using this approach toward labeling, Topic 3 is ‘*Endangered species*’, Topic 5 is ‘*Securities: investment companies*’, Topic 21 is ‘*Grants: education*’, and Topic 23 is ‘*Health: insurance*’ (as depicted in Panels A – D of Figure 2, respectively).

3.2. Measurement of Regulatory Activity by Each Government Agency

Each FR document specifies the agency that wrote the document. This enables us to determine the extent to which each regulatory topic, as defined in the prior subsection, falls under the purview of multiple agencies. First, we obtain the number of words per document \times topic, based on the percent of the document allocated to this topic. We then calculate the number of words per agency \times topic \times year. For instance, how many words did the Securities and Exchange Commission devote to LDA topic 58 during 2012. Next, for each topic \times year, we determine the percent of the

¹⁰ Several LDA topics are related to each other. For example, the broad area of environmental protection (one of the CFR subjects) is comprised of sub-areas such as water, air, and/or hazardous waste (each of which also has a unique CFR subject). As explained in section 6, grouping topics by broad economic area does not change the main results in the paper.

topic that is regulated by each agency. For instance, if in 2012 the SEC (Federal Reserve) devoted 100 words (1,900 words) to topic 58, then the SEC's share is 5% and the Fed's share is 95%. Finally, we square each of these percentages and then sum them, analogous to an HHI. For descriptive purposes, we use a measure of agency dispersion, which equals 1 minus the sum of these squared percentages. Formally:

$$AgencyHHI_{i,t} = \sum_{Agency} \omega_{i,a,t}^2 \quad (1)$$

$$AgencyDispersion_{i,t} = 1 - AgencyHHI_{i,t} \quad (2)$$

where $\omega_{i,a,t}^2$ represents the (squared) percent of topic i written by agency a at time t . Agency dispersion potentially varies from 0 to (almost) 1, where 0 represents a case where the entire topic falls within documents written by a single agency. The highest possible value would be 0.992, which would reflect a case where the topic was dispersed equally between the 121 agencies.¹¹

Panel A of Table 1 shows the topics with the lowest and highest agency dispersion. Topics with the lowest dispersion include "Securities: investment companies" and "Health: insurance," consistent with such issues being very focused and thus having a clear jurisdiction. However, it is notable that even these topics have dispersion measures of approximately 0.34. While many scenarios could generate such a measure, to give some intuition one possible case would be where one agency covers 78% of the topic and a second agency covers 22%. At the other extreme, topics such as "Freedom of information" and "Government Procurement: Small Businesses" have agency dispersion measures of approximately 0.95. This is consistent with the general nature of these topics, which are applicable in different contexts and can thus be covered by many agencies. From

¹¹ If a topic was spread equally across the 121 agencies, each agency would have a share of $1/121 = 0.0083$. Agency dispersion would equal $1 - 121*(0.0083^2) = 0.9917$.

a firm's perspective, these statistics highlight the possibility that a single topic is regulated by multiple agencies, which could increase the uncertainty associated with compliance (see below in the hypotheses section).

Panel A of Figure 3 depicts the distribution of Agency dispersion. The figure highlights the high heterogeneity across topics. Some topics have a dispersion less than 0.25, suggesting that regulation of these issues is quite concentrated. However, the distribution is quite skewed, with most topics having relatively high dispersion.

3.3. Regulatory Topics in Firm Financial Disclosures

In the previous subsection, we characterized the government's agenda using an LDA algorithm, focusing on the extent to which each LDA topic may be regulated by multiple agencies. In this subsection, we turn our attention to companies, and in particular the extent to which a company's operations relate to multiple regulatory topics. We begin by applying the LDA algorithm previously trained on FR documents to the firm's annual report (form 10-K). This enables us to capture the set of issues pertinent to the firm. We calculate $P_{f,i,t}$, which is the percent of firm f 's annual report that pertains to topic i at time t . We square these percentages and calculate topic dispersion for each firm-year as:

$$TopicDispersion_{f,t} = 1 - \sum_{Topic} P_{f,i,t}^2 \quad (3)$$

Note that $TopicDispersion_{f,t}$ quantifies the concentration of regulatory topics, and it varies within firms over time. Panel B of Table 1 lists firms with the highest and lowest topic dispersion (averaged over the sample period). The first takeaway is that all firms have relatively high topic dispersion. Across our entire sample, the firm with the lowest topic dispersion is Carolina Bank Holdings, with a dispersion of 0.85. The second takeaway is that the firms with the

lowest topic dispersions are all financial institutions. This likely reflects the fact all firms have a portion of their 10-K devoted to financial issues, but unlike other operating companies, financial institutions do not also have substantial portions devoted to non-financial lines of business.

Panel B of Figure 3 shows a histogram, which depicts the distribution of topic dispersion across firm-year observations. The distribution is nearly normal shaped between 0.9 and 0.99, but it also includes a left-hand tail. Approximately 9% of the observations have a topic dispersion less than 0.90.

3.4. Regulatory Dispersion

Our key measure, regulatory dispersion, captures the exposure of each company-year to the dispersion of regulation across agencies. Specifically, regulatory dispersion equals the weighted average of agency dispersion across topics, where the weights represent the relative importance of each topic for the firm (the portion of the firm's 10-K that relates to each topic, $P_{f,i,t}$). Formally:

$$RegulatoryDispersion_{f,t} = \sum_{Topic} P_{f,i,t} \cdot AgencyDispersion_{i,t}$$

Lower regulatory dispersion implies that a firm-year is regulated intensively by a small number of agencies, i.e., the firm's regulatory burden is highly concentrated within relatively few government agencies. Conversely, higher regulatory dispersion means that the firm's regulatory obligations are more evenly spread across multiple agencies. Panel C of Table 1 lists firm-years with the lowest and highest levels of regulatory dispersion. There is a striking contrast between Panel B and Panel C. Specifically, firms in the financial industry represent cases with the *lowest* topic dispersion but with the *highest* regulatory dispersion. Put differently, financial companies

concentrate on a relatively small number of topics, but those topics tend to be regulated by multiple federal agencies. Analogously, firms in the medical industry are heavily represented in the highest topic dispersion but the lowest regulatory dispersion. These differences highlight the fact that we capture two distinct notions of regulatory burden: the number of topics and the number of agencies that regulate each topic.

Panel C of Figure 3 shows a histogram, which depicts the distribution of regulatory dispersion. This distribution is considerably less skewed than either topic-agency dispersion or firm-topic dispersion. The distribution is nearly normal, with only a slight left skewness.

Panel A of Figure 4 illustrates trends in regulatory dispersion. Specifically, we compute the annual average of *RegulatoryDispersion*_{*f,t*} within each of the 12 Fama-French 12 industries. Overall, there is a downward trend in regulatory dispersion over time. One notable exception is the period 2008-2010, when a temporary yet large shift in regulatory dispersion increased its levels by almost 7 percentage points. After 2010, the trend reversed, and we continued to see a decline in regulatory dispersion. These trends hold for each of the 12 industries, although they differ in the levels of regulatory dispersion.

Averaging across companies masks substantial within-industry variation in regulatory dispersion. We examine this in greater detail in Panel B, focusing for brevity on the Non-Durables industry (analysis of the remaining industries reveals similar patterns; results are available upon request). Panel B highlights the extent to which firms within an industry experience both different levels of regulatory dispersion and different year-to-year changes in dispersion. In fact, dispersion within an industry (as shown in Panel B) is greater than dispersion across industries (as illustrated in Panel A).

4. The Government Agenda over time

Our data provide new insight into the broad government agenda, and in this section, we discuss some key aspects of this agenda. The patterns we uncover highlight the breadth of government activity, the changes in regulatory focus, and the changes in the workload of individual agencies.

As discussed earlier, a unique aspect of our data is that includes the entire government agenda, as documented through notices, proposed rules, and rules. A comparison across these different types of documents indicates that each contains unique information. In particular, none of the topics that fall within the Top Ten among notices similarly fall among the Top Ten for final rules. To the extent that firms can benefit from staying abreast of issues communicated through notices, or in some cases are even obligated to do so, any measure that focuses just on final rules will be only a partial measure of government activity.

Looking across all FR documents, we see that the most common topics have varied substantially over time. For example, two of the topics with the greatest increase over the entire period include *'Health: insurance'* (490% increase, from 68,000 words to 398,000 words) and *'Environment: data & studies'* (163% increase, from 152,000 words to 401,000 words). Each of these trends is consistent with general national trends, for example an increased focus on the environment and on healthcare. Some trends also suggest cause for concern. For example, *'Aviation safety: inspection'* was one of the topics with the greatest decreases over our sample period. In light of the recent Boeing disaster, this suggests that trends in regulatory attention may be informative regarding future potential problems.

We also observe marked changes in the amount of attention each topic receives around key national events, for example the Financial Crisis and the 2016 Presidential election. Following the Trump election, the topics with the largest decreases (in terms of FR words) include ‘*Environment: government relations*’, ‘*Energy conservation*’, and ‘*Endangered species*’. The fact that these topics experienced the largest decreases confirms general perceptions regarding Trump’s agenda. However, the magnitude of the decreases (-66%, -61%, and -26%) raises concerns regarding the long-term effects in these areas.

Commensurate with the trends in regulatory topics, we also observe trends among regulatory agencies. Changes in agency activity in the 2017-2019 period (relative to the prior three-year period) are very consistent with Trump’s stated agenda. The agenda of the Department of the Interior, Environmental Protection Agency, and the Department of Energy decreased by 49%, 31%, and 54% respectively (as proxied by the number of words in the FR). Around the 2008 – 09 Financial Crisis, the activity of the SEC, Federal Reserve System (FRS) and Commodities Futures Trading Commission (CFTC) increased by 18%, 130%, and 520% respectively. In contrast, activity by the Housing and Urban Development (HUD), Treasury, and Federal Energy Regulatory Commission (FERC) decreased by 41%, 15%, and 25%, respectively.¹² It is arguably worrisome to observe such a large decrease by HUD, particularly given that so many individuals were housing insecure in the wake of the Financial Crisis.

In addition to the amount of government activity changing around these key national events, Figure 5 shows large changes in the dispersion of topics across agencies around these times.

¹² It is arguably surprising that Treasury’s activity (again as measured by word count in the Federal Register) decreased. One possible explanation is that some functions were transferred to other agencies. For instance, the Office of Thrift Supervision (a unit within Treasury) was dissolved during 2011 and its responsibilities were picked up by other financial agencies.

Looking first at Panel A, following the Trump election two of the topics with the greatest increase in dispersion relate to the environment: ‘*Energy Conservation*’ and ‘*Endangered Species*’. This is consistent with the primary agencies responsible for these issues receiving less funding, and thus remaining oversight being spread more widely across many agencies. In contrast, two of the topics with the greatest decrease in dispersion relate to the financial sector: ‘*Banks*’ and ‘*Income & Other Taxes*’. Indeed, the Trump administration set a goal of reducing the fragmentation and overlapping jurisdiction with regards to financial regulation.¹³ Panel B of Figure 5 shows the topics with the biggest changes around the Financial Crisis, which also coincides with the election of Barack Obama. Interestingly, some of the topics with the largest increases in dispersion in Panel A are among the largest decreases in Panel B, and vice versa. For example, whereas the dispersion of ‘*Energy Conservation*’ increased following the Trump election, it had decreased in 2009-2011 (relative to the prior three-year period).

Our ability to quantify the dispersion of regulatory oversight across agencies, and to highlight major turnaround points, paves the way to the main part of the analysis: how does this dispersion affect companies?

5. Effects of Regulatory Dispersion on Economic Activity

5.1 Empirical setup

This section focuses on empirically testing our two hypotheses, which relate to the effects

¹³ A recent report by the U.S. Department of Treasury makes a similar point, arguing that fragmentation and overlap could potentially lead to “ineffective regulatory oversight and inefficiencies that are costly to ... businesses.” See <https://www.treasury.gov/press-center/press-releases/Documents/A%20Financial%20System.pdf>.

of regulatory dispersion on underlying firms. Ex ante, is not clear how regulatory dispersion will affect firms. We refer to the competing hypotheses as the Benefits of Regulatory Concentration hypothesis versus the alternative Benefits of Regulatory Dispersion hypothesis.

Under the *Benefits of Regulatory Dispersion* hypothesis, the potential benefits of falling under the purview of a higher number of regulatory agencies are severalfold. When multiple regulators overlap, companies are more likely to be able to select their regulator. They may select a regulator based on a perceived ability to better influence new regulation to their advantage. Alternatively, they may select a regulator based on which one offers the least restrictive regulations. Either of these scenarios arguably benefits firms, via a race to the bottom in regulation.

While regulator choice can be beneficial for firms, there are also potential costs associated with falling under the purview of a higher number of regulatory agencies. Firms arguably have more uncertainty regarding which regulator they must satisfy. Relatedly, there are likely to be cases where a firm has to satisfy multiple regulators on a particular issue. In a related vein, a firm that participates in lobbying is less able to focus its efforts on the single most important regulatory agency. To the extent that lobbying is less effective as a result, any new regulations are more likely to be detrimental for the firm. Because lobbying is often a source of information flow (Bertrand, Bombardini, and Trebbi (2014); Blanes i Vidal, Draca, and Fons-Rosen (2012)) the firm is arguably also less likely to be informed about upcoming regulatory initiatives. More broadly, in the absence of unlimited resources, it becomes more costly to capture the regulator and to influence regulatory decisions. All these factors lead to the *Benefits of Regulatory Concentration* hypothesis.

Before presenting our main empirical tests, we provide descriptive statistics on average firm characteristics across quintiles of topic dispersion and across quintiles of regulatory dispersion in Table 2. We categorize the entire sample of firm-years first into topic dispersion

quintiles (left-hand columns), and then into regulatory dispersion quintiles (right-hand columns). Several features are worth highlighting. First, regulatory dispersion is relatively constant across the topic dispersion quintiles, indicating that regulatory dispersion and topic dispersion are two distinct phenomena. Second, neither topic dispersion nor regulatory dispersion is strongly related to firm size, as measured by sales. Third, SG&A expenses are positively related to both measures of dispersion. This is a preliminary indication that regulatory dispersion and topic dispersion are both associated with higher administrative costs. Fourth, firm growth (as proxied by sales growth, asset growth or Tobin's Q) is positively related to topic dispersion but negatively related to regulatory dispersion. Firms with operations that pertain to a greater number of topics tend to grow faster, but when these topics relate to more distinct regulatory bodies the growth is slower.

We next turn to regression analyses. We control for a bevy of firm factors and fixed effects to robustly analyze the relation between regulatory dispersion and firm outcomes. The main empirical tests of our two hypotheses use variants of the following framework:

$$y_{f,t+l} = \alpha + \beta \cdot \text{RegulatoryDispersion}_{f,t} + \vec{X}_{f,t} + \tau_t + \theta_k + \mu_f + \varepsilon \quad (5)$$

where $y_{f,t+l}$ is a firm-level outcome and $\text{RegulatoryDispersion}_{f,t}$ was defined above. We include year fixed effects (τ_t), industry fixed effects (θ_k), and firm fixed effects (μ_f). In the tightest specification we replace year with year×industry fixed effects, removing industry trends and focusing on the variation within-industry across companies. Firm-level controls ($\vec{X}_{f,t}$) include the length of the firm's 10-K (in log), property, plant and equipment as a fraction of assets, profitability (EBITDA scaled by total assets), sales (in log), and Tobin's Q. In addition, we control for $\text{TopicDispersion}_{f,t}$ and for $\text{RegulationQuantity}_{f,t}$. The former variable, defined above, represents the extent to which the firm's business extends across multiple areas. The latter variable

proxies for the amount of regulation that relates to the firm's business. Formally:

$$RegulationQuantity_{f,t} = \sum_{Topic} P_{f,i,t} \cdot \log(Words_{i,t}) \quad (6)$$

where $P_{f,i,t}$ is the percent of words in firm f 's annual report in year t that pertain to topic i , and $\log(Words)$ is the number of words devoted to this topic in the FR in the same year. In other words, *RegulationQuantity* is the weighted average of the number of FR words in each of the 100 topics, where weights equal the relative importance of each topic for the firm. We lag all independent variables one period and cluster standard errors at the Fama-French 48 industry level.

5.2 SG&A expenses

We begin in Table 3 by examining the extent to which regulatory dispersion influences SG&A expenses, as a fraction of assets. The Benefits of Regulatory Dispersion hypothesis predicts a negative relation, as the firm's ability to strategically choose its regulator contributes to lower regulatory costs. In contrast, the Benefits of Regulatory Concentration hypothesis predicts a positive relation, as the larger number of regulatory agencies that the firm must satisfy contributes to higher costs.

Column 1 presents a model in which independent variables include regulation quantity, topic dispersion, and other controls that capture the business environment of the firm in ways that potentially relate to SG&A expenses. We include industry, firm, and year fixed effects. We find a significant positive coefficient on regulatory dispersion, which is consistent with the Benefits of Regulatory Concentration hypothesis. The economic magnitude is quite large: a one-standard-deviation increase in regulatory dispersion is associated with 4.4% standard deviation increase in

SG&A / assets¹⁴

Column 4 presents a tighter specification, where we replace year fixed effects with year×industry fixed effects. Here, we compare companies who operate within the same industry boundaries, thus removing industry factors that affect both the regulatory environment and company-level costs. The results remain highly significant and economically large.

The coefficients on topic dispersion are also informative. The significantly positive coefficients on topic dispersion relate to the broader debate on the costs and benefits of firm diversification. Lang and Stulz (1994), Berger and Ofek (1995) and Servaes (1996) show that diversified firms trade at a discount, but Campa and Kedia (2002) and Villalonga (2004) conclude that these effects disappear after controlling for endogeneity, and Tate and Yang (2015) conclude that firms can benefit from diversification within internal labor markets. Our findings indicate that if the firm's overall activity remains unchanged (proxied by sales and length of form 10-K), but its businesses cross a greater number of regulatory areas, then the firm incurs significantly higher administrative costs. Moreover, this holds even with the inclusion of firm fixed effects, indicating that an increase in topic dispersion relates to higher SG&A costs the following year.

5.3 Firm profitability and productivity

The finding in the prior section, that higher regulatory dispersion contributes to higher SG&A expenses, provides preliminary evidence in support of the Benefits of Regulatory Concentration hypothesis. This subsection provides further evidence on the hypotheses by examining the link between regulatory dispersion and firm productivity and profitability.

Columns 2 and 5 of Table 3 show regressions of total factor productivity (TFP). TFP, by

¹⁴ The magnitude is calculated as coefficient*sd(regulation dispersion)/sd(SGA/AT) (i.e., 0.433*0.027/0.27).

definition, captures firm output per unit of input. If greater regulatory dispersion causes the firm to require more inputs (i.e., either more employees or more capital) to produce a unit of output, then we will observe a negative relation between dispersion and TFP. This would be the case if, for example, greater dispersion requires the firm to expend more resources satisfying regulatory requirements, thus taking input away from more productive uses. This would be consistent with the Benefits of Regulatory Concentration hypothesis. Alternatively, if greater regulatory dispersion enables the firm to self-select into less costly regulatory regimes, for example because firms can choose which agency's rules to abide by, then we will observe a positive relation between regulatory dispersion and TFP. This would be consistent with the Benefits of Regulatory Dispersion hypothesis.

We measure firm total factor productivity (TFP) following Imrohoroglu and Tuzel (2014) and Olley and Pakes (1996).¹⁵ Broadly speaking, TFP is a function of firm-level value added (measured as sales minus non-labor expenses), the stock of labor (measured by number of employees), and the stock of capital (measured as gross plant, property, and equipment). The model is estimated using a semi-parametric procedure, which relative to OLS-based methods has the advantages of controlling for selection biases, controlling for simultaneity biases, and accounting for firm serial correlation.

Columns 2 and 5 in Table 3 show regressions similar to those in columns 1 and 4. We regress TFP on regulatory dispersion, regulation quantity, firm topic dispersion, and relevant controls and fixed effects. Results provide further evidence consistent with the Benefits of Regulatory Concentration hypothesis. Across all columns, we find a significant negative relation

¹⁵ We thank Imrohoroglu and Tuzel for making TFP data available for years up to 2013, and for providing the code to calculate the measure for subsequent years.

between regulatory dispersion and TFP. Our strictest specification, which includes company and industry×year fixed effects, indicates that a one-standard-deviation in regulatory dispersion is associated with a 3.2% standard deviation decrease in TFP during the following year.

In contrast to the significant negative relation between regulatory dispersion and TFP, we find little evidence that either regulation quantity or firm topic dispersion is significantly related to TFP. It is striking that the dispersion of regulatory activity across government agencies has a significant impact on firm productivity, but neither the level of regulation nor the number of regulatory areas in which a firm operates has a similar influence.

The finding that higher regulatory dispersion generates higher overhead costs (in terms of SG&A) and lower productivity (in terms of TFP), suggests that the firms will also tend to have lower profits. Over time, if the higher regulatory dispersion causes firms take fewer positive NPV projects, then the negative impacts on profitability are potentially exacerbated. Columns 3 and 6 in Table 3 examine the effects of regulatory dispersion on ROA. Consistent with expectations, we find a significant negative effect. Specifically, we find that one-standard-deviation increase in regulatory dispersion is associated with a fall in the following year's ROA that ranges from 4.7 – 5.0% of a standard deviation.

5.4 Firm growth

Findings to this point indicate that greater regulatory dispersion increases firm overhead costs and decreases firm productivity and profitability. Both these factors will tend to decrease the number of projects that have a positive NPV, thus contributing to lower growth. We examine this conjecture in Table 4, investigating the relation between regulatory dispersion and sales growth and asset growth, respectively. The table follows the format of Table 3.

Consistent with expectations, we find significantly negative effects of regulatory dispersion on both sales growth and asset growth. Looking first at columns 1 and 4, where the dependent variable is sales growth, the coefficient on regulatory dispersion is significantly negative at the 1% level in both specifications. Column 1 indicates that a one-standard-deviation increase in the firm's regulatory dispersion in year t is followed by the firm's sales growing 4.2% slower the following year. This is after controlling for regulation quantity, which as expected also has a significant negative effect on sales growth. Columns 2 and 5, which use asset growth as a dependent variable, show similar effects. Focusing on column 5, a one-standard-deviation increase in the firm's regulatory dispersion in one year is followed by the firm experiencing 5.7% slower asset growth in the following year. Similar to the results for sales growth, we also find that regulation quantity has a significant negative effect on asset growth.

It is worth highlighting that, similar to the findings for SG&A, profitability and TFP, the significant negative relations between regulatory dispersion and firm growth occur both within-firm and within industry-year. In other words, firms that have higher regulatory dispersion, for example due to the businesses in which they operate, grow at slower rates. Incremental to this, if a firm experiences an increase in regulatory dispersion in year t , that firm tends to grow slower in the following year.

In sum, results throughout this subsection showing robust negative relations between regulatory dispersion and firm growth provide further support for the Benefits of Regulatory Concentration hypothesis.

5.5 Channels underlying effects of regulatory dispersion

Finding to this point raise questions regarding the channels underlying the above relations.

That is, what causes increases in regulatory dispersion to be followed by higher SG&A costs, lower productivity, lower growth and lower profitability. We focus on a key input to firm production: labor.

The detrimental effects of regulatory dispersion, including the higher administrative and overhead costs and the decreased productivity, cause profitability to fall (as shown in Table 3). The higher costs and lower productivity also arguably cause a fewer number of projects to have a positive net present value, and as firms take on fewer projects, growth decreases (as shown in Table 4). On the one hand, the undertaking of fewer new projects can cause firms to hire fewer new employees. This suggests a negative relation between regulatory dispersion and employment. Incremental to these negative influences on labor, regulatory dispersion also has a potential positive effect on employment. Firms may be forced to hire additional people to satisfy the increased regulatory requirements (Simkovic and Zhang (2019)).

Column 6 in Table 4 provide evidence of a positive net effect, that is, greater regulatory dispersion leads firms to hire more employees. The higher labor costs contribute to increased overhead costs, lower productivity, and decreased profitability; as such, they are consistent with findings in Table 3. Here again, the results are identified within-firm over time and net of industry trends.

5.6 The relevance of the different stages of the government agenda

5.6.1 Notices, Proposed rules, and Rules

In this subsection, we analyze the extent to which the documented relations between regulatory dispersion and firm outcomes are driven predominantly by final rules, or whether other stages of the government agenda also significantly affect firms.

We begin by providing more insight into the content of the Notices section and how this content represents a key portion of the total government agenda. Notices include several different types of government activity. One subset of notices pertains to future rule making. For example, on August 3, 2021 the Philadelphia Stock Exchange filed a notice to change some of the rules regarding short-term options trading. A second subset relates to the implementation of laws and regulations that have already passed. For example, companies are required to seek regulatory approval for transfer of ownership on energy facilities or for maintaining a business partnership that may violate antitrust regulations.

Table 5 provides direct insight on the extent to which notices relate to past and future rulemaking. We estimate regressions where the dependent variable is the log number of words within the *Rules* section written by agency a on topic i during year t . In Column 1, the key independent variables are the log number of words within the *Notices* section written by the same agency on the same topic in years $t-1$ and $t-2$. If notices contain information on future rulemaking, we expect positive coefficients on the lagged notices. The results in column 1 support this prediction. Predictive power is strongest for one-year ahead, as a one-standard-deviation increase in notice words predicts a 24.0% increase in rules words in the subsequent year.¹⁶ The two year ahead effect is a somewhat smaller, as expected, but it is also statistically significant at the 1% level. In Column 2 we estimate a similar specification, except that we include two annual leads of words in notices (as opposed to lags). Both leads are statistically significant at the 1% level. In economic terms, a one-standard-deviation increase in notices words in year $t+1$ is associated with an 23.0% increase in rulemaking in the prior year (as defined as words on the same topic by the

¹⁶ We calculate economic significance by multiplying the coefficient by the standard deviation of independent variable (#Words (notices, agency, topic, year -1)) and dividing it to the standard variable of the dependent variable (#Words (rules, agency, topic, year)). Economic significance: $0.259 * 2.30 / 2.47$.

same agency). Columns 3 and 4 provide even stronger evidence on the significance of both the lead and the lag relation between notices and rules. In column 3, we simultaneously include both two lags and two leads of the number of words in the Notices section. In column 4, we include an even stricter set of fixed effects. This specification estimates how an agency pays greater attention to a particular topic relative to its average attention for that topic (agency-topic fixed effects), controlling for the overall increase in the agency's activities during the year (agency-year fixed effects), and for the overall increase in the government's attention to this topic during the year (year-topic fixed effects). Not surprisingly, the magnitude of the coefficients decreases, as we are arguably soaking up part of the effect in which we are interested. Nonetheless, the coefficients remain significant at the 1% level.

A separate set of notices includes miscellaneous activities such as meetings open to the public, collection of information from the public, and organizing international trade missions. These actions will not necessarily have a lead-lag relation with rules, but they clearly indicate how documents in the Notices section are relevant for companies (see, for example, Chen and Kalmenovitz (2020)).

The relative amount of notices, proposed rules and final rules varies both over time and across topics. Only approximately two-thirds of proposed rules are ultimately passed into final rules, and the proportion of notices whose content is ultimately incorporated into a final rule is likely even lower. At the same time, there are multiple reasons for firms to pay attention to notices and proposed rules, in addition to final rules. First, as shown in Table 5, some notices contain information on the early stages of rulemaking, and others contains details regarding the implementation of already-passed rules. Second, some notices apply specifically to certain firms and require them to take action. Finally, notices can focus on a different set of issues than final

rules.

To empirically evaluate the effects of regulatory dispersion across different types of government activity, we separately calculate the regulatory dispersion of notices, of proposed rules, and of final rules. The correlations between these different measures are consistent with these different portions of the government agenda capturing a set of issues with some overlap but that also with unique aspects. As shown in Panel A of Table 6, the correlation between the regulatory dispersion of rules and proposed rules is 0.66, and between rules and notices is 0.28.

Panels B-D of Table 6 show regressions similar to those in Tables 3-4, except that we use these more narrowly defined measures. Panel B focuses on regulatory dispersion calculated across notices, Panel C on proposed rules, and Panel D on final rules. Comparing across the three panels highlights the significant effects of each stage of the regulatory agenda. While notices are largely ignored in regulation studies, regulatory dispersion across these documents predicts higher future overhead costs, lower future productivity, and lower future profitability and growth. In contrast, the effects of regulatory dispersion on new hiring are concentrated within new rulemaking: higher regulatory dispersion within both proposed rules and final rules has a significant positive effect on firm's hiring decisions. This is consistent with firms hiring more employees to satisfy regulatory requirements that are changing or have a high probability of changing (final rules or proposed rules).

5.6.2. New versus modified rules

As discussed previously, our comprehensive measure of the government agenda represents the flow of all government activity. With respect to rules and proposed rules, this includes both rulemaking on new issues and modifications to existing rules. Within this section, we separately

examine the influence of each. On the one hand, most regulation-related studies focus on the effects of a newly implemented rule, examining the ways in which this new rule affects firms. However, firm executives regulatory complain about the increasing costs of satisfying regulatory requirements, where in many cases the changing requirements reflect ongoing modifications to previously passed rules.

We take a unique approach to separating rulemaking on new issues versus modifications to prior rules. Rules and proposed rules within the FR are filed with a Regulation Identifier Number (RIN). All modifications to previously passed rules are filed under the same RIN as the original rule. Thus, we classify the first document with a given RIN as a new rule or proposed rule. Analogously, all follow-on documents filed under a previously used RIN are classified as modifications to existing rules. We separately calculate regulatory dispersion across New Rules (specifically New RIN documents) and across Rule Modifications (specifically Old RIN documents). As shown in Panel A of Table 7, the correlation between these measures is 0.54, indicating that there is overlap but they also capture different dynamics.

Panel B of Table 7 examines the relations between the regulatory dispersion across New Rules and firm outcomes: SG&A, productivity, sales and asset growth, profitability, and employees. Panel C is similar, but it focuses on the regulatory dispersion across Rule Modifications and these same firm outcomes. Results indicate that both types of regulatory activity are significantly related to firm outcomes. Moreover, in many cases the economic magnitudes are similar. In sum, the dispersion of regulatory activity across government agencies is costly to firms, in terms of higher overhead costs, lower productivity, lower profitability, and lower growth. These costs are not restricted to final rulemaking on new issues. Rather, the effects extend to a broad range of government activity, including modifications to existing rules, earlier stages of

rulemaking, and the broad set of actions included in notices.

5.7 Lobbying

Lobbying represents one of the common tools firms employ to influence government regulatory activity, including new rulemaking, proposed future actions, and enforcement issues. In this section, we examine the extent to which changes in regulatory dispersion are related to subsequent lobbying expenditures. Results to this point suggest that greater regulatory dispersion is costly to firms, arguably because it increases the number of government agencies with which a firm must interact. The greater dispersion potentially leads firms to increase lobbying expenditures as a way to counteract the increased costs and resulting lower firm profitability. At the same time, however, the increased dispersion arguably decreases the efficiency of lobbying, as it is less clear where to focus lobbying efforts. When multiple agencies oversee a given regulatory issue, firms face less clarity on where to direct lobbying dollars. Moreover, the impact of lobbying for or against a given regulatory topic is likely lower, when that regulatory activity is spread more widely across multiple agencies.

To examine these issues, in Table 8 we estimate regressions similar to those shown in Tables 3 and 4, with the exception that lobbying is the dependent variable. Specifically, we measure lobbying as the log of lobbying expenditures in columns 1 and 3, and as raw lobbying expenditures in columns 2 and 4 (in USD millions). The independent variable of focus is regulation dispersion, and we also include topic dispersion, regulation complexity, and control variables used in prior regressions. Columns 1 and 2 include company and year fixed effects, and columns 3 and 4 additionally include industry×year fixed effects. Across all specifications, we find that greater regulatory dispersion is associated with a significant decrease in firm lobbying. These results are consistent with firms concluding that the benefits of lobbying are lower, when it is less clear where

to direct lobbying efforts.

6. Alternative groupings of regulation topics

Our main analyses are based on classifying FR documents into 100 topics, a choice that is somewhat arbitrary. On the one hand, we deliberately chose a larger number than prior studies that used topic analysis in more narrow settings. However, we did not have a clear motivation for choosing 100 as opposed to 80 or 60. In this section, we examine the robustness of our results to alternative groupings of topics.

Manual examination of our topics indicates that some topics are quite distinct, while others have a relatively higher degree of overlap. For example, there is one topic that relates to motor vehicle safety, topic 99. In contrast, there are seven topics that relate to aviation safety, topics 73, 79, 82, 86, 91, 96, and 97. Recognizing this variation, we manually go through our set of 100 topics and group similar topics into ‘Topic-Groups’. Our approach is as follows. As described earlier, for each topic we identify the most common CFR subject, the second most common CFR subject, etc. We refer to these as CFR_1 , CFR_2 ,

- Case 1: For any topic for which CFR_1 is unique, i.e., this CFR subject does not represent CFR_1 for any other topic, we retain the topic by itself. To provide an example, Topic 98 is the only topic for which CFR_1 is ‘Accounting’.
- Case 2: For any topics with a common CFR_1 but with distinctly different CFR_2 ’s, we label the topic according to both CFR_1 and CFR_2 , and we also retain these topics by themselves. To provide an example, Topic 10 is ‘Environmental protection: Agricultural commodities’ and Topic 35 is ‘Environmental Protection: Pollution and Penalties’.

- Case 3: For topics that have both a common CFR₁ and a common CFR₂, we combine the topics into a single topic-group. To provide an example, topics 5 and 85 both have CFR₁ equal to ‘*Securities*’ and CFR₂ equal to ‘*Brokers*’. We combine these together into a single topic-group.
- Case 4: For topics that have a common CFR₁ and CFR₂’s that are similar but not identical, we make judgment calls. To provide an example, Topics 64, 74, and 75 all have CFR₁ equal to ‘*Environmental Protection*’, and their CFR₂’s are ‘*Emissions*’, ‘*Air Pollution and Aircrafts*’, and ‘*Air Pollution and Air Quality*’. Given the similarity in these CFR₂’s, we combine these three topics into a single topic-group.

This approach yields either 57 or 70 topic-groups, depending on the strictness of classification in Case 4. We re-calculate Regulatory Dispersion, Regulation Quantity, and Topic Dispersion for these two alternative groupings, i.e., based on 57 topic groups and based on 70 topic groups, using the formulas provided earlier. We then re-estimate the regressions from Tables 3 and 4 and report the results in Table 9. For brevity, we report only the results from the tightest specification with firm fixed effects and year×industry fixed effects.

The main takeaway from this analysis is that our results are extremely robust. We continue to find that higher regulatory dispersion is followed by higher firm SG&A costs, lower firm productivity, lower firm profitability, and lower firm sales and asset growth.. These findings provide strong, consistent evidence in support of the Benefits of Regulatory Concentration hypothesis. We also continue to find strong evidence regarding the channel underlying these relations. Specifically, higher regulatory dispersion is associated with increases in firms’ number of employees. These results suggest that the higher regulatory dispersion leads firms to increase hiring to satisfy the higher regulatory burden. In aggregate, our findings are consistent with the

greater labor costs contributing to higher SG&A costs, lower productivity (as the labor is used to satisfy regulations rather than contribute to value-added of the business), and lower profitability.

6. Conclusion

The federal government is the largest economic agent in the country. As such, the government's agenda – the sum of all its activities – has a tremendous impact on companies. And yet, studies tend to focus on small subsets of the government's agenda and especially on various federal regulations that are already in place. In this paper we choose a different path and develop the first rigorous measure of the federal government's entire agenda. We achieve this by analyzing the voluminous official documents published daily by the government in the Federal Register (FR). By paying close attention to the FR, we are able to represent the government's wide range of activities, which includes not only preparing, finalizing, and implementing federal rules but also for instance offering grants, approving transactions, considering permits and exemptions, and conducting meetings with members of the public.

We use a machine learning algorithm to categorize all FR activities into 100 topics and label each topic according to its economic focus. We report novel facts on the scope and composition of the government's agenda. For instance, we find that topics are often handled simultaneously by multiple federal agencies, and there are substantial shifts occur around major macroeconomic events such as presidential elections and the financial crisis. We use a similar machine learning technology to classify the regulatory topics each company is facing, based on the verbal content of the annual 10-K filings. We find substantial heterogeneity in regulatory topics within and across firms. This finding highlights how each company faces a unique regulatory

environment, which is a function of the number of topics and the relative relevance of each topic to the company's operations. Finally, we combine the two parts – FR analysis and 10-K analysis – to create a novel measure of regulatory dispersion. It is based on the intuition that each company is dealing with multiple regulatory topics (calculated based on the 10-K filing), and each topic is handled by multiple agencies (calculated based on the FR documents). It is a firm-specific, time-varying measure, where high dispersion implies that the company's businesses are overseen by multiple federal agencies.

We show that regulatory dispersion is an important predictor of growth, profitability, productivity, and administrative costs. Specifically, high dispersion is associated with significantly higher SG&A costs, lower productivity (TFP), lower profitability, and slower growth. These results are conditional on other measures of regulatory burden and complexity, which we derive separately, and are identified within firm over time and also within each industry×year. Combined, our findings indicate that companies internalize the costs of having to keep abreast of multiple regulatory bodies. When a firm must answer to a greater number of government agencies, it must divert resources away from value-increasing efforts to satisfy regulatory requirements. Put differently, companies benefit if their businesses are regulated by fewer government agencies: they face less uncertainty and find it easier to capture the relevant regulators.

Overall, our paper is related to the emerging literature that studies how regulation in all its forms affects economic activity. Our empirical approach applies advanced linguistic tools to a long-established but little-used administrative data set, namely, the Federal Register. This approach allows us to study broad trends in the government's entire agenda, and to develop micro-level evidence on how individual firms respond to changes in that agenda. Finally, our focus on regulatory dispersion sheds light on a less-known aspect of regulation: the “industrial organization”

of the federal government, where multiple agencies regulate similar topics.

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Figure 1: Total number of words in Federal Register

This figure shows the annual number of words in the Federal Register between 1995 and 2019, as recorded across three types of documents: rules, proposed rules, and notices. We estimate the number of words by counting words from Grady Ward’s English dictionary in each document. The full sample consists of 783,950 documents obtained from the Federal Register server.

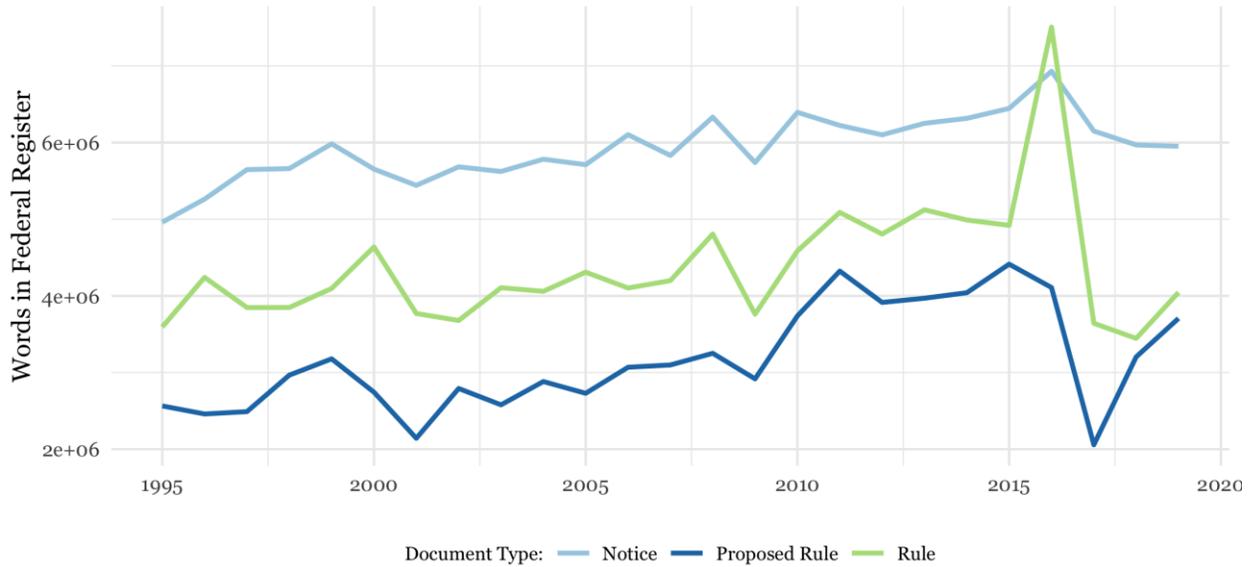
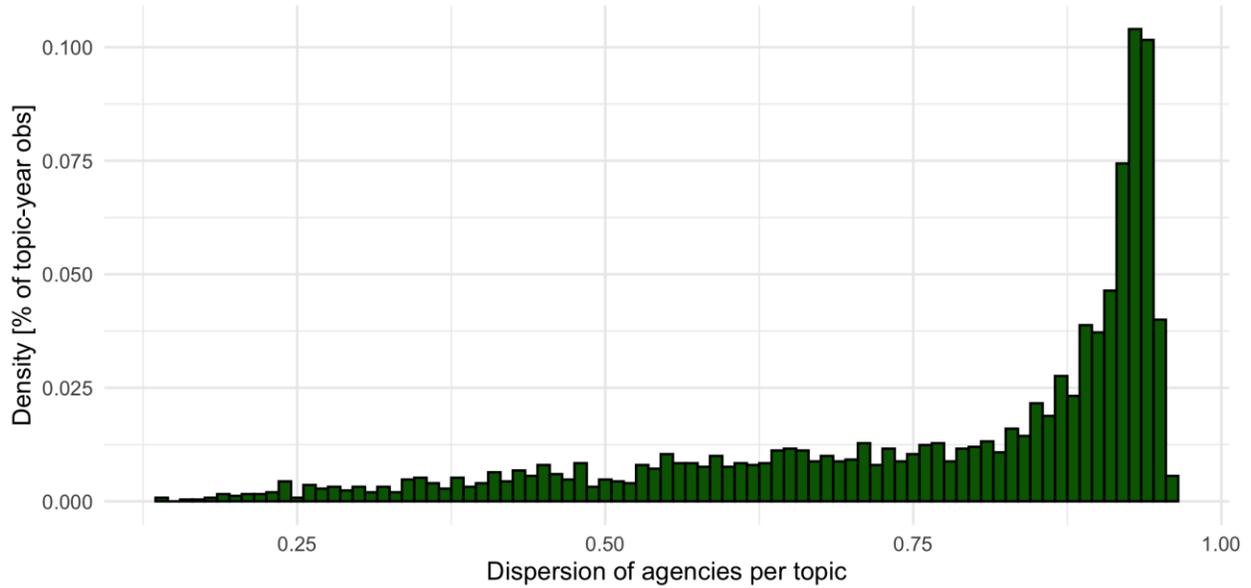


Figure 3: Regulatory Dispersion Histograms

This figure shows the distribution of agency dispersion, topic dispersion and regulatory dispersion. Agency dispersion (Panel A) is measured at the topic-year level; it equals 1 minus the sum of squares of the fractions of words in the topic-year observation written by each agency. Topic dispersion (Panel B) is measured at the firm-year level; it equals 1 minus the sum of squares of the fraction of each topic in the firm's annual report. Regulatory dispersion (Panel C) is measured at the firm-year level; it equals the weighted average of agency dispersion across all topics, where weights correspond to the fraction of the annual report devoted to each topic. The precise formulas are shown at the top of each panel.

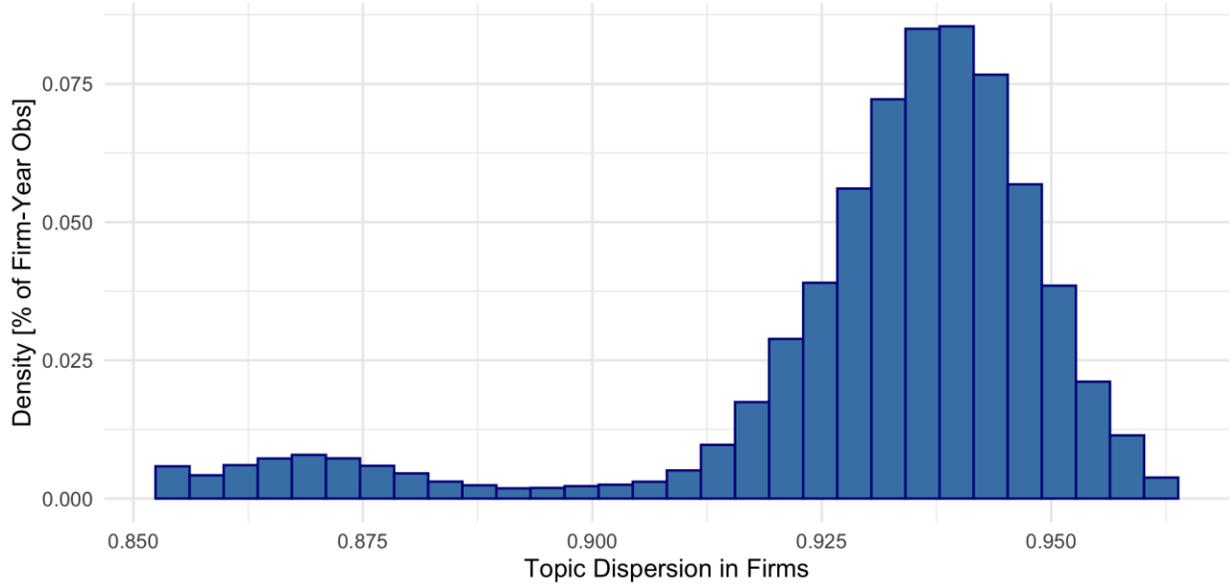
Panel A: Dispersion of agencies per topic-year

$$AgencyDispersion_{i,t} = 1 - \sum_{Agency} \omega_{i,t,a}^2$$



Panel B: Dispersion of Topics per firm-year

$$\text{TopicDispersion}_{f,t} = 1 - \sum_{\text{Topic}} P_{f,i,t}^2$$



Panel C: Dispersion of Regulations per firm-year

$$\text{RegulatoryDispersion}_{\text{Firm } f, \text{Year } t} = \sum_{\text{Topic}} P_{f,i,t} \cdot \text{AgencyDispersion}_{i,t}$$

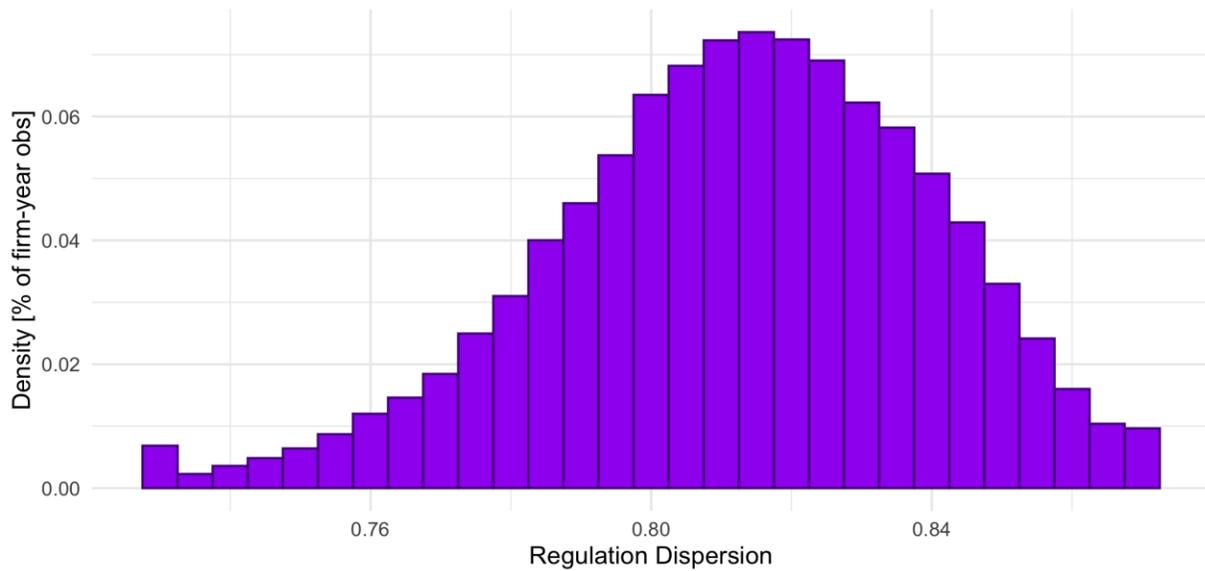
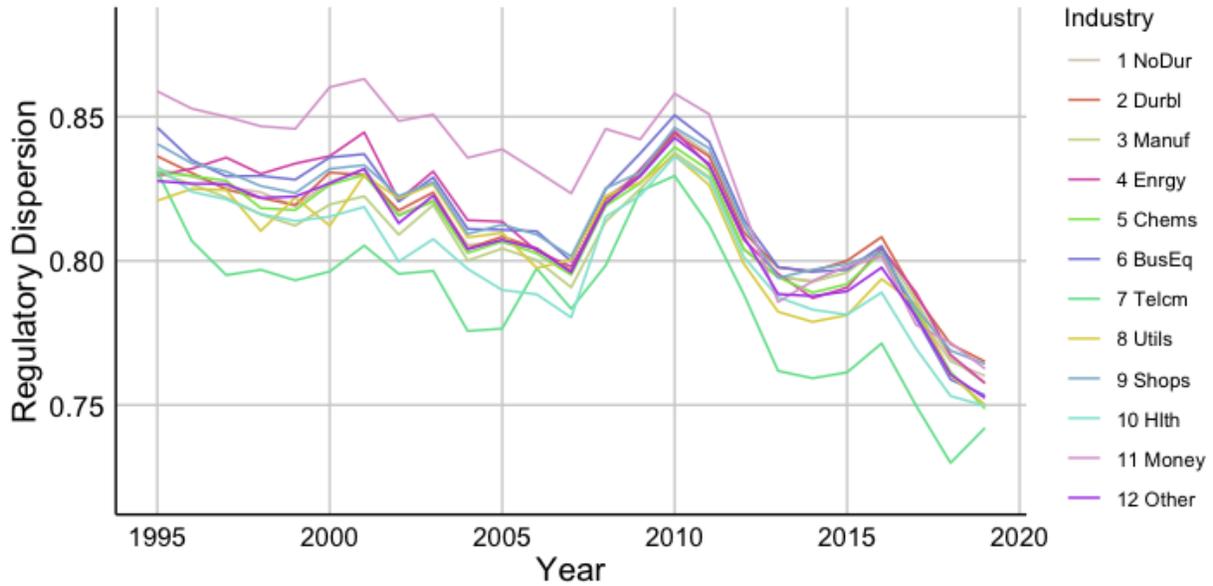


Figure 4: Time Trends in Regulatory Dispersion

Panel A shows the average value of regulatory dispersion by 12 Fama-French industries each year. Panel B plots the distribution of the regulatory dispersion for each firm within the Non-Durables Fama-French industry.

Panel A: 12 Fama-French Industries



Panel B: Fama-French Industry #1 (Non-Durables)

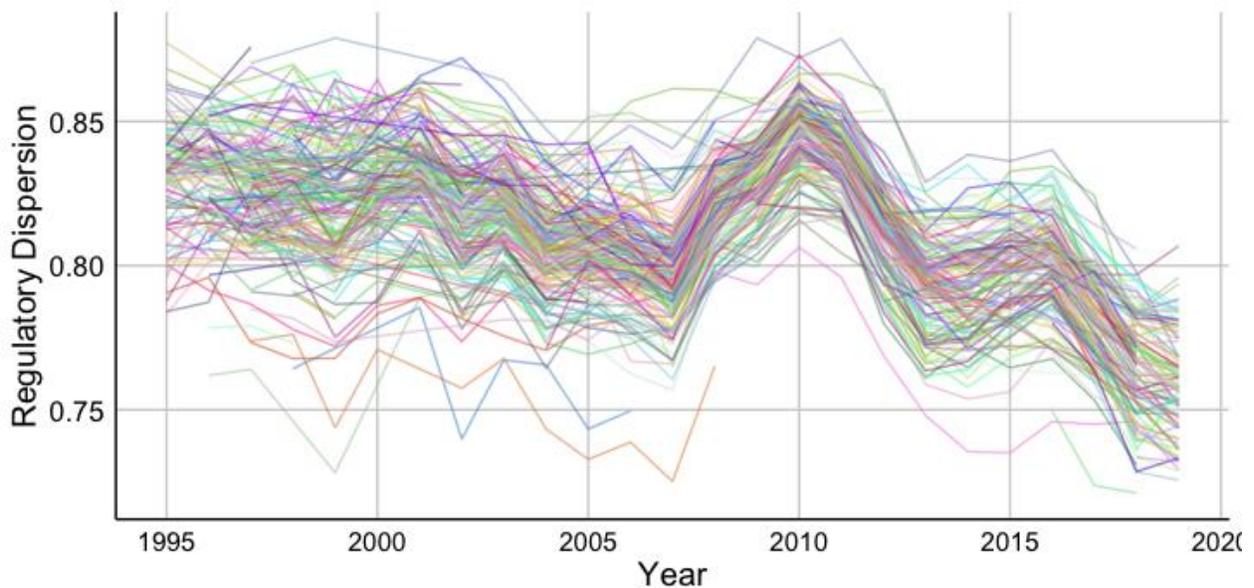
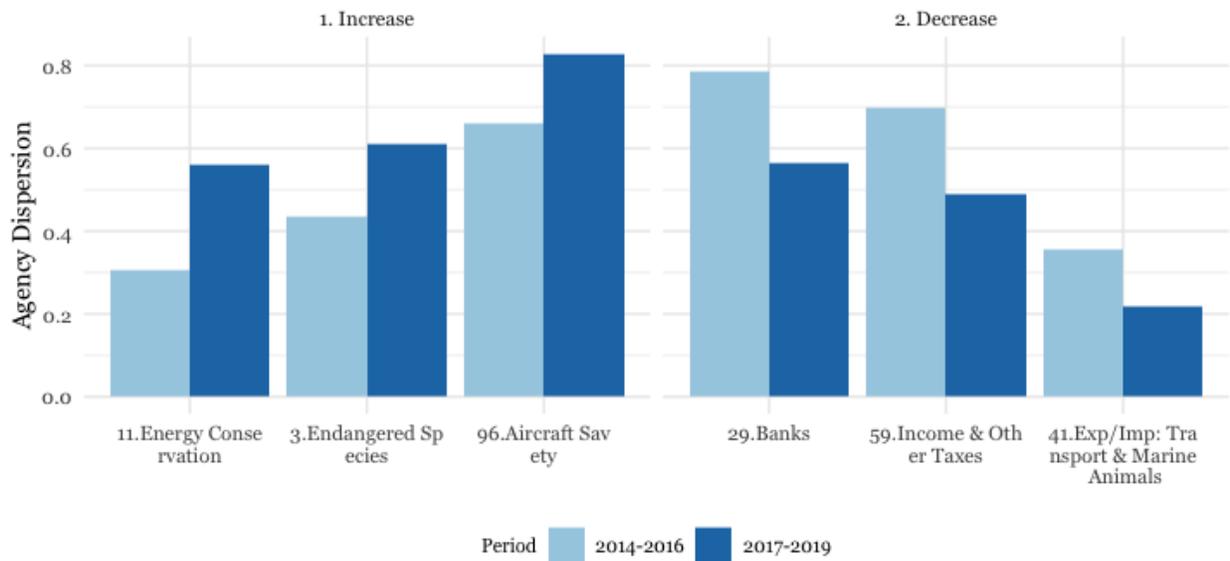


Figure 5: Changes around Trump Election and the Global Financial Crisis

Panel A shows the topics with the highest (lowest) changes in regulatory dispersion from the 2014-16 period to the 2017-19 period. Panel B plots the topics with the highest (lowest) changes in agency dispersion from the 2006-08 period to the 2009-11 period.

Panel A: Topics with the biggest change around the 2016 presidential election



Panel B: Topics with the biggest change around the 2008-09 financial crisis

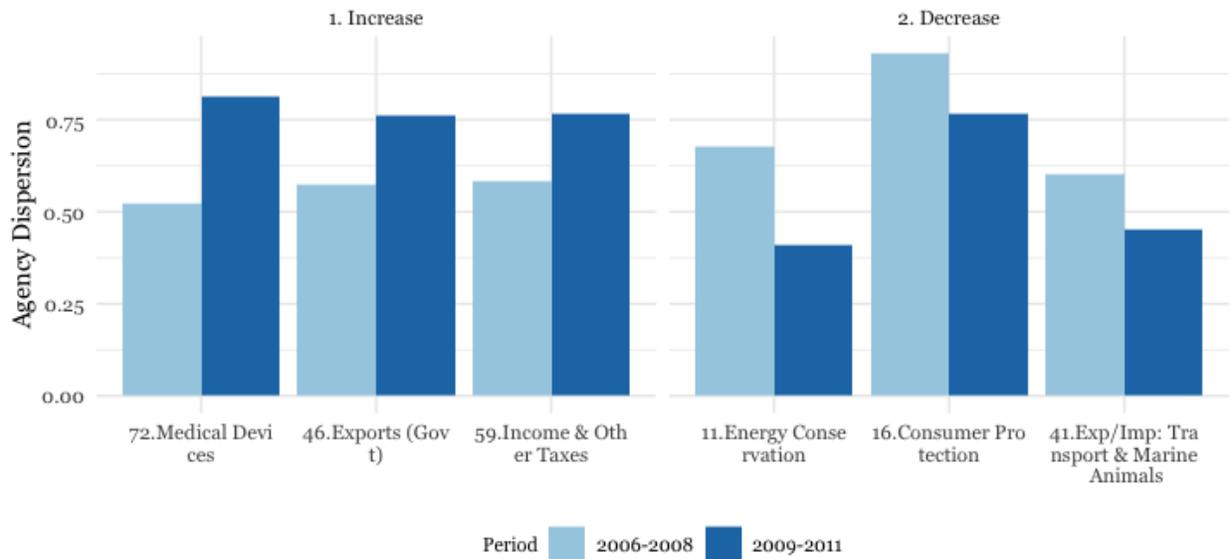


Table 1: Regulatory dispersion, across topics and firms

Panel A shows the five topics with the highest (lowest) average agency dispersion across the topics. Agency dispersion is measured at the topic-year level and is calculated as 1 minus the sum of squares of the fraction of words written by each agency. Panel B shows the five companies with the highest (lowest) average topic dispersion among the companies that are present in the sample for at least five years. Topic dispersion is measured at company-year level and is calculated as 1 minus the sum of squares of each LDA topic in the company's annual report. Panel C shows the five companies with the highest (lowest) average regulatory dispersion among the companies that are present in the sample for at least five years. Regulatory dispersion is estimated as a weighted sum of squares of topic-agency dispersions, where weights represent the probability of a topic in the company's annual report.

Panel A: Average agency dispersion of Topics

Topics with Lowest Average Agency Dispersion			Topics with Highest Average Agency Dispersion		
Topic	Label	Agency Dispersion	Topic	Label	Agency Dispersion
36	Nuclear materials	0.3867	20	Freedom of information	0.9501
64	Env: Emissions	0.3849	18	Claims	0.9488
79	Aviation Safety: inspection	0.3589	62	Privacy: Freedom of Information	0.9487
23	Health: insurance	0.3446	26	Govt procurement: Env	0.9474
5	Securities: invt cos	0.3395	66	Govt procurement: Small bus	0.9418

Panel B: Average Topic Dispersion of Firms

Firms with Lowest Topic Dispersion		Firms with Highest Topic Dispersion	
Firm Name	Topic Dispersion	Firm Name	Topic Dispersion
First capital	0.8527	Dexcom	0.9604
Calamos Asset Management	0.8527	Chad Therapeutics	0.9604
Glen Burnie Bancorp	0.8530	CVS Caremark	0.9604
Jeffersonville Bancorp	0.8534	Hansen Medical	0.9600
Carolina Bank Holdings	0.8535	Marinemax	0.9594

Panel C: Average Regulatory Dispersion of Firms

Firms with Lowest Regulatory Dispersion		Firms with Highest Regulatory Dispersion	
Firm Name	Regulatory Dispersion	Firm Name	Regulatory Dispersion
Select Medical Holdings	0.7278	Comm Bankcorp	0.8716
HCA Holdings	0.7278	Dearborn Bancorp INC	0.8681
Affiliated Managers Group	0.7286	Oneida LTD	0.8666
LHC Group	0.7301	Wells Fargo	0.8665
Healthsouth	0.7334	NASB Financial	0.8665

Table 2: Descriptive statistics

The sample consist of 60,573 company-year observations between 1995 and 2019 and is based on the CRSP/Compustat database with non-missing annual report at the SEC EDGAR server. The first panel divides the sample into five quintiles based on the value of the topic dispersions and report the average of firm characteristics in each group. The second panel groups the sample based on regulatory dispersion quintiles.

Quantile:	Quintiles of Topic Dispersion					Quintiles of Regulatory Dispersion				
	0%-20%	20%-40%	40%-60%	60%-80%	80%-100%	0%-20%	20%-40%	40%-60%	60%-80%	80%-100%
Num. Obs.	11,281	11,281	11,281	11,281	11,281	11,281	11,281	11,281	11,281	11,281
Topic Dispersion	12,108	12,107	12,107	12,107	12,108	12,108	12,107	12,107	12,107	12,108
Regulatory Dispersion	0.889	0.928	0.935	0.942	0.950	0.93	0.932	0.933	0.932	0.917
Sale	3,416	3,852	2,5623	1,985	2,234	3,325	2,766	2,614	2,461	2,886
TFP	-0.241	-0.29	-0.323	-0.381	-0.376	-0.318	-0.336	-0.338	-0.345	-0.314
N segments	1.953	2.616	2.434	2.208	2.056	2.347	2.351	2.324	2.205	2.039
PPE/AT	1.106	1.297	1.233	1.197	1.156	1.222	1.238	1.211	1.184	1.134
EBITDA/AT	0.109	0.274	0.258	0.238	0.233	0.242	0.238	0.236	0.229	0.168
MB	0.062	0.111	0.1	0.082	0.049	0.068	0.082	0.086	0.086	0.081
Sales Growth, %	2.674	3.245	3.022	3.252	3.849	3.75	3.158	3.204	3.04	2.89
Assets Growth, %	8.4	10.265	11.235	11.845	14.381	12.877	11.814	10.868	11.019	9.548
Tobin's Q	9.359	10.285	11.618	12.608	13.774	12.864	12.042	11.083	10.526	11.128
SGA/AT	1.519	2.012	2.082	2.26	2.666	2.351	2.112	2.133	2.096	1.848
EMP/AT	0.091	0.25	0.292	0.334	0.375	0.24	0.265	0.286	0.304	0.245
INVST/AT	0.002	0.007	0.007	0.007	0.007	0.004	0.006	0.007	0.008	0.006
ROA, %	0.024	0.078	0.089	0.102	0.115	0.076	0.084	0.088	0.09	0.068

Table 3: Regulatory Dispersion and SGA Expenses, Productivity and ROA

The sample consists of 60,573 company-year observations between 1995 and 2019. The main independent variable is *Regulatory Dispersion*. The dependent variable in Model 1 is *SGA/AT* (the ratio SG&A to total assets in year t+1). The dependent variable in Model 2 is TFP (measured following İmrohoroglu and Tüzel (2014) in year t + 1). The dependent variable in Model 3 is *ROA* (100*income before extraordinary items/assets), measured in year t+1. All variables are defined in Appendix 2. Standard errors are clustered at 48 Fama-French industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Dep. Var.	SGA/AT	TFP	ROA	SGA/AT	TFP	ROA
Regulatory Dispersion	0.381*** (0.136)	-0.603** (0.270)	-37.735*** (8.301)	0.486*** (0.125)	-0.539* (0.313)	-34.069*** (9.400)
Topic Dispersion	0.488** (0.189)	-0.542 (0.416)	-9.278 (16.646)	0.505** (0.210)	-0.685* (0.373)	-7.236 (14.732)
Regulation Quantity	0.036 (0.035)	0.037 (0.062)	3.182 (3.480)	0.058 (0.044)	0.041 (0.068)	4.735** (2.335)
Log(Word,10K)	-0.006 (0.004)	-0.014 (0.009)	-3.961*** (0.936)	-0.006 (0.005)	-0.015* (0.008)	-3.839*** (0.918)
PPE/AT	0.083** (0.033)	-0.552*** (0.092)	-6.745*** (1.698)	0.080** (0.035)	-0.588*** (0.083)	-6.432*** (2.189)
EBITDA/AT	-0.036** (0.016)	1.177*** (0.079)	40.224*** (3.563)	-0.038** (0.016)	1.224*** (0.081)	39.779*** (3.711)
Log(Sale)	-0.040*** (0.006)	0.098*** (0.010)	3.191*** (0.352)	-0.042*** (0.007)	0.094*** (0.010)	3.159*** (0.369)
Tobin's Q	0.013*** (0.001)	0.048*** (0.004)	-0.480*** (0.092)	0.013*** (0.001)	0.049*** (0.005)	-0.467*** (0.075)
Num. Obs.	60,537	38,925	60,537	60,537	38,925	60,537
R2	0.867	0.729	0.637	0.872	0.740	0.653
Company FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X
Industry*Year FE				X	X	X

Table 4: Regulatory Dispersion and Sales Growth, Assets Growth and Employment

The sample consists of 60,573 company-year observations between 1995 and 2019. The main independent variable is *Regulatory Dispersion*. The dependent variable in Model 1 is *Sales Growth* ($100 \times (\text{sale}_{t+1}/\text{sale}_t - 1)$), measured in year $t+1$. The dependent variable in Model 2 is *Assets Growth* ($100 \times (\text{assets}_{t+1}/\text{assets}_t - 1)$), measured in year $t+1$. The dependent variable in Model 3 is *Emp/AT* (emp/at), measured in year $t+1$. All variables are defined in Appendix 2. Standard errors are clustered at 48 Fama-French industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Dep. Var.	Sales Growth	Assets Growth	EMP/AT	Sales Growth	Assets Growth	EMP/AT
Regulatory Dispersion	-146.768*** (25.813)	-199.418*** (33.590)	0.000 (0.005)	-163.501*** (32.829)	-193.542*** (37.993)	0.004** (0.002)
Topic Dispersion	-21.551 (38.357)	39.433 (30.739)	0.006 (0.005)	5.579 (34.880)	53.072 (35.244)	0.002 (0.005)
Regulation Quantity	-41.662*** (12.016)	-53.961*** (9.018)	0.002** (0.001)	-44.303*** (10.560)	-52.366*** (9.023)	0.001 (0.001)
Log(Word,10K)	5.145*** (1.536)	6.241*** (1.059)	0.000* (0.000)	4.595*** (1.471)	5.661*** (1.187)	0.000* (0.000)
PPE/AT	-17.540*** (4.531)	-38.782*** (7.428)	0.003*** (0.001)	-13.521** (6.185)	-35.774*** (9.636)	0.003*** (0.001)
EBITDA/AT	-0.719 (8.332)	13.952*** (3.697)	0.002*** (0.000)	-2.440 (7.830)	12.733*** (3.824)	0.001*** (0.000)
Log(Sale)	12.400*** (1.111)	9.914*** (0.880)	0.000 (0.000)	12.904*** (1.167)	10.095*** (0.921)	0.000 (0.000)
Tobin's Q	0.943*** (0.179)	-0.895*** (0.228)	0.000*** (0.000)	0.883*** (0.199)	-0.919*** (0.234)	0.000*** (0.000)
Num. Obs.	60,537	38,925	60,537	60,537	38,925	60,537
R2	0.867	0.729	0.637	0.872	0.740	0.653
Company FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X
Industry*Year FE				X	X	X

Table 5: Relationship between Rules and Notices, Past and Future

This table shows the relationship between past or future notices and rules. The sample includes a panel of 227,600 agency×topic×year observations. The dependent variable is $\log(1 + Words_{rules,a,i,t})$, where $Words_{rules,a,i,t}$ is the total number of words written by agency a on topic i at year t in the Rules section of the FR. Independent covariates are based on the total number of words written by agency a on topic i at year t in the Notices section of the FR, with up to two years of leads and lags. Standard errors are clustered at the agency level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

<i>Dependent Variable:</i>	<i>#Words (rules, agency, topic, year)</i>			
	Model 1	Model 2	Model 3	Model 4
#Words (notices, agency, topic, year -1)	0.259*** (0.042)		0.140*** (0.026)	0.135*** (0.010)
#Words (notices, agency, topic, year -2)	0.177*** (0.026)		0.095*** (0.020)	0.114*** (0.009)
#Words (notices, agency, topic, year +1)		0.248*** (0.047)	0.151*** (0.033)	0.141*** (0.010)
#Words (notices, agency, topic, year + 2)		0.219*** (0.027)	0.150*** (0.022)	0.155*** (0.010)
Num. Obs.	227,600	227,600	227,600	227,600
R2	0.822	0.823	0.826	0.890
Agency, Year, Topic FE	X	X	X	
Agency×Year, Agency×Topic, Topic×Year FE				X

Table 6: Regulatory Dispersion across Notices, Proposed Rules, and Final Rules

We re-estimate the regressions in Tables 3 and 4 for each of the three document classes: notices, proposed rules, and rules. For each of the three classes, we first re-calculate our measures of agency dispersion, regulatory dispersion, and regulatory quantity, using only the documents that belong to this class. Panel A shows the correlation between all four measures. Panel B repeats the analysis from Tables 3-4 using the notices-specific measures. Panels C and Panel D repeat this analysis for the measures that are based on proposed rules and rules, respectively. All regressions in Panels B – D include industry*year and company fixed effects as well as controls for Regulation Quantity, topic dispersion, Log (10K, Words), PPE/AT, Log(Sale) and Tobin’s Q. All variables are defined in Appendix 2. Standard errors are clustered at the 48 Fama-French industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Correlation between Regulatory Dispersion measures based on different types of documents

	Regulatory Dispersion (Notices)	Regulatory Dispersion (Proposed Rules)	Regulatory Dispersion (Rules)
Regulatory Dispersion (All docs)	0.7610	0.7136	0.7453
Regulatory Dispersion (Notices)	1	0.2470	0.2823
Regulatory Dispersion (Prop. Rules)		1	0.6645
Regulatory Dispersion (Rules)			1

Panel B. Regulatory Dispersion (Notices) and future performance

Dep. Var:	SGA/AT	TFP	Sales Growth	Assets Growth	ROA	Emp/AT
Regulation Disp (Notices)	0.414** (0.186)	-1.113*** (0.361)	8.542 (9.954)	-164.691*** (34.905)	-180.600*** (36.789)	0.004 (0.003)
Num.Obs.	60,537	38,925	60,537	60,537	60,537	60,537
Controls	X	X	X	X	X	X
Ind* Yr, Comp FE	X	X	X	X	X	X

Panel C. Regulatory Dispersion (Proposed Rules) and future performance

Dep. Var:	SGA/AT	TFP	Sales Growth	Assets Growth	ROA	Emp/AT
Regulation Disp (Pr. Rules)	0.398*** (0.101)	-0.061 (0.194)	-46.406*** (8.997)	-109.233*** (25.617)	-142.481*** (27.977)	0.003** (0.002)
Num.Obs.	60,537	38,925	60,537	60,537	60,537	60,537
Controls	X	X	X	X	X	X
Ind*Yr, Comp FE	X	X	X	X	X	X

Panel D. Regulatory Dispersion (Rules) and future performance

Dep. Var:	SGA/AT	TFP	Sales Growth	Assets Growth	ROA	Emp/AT
Regulation Disp (Rules)	0.476*** (0.118)	0.022 (0.275)	-65.682*** (10.627)	-115.378*** (29.271)	-137.395*** (31.474)	0.005** (0.002)
Num.Obs.	60,537	38,925	60,537	60,537	60,537	60,537
Controls	X	X	X	X	X	X
Ind*Yr, Comp FE	X	X	X	X	X	X

Table 7: Regulatory Dispersion across New and Modified Rules

We re-estimate the regressions in Tables 3 and 4 for rules with new and repeated RIN identification. Rules with new RIN represent novel regulations and rules with repeated RIN represent modifications to previous rules. For both types we first re-calculate our measures of agency dispersion, regulatory dispersion, and regulatory quantity, using only the documents that belong to this class. Panel A shows the correlation between regulatory dispersion for all rules, new rules, and modifications of previous rules. Panel B repeats the analysis from Tables 3-4 using the same controls and industry*year and company fixed effects. Standard errors are clustered at the 48 Fama-French industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Correlation between Regulatory Dispersion measures based on different types of documents

	Reg Disp (All Rules)	Reg Disp (New RIN)	Reg Disp (Old RIN)
Reg Disp (All Rules)	1	0.6160	0.6772
Reg Disp (New RIN)		1	0.5382
Reg Disp (Old RIN)			1

Panel B. Regulatory Dispersion (Rules with new RIN) and future performance

	SGA/AT	TFP	Sales Growth	Assets Growth	ROA	Emp/AT
Regulation Disp	0.487***	-0.183	-62.065***	-104.931***	-139.175***	0.001
(New RIN)	(0.102)	(0.160)	(8.736)	(27.249)	(23.310)	(0.003)
Num.Obs.	60537	38925	60537	60537	60537	60537
R2	0.872	0.740	0.654	0.399	0.305	0.923
Ind*Yr, Comp FE	X	X	X	X	X	X

Panel C. Regulatory Dispersion (Rules with old RIN) and future performance

	SGA/AT	TFP	Sales Growth	Assets Growth	ROA	Emp/AT
Regulation Disp	0.374***	-0.077	-45.571***	-95.487***	-126.135***	0.005***
(Old RIN)	(0.096)	(0.230)	(10.668)	(27.944)	(29.605)	(0.002)
Num.Obs.	60537	38925	60537	60537	60537	60537
R2	0.872	0.740	0.653	0.399	0.305	0.923
Ind*Yr, Comp FE	X	X	X	X	X	X

Table 8: Regulatory Dispersion and Lobby Expenses

The sample consists of 14,986 company-year observations with information on lobby donations in LobbyView database. The dependent variable in Models 1 and 3 is $\text{Log}(\text{Lobby})$ measured in year $t+1$. The main independent variable is *Regulatory Dispersion*. All regressions include controls previously used in Tables 3 and 4. The dependent variable in Models 2 and 4 is *Lobby*: lobby expenses in USD millions measured in year $t+1$. Standard errors are clustered at 48 Fama-French industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Log(Lobby)	Lobby	Log(Lobby)	Lobby
Regulation Dispersion	-22.301*** (6.832)	-6.678*** (2.255)	-21.617** (8.147)	-5.827** (2.218)
Topic Dispersion	-8.688 (13.303)	0.647 (2.980)	-14.730 (13.542)	-2.184 (2.698)
Regulation Complexity	-1.971 (2.505)	-0.812 (0.838)	-2.719 (2.679)	-1.321* (0.769)
Log(Word,10K)	0.686** (0.327)	0.107 (0.099)	0.441 (0.322)	0.058 (0.109)
PPE/AT	0.163 (0.955)	0.013 (0.229)	-0.384 (1.053)	0.040 (0.287)
EBITDA/AT	-1.007** (0.471)	-0.420*** (0.094)	-0.457 (0.566)	-0.360*** (0.124)
Log(Sale)	1.023*** (0.236)	0.248*** (0.057)	1.049*** (0.259)	0.238*** (0.073)
Tobin's Q	-0.015 (0.037)	-0.003 (0.008)	-0.038 (0.039)	-0.010 (0.007)
Num.Obs.	14,986	14,986	14,986	14,986
R2	0.611	0.874	0.649	0.887
Company FE	X	X	X	X
Year FE	X	X	X	X
Industry*Year FE			X	X

Table 9. Robustness of LDA Analysis

We aggregate 100 LDA topics into 70 (57) groups based on their labels. We re-measure all the main variables (regulatory dispersion as well as agency dispersion, topic dispersion, and regulation complexity) and then re-estimate Tables 3-4 with the same set of controls and fixed effects as Models 4-6. Standard errors are clustered at the Fama-French 48 industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: 70 Topics

	SGA/AT	TFP	Sales Growth	Assets Growth	ROA	Emp/AT
Regulation Disp (70 groups)	0.570*** (0.122)	-0.583** (0.285)	-34.680*** (10.148)	-193.456*** (34.507)	-230.394*** (38.226)	0.008*** (0.003)
Num.Obs.	60,537	38,925	60,537	60,537	60,537	60,537
R2	0.872	0.740	0.653	0.399	0.305	0.923
Ind*Yr, Comp FE	X	X	X	X	X	X

Panel B: 57 Topics

	SGA/AT	TFP	Sales Growth	Assets Growth	ROA	Emp/AT
Regulation Disp (57 groups)	0.473*** (0.142)	-0.441 (0.412)	-24.445 (14.868)	-184.724*** (49.103)	-176.154*** (47.379)	0.010** (0.004)
Num.Obs.	60,537	38,925	60,537	60,537	60,537	60,537
R2	0.872	0.740	0.653	0.399	0.304	0.923
Ind*Yr, Comp FE	X	X	X	X	X	X

Appendix 1

Table A1: Full Agency Names

This table lists all full names of the agencies, and the corresponding abbreviations used in the paper.

Agency	Label
Commodity Futures Trading Commission	CFTC
Department of Agriculture	USDA
Department of Commerce	Commerce
Department of Energy	DOE
Department of Health and Human Services	HHS
Department of Housing and Urban Development	HUD
Department of Interior	DOI
Department of Justice	DOJ
Department of Labor	DOL
Department of Transportation	Transportation
Department of Treasury	Treasury
Department of Veteran Affairs	VA
Environmental Protection Agency	EPA
Federal Communications Commission	FCC
Federal Energy Regulatory Commission	FERC
Federal Reserve System	FRS
International Trade Commission	ITC
Nuclear Regulatory Commission	NRC
Securities and Exchange Commission	SEC

Appendix 2

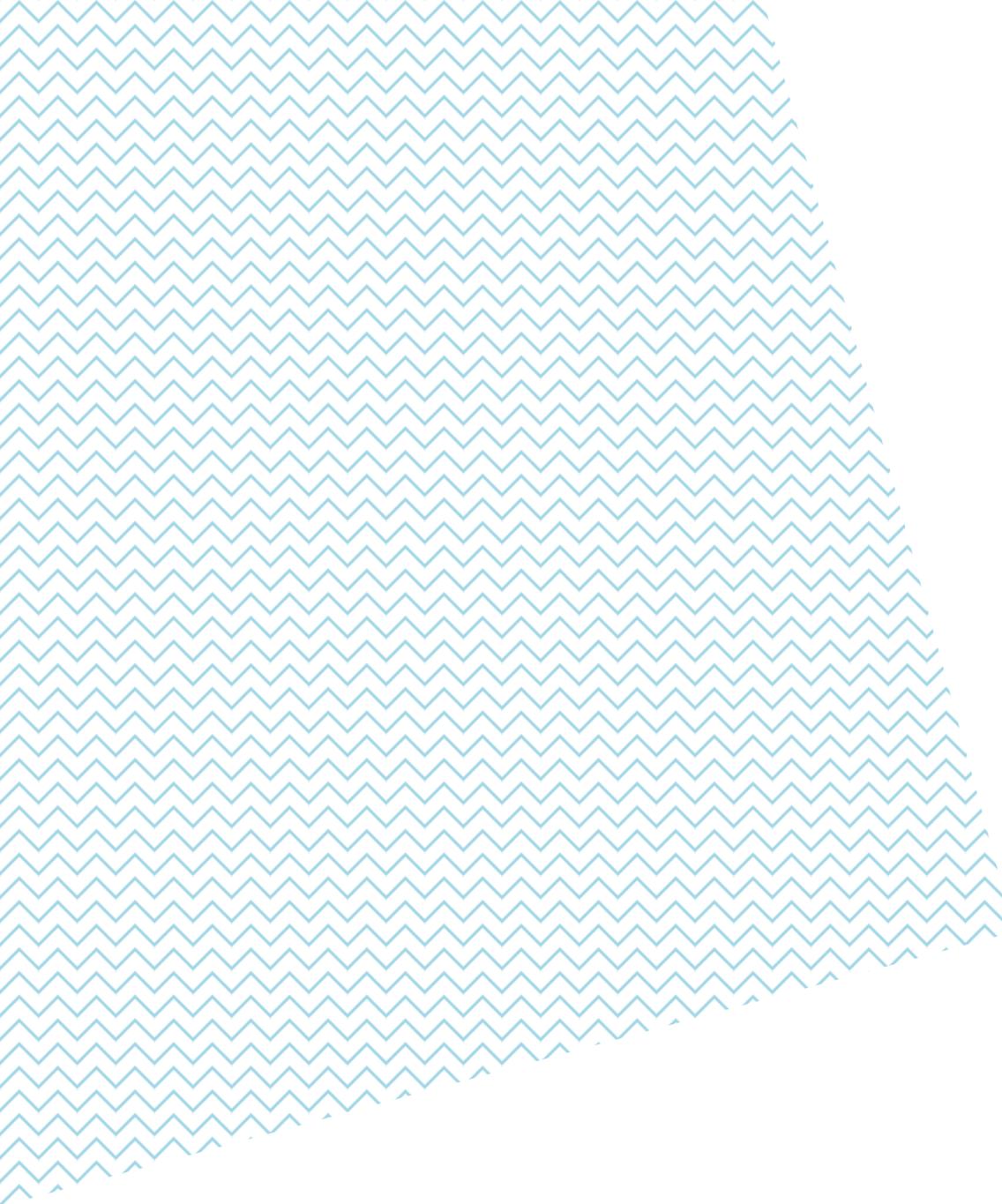
Table A2A: Regulation related variables

Name	Description	Level	Data Source
Agency Dispersion	$= 1 - \sum_{Agency} \omega_{Topic\ i,Year\ t,Agency}^2$, where $\omega_{Topic\ i,Year\ t,Agency}$ is the fraction of the words in all Federal Register documents written by each agency in a given topic in a given year.	Topic-year	FR
Topic Dispersion	$= 1 - \sum_{Topic} P_{Firm\ f,Year\ t,Topic}^2$, where $P_{Firm\ f,Year\ t,Topic}$ is the fraction of the annual report of firm f in year t dedicated to a given topic.	Company-year	FR, SEC EDGAR
Regulatory Dispersion	$1 - \sum_{Topic} \sum_{Agency} P_{Firm,Topic,Year} \omega_{Topic,Agency,Year}^2$, Equivalently, this can be estimated as a weighted sum across all 100 topics of topic-agency dispersion ($\omega_{Topic\ i,Year\ t,Agency}^2$), where weights equal the topic probability in the firm's annual report	Company-year	FR, SEC EDGAR
Regulation Quantity	$\sum_{Topic} P_{Firm,Topic,Year} \cdot \log(Topic\ Words, Fedreg)$, where $\log(Topic\ Words, Fedreg)$ is the natural logarithm of the number of words in each topic	Company-year	FR, SEC EDGAR

In the paper we also estimate Regulation Quantity separately for notices, proposed rules, and rules. First, we estimate agency dispersion for notices (proposed rules/rules) only using the formula from the table above and applying it only to notices (proposed rules/rules). Then we use this new measure of agency dispersion and re-estimate Regulatory Dispersion using the same formula as before.

Table A2B: Other variables

Name	Description	Level	Data Source
Log(Words,10K)	Logarithm of the number of English words in the main file of the company's 10-K report. English words are defined according to Grady Ward dictionary	Company-year	SEC EDGAR
PPE/AT	<i>ppent/at</i> (Compustat items)	Company-year	Compustat
EBITDA/AT	<i>ebitda/at</i> (Compustat items)	Company-year	Compustat
Log(Sale)	$\log(\text{sale})$ (Compustat item)	Company-year	Compustat
Tobin's Q	$(at - ceq + size/10^3)/at$, where <i>at</i> and <i>ceq</i> are Compustat items, and <i>size</i> is company market capitalization from the end of the previous calendar year (CRSP)	Company-year	Compustat, CRSP
Industry	Fama-French 48 industry	Company-year	CRSP, Fama-French
N segments	Number of business segments	Company-year	Compustat Segment



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