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### Word Limited: An Empirical Analysis of the Relationship Between the Length, Resiliency, and Impact of Federal Regulations

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WORD LIMITED:  
AN EMPIRICAL ANALYSIS OF THE  
RELATIONSHIP BETWEEN THE LENGTH,  
RESILIENCY, AND IMPACT OF FEDERAL  
REGULATIONS

Anthony Moffa\*

*Since the rise of the modern administrative state we have seen a demonstrable trend towards lengthier regulations. However, popular critiques of the administrative state that focus on the overall size of the Federal Register are misguided. They rest on the premise that more, and longer, regulations unduly burden industry and the economy in general. However, movement towards lengthier and more detailed regulations could be rational and largely unproblematic. This study tests two potential rational explanations for the trend towards longer regulations: dubbed (1) “the insulation hypothesis” and (2) “the socially beneficial hypothesis.” Each of these explanations embodies a theoretically rational decision. First, the insulation hypothesis rests on the idea that it would make sense for policymakers to include more detailed legal and scientific support in new regulations, and thereby increase their length relative to previous regulations, if the additional detail provided more insulation from judicial review. Second, the socially beneficial hypothesis rests on the idea that devoting relatively more time and resources to each new rule would be appropriate if longer, newer regulations produced more net social benefits than older, shorter ones. The empirical analysis set forth in this article combines data from a number of publicly available sources to test these hypotheses. The results, confirming “the socially beneficial hypothesis,” add to the canon of empirical analysis of administrative law, building on the work of Cass Sunstein, Cary Coglianese, and others. Recognizing an overly burdensome regulatory state, an undoubtedly worthwhile and vital check in a democratic society, requires more than simply counting the pages of regulations. The results of this study should put some minds at ease, at least with respect to EPA regulations; they should also help better direct our scrutiny in the future.*

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\* Associate Professor of Law, University of Maine School of Law. This Article has benefited greatly from the feedback received at the Sabin Colloquium on Innovative Environmental Law Scholarship at Columbia Law School and the Rocky Mountain Land Use Institute's Environmental Scholarly Workshop at the University of Denver's Sturm College of Law. Thanks to Ashley Fagan for her diligent research assistance. Many thanks are also due to Robert Bruce Thompson, Sarah Schindler, Thea Johnson, Richard Chen, and Justin Pidot for helpful feedback. Any errors are mine alone.

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## INTRODUCTION

*“For many decades, an ever-growing maze of regs, rules, and restrictions has cost our country trillions of dollars, millions of jobs, countless American factories, & devastated entire industries.”—President Donald J. Trump<sup>1</sup>*

*“The era of big government is over.”—President William J. Clinton<sup>2</sup>*

A common criticism of the federal administrative state from presidents, politicians, pundits, policymakers, and even scholars has been that there are simply too many regulations. Often this criticism is accompanied by a theatric numerical or physical depiction of the pages in the Code of Federal Regulations or the Federal Register.<sup>3</sup> Although these arguments have media appeal, they

<sup>1</sup> Michal Kranz, *Trump Cut Literal Red Tape While Standing Next to a Massive Pile of Paper to Make a Point About Big Government*, BUS. INSIDER (Dec. 14, 2017), <http://www.buinessinsider.com/trump-stood-next-to-a-huge-pile-of-paper-showing-big-government-2017-12> [<https://perma.cc/C6HR-KEBQ>].

<sup>2</sup> William Jefferson Clinton, President, U.S., State of the Union Address (Jan. 23, 1996), available at <https://clintonwhitehouse4.archives.gov/WH/New/other/sotu.html> [<https://perma.cc/QRR7-QQT4>].

<sup>3</sup> See, e.g., Steven J. Davis, *Regulatory Complexity and Policy Uncertainty: Headwinds of Our Own Making*, HOOVER INSTITUTION 1, 1 (2017) (comparing the number of pages in the Code of Federal Regulations to 133 King James Bibles); Kranz, *supra* note 1 (depicting President Donald J. Trump next to large stacks of printed out pages).

misconstrue the reality of the data,<sup>4</sup> while asking and answering the wrong question. It may be true that individual regulations have grown, and continue to grow, increasingly complex and lengthy to read, adding pages to the Federal Register at higher rates each year.<sup>5</sup> Indeed, the data largely confirm the existence of such a trend.<sup>6</sup> The movement towards longer and more detailed regulations could be rational,<sup>7</sup> and unproblematic. Despite the fundamental importance of determining whether a relationship between length and some measure of effectiveness exists, no prior empirical study has directly addressed the issue.<sup>8</sup>

This study begins to fill that void by testing two hypothesized rational explanations for longer regulations: (1) “the insulation hypothesis” and (2) “the socially beneficial hypothesis.”<sup>9</sup> The insulation hypothesis posits that it makes sense for policymakers to increase the length of new regulations relative to previous regulations because the additional pages provide more insulation from judicial review. Regulations that consistently get overturned impose costs on both the regulators and the regulated community, making the reduction of those costs a rational goal. The socially beneficial hypothesis posits that using more words for each new rule is appropriate because longer regulations produce more net social benefits. In other words, if individual regulations have grown in order to increase the net social benefits they provide or to better insulate them from judicial review, then the trend towards longer rules would be justified. If, on the other hand, regulations have become needlessly loquacious, then perhaps a change of course is in order.

This paper attempts to answer the question of the trend’s rationality in terms of resilience and quantified benefits of administrative rules in the context of environmental regulations. The analysis relies on data compiled by the Office of the Federal Register<sup>10</sup> and QuantGov<sup>11</sup> to prove the existence of a trend;

<sup>4</sup> See *infra* Part II (revealing that the number of rules added to the Federal Register each year has actually decreased over time).

<sup>5</sup> See Davis, *supra* note 3, at 1. For example, the Clean Power Plan, finalized by the Environmental Protection Agency on August 3, 2015 and published in the Federal Register on October 23, 2015, comprised over 300,000 words (data on file with author).

<sup>6</sup> See *infra* Figure 3 (demonstrating the increasing number of pages per rule over time).

<sup>7</sup> The term “rational” throughout means an administrative process that functions optimally in terms of the costs and benefits of the process itself—the value of the regulation for society is produced with the least wasted effort. In other words, an irrational administrative process would be one that utilizes more labor to produce regulations than is necessary to render those regulations effective for their underlying purpose and as resilient as possible.

<sup>8</sup> See *infra* Part I (discussing the empirical scholarship in the field and identifying this gap in the literature).

<sup>9</sup> These are just two potential rational explanations for crafting longer and more detailed regulations. Part I will discuss why these two explanations stand out for empirical analysis and serve as the focus of this piece.

<sup>10</sup> See OFFICE OF THE FED. REGISTER, FEDERAL REGISTER STATISTICS (2018), <https://www.federalregister.gov/reader-aids/understanding-the-federal-register/federal-register-statistics> [<https://perma.cc/QHT4-ZPUW>].

the words and pages of the regulatory texts themselves to provide the data points on length; the regulatory impact and cost benefit analyses prepared by the Environmental Protection Agency (EPA) to provide quantified social impacts; and United States Courts of Appeal and United States Supreme Court opinions in cases reviewing EPA regulations to indicate likelihood of reversal. Applying a neutral, empirical lens, through which to evaluate the trend towards increasingly complex rulemaking, benefits administrative agencies, courts, and commentators by grounding discussions of reform.

Environmental regulations constitute a significant portion of the pages of the Code of Federal Regulations and the Federal Register that political actors like to pile up for visuals.<sup>12</sup> The EPA consequently takes the brunt of the popular criticism aimed at the expansive government bureaucracy and the pervasive administrative state.<sup>13</sup> Rulemakings initiated by the EPA provide an important set of data on which to test the correlations that suggest rational explanations for the growing length and complexity of administrative rules. In addition to presenting empirical evidence on the perceived trend of increasing length of regulations over time, this study tests for correlations related to the hypotheses described above to determine whether or not longer regulations signal a move to a less effective and more inefficient, in other words irrational, administrative state. Ultimately, the results, reported in full below, supported one of the two primary hypotheses—the socially beneficial hypothesis. The study found a robust, statistically significant positive correlation between the number of words in a final rule and the EPA’s estimated net social benefits of that rule.

Part I locates this study within the existing body of empirical legal scholarship on administrative law. Part II begins the analysis by examining the trend towards longer regulations across all agencies in more detail, looking at all of the rules proposed and finalized in the Federal Register over time. Part III explains why the correlations tested herein are of particular interest. It discusses how the potential relationship between the length of rules and the rate of success on judicial review is consistent with the theses of some administrative law scholars regarding the behavior of agencies and administrators. From the policymakers’ perspective, this part highlights how the potential relationship between the length of rules and their net social benefit is consistent with political

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<sup>11</sup> QuantGov is an open-source platform that compiles data up to date on regulatory text, pulling from, among other sources, the eCFR. See Patrick A. McLaughlin & Oliver Sherouse, *QuantGov—a Policy Analytics Platform*, QUANTGOV (Dec. 20, 2017).

<sup>12</sup> See Patrick A. McLaughlin & Oliver Sherouse, *RegData US 3.1 Annual (dataset)*, QUANTGOV (2018), <https://quantgov.org/regdata-us/> [<https://perma.cc/32JR-XW39>] (last visited Jan. 6, 2020) (reporting the number of words added to the CFR by each agency every year from 1970–2017 in the “RegData 3.1 Agency Summary” subset).

<sup>13</sup> Arthur Pugsley, *The Myth of EPA Overregulation*, 39 *ECOLOGICAL L.Q.* 475, 478 (2012) (“A near-universal chorus on the political right, including elected officials and interest groups, has objected to the EPA as overregulating and thereby causing economic harm. Moreover, some Democrats have supported the effort to cut back on EPA regulations for the same reason.”).

statements about rulemakings. Part IV presents the methodology, findings, and analysis regarding the first hypothesized correlation; Part V presents the methodology, findings, and analysis regarding the second. Part VI further explores some other potential explanations for the initially observed trend towards longer regulations, as well as suggests areas for future study. Part VII discusses implications of the findings for courts, policymakers, and scholars. Part VIII explicitly acknowledges the limitations of this study.

#### I. PREVIOUS EMPIRICAL STUDIES OF THE ADMINISTRATIVE STATE

Other scholars have endeavored to empirically examine the changes in the regulatory state in the modern era. Cornelius Kerwin and Scott Furlong conducted a study that, like this work, attempted to demonstrate and explain a trend towards more complex regulations.<sup>14</sup> However, rather than focusing on the length of individual rules, Kerwin and Furlong chose to study the duration from proposed rule to final rule.<sup>15</sup> Specifically, they compiled data from the EPA's internal regulatory tracking system on 150 non-routine rules promulgated between October 1, 1986, and September 30, 1989.<sup>16</sup> Kerwin and Furlong then tested empirically (using proxies) some of the hypotheses prevalent in scholarship purporting to explain the variance in the passage of time from proposal to final rule.<sup>17</sup> Overall, the regression models they constructed explained

<sup>14</sup> Cornelius M. Kerwin & Scott R. Furlong, *Time and Rulemaking: An Empirical Test of Theory*, 2 J. PUB. ADMIN. RES. & THEORY 113, 130–31 (1992).

<sup>15</sup> *See id.* at 121.

<sup>16</sup> *Id.* at 122.

<sup>17</sup> Kerwin and Furlong described their methods, in part, as follows:

We sought to develop measures to capture the complexity of subject matter, as well as the legal, bureaucratic, and political constraints.

We were unable to measure directly the effects of complex subject matter on elapsed time because developing and applying objective measures proved too difficult; we used instead two admittedly crude indicators. First, we classified rules by program office to determine whether the general subject matter (e.g., air, water, or toxic substances) had any effect on elapsed time and, hence, on delay. Second, we considered the length of the rule, measured by the number of columns it occupies in the *Federal Register* . . . .

The effect of legal constraints was measured in several ways. Classifying rules by program office helped account for different procedural requirements written into authorizing statutes. We also included a measure of the potential impact of the rule—whether it was classified as major, significant, or minor—because these are associated with varying legal requirements as to the form of mandatory analyses . . . . Because of its prominence in the literature and in policy debates, we also included OMB review time as a separate independent variable . . . .

We measured in several ways bureaucratic factors that potentially influence the amount of time it takes to issue a rule. The number of participants in the rulemaking workgroup was a measure of organization complexity. . . . Finally, because the literature suggests that delay is reduced when senior agency management makes expeditious rulemaking a priority, we used an independent variable to account for creation of an agency steering committee as a mechanism for better central management of the rulemaking.

The political constraints on rulemaking, like the complexity of the subject matter, are difficult to measure with accuracy, so we again employed a surrogate: the number of public comments received on the proposed rule.

approximately half of the variance in duration of the rulemaking process—a noteworthy result.<sup>18</sup> The results confirmed empirically that the length of time for an EPA rule to go from proposed to final depends, at least to some significant extent, on such variables as: the complexity of the regulated subject, the statutory process and evidentiary requirements, the bureaucracy involved, and political pressure on the agency.<sup>19</sup> One might reasonably expect that those same factors would affect the length of a given rule, in addition to its time to promulgation.

Indeed, some of those factors are closely related to the hypotheses tested herein; for example, political pressure and statutory requirements (specifically those enshrined in the Administrative Procedure Act) directly relate to whether and how a rule would be subject to judicial review.<sup>20</sup> Other individual variables they tested seem more closely connected to internal agency time and priority management than to the length of a given rule. On a granular level, only one specific variable—the variable used to measure the attention a rule receives from high-level agency officials—proved significant in all three of Kerwin and Furlong’s models.<sup>21</sup> That finding “lends support to anecdotal reports and professional opinion regarding the positive effects on rule-making of agency-leadership attention.”<sup>22</sup> From both an intuitive and empirical perspective, the attention of agency leadership on a particular rulemaking suggests that the rule will be finalized in more timely fashion; however, one cannot say the same about the effect that the attention of leadership might have on the final rule’s length.

One important assumption underlying the hypotheses tested here is that longer regulations require more agency resources to complete. Kerwin and Furlong’s results both support and challenge that assumption. Supporting that assumption is their finding that the number of participants in work groups was not a significant predictor of the length of time from proposed to final rule, and to the extent it was related, the correlation was negative, suggesting that devoting additional full-time employees (FTEs) to a rule sped up its promulgation.<sup>23</sup>

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*Id.* at 120–21.

<sup>18</sup> *See id.* at 130 (reporting that “[t]he models used account for between 41 and 57 percent of the variance in elapsed time, and all models proved to be statistically significant.”).

<sup>19</sup> *Id.*

<sup>20</sup> *See, e.g.,* Administrative Procedure Act, 5 U.S.C. § 704 (2018) (“Agency action made reviewable by statute and final agency action for which there is no other adequate remedy in a court are subject to judicial review. A preliminary, procedural, or intermediate agency action or ruling not directly reviewable is subject to review on the review of the final agency action. Except as otherwise expressly required by statute, agency action otherwise final is final for the purposes of this section whether or not there has been presented or determined an application for a declaratory order, for any form of reconsideration, or, unless the agency otherwise requires by rule and provides that the action meanwhile is inoperative, for an appeal to superior agency authority.”).

<sup>21</sup> Kerwin & Furlong, *supra* note 14, at 131.

<sup>22</sup> *Id.*

<sup>23</sup> *See id.*

Kerwin and Furlong also tested one measure of length—number of columns in the Federal Register entry—as a predictor of duration, but did not find a statistically significant relationship.<sup>24</sup> Taken together, those findings suggest that additional resources, in the form of FTEs, could be devoted to specific rule-makings based on something other than the schedule—perhaps the length and complexity of the rule. A devotion of resources in that manner, particularly if those resources assist in moving the process along, would explain why a rule’s length is not a good predictor of the time it takes for that rule to be finalized. On the other hand, the findings with respect to the lack of a relationship between the length of a rule and duration of the process might suggest that longer rules are not necessarily more work.

A host of prominent scholars have empirically studied judicial review of administrative agency decisions.<sup>25</sup> The design of these studies informed the methods employed here. The findings of these studies, particularly with respect to the rates of reversal, prove especially relevant to the analysis of findings on the “insulation hypothesis.”<sup>26</sup> Because of these forerunners, there exists a foundation upon which to build this study. Although some of these scholars attempted to explain what drives judicial review decisions,<sup>27</sup> none of them sought to examine the potential relationship between the length of rules and the likelihood of their reversal or remand. Thus, this work fills that important gap.

<sup>24</sup> *Id.*

<sup>25</sup> See, e.g., James J. Brudney et al., *Judicial Hostility Toward Labor Unions? Applying the Social Background Model to a Celebrated Concern*, 60 OHIO ST. L.J. 1675, 1679–80 (1999); Kiki Caruson & J. Michael Bitzer, *At the Crossroads of Policymaking: Executive Politics, Administrative Action, and Judicial Deference by the DC Circuit Court of Appeals (1985–1996)*, 26 LAW & POL’Y 347, 349 (2004); Jason J. Czarnecki, *An Empirical Investigation of Judicial Decisionmaking, Statutory Interpretation, and the Chevron Doctrine in Environmental Law*, 79 U. COLO. L. REV. 767, 769 (2008); Kristin E. Hickman & Matthew D. Krueger, *In Search of the Modern Skidmore Standard*, 107 COLUM. L. REV. 1235, 1238 (2007); Martha Anne Humphries & Donald R. Songer, *Law and Politics in Judicial Oversight of Federal Administrative Agencies*, 61 J. POL. 207, 211–12 (1999); Orin S. Kerr, *Shedding Light on Chevron: An Empirical Study of the Chevron Doctrine in the U.S. Courts of Appeals*, 15 YALE J. REG. 1, 4 (1998); Thomas J. Miles & Cass R. Sunstein, *The Real World of Arbitrariness Review*, 75 U. CHI. L. REV. 761, 765–66 (2008) [hereinafter Miles & Sunstein, *Real World*]; Thomas J. Miles & Cass R. Sunstein, *Do Judges Make Regulatory Policy? An Empirical Investigation of Chevron*, 73 U. CHI. L. REV. 823, 825 (2006) [hereinafter Miles & Sunstein, *Empirical Investigation*]; Richard J. Pierce, Jr. & Joshua Weiss, *An Empirical Study of Judicial Review of Agency Interpretations of Agency Rules*, 63 ADMIN. L. REV. 515, 519 (2011); Peter H. Schuck & E. Donald Elliott, *To the Chevron Station: An Empirical Study of Federal Administrative Law*, 1990 DUKE L.J. 984, 988 (1990); David H. Willison, *Judicial Review of Administrative Decisions: Agency Cases Before the Court of Appeals for the District of Columbia, 1981–84*, 14 AM. POL. Q. 317, 318 (1986).

<sup>26</sup> See *infra* Part II (explaining the hypotheses tested in this study).

<sup>27</sup> For example, Miles and Sunstein, in both of their prominent empirical studies of judicial review of agencies, focus on determining whether politics of judges, and of administrators, have a significant effect on the outcome. See Miles & Sunstein, *Real World*, *supra* note 25, at 781; Miles & Sunstein, *Empirical Investigation*, *supra* note 25, at 869–70.



## II. GROWTH OF REGULATIONS

By the end of 2016, the Federal Register encompassed just over 97,000 pages, including over 60,000 devoted to final and proposed rules.<sup>28</sup> According to QuantGov, as of January 9, 2020, there were a total of 103,167,288 words in the Code of Federal Regulations.<sup>29</sup> These staggering numbers grow yearly, providing cannon fodder for the “regulatory reform” advocates in the popular media and the academy. However, the data present a more complicated picture.

Contrary to the contentions of some prominent scholars,<sup>30</sup> the regulatory state has not “ossified”<sup>31</sup>—at least not according to the data. Cary Coglianese first exposed the lack of empirical support for the ossification hypothesis in 2008.<sup>32</sup> Coglianese used simple data from the Code of Federal Regulations (CFR) and the Federal Register to demonstrate that “the regulatory state has increased considerably in size and impact since the establishment of the APA and subsequent reforms, including OMB review.”<sup>33</sup> According to Coglianese’s findings, the CFR has grown by a multiple of five since 1946, without demonstrating any appreciable slowdown in growth since the advent of OMB review.<sup>34</sup> In fact, he found that, in 2006, the CFR contained approximately 33 percent more pages than it did in 1980.<sup>35</sup> Coglianese also reported that from approximately 1986 to 2006, the Federal Register included “about 4,000 new rules each year.”<sup>36</sup> This work begins by updating and more closely examining this last figure.

<sup>28</sup> OFFICE OF THE FED. REGISTER, FEDERAL REGISTER & CFR PUBLICATION STATISTICS—AGGREGATED CHARTS—AGGREGATED CHARTS (2016), <https://www.federalregister.gov/uploads/2017/04/stats2016Fedreg.pdf> [<https://perma.cc/R4DP-UWZT>]. Under Section 553 of the Administrative Procedure Act, “[g]eneral notice of proposed rule making shall be published in the Federal Register,” followed by a period of public comment, before a rule issues and becomes effective (i.e., becomes a “final” rule). 5 U.S.C. § 553(b) (2018).

<sup>29</sup> The QuantGov Team, *The QuantGov Regulatory Clock*, QUANTGOV, <https://quantgov.org/charts/the-quantgov-regulatory-clock/> [<https://perma.cc/38DN-VULX>] (last visited Jan. 9, 2020).

<sup>30</sup> See, e.g., Thomas O. McGarity, *Some Thoughts on “Deossifying” the Rulemaking Process*, 41 DUKE L.J. 1385, 1385–86 (1992); Richard J. Pierce, Jr., *Rulemaking Ossification Is Real: A Response to Testing the Ossification Thesis*, 80 GEO. WASH. L. REV. 1493, 1494 (2012).

<sup>31</sup> The term “ossification” has been used by scholars over the last three decades to describe a perceived decline in regulatory activity. See Jason Webb Yackee & Susan Webb Yackee, *Testing the Ossification Thesis: An Empirical Examination of Federal Regulatory Volume and Speed, 1950–1990*, 80 GEO. WASH. L. REV. 1414, 1418 n.18 (2012) (reporting that the term “ossification” produced over 1000 hits in a search of documents in Westlaw’s Journals and Law Reviews database).

<sup>32</sup> Cary Coglianese, *The Rhetoric and Reality of Regulatory Reform*, 25 YALE J. ON REG. 85, 92 (2008) [hereinafter Coglianese, *Rhetoric and Reality*].

<sup>33</sup> *Id.* at 91.

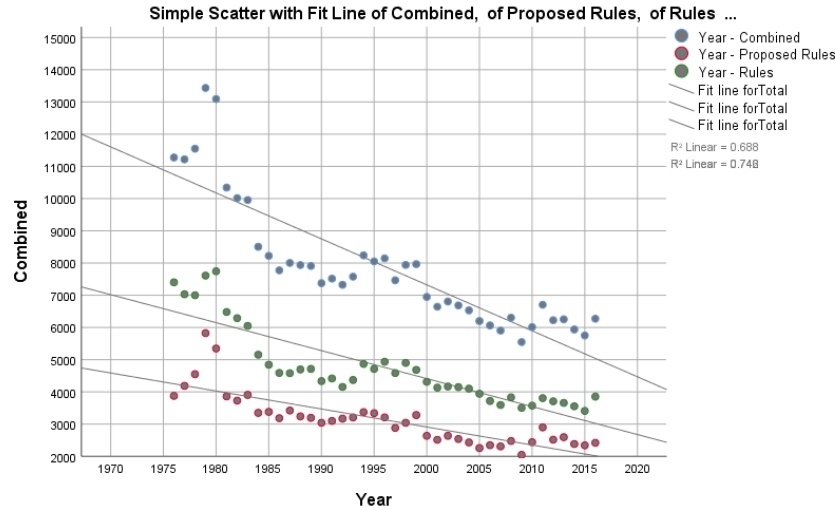
<sup>34</sup> *Id.*

<sup>35</sup> *Id.*

<sup>36</sup> *Id.*

The reported Federal Register data indicates that these large numbers are not simply the result of an increasingly active administrative state over time, at least in terms of rules proposed and finalized.<sup>37</sup> As Figure 1 shows, the number of rules added to the Federal Register each year has actually decreased over the period for which data is available.<sup>38</sup>

FIGURE 1



MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.865 <sup>a</sup>	.749	.735	6.163

a. Predictors: (Constant), Combined, Proposed Rules

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.864 <sup>a</sup>	.746	.740	6.114

a. Predictors: (Constant), Combined

The regression model presented in Figure 1 demonstrates that the year serves as a fairly strong predictor of the number of proposed and final rules added to the Federal Register. The R-square numbers indicate that the regres-

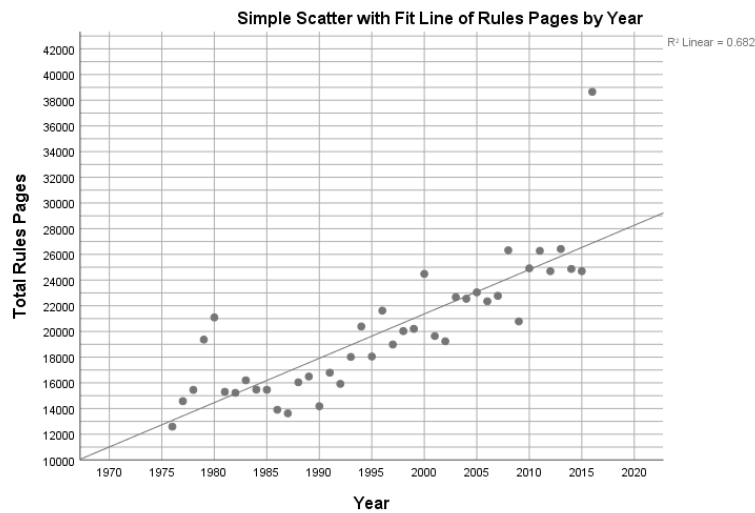
<sup>37</sup> See FEDERAL REGISTER STATISTICS, *supra* note 10.

<sup>38</sup> See *infra* Figure 1.

sion model explains almost three-quarters of the variance in the data.<sup>39</sup> That is a comparatively strong result<sup>40</sup> consistent with Coglianese's observations.<sup>41</sup>

Over that same period, the length of each rule added to the Federal Register has steadily increased.<sup>42</sup> According to the Office of the Federal Register, the number of pages devoted to rules each year in the Federal Register has actually increased, despite the decline in the number of individual rules demonstrated above.<sup>43</sup> Figure 2 presents this data graphically and again reports a statistically significant relationship, with the model accounting for approximately 68 percent of the variance.

FIGURE 2



<sup>39</sup> IBM, *R-Squared Statistics*, [https://www.ibm.com/support/knowledgecenter/en/SSLVMB\\_25.0.0/statistics\\_casestudies\\_project\\_ddita/spss/tutorials/log\\_loan\\_rsquare.html](https://www.ibm.com/support/knowledgecenter/en/SSLVMB_25.0.0/statistics_casestudies_project_ddita/spss/tutorials/log_loan_rsquare.html) [https://perma.cc/LRN9-VD4P] (last visited Jan. 6, 2020) (“In the linear regression model, the coefficient of determination,  $R^2$ , summarizes the proportion of variance in the dependent variable associated with the predictor (independent) variables, with larger  $R^2$  values indicating that more of the variation is explained by the model, to a maximum of 1. For regression models with a categorical dependent variable, it is not possible to compute a single  $R^2$  statistic that has all of the characteristics of  $R^2$  in the linear regression model, so these approximations are computed instead. The following methods are used to estimate the coefficient of determination. . . . What constitutes a ‘good’  $R^2$  value varies between different areas of application. While these statistics can be suggestive on their own, they are most useful when comparing competing models for the same data. The model with the largest  $R^2$  statistic is ‘best’ according to this measure.”).

<sup>40</sup> See Kerwin & Furlong, *supra* note 14, at 130 (describing r-squares of 41 to 57 as a “modest” results).

<sup>41</sup> See Coglianese, *Rhetoric and Reality*, *supra* note 32, at 92.

<sup>42</sup> See *infra* Figure 3.

<sup>43</sup> See FEDERAL REGISTER STATISTICS, *supra* note 10.

## MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.826 <sup>a</sup>	.682	.673	2861.565

a. Predictors: (Constant), Year

Combining the two sets of data yields an important figure for this study—the number of pages per rule.<sup>44</sup> During the 1970s, in the early years of the Environmental Protection Agency and in the midst of the social regulation era, each new final or proposed rule (across all agencies) accounted for about two Federal Register pages.<sup>45</sup> Since then, that figure has nearly quintupled to almost ten Federal Register pages for each new rule (across all agencies).<sup>46</sup> Furthermore, that pages per rule figure has been relatively, steadily increasing over time.<sup>47</sup> Figure 3 depicts these results graphically and presents a regression model quantifying the strength of the relationship between pages per rule and year of the rule's promulgation.

Interestingly, this model performs the best of the three with respect to its R-square result. Over 90 percent of the variance in pages per rule can be explained by the year that the rule was promulgated, with newer rules (i.e., higher-numbered years) comprising more pages than older rules (i.e., lower-numbered years). Again, this result confirms Coglianese's contention that the regulatory state has not ossified, but also demonstrates that the nature of individual rulemakings has changed over time.

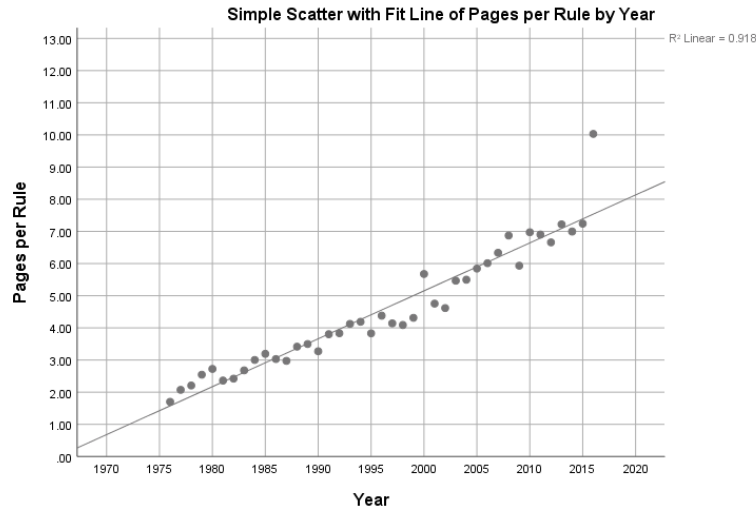
<sup>44</sup> The pages per rules figures derive from dividing the "Rules Pages" in a given Federal Register year (*see supra* Figure 2) by the number of "Final Rules" published in that same year (*see supra* Figure 1).

<sup>45</sup> *See infra* Figure 3.

<sup>46</sup> *See infra* Figure 3.

<sup>47</sup> The general phenomenon of increasing length of rules since the 1970s was first observed and remarked upon by Jerry Mashaw in 1994, and, as the data here demonstrate in more precise detail, the trend has continued in the intervening two-plus decades. *See* Jerry L. Mashaw, *Improving the Environment of Agency Rulemaking: An Essay on Management, Games, and Accountability*, 57 *LAW & CONTEMP. PROBS.* 185, 197 n.38 (1994) ("Constant or modestly increasing pages in the Federal Register rules sections combined with declining numbers of documents in those same sections lead to an obvious conclusion: the average length of documents filed with the Federal Register has been increasing from the mid 1970s until the present. Indeed, simple computation reveals that the average number of pages in the rules section of the Federal Register in 1991 as a percentage of that same average in 1975 is 218 [percent]. The parallel percentage for the proposed rules sections is 225 [percent]."). Mashaw's work set out to determine whether "policymaking by rule has become moribund or 'ossified' as some have argued" and, if so, "to reconsider the structure of agency rulemaking as a mechanism of governance, quite apart from that mechanism's substantive effects in particular instances." *Id.* at 187.

FIGURE 3



## MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.958 <sup>a</sup>	.918	.916	.54152

a. Predictors: (Constant), Year

As this foundational data demonstrates, there can be little dispute that the individual regulations all agencies have been putting in place have become wordier over time.<sup>48</sup> The empirical and logical analyses in the parts that follow reflect an effort to discern why.

<sup>48</sup> The data compiled and presented here do conflict to some degree with data presented in Anne Joseph O'Connell, *Political Cycles of Rulemaking: An Empirical Portrait of the Modern Administrative State*, 94 VA. L. REV. 889, 940 Chart 6 (2008). Specifically, O'Connell graphically presents the number of Notices of Proposed Rulemaking (NPRMs) over time as an indicator of regulatory activity. *See id.* O'Connell's data does not show a decline in NPRMs over time, which contrasts with the decline in rules and proposed rules over time reported by the Office of the Federal Register and analyzed above. *Id.* There are a few potential explanations for the discrepancy, the first of which being that NPRMs have not historically been issued for every rulemaking. The second explanation has to do with the composition of O'Connell's dataset, which she constructed using "federal agency reports in the Unified Agenda, which is published twice a year in the Federal Register, from 1983 to 2003." *Id.* at 924. These reports included agency-provided information on rulemakings, including the date of the NPRM, "the date(s) of the comment period(s), [and] the date [of] the final rule" or withdrawal. *Id.* As O'Connell herself concedes, the database "has some disadvantages" the most significant of which being that the information included in the Unified Agenda is all self-reported by the agencies. *Id.* at 927. Particularly relevant to the focus of this piece, at least one prominent scholar, Jerry Mashaw, contends that "[t]he EPA . . . does

## III. HYPOTHESES TESTED (AND UNTESTED)

As explained in brief above, the aim of this work is to test two potential explanations for crafting longer regulations: (1) “the insulation hypothesis” and (2) “the socially beneficial hypothesis.” Each of these explanations embodies a theoretically rational decision on the part of administrators allocating resources. First, the insulation hypothesis posits that it makes sense for policymakers to include more detailed legal and scientific support in new regulations, and thereby increase their length relative to previous regulations, because the additional detail provides more insulation from judicial review. In other words, more resources devoted to writing a longer rule are well spent if they better protect the rule from invalidation by a court. Second, the socially beneficial hypothesis posits that devoting relatively more resources to each new rule is appropriate because longer regulations produce more net social benefits. In other words, a new rule being twice as long as an older rule is just as efficient (in terms of the costs associated with drafting and publishing) if it is also twice as beneficial to society. The analyses that follow attempt to test these hypotheses by looking for statistically significant correlations in the data.<sup>49</sup>

The universe of possible reasons for the trend observed in Part I is much broader than the two hypotheses that this work seeks to test empirically. Many of these potential explanations, however, would prove difficult to empirically test. For example, one potential explanation for regulations increasing in length over time is that the subjects of rulemaking have become increasingly complex and sophisticated over that same time period,<sup>50</sup> necessitating more detailed regulations to prevent workarounds and reach all elements of the regulated industries. Another such difficult-to-test hypothesis would be that policymakers have become more risk averse or better educated over time. One could hypothesize that with increased risk aversion or years in higher education, rule-writers would tend towards lengthier, more complex proposals. In contrast, the insulation and socially beneficial hypotheses present two opportunities for empirical study based on the available data from court decisions and the EPA’s mandated cost-benefit analyses.

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not report any rulemaking activity that it considers insignificant [to be included in the Unified Agenda].” Mashaw, *supra* note 47, at 198 n.41. O’Connell explicitly disputes Mashaw’s account but does ultimately agree with his contention “that it is not feasible ‘for the untutored eye to discern from the reporting in the Unified Agenda . . . whether activity levels are primarily in a regulatory or deregulatory direction.’” O’Connell, *supra*, at 928 (quoting Mashaw, *supra* note 47, at 198 n.41).

<sup>49</sup> Statistical significance refers to the confidence that a correlation (positive or negative) found in the data is not the product of random variation. This work will utilize a confidence level of 95 percent to define statistical significance. See Amy Gallo, *A Refresher on Statistical Significance*, HARVARD. BUS. REV. (Feb. 16, 2016), <https://hbr.org/2016/02/a-refresher-on-statistical-significance>.

<sup>50</sup> Cf. H. Jeffrey Leonard, *Confronting Industrial Pollution in Rapidly Industrializing Countries: Myths, Pitfalls, and Opportunities*, 12 ECO. L.Q. 779, 780–81 (1985) (describing how industrialization leads to increasing complexity in sources of industrial pollution).

Still other potential explanations were not the focus of this piece due to the lack of significant implications for law and policy; though some of those potential explanations are explored briefly.<sup>51</sup> For example, one reason for longer regulations might simply be improvement in technology on which the regulations are drafted (i.e., personal and laptop computers).<sup>52</sup>

The insulation and socially beneficial hypotheses, whether proved or disproved by the data, could influence how closely courts scrutinize rules in the future and how agencies allocate their limited rulemaking resources. These are but a few of the numerous other explanations, some of which may indeed deserve study.<sup>53</sup> Nonetheless, the results testing these two explanations provide an opportunity to expand the critical conversation around regulatory reform.

The hypotheses selected here stand out as important for empirical study because they are consistent with the statements made by policymakers in promotion of new rules<sup>54</sup> and the analyses of those rules by some administrative law scholars.<sup>55</sup> Both groups tend to point to the erosion of deference by courts (i.e., the need to provide more information and support to insulate rules from judicial invalidation) and to the economic significance of new major rules (i.e., the massive net benefits of longer, more recent rules, as compared to older, shorter rules).<sup>56</sup>

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<sup>51</sup> See *infra* Part V.

<sup>52</sup> See Lois Mayer Nichols, *Pencil and Paper Versus Word Processing: A Comparative Study of Creative Writing in the Elementary School*, 29 J. RES. ON COMPUTING EDUC. 159, 160 (1996) (finding, in a study of elementary school students, that those using computers wrote compositions with significantly more words and sentences than those writing with pencil and paper).

<sup>53</sup> See *infra* Part V for some suggestions regarding future areas of study.

<sup>54</sup> See, e.g., Barack Obama, President, U.S., Remarks by the President in Announcing the Clean Power Plan (Aug. 3, 2015), <https://obamawhitehouse.archives.gov/the-press-office/2015/08/03/remarks-president-announcing-clean-power-plan> [<https://perma.cc/T2GN-FS9X>] (describing the Clean Power Plan as “a plan two years in the making, and the single most important step America has ever taken in the fight against global climate change.”).

<sup>55</sup> See, e.g., Cary Coglianese, *Empirical Analysis and Administrative Law*, 2002 U. ILL. L. REV. 1111, 1130 (2002) (describing the “ossification hypothesis, which supposes that agencies have to work harder to produce rules that will withstand judicial scrutiny.”) [hereinafter Coglianese, *Empirical Analysis*]; Sidney A. Shapiro & Richard E. Levy, *Heightened Scrutiny of the Fourth Branch: Separation of Powers and the Requirement of Adequate Reasons for Agency Decisions*, 1987 DUKE L.J. 387, 412 (1987) (analogizing the statement of basis and reasons provided by an agency in a rulemaking to judicial opinion writing, “giv[ing] a ‘reasoned elaboration’ for . . . actions according to norms of consistent, neutral and candid decisional processes.”).

<sup>56</sup> See *infra* Parts IV and V.

## IV. THE INSULATION HYPOTHESIS

## A. Introduction

The first potential correlation this work will investigate is the relationship between the length of a rule (measured in Federal Register pages) and the fate of that rule on judicial review. Such an analysis is of interest because it is now common practice in Federal Register entries for agencies to explain in painstaking detail the components of the administrative record, and even the legal analysis, supporting a particular rulemaking.<sup>57</sup> Some commentators have analogized this function of the administrative record to judicial opinion writing, which “give[s] a ‘reasoned elaboration’ for [] actions according to norms of consistent, neutral and candid decisional processes.”<sup>58</sup> It is quite possible that agencies, and their counsel, have determined that explaining the reasoning behind an agency action in the public record, rather than just before a court, makes that action less likely to be deemed “arbitrary and capricious” under the Administrative Procedure Act (APA).<sup>59</sup>

Judicial review of agency action is confined, except for a few narrow exceptions, to the administrative record.<sup>60</sup> The record includes much more than the text of the rule itself, but agencies still use the Federal Register entry for a rule to explain in detail the specific record components they are relying on. For example, when the EPA published the “endangerment finding” with respect to greenhouse gases, it stated “[t]he major assessments by the U.S. Global Climate Research Program (USGCRP), the Intergovernmental Panel on Climate Change (IPCC), and the National Research Council (NRC) serve as the primary scientific basis supporting the Administrator’s endangerment finding.”<sup>61</sup> The notice did not stop there; it included an entire section devoted to explaining why those studies “compellingly support[ed]”<sup>62</sup> the finding<sup>63</sup> and directed the reader to its “Technical Support Document (TSD)” summarizing the major assessments

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<sup>57</sup> See, e.g., Repeal of the Clean Power Plan and Revisions to Emissions Guidelines, 84 Fed. Reg. 32, 520 (July 8, 2019) (to be codified at 40 C.F.R. pt. 60) (including two separate sections heavily laden with legal analysis, one laying out the legal basis for repeal of the Clean Power Plan and another laying out the authority for the regulation of electric generating units).

<sup>58</sup> Shapiro & Levy, *supra* note 55, at 412.

<sup>59</sup> See *infra* notes 68-75 and accompanying text.

<sup>60</sup> Fla. Power & Light Co. v. Lorion, 470 U.S. 729, 744 (1985) (“If the record before the agency does not support the agency action, if the agency has not considered all relevant factors, or if the reviewing court simply cannot evaluate the challenged agency action on the basis of the record before it, the proper course, except in rare circumstances, is to remand to the agency for additional investigation or explanation.”).

<sup>61</sup> Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,497 (Dec. 15, 2009).

<sup>62</sup> *Id.*

<sup>63</sup> See *id.*



listed.<sup>64</sup> The section explaining the EPA's scientific analysis concluded with a statement emphasizing the reasonableness of the EPA's reliance on the aforementioned assessments.<sup>65</sup>

The data collected and analyzed here focus specifically on “arbitrary and capricious review” of the substance of EPA rules, as distinct from the review of the EPA's interpretation of statutory mandates pursuant to *Chevron v. Natural Resources Defense Council*.<sup>66</sup> Separating empirical analyses of cases applying these two standards of review is consistent with the approach taken by Thomas Miles and Cass Sunstein.<sup>67</sup> Not only is it empirically sound, but logically consistent with the hypothesis tested. As described above, the insulation hypothesis embodies an approach to rulemaking that justifies long and detailed rules by pointing to courts' increasingly searching inquiries into the scientific and economic rationale for those rules. The APA's “arbitrary and capricious” clause provides the basis for such review.<sup>68</sup> In contrast, the *Chevron* deference doctrine concerns the statutory authority for a given rule, rather than the rationale underlying its substance.<sup>69</sup>

Under the APA, an agency action is unlawful if it is “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.”<sup>70</sup> As the Supreme Court has noted, the reviewing court must determine whether the agency based its decision on a consideration of “the relevant factors” or whether it made “a clear error of judgment.”<sup>71</sup> Such a determination necessarily entails a “searching and careful” fact-specific inquiry, but “the ultimate standard of re-

<sup>64</sup> *Id.* at 66,497 n.1.

<sup>65</sup> *Id.* at 66,511 (“In summary, EPA concludes that its reliance on existing and recent synthesis and assessment reports is entirely reasonable and allows EPA to rely on the best available science.”).

<sup>66</sup> *Chevron U.S.A. Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837, 843–44, 862 (1984) (the Supreme Court famously laid out the boundaries of agencies' discretion in interpreting their statutory mandates and acting upon those interpretations).

<sup>67</sup> Compare Miles & Sunstein, *Real World*, *supra* note 25, at 766 (analyzing arbitrariness review), with Miles & Sunstein, *Empirical Investigation*, *supra* note 25, at 825 (analyzing the application of *Chevron* deference).

<sup>68</sup> 5 U.S.C. § 706 (2018) (“The reviewing court shall . . . hold unlawful and set aside agency action, findings, and conclusions found to be . . . arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law”).

<sup>69</sup> See *Chevron*, 467 U.S. at 843 (“The power of an administrative agency to administer a congressionally created . . . program necessarily requires the formulation of policy and the making of rules to fill any gap left, implicitly or explicitly, by Congress.” (quoting *Morton v. Ruiz*, 415 U.S. 199, 231 (1974))).

<sup>70</sup> 5 U.S.C. § 706(2)(A). The APA, as interpreted by the courts, also imposes a number of other requirements on rulemaking in § 553, including statements about legal authority, data supporting the rulemaking, an opportunity for public comment, responses to material comments, and a defense of the final rulemaking as rationale and as a logical outgrowth of the proposed rule. See *id.* § 553(b)–(c); *Weyerhaeuser Co. v. Costle*, 590 F.2d 1011, 1031 (D.C. Cir. 1978); *United States v. Nova Scotia Food Prods. Corp.*, 568 F.2d 240, 251 (2d Cir. 1977).

<sup>71</sup> *Citizens to Pres. Overton Park, Inc. v. Volpe*, 401 U.S. 402, 416 (1971) (citations omitted).

view is a narrow one.”<sup>72</sup> “The court is not empowered to substitute its judgment for that of the agency.”<sup>73</sup>

The Supreme Court has provided some much-needed context to this rather amorphous standard over the years. The most commonly cited definition, from the Court’s opinion in *Motor Vehicle Manufacturers Association of the United States v. State Farm Mutual Automobile Insurance Company*,<sup>74</sup> holds that the “arbitrary and capricious” standard is violated when:

the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.<sup>75</sup>

A number of scholars have previously conducted studies of judicial review of administrative action.<sup>76</sup> For a time, the scholarly, and political, consensus settled on a figure of 80 percent for the percentage of final rules that became the subject of judicial review.<sup>77</sup> Cary Coglianese conducted a study to challenge that conventional wisdom and ultimately concluded that only about one quarter of the EPA rules are challenged in court.<sup>78</sup> A similar study, conducted by Stephen Johnson,<sup>79</sup> limited the pool of final rules to those designated as “significant”<sup>80</sup> by the EPA between 2001 and 2005 and found that over 40 percent of

<sup>72</sup> *Id.*

<sup>73</sup> *Id.*

<sup>74</sup> *Motor Vehicle Mfrs. Ass’n of the U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29 (1983).

<sup>75</sup> *Id.* at 43.

<sup>76</sup> See *supra* text accompanying note 25.

<sup>77</sup> For a list of sources claiming that litigants challenge 80 percent of the rules that EPA issues see Cary Coglianese, *Assessing Consensus: The Promise and Performance of Negotiated Rulemaking*, 46 DUKE L.J. 1255, 1343–49 (1997). See also William D. Ruckelshaus, *Environmental Negotiation: A New Way of Winning*, Address to Conservation Foundation’s Second National Conference on Environmental Dispute Resolution (Oct. 1, 1984), cited in Lawrence Susskind & Gerard McMahon, *The Theory and Practice of Negotiated Rulemaking*, 3 YALE J. ON REG. 133, 134 (1985) (stating that almost 80 percent of the agency’s major rules were challenged while he was EPA Administrator).

<sup>78</sup> See Coglianese, *Empirical Analysis*, *supra* note 55, at 1129 (“data reveal that the actual rate is only about 26 [percent], and that even the most significant rules are subject to petitions for review only about 35 [percent] the time”).

<sup>79</sup> Stephen M. Johnson, *Ossification’s Demise? An Empirical Analysis of EPA Rulemaking from 2001–2005*, 38 ENVTL. L. 767, 768–71 (2008).

<sup>80</sup> An Executive Order dictated how the agency was to define significance:

Significant regulatory action” means any regulatory action that is likely to result in a rule that may:

(1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

them were challenged in court.<sup>81</sup> Further constraining the sample to only “economically significant”<sup>82</sup> rules, Johnson found that the percentage subject to judicial review rose to 75 percent (approaching the 80 percent consensus figure).<sup>83</sup>

Scholars have directed their attention not only to the likelihood of judicial review, but also, perhaps more importantly, to the rate at which courts reverse or remand agency action. Prior to Coglinese’s and Johnson’s works described above, Don Elliott and Peter Schuck conducted the seminal study of judicial review of agency action.<sup>84</sup> Elliott and Schuck, reviewing data from reported opinions of federal appellate courts from 1965, 1975, 1984, and 1985, found that approximately 44 percent of rulemakings succeeded on judicial review (suggesting some 56 percent of rules reviewed were reversed or remanded to the agency).<sup>85</sup> Other scholars, particularly those associated with the regulatory reform movement, often cite Elliott and Schuck’s figure as evidence of a problem.<sup>86</sup> Subsequent studies tend to support a lower rate of reversal, however. In another landmark study, Martha Humphries and Donald Songer compiled and analyzed a comprehensive database of opinions from United States Courts of Appeals from 1969 to 1988, finding a success rate of 58 percent for all agency decisions (suggesting some 42 percent of rules reviewed were reversed or re-

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(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in this Executive order.

Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Oct. 4, 1993).

<sup>81</sup> Johnson, *supra* note 79, at 785 (“Seventy percent of the significant rules that were challenged were issued under the Clean Air Act and more than 80 [percent] of the challenges were brought in the United States Court of Appeals for the District of Columbia Circuit”).

<sup>82</sup> Economically significant rules are those rules subject to more stringent Office of Management and Budget review as “significant” by virtue of “hav[ing] an annual effect on the economy of \$100 million or more or adversely affect the economy in a material way.” *Id.* at 776 (citing 58 Fed. Reg. 51,738).

<sup>83</sup> *Id.* at 785 (“Half of the challenged rules were issued under the Clean Air Act and more than 90 [percent] of the challenges were brought in the D.C. Circuit.”).

<sup>84</sup> Schuck & Elliott, *supra* note 25, at 1007. As the title of their work suggests, Elliott and Schuck focused their analysis on the effect of the *Chevron* doctrine. However, their general figures regarding success rates of agency rulemakings in federal courts remain relevant to the discussion of all standards of judicial review.

<sup>85</sup> *Id.* at 1022 (“When the 1965, 1975, and 1984–85 data for reported opinions from all agencies are combined, a systematic difference in success rates emerges: Adjudications have enjoyed a long-term success rate of 57.8 [percent] (625 of 1082 cases), compared to only 43.9 [percent] (25 of 57) for rulemakings—in other words, the success rate for rulemaking has been only three-quarters that for adjudications.”).

<sup>86</sup> See, e.g., Richard J. Pierce, Jr., *Seven Ways to Deossify Agency Rulemaking*, 47 ADMIN. L. REV. 59, 84 (1995) (citing Elliott and Schuck to support a claim that courts uphold less than 50 percent of the legislative rules under the arbitrary and capricious standard). Johnson then subsequently wrote that “most empirical studies have found courts invalidate the rules in 30 [percent]–40 [percent] of the cases.” Johnson, *supra* note 79, at 773.

manded to the agency).<sup>87</sup> More recently, Coglianese reported finding that federal appellate courts uphold the agency decision in approximately half of the cases.<sup>88</sup>

As many have noted, the success rate on judicial review can vary significantly by administrative agency.<sup>89</sup> Relevant to the analysis here, some prominent studies have focused, at least in part, on the performance of EPA decisions when subject to judicial review. A contemporary of Elliott and Schuck, David Willison, found that for EPA decisions reviewed by the Court of Appeals for the District of Columbia between 1981 and 1984, the success rate was slightly higher 59 percent.<sup>90</sup> In 1994, James Hamilton and Christopher Schroeder examined a subset of EPA rules (only those issued pursuant to the Resource Conservation and Recovery Act (RCRA))<sup>91</sup> and found that approximately 22 percent of those rules had been subject to a court remand or consent decree (meaning 78 percent survived review).<sup>92</sup> More recently, Thomas Miles and Cass Sunstein analyzed the published opinions of United States Courts of Appeals over a ten-year period from 1996 to 2006 involving review of EPA and National Labor Relations Board (NLRB) “decisions either for arbitrariness or for lack of substantial evidence.”<sup>93</sup> Miles and Sunstein found that “the overall rate of votes to validate agency decisions challenged as arbitrary is 64 percent.”<sup>94</sup> Similarly,

<sup>87</sup> Humphries & Songer, *supra* note 25, at 215.

<sup>88</sup> See Coglianese, *Empirical Analysis*, *supra* note 55, at 1129 (“After petitions for review are filed challenging EPA rules, only about 29 [percent] of them ever result in a decision of an appellate panel. Voluntary settlement, it turns out, is a common means of disposing of judicial review litigation. Moreover, in those cases that do result in judges’ decisions on the merits, in at least half of the cases the agency decision is upheld entirely.”).

<sup>89</sup> See, e.g., Bradley C. Canon & Michael Giles, *Recurring Litigants: Federal Agencies Before the Supreme Court*, 25 W. POL. Q. 183, 184 (1972) (reporting that agency success rates before the Supreme Court range from 56 percent to 91 percent); Donald W. Crowley, *Judicial Review of Administrative Agencies: Does the Type of Agency Matter?*, 40 W. POL. Q. 265, 271 (1987) (finding that agencies classified as “economic” have a 79 percent success rate versus a 68 percent success rate for those classified as “social”); Roger Handberg, *The Supreme Court and Administrative Agencies: 1965–1978*, 6 J. CONTEMP. L. 161, 168 (1979) (reporting similar agency success rates ranging from 55 percent to 91 percent); Reginald S. Sheehan, *Administrative Agencies and the Court: A Reexamination of the Impact of Agency Type on Decisional Outcomes*, 43 W. POL. Q. 875, 880 (1990) (reporting no significant overall difference in success rates for “economic” and “social” agencies, but finding significant variation depending on the classification of “social” agencies’ decisions as “liberal” or “conservative”).

<sup>90</sup> David H. Willison, *supra* note 25, at 321.

<sup>91</sup> 42 U.S.C. § 6901 (1994).

<sup>92</sup> See James T. Hamilton & Christopher H. Schroeder, *Strategic Regulators and the Choice of Rulemaking Procedures: The Selection of Formal vs. Informal Rules in Regulating Hazardous Waste*, 57 LAW & CONTEMP. PROBS. 111, 153 (1994).

<sup>93</sup> Miles & Sunstein, *Real World*, *supra* note 25, at 766.

<sup>94</sup> *Id.* at 767. This validation rate is the same as the rate they previously observed for courts’ deference to agencies under *Chevron*. See Miles & Sunstein, *Empirical Investigation*, *supra* note 25, at 825, 849 (analyzing 183 federal appellate cases reviewing EPA interpretations of statutes and finding that judges deferred to the agency 64 percent of the time).

Jason Czarnezki, analyzing ninety-three appellate cases decided between 2003 and 2005, found an affirmance rate of 69 percent for the EPA's decisions.<sup>95</sup> The dataset of EPA rules and cases reviewing them, from 1972 to the present, constructed for this study was generally consistent with these prior findings, showing an overall success rate of approximately 55 percent.<sup>96</sup>

Though Cary Coglianese and others have drilled down further and interpreted the available data as indicative of a judicial review process that is less impactful than generally assumed,<sup>97</sup> policymakers, and this work, remain rightly concerned about the roughly 40 percent of cases that result in rules being remanded or invalidated.<sup>98</sup> More specifically, EPA administrators would like 100 percent of the rules they finalize to survive judicial review unscathed, rather than have to deal with fixing, or completely reworking, a third of them.<sup>99</sup> Remand or invalidation means extra work on the back end for the agency, and if it could be avoided by including more support and/or information on the front end, that would be a rational response.

### B. Methodology

This analysis relied on a dataset based on 131 EPA rules from 1973 to 2017 that were subject to judicial review in one of the United States Courts of Appeals or the United States Supreme Court. The data were extracted from the rules themselves and the opinions reviewing them. That dataset was constructed by first identifying, via a search query in LexisNexis,<sup>100</sup> United States Courts of Appeal and Supreme Court cases wherein EPA rules were mentioned alongside arbitrary and capricious review. Those search results were then individually screened to create the dataset of 131 cases that actually involved arbitrary and capricious review of the EPA rule(s) referenced in the opinion (as opposed to cases disposed of on other grounds, such as *Chevron* deference,<sup>101</sup> or cases involving rules from other administrative agencies). The opinions from the culled list comprised the first half of the source data. From the list of cases

<sup>95</sup> Czarnezki, *supra* note 25, at 769, 782–84.

<sup>96</sup> Data is a result of a study conducted by author and on file with the author.

<sup>97</sup> See Coglianese, *Empirical Analysis*, *supra* note 55, at 1129–30.

<sup>98</sup> Johnson, *supra* note 79, at 773 (“When agencies’ rules are challenged in court, most empirical studies have found courts invalidate the rules in 30 [percent] [to] 40 [percent] of the cases.”); *id.* at 768–69 (“commentators frequently reference . . . studies that have found agency rules are invalidated in 30 [percent] [to] 50 [percent] of the cases in which they are challenged.”). A simple average of the figures reported in the studies mentioned here yields a reversal rate of 38 percent. See *supra* text accompanying notes 86–9688.

<sup>99</sup> A simple average of the figures for review of EPA decisions discussed here yields a reversal rate of 32.5 percent. See *supra* text accompanying notes 91–96.

<sup>100</sup> The specific query searched the LexisAdvance database of published Federal Courts of Appeal and United States Supreme Court opinions for the following terms in combination: “EPA” and “rule” and “arbitrary and capricious.” The search returned 1,529 opinions that satisfied the parameters (search results on file with author).

<sup>101</sup> See *supra* notes 94–95 and accompanying text.

a list of the rules subject to review in those cases was produced. The Federal Register entries for those rules comprised the second half of the source data.

The opinions included within the source data were then coded on a binary dimension indicating that the EPA rule subjected to arbitrary and capricious review was either: (1) upheld or (2) reversed or remanded to the agency.<sup>102</sup> That binary coding comprised one half of the data necessary to perform a statistical analysis. The page count for each of the Federal Register entries for the identified rules comprised the other half of the data necessary to test the insulations hypothesis.

Statistical analysis was then performed using IBM SPSS Statistics software.<sup>103</sup> Specifically, two partial correlation and two simple regression analyses<sup>104</sup> were performed on the dataset and a subset of the dataset, as well as descriptive statistical analyses for both the complete dataset and the selected subset. The partial correlation analyses performed produced the zero-order correlations (correlations without any control variables) between the year of the final rule, the pages in that rule's Federal Register entry, and whether that rule was upheld on judicial review; the analyses also produced the partial correlation of the pages in that rule's Federal Register entry with whether that rule was upheld on judicial review (controlling for the year the rule was promulgated).<sup>105</sup> The descriptive statistics revealed, among other things, the means, medians, and standard deviations for Federal Register pages. The boxplots produced with those descriptive statistics allowed for the identification, and subsequent removal, of outliers. After the outliers were removed from both the complete dataset and the selected subset, the partial correlation and regression analyses were re-run, producing a second set of results for each.

### C. Results

Table 1 provides the results testing for partial correlations on the entire dataset of EPA rules between the pages in a rule's Federal Register entry, whether that rule was upheld on judicial review, and the year of the final rule. The results show both zero-order correlations and correlations controlling for the year of the final rule.

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<sup>102</sup> In the dataset, a code "2.0" indicated a rule being upheld, while a code "1.0" indicated a rule being reversed or remanded.

<sup>103</sup> IBM SPSS Statistics, Version 25.0 (2017).

<sup>104</sup> Correlation analysis identifies the association (magnitude and direction) between two variables, or the absence of a significant association. *See* Introduction to Correlation and Regression Analysis, BOSTON U. SCH. PUB. HEALTH, [http://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/BS704\\_Multivariable/BS704\\_Multivariable5.html](http://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/BS704_Multivariable/BS704_Multivariable5.html) (last visited Jan. 27, 2020). Regression analysis generates a model meant to predict the value of one variable based on the known value of the other. *See* Gallo, *supra* note 50.

<sup>105</sup> Controlling for the year was necessary to ensure that the strong, positive linear relationship between year and rule length, observed in the larger dataset and reported *supra*, did not influence the results in testing the insulation hypothesis.

TABLE 1: CORRELATIONS

Control Variables			Number of Pages in Final Rule Fed. Reg. Entry?	Reverse	Year (Final Rule)
-None <sup>a</sup>	Number of Pages in Final Rule Fed. Reg. Entry?	Correlation	1.000	-.101	.258
		Significance (2-tailed)	.	.251	.003
		df	0	129	129
	Reverse/Remand	Correlation	-.101	1.000	.101
		Significance (2-tailed)	.251	.	.249
		df	129	0	129
	Year (Final Rule)	Correlation	.258	.101	1.000
		Significance (2-tailed)	.003	.249	.
		df	129	129	0
Year (Final Rule)	Number of Pages in Final Rule Fed. Reg. Entry?	Correlation	1.000	-.132	
		Significance (2-tailed)	.	.134	
		df	0	128	
	Reverse/Remand	Correlation	-.132	1.000	
		Significance (2-tailed)	.134	.	
		df	128	0	

a. Cells contain zero-order (Pearson) correlations.

The zero-order correlation between the number of Federal Register pages a rule comprises and its fate on judicial review is both very low (-0.101) and not statistically significant ( $p = 0.251$ ). Furthermore, the sign of the correlation (negative) is the opposite of hypothesized; a significant negative correlation would indicate that shorter rules enjoy more success when subjected to arbitrariness review. The partial correlation is only slightly different (-0.132) and, though closer to significance, still falls short ( $p = 0.134$ ). The slight change from the zero-order correlation is due to the positive correlations between the year and both the number of pages in a rule and a rule's resilience to judicial review.

Table 2 provides the summary results for a regression analysis, which sought to determine whether the number of Federal Register pages was a good predictor of whether a rule was upheld on judicial review.

TABLE 2: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.101 <sup>a</sup>	.010	.003	.49881

a. Predictors: (Constant), Number of Pages in Final Rule Fed. Reg. Entry?

The low R-square result (0.010) indicates that the regression model only explains 1 percent of the variance in the data. Coupled with the lack of a statistically significant correlation, these initial findings suggest that no relationship exists between the length of a rule and its fate on judicial review. Put simply, this finding does not support the insulation hypothesis.

In order to determine whether the data were skewed by outliers (particularly lengthy rules that were overturned or particularly short rules that were upheld), it is useful to examine the descriptive statistics for the data set. Table 3 presents the mean and median number of pages for two groups of rules—those that were reversed or remanded and those that were upheld. Figure 4 presents box plots of these groups.

The simple descriptive results are revealing. Both the mean (63.5 pages versus 52.0 pages) and the median (53.0 pages versus 44.5 pages) figures were slightly higher for the group of reversed or remanded rules than the group of upheld rules. That is consistent with the weak negative correlation reported above and inconsistent with the insulation hypothesis. Figure 4 reveals a total of seven outliers (five in the upheld group and two in the reversed or remanded group).

TABLE 3: DESCRIPTIVES

		Reverse	Statistic	Std. Error	
Number of Pages in Final Rule Fed. Reg. Entry?	Reversed or Remanded	Mean	63.51	7.318	
		95% Confidence Interval for Mean	Lower Bound	48.86	
			Upper Bound	78.16	
		5% Trimmed Mean	58.24		
		Median	53.00		
		Variance	3159.392		
		Std. Deviation	56.208		
		Upheld	Mean	52.01	6.748
	95% Confidence Interval for Mean		Lower Bound	38.56	
			Upper Bound	65.47	
	5% Trimmed Mean		44.53		
	Median		33.50		
	Variance		3278.577		
	Std. Deviation	57.259			



FIGURE 4

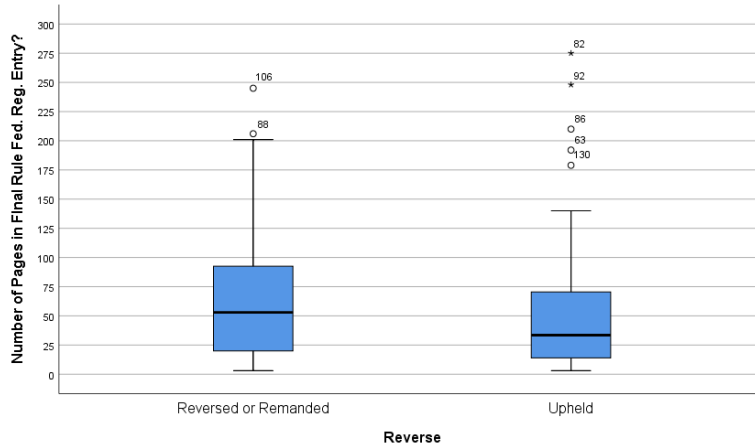


Table 4 presents the partial correlation results for the dataset with the seven identified outliers removed.

TABLE 4: CORRELATIONS

Control Variables			Number of Pages in Final Rule Fed. Reg. Entry?	Reverse	Year (Final Rule)
-None <sup>a</sup>	Number of Pages in Final Rule Fed. Reg. Entry?	Correlation	1.000	-.222	.257
		Significance (2-tailed)	.	.013	.004
		df	0	122	122
	Reverse/Remand	Correlation	-.222	1.000	.093
		Significance (2-tailed)	.013	.	.305
		df	122	0	122
	Year (Final Rule)	Correlation	.257	.093	1.000
		Significance (2-tailed)	.004	.305	.
		df	122	122	0
Year (Final Rule)	Number of Pages in Final Rule Fed. Reg. Entry?	Correlation	1.000	-.255	
		Significance (2-tailed)	.	.004	
		df	0	121	
	Reverse/Remand	Correlation	-.255	1.000	
		Significance (2-tailed)	.004	.	
		df	121	0	

a. Cells contain zero-order (Pearson) correlations.

With the outliers excluded, a different statistical picture emerges. The zero-order correlation between the number of Federal Register pages a rule comprises and its fate on judicial review is now slightly more substantial (-0.222) and, more importantly, statistically significant ( $p = 0.013$ ). However, the sign of the correlation (negative) remains the opposite of hypothesized, indicating that a significant inverse relationship exists between the number of pages in a rule and whether that rule survives judicial review. In other words, at least for the rules in the dataset, shorter rules, rather than longer rules, were upheld more often. The partial correlation shows the same directionality with a slightly stronger (-0.255) and more statistically significant ( $p = 0.004$ ) effect. The change from the zero-order correlation can be explained by the removal of the positive correlations between the year and both the number of pages in a rule and a rule's resilience to judicial review, which would tend to soften or counteract the observed negative correlation.

Table 5 provides the summary results for a regression analysis with the outliers excluded. Again, the regression attempts to model whether the number of Federal Register pages was a good predictor of whether a rule was upheld on judicial review.

TABLE 5: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.222a	.049	.041	.48991

a. Predictors: (Constant), Number of Pages in Final Rule Fed. Reg. Entry?

Interestingly, despite the significant negative correlations reported above, the regression model cannot explain a large percentage of the variance in the data. Indeed, the R-squared result indicates that the model explains less than 5 percent of the variance. Taken together these results suggest that although shorter rules tended to enjoy more success when reviewed by courts, the length of a given rule is not a particularly accurate predictor of whether or not it will survive judicial review. Logically, this result makes sense. A particularly accurate regression model based on a negative correlation would suggest that policymakers could better insulate their decisions from judicial review by explaining them less fully. Put another way: the statistically significant negative correlation simply disproves the insulation hypothesis, while a strong R-squared regression model would provide evidence for a directly opposite hypothesis.

Examining the dataset of 131 rules more closely, one finds that a substantial subset of them (31) are rules merely approving or disapproving of State Implementation Plans (SIPs) under the Clean Air Act's National Ambient Air Quality Standards (NAAQS) program.<sup>106</sup> There is reason to suspect that these

<sup>106</sup> 42 U.S.C. § 7409 (2018); Data on file with author.

rules may be skewing the sample. Such SIP rules tend to be shorter: the mean length of the thirty-one rules in the dataset that promulgated approvals (or disapprovals) of SIPs was twenty-four pages, whereas the mean length of the remaining one hundred rules in the dataset was sixty-seven pages.<sup>107</sup> SIP rules tend to be upheld by United States Courts of Appeal: of the thirty-one rules in the dataset that promulgated approvals (or disapprovals) of SIPs, twenty-one (67.7 percent) were upheld, whereas of the remaining one hundred rules, only fifty-one (51.0 percent) were upheld.<sup>108</sup>

Table 6 presents the partial correlation results for the subset of rules not related to SIP approvals. Again, the correlations tested were between the pages in a rule's Federal Register entry, whether that rule was upheld on judicial review, and the year of the final rule. Table 7 provides the summary results for a regression analysis, which sought to determine whether the number of Federal Register pages was a good predictor of whether a rule was upheld on judicial review.

TABLE 6: CORRELATIONS

Control Variables			Number of Pages in Final Rule Fed. Reg. Entry?	Reverse/Remand	Year (Final Rule)
-None <sup>a</sup>	Number of Pages in Final Rule Fed. Reg. Entry?	Correlation	1.000	-.070	.383
		Significance (2-tailed)	.	.486	.000
		df	0	98	98
	Reverse/Remand	Correlation	-.070	1.000	.109
		Significance (2-tailed)	.486	.	.281
		df	98	0	98
	Year (Final Rule)	Correlation	.383	.109	1.000
		Significance (2-tailed)	.000	.281	.
		df	98	98	0
Year (Final Rule)	Number of Pages in Final Rule Fed. Reg. Entry?	Correlation	1.000	-.122	
		Significance (2-tailed)	.	.228	

<sup>107</sup> Data is a result of a study conducted by author and on file with author.

<sup>108</sup> Comparing these affirmance rates with those reported by prior studies, see *supra* notes 85–98 and accompanying text, both figures are within the range of reported results. The 51.0 percent affirmance figure is more consistent with the average of all the studies (reversal rate of 46 percent), whereas the 67.7 percent affirmance figure is very consistent with the average of the EPA-specific studies (reversal rate of 32.5 percent).

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		df	0	97	
	Reverse/Remand	Correlation	-.122	1.000	
		Significance (2-tailed)	.228	.	
		df	97	0	

a. Cells contain zero-order (Pearson) correlations.

TABLE 7: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.070 <sup>a</sup>	.005	-.005	.50372

a. Predictors: (Constant), Number of Pages in Final Rule Fed. Reg. Entry?

Comparing the results for this subset of the data to the results for the entire dataset reported above, there is little remarkable difference. As expected, (due to the relatively higher rate of affirmance and short length of the SIP-related rules removed to form the subset) the magnitude of the negative correlations both for zero-order and partial correlations was diminished. Importantly for the robustness of this study's findings, the sign did not change, indicating that the observed negative correlation was not simply a result of the SIP-related rule-makings skewing the data. The regression analysis also did not change significantly; in fact, with the SIP-related rulemakings removed, the R-squared result actually marginally increased.

To complete a thorough analysis, the subset was also subjected to the same descriptive statistics workup as the entire dataset above. Table 8 presents the mean and median number of pages for two groups of rules within the subset—those non-SIP-related rules that were reversed or remanded and those that were upheld. Figure 5 presents box plots of these groups.

TABLE 8: DESCRIPTIVES

		Reverse Remand		Statistic	Std. Error
Number of Pages in Final Rule Fed. Reg. Entry?	Reversed or Remanded	Mean		71.88	8.254
		95% Confidence Interval for Mean	Lower Bound	55.28	
			Upper Bound	88.47	
		5% Trimmed Mean		67.34	
		Median		75.00	
		Variance		3338.193	
		Std. Deviation		57.777	
	Upheld	Mean		63.47	8.714

95% Confidence Interval for Mean	Lower Bound	45.97	
	Upper Bound	80.97	
5% Trimmed Mean		56.19	
Median		40.00	
Variance		3872.414	
Std. Deviation		62.229	

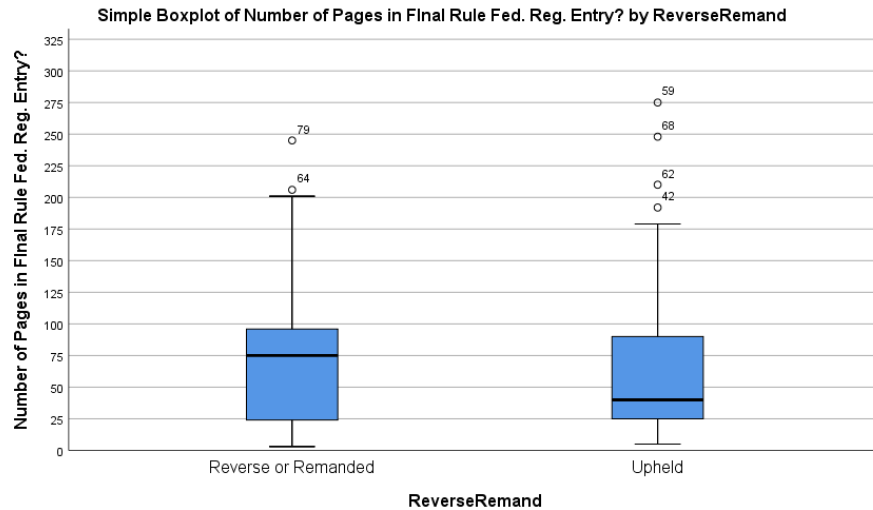


FIGURE 5

Despite removing the SIP-related rules from both groups, the mean (71.9 pages versus 63.5 pages) and the median (75.0 pages versus 40.0 pages) figures remained higher for the group of reversed or remanded rules than the group of upheld rules. Again, that is consistent with the weak negative correlation reported above and inconsistent with the insulation hypothesis. Figure 5 reveals a total of six outliers (four in the upheld group and two in the reversed or remanded group).

Table 9 presents the partial correlation results for the most refined subset of the data tested (excluding SIP-related rules and excluding outliers within that subset). Table 10 presents the regression analysis results for that same stylized subset.

TABLE 9: CORRELATIONS

Control Variables			Number of Pages in Final Rule Fed. Reg. Entry?	Reverse/Remand	Year (Final Rule)
-None <sup>a</sup>	Number of Pages in Final Rule Fed. Reg. Entry?	Correlation	1.000	-.183	.405
		Significance (2-tailed)	.	.078	.000
		df	0	92	92
	Reverse/Remand	Correlation	-.183	1.000	.098
		Significance (2-tailed)	.078	.	.347
		df	92	0	92
	Year (Final Rule)	Correlation	.405	.098	1.000
		Significance (2-tailed)	.000	.347	.
		df	92	92	0
Year (Final Rule)	Number of Pages in Final Rule Fed. Reg. Entry?	Correlation	1.000	-.244	
		Significance (2-tailed)	.	.018	
		df	0	91	
	Reverse/Remand	Correlation	-.244	1.000	
		Significance (2-tailed)	.018	.	
		df	91	0	

a. Cells contain zero-order (Pearson) correlations.

TABLE 10: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.183a	.033	.023	.49690

a. Predictors: (Constant), Number of Pages in Final Rule Fed. Reg. Entry?

Unlike the results for the complete dataset, the negative zero-order correlation did not become significant when the outliers were removed. However, a significant and stronger negative partial correlation (-0.244,  $p = 0.018$ ) again emerged once the positive correlation with the year was controlled for. The duplication of this significant result in the subset of data that excludes the potentially abnormal SIP-related rules adds support to the findings from the complete dataset, which invalidated the insulation hypothesis. The regression analysis on the subset with outliers excluded also produced similar results to the regression

analysis on the complete dataset with outliers excluded. The regression model still cannot explain a large percentage of the variance in the data in the subset. Here, the R-squared result indicates that the model explains less than 4 percent of the variance.

Overall, the results of these analyses taken together disprove the insulation hypothesis. Among the rules in the dataset, and among the rules in the tested subset, the length of a rule was not positively related to its treatment by the courts on judicial review. Indeed, once the outliers were removed, a significant negative relationship emerged. However, that negative relationship could not form the basis of a useful predictive model. One ultimately must conclude that no useful relationship exists between a rule's length and whether a court decides to reverse or remand it when subjecting it to arbitrary and capricious review. Thus, an administrator directing his or her staff to write more in every rule cannot rationally justify that deployment of resources on the basis of threatened judicial review.

In 2010, David Zaring helpfully aggregated and compared many of the above-referenced prior studies of judicial review.<sup>109</sup> His literature review provides important context for this study's results. Zaring's graphical presentation of the observed rates of success on judicial review over time suggests the lack of a significant relationship between the year of judicial review and the outcome of that review.<sup>110</sup> Because of the strong positive correlation between years and pages, if the insulation hypothesis held true, one would expect to see the observed judicial review success rate increase over time. Zaring's analysis does not show such a trend and thus provides some additional evidence against the insulation hypothesis and consistent with the results here.

#### D. Anecdotal Examples

Behind the empirical results lie some interesting and illuminating comparisons of individual cases dealing with rules pertaining to similar subjects. Two rules concerning gasoline additives provide a simple illustration that anecdotally supports the empirical findings and cuts against the hypothesis that the increased length of environmental regulations is a necessary reaction to more searching judicial inquiry, rather than a product of overzealous risk aversion. In 1973, the EPA finalized a "Regulation of Fuels and Fuel Additives" that was the first control of lead added to gasoline.<sup>111</sup> The Federal Register entry for the final rule was eight pages.<sup>112</sup> The rule was upheld by the D.C. Circuit in *Ethyl Corp. v. EPA*.<sup>113</sup> Twenty-five years later, the EPA promulgated another "Regu-

<sup>109</sup> David Zaring, *Reasonable Agencies*, 96 VA. L. REV. 135, 135 (2010).

<sup>110</sup> *Id.* at 172.

<sup>111</sup> Regulation of Fuels and Fuel Additives: Control of Lead Additives in Gasoline, 38 Fed. Reg. 33,734 (Dec. 6, 1973).

<sup>112</sup> *Id.* at 33,734-41.

<sup>113</sup> *Ethyl Corp. v. EPA*, 541 F.2d 1, 12 n.15, 55 (D.C. Cir. 1976) (en banc).

lation of Fuels and Fuel Additives” that was subject to judicial review.<sup>114</sup> The Federal Register entry for that rule, setting baseline requirements for foreign-produced gasoline, was thirty-six pages (more than four times longer).<sup>115</sup> That rule was upheld by the D.C. Circuit in *George E. Warren Corp. v. EPA*.<sup>116</sup> The fact that the latter rule was significantly longer could not have been a response to the review of the earlier rule. Both rules successfully survived judicial review, despite the disparity in length.

A set of cases dealing with Prevention of Significant Deterioration (PSD) regulations under the Clean Air Act’s NAAQS program<sup>117</sup> tell a similar story. The first set of PSD rules,<sup>118</sup> promulgated in 1974 and 1975, were challenged in *Sierra Club v. Environmental Protection Agency*.<sup>119</sup> The D.C. Circuit “[found] no ground on which to disturb the regulations under review, and . . . therefore affirm[ed] the EPA ‘Prevention of Significant Air Quality Deterioration’ regulations.”<sup>120</sup> The regulations totaled nineteen pages.<sup>121</sup>

The EPA updated and expanded upon those PSD regulations multiple times over the years since their initial promulgation, including in 2002.<sup>122</sup> Those regulations totaled 105 Federal Register pages, more than five times the length of the 1970s PSD rules.<sup>123</sup> Nonetheless, the D.C. Circuit found that “two aspects of the 2002 rule rest[ed] on impermissible interpretations of the Act and a third [was] arbitrary and capricious.”<sup>124</sup> The arbitrary and capricious component of the rule exempted sources undergoing changes from recordkeeping requirements if those sources themselves determined that the changes could not reasonably qualify as “modifications” for permitting purposes.<sup>125</sup> The court found that the EPA had failed to provide a reasoned explanation for its inclusion of

<sup>114</sup> Regulation of Fuels and Fuel Additives: Baseline Requirements for Gasoline Produced by Foreign Refiners, 62 Fed. Reg. 45,533 (Aug. 28, 1997).

<sup>115</sup> *Id.* at 45,533–68.

<sup>116</sup> *George E. Warren Corp. v. EPA*, 159 F.3d 616, 629 (D.C. Cir. 1998).

<sup>117</sup> 42 U.S.C. § 7409 (1977).

<sup>118</sup> Final PSD regulations were published December 5, 1974, (Approval and Promulgation of Implementation Plans: Prevention of Significant Air Quality Deterioration, 39 Fed. Reg. 42,510 (Dec. 5, 1974)), and were amended slightly on January 16, 1975 (Approval and Promulgation of Implementation Plans: Prevention of Significant Air Quality Deterioration; Correction, 40 Fed. Reg. 2,802 (Jan. 16, 1975)), June 12, 1975 (Approval and Promulgation of Implementation Plans: Prevention of Significant Air Quality Deterioration, 40 Fed. Reg. 25,004 (June 12, 1975)), and Sept. 10, 1975 (Approval and Promulgation of Implementation Plans: Prevention of Significant Air Quality Deterioration, 40 Fed. Reg. 42,011 (Sept. 10, 1975)).

<sup>119</sup> *Sierra Club v. EPA*, 540 F.2d 1114, 1119–20 (D.C. Cir. 1976).

<sup>120</sup> *Id.* at 1140.

<sup>121</sup> See Final PSD Regulations, *supra* note 119.

<sup>122</sup> Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR), 67 Fed. Reg. 80,189–90 (Dec. 31, 2002).

<sup>123</sup> Compare *id.*, with PSD Regulations, *supra* note 118.

<sup>124</sup> *New York v. EPA*, 413 F.3d 3, 10 (D.C. Cir. 2005).

<sup>125</sup> *Id.* at 11.



the aforementioned exemption, despite publishing a rule of more than 100 Federal Register pages.<sup>126</sup>

These stories reflect just two pairs of rules and cases that exemplify the empirical results. It is likely that others tell supporting (and conflicting) stories; however, when aggregated, the cases in the sample demonstrate a significant negative correlation that disproves the insulation hypothesis. The anecdotal evidence adds some weight to that conclusion, but, more importantly, it presents a picture of how and why the number of pages in a final rule is not a good predictor of that rule's fate when subjected to arbitrariness review.

## V. THE SOCIALLY BENEFICIAL HYPOTHESIS

### A. Introduction

The second potential correlation this piece will investigate is the relationship between the number of words in a rule and the quantified net benefits of that rule. At least since President Reagan issued Executive Order 12,291 in 1981,<sup>127</sup> agencies have been required to provide cost-benefit analyses for "major rules" to the Office of Management and Budget.<sup>128</sup> Scholars have long pointed to this command itself as a cause of the purported ossification of rule-making activity.<sup>129</sup> No study as of yet has examined whether the content of those cost-benefit analyses reveals anything about the pattern of rulemaking in

<sup>126</sup> *Id.* ("The agency failed to provide a reasoned explanation for how, absent such records, it can ensure compliance with NSR.")

<sup>127</sup> Exec. Order No. 12,291, 46 Fed. Reg. 13,193 (Feb. 17, 1981). President Clinton issued Executive Order No. 12,866 in 1993, reaffirming and further clarifying this requirement. *See* Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993).

<sup>128</sup> Defined as:

any regulation that is likely to result in: (1) An annual effect on the economy of \$100 million or more; (2) A major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions; or (3) Significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

Exec. Order No. 12,291, 46 Fed. Reg. 13,193. (Feb. 17, 1981). President Clinton's Executive Order No. 12,866 applied the cost-benefit analysis requirement to "significant regulatory action," a category which, though very similar, also included any rule that may "[r]aise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive order." *See* Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993).

<sup>129</sup> *See, e.g.,* Coglianese, *Rhetoric and Reality*, *supra* note 32, at 88 ("When President Reagan first established formal White House review of rulemaking under E.O. 12,291, critics raised separation of powers questions, but they also complained that OMB review would impede agencies' ability to make new regulations."); Alan B. Morrison, *OMB Interference with Agency Rulemaking: The Wrong Way to Write a Regulation*, 99 HARV. L. REV. 1059, 1064 (1986) ("OMB control imposes costly delays that are paid for through the decreased health and safety of the American public."); Pierce, *supra* note 86, at 62 ("The executive branch has contributed to ossification through the direct and indirect effects of the Office of Management and Budget's (OMB's) methods of implementing Executive Order 12,291.")

this country. The empirical analysis herein presents an effort to at least begin to fill that gap.

Independent of the relationship between a rule's projected benefits (or costs) and its length, some empirical evaluation of the reported costs of rules over time has been conducted. One study examined annual compliance costs associated with environmental regulations from 1972 to 1990 and reported that they have grown steadily on an absolute basis and as a percentage of gross national product.<sup>130</sup> Cary Coglianese has also written of the existence of a similar trend based on reports from the Office of Management and Budget.<sup>131</sup> These studies essentially contend that regulations have become increasingly costly to regulated parties and to society. However, the costs of regulations only reflect one-half of the relevant cost-benefit equation. The analyses below rely on net cost-benefit figures reported by the EPA to determine whether there is a statistically significant relationship between those figures and the length of rules.

The results of this analysis could prove useful in assessing the cost-effectiveness of the modern administrative state, using the number of words in a Federal Register entry as a proxy for the amount of work federal government employees devoted to crafting the associated rule. If regulations that have required more work have also produced more net benefits, there should be no cause for concern.

### B. Methodology

This analysis relied on a dataset comprised of information pertaining to rules for which numerical cost-benefit analyses were readily available. That dataset was constructed by first finding a publicly available repository of Regulatory Impact Analyses (RIAs) produced by the EPA since 1981.<sup>132</sup> That repository included RIAs for fifty-one final rules promulgated pursuant to the Clean Air Act; of those fifty-one RIAs, forty included numerical cost-benefit analyses and thus formed the basis of the dataset.<sup>133</sup> That subset of RIAs provided the first half of the source data. From the RIAs themselves a list of the rules they analyzed was produced. The Federal Register entries for those rules comprised the second half of the source data.

Cost, benefit, and net figures for each regulation were then drawn from the RIAs included within the source data. Because the EPA often included a range of estimates in each RIA for costs and benefits (tying different estimates to dif-

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<sup>130</sup> Adam B. Jaffe et al., *Environmental Regulation and the Competitiveness of U.S. Manufacturing: What Does the Evidence Tell Us?*, 33 J. ECON. LITERATURE 132, 140 (1995).

<sup>131</sup> Coglianese, *Rhetoric and Reality*, *supra* note 32, at 91 (citing OFFICE OF MGMT. & BUDGET, DRAFT 2007 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS 34 (2007)).

<sup>132</sup> *Regulatory Impact Analyses for Air Pollution Regulations*, EPA, <https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/regulatory-impact-analyses-air-pollution> [<https://perma.cc/YQ54-W7Q4>] (last visited Jan. 6, 2020).

<sup>133</sup> Data is a result of a study conducted by the author and on file with the author.

ferent scenarios), the data collected was limited to the highest and lowest absolute values for each parameter—costs, benefits, and net.<sup>134</sup> These figures comprised one-half of the data necessary to perform the statistical analyses. The Federal Register entries for the identified rules yielded page counts, and freely available word-counting software was used to produce a word count for each of the Federal Register entries. The resulting page and word count figures comprised the other half of the source data. The high and low estimates of net benefits (or costs) for each rule was divided by the number of words in that rule to produce high and low estimates of benefits (or costs) per word for each rule-making.

Finally, statistical analysis was performed using IBM SPSS Statistics software.<sup>135</sup> Again, the first test performed was a partial correlation, producing the zero-order correlations (correlations without any control variables) between the year of the final rule, the highest net benefit (or cost) estimate for that rule, the lowest net benefit (or cost) estimate for that rule, and the number of words in that rule's Federal Register entry; the analyses also produced the partial correlation of the words in that rule's Federal Register entry with the high and low estimates of net benefits (or costs) (controlling for the year the rule was promulgated).<sup>136</sup> A regression analysis was performed to determine whether the number of words in a Federal Register entry was a significant predictor of the high estimate of a rule's net benefits. From the scatterplot associated with that regression analysis, one outlier was identified and removed. The partial correlation and regression analyses were then re-run with the identified outlier excluded. In addition, a regression analysis was performed to verify that the year a rule was published was not a significant predictor of the high or low net benefits (or costs) per word of that rule. This last test was meant to demonstrate empirically the trend, or more precisely lack thereof, in benefits-per-word over time.

### C. Empirical Findings

Table 11 provides the results testing for partial correlations on the dataset of EPA CAA rules between the number of words in a rule's Federal Register entry, the highest net benefit (or cost) estimate, the lowest net benefit (or cost)

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<sup>134</sup> Often the only, or most significant, factor affecting these values was the discount rate. The methodology employed treated different discount rates like any other scenario. This piece takes no position on the appropriate discount rate to be applied for cost-benefit analyses or even if one should be applied at all. For a thoughtful discussion of the difficulties posed by discounting in environmental law, see generally Douglas A. Kysar, *Discounting . . . on Stilts*, 74 U. CHI. L. REV. 119 (2007).

<sup>135</sup> IBM SPSS Statistics, Version 25.0 (2017).

<sup>136</sup> Controlling for the year was necessary to ensure that the strong, positive linear relationship between year and rule length, observed in the larger dataset and reported *supra*, did not influence the results in testing the insulation hypothesis.

estimate, and the year of the final rule. The results show both zero-order correlations and correlations controlling for the year of the final rule.

TABLE 11: CORRELATIONS

Control Variables			Number of Words in Final Rule Fed. Reg. Entry?	Highest Net (Cost or Benefit) Projection (millions \$)	Lowest Net (Cost or Benefit) Projection (millions \$)	Year (final rule)	
-None <sup>a</sup>	Number of Words in Final Rule Fed. Reg. Entry?	Correlation	1.000	.520	.545	.199	
		Significance (2-tailed)	.	.001	.000	.218	
		df	0	38	38	38	
	Highest Net (Cost or Benefit) Projection (mil- lions \$)	Correlation	.520	1.000	.923	.034	
		Significance (2-tailed)	.001	.	.000	.836	
		df	38	0	38	38	
	Lowest Net (Cost or Benefit) Pro- jection (millions \$)	Correlation	.545	.923	1.000	.151	
		Significance (2-tailed)	.000	.000	.	.353	
		df	38	38	0	38	
	Year (final rule)	Correlation	.199	.034	.151	1.000	
		Significance (2-tailed)	.218	.836	.353	.	
		df	38	38	38	0	
	Year (final rule)	Number of Words in Final Rule Fed. Reg. Entry?	Correlation	1.000	.524	.531	
			Significance (2-tailed)	.	.001	.001	
			df	0	37	37	
Highest Net (Cost or Benefit) Projection (mil- lions \$)		Correlation	.524	1.000	.929		
		Significance (2-tailed)	.001	.	.000		
		df	37	0	37		
Lowest Net (Cost or Benefit) Pro- jection (millions \$)		Correlation	.531	.929	1.000		
		Significance (2-tailed)	.001	.000	.		
		df	37	37	0		

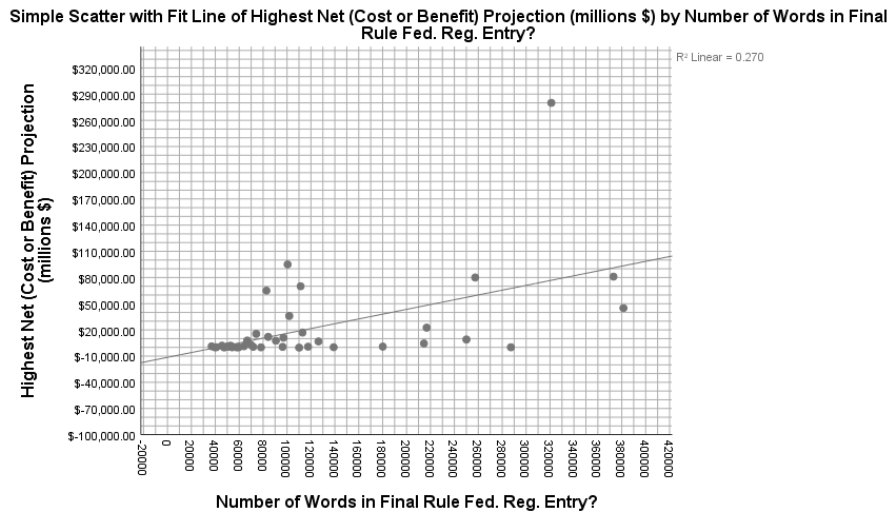
a. Cells contain zero-order (Pearson) correlations.

The zero-order correlations between the number of words in the Federal Register entry and both the high and low estimates of net benefits (or costs) re-

port as modestly positive (0.520 and 0.545, respectively) and very significant ( $p = 0.001$ ,  $p < 0.001$ ). Because, within this dataset (as in the larger dataset examined *supra*), the correlation between a rule's length and the year of its promulgation was positive, the partial correlations controlling for year provide the more useful picture. Very little change is observed when year is controlled for. The partial correlations between the number of words in the Federal Register entry and both the high and low estimates of net benefits (or costs) remain modestly positive (0.524 and 0.531) and very significant ( $p = 0.001$ ,  $p = 0.001$ ).

Figure 6 provides a scatterplot and summary results for a regression analysis, which sought to determine whether the number of words in a Federal Register entry was a good predictor of the net social impact of that rule (measured by the high estimate of net benefits (or costs)).

Figure 6



The regression results indicate that the variation in the number of words in

## MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.520a	.270	.251	\$42,713.70139

a. Predictors: (Constant), Number of Words in Final Rule Fed. Reg. Entry?

Federal Registry entries can at least in part be explained by the estimated social impacts of rules. More precisely, the R-square value (0.27) suggests that the regression model can explain about a quarter of the variation (27 percent) in the data. This suggests that the length of a rule can accurately predict the magnitude of the high estimate of that rule's net benefits (or costs) for approximately one out of four rules. The relative inaccuracy of the model likely precludes any

practical application of it. In other words, policymakers, or stakeholders, should not rely on the length of a rule, by itself, to inform them of the likely net social benefits of that rule; independent cost-benefit analyses remain worthwhile and important endeavors. The hypothesis of interest to this study, however, concerns not the continued utility of cost-benefit analyses, but the relative utility of lengthier, versus shorter, rules. The positive correlations between words and net benefits reported above confirm the socially beneficial hypothesis with respect to rules in the sample from the last four decades of EPA activity.

In addition to displaying the graphical representation of the regression equation, the scatterplot, perhaps more importantly, reveals the presence of one prominent outlier—the Transport Rule.<sup>137</sup> To present a fuller account of the story that the data tells, and to ensure that the unusually beneficial (at least according to EPA’s estimates) Transport Rule was not skewing the sample, the correlation and regression analyses were performed on the dataset without that outlier. Table 12 provides the partial correlation results for the dataset of EPA CAA rules (minus the Transport Rule). The results show both zero-order correlations and correlations controlling for the year of the final rule.

TABLE 12: CORRELATIONS

Control Variables			Number of Words in Final Rule Fed. Reg. Entry?	Highest Net (Cost or Benefit) Projection (millions \$)	Lowest Net (Cost or Benefit) Projection (millions \$)	Year (final rule)
-None <sup>a</sup>	Number of Words in Final Rule Fed. Reg. Entry?	Correlation	1.000	.455	.520	.184
		Significance (2-tailed)	.	.004	.001	.261
		df	0	37	37	37
	Highest Net (Cost or Benefit) Projection (mil- lions \$)	Correlation	.455	1.000	.715	-.059
		Significance (2-tailed)	.004	.	.000	.723
		df	37	0	37	37
	Lowest Net (Cost or Benefit) Pro- jection (millions \$)	Correlation	.520	.715	1.000	.169
		Significance (2-tailed)	.001	.000	.	.303
		df	37	37	0	37
	Year (final rule)	Correlation	.184	-.059	.169	1.000
		Significance (2-tailed)	.261	.723	.303	.
		df	37	37	37	0
Year (final	Number of	Correlation	1.000	.474	.505	

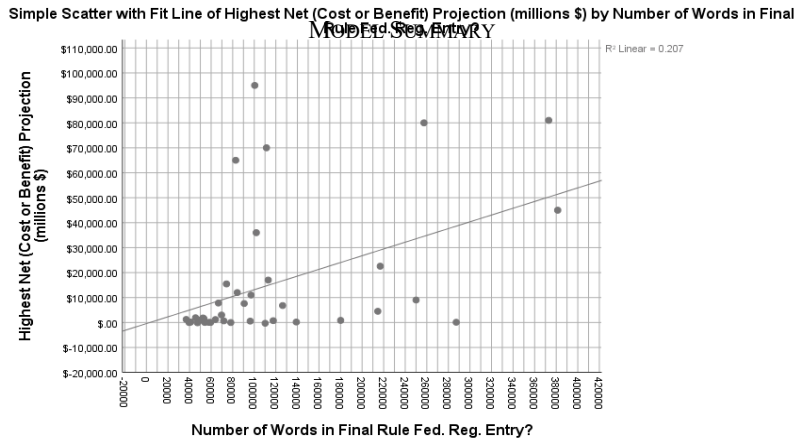
<sup>137</sup> Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 Fed. Reg. 48,208 (Aug. 8, 2011).

rule)	Words in Final Rule Fed. Reg. Entry?	Significance (2-tailed)	.	.003	.001	
		df	0	36	36	
Highest Net (Cost or Benefit) Projection (millions \$)	Highest Net (Cost or Benefit) Projection (millions \$)	Correlation	.474	1.000	.736	
		Significance (2-tailed)	.003	.	.000	
		df	36	0	36	
Lowest Net (Cost or Benefit) Projection (millions \$)	Lowest Net (Cost or Benefit) Projection (millions \$)	Correlation	.505	.736	1.000	
		Significance (2-tailed)	.001	.000	.	
		df	36	36	0	

The zero-order correlations between the number of words in the Federal Register entry and both the high and low estimates of net benefits (or costs) remain modestly positive (0.455 and 0.520, respectively) and significant ( $p = 0.004$ ,  $p = 0.001$ ). Both the magnitude and statistical significance of the correlations saw a very small decrease from the analysis on the entire dataset. Again, controlling for the year of a given rule had little effect on the results, with partial correlations between the number of words in the Federal Register entry and both the high and low estimates of net benefits (or costs) reporting as modestly positive (0.474 and 0.520) and significant ( $p = 0.003$ ,  $p = 0.001$ ). The removal of the identified outlier thus has little effect on the conclusions policymakers and scholars can draw from this analysis; the Transport Rule did not cause the observed positive correlations.

Figure 7 provides a scatterplot and summary results for a regression analysis, which sought to determine whether the number of words in a Federal Register entry was a better predictor of the net social impact of that rule (measured by the high estimate of net benefits (or costs)) with the extreme outlier excluded.

FIGURE 7



Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.455 <sup>a</sup>	.207	.185	\$23,950.94816

a. Predictors: (Constant), Number of Words in Final Rule Fed. Reg. Entry?

Interestingly, the regression model constructed on the narrower dataset performed worse than the regression model based on the complete dataset. The R-squared value suggests that, rather than explaining a quarter of the variance, this model now explains only about one-fifth (21 percent). Again, this result indicates that the number of words in a Federal Register entry alone does not provide a reliable predictor of the amount of net benefits a rule projects to impart upon society. The underwhelming regression models, however, do not disprove the hypothesis or the correlation findings. Looking at the partial correlations and regression analyses together, one can discern that over the same period that rules have gotten longer<sup>138</sup> those rules have each also tended to provide more net benefits to society, but the positive correlation between those two variables does not translate into a predictive model that indicates precisely how much net benefit one can expect to gain by writing a longer rule. The socially beneficial hypothesis posited simply that a statistically significant positive correlation exists, and the data confirm that.

One alternative way to formulate the socially beneficial hypothesis frames it in terms of net benefits (or costs) per word in a Federal Register entry. This formulation posits that over time the estimated net benefits per word of EPA regulations has been stable; there exists no statistically significant trend in benefits per word over time. Table 13 shows the correlation results testing for a relationship between both high and low estimates of net benefits (or costs) per word and the year. Figures 8 and 9 provide scatterplots and regression analyses examining that same potential relationship. Figure 8 uses the high net benefits (or costs) estimates to calculate the benefits per word data; Figure 9 uses the low net benefits (or costs) estimates.

TABLE 13: CORRELATIONS

		Year (final rule)	High Net Benefit per Word	Low Net Benefit per Word
Year (final rule)	Pearson Correlation	1	-.040	.182
	Sig. (2-tailed)		.806	.261
	N	40	40	40
High Net Benefit per Word	Pearson Correlation	-.040	1	.745**
	Sig. (2-tailed)	.806		.000
	N	40	40	40

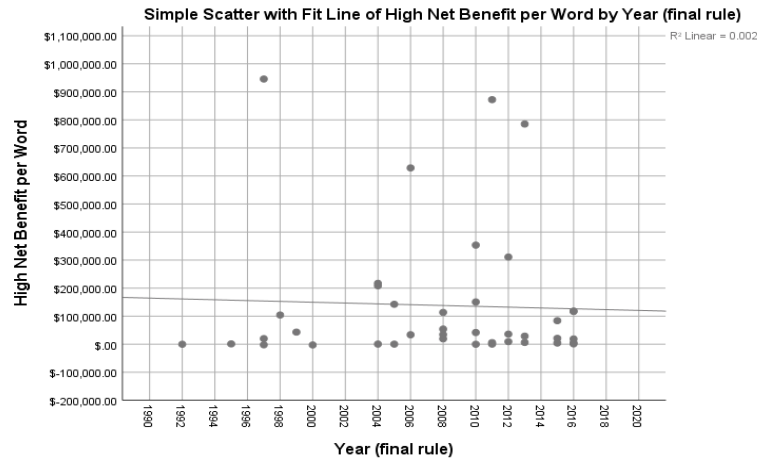
<sup>138</sup> See *supra* Part II.



Low Net Benefit per Word	Pearson Correlation	.182	.745**	1
	Sig. (2-tailed)	.261	.000	
	N	40	40	40

\*\*Correlation is significant at the 0.01 level (2-tailed).

FIGURE 8

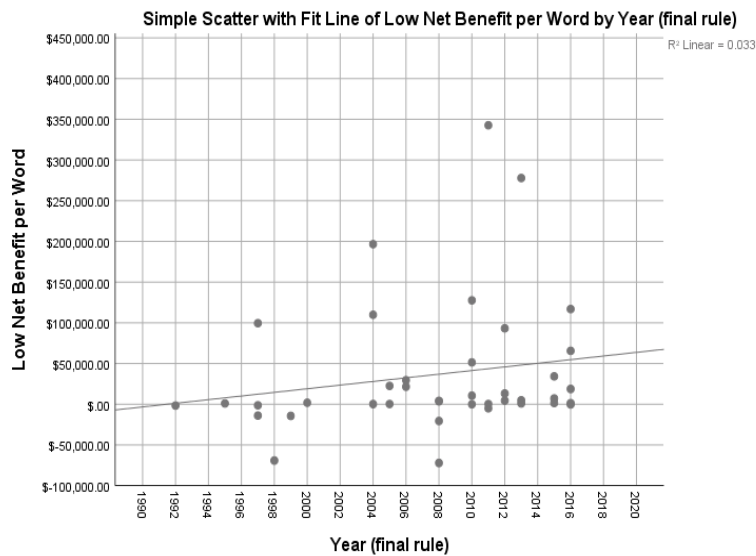


MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.040 <sup>a</sup>	.002	-.025	\$247,344.28837

a. Predictors: (Constant), Year (final rule)

FIGURE 9



## MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.182 <sup>a</sup>	.033	.008	\$81,623.71590

a. Predictors: (Constant), Year (final rule)

The correlation results are telling. The magnitude of any observed correlation was slight (-0.040 and 0.182) and inconsistent in direction between the two estimates of benefits (or costs) per word. Most importantly, neither correlation measured as close to statistically significant ( $p = 0.806$  and  $p = 0.261$ ). As one would expect given this lack of significant correlation, both scatterplots show variation in the data, but no pattern related to the passage of time emerges. The regression models confirm that the year of rulemaking proved a very poor predictor of net benefits per word. Indeed, the R-square value for the high estimates of benefits per word (0.002) suggests that the model cannot even explain 1 percent of the variation in the data. The regression model based on the low estimates did not fare much better, explaining about 3 percent of the variation in the data (0.033). Alone these regression analyses do not confirm (or refute) the socially beneficial hypothesis. However, they provide an additional level of robustness to the confirmation of the hypothesis reported above.

#### D. Anecdotal Examples

Two rules pertaining to regional haze provide some anecdotal support for the hypothesis that regulations are longer in part because they have a larger marginal impact and produce more benefits. The Federal Register entry for the Regional Haze Rule,<sup>139</sup> promulgated by the EPA in 1999, comprised 69,647 words. According to the EPA, the rule would produce net benefits of up to \$3 billion, which would equate to a net benefit of \$43,074 per word (the low-end estimate was a net cost of \$1 billion, equating to a net cost of \$14,358 per word).<sup>140</sup> In 2005, the EPA promulgated regulations updating the Regional Haze Rule, particularly focused on Best Available Retrofit Technology (BART) Determinations.<sup>141</sup> The Federal Register entry included 84,252 words.<sup>142</sup> According to the EPA, the rule would produce net benefits of up to \$12.0 billion, which would equate to a net benefit of \$142,430 per word (the low end estimate was net benefits of \$1.9 billion, equating to a net benefit of

<sup>139</sup> Regional Haze Regulations, 64 Fed. Reg. 35,714 (July 1, 1999).

<sup>140</sup> See INNOV. STRATS. & ECON. GRP., ENVTL. PROT. AGENCY, REGULATORY IMPACT ANALYSIS FOR THE FINAL REGIONAL HAZE RULE 6 (1999), available at [https://www3.epa.gov/ttn/ecas/docs/ria/visibility-rule\\_ria\\_final-reg-haze-rule\\_1999-04.pdf](https://www3.epa.gov/ttn/ecas/docs/ria/visibility-rule_ria_final-reg-haze-rule_1999-04.pdf) [hereinafter REGULATORY IMPACT ANALYSIS FINAL REGIONAL HAZE RULE].

<sup>141</sup> Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations, 70 Fed. Reg. 39,104 (July 6, 2005).

<sup>142</sup> Data is a result of a study conducted by author and on file with author.

\$22,551 per word).<sup>143</sup> Though close in time, these Regional-Haze Rules actually show an increase in net benefit per word over time.

A series of rules setting the National Ambient Air Quality Standards for ozone tell a similar tale. In 1997, the EPA updated the Ozone NAAQS in a Federal Register entry totaling 50,210 words.<sup>144</sup> The EPA estimated that net benefits from that rule would accrue in an amount between \$700 million and \$1 billion, which equates to a net benefit per word figure between \$13,941 and \$19,916.<sup>145</sup> Eleven years later, in 2008, the EPA again updated the Ozone NAAQS.<sup>146</sup> This time the Federal Register entry comprised 97,003 words and the projected net benefits ranged from \$7 to \$11 billion.<sup>147</sup> Thus, the net benefit per word ranged from \$72,163 to \$113,399, an increase of more than five times the prior rule. The most recent update to the Ozone NAAQS came in 2015.<sup>148</sup> The Federal Register entry for that rule was the longest of the three by far, totaling 214,558 words. The estimated net benefits of the rule ranged from \$1.5 to \$4.5 billion, producing a benefit per word range of \$6,991 to \$20,973.<sup>149</sup> Comparing these figures over time shows a spike in benefits per word with the 2008 rule and a return close to 1997 levels with the (much longer) 2015 rule. Looking at the total benefits of each rule, rather than the per-word figures, one observes an example of the positive correlation between length and estimated social benefits. The inability to precisely model that relationship also emerges, particularly when comparing the 2008 and 2015 rules.

These groups of similar rules exemplify the empirical results confirming the socially beneficial hypothesis. Perhaps on an intuitive level, these results will surprise few—longer, bigger, more complicated rules have more reach, more impact, and more quantifiable benefit to society. However, if that relationship were pervasively self-evident, many of the criticisms of the regulatory state mentioned at the outset would have fallen flat, or perhaps died out. Instead, they seem to be gaining, rather than losing, traction. The results reported here confirm empirically, that, at least with respect to the EPA's CAA rulemak-

<sup>143</sup> See REGULATORY IMPACT ANALYSIS FINAL REGIONAL HAZE RULE, *supra* note 140, at 6.

<sup>144</sup> National Ambient Air Quality Standards for Ozone, 62 Fed. Reg. 38,856 (July 18, 1997).

<sup>145</sup> See INNOV. STRATS. & ECON. GRP., ENVTL. PROT. AGENCY, REGULATORY IMPACT ANALYSES FOR THE PARTICULATE MATTER AND OZONE NATIONAL AMBIENT AIR QUALITY STANDARDS AND PROPOSED REGIONAL HAZE RULE 65–66 (1997), available at [https://www3.epa.gov/ttn/ecas/docs/ria/naaqs-o3-pm\\_ria\\_proposal\\_1997-07.pdf](https://www3.epa.gov/ttn/ecas/docs/ria/naaqs-o3-pm_ria_proposal_1997-07.pdf).

<sup>146</sup> National Ambient Air Quality Standards for Ozone, 73 Fed. Reg. 16,436 (Mar. 27, 2008).

<sup>147</sup> See generally AIR BENEFIT & COST GRP., ENVTL. PROT. AGENCY, FINAL OZONE NAAQS REGULATORY IMPACT ANALYSIS (2008), available at [https://www3.epa.gov/ttnecas1/regdata/RIAs/452\\_R\\_08\\_003.pdf](https://www3.epa.gov/ttnecas1/regdata/RIAs/452_R_08_003.pdf).

<sup>148</sup> National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65,292 (Oct. 26, 2015).

<sup>149</sup> See generally OFFICE OF AIR QUALITY PLANNING & STANDARDS, ENVTL. PROT. AGENCY, REGULATORY IMPACT ANALYSIS OF THE FINAL REVISIONS TO THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR GROUND-LEVEL OZONE 15 (2015), available at <https://www3.epa.gov/ttnecas1/docs/20151001ria.pdf>.

ing, longer rules have provided more social benefits, and no significant change in benefits per word over time exists. From this empirical conclusion emerges the practical bottom line—policymakers at the EPA have rationally deployed resources to write longer rules when those rules provide more benefits. Furthermore, the EPA’s rules have provided benefits to society on a relatively unchanging per-word basis.

#### VI. OTHER POTENTIAL EXPLANATIONS

Many potential explanations exist for the observable trend in the length of individual rules published in the Federal Register over time—some rational, some irrational, some intuitive, others likely not. The empirical analyses above test only two of those multitude. Specifically, this work tests two hypotheses that would offer rational explanations for the trend towards longer rules. Although the data supported one of those two hypotheses, that does not preclude the importance of other factors that this study was not designed to test. In fact, the regression analysis results suggest that the addition of other variables may yield a more accurate, and thus useful, predictive model. A fuller exploration of some untargeted hypotheses helps to contextualize and better understand the significance of the findings here.

Thoughtful perusal of the history of the United States since the rise of the regulatory state in the 1970s yields a variety of possible drivers of increasing rule length. In the realm of technology, it would be difficult to understate the drastic changes to the way humans live, work, and relate with one another brought on by the rise of the personal computer in the 1980s and the internet in the 1990s. That technology certainly changed the capabilities of government agencies with respect to rule writing and record building. Outside of the agencies themselves, the regulated community, and citizenry in general, gained access to vastly more information and the capacity to author and quickly submit public comments based on that information.<sup>150</sup> That latter reality intersects with one of the first intuitions of administrative scholars when told of the trend at the heart of this work; a good number of them would argue that the real driver of the increased length of regulations is external to the rulemaking agency—the number and complexity of public comments.<sup>151</sup> Another common reaction points to politics, insinuating that perhaps one political party (chiefly, the

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<sup>150</sup> See Thomas A. Bryer, *Public Participation in Regulatory Decision-Making: Cases from Regulations.gov*, 37 PUB. PERFORMANCE & MGMT. REV. 263, 263 (2013) (describing regulations.gov as “an award-winning government Web site that has democratized the federal rulemaking process by making it easier for citizens to search, read, and comment on proposed rules.”).

<sup>151</sup> See, e.g., Kerwin & Furlong, *supra* note 14, at 121 (using the number of public comments as a proxy for the political interest in a rulemaking); Yackee & Yackee, *supra* note 31, at 1459 (attributing an observed increase in the number of words in National Park Service final rules at least in part to the requirement that agencies respond to public comments and noting that “[e]arly final rules provided almost comically brief responses to public comments.”).

Democratic party) caused the increase in regulatory complexity based on that party's view regarding the role of the federal government.<sup>152</sup>

Unfortunately, the scope of the data collection for this work, and its analysis, did not encompass the number of public comments the EPA received on the rules comprising the two datasets. A future study focusing on just that type of data for a wider sample of administrative rules would provide a welcome addition to the findings here.<sup>153</sup> Until then, however, prior empirical research fortunately sheds little light on the question. The Kerwin and Furlong study discussed at the outset somewhat undercuts the hypothesis that the number of comments drive the increasing length of rules. Kerwin and Furlong found that there was a comparatively strong negative correlation between the number of public comments received and the time it took to write a rule.<sup>154</sup> Coupled with their finding of no significant relationship between length of rule text and duration of rulemaking process,<sup>155</sup> these findings do not suggest the existence of a significant positive relationship between public comments received and rule length. Without specifically testing for that correlation, they tend to undercut the hypothesis that rules are longer simply due to an increase in public comments. However, Kerwin and Furlong's study was limited in scope and conducted before the rise in personal computers, the advent of the internet, and the launch of regulations.gov<sup>156</sup>—all significant developments for the public comment process. A future study using updated data to test the hypothesis that a rise in public comments explains the increase in the length of regulations would help clarify the picture.

Commentators, scholarly and otherwise, tend to focus on partisan politics as an explanation for observed phenomena in regulatory activity.<sup>157</sup> Cass Sunstein and Thomas Miles investigated arbitrary and capricious review through

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<sup>152</sup> See, e.g., O'Connell, *supra* note 48, at 919 (testing, among others, the hypothesis that "agencies engage in less rulemaking activity under Republican Presidents than Democratic Presidents."); see also Pugsley, *supra* note 12, at 477 ("Republicans now largely accept, as an article of faith, that the EPA is overregulating and thereby hurting the economy.").

<sup>153</sup> Indeed, the author intends to design and conduct such a study.

<sup>154</sup> Kerwin & Furlong, *supra* note 14, at 131.

<sup>155</sup> See *id.*

<sup>156</sup> See Kerwin & Furlong, *supra* note 14.

<sup>157</sup> See, e.g., Miles & Sunstein, *Real World*, *supra* note 25, at 813–14 (testing whether the political party of the President who appointed a judge was a statistically significant predictor of that judge's vote when reviewing agency activity); Terry M. Moe, *Regulatory Performance and Presidential Administration*, 26 AM. J. POL. SCI. 197, 197 (1982) (testing for variation in the regulatory activity of the NLRB, FTC, and SEC dependent on the President's Party); O'Connell, *supra* note 48, at 957, 957 n.177 (empirically examining the trend of "Midnight Regulations" and finding no significant difference in that trend based on the political party in power); Jay Cochran, III, *The Cinderella Constraint: Why Regulations Increase Significantly During Post-Election Quarters* 1 (Mercatus Ctr., Working Paper, 2001) (empirical analysis of Federal Register pages added in post-election quarters, finding no statistically significant relationship between the President's party and the number of pages added per month).

this lens.<sup>158</sup> Sunstein and Miles empirically tested whether the party of the president that appointed a judge made a statistically significant difference in the voting record of that judge when reviewing administrative rules.<sup>159</sup> Their study classified agency actions as “liberal” or “conservative” and found that Democratic appointees were significantly more likely to vote to uphold liberal agency decisions and Republican appointees were significantly more likely to uphold conservative agency decisions.<sup>160</sup> On the whole they found that Democratic appointees had a 69 percent rate of liberal voting versus a 55 percent rate for Republican appointees.<sup>161</sup> From these findings, Sunstein and Miles concluded that “the political party of the appointing president is a fairly good predictor of how a judge will vote in cases involving arbitrariness review.”<sup>162</sup> Sunstein and Miles’s results provide an explanation for the variation in judicial review outcomes, variation this study could not explain using the length of regulations as a potential indicator. No study as of yet, however, has set out to answer the question whether Democratic or Republican administrations tend to author significantly longer rules, and, more interestingly, whether the influence of one political party could be responsible for the trend of increasing length over time.

Because the party in power, at least with respect to the executive branch, is a relatively straightforward and publicly available data point, testing for a statistically significant relationship within the high-level data from the Office of the Federal Register proved relatively simple. Consistent with the prevailing perception of the Democratic party as relatively more pro-regulation than the Republican party,<sup>163</sup> a year in which the president was a Democrat was coded 2.00 and a year in which the president was a Republican was coded 1.00. Thus, if the increase in Federal Register pages per rule could be attributed primarily to Democrats, one would expect to see a positive correlation between the political party variable and the pages per rule variable. Table 14 provides the results

<sup>158</sup> Miles & Sunstein, *Real World*, *supra* note 25, at 813.

<sup>159</sup> *Id.* at 813–14.

<sup>160</sup> *Id.* at 813. The effect intensified when sitting on a panel with all like-minded judges. “Democratic appointees show especially liberal voting patterns when sitting on all-Democratic panels; Republican appointees show especially conservative voting patterns when sitting on all-Republican panels.” *Id.*

<sup>161</sup> *Id.*

<sup>162</sup> *Id.* at 813–14 (noting that “the political party of the president who appointed the two other judges on the panel is also a strong predictor.”).

<sup>163</sup> See, e.g., Richard L. Revesz, *Environmental Regulation, Ideology, and the D.C. Circuit*, 83 VA. L. REV. 1717, 1717–18 (1997) (“Some commentators have criticized the D.C. Circuit’s politicization and have maintained that judges simply vote according to their policy preferences. In environmental cases, the allegation goes, judges appointed by Republican Presidents vote principally for laxer regulation and judges appointed by Democratic Presidents vote for more stringent regulation.”); Russell Heimlich, *Deepening Divide Between Republicans and Democrats Over Business Regulation*, PEW RES. CTR. (Aug. 14, 2012), <https://www.pewresearch.org/fact-tank/2012/08/14/deepening-divide-between-republicans-and-democrats-over-business-regulation/> [<https://perma.cc/6ML6-EYRF>] (finding that “76 [percent] of Republicans [versus only 41 percent of Democrats] say that government regulation of business does more harm than good”).

for correlation analyses for these variables, reporting both zero-order and partial correlations controlling for year.

TABLE 14: CORRELATIONS

Control Variables		Political Party R/D	Pages per Rule	Year	
-none <sup>a</sup>	Political Party R/D	Correlation	1.000	.295	.272
		Significance (1- tailed)	.	.031	.043
		df	0	39	39
	Pages per Rule	Correlation	.295	1.000	.958
		Significance (1- tailed)	.031	.	.000
		df	39	0	39
	Year	Correlation	.272	.958	1.000
		Significance (1- tailed)	.043	.000	.
		df	39	39	0
Year	Political Party R/D	Correlation	1.000	.123	
		Significance (1- tailed)	.	.226	
		df	0	38	
	Pages per Rule	Correlation	.123	1.000	
		Significance (1- tailed)	.226	.	
		df	38	0	

a. Cells contain zero-order (Pearson) correlations.

It would appear from the zero-order correlations that indeed the political party of the president had a statistically significant ( $p = 0.031$ ) positive correlation (0.295) with the number of pages in the rules administrative agencies promulgated during his tenure. However, the partial correlation results controlling for year reveal that positive correlation to be weaker (0.123) and no longer significant ( $p = 0.226$ ). These preliminary results are by no means conclusive on the larger empirical question about the effect of political party on rule length. Nonetheless, they suggest that the trend that this study attempts to explain by the insulation and socially beneficial hypotheses cannot easily be explained by politics instead.

Among the myriad of explanations for individual rules getting longer, some of the more plausible may prove both difficult to test and relatively uninteresting in terms of implications for policymakers and commentators. Chiefly the rise of the personal computer as a tool for agency work and the internet as a method of commenting fit this description. Some data exist on the number of

personal computers available to agency employees over time,<sup>164</sup> but, unsurprisingly, those figures almost perfectly positively correlate with time (i.e., the government has more computing power every year).<sup>165</sup> Similarly, the invention, and now reach, of the internet and access to it positively correlates with time (i.e., internet access and speed improve each year).<sup>166</sup> As a consequence, it was outside the scope of this study to construct an empirical analysis that could isolate the effects of these technological advances on the length of regulations. A more detailed data compilation and analysis focused on these advances, perhaps using more nuanced measures, would provide welcome insight. From a logical, rather than empirical, perspective it is difficult to imagine that neither the ease of word processing on a personal computer nor the widespread availability of information on the internet have any effect on the length and complexity of rulemaking.

#### VII. IMPLICATIONS OF FINDINGS

The twin empirical analyses of this piece asked, and began to answer, important questions about the effectiveness of the administrative state in relation to the length of Federal Register entries. Policymakers, pundits, and the public need to understand if the criticisms of the regulatory state embodied by the media photos of large stacks of paper have practical significance or merely represent misguided finger-pointing. The results reported above suggest the latter, at least with respect to one of the two hypotheses tested.

Empirical analysis of the data collected from EPA CAA rules confirmed the central claim of the socially beneficial hypothesis—longer rules have tended to confer more net benefits upon society. For policymakers, that finding counsels an approach that estimates the costs and benefits of a proposed regulation early on in the process and then devotes resources (and Federal Register pages) to those rules that have the highest net benefits. Indeed, the numbers suggest this already happens. Pundits and commentators would do well to focus their scrutiny on the cost-benefit analyses underlying agency decisions, rather than the ultimate length of those decisions themselves. Scholarly critiques of this part of the administrative process abound,<sup>167</sup> and much productive political

<sup>164</sup> See William Lehr & Frank R. Lichtenberg, *Computer Use and Productivity Growth in US Federal Government Agencies, 1987–92*, 46 J. INDUS. ECON. 257, 259, 267 (1998) (“us[ing] productivity data obtained from the Bureau of Labor Statistics’ (BLS) Federal Productivity Measurement Program, which was established for the specific purpose of tracking the labor productivity (real output per employee-hour worked) of federal government organizations, linked to data on computer use obtained from Computer Intelligence Infocorp (CII), a private marketing research firm.”).

<sup>165</sup> See *id.* at 267 (reporting data demonstrating that “computerization of public sector workplaces proceeded at a rapid pace [from 1987 to 1992]”).

<sup>166</sup> See Max Roser et al., *Internet*, UNIV. OF OXFORD, <https://ourworldindata.org/internet> (2020) (last visited Feb. 11, 2020).

<sup>167</sup> See e.g., FRANK ACKERMAN & LISA HEINZERLING, *PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING* 9–11 (2004).



discourse could flow from that debate. For the citizenry, recognizing an overly burdensome regulatory state, an undoubtedly worthwhile and vital check in a democratic society, requires more than simply counting the pages of regulations. The results of this study should put some minds at ease, at least with respect to EPA regulations; they should also help better direct our scrutiny in the future.

On the other hand, the data collected from United States Courts of Appeals decisions and the Federal Register failed to confirm the insulation hypothesis. For policymakers, the straightforward implication of that finding sounds obvious—simply making a rule longer will likely not better protect it from judicial review. It is the more nuanced, and admittedly unproved, implication that should cause them pause—perhaps devoting pages and pages in the Federal Register to exhaustively detailing the rationale for a given rule is not an efficient use of pulp, ink, and human resources. The empirical result (the lack of a statistically significant finding) should also motivate scholars and commentators to further probe the utility of process requirements (judicially, legislatively, or administratively imposed) that add length and detail to Federal Register entries, particularly in the “Statement of Basis and Reasons.” This work’s author looks forward to joining the debate in that arena. Finally, court and agency watchers in the public should take the results here as a reminder that the size of a rule reveals little about its propensity to last—courts invalidate short, simple rules and long, complex ones.

#### VIII. STUDY LIMITATIONS

As with any empirical study, significant and notable limitations cabin the results of this work. Two prominent limitations derive directly from the study’s design, while a third is extrinsic to the data collection and analysis.

First, and most prominently, the samples used for this study were confined by design to environmental regulations, specifically those promulgated by the EPA. The motivations for that decision to narrowly define the scope of the data collection range from the purely practical (resource constraints) to the theoretical (EPA regulations attract scholarly and popular attention because they epitomize the sweeping reach and powerful impact of the modern administrative state). Though intentional, this sharp focus on the EPA did not come without drawbacks, the most significant of which clouds the results with respect to one untested explanation for the growing length of regulations. Scholars have argued that environmental problems, particularly those addressed by our laws, have become more complex over time.<sup>168</sup> One might surmise that regulations

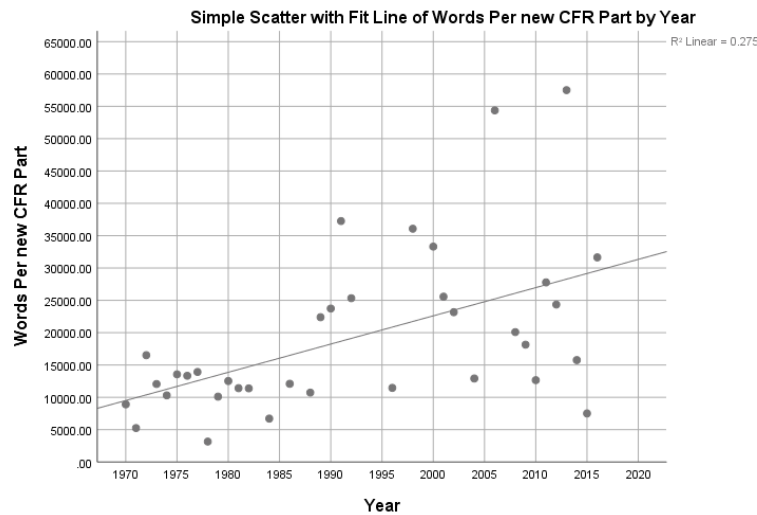
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<sup>168</sup> Robert Glicksman & Christopher H. Schroeder, *EPA and the Courts: Twenty Years of Law and Politics*, 54 *LAW & CONTEMP. PROBS.* 249, 252 (1991) (“The first wave of environmental legislation was directed at the problems that were easiest to see and resolve. Burning rivers and lakes suffocating from massive algal blooms were obvious targets for remediation. The smog covering the nation’s urban areas and the odors emanating from open solid waste dumps cried out for attention. . . . Just as the problems seemed obvious, so did

have responded to the increasing complexity of their targets by becoming longer and more complicated themselves. This study, limited as it is to EPA regulations, could not control for, nor measure, that potential effect.

Another limitation follows from the design choice to focus on Federal Register entries as the measure of rule length, rather than Code of Federal Regulations provisions. Looking at words, rather than pages, and at parts making up the Code of Federal Regulations, rather than rules published in the Federal Register, provides another measure of the observed trend. However, that measure paints a much noisier picture, as Figure 10 shows.<sup>169</sup> Individual data points vary more sporadically from year to year due to the fact that some years saw fewer (or even no) new parts added to the Code of Federal Regulations, and the trend appears consistent with that observed in the Federal Register data. However, the regression model results suggest a more complicated picture. In addition to these analysis challenges, the data collection regarding the number of words added by a given rulemaking would have proved far more time consuming, particularly for rules that have since been removed from, or even simply revised in, the Code of Federal Regulations. For those reasons, this study was designed with a Federal Register focus, acknowledging that it opens the results to an additional avenue of critique.

FIGURE 10



the most effective solutions. The early legislation required EPA and the states to prohibit or control industrial and municipal discharges from both stationary and mobile sources, typically by imposing end-of-pipe controls. A direct cause and effect relationship between compliance with these limitations on pollutant discharges and a cleaner environment was simply assumed. Twenty years later, these early assessments of the nature of both environmental problems and their resolution seem naive.”).

<sup>169</sup> Data derived from McLaughlin & Sherouse, *supra* note 12.

## MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.524 <sup>a</sup>	.275	.253	13.009

a. Predictors: (Constant), Words Per new CFR Part

An extrinsic limitation to the findings in this study bears repeating<sup>170</sup> because of the findings on the socially beneficial hypothesis. The benefits and costs estimates that comprise one half of the data set come directly from EPA Regulatory Impact Analyses. Those analyses were necessarily performed at the time of the rulemakings they concern, predicting the benefits and costs to society. Unfortunately for the purposes of this empirical analysis,<sup>171</sup> the EPA has not maintained a consistent methodology with respect to calculating and modeling costs and benefits of rulemaking. Changes in that methodology over time make comparisons of cost-benefit figures over time less valid. The fact that this study uses a sample of exclusively CAA rules at least controls for variation in valuation and methodology across environmental media and corresponding EPA offices (e.g., air, water, solid waste). Nonetheless, any differences in methods over time unavoidably to some degree infect the results here.

## CONCLUSION

The findings reported here suggest that while EPA regulations have been getting longer, they have also been conferring more benefits on society. If EPA's activity reflects the larger trend across all agencies, which seems a reasonable assumption, we need not worry so much about the increasing length of individual rules. Despite these findings, politicians will certainly continue to take photo opportunities with stacks of paper. Pundits and commentators will continue to decry the growing regulatory state. Voters will curse the government bureaucracy and "red tape." This work should mark the next step in a more informed debate—a debate for the first time grounded in comprehensive data and thorough analysis, rather than isolated big numbers and rhetorical theatrics. The findings here should prompt reexamination of administrators' and general counsels' approaches to avoiding judicial review. The findings should further prompt administrators to direct rule-writing resources on the basis of cost-benefit analyses, or, perhaps more accurately, should prompt them to at least acknowledge their existing tendency to unknowingly do so. Future studies could prompt reforms or reconsiderations in countless other areas. All of this is based on evidence, the preferred decision-making tool of the thousands of sci-

<sup>170</sup> See *supra* Section IV.C.

<sup>171</sup> This is not to say EPA has not improved its cost-benefit analysis methodology over time. It is simply to point out that the inconsistent methodologies somewhat undermine the ability to compare figures over time, a necessary comparison for the empirical study here.

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entific experts that serve in agencies. Empirical study of the work of administrative agencies is vital to the continued success of our system of government, which remains dependent on their resilient and efficient work.

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