Comparing Apples:
Predicting the effect of public comments on administrative rules

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ABSTRACT

This dissertation addresses three questions about administrative rulemaking:

- Do comments submitted on proposed rules vary in identifiable ways?

- Do these differences directly relate to the likelihood that recommendations will be associated with changes to regulations?

- Can these characteristics be incorporated into a model that accurately predicts whether or not suggestions will coincide with changes to administrative rules?

Using data collected from the Commonwealth of Virginia's Regulatory Town Hall, I analyze 2,534 comments that address 67 regulations proposed by state agencies during an 11-year period. I find that submissions do differ in meaningful ways. I also find statistically significant evidence that those differences are related to the probability that a requested change coincides with a subsequent modification to a rule. The principal result of this research is a model that predicts with a high degree of accuracy the outcome of participants' recommendations to alter proposed regulations. I also demonstrate the implications of these results and how failure to account for these differences undermines the legitimacy of conclusions that can be drawn from studies of notice-and-comment rulemaking. The primary contribution of this dissertation is methodological, but the empirical evidence presented here also raises questions about the value of citizen participation in notice-and-comment rulemaking in its current form. As a result, it challenges contentions that participation contributes to the democratic legitimacy of bureaucracy, serves as a safeguard against the influences of organized interests, or improves the substantive quality of administrative decisions.

To Buddy and Boo;

Kirsten too.

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CHAPTER ONE

INTRODUCTION

I address three key questions in this dissertation:

- Do comments submitted on proposed administrative rules vary in identifiable ways?

- Do these differences relate directly to the likelihood that recommendations will be associated with changes to regulations?

- Can these characteristics be incorporated into a model that accurately predicts which suggestions will coincide with changes to proposed rules?

The short answer to each of these questions is yes. Citizens' contributions during comment periods differ considerably across a number of substantive dimensions and this variation has a meaningful impact on the probability that a suggested change will be associated or coincident with a modification to a rule.[1]

For practitioners committed to a participatory rulemaking process, these findings underscore the importance of developing tools and implementing practices that nudge stakeholders toward providing high-quality feedback. This analysis also suggests that agencies should actively develop deterrents to forms of participation that impose excessive

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[1] I opt for the phrase "coincident with" rather than the more definitive "cause" for two reasons. Comments are tools wielded in the hope of achieving desired ends. They *cause* changes in regulations only to the extent that baseball bats *induce* home runs and axes *bring about* split wood. Additionally, I hesitate to claim that any specific comment triggered a modification to a rule. Even in scenarios in which an agency indicates that it concurs with a suggestion and has altered the rule accordingly, one rarely can say with certainty that in the absence of the comment the change would not have occurred.

costs on government organizations, soaking up limited resources, yet providing little substantive benefit in drafting regulations.

For citizens interested in engaging in the administrative decision-making process, this study suggests that they must be committed to absorbing the costs of participation, not merely in taking the time to interject their voices into the discussion, but also making the effort to become informed about the regulatory process and the issues being addressed.

For administrative law, political science, and public administration scholars interested in using comments to examine citizen participation, interest group influence, or bureaucratic control and autonomy, these findings also have important implications. Specifically, this effort suggests that researchers must account for the variation across comments in their future studies. Correlatively, this analysis also strongly calls into question the conclusions of studies of notice-and-comment rulemaking that fail to do so.

For example, before one can assess whether bureaucrats demonstrate a bias toward one interest group versus another, one must develop reasonable expectations concerning the likelihood that comments submitted by both groups will be associated with changes in proposed regulations. Stated differently, the contents of the baskets must be normalized to ensure one compares apples to apples.

I devote the bulk of this dissertation to the challenge of building a model that enables this type of normalization. In this respect, the primary contribution of this research to the study of administrative rulemaking is methodological. A secondary contribution—a byproduct of the analysis—is additional insight into the question of whether and how participation in notice-and-comment rulemaking is meaningful.

The empirical evidence I provide suggests the answer to this query depends upon how one defines the word "meaningful."

Many scholars have advanced arguments in support of broad-based participation in agency decision-making, including the following claims:

- It serves an important oversight function and increases the accountability of bureaucrats (Langton 1978);

- It diffuses the power of factions—a quintessentially Madisonian preoccupation—and reduces the influence of interest groups (Gellhorn 1971);

- It helps to overcome the limitations of "expert" decision-making and facilitates the implementation of superior solutions to intractable problems (Fischer 1993, Mashaw 1985);

- It ensures better representation of and responsiveness to diverse interests as well as greater attention to public needs (Cramton 1971);

- It increases the perceived legitimacy of agency actions (Gellhorn 1971, Mashaw 1985); and

- It promotes democratic values and helps to cultivate a citizenry with a heightened sense of civic responsibility (Barber 2004, Pateman 1970, Shklar 1991).

Counterbalancing this general tenor of optimism about public participation have been the cautions offered by a small but notable group of researchers and thinkers who have warned that unfettered mass participation not only imposes costs, but can also become a

corrosive force that undermines, rather than fortifies, democracy (e.g., Arendt 1968, Lippmann 1925, Plato 1992).

The results of this analysis neither support nor contradict these polarized positions. Rather, they demonstrate that despite the fact that the opportunity is open to all, few beyond those with direct interests are motivated to participate in the regulatory process. Those who do interject their voices typically offer little of value to administrators beyond statements crafted to advance self-interests. Rarely do they introduce substantive information that had not been known to agency decision-makers prior to drafting the rule. However, I also find that when a participant identifies a problem, bureaucrats are willing to modify a proposed regulation as long as the change is relatively minor, or when a provision unintentionally imposes significant costs.

1.1   Why study administrative rulemaking?

I believe rulemaking is one of the most intriguing facets of the American system of government. Administrative rules affect nearly every dimension of our lives—from the pesticides sprayed on many of our foods to the stew of toxins suffocating a share of our rivers and streams; from the safety standards for infant car seats and bicycle helmets to such mundane issues as who may purchase a scratch-off ticket at a bingo game or promote a professional wrestling event. Administrative rules carry the weight of law, but their specificity—the rights and obligations of those who are affected by or required to comply with them—almost always exceeds that contained in statutes. Yet, the interplay of formal and informal influences on the rule-writing process is, at best, poorly understood.

Administrators are not directly accountable to the public—people cannot "vote the bums out" if they are dissatisfied with the regulations written—but state and federal

agencies are required to provide public notice of intended rulemaking activities and an opportunity for interested parties to submit comments concerning those proposed actions. Government organizations are not obliged to modify rules to reflect such recommendations, but typically must provide a written justification for the decisions they make, and failure to respond to reasonable input may lead to later invalidation of a regulation by judicial review.

Although it is tempting to consider statutory law as the skeleton of the legal system and administrative rules as its flesh and blood, the analogy fails to reflect the institutional complexity of the rulemaking process. It is not merely instrumental—administrators dutifully pulling levers and pressing buttons to carry out the will of legislators and to keep the government running smoothly—nor is it strictly a political process. Rather, administrative rulemaking reflects "our ambivalence toward delegated authority… the influence of politics in institutional choice as well as the constitutional tensions built into the American political system" (West 2005, 661). As a result, political scientists and administrative law scholars have generated a welter of propositions concerning the rulemaking process, many of which carry considerable intuitive appeal, but are inconsistent and often at odds with each other (West 1997).

Recent advances in technology, particularly with the advent of Web 2.0 applications, have made it much less expensive for agencies to solicit feedback on regulatory actions (Brandon and Carlitz 2002, Coglianese 2003, 2003b, 2004, Farina et al. 2013). These developments have also made it easier for organized interests to mobilize citizens to express their support or disapproval of bureaucratic decisions (Karpf 2010, Shulman 2009). However, it remains unclear whether the Internet has or can increase citizen

participation (Balla and Daniels 2007, Beierle 2003, Coglianese 2006), whether online tools have expanded or narrowed the range of preferences voiced during the notice-and-comment period (Best and Krueger 2005, Stanley and Weare 2004), or whether the availability of such applications promotes or stifles deliberation (Schlosberg, Zavestoski, and Shulman 2007, Shulman 2007).

What can be said with certainty is that technology has provided scholars with a vast and easily tapped pool of data to examine the regulatory process. As a result, notice-and-comment rulemaking has become the focus of an increasing number of researchers in recent years.

This turn raises two important issues—one theoretical, the other methodological. First, what questions is analysis of this information well-suited to answer? Written feedback on proposed regulations may be a rich source of data, but the comment period provides a narrow window into rulemaking practice, one typically situated at the tail end of an often long, occasionally serpentine, and rarely fully transparent process. Second, how can one design a study to address questions of internal and construct validity?

As detailed in the next section, much of the scholarship on notice-and-comment rulemaking has been devoted to the first of these concerns. In contrast, I focus on the latter issue and identify a number of distinct dimensions of stakeholder suggestions, demonstrate how they vary, and quantify those differences. The result is a model that predicts with a high degree of accuracy whether a recommendation to modify a proposed regulation will be associated with a subsequent change. This model enables the normalization of comments and facilitates the comparison of "baskets" of recommendations, for example, those submitted by groups that represent opposing interests. This study's results provide

some insight into the types of research questions this data may be well-suited or inappropriate to address. It also raises important questions about the value of participation in notice-and-comment rulemaking in its current form and given citizens' interest in absorbing the costs required to become effective contributors in the administrative decision-making process.

1.2 Dissertation overview

Much of the scholarship that focuses on administrative rulemaking has been devoted to a single question: Who controls the bureaucracy? This literature has generated a number of competing theories that can be grouped broadly into three categories: (1) political control, (2) interest group influence, and (3) administrative autonomy. Within the comparatively rich and rapidly growing body of literature on participation, a number of studies have also investigated citizen engagement in the regulatory process. Many have examined the various formal opportunities provided to citizens to interact with administrators and each other such as advisory groups, town hall meetings, and regulatory negotiation (e.g., Coglianese 1996-97, 2000-2001, Freeman 1997-1998, Freeman and Langbein 2000-2001, Fung 2006, Halvorsen 2003, Harter 1982-1983, 2000-2001, Langbein and Kerwin 2000, Rose-Ackerman 1994, Rossi 1997, Rowe and Frewer 2005). A small number of scholars have focused on contributions made during the notice-and-comment period of the rulemaking process—the only opportunity for direct engagement mandated by the United States Administrative Procedure Act (APA) (1946) and the similar APAs adopted in each of the 50 states. Much of this research has sought to determine whether this form of participation is meaningful, that is, does it appear to shape the content of adopted rules (Elliot 1992, Golden 1998, Shapiro 2008, 2013, West 2004, Yackee 2006).

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Unfortunately, these studies have generated contradictory results: Some researchers have determined that the comment period provides an opportunity for meaningful participation (Davis 1975) while others have concluded that it is primarily symbolic (Fritschler 1989). Similarly, some analysts have suggested that bureaucrats demonstrate a bias toward specific interest groups such as businesses, altering final rules to reflect the comments submitted by firms but not others (Cropper et al. 1992, Yackee and Yackee 2006), while other researchers have not found any systematic biases (Best and Krueger 2005, Cuéllar 2005, Furlong 1997, Golden 1998, Magat, Krupnick, and Harrington 1986, Nixon, Howard, and DeWitt 2002).

The model developed in this dissertation represents a step toward reconciling these differences. How it does this is perhaps best explained through a brief hypothetical example.

Imagine a scholar who seeks to determine whether bureaucrats are more likely to modify proposed rules on the basis of recommendations received earlier in the notice-and-comment period than near its end (i.e., she wishes to test an "early bird" hypothesis that suggests that comments submitted early in the process are privileged and set the agenda for the discussion that follows).

Imagine also that examination of the data reveals that administrators modified the regulation under scrutiny in ways that were consistent with 60 percent of recommendations the agency received during the first 10 days of the comment period, but only 10 percent of those submitted during the last 20 days. How should these results be interpreted?

One interpretation is that the early bird does in fact get the worm (Naughton et al. 2009). But is this explanation correct?

One cannot answer this question in the absence of context. Specifically, one must first know the likelihood of generating these results.

Now, suppose a disproportionate number of the early comments introduced arguments and data the agency had not considered. One might further imagine that recommendations submitted near the end of the period offered little new information or perhaps raised questions outside the purview of the agency or opposed facets of the rule mandated by legislation.

As this example illustrates, introducing this single dimension—the substance of the comment—can play a significant role in determining how one interprets the results of the analysis. If a researcher has a reasonable expectation that substantive recommendations—ones similar to those submitted in the first ten days of the comment period—tend to be consonant with changes in proposed rules approximately 70 percent of the time, the result of 60 percent is below expectations, perhaps to a statistically significant degree. Similarly, if the probability that comments with characteristics similar to those submitted in the latter period will mirror changes in the rule only 5 percent of the time, the outcome of 10 percent exceeded expectations. In other words, in this example early birds may have gotten plenty of worms, but not because they were early and, in any case, relative to expectations, they underperformed their late-to-the-table counterparts.

Altering the expected probability of associated changes for the suggestions submitted in the first period to, say, 50 percent illustrates a second important shortcoming of analyses that fail to use benchmarks to assess results: Unless a study draws upon only

those issues in which both sides were presented, the modification of proposed rules is not a zero-sum game, i.e., it is possible that both early-birds, with their 60 percent success rate, and their tardy colleagues, with their 10 percent success rate, feasted to a greater extent than expected.

Dichotomies, such as private citizens and organized interests or businesses and consumers, have intuitive appeal and lend themselves nicely to research questions such as, "Do bureaucrats demonstrate a bias toward business?" Unfortunately, in the absence of reasonable expectations against which their results may be assessed, the outcomes of such studies may be difficult to interpret. More importantly, the either-or nature of the question represents merely a subset of the possible results. As the above example illustrates, the full set includes either *X* or *Y* as well as *both* and *neither* and no bias whatsoever. Failure to consider this full range of potential outcomes increases the likelihood of misinterpreting results. It also significantly reduces the utility of the data generated, specifically, the number of questions it may be used to explore. For example, one might imagine two groups of agencies—one that consistently modifies proposed regulations in accordance with recommendations at a rate that far exceeds expectations and the other with a frequency well below that anticipated. Why might that be? Perhaps the salience or complexity of the rules accounts for the difference. Perhaps the leadership of the agencies differs in systematic ways. Perhaps the governors and legislators are predominantly members of one party in the first instance, but not in the latter case. Or perhaps procedural requirements and a greater likelihood of judicial review of rules in some states has led to greater "ossification" (McGarity 1992, Pierce 1995, Seidenfeld 1997) and an increased propensity for "white tape" to become "red" (Bozeman 1993, Eggers 2007, Kaufman 1977).

Developing reasonable expectations and using them as a benchmark for interpreting results is hardly a novel idea. After all, the point spread of a football game may be considered nothing more than an odds-maker's expectation for a team's probability of victory.[2] Similarly, the price of a stock reflects not only a company's intrinsic value; it incorporates analysts' expectations for its future growth as well. When a company reports net income of 5 cents per share for a fiscal quarter, how investors make sense of that result depends on their expectations. If analysts projected the firm would lose 15 cents per share, then the result is quite good. In contrast, if they expected the corporation would realize a net income of 1 dollar per share, the result is rather poor.

Prior studies of notice-and-comment rulemaking have not employed this type of benchmarking. The "reasonable" expectation in previous analyses has been that all comments are equally likely to prompt administrators to modify a proposed rule (McKay and Yackee 2007, Naughton et al. 2009, Yackee 2006). My analysis (detailed below) demonstrates that this assumption is unsound. Based on a review of 2,534 comments addressing 67 regulations proposed by agencies in the Commonwealth of Virginia during an 11-year period, I found that

- Comments and recommendations differ considerably across a number of key dimensions;

- These differences play a significant role in determining the likelihood that a proposal will be associated with a change in a regulation; therefore,

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[2]   This statement is conventional wisdom, but it is not technically true unless a bookmaker seeks to minimize loss rather than maximize return. Point spreads and odds reflect expectations for victory as well as prospects of bettors' actions at various levels (Levitt 2004).

- Failure to control for this variation severely limits the conclusions that can be legitimately drawn from a study.

1.3 The road map for this study

The next chapter describes the elements of the model I developed and outlines the propositions I tested. Chapter Three provides an overview of the "nuts and bolts" of the framework including data and sample selection and the operationalization of concepts. It also includes a brief explanation of the use of logistic regression in the analysis. I report the study's results in Chapter Four and discuss them in Chapter Five. I also provide two examples of how the model can be applied. These scenarios illustrate the implications of failing to normalize comments in a study by applying a benchmark of reasonable expectations. Finally, I conclude Chapter Five by considering the limitations of this inquiry and outlining some of its implications for scholars and practitioners. I also outline a range of opportunities to build upon the results of this research.

CHAPTER TWO

CONCEPTUALIZING THE MODEL

As noted in the introduction, I sought primarily to make a methodological contribution to the study of notice-and-comment rulemaking when I embarked on this research. If I am candid, I must also confess that I find this "contribution" odd. Using a benchmark to interpret results is not new or creative or particularly insightful. And yet in this literature and others, analysts conduct studies and report findings, and conclusions are drawn based upon the assumption that two or more groups in an analysis do not differ in fundamental ways. Or, they simply confuse total performance for value added.[3]

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[3] Studies of the value of a college degree often demonstrate these problems: see, for example, the most recent "Education Pays" report (Baum, Ma, and Payea 2013) published by the College Board. The authors point to the income gap between those who possess a college degree and those who have earned only a high school diploma or General Education Development (GED) certificate as evidence of the value of earning a postsecondary degree. Of course, this conclusion is no different than comparing the lifetime earnings of those who graduated from Princeton, Harvard, and Stanford universities to those who earned degrees from public colleges and universities. A gap—likely a statistically significant one—almost certainly exists, yet it is doubtful that it can be attributed to differences in the quality of education provided by these institutions. A second problem arises from a failure to use a benchmark to assess the college experience. Stated differently, the human capital one accumulates while earning a degree at Swarthmore College, for example, is a student's "total return" from the experience (excluding for the moment the signaling value of the degree). Much like a decision to invest dollars in one asset class rather than another, the student could have opted for any number of alternative experiences—e.g., started a business, worked on a farm, pursued a career in the arts, backpacked through the Middle East, etc.—and presumably realized personal and intellectual growth in these endeavors as well. In this respect, the relevant question is the following: How much value does Swarthmore provide in excess of these alternatives? Finally, many of these studies tend to side-step the issue of the signaling value of a college degree, which is a private rather than a public benefit. As the 17 million people who possess a college degree but are employed in jobs (such as parking lot attendant, tow truck driver, and stripper) that do not require a postsecondary education might attest, the value of a degree varies considerably across sub-populations and results in the crowding out of applicants who would be otherwise qualified. Paraphrasing a quip by Richard Vedder, if the current trend continues, people will be required to "invest" six years of time and tuition to earn a Master of Arts degree in the Custodial Arts or a Master of Science degree in Janitorial Sciences to be considered qualified to push a broom and empty trash cans (Vedder 2012), a scenario that will confer considerable benefit to administrators and faculty employed by institutions of higher education but one that may also impose heavy costs on society.

Although a handful of scholars have sought to examine some of the dimensions incorporated in this analysis, operationalization of the concepts involved often has been poor.[4]

Cuéllar (2005) and Jewell and Bero (2007) have produced two notable exceptions to this general rule. Cuéllar examined rules from the Department of the Treasury, Federal Election Commission, and the Nuclear Regulatory Commission to determine whether a relationship existed between the sophistication of comments and the relative rate at which these agencies modified proposed rules to reflect recommendations received. Cuéllar found that private citizens submitted the majority of comments and these were unsophisticated. Meanwhile, suggestions that (a) differentiated between the statutory requirement and the rule, (b) recommended an explicit change, and (c) were substantiated with a page or more of legal or empirical analysis had the most significant effect on the contents of final or adopted rules (2005, 478).

Jewell and Bero (2007) did not study the relationship between comments and rule changes. Rather, their case study of a single rule advanced by California's Occupational Safety and Health Administration identified four types of commenters (the regulated community, labor-public health organizations, private citizens, and ergonomics organizations), five types of arguments and claims (health effects, economic impact,

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[4] For example, Yackee and Yackee operationalized "informational quality" using five variables: "[1] whether the commenter identified him or herself as an 'expert'; [2] whether the commenter submitted a comment of over one page in length (assuming that longer comments contain more information); [3] whether the commenter attached any additional documents, such as a scientific study, to the comment; [4] whether the commenter suggested more than one change within the comment; and [5] whether the commenter was a Washington D.C. 'insider'", that is, whether the person listed a Maryland, Virginia, or Washington D.C. address (2006, 136). Not surprisingly, they found "no statistically significant relationship between any of our measures of comment quality and the fact that the comment was written by a business interest." Therefore, they concluded, "If business comments are generally no higher quality than the comments of other kinds of commenters, then it is unlikely that business expertise is behind the disproportionate influence of business commenters" (2006, 137).

implementation considerations, legal questions, and ideological issues), and five types of evidence used by commenters to substantiate their positions (statistics, citations, study results, anecdotal or personal accounts, and private experience with ergonomics programs). They explored how these groups tended to frame their positions—business associations, which accounted for the majority of comments, used an "abstract-technical" policy frame, while labor and public health organizations and private citizens relied primarily on a "concretized-moral" perspective and provided experiential information. They did not assess whether any one of these frameworks appeared to be more influential than the others. Given the high salience of the regulatory action they investigated, it is likely that other factors such as interaction(s) between agency personnel and elected officials may have muted the effect of comments and made substantiating such conclusions difficult.

I drew upon both of these studies as well as others in this analysis, but I did not rely upon any single existing theory or argument. Stated somewhat differently, this project was primarily an exercise in theory-building rather than theory-testing. Its main contribution is methodological. Using a benchmark to interpret results is intuitive. Demonstrating how failure to do so affects the conclusions that can be drawn from a study constitutes a minor (though important) addition to the literature that has considered the regulatory process. In contrast, developing a model that identifies and quantifies the most important dimensions of comments and rules and enables this type of normalization is a much more significant challenge; one that augurs important implications for future research and alters how one assesses the conclusions of prior studies.

I turn next to providing a description of the variables used in this study.

2.1 Sophistication

As West has noted, "Effective public comment … entails reasoned argumentation. Depending on the issue, it may also require the collection and analysis of data or the ability to make a convincing legal case that the agency has stayed within or exceeded its statutory authority" (2005, 661). As Naughton *et al*. have observed:

> Comments that … provide hard data or important qualitative insight appear to be most influential. … The relatively high value placed on hard data in comments is best summed up by the interviewee who stated, 'We look at every comment; we consider every comment. But unless there is data supporting the position, it's just not that useful in the rulemaking process' (2009, 270).

Cuéller (2005) has similarly noted that regulators appear to be responsive to recommendations to modify proposed rules. However, technical sophistication varies considerably across commenters and therefore among their observations and appears to affect the likelihood that agencies will respond to a request to alter a regulation.

Even a cursory examination of comments in my data set confirmed Cuéller's conclusion as the following two recommendations demonstrate:

First off i use to be a dancer........and this law that is trying to be passed is absolutley ludacris...think about it you watch tv you see naked woman on tv what do you do shut the tv off when you see a naked woman throw the tv out .... you see more at the beach now then at a strip bar my question is this are you going to ban tv is the beach going to shut down now....or maybe we should get rid of electricity and just revert back to the 1930s what is wrong with a beautiful topless woman making money LEGALLY..... your 9 years olds arent going in to the bars are they? your 9 years olds probably hear and see more shit then in a strip bar.....and i am almost guessing that half of these hypocrites that talk all this shit about strip bars are probably the very ones that frequent them themselves (not mentioning any names but you know who you are) ever hear the saying tie a rope around a horses neck and they will just fight harder....this is freaken america the land of the FREE .....look the word up it means something why you trying to STRIP away our freedom does that make sense to you really does it?? i am just really stumped as to what is wrong with a woman dancing topless to make money to support kids....pay for school.... pay health insurance becuase we all know the government sucks balls when it comes to providing any kind of signifiacnat assiatance to single moms, people with no health insurance so these girls are tyring thier best to compensate what the government sucks at and thats taking care of thier own no thier to worreid about people overseas......our government here in va and in the us is just jacked the hell up and our government wounders why everyone is moving the hell out this fucked up state and country.[5]

This comment was submitted by "names not important now is it" on October 1, 2008, in

opposition to an action proposed by the Virginia Alcoholic Beverage Control Board to

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[5] This comment with profanities redacted may be accessed through Virginia Regulatory Town Hall at the following URL: http://townhall.virginia.gov/L/viewcomments.cfm?commentid=2751.

amend rules governing the permitted activities of partially nude entertainers at licensed establishments.

In contrast, Dr. Peter G. Rainey submitted the following comment on October 18, 2007 concerning the Virginia Soil and Water Conservation Board action to amend its regulations governing impounding structures.

> *Capacity should be determined by inflow hydrographs. The computation of an inflow hydrograph is a function of the watershed characteristics, while an outflow hydrograph is both [a] function of inflow and dam design, including reservoir characteristics, dam height, spillway characteristics, and gate(s) operating procedures. The setting of SDF design based on the outcome of that design is circular logic.*
>
> *The owner's engineer must develop PMF hydrographs for 6-, 12-, and 24-hour durations. The hydrograph that creates the largest peak outflow inflow is to be used to determine capacity for nonfailure and failure analysis.[6]*

Taken together, the above examples and analyses lend themselves to the following propositions:

> *P1. The sophistication of recommendations submitted on proposed rules varies significantly across comments.*
>
> *P2. The probability that a suggested modification will correspond to a change in a proposed regulation is related to its sophistication, that is, highly refined recommendations are more likely to coincide with amendments to rules than unsophisticated ones.*

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[6] http://townhall.virginia.gov/L/viewcomments.cfm?commentid=514.

2.2 Significance

Although the notice-and-comment period is often considered a central facet of the rulemaking process, it typically occurs after policy questions have been defined and alternatives evaluated (Simon 1976) and the agency has invested substantial time and resources in research, analysis, and consensus-building (West 2004). In this respect, whether the comment phase offers an opportunity for meaningful participation (Davis 1975), serves as a "fire alarm" to alert elected officials of the need for additional oversight (McCubbins, Noll, and Weingast 1989), or is primarily symbolic (Fritschler 1989), when one evaluates the effectiveness of comments as a form of participation in administrative rulemaking, the "stickiness" of proposed steps or actions should not be dismissed. Sunk costs likely increase an agency's commitment to a rule published for comment (Arkes and Blumer 1985). One may also assume that public officials do not intentionally write regulations they anticipate will require significant modifications.

It also appears reasonable to suppose that agency personnel possess substantial competence in the art of writing rules. At a minimum, those charged with the task have the requisite skills to pen regulations that meet statutory requirements. One may also assume administrators possess above-average technical, scientific, and economic expertise that enables them to assess the potential impact of rules on various parties and, ideally, develop a suitable narrative that minimizes dissension and possibly reconciles interests to produce a broad consensus in support of the regulation. As issues are explored and alternatives considered, agency employees have multiple opportunities to interact with and gather feedback from elected officials, various interest groups, citizens, and other public servants prior to publishing a proposed rule for comment. Additionally, government officials often

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draft regulations with the assistance of technical advisory committees or citizen advisory boards. For example, administrators wrote 39 of the 67 rules in my data set with input provided by an ad hoc or technical advisory committee. Agency staffers also typically receive feedback from interested parties through public hearings.

Translating these assumptions into expectations suggests that the burden of proof to alter a proposed rule, particularly with respect to its core elements, rests with those seeking change. Absent input that provides compelling evidence or a convincing argument, the agency will likely promulgate the regulation as written. But this stickiness is not necessarily equivalent to resistance to change. It simply suggests that responsible officials expend reasonable effort to gather and weigh relevant data in the course of drafting rules. As a result, the likelihood that new information will be provided in a comment—knowledge the public organization had not been able to gain through its multiple formal and informal interactions with various parties—will generally be low (Mendelson 2011). In sum, in order to demonstrate responsiveness to commenters, agencies may alter proposed rules. These changes may even be numerous. But they are also likely to occur at the margins while substantive elements remain unchanged (Golden 1998, Nixon, Howard, and DeWitt 2002, West 2004). This tendency translates into the following proposition:

> P3.   *Suggestions to change minor provisions of a rule are more likely to be reflected in future versions of the regulation than are recommendations to alter major provisions.*

Some scholars have "found strong evidence that interest group comments influence the bureaucratic rules issued by executive department agencies" (Yackee 2006, 114) and concluded, "those who voice their preference during the notice and comment period of

rulemaking are able to change government policy outputs to better match their preference," (Yackee 2006, 119). But the unanswered question is whether such changes are dependent, or at least related, to the significance of those preferences. Although Shapiro (2008) has hypothesized a relationship between sunk costs and rule stickiness, this proposition implies that this attribute may not be constant, rather it increases as the importance of the concern under consideration rises.

2.3   Nature of request

Another facet of stickiness is the necessity for the relevant agency to balance the statutory requirement to inform the public of rulemaking activity, to provide ample opportunity and a forum for individuals to offer feedback, to consider the recommendations received and, where appropriate, to modify a proposed regulation given the information provided.

The rub is that changing rules on the basis of comments exposes an agency to the criticism that it failed to provide sufficient notice or ample opportunity for those affected by the regulation to review it and provide input (West 2009). The more significant the modifications, the greater the potential for reproach, and the more likely the rule will be vacated by the courts on the basis of inadequate notice (Lubbers 2006). In this respect, regulator changes are not only more likely to be small and superficial, they are more likely to eliminate provisions than to add them (Magat, Krupnick, and Harrington 1986, West 2004).

Public officials may eliminate some elements of a rule with minimal substantive effect. Others cannot be deleted or modified without significantly altering the central aims of a regulation. The same is true for adding provisions: some may be quite important while others are much less so. But in all cases, a new provision, by definition, adds something to

the rule that others did not have an opportunity to consider. For example, if after the

comment period ends, an agency adds a condition that requires certain businesses to file a

report within 10 days of a specific event occurring, this change would be far more

significant than if the deadline had been part of the draft regulation, but modified from a

requirement of 10 days to 15. This bias against additive changes translates into the

following proposition:

> *P4.*   *Requests to eliminate or modify provisions of a rule, ceteris paribus, are*
> *more likely to be reflected in future versions of a regulation than*
> *recommendations to add new provisions.*

2.4   Conflict

Conflict may be the most interesting and bedeviling concept associated with rulemaking. If

one accepts the logic that sunk costs tend to contribute to rule stickiness, one might further

hypothesize that conflict encourages staff to leave rules as written. But three facets of

conflict contribute to its vexing nature:

- Statements in support of a regulation are far less frequent than arguments in

  opposition;[7]

- Participants who contribute written comments tend to exaggerate the extent of

  their disagreement (Wellman and Fahmy 1985); and

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[7]   In the sample used in this analysis, unique recommendations to alter a proposed rule outpaced unique statements of support at a rate of approximately 12:1. Following my review of the data, I categorized statements of support broadly into three groups: (1) Fear: failure to counter-balance voices of opposition might result in the agency modifying the proposed rule to accommodate the preferences of opponents, (2) Moderation: a desire to soften the extreme rhetoric of other commenters in the hope of finding a more amicable solution, e.g., a number of people who submitted observations on rules governing the towing and locksmith industries acknowledged the need for more stringent regulations, but also requested specific modifications, and (3) Cynicism: typically congratulatory statements directed at the relevant agency for taking long overdue steps.

- Parsing degrees of dissensus is particularly difficult because high numbers of comments on opposing sides of an issue may be more reflective of the effectiveness of organized interests to mobilize constituents than a reliable predictor of broad-based division(s) (Farina et al. 2013, Mendelson 2012).

Despite these difficulties, consideration of conflict yields the following proposition:

> P5. *Uncontested recommendations are more likely to be coincident with modifications in proposed regulations than suggested changes that face opposition.*

2.5   Burden

At its most basic level, administrative rulemaking is a process of imposing and/or alleviating burdens—directly and indirectly—on various parties. Some of these restrictions, requirements, and duties may be significant while others are relatively minor. Applied to the notice-and-comment portion of the rulemaking process, consideration of costs includes not only questions of degree, but also of origin; that is, whether the agency imposed the burden in the process of writing the regulation or a separate entity requested a modification that would impose it. From the perspective of those offering comments, the former is a request by an individual to minimize an obligation imposed on him or her, while the latter calls on public officials to assign costs to someone or some other group of people instead.

If one accepts the claim that agencies seek to minimize the likelihood that a rule will be invalidated through a court challenge, then a reasonable corollary to the "ossification thesis" of administrative rulemaking (McGarity 1992, Pierce 1995, Seidenfeld 1997)—the

theory that procedural constraints have raised the evidentiary burden placed on agencies and, thus, impeded the crafting and updating of regulations—is a "hardship" postulate summarized by the following propositions:

> *P6. Requests to alleviate major costs imposed by proposed regulations are more likely to coincide with subsequent changes in rules than recommendations to minimize or eliminate inconsequential or minor ones.*

> *P7. Suggestions to impose major burdens are less likely to parallel future modifications of rules than appeals that impose insignificant or minor costs on others.*

The "ossification" and "hardship" theories assume agencies are risk-averse. As evidentiary standards increase, administrators become more cautious in drafting rules. Likewise, as the toll exacted by a statute rises, the probability also increases that an agency will exercise careful diligence in ensuring it can justify any costs imposed by the rules it promulgates.

2.6   Salience and complexity

While the first four elements of the framework I develop in this analysis focus on characteristics of comments, the final two examine the salience and complexity of the rules themselves. Drawing upon Schattschneider's (1960) work on conflict, Gormley (1986) defined salience as the scope and intensity of a rule's impact on the public. High salience issues not only affect many people, the effect on those individuals is significant. He defined complexity as a function of the degree of specialized knowledge required to understand and address the problems associated with an issue. Combining these two variables suggests who will likely seek to exert influence in the regulatory process. It also raises

interesting questions about how agencies are likely to respond to comments concerning proposed rules.

For example, scholars have theorized that technical complexity raises intellectual barriers-to-entry and, thus, serves as an important element in sustaining a closed policy system (Baumgartner and Jones 1993, Sabatier and Jenkins-Smith 1993). Intricacy may also translate into greater agency discretion because it increases elected officials' incentive to pass laws with general provisions and rely on administrators to "fill in the blanks" (Bawn 1995).

Complexity may be related broadly to agency discretion, but it is difficult on that basis to anticipate whether or how it may be related to administrators' propensity to modify regulations based on participants' input. Common sense suggests that as the technical complexity of an action increases, the specialized knowledge underpinning comments would also need to rise. If not, one would expect the success rate of recommendations to decline. Although *sophistication* is a main predictor variable, I did not develop a metric to reflect the technical acumen revealed by specific provisions or recommendations. Such an assessment requires expertise, i.e., what appears highly sophisticated to one who is unfamiliar with a field may be naïve or simply nonsensical to one who is an expert. Additionally, although 35 percent of recommendations in my sample fell into the "high complexity" category (see table 4.2), only a small fraction of requests to alter rules appeared likely candidates for a "high" technical sophistication rating.

In contrast to complexity, salience may be more likely to relate directly—and inversely—to the probability that any specific recommendation is coincident with future modifications of a rule. Increased public visibility of an issue addressed by a regulation may

imply a broader range of interests at the table and additional stakeholders vying to exert

influence (Rossi 1997). Salience may also be related to conflict: as the public prominence of

a concern increases, newly interested and often opposing voices may be expected

increasingly to enter the rulemaking arena. As a rule's visibility decreases, regulated

entities may be left largely alone to hash out the terms of regulations with administrators.

I have synthesized these observations into the following propositions:

> P8.   *Technical complexity is not directly related to the probability that a
> request to modify a regulation will be incorporated into future versions
> of a rule.*

> P9.   *As the salience of a proposed regulation increases, the likelihood that
> recommendations will be reflected in subsequent versions of the rule will
> decrease.*

2.7   Other considerations

A number of other variables merit consideration and, in certain situations, may play an

important role in the likelihood that a suggestion coincides with a change to a proposed

rule.

2.7.a   Other opportunities for participation

Whether other opportunities to participate in the rulemaking process—for example, by

attending and speaking at a public hearing or serving on an advisory committee—increase

or decrease the likelihood that written recommendations submitted during the comment

period will be reflected in future versions of a rule is unclear.

One might reasonably anticipate that as the number of opportunities to participate

increases, the importance of any specific opportunity to do so will be diminished,

particularly those occasions that occur late in the rulemaking process. Additionally, if early

forms of participation increase the quality of information agencies receive prior to or

during the drafting of rules, the likelihood that comments will provide new data or analysis

may also be reduced. Both of these rationales suggest an inverse relationship between

participatory opportunities and modifications initiated during notice-and-comment

periods.

However, engagement at a public hearing does not necessarily preclude submission

of written comments. In fact, in reviewing the data used in this analysis, I found that some

people consider the comment period an opportunity to submit much more detailed and

well-reasoned arguments in favor of specific changes. They also often cite an inability to

articulate their positions fully during a hearing when the time limit imposed on speakers is

often two minutes. This improvement in quality appears at times to be a product of

frustration with the format of the hearing and at others the byproduct of learning about

opponents' arguments or responding to specific questions and hesitations voiced by agency

officials.

In short, other opportunities for participation in the rulemaking process may affect

the likelihood that a recommendation may translate into a modification of a regulation, but

I found no reason to suggest that a relationship exists or, if one does exist, its direction.

2.7.b   Rule characteristics

A number of characteristics of a proposed rule may affect the probability that a recommendation is coincident with a change; however, theory and intuition provided me little traction in forming expectations about these variables.

For example, one might hypothesize that *action type*—the amendment or repeal of an existing statute or the promulgation of a new rule—or *stage*—e.g., Notice of Intended Regulatory Action (NOIRA) versus proposed—or *federal standards*—i.e., whether there are any applicable related national regulations and whether the proposed state rule meets or exceeds those criteria—may have a moderating effect on the sophistication-change relationship. But it is unclear what the influence may be or what logic may underpin it.

I included a number of these elements as controls in the analysis. However, I did not test any specific propositions.

2.7.c   Commenter characteristics

Scholars disagree about whether comments submitted by certain individuals or groups receive preferential treatment from administrators (Yackee 2006, Yackee and Yackee 2006, but see Balla 1998, Nixon, Howard, and DeWitt 2002). Theories of agency capture and cooptation suggest that public regulatory organizations may be more responsive to special interests (Bernstein 1955, Selznick 1949, Stigler 1971) than to the general public. However, given that organized interests often have numerous (and potentially far more effective) formal and informal avenues to influence policy (Balla and Wright 2001, Chubb 1983, Hrebenar 1997), particularly at early stages in the process where the impediment of overcoming sunk organizational costs is lower (Arkes and Blumer 1985), one might question whether an inclination in favor of special or strongly affected interests during the

comment period is a reasonable assumption or if bias *against* those stakeholders that failed

to influence policy-making at an earlier stage represents a more reasonable expectation.

Perhaps the most important factor that suggests commenter characteristics have

little, if any, impact on the probability that a recommendation will coincide with a change in

a rule is the difficulty agencies face in easily and reliably verifying self-reported affiliations

and credentials. This obstacle suggests that at best commenter characteristics may have a

minor interactive effect with other variables and likely have no impact on the

recommendation-change relationship.

2.7.d   Timing

As noted above, some research suggests that those who participate early in the policy

process have a greater ability to define the terms of the debate than those who become

involved thereafter (Magat, Krupnick, and Harrington 1986, Naughton et al. 2009, but see

Balla 1998). However, people who submit recommendations near the end of the comment

period are not obligated to refute the arguments offered by previous participants.

Additionally, one might hypothesize that late submissions have a strategic advantage.

Administrators run the risk of court review if they fail to amend a proposed rule on the

basis of substantive data and analysis. By submitting recommendations late in the period,

participants prevent their opponents from providing counter-arguments to their claims.

The combination of these factors does not lend itself to an expectation that administrators

will systematically favor recommendations received early or late during the comment

period.

2.7.e Form letters

Various studies have noted the rising ubiquity of form letters that inundate agencies and offer little new information (Coglianese 2004, Emery and Emery 2005, Farina et al. 2013, Mendelson 2012, Noveck 2004-2005, Schlosberg, Zavestoski, and Shulman 2007, Zavestoski, Shulman, and Schlosberg 2006), but it remains unclear whether administrators demonstrate a vote-counting tendency when assessing recommendations.

CHAPTER THREE

PUTTING IT TOGETHER: THE NUTS & BOLTS OF THE MODEL

This chapter describes the "nuts and bolts" of the model. The first section details the data

used in the analysis. I also explain why I chose to focus on rulemaking in the

Commonwealth of Virginia. In the second part, I outline the five steps I followed to select

my sample of rules and comments. The third section contains a description of how I

identified the recommendations used in the analysis. The fourth part details the dependent,

independent, and control variables. I also describe two test variables—*identity* and *role*—

that I employed to demonstrate how to apply the model and how failure to do so can lead

one to draw erroneous conclusions. I conclude this chapter by specifying the parameters of

the model and explaining why logistic regression analysis is appropriate for a study of this

nature.

3.1 Data selection

I used comments submitted through the Virginia Regulatory Town Hall (VRTH) website in

this analysis. VRTH is a rulemaking portal maintained by the Virginia Department of

Planning & Budget (VDPB). I drew the sample for this study from suggestions to modify

proposed regulations from the launch of the site in October 1999 through February 2011.

Stakeholders submitted a total of 15,054 comments on 482 proposed rules, public

petitions for rulemaking, and periodic reviews of agency regulations during this period

(see Table 3.1). These comments are public information and available online at

http://townhall.virginia.gov/.

Why Virginia?

Gormley has argued that scholars "have focused most of our attention on federal

regulation, despite the growing importance of state regulation and the continuing

importance of local regulation … our emphasis on federal regulation has led to a set of

generalizations applicable to highly visible, technically difficult issues but not to the wider

range of regulatory issues" (1986, 596).

Apart from a handful of exceptions (Baranowski 2001, Grady and Simon 2002,

Jewell and Bero 2007, Miller and Wright 2009, Renfrow and Houston 1987, Renfrow, West,

and Houston 1986, Woods 2004, 2005, 2009) this lack of scholarly attention has been

unfortunate because states offer perhaps the best opportunity for examining competing

theories of bureaucratic responsiveness, control, and accountability across a range of

political, institutional, economic, and demographic conditions (Gerber and Teske 2000).

Virginia, in particular, provides a unique chance to study the effect of citizen

participation and bureaucrat responsiveness in the rulemaking process because no other

state has developed a web portal similar to VRTH or provides comparable access to more

than a decade of administrative rules and associated comments.

3.2 Sample selection

I took five steps to select the sample used in this study. I provide a summary of the number of rules and associated comments excluded from the sample in Table 3.1.

- *Step 1— "Bad" comments*: I eliminated 471 suggestions flagged as "bad" by VDPB. VRTH does not have a spam filter on its form, so a certain number of irrelevant "comments" are submitted.

- *Step 2—Spam*: I discarded an additional 259 comments that I categorized as "spam" because they did not recommend a change, offer a statement, or ask a question directly related to a proposed rule.[8]

- *Step 3—High and low salience rules*: I narrowed the sample to those regulations that received 5 or more suggestions, but fewer than 500. After reviewing a sample of comments, I concluded that recommendations on rules outside this band were typically low in quality and offered little more than general approval or disapproval for the proposed action. Although I explore the effect of comment sophistication in the analysis, I opted to exclude this group of 10,457 suggestions (73 percent of submissions excluding "bad" comments and spam) out of concern that if I included them the results of this analysis might be biased. Additionally, scholars have theorized that multiple parties are much more likely to engage in the policy process on high salience issues (Gormley 1986). In such situations, the probability that public comments will be directly associated with changes to a proposed rule may be

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[8] The majority of these comments were generic in character, such as "Very informative site!" and included a promotional hyperlink of the sort characteristic of spam.

greatly diminished. Many competing forces including input from elected officials and from formal and informal interaction with members of interest groups may play a much more prominent role in shaping the key provisions of regulations and may increase the "stickiness" of regulations, that is, the willingness of agency officials to consider modifications.

- *Step 4—Petitions*: I set aside 15 petitions and their associated comments (439). These actions are, as the name suggests, a request submitted to an agency recommending an amendment to an existing regulation or the development of a new one.[9] Although petitions provide a potentially important path for people to participate in the rulemaking process, their associated comments are fundamentally different than those submitted on agency-initiated rules because they seek to initiate a regulation rather than alter existing or proposed administrative actions.[10]

- *Step 5—Agency statements*: I also eliminated 26 stages that met the previous criteria, but did not have associated published statements providing the relevant agency's response to the submitted comments.[11] This group included final actions (agencies are not obligated to respond to comments submitted during this period), and proposed, emergency, and NOIRA stages that have not yet advanced to the next phase and, therefore, lacked an agency statement. I also excluded 4 APA-exempt stages that also did not include an agency response to the comments submitted.

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[9] The steps for submitting a petition are detailed in § 2.2-4007 (A) of the Virginia Code.
[10] Agencies opted to initiate rulemaking procedures on 6 of the 15 petitions (40 percent).
[11] The standard rulemaking process in the Commonwealth includes three stages: (1) Notice of Intended Regulatory Action, (2) Proposed, and (3) Final. Each step includes executive branch review of the proposed action, publication in *The Virginia Register of Regulations*, and a 30- or 60-day comment period. I provide a more detailed description of each of these steps in Appendix C.

Table 3-1: Data, stages and comments

	Stages	Comments
Complete data set*	482	15,054
Comments flagged as "bad" on VRTH		(471)
Comments flagged as spam by researcher		(259)
Excluding bad & spam comments (i.e., "good" comments)	482	14,324
Stages with < 5 or >= 500 "good" comments	(370)	(10,457)
Excluding stages with < 5 or >= 500 "good" comments	112	3,867
Petitions	(15)	(439)
Excluding petitions	97	3,428
Stages without agency statements	(26)	(823)
APA exempt actions without agency statements	(4)	(71)
Excluding stages without agency statements	67	2,534

* All comments submitted concerning proposed regulations through Virginia Regulatory Town Hall (http://townhall.virginia.gov/) from October 29, 2001 through February 18, 2011.

3.3 Identification of recommendations

Close (i.e., painstaking and often wretchedly tedious) review of the remaining 2,534 comments yielded 3,777 recommendations, statements, and questions concerning proposed regulations. I took five steps in determining the final sample used in this analysis. I summarize those measures in Table 3.2.

- *Step 1—No "rahs"*: I excluded all statements of support (764). In this analysis I sought to determine agencies willingness to alter proposed regulations based on the information they receive during the notice-and-comment period. By definition, statements of support do not request a modification of the proposed rule. Backing is reflected in the *conflict* variable (see section 3.4.b for a description of independent variables). However, as I noted earlier, I did not attempt to quantify degrees of support and opposition with an eye toward ascertaining whether bureaucrats

demonstrate a propensity toward "vote counting" in their review of comments (Schlosberg and Dryzek 2002).

- *Step 2—No misinterpretations*: I eliminated 296 recommendations that reflected a misinterpretation of the proposed rule. Many participants demonstrated a whisper-down-the-lane tendency. One commenter, for example, would state that although X was part of the proposed regulation, it really was masquerading for Y, a perceived negative alternative. Several subsequent contributors voiced strong disapproval of Y, despite the fact that it was not part of the proposed rule nor was it a logical consequence of X.

- *Step 3—Stay within the lines*: I excluded 153 requests to modify proposed rules in ways prohibited by the Code of Virginia.

- *Step 4—Eye on the prize*: I similarly omitted 164 recommended changes that fell outside the scope of the agency's obligations and constraints in writing the rule.

- *Step 5—No comments or questions*: Finally, I eliminated 492 statements and questions that failed to offer a specific or general modification for altering the proposed regulation.

This winnowing process left me with 1,908 substantive requests to alter proposed rules and a set of 687 unique recommendations for change.

Table 3-2: Data, recommendations

	Total	No. per comment
Recommendations, statements, and questions	3,777	1.490
Statements of support	(764)	0.301
Misinterpretation of proposed rule	(296)	0.117
Required by Code of Virginia	(153)	0.060
Outside scope of proposed regulation	(164)	0.065
Statement or question (excluding statements of support)	(492)	0.194
Recommendations	1,908	0.750
Unique Recommendations	687	0.272

Although three or fewer commenters requested each unique suggestion on average, most recommendations—482 in total or 70.2 percent—received support from only one person. Additionally, only 84 requests (12.2 percent) garnered the backing of five or more people.

3.4   Operationalization of concepts

I describe the dependent, independent, and control variables in the following section. I provide a detailed description of how I coded these factors in Appendix B.

3.4.a *Dependent variable*

The dependent variable in this analysis was *change*. This binary variable indicates whether the proposed rule was modified in a manner consistent with a recommendation submitted through VRTH.

3.4.b   Independent variables

My analysis included eight predictor variables (described below) and ten control variables (detailed in the next section).

Sophistication

Sophistication reflects the substance of a recommendation, how it is framed and its positions supported. I assessed sophistication using an ordinal scale from 0 to 4 with 1 point assigned for each affirmative answer to the following questions:

1. Is a specific problem identified?

2. If a particular issue has been recognized, has the commenter provided at least one tangible reason why it is problematic?

3. If the commenter has singled out a specific concern, has she provided more than one tangible reason for why it is challenging?

4. Is the participant-proposed solution supported by data and/or analysis, at least in theory?

I use the dummy variable $SOPH_{HIGH}$ in the model to indicate whether the recommendation has "high sophistication," i.e., I garnered 3 or 4 points on the ordinal scale.

Significance

Significance reflects whether the participant suggests the deletion, modification, or addition of a *superficial* (SIGN$_{SUPER}$) element, e.g., editorial suggestions, or *minor* (SIGN$_{MINOR}$) facet of the rule. The referent for these dummy variables is *major* provisions. I used *major* as the excluded category to facilitate comparison between requests to change minor and significant elements of regulations.

Request

Request indicates whether the commenter requested *eliminating/editing* or *adding* (the omitted category) a provision to the rule.

Conflict

Conflict is a dummy variable indicating whether other commenters opposed a recommendation.

Burden imposed

Burden imposed reflects whether the regulation represented a *major* (BURDEN$_{MAJOR}$) or *minor* (BURDEN$_{MINOR}$) cost on the commenter. The referent for this set of dummy variables is none, i.e., *no burden*.

Impose burden

The variable, *impose burden*, indicates whether the participant recommended modifications to the proposed regulation that would impose a *major* (IMPOSE$_{MAJOR}$) or *minor* (IMPOSE$_{MINOR}$) cost on others. Similar to the other burden-related variable, the

referent for this set of dummy variables is *none*, i.e., no substantive burden was imposed on others by the participant's proposed changes.

Salience

Salience suggests whether the rule affects a *large* (SALIENCE$_{HIGH}$), *medium* (SALIENCE$_{MEDIUM}$), or *small* (the excluded category) number of people. From this measure, I also calculated a secondary dummy variable, SALIENCE_ALT, which collapsed the *medium* and *large* categories into one, creating a binary typology: *low* and *not low*. My review of the proposed regulations suggested a three-state categorization was more appropriate. However, this second measure of salience replicates Gormley's earlier typology (1986).

Complexity

Complexity indicates whether the proposed regulation deals with issues of a *high* (COMPLEXITY$_{HIGH}$), *medium* (COMPLEXITY$_{MEDIUM}$), or *low* (the referent) technical complexity. Similar to salience, I also calculated a second measure of complexity, COMPLEXITY_ALT, which grouped the *medium* and *high* categories in one basket in order to replicate Gormley's (1986) earlier typology.

3.4.c   Control variables

Comments

I use the dummy variable, *comments*, to indicate whether one person or more than one participant offered a recommendation.

Hearings

I employed two dummy variables—HEARINGS$_1$ and HEARINGS$_2$—to indicate whether the government organization held 1-2 hearings or if the agency held 3 or more public meetings. I used *no-hearings* as the excluded category.

Committees

The dummy variable, *committee*, indicates whether a citizens' or technical advisory committee or a similar formal working group provided the agency input as its staffers crafter the proposed rule.

Rule-related variables

I included a number of rule-related variables in the analysis:

- *Stage*: Two dummy variables—$STAGE_1$ and $STAGE_2$—indicate whether the comments were submitted concerning a proposed regulation in the first stage of the rulemaking process (i.e., NOIRA, emergency NOIRA, or fast-track) or the second phase (proposed). The excluded category is the third, or final, review period.[12]

- *Action*: Similar to the stage-related variables, I employed two dummy variables—$ACTION_{ADVANCED}$ and $ACTION_{SUSPENDED}$—to stipulate whether the agency advanced a proposed regulation to the next phase or suspended it. $ACTION_{WITHDRAWN}$ is the referent for this category.

- *Exempt-status*: EXEMPT is a dummy variable specifying whether a proposed action was exempt from Article 2 of the Virginia Administrative Process Act and, therefore, normal executive branch review.

- *Action-type*: I used the dummy variable $ACTION_{NEW}$ to indicate whether a requested action required the promulgation of a new rule or an amendment to an existing regulation (the excluded category).

- *Federal standards*: FEDERAL was a dummy variable with a value of 1 when national requirements or standards were applicable to a proposed regulation.[13]

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[12]   Note that in the description of the sample selection I indicated that I excluded comments submitted during the final stage when the agency did not provide a statement with responses to the recommendations it had received. However, I did include in the analysis recommendations submitted during the final stage if the agency offered a formal response to them.

[13]   I opted not to include two related variables in this analysis: whether the proposed *rule* included provisions that exceed federal laws or regulations and whether the proposed *recommendation* requested changes that exceed national standards. Given that both variables are contingent (i.e., if $FED_{APPLICABLE} = 1$, then determine if they meet the other criterion), including them would have significantly reduced the sample size in the analysis. Additionally, I found only 42 recommendations that clearly requested changes that exceeded federal standards. All of these suggestions were submitted by Maureen Hollowell on behalf of

3.4.d   Test variables

This analysis is premised on the contention that administrators decide to alter proposed regulations—if they opt to modify them at all—on the basis of the substantive feedback they receive from participants. Stated differently, a written recommendation that prompts a change to a rule will have that result whether a man or woman submits it, whether the commenter identifies him or herself, or whether the author notes a particular affiliation or cites a credential that may suggest expertise.

Given the inherent difficulty of verifying the identity of those who submit comments online, administrators have few, if any, options more viable than simply assessing recommendations on the merits of the arguments they present. This assumption does not run counter to the vast literature concerning bureaucratic policymaking, e.g., theories and findings of empirical analyses of "regulatory capture" (Stigler 1971, Peltzman 1976, Tirole 1986, Laffont and Tirole 1993). Instead, it suggests if capture occurs, it will not be reflected in a greater responsiveness to recommendations submitted by regulated entities during the comment period of the rulemaking process. The "success rate" of these groups' requests to alter proposed regulations may exceed the proportion realized by "unorganized" interests, but this disparity will be the product of systematic and substantive differences in the arguments supporting and opposing changes rather than bureaucratic bias.

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the Virginia Coalition for Students with Disabilities. The Virginia Department of Education opted not to provide additional guidance or alter the rule based on her recommendations and noted that the language included in the draft rule mirrored the federal regulatory requirement.

Chapter 5 demonstrates how inaccurate conclusions can be drawn from analyses that do not build upon this assumption regarding bias by applying the model developed in this paper to two test cases:

- *Identity*: This variable indicates whether an author signed his or her comment.

- *Role*: I coded all submissions for three roles: (a) regulated firms, e.g., poultry farmers; (b) interests or individuals indirectly affected by a regulation, e.g., fly-fishing guides whose businesses may be negatively affected by the run-off of poultry waste into streams and rivers, and consumers or private citizens, e.g., those who use rivers for recreational purposes; and (c) unknown.

I provide a detailed description of how I coded these and all of the main predictor and control variables in Appendix B.

3.5   Building the model

The previous chapter's propositions can be summarized as follows:

The probability that a recommendation will coincide with a change to a proposed regulation <u>rises</u> as

- The *sophistication* of the argument(s) presented increases
- The costs or *burden imposed* by any element of a rule grow

And if

- The *request* requires editing or deleting provisions rather than adding them

And <u>decreases</u> as

- The *significance* of the suggested modification grows

- The *burden imposed* by the requested change increases

- The *salience* of the regulation rises

And if

- The recommendation is contested, that is, if *conflict* exists.

Of course, each of these statements is offered with the caveat of *ceteris paribus*, that is, these relationships may be expected "all other things being equal."

If I followed the standard practice of most academic papers, I likely would not have included the previous summary. Instead I would have noted, "Given the dichotomous nature of the dependent variable, *change*, I used a logit regression model in this analysis." Thereafter, I would have provided the generalized formula:

$$\text{logit(Y)} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k \tag{3.1}$$

I would note that the *X*s represent variables of interest, α and βs are constant unknown parameters, and logit(Y) is the natural logarithm of the odds of the dependent variable. Logit(Y) may also be converted to odds as follows:

$$\text{Odds}(Y = 1) = e^{\ln[odds(y=1)]} \tag{3.2}$$

$$\text{Odds}(Y = 1) = e^{\alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k} \tag{3.3}$$

Odds are simply ratios: the probability that an event (*i*) will happen relative to the probability it will not:

$$\frac{P_i}{(1 - P_i)} = O_i \qquad (3.4)$$

Or rearranged algebraically,

$$P_i = \frac{O_i}{(1 + O_i)} \qquad (3.5)$$

Therefore, probability may be calculated from logit(Y):

$$P_i = \frac{e^{\alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k}}{(1 + e^{\alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k})} \qquad (3.6)$$

Applying the generalized logit formula to my model, I would therefore have provided the following result:

$$\begin{aligned}
\text{logit(Y)} = {} & \alpha + \beta_1 \, \text{SOPH}_{\text{HIGH}} + \beta_2 \, \text{REQUEST} \qquad (3.7)\\
& + \beta_3 \, \text{BURDEN}_{\text{MAJOR}} + \beta_4 \, \text{BURDEN}_{\text{MINOR}}\\
& + \beta_5 \, \text{CONFLICT}\\
& + \beta_6 \, \text{SIGN}_{\text{MINOR}} + \beta_7 \, \text{SIGN}_{\text{SUPER}}\\
& + \beta_8 \, \text{IMPOSE}_{\text{MAJOR}} + \beta_9 \, \text{IMPOSE}_{\text{MINOR}}\\
& + \beta_{10} \, \text{SALIENCE}_{\text{HIGH}}\\
& + \beta_{11} \, \text{SALIENCE}_{\text{MEDIUM}}\\
& + \beta_{12} \, \text{COMPLEXITY}_{\text{HIGH}}\\
& + \beta_{13} \, \text{COMPLEXITY}_{\text{MEDIUM}}
\end{aligned}$$

While such a description may be succinct, I believe such explanations and equations are often inferior to their "plain English" alternatives.

First, if one does not spend much time thinking about equations, the short-hand of a formula typically requires effort to interpret. An elegant equation is not unlike a piece of

well-written code, except that best practices dictate by definition that well-written code should also be well-commented.

Second, conceptually, dummy variables are intuitive, yet their interpretation for ordinals with more than two categories is more troublesome than deciphering well-written prose. For example, the statement "The likelihood of change ... decreases as the *salience* of the regulation increases" is clear. In contrast, "logit(Y) = α + β_9 SALIENCE$_{HIGH}$ + β_{10} SALIENCE$_{MEDIUM}$" converts salience into two variables and requires knowledge of the omitted category (although clearly using descriptive names for variables aids interpretation).

Finally, interactions between variables can be both significant and difficult to interpret. My model does not contain any interactive terms. However, if I had a variable for *technical sophistication*, for example, I might hypothesize that it interacts with *complexity*, e.g., as the complexity of an action increases, technical sophistication must also rise to realize a similar probability of change. These hypothetical interactive terms may have been included in the model as follows:

$$... + \ \beta_{13}COMPLEXITY_{HIGH}SOPH_{TECH} \hspace{3cm} (3.8)$$
$$+ \ \beta_{14}COMPLEXITY_{MEDIUM}SOPH_{TECH}$$

This representation of the interaction is precise, but it raises questions about its exact character: Why, for example, is it multiplicative rather than, say, additive?

While these criticisms are relatively superficial, one that requires more consideration is that most people possess little, if any, intuition about what the natural logarithm of the odds of an event may be. In contrast, when we consider the probability of an event (*Y*) given a set of factors (*X$_1$, X$_2$, X$_3$, ... X$_k$*), we know at a minimum that *Y* will be a

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value that ranges from 0 to 1 because probabilities of -0.24 and 1.38 are clearly nonsensical.

Given these limits, we may also likely intuit that a linear relationship does not exist between X and Y. Instead large changes in X at the tails will produce small increases in the probability of Y, that is, the line depicting probability will flatten as it reaches its limits. And relatively small changes in X in a mid-range of values will alter the probability of Y considerably. Perhaps an S-shaped curve is not necessarily intuitive in the abstract, but it becomes so when one considers a simple analogy.

Suppose one is interested in the relationship between income—our predictor variable (X)—and home-ownership (Y) where $Y=1$ when a person owns a home. Imagine a person who earns $10,000 per year. In all likelihood he does not own a home. Of course, he may, but if we select him at random from a population of people who earned $10,000, it is reasonable to suspect he will not.

Now imagine that our hypothetical friend has the good fortune to double his income. Perhaps he earned his Ph.D. in literature and a resurgence of interest in lyric poetry of the High Middle Ages has been a boon for his bottom line. Despite the $10,000 increase in annual income to $20,000, he likely will still not have the resources to own a home. After all, his earnings may not be enough to pay for basic necessities, let alone for amassing the capital necessary for a down-payment.

Similarly, if we select an individual at random who earns $300,000 per year, in all likelihood, she will own a home. And if she has the similar good fortune to realize a $10,000 bump in base pay, the effect on the probability that she owns a house will likely be minimal.

In contrast, if we select someone at random from among individuals who earn

$60,000 per year and her salary increases to $70,000, the likelihood she owns a house may

increase considerably.[14]

The value of the S-shape becomes even more evident when describing the

relationship of multiple predictor variables. For example, consider a simplified version of

my model that includes only three dummy variables—*sophistication*, *action*, and *conflict*:

- $SOPH_{HIGH}$ = 1 for highly sophisticated comments (0=low sophistication)

- $ACTION$ = 1 for edits and eliminations (0=additions)

- $CONFLICT_{NONE}$ = 1 when the recommendation is uncontested (0=some participants

  voice disagreement with the suggested change)

Reflect on the following formula:

$$P(CHANGE=1) = 0.2 + 0.5 \ SOPH_{HIGH} \qquad\qquad (3.9)$$
$$+ 0.4 \ ACTION$$
$$+ 0.4 \ CONFLICT_{NONE}$$

If sophistication of the recommendation is low, the request requires the addition of

provisions, and other participants oppose the changes, all of our dummy variables equal

zero and the predicted probability that the recommendation coincides with a change to the

proposed rule is 0.2.

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[14] Many use this example to illustrate curvilinear relationships. I first encountered it in Pampel's *Logistic Regression* (2000).

If we consider the opposite scenario—a highly sophisticated comment (SOPH$_{HIGH}$ = 1) that requests the elimination of a provision (ACTION = 1) and is uncontested (CONFLICT$_{NONE}$ = 1)—the fly in this ointment becomes apparent:

$$P(CHANGE=1) = 0.2 + 0.5\ (1) + 0.4\ (1) + 0.4\ (1) = 1.5 \qquad (3.10)$$

A few deductions might be made from this example. Perhaps one might surmise that the "value added" contribution of our variables—our betas—should not be constant. Alternatively, the analyst might suspect that the relationship between variables is interactive or perhaps not additive.

One can pursue a few options to address this problem. For example, researchers can continue to use a linear equation but truncate results at 0 and 1. Unfortunately, this solution fails to address important conceptual requirements of regressions: primarily, to make inferences about the parameters, the effect of a predictor variable on a dependent variable must be constant and independent of other variables. Stated more simply, if our β for a variable is 0.5, it must be 0.5 for all values of the variable. It cannot change as other factors in the equation change.[15]

Alternatively, one can continue to use a linear equation to relate the independent variables to the dependent variable, but transform one or the other so the *substantive* relationship between them is nonlinear (Menard 2002). Berry and Feldman (1985) review

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[15] Additionally, this option fails to satisfy the requirement of normality for the error terms and homoscedasticity. Obviously, errors cannot be normally distributed because a dichotomous dependent variable can only be two values. Moreover, error terms in this equation will vary systematically with the independent variables (Pampel 2000).

a number of methods for transforming independent variables, but the most

straightforward option is altering the dependent variable so it naturally varies from 0 to 1

as the sum of predictors ranges from positive to negative infinity (Kleinbaum and Klein

2010). In other words, by transforming the dependent variable, one solves the problems

identified in Equation 3.10. One may use a linear formula, that is, sum the constant (α) and

the products of the parameters (β_i) and independent variables (X_i). The delimited

parameters are (appropriately) constant—one does not need to alter them for various

values of a predictor or as the values of the other predictors in our equation vary—and

totals in excess of 1 or less than 0 no longer occur.

Aldrich and Nelson (1984) describe a number of curvilinear transformations that

differ in how rapidly or slowly their tails approach their limits, but the most commonly

used for analyzing dichotomous dependent variables—and the one I use in this analysis—

is the logistic transformation (Hosmer, Lemeshow, and Sturdivant 2013):

$$Y = \frac{1}{1 + e^{-x}} \qquad\qquad (3.11)$$

Although it may not be intuitive, Equation 3.11 is equivalent to Equation 3.6. It produces

the desired S-shaped curve (Figure 3.1) with a predicted probability (the Y-axis) that

ranges from 0 to 1 as *X* varies from ± ∞:

Figure 3-1: Logistic model
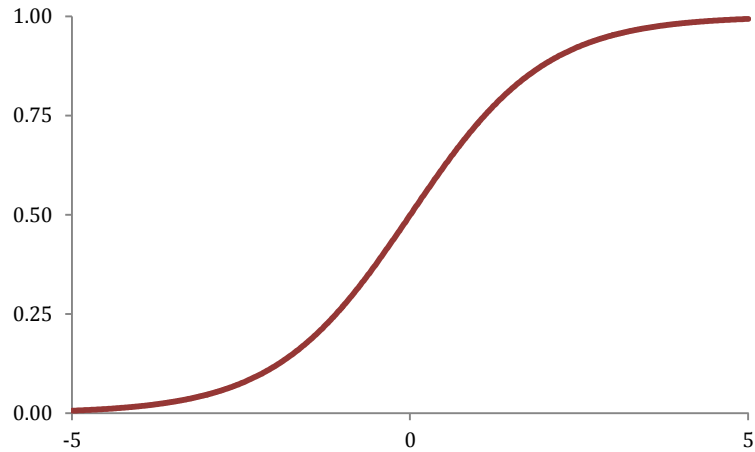
The next chapter describes the results of my study by reviewing a number of descriptive statistics about the data, providing a correlation matrix of the variables, and detailing the results of the logistic regression analyses I performed. I also provide a summary of the bootstrap analyses I conducted to determine how dependent the results of my regressions were upon the sample I selected.

CHAPTER FOUR

RESULTS

I describe the results of my analysis in the next four sections. In the first two of those parts, I detail a number of descriptive statistics, provide a correlation matrix of the independent variables and consider questions of multicollinearity. In the third section, I review the model's coefficient estimates and summary statistics. Finally, I provide the results of three bootstrap analyses that offer greater context for interpreting the results of the regression analyses I performed.

4.1   Descriptive statistics

Table 3.2 detailed the sample used in this analysis, which included 687 unique recommendations. Approximately 38 percent of those suggestions (260) were coincident with subsequent modifications to proposed regulations. Table 4.1 below lists each of the main predictor variables and the number and percentage of recommendations that coincided with a change to a rule.

Table 4-1: Success rate of main predictor variables

	No change	Change	Total	No change	Change
SOPHISTICATION					
SOPH HIGH	275	225	500	0.5500	0.4500
SOPH LOW	152	35	187	0.8128	0.1872
SIGNIFICANCE					
SIGN MAJOR	75	9	84	0.8929	0.1071
SIGN MINOR	223	177	400	0.5575	0.4425
SIGN NONE	129	74	203	0.6355	0.3645
REQUEST					
REQUEST AX/EDIT	169	210	379	0.4459	0.5541
REQUEST ADD	258	50	308	0.8377	0.1623
CONFLICT					
CONFLICT YES	140	9	149	0.9396	0.0604
CONFLICT NO	287	251	538	0.5335	0.4665
BURDEN IMPOSE					
BURDEN MAJOR	7	105	112	0.0625	0.9375
BURDEN MINOR	159	15	174	0.9138	0.0862
BURDEN NONE	261	140	401	0.6509	0.3491
IMPOSE BURDEN					
IMPOSE MAJOR	96	7	103	0.9320	0.0680
IMPOSE MINOR	93	19	112	0.8304	0.1696
IMPOSE NONE	238	234	472	0.5042	0.4958
SALIENCE					
SALIENCE HIGH	17	14	31	0.5484	0.4516
SALIENCE MEDIUM	242	130	372	0.6505	0.3495
SALIENCE LOW	168	116	284	0.5915	0.4085
SALIENCE (ALTERNATE)					
SALIENCE NOT LOW	259	144	403	0.6427	0.3573
SALIENCE LOW	168	116	284	0.5915	0.4085
COMPLEXITY					
COMPLEXITY HIGH	150	91	241	0.6224	0.3776
COMPLEXITY MEDIUM	167	78	245	0.6816	0.3184
COMPLEXITY LOW	110	91	201	0.5473	0.4527
COMPLEXITY (ALTERNATE)					
COMPLEXITY NOT LOW	317	169	486	0.6523	0.3477
COMPLEXITY LOW	110	91	201	0.5473	0.4527

Setting aside *salience* and *complexity* for a moment, the predictor variables and the dependent variable, *change*, appear to be related. For example, requested modifications with a high rating for *sophistication* coincided with changes more frequently than average (45 percent vs. 38 percent). More importantly, as the sophistication of recommendations increased from low to high, their success rate (that is, their association with a subsequent shift) increased from 18.7 percent to 45 percent.

As expected, most of the variables showed similar increases in success rate. Nonetheless, I encountered some interesting and unanticipated results, which I describe below:

- **Burden imposed**: Agencies demonstrated a greater tendency to alter the provisions of regulations that impose major rather than minor burdens. However, I found the disparity—93.8 percent versus 8.6 percent—remarkable. By reviewing the data, I discovered that almost all of the "major burdens" modified upon request seemed to reflect misperceptions on the part of the agency regarding the extent of costs the rule imposed. For example, the Board of Veterinary Medicine proposed a restriction on dental descaling by veterinary assistants. In response, David Smith, DVM, outlined a number of reasons why this change ran counter to standard practices, increased the risk to patients (by increasing the time they would need to be anesthetized), and placed a greater financial burden on their guardians.[16] Similarly, regulations proposed by the Virginia Soil and Water Board initially did not include a provision to exclude Class IV

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[16] http://townhall.virginia.gov/L/viewcomments.cfm?commentid=2757

impounding structures if failure would result in no loss of life and no damage to properties other than those of the dam owner. When so advised, the agency's resulting modification affected only nine dams, but reduced the fiscal impact of the regulation by approximately $25 million (Virginia Soil and Water Conservation Board 2008). Prior to reviewing the comments, I believed shifts such as these were relatively infrequent. However, this study revealed that they occur more frequently than anticipated.

- **Impose burden**: As expected, the greater the burden a commenter seeks to impose the less receptive administrators appear to be to make a change to a proposed rule. However, I was surprised to learn that nearly half (49.6 percent) of all recommendations coincided with changes to proposed rules if one excludes requests that seek to impose a cost. By excluding recommendations that impose a burden of any kind, I found that 65.2 percent of requests for *minor* changes and 16 percent of *major* modifications were adopted. The combination of these results suggests a certain degree of administrative responsiveness to input from participants during the notice-and-comment period, but primarily in ways that do not alter the core elements of a regulation. That is not to say that the changes are overwhelmingly superficial. One may create meaningful benefit or impose significant costs by adding or eliminating minor provisions of a regulation. It suggests instead that much of the action of the regulatory process, particularly as it pertains to the crafting

of the central facets of rules appears to occur, as Stewart (1975) and Elliot (1992) suggested, off the public stage.

- **Salience**: Another interesting and somewhat surprising result is the U-shaped relationship between *salience* and *change*. However, one should note that there are only 31 recommendations on high salience regulations (4.5 percent of recommendations in the sample). Given this low number of observations, the 45.2 percent success rate of recommendations for this group should be interpreted with caution. It is certainly possible the suggestions addressing high salience issues coincide with changes at a much lower frequency and this relationship—inverse linear rather than U-shaped—would be revealed if the sample included a greater number of very salient actions.

    It is also possible that the success rate is accurate or perhaps even low. If one accepts the general assumption that the risk of rule invalidation by judicial review increases if administrators fail to demonstrate a willingness to modify regulations based on the feedback they receive and higher salience issues have more interested parties who may seek to use the comment period to prompt action by the courts, risk-aversion on the part of the agency may translate into a higher-than-average success rate for recommendations on highly salient actions.

    This logic suggests that the problem presented by the U-shaped relationship is not the success rate of recommendations concerning strongly salient issues. Instead, the noteworthy result is the unexpectedly

large acceptance rate on requests related to low salience issues. That is, instead of 40.9 percent, one might anticipate that it would be less than the approximately 35 percent observed for recommendations on medium salience rules.

Alternatively, the answer may lie elsewhere, perhaps hidden in the nature of the requested changes and the perspective and objectives of the administrators taxed with drafting the rules and responding to participants' requests. For example, one might theorize that (a) the success rate of requests for major changes will fall as salience (and agency risk-aversion) decreases. But if (b) the percentage of recommendations that seek modifications to key provisions remains constant as salience varies, then (c) the success rate for *non-major* changes will *increase* as salience *decreases.* Parsing the numbers, I found the following:

(a) The success rate of recommendations suggesting major changes does decline from 16.3 percent (7 out of 43) to 5.6 percent (2 out of 36) as salience decreases from medium to low.[17]

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[17] There were only five recommendations for major changes concerning high salience actions in my sample and none of them coincided with modifications to the proposed rules. Again, note the difficulties posed by small samples. If administrators adopted only one of the requested modifications, the success rate on high salience regulations would have been 20 percent.

(b) The frequency of requests for major modifications is relatively stable as salience varies: 12.7 percent for low, 11.6 percent for medium, and 16.1 percent for high.[18]

(c) From this I deduce that the success rate for minor and insignificant changes was higher on low salience issues—49.4 percent and 40.2 percent, respectively—than medium and high salience rules combined—41 percent and 33.3 percent.

These numbers reveal the phenomenon, but they do not explain it. I suspect this gap reflects some combination of better quality control on the part of the agency as salience increases, higher-than-average quality recommendations on low salience issues, and less conflict.

As salience increases, agencies appear to take greater care in producing regulation drafts before submitting them for comment. Higher quality control means fewer opportunities for superficial editorial changes.[19] Many low salience issues in this sample were also not complex (see Tables 4-3 and 4-4), which means many citizens and politicians "couldn't care less [about them]… journalists, who thrive on the histrionics of political partisanship and outraged citizens, find little grist for their mill… the stakes [aren't] high enough to warrant judicial

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[18] Although the high-salience value seems larger than the others, the small number of recommendations (31) concerning these actions means if only one of the suggestions had been minor rather than major the percentage would have been 12.9, very much meeting expectations.

[19] One may argue that all recommendations for insignificant changes should be excluded from an analysis if the primary interest is agency responsiveness to requests for substantive modifications of rules. In the next section, I calculate two versions of the model: one with all recommendations and one with requests to alter insignificant elements excluded.

review... [so] this leaves the field to low-level bureaucrats and regulated firms, who reach a *modus vivendi* that enables both to survive" (Gormley 1986, 610).

The byproduct of this balance may be a greater aversion on the part of administrators to implement major modifications to low salience-low complexity regulations, but also a somewhat greater willingness to compromise on changes of lesser importance. Additionally, emptying the field of participants other than members of the regulated industry translates into less conflict and, accordingly, less justification for the agencies to disregard well-reasoned requests for changes.

- **Complexity:** The U-shaped relationship between *complexity* and *change* is also curious. Recall that in proposition 8, I anticipated no relationship between these variables. Given that the recommendations are distributed roughly evenly across the states of complexity, the level of variation suggests a statistically significant relationship likely exists. As the correlation matrix provided in Table 4-6 illustrates, *complexity* is not strongly correlated with any of the other independent variables. Similar to *salience*, the U-shaped curve may be the product of multiple factors, but I found no explanation with intuitive appeal.

- **Alternative measure of salience and complexity:** The alternative measures of salience and complexity are a bit easier to interpret: as salience increases, the success rate of recommendations decreases; as

complexity rises, fewer requests to modify proposed rules appear to translate into changes. Table 4-2 provides the success rate in a two-by-two matrix of these alternative measures:

Table 4-2: Success rate of alternative measures of salience and complexity

		COMPLEXITY		
		Low	Not Low	Total
	Low	0.4496	0.3742	0.4085
SALIENCE	Not Low	0.4583	0.3353	0.3573
	Total	0.4527	0.3477	

As noted, approximately 40 percent (27 of 67) of the stages included in the sample were low in salience and complexity and they generated 18.8 percent of the recommendations I examined (see Table 4-3). As intricacy increased, the number of recommendations per rule also increased—5.3 for low, 15.3 for medium, and 18.5 for high—as did the number of comments per rule—26.9 for low, 40.8 for medium, and 66.1 for high.

High salience rules received the lowest number of unique recommendations per regulation, 6.2. The average number of comments submitted per rule also increased as salience rose from 29.0 for low to 64.6 for high. Combining these results suggests that as salience rises, more people add their voices to the discussion, but they say less and, more often than not, repeat what others have

already said. But, again, one must exercise caution in interpreting these results given the low number of observations for high salience rules.

Table 4-3: Stages, recommendations, and comments by salience and complexity

		COMPLEXITY			
		Low	Medium	High	Total
		Stages—recommendation—comments	Stages—recommendation—comments	Stages—recommendation—comments	Stages—recommendation—comments
	Low	27—129—572	9—119—472	2—36—57	38—284—1,101
SALIENCE	Medium	9—49—389	7—126—180	8—197—541	24—272—1,110
	High	2—23—62	0—0—0	3—8—261	5—31—323
	Total	38—201—1,023	16—245—652	13—241—859	67—687—2,534

These relationships also exist when considered from the perspective of the two-by-two typology of salience and complexity: as salience increases, the number of comments submitted increases, but the number of unique recommendations does not increase proportionately, i.e., more voices enter the fray, but they generate relatively fewer discrete ideas for change.

In contrast, as technical complexity increases, the number of comments per rule nearly doubles but the number of recommendations the agency receives more than triples.

Table 4-4: Stages, recommendations, and comments by alternative measure of salience and complexity

		COMPLEXITY		
		Low	Not Low	Total
		Stages—recommendation—comments	Stages—recommendation—comments	Stages—recommendation—comments
	Low	27—129—572	11—155—529	38—284—1,101
SALIENCE	Not Low	11—72—451	18—331—982	29—303—1,433
	Total	38—201—1,023	29—486—1,511	67—687—2,534

Table 4-5 provides a list of my control variables and the number and percentage of

recommendations that coincided with a change to a rule.

Table 4-5: Success rate of control variables

	No change	Change	Total	No change	Change
COMMENT					
COMMENT $_1$	313	169	482	0.6494	0.3506
COMMENT $_{GT\_1}$	114	91	205	0.5561	0.4439
HEARINGS					
HEARINGS $_0$	170	111	281	0.6050	0.3950
HEARINGS $_1$	183	84	267	0.6854	0.3146
HEARINGS $_2$	74	65	139	0.5324	0.4676
COMMITTEE					
COMMITTEE $_{YES}$	166	117	283	0.5866	0.4134
COMMITTEE $_{NO}$	261	143	404	0.6460	0.3540
STAGE					
STAGE $_1$	59	11	70	0.8429	0.1571
STAGE $_2$	49	35	84	0.5833	0.4167
STAGE $_3$	319	214	538	0.5985	0.4015
ACTION					
ACTION $_{ADVANCED}$	363	248	611	0.5941	0.4059
ACTION $_{SUSPENDED}$	59	11	70	0.8429	0.1571
ACTION $_{WITHDRAWN}$	5	1	6	0.8333	0.1667
EXEMPT STATUS					
EXEMPT $_{YES}$	60	22	82	0.7317	0.2683
EXEMPT $_{NO}$	367	238	605	0.6066	0.3934
ACTION TYPE					
ACTION $_{TYPE\_NEW}$	210	105	315	0.6667	0.3333
ACTION $_{TYPE\_AMEND}$	217	155	372	0.5833	0.4167
FEDERAL STANDARDS					
FEDERAL $_{YES}$	251	154	405	0.6198	0.3802
FEDERAL $_{NO}$	176	106	282	0.6241	0.3759

Single or lone participants requested more than 70 percent of recommendations (the

highest number of commenters to request a specific change was 151). But as the number of

people requesting a modification increased, the success rate rose from 35.1 to 44.4 percent.

This tally also suggests that administrators may be more amenable to modifying provisions of regulations that are being amended (rather than being created afresh) and if the rule had been drafted with input from a citizen or stakeholder advisory committee.

Another curious U-shape relationship appears to exist between *hearings* and *change*. It is possible that hearings may be another (and perhaps superior) measure of salience, but as the matrix in Table 4-6 details, the correlation coefficient between hearings and salience is 0.145.

Three of the dummy control variables—*stage*, *action*, and *exempt status*—may not be good candidates for inclusion in the final model because a large percentage of the recommendations for each falls into only one of the three categories.

4.2   Correlation matrix

I provide a correlation matrix of the independent variables in Table 4-6. I highlight the main predictor factors as well as any relationships with absolute values in excess of 0.5.

Examination of the pairwise correlation coefficients of the independent variables suggests that multicollinearity is low and should not be problematic for the model. I confirmed this conclusion by calculating the condition index for the correlation matrix. That calculation yielded a value of 8.2, or slightly more than half the cut-off value of 15 which would suggest the presence of collinearity (Chatterjee and Hadi 2012). As a second check, I calculated tolerance for each of the variables by running a regression of the predictor variables against the variable, *change*, using OLS.[20] The average tolerance across the variables was 0.674. The minimum was 0.483 for the variable, *significance.* Both of

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[20]   Collinearity concerns the relationship between predictor variables; therefore, the functional form of the model to the dependent variable is unimportant (Menard 2002).

these results are substantially higher than the benchmark of less than 0.2 used to detect the presence of multicollinearity (Menard 2002).

Expanding this analysis to include the control variables, the tolerance levels for *stage*, *action*—whether the agency advanced, withdrew, or suspended the proposed regulation—and *exempt status* fell below the 0.2 cut-off, suggesting that the model may be improved by excluding them. The condition index with all variables included was 55.1, well in excess of the recommended cut-off of 15. I calculated various combinations of independent variables and determined that excluding *stage* and *action* reduced the condition index to 15.0. Any combination that included these variables had a condition index in excess of 50. Eliminating any other control variable from the model lowered the condition index to a value ranging from 13.2 to 14.6.

Table 4-6: Correlation matrix of main predictor and control variables

	SOPH	SIGN	REQ	CON	BUR	IMP	SAL	COMP	COM	HEAR	CMT	STG	ACTR	EXP	ACTT	FED
Sophistication (SOPH)	1.00	0.09	-0.22	-0.04	-0.32	0.29	-0.06	0.06	0.00	-0.10	0.03	-0.17	0.19	0.17	0.04	-0.05
Significance (SIGN)		1.00	0.01	0.34	-0.02	0.28	0.01	0.07	-0.10	0.12	0.24	0.09	-0.09	-0.13	-0.12	0.01
Request (REQ)			1.00	0.38	0.34	0.01	0.05	0.02	0.02	0.10	-0.09	-0.07	0.10	0.05	-0.06	0.01
Conflict (CON)				1.00	0.35	0.32	0.03	-0.05	-0.09	0.06	0.05	-0.04	-0.03	-0.03	-0.11	-0.09
Burden imposed (BUR)					1.00	-0.20	0.04	-0.10	0.01	0.21	0.04	0.13	-0.08	-0.13	-0.11	-0.12
Impose burden (IMP)						1.00	0.09	0.06	-0.13	-0.10	0.08	-0.21	0.14	0.15	0.03	0.01
Salience (SAL)							1.00	0.30	-0.03	0.15	0.05	-0.14	0.10	0.09	0.31	0.28
Complexity (COMP)								1.00	-0.03	0.15	0.34	0.04	-0.03	-0.13	0.01	0.41
Comments (COM)									1.00	0.05	-0.01	0.14	-0.10	-0.12	0.08	-0.06
Hearings (HEAR)										1.00	0.37	0.53	-0.31	-0.39	-0.22	-0.22
Committee (CMT)											1.00	0.24	-0.28	-0.27	-0.27	-0.25
Stage (STG)												1.00	-0.83	-0.86	-0.18	-0.22
Action rule (ACTR)													1.00	0.88	0.30	0.18
Exempt status (EXP)														1.00	0.23	0.13
Action type (ACTT)															1.00	0.31
Federal std. (FED)																1.00

4.3 Model estimates and summary statistics

I provide the results of the full model in Table 4-7.

Table 4-7: Base model estimates and prediction summary

Model estimates	Coefficient	Significance (Wald)[21]	Significance (Δ -2LL)[22]	Exp(β)
Constant	-0.637			
SOPH HIGH	1.684	0.000	0.000	5.385
SIGNIFICANCE		0.000	0.000	
SIGN SUPER	2.600	0.005		13.460
SIGN MINOR	3.831	0.000		46.103
REQUEST	-1.706	0.000	0.000	0.182
CONFLICT	-2.770	0.000	0.000	0.063
BURDEN IMPOSED		0.000	0.000	
BURDEN MINOR	-4.393	0.000		0.012
BURDEN MAJOR	4.154	0.000		63.702
IMPOSE BURDEN		0.000	0.000	
IMPOSE MINOR	-2.777	0.000		0.062
IMPOSE MAJOR	-3.571	0.000		0.028
SALIENCE		0.226	0.217	
SALIENCE MEDIUM	-0.738	0.147		0.478
SALIENCE HIGH	-0.623	0.400		0.536
COMPLEXITY		0.019	0.019	
COMPLEXITY MEDIUM	-1.375	0.005		0.253
COMPLEXITY HIGH	-1.094	0.048		0.335
COMMENTS	-0.985	0.007	0.006	0.373
HEARINGS		0.579	0.575	
HEARINGS 1	-0.428	0.424		0.651
HEARINGS 2	0.115	0.847		1.122
COMMITTEES	0.091	0.846	0.846	1.096
EXEMPT	0.344	0.551	0.551	1.411
ACTION NEW	-0.809	0.050	0.051	0.445
FEDERAL	0.783	0.066	0.063	2.187

	λ	Accuracy	R²L	Hosmer-Lemeshow
Model summary	0.685*	0.881	0.615*	0.000

* $p \leq 0.001$

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[21] Significance based on Wald statistic.
[22] Significance calculated as the change in -2 Log Likelihood if the variable is removed.

I found statistically significant evidence that each of the main predictor variables except

salience and *complexity* has a relationship with *change*, at the level of $p < 0.001$. The effect

of *complexity* on *change* is statistically significant at the $p < 0.05$ level. The model χ^2

(labeled R^2L) is also significant at $p < 0.001$, enabling me to reject the null hypothesis that

the independent variables are not related to the dependent variable. However, note that

the Hosmer-Lemeshow test is statistically significant ($p < 0.001$) which suggests the model

does a poor job of fitting the data.[23]

In many studies, how well the model fits the data is the primary focus. In this

analysis, I am principally interested in the model's predictive efficiency. As Menard (2002)

noted, one may develop a framework that fits a data sample well but does a poor job of

predicting outcomes.

Lambda—an asymmetric, proportional reduction in error measure of association—

indicates the model does a very good of predicting case classification.[24] It is also

statistically significant at $p < 0.001$. The predictive accuracy of the model is 0.881.

Although applying the backward elimination of variables method may at times fail

to uncover complex interactions between independent variables, it is commonly used for

exploratory research and in predictive model construction (Menard 2002). Using -2 Log

Likelihood (-2LL) as the litmus enabled me to exclude the following variables:

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[23] I provide the results of the Hosmer-Lemeshow test primarily because it is a popular goodness-of-fit
     statistic. It should be noted, however, that the results of this test vary depending on the number of groups
     selected. Hosmer and Lemeshow (1980) recommend using ten groups—and I use ten in my calculation—
     but this choice is arbitrary and without a theoretical foundation (Allison 2013).
[24] Although indices of predictive efficiency are not often reported in summary statistics (Pampel 2000),
     Menard (2010) makes a strong case for their inclusion, particularly when the accuracy of the model in
     predicting outcomes is a primary concern. Menard recommends lambda for prediction models because it
     measures the proportional change in error based on predicting the mode. He recommends tau-p which is
     based on Klecka's tau (Klecka 1980) for classification models because it is based upon predictions relative
     to the base rate. The tau-p for the model described here is 0.746 and is significant at the level of $p < 0.001$.

Table 4-8: Variables excluded from model using backward elimination based on -2LL

Variable	Δ -2LL	Significance (Δ -2LL)
1: COMMITTEE	0.038	0.846
2: HEARINGS	1.236	0.539
3: EXEMPT	1.099	0.294
4: SALIENCE	2.290	0.318

At Step 5, all of the remaining variables were significant at a level of $p < 0.05$. Therefore, no additional variables were removed from the framework. I report the parameter values and a summary of the final model for all recommendations in the sample in Table 4-9.

Table 4-9: Final model estimates and prediction summary (all recommendations)

Model estimates	Coefficient	Significance (Wald)	Significance (Δ -2LL)	Exp(β)
Constant	-0.572			
SOPH HIGH	1.594	0.000	0.000	4.925
SIGNIFICANCE		0.000	0.000	
SIGN SUPER	2.553	0.006		12.845
SIGN MINOR	3.834	0.000		46.246
REQUEST	-1.627	0.000	0.000	0.197
CONFLICT	-2.898	0.000	0.000	0.055
BURDEN IMPOSED		0.000	0.000	
BURDEN MINOR	-4.369	0.000		0.013
BURDEN MAJOR	4.137	0.000		62.616
IMPOSE BURDEN		0.000	0.000	
IMPOSE MINOR	-2.715	0.000		0.066
IMPOSE MAJOR	-3.558	0.000		0.028
COMPLEXITY		0.000	0.000	
COMPLEXITY MEDIUM	-1.727	0.000		0.178
COMPLEXITY HIGH	-1.722	0.000		0.179
COMMENTS	-1.015	0.004	0.003	0.362
ACTION NEW	-1.174	0.000	0.000	0.309
FEDERAL	0.936	0.007	0.006	2.549

	λ	Accuracy	R²L	Hosmer-Lemeshow
Model summary	0.712*	0.891	0.610*	0.285

* $p \leq 0.001$

All of the main predictor variables are significant at the level of $p \leq 0.001$. Only three control variables remained in this model, but all were significant at the level of $p \leq 0.01$. Eliminating variables unrelated to *change*, the predictive efficiency of the model as well as its goodness-of-fit improved (lambda increased to 0.712 and the Hosmer-Lemeshow test was well above the critical value of p < 0.05).

Substituting Gormley's (1986) alternative (two-category) measures of *salience* and *complexity* for my three-category variables produced nearly identical results with the same factors eliminated through backward elimination (see Table 4-10).

Table 4-10: Model coefficients using 2- and 3-category measures of salience and complexity

Model estimates	Original model Coefficient[25]	Alternate model Coefficient[26]	Original model Significance	Alternate model Significance
Constant	-0.572	-2.297		
SOPH HIGH	1.594	1.595	0.000	0.000
SIGNIFICANCE			0.000	0.000
SIGN SUPER	2.553	2.553	0.006	0.006
SIGN MINOR	3.834	3.834	0.000	0.000
REQUEST	-1.627	-1.627	0.000	0.000
CONFLICT	-2.898	-2.897	0.000	0.000
BURDEN IMPOSED			0.000	0.000
BURDEN MINOR	-4.369	-4.370	0.000	0.000
BURDEN MAJOR	4.137	4.138	0.000	0.000
IMPOSE BURDEN			0.000	0.000
IMPOSE MINOR	-2.715	-2.716	0.000	0.000
IMPOSE MAJOR	-3.558	-3.558	0.000	0.000
COMPLEXITY		1.725	0.000	0.000
COMPLEXITY MEDIUM	-1.727		0.000	
COMPLEXITY HIGH	-1.722		0.000	
COMMENTS	-1.015	-1.015	0.004	0.004
ACTION NEW	-1.174	-1.174	0.000	0.000
FEDERAL	0.936	0.937	0.007	0.005

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[25] Model using high, medium, and low categories for *salience* and *complexity* (values same as reported in Table 4-9).

[26] Model with two classification categories for *salience* and *complexity*.

I also calculated the results for a model that excluded the control variables. Backward elimination of variables was unnecessary because all variables were significant at the level of p < 0.05 (however, the estimate for the "high" dummy variable of salience had a P value of 0.146). All of the summary statistics for the main-predictor-only model are worse than the final framework with control variables included, but the differences are minor (Table 4-11).

Table 4-11: Model estimates and prediction summary using main predictor variables only

Model estimates	Coefficient	Significance (Wald)	Significance (Δ -2LL)	Exp(β)
Constant	-1.015			
SOPH $_{HIGH}$	1.666	0.000	0.000	5.289
SIGNIFICANCE		0.000	0.000	
SIGN $_{SUPER}$	2.034	0.019		7.641
SIGN $_{MINOR}$	3.154	0.000		23.433
REQUEST	-1.795	0.000	0.000	0.166
CONFLICT	-2.579	0.000	0.000	0.076
BURDEN IMPOSED		0.000	0.000	
BURDEN $_{MINOR}$	-3.799	0.000		0.022
BURDEN $_{MAJOR}$	4.407	0.000		82.041
IMPOSE BURDEN		0.000	0.000	
IMPOSE $_{MINOR}$	-2.156	0.000		0.116
IMPOSE $_{MAJOR}$	-3.222	0.000		0.040
SALIENCE		0.022	0.019	
SALIENCE $_{MEDIUM}$	-0.796	0.014		0.451
SALIENCE $_{HIGH}$	-0.958	0.146		0.284
COMPLEXITY		0.012	0.011	
COMPLEXITY $_{MEDIUM}$	-1.112	0.003		0.329
COMPLEXITY $_{HIGH}$	-0.49	0.044		0.428

	λ	Accuracy	R^2L	Hosmer-Lemeshow
Model summary	0.665*	0.873	0.587*	0.002

* $p \leq 0.001$

In the final iterations of the model I calculated I excluded "insignificant" recommendations from analysis, such as those indicating the need to edit a correction inadvertently carried over from a previous version of a proposed regulation. Although the sample size is smaller, the results may be considered more meaningful because it includes only requests for substantive changes to rules. I present the first restatement of the model with all variables (main predictor and control) in Table 4-12 and the final version using backward elimination (again, based on the estimated -2LL of variables) in Table 4-13.[27]

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[27] I tested for collinearity prior to running the model. The tolerance levels for *stage* and *action* once again fell below the 0.2 cut-off so I did not include them in the base model.

Table 4-12: Base model coefficients and summary (ex. superficial recommendations)

Model estimates	Coefficient	Significance (Wald)	Significance (Δ -2LL)	Exp(β)
Constant	1.893			
SOPH $_{HIGH}$	2.393	0.004	0.001	10.946
SIGNIFICANCE	-3.953	0.000	0.000	0.019
REQUEST	-1.530	0.000	0.000	0.217
CONFLICT	-2.597	0.000	0.000	0.074
BURDEN IMPOSED		0.000	0.000	
BURDEN $_{MINOR}$	-4.152	0.000		0.016
BURDEN $_{MAJOR}$	4.254	0.000		70.390
IMPOSE BURDEN		0.000	0.000	
IMPOSE $_{MINOR}$	-2.733	0.000		0.065
IMPOSE $_{MAJOR}$	-3.573	0.000		0.028
SALIENCE		0.224	0.231	
SALIENCE $_{MEDIUM}$	-0.830	0.170		0.436
SALIENCE $_{HIGH}$	-1.004	0.336		0.367
COMPLEXITY		0.180	0.176	
COMPLEXITY $_{MEDIUM}$	-1.132	0.070		0.322
COMPLEXITY $_{HIGH}$	-0.889	0.236		0.411
COMMENTS	-1.087	0.014	0.012	0.337
HEARINGS		0.977	0.513	
HEARINGS $_1$	0.034	0.963		1.035
HEARINGS $_2$	-0.105	0.883		0.901
COMMITTEES	0.401	0.513	0.474	1.493
EXEMPT	0.545	0.477	0.348	1.725
ACTION $_{NEW}$	-0.485	0.350	0.123	0.616
FEDERAL	0.814	0.131	0.001	2.258

	λ	Accuracy	R^2L	Hosmer-Lemeshow
Model summary	0.780*	0.915	0.703*	0.841

* $p ≤ 0.001$

Table 4-13: Final model coefficients and summary (ex. superficial recommendations)

Model estimates	Coefficient	Significance (Wald)	Significance (Δ -2LL)	Exp(β)
Constant	2.024			
SOPH $_{HIGH}$	2.177	0.005	0.002	9.333
SIGNIFICANCE	-3.683	0.000	0.000	0.025
REQUEST	-1.467	0.000	0.000	0.231
CONFLICT	-2.522	0.000	0.000	0.080
BURDEN IMPOSED		0.000	0.000	
BURDEN $_{MINOR}$	-4.019	0.000		0.018
BURDEN $_{MAJOR}$	3.937	0.000		51.289
IMPOSE BURDEN		0.000	0.000	
IMPOSE $_{MINOR}$	-2.534	0.000		0.079
IMPOSE $_{MAJOR}$	-3.604	0.000		0.027
COMPLEXITY		0.045	0.040	
COMPLEXITY $_{MEDIUM}$	-1.084	0.015		0.338
COMPLEXITY $_{HIGH}$	-0.775	0.118		0.461
COMMENTS	-1.142	0.019	0.006	0.319
	λ	Accuracy	R^2L	Hosmer-Lemeshow
Model summary	0.774*	0.913	0.691*	0.141

* $p \leq 0.001$

Narrowing the focus of analysis to requests for substantive modifications to proposed rules improved the model's predictive accuracy and goodness of fit. I found statistically significant evidence of a relationship between all of the main predictor variables—except *salience*—and the dependent variable. I also determined that the control variable, *comments* (whether one or more than one stakeholder made the recommendation), was also related to *change* (at the level of $p < 0.01$).

4.4 Bootstrap

> There were ... others who had forced their way to the top from
> the lowest rung by the aid of their bootstraps. Sheer force of
> natural genius, that. With brains, sir.
>
> James Joyce, *Ulysses*

An important concern that should be addressed by anyone seeking to develop a predictive model, particularly if the results are intriguing and the population may not be normally distributed, is how dependent the model is on the sample selected.

Unfortunately, that is a difficult question to answer either in the abstract or in the present analysis. Summary statistics and P values of parameters indicate how well the model performed for the cases chosen. Ideally, that sample generalizes well to the population. And, yet, even when evidence suggests a relationship between two variables at, say, the 0.05-level, we know that by definition, on average, five times out of one hundred no relationship will exist.

One of the key challenges in building models is finding a balance between parsimony—and the risk of excluding predictors of importance—and the temptation to include everything but the kitchen sink—and the loss of precision that often results. In an effort to realize a measure of harmony between these two aims and address the question of sample-dependence, I performed three bootstrap analyses.

"Bootstrapping" is a well-known and widely used statistical method. When one has a sample statistic such as mean or, in my analysis, the predictive efficiency of a model, obviously it is related to the sample selected that hopefully represents the population of interest. Nonetheless, the extent that the sample statistic may vary if other sub-populations

are drawn is unknown. In an ideal situation, the analyst would select multiple samples to estimate variance. But, practically speaking, doing so runs counter to the rationale for sampling in the first instance: it enables one to collect data quickly and inexpensively. Bootstrapping provides a way out of this box, one that is theoretically sound and does not resort to complex mathematical methods that are often inaccurate and prone to bias (Davison and Hinkley 1997, Efron and Tibshirani 1994).

In the most basic application of the bootstrap method, one selects n data points randomly and with replacement from the data to create a "sample" of the sample (n equals the size of the original data set). Repeating this process many times, the researcher arms herself with many "samples" to calculate a statistic of interest and estimate its variance.

For my first calculation, I applied the variables and coefficients derived in the final model (reported in Table 4-13) to 1,000 "bootstraps" to estimate an upper and lower bound of predictive efficiency. [28] Goodness-of-fit is a problematic concept for logistic models. A number of measures have been proposed to address the concern, but all have shortcomings (Hosmer and Lemeshow 1980, Hosmer et al. 1997). As a result, it is wise not to place too much importance on pseudo-variance measures (Pampel 2000). Nonetheless, assessing the predictive accuracy of a model across a large number of samples can be informative.

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[28] The question "How many bootstraps are required?" cannot be answered easily. Efron and Tibshirani (1994) have argued that 500 is an appropriate count in most scenarios. Davidson and MacKinnon (2000) suggested selecting the number on the basis of a desired P value and indicated that 399 is the minimum required for a test at the 0.05 level. I opted for 1,000 because it seemed sufficiently large without being overly taxing in terms of calculating the results. Although determining an appropriate minimum number of bootstraps to include in an analysis is not a primary focus of this study, I assessed the value of incorporating more rather than fewer replications through a basic simulation. I have included a description of this analysis in Appendix E.

In my second inquiry, I shifted my focus from the model to the estimated coefficients for the predictor variables. I used the replications I generated for the first test to calculate ranges for the betas to determine how widely they varied across samples.

Finally, I re-introduced all of the independent variables into a base model and employed backward elimination to determine a "final" model for each of the bootstraps. Although the backward elimination strategy is intuitively appealing, by applying it one runs the risk of over-fitting the model, either including "noise" variables or eliminating factors that may not be related linearly to the dependent variable or on a stand-alone basis, but are connected in conjunction with other variables (Derksen and Keselman 1992, Sainani 2013). I avoided the most common causes of these problems (for example, missing data and a high ratio of predictor variables to sample size) and by applying backward elimination on each bootstrap I was able to determine how frequently variables remained in the completed model.

Bootstrap Results

Applying the finished framework and its estimated coefficients to the bootstrap samples, I determined that the predictive accuracy of my final model varied from 0.872 to 0.946 with a mean of 0.911 and standard deviation of 0.013. In the figure below, I present a histogram of these results in one-half percent increments. The estimate for the finished formulation (Table 4-13), though 40 basis points higher than the average across replications, is not an outlier.

Figure 4-1: Predictive efficiency of final model estimated from bootstrap samples
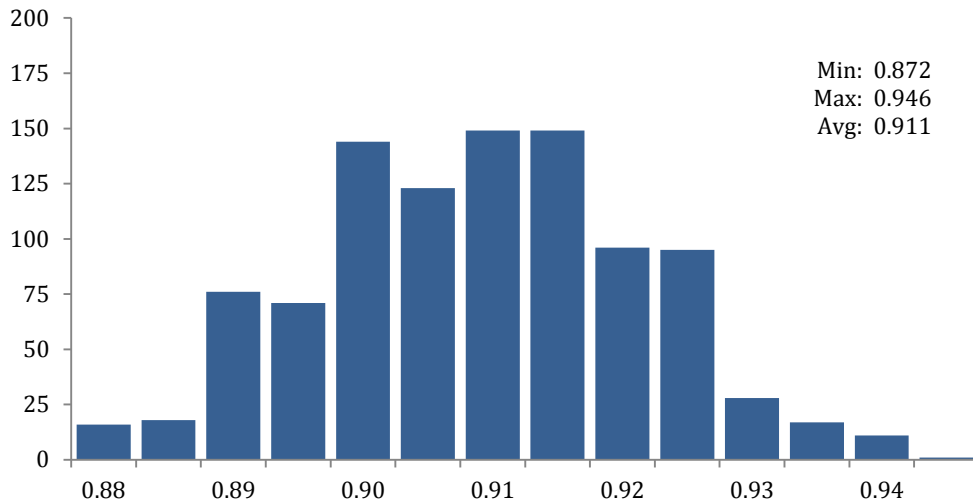
I also examined how well the model performed in estimating the results of a basket of recommendations, that is, the ratio of requests that resulted in a change relative to those that did not. Although the predictive accuracy of the framework at the recommendation-level is 0.911, across a group of suggestions errors will tend to cancel each other and the estimate of the basket will be much more accurate.[29] In the figure below, I provide a histogram using half-percent increments to illustrate the model's efficiency in predicting outcomes for the bootstrap samples. The average effectiveness was 98.5 percent and the standard deviation was 1.1 percent.

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[29] If the canceling of errors is not intuitive, please refer to Appendix F for an explanation.

Figure 4-2: Model accuracy, predicting outcomes for groups
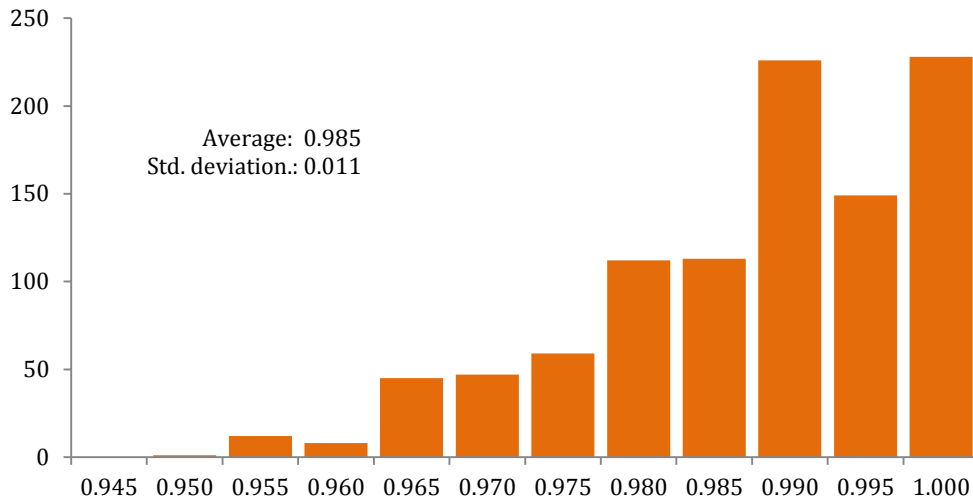
In my second bootstrap analysis, I calculated optimal coefficients for the final model for each iteration and limited the variables included to those identified in the final model. I report the results in Table 4-14 and in a series of distribution charts in Appendix D.

The results of the bootstrap exercise are consistent with the initial analysis. All of the main predictor variables with the exception of *complexity* had betas with the expected sign for all of the replications, e.g., the coefficient for *sophistication* was positive while the coefficient for *significance* was negative for all iterations. The control variable, *comment*, had 3 cases (0.3 percent) with the incorrect sign. The beta for *complexity_medium* was positive (rather than the anticipated negative) in 4 cases (0.4 percent). The most significant deviation from expectations was for *complexity_high*. A total of 79 cases (7.9 percent) resulted in a coefficient equal to or greater than zero. These results are generally consistent with the P values of the Wald statistics reported for the model in Table 4-13.

Table 4-14: Mean estimate of coefficients of final model using bootstrap samples

Model estimates	Model Coefficient	Bootstrap Coefficient
Constant	2.024	1.983
SOPH $_{HIGH}$	2.177	2.501
SIGNIFICANCE	-3.683	-5.993
REQUEST	-1.467	-1.594
CONFLICT	-2.522	-2.928
BURDEN IMPOSED		
BURDEN $_{MINOR}$	-4.019	-4.291
BURDEN $_{MAJOR}$	3.937	6.516
IMPOSE BURDEN		
IMPOSE $_{MINOR}$	-2.534	-2.670
IMPOSE $_{MAJOR}$	-3.604	-3.879
COMPLEXITY		
COMPLEXITY $_{MEDIUM}$	-1.084	-1.162
COMPLEXITY $_{HIGH}$	-0.775	-0.873
COMMENTS	-1.142	-1.191

These bootstrap analyses provide reasonable confirmation of the results of the final framework, but the last test I conducted proved to be the most interesting. Given the potential problems associated with automated backward elimination of variables in regression analysis (Derksen and Keselman 1992, Sainani 2013), I computed a "final" model using backward elimination for each of the bootstrap samples.

This analysis was encouraging in that the most frequent "final" model included all and only the eight variables identified in the primary analysis (and reported in Table 4-13). However, this combination of factors occurred in only 6.8 percent of the cases. Backward elimination yielded 164 unique combinations of main predictor and control variables as the "final" models for the one thousand bootstraps. In 12 percent of the cases, the "final" model determined through this method was optimal for five or fewer samples. In other words, this analysis indicates that I had a 1-in-8 (approximately 12 percent) chance of

selecting a final model through backward elimination that would have been the best

assessment of the relationship between the predictors and dependent variable on 0.5

percent or less (1-5 samples out of 1,000) occasions. Although the eight-variable final

model I arrived at through the initial analysis happened to be the one appropriate for the

greatest number of samples, it was actually more likely that I would have ended up with a

framework that was an optimization for only one or two specific bootstraps because they

accounted for 8.3 percent of the thousand samples.

One of the primary benefits of bootstrap analysis, particularly if combined with

automated backward elimination of variables, is determining how frequently independent

variables appear in the final model. I report these frequencies in descending order in Table

4-15 below.

Table 4-15: Frequency of independent variables in final model of bootstrap samples

Independent variables	Count in Bootstraps
Significance	1,000
Burden imposed	1,000
Impose burden	1,000
Conflict	999
Request	988
Sophistication	977
Comments	790
Complexity	678
Salience	491
Federal standards	466
Action type	386
Committee	231
Exempt	216
Hearings	202

Perhaps the most important observation that can be made about these results is that six of the predictor variables are exceptionally good, appearing in the final model for 977 or more of the bootstrap samples. Opinions differ on the appropriate cut-off level for including variables in a framework. Derksen and Keselman (1992) suggest including all factors that exceed a threshold level of 50 percent. Austin and Tu (2004) recommend a frequency of 60 percent for achieving a parsimonious model without sacrificing predictive efficiency. In contrast, Beyene *et al*. (2009) opt for a 70-percent level for their study and suggest that in some instances, for example, when a study includes a high number of variables or missing data points, only those factors that appear in 90 percent of bootstraps should be kept in the model.

I have concluded that the results of this and the previous bootstrap analysis suggest that all of the variables in the final model should be retained. Similarly, this frequency test suggests that none of the factors omitted are strong candidates for inclusion.

CHAPTER FIVE

DISCUSSION

This section revisits the propositions I detailed in the second chapter, demonstrates how the model can be applied, and provides some thoughts on this study's limitations. This chapter also considers the implications of these findings and outlines a number of opportunities to build upon its results through additional research.

5.1   Review of propositions

Chapter Four described the results of my analysis. This section briefly reviews the propositions that guided this study referencing the final model (reported in Table 4-13) that included only requests for substantive changes (e.g., I excluded editorial and similarly minor recommendations).

SOPHISTICATION

> *P1.   The sophistication of recommendations submitted concerning proposed rules varies significantly across comments.*

> *P2.   The probability that a suggested modification will correspond to a change in a proposed regulation is related to its sophistication, that is, highly informed recommendations are more likely to coincide with amendments to rules than unsophisticated ones.*

As suggested by the sample recommendations I included in Chapter Two, the reach and thoughtfulness of observer comments varied quite considerably. I also found statistically significant evidence of a positive relationship between the quality of requested modifications and the likelihood they will be coincident with changes to proposed rules.

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> *P3. Recommendations to change minor provisions of a rule are more likely to be reflected in future versions of the regulation than suggestions to alter its major features.*

The odds ratio (reported at "exp(β)" in the results tables) of the coefficient of *significance* was 0.025 (with a P value < 0.001). I coded this dummy variable as 1 for appeals to modify major facets of the rule; therefore, the odds ratio implies recommendations to adjust major elements of regulations are 97.5 percent less likely to coincide with changes than requests to amend minor provisions.

NATURE OF REQUEST

> *P4. Requests to eliminate or modify provisions of a rule, ceteris paribus, are more likely to be reflected in future versions of the regulation than recommendations to add new provisions.*

CONFLICT

> *P5. Uncontested recommendations are more likely to be coincident with modifications in proposed regulations than suggested changes that face opposition.*

Similar to *significance*, the sign of the coefficients for *request* and *conflict* met expectations and the analysis provided evidence (at P < 0.001) suggesting a relationship to *change*.

> *P6. Requests to alleviate major burdens imposed by proposed regulations are more likely to coincide with subsequent changes in rules than recommendations to minimize or eliminate inconsequential or minor costs.*

> *P7. Suggestions to impose major burdens are less likely to parallel future modifications of rules than appeals that place insignificant or minor costs on others.*

In the model results reported in Table 4-13, the excluded category for the burden-related variables—*burden* (imposed) and *impose* (burden)—is none, i.e., no meaningful cost is related to the provision under discussion. The beta for *burden_major* is positive, as expected, while the coefficient for *impose_major* is negative, also as anticipated. Both coefficients have P values less than 0.001. Comparison of major and minor costs (as opposed to major and insignificant ones) required a second calculation in which I designated "major" as the excluded category. The coefficient of *burden_minor* was negative (P < 0.001) indicating that administrators are far less likely to alter rules when faced with requests to alleviate minor burdens relative to major ones. In contrast, the odds ratio for *impose_minor* was 2.915. This value suggests that administrators are more willing to adopt changes that impose less significant rather than important burdens. However, this coefficient had a P value of 0.093.

COMPLEXITY

> P8.   *Technical complexity is not directly related to the probability that a request to modify a regulation will be incorporated in future versions of a rule.*

I found statistically significant evidence at the 0.05-level of a relationship between

complexity and *change*. Therefore, I fail to confirm this proposition. As noted earlier,

the complexity factor has bedeviled me throughout this analysis. Comments

submitted concerning regulations that are medium or high in complexity are less

likely to coincide with subsequent modifications than those low in that

characteristic, but only the coefficient for medium has a P value under 0.05. When I

switch the omitted category to "high," the P value of complexity remains unchanged,

but the coefficient for *complexity_medium* has a P value of 0.532. In other words, of

the three relationships—(a) low-medium, (b) low-high, (c) medium-high—only one

(low to medium) is statistically significant.

SALIENCE

> P9.   *As the salience of proposed regulations increases, the likelihood that recommendations will be reflected in subsequent versions of the rule will decrease.*

The analysis also failed to confirm this proposition. As detailed in the fourth chapter, by

using a process of backward elimination of variables, I was able to exclude *salience* from

the model. Bootstrap analysis provided further evidence that a relationship may not exist

between *salience* and the dependent variable, *change*.

5.2 Applying the model

The results reported here support my general contention that the substantive characteristics of recommendations are related to the likelihood that administrators will modify proposed rules. To provide further context, I ran two additional sets of regressions. In the first, I explored the relationship between *identity*—that is, whether the participant included his or her name with the comment—and *change*. In the second, I explored the relationship between *role*—the interest orientation of the commenter—and *change*.

I discovered that 51.3 percent of anonymous recommendations were coincident with changes to proposed rules. In contrast, only 36 percent of requests submitted by those who signed their comment coincided with modifications. This rather curious result might lead one to formulate a number of fanciful propositions. And upon running a regression analysis with *identity* as the main predictor variable and a number of control variables such as the one I included in earlier analyses, an aspiring scholar would find statistically significant evidence (at the level of $P < 0.05$) of a relationship between *identity* and the dependent variable, *change*.

However, if that same researcher included the variables I identified in the final model in his or her analysis, evidence of this relationship ceases to be statistically significant (unless, of course, one defines significance at a much higher P value). The results of these two analyses are presented in the table below.

Table 5-1: Identity-change relationship, with and without the final model

Model estimates	WITHOUT MODEL		WITH MODEL	
	Coefficient	Significance (Wald)	Coefficient	Significance (Wald)
Constant	0.623		2.307	
IDENTITY	-0.634	0.018	-0.738	0.159
SOPH $_{HIGH}$			2.465	0.004
SIGNIFICANCE			-3.906	0.000
REQUEST			-1.487	0.000
CONFLICT			-2.700	0.000
BURDEN IMPOSED				0.000
BURDEN $_{MINOR}$			-4.147	0.000
BURDEN $_{MAJOR}$			4.174	0.000
IMPOSE BURDEN				0.000
IMPOSE $_{MINOR}$			-2.702	0.000
IMPOSE $_{MAJOR}$			-3.560	0.000
COMPLEXITY				0.031
COMPLEXITY $_{MEDIUM}$			-1.320	0.025
COMPLEXITY $_{HIGH}$			-1.433	0.031
COMMENTS			-1.127	0.011
HEARINGS		0.134		0.990
HEARINGS $_1$	-0.340	0.194	-0.088	0.895
HEARINGS $_2$	0.174	0.537	-0.081	0.910
COMMITTEES	-0.169	0.457	0.446	0.457
EXEMPT	-0.644	0.069	0.430	0.549
ACTION $_{NEW}$	-0.050	0.819	-0.634	0.190
FEDERAL	-0.219	0.294	0.777	0.143

Turning my attention to the relationship between *role* and *change*, an initial investigation of the success rate of recommendations may have led me to hypothesize that administrative officials exhibit a bias favoring business. I discovered that 45.4 percent of suggestions submitted by firms and their advocates coincided with changes to proposed regulations. In contrast, only 22.4 percent of recommendations submitted by unaffiliated citizens and citizen-advocacy groups were consistent with subsequent changes. Similar to the previous example, I ran two separate regression analyses. Once again, the statistically

significant evidence of a relationship between *role* and *change* (at P < 0.001) disappeared

when considered within my proposed model.

Table 5-2: Role-change relationship, with and without the final model

Model estimates	WITHOUT MODEL		WITH MODEL	
	Coefficient	Significance (Wald)	Coefficient	Significance (Wald)
Constant	0.623		2.453	
ROLE		0.000	-	0.125
ROLE $_{UNKNOWN}$	-0.613	0.036	0.028	0.962
ROLE $_{CITIZEN/CONSUMER}$	-1.377	0.000	-1.492	0.058
SOPH $_{HIGH}$			2.207	0.007
SIGNIFICANCE			-4.123	0.000
REQUEST			-1.463	0.001
CONFLICT			-2.712	0.000
BURDEN IMPOSED				0.000
BURDEN $_{MINOR}$			-4.248	0.000
BURDEN $_{MAJOR}$			4.317	0.000
IMPOSE BURDEN				0.000
IMPOSE $_{MINOR}$			-2.637	0.000
IMPOSE $_{MAJOR}$			-3.575	0.000
COMPLEXITY				0.129
COMPLEXITY $_{MEDIUM}$			-1.149	0.060
COMPLEXITY $_{HIGH}$			-1.017	0.144
COMMENTS			-1.185	0.009
HEARINGS		0.054		0.796
HEARINGS $_1$	-0.613	0.024	-0.327	0.643
HEARINGS $_2$	-0.154	0.588	-0.484	0.504
COMMITTEES	-0.059	0.800	0.215	0.727
EXEMPT	0.179	0.693	1.315	0.152
ACTION $_{NEW}$	-0.168	0.445	-0.917	0.079
FEDERAL	-0.107	0.610	0.768	0.151

In order to provide some additional context to understand this result, I calculated the

probability of *change*=1 using my model. Using a cut-off value of 0.5—that is, I assigned a

value of 1 to all recommendations that had an estimated probability of *change*=1 of 50

percent or higher—I estimated 23 requests from consumers/citizens would coincide with changes. In contrast, the model predicted that 139 recommendations from businesses and their advocates would align with subsequent modifications to rules. Applying the estimated predictive efficiency for a basket of recommendations calculated in the bootstrap analysis, the range of expected suggestions coinciding with a change is 22-24 for consumers/citizens and 134-144 for businesses.[30]

The actual count for each group was the following: 24 for consumers/citizens and 138 for businesses, both within the expected range. In other words, the bias toward firms vanished when viewed against a benchmark derived from the substantive dimensions of the recommendations.

This example illustrates the importance of using a benchmark. In the absence of reasonable expectations, superficial evidence of a relationship may appear significant. It also underscores another important point: the full set of outcomes for a binary variable includes not only (a) a bias toward X or (b) toward Y, but also (c) a bias toward X and Y, (d) a bias against X and Y, or (e) no bias toward either group. These outcomes are illustrated through a series of hypothetical cases presented in Table 5-3 in which the realized success rate for businesses is a constant of 0.45 and 0.25 for private citizens, but the benchmark varies.

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[30] Recall that the estimated accuracy of the model in predicting the ratio of *change*=0 to *change*=1 recommendations is 0.985 with a standard deviation of 0.011.

Table 5-3: Possible outcomes of analysis of binary variable

	A	B	C	D	E
BUSINESSES					
Success rate, expected	0.45	0.45	0.45	0.45	0.45
Success rate, realized	0.54	0.39	0.51	0.39	0.45
Difference	0.09	-0.06	0.06	-0.06	0.00
PRIVATE CITIZENS					
Success rate, expected	0.25	0.25	0.25	0.25	0.25
Success rate, realized	0.25	0.29	0.33	0.18	0.25
Difference	0.00	0.04	0.08	-0.07	0.00
BIAS	Toward businesses	Toward citizens	Toward both	Against both	None

5.3 Limitations of this study

A number of limitations of this analysis may affect the generalizability of its results. For example, the sample excluded comments submitted to agencies via email, fax, or the post. Based on a random selection of 20 rules and a review of their agency statements, I concluded that a majority of the recommendations submitted through alternative methods duplicated comments submitted online. Although my examination suggested that perhaps only 1-2 percent of requests to alter proposed regulations in recent years have been submitted by alternate methods, in the absence of a detailed analysis, I cannot characterize with confidence the nature of those comments, whether they differ in meaningful ways from statements submitted through VRTH, if the quality of those observations differs along substantive dimensions, or if administrators respond to them differently.

A second limitation concerns the selection of Virginia for the sample data. Although many similarities exist across states there are also many differences among them. As this research is expanded to include rules and comments from other states, the model will likely become increasingly robust or, alternatively, its weaknesses will be easier to identify. Until

that time, it will be rooted in the administrative structure, rulemaking process, agency cultures, interest group influences, etc. particular to the Commonwealth of Virginia, a context that may or may not be typical of the nation's other 49 states.

I believe the coding of the variables in this analysis is both a strength and weakness of this investigation for a number of reasons. Opting to use a single coder as I did necessarily increases the risk of introducing systematic biases in how variables are assessed. However, it also eliminates the risk of such a difficulty across coders. I also doubt that any code-book, no matter how thoughtfully and thoroughly prepared, can be applied without interpretation, certainly not to the extent that multiple researchers could code numerous variables for more than two thousand comments and encounter no discrepancies except for those produced by random error.

How I defined the variables may represent another limitation of this analysis. I opted to paint with a broad brush, but it is possible that finer gradations applied to some factors, such as *sophistication,* would yield better results. My intuition is that it would not, but I believe they may illuminate other relationships or interactions of importance. For example, borrowing from Gormley, I included *salience* and *complexity* at the rule-level, yet both can also be applied at the provision-level and, therefore, would vary within a rule. Also, a concept such as complexity is multi-faceted, rather than one dimensional, as it appears in this study. The code of a computer application may be complex, that is, require a certain degree of technical knowledge to decipher it, but in a spectrum that varies from perfect certainty to complete uncertainty, it is likely situated closer to the former than the latter—either it works or it throws an error. Many policy issues, in contrast, may be technically complex, but the more bothersome aspect is their complexity of unknowns.

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Applying this broader conception of complexity to this study, I would hypothesize an inverse relationship between unknowns and bureaucrats' willingness to modify proposed rules. In contrast, administrators may be much more prone to alter the purely technical aspects of regulations.

Finally, although the model predicts the outcome of recommendations well across the full range of probabilities, it is more accurate at the extremes, that is, when it estimates the likelihood of *change*=1 exceeds 0.9 or is less than 0.1. The final model sorted 71 percent of recommendations into these two groups and its success rate in predicting their outcomes was 99.7 percent. Ideally, the framework would sort all requests into one of these two groups or be equally effective in estimating probabilities when it does not. However, achieving this end will require identifying additional predictors related to change and refining those currently included in the model.

5.4   Implications of findings

This dissertation addressed an important shortcoming of many studies of notice-and-comment rulemaking—their failure to use a benchmark when interpreting results. In doing so, I explored two related questions:

(1)   Is there a definable set of characteristics that make some recommendations more likely than others to result in changes in proposed regulations in the notice-and-comment rulemaking process?

(2)   If so, can a model with sufficient predictive accuracy be developed to enable researchers to form reasonable expectations about the likelihood that recommendations will be associated with changes to rules?

Although my analysis is neither exhaustive nor definitive, its results suggest several implications for future research that explores citizen participation in the regulatory process, the conclusions of past studies, and the practice of rulemaking.

First, scholars have devoted considerable energy during the last four decades to the question of who controls the bureaucracy (Hammond and Knott 1996). The most common answers can be grouped broadly along three lines of thought:

- Bureaucratic autonomy due to political indifference (Ogul 1976, Weingast 1981), information asymmetries (Arrow 1984), legislative-executive gridlock (Dahl and Lindblom 1963), or by establishing political legitimacy (Carpenter 2001);

- Political control of administration, either by the legislative branch, the chief executive, the judiciary, or a combination of the three (McCubbins, Noll, and Weingast 1989, McCubbins and Schwartz 1984, Melnick 1983, Waterman 1989, Wood and Waterman 1991);

- Interest group influence and control (Rourke 1984, Tierney 1986).

In the past 20 years, a small but growing number of scholars have explored these theories through the lens of notice-and-comment rulemaking. However, relatively few of those studies have included a content analysis of comments to determine whether or to what extent they vary across a number of key dimensions.

This study has demonstrated that recommendations do differ, often in meaningful ways, and those dissimilarities are directly related to the likelihood they will be associated with changes to proposed regulations: Recommendations that possess certain

characteristics have probabilities that approach 1, while others that lack those elements have predicted probabilities near or at 0. As paper and offline processes are increasingly digitized and moved online, the data for studying notice-and-comment rulemaking will become much more accessible. Future scholarship in this area—whether theoretical or empirical—must account for these changes. Additionally, this analysis directly calls into question the conclusions drawn from past studies that did not incorporate benchmarks based upon this variation.

Second, the democratic legitimacy of the bureaucracy has been a focus of administrative law scholarship for decades. Citizen participation and procedures perceived as promoting transparency in the regulatory process have often been theorized as important safeguards to potential problems such as agency capture by interest groups. Indeed, some scholars have elevated these processes to virtual "sacrosanct status" for their promotion of democracy and ability to improve the quality of decisions made by otherwise supposedly near-sighted administrators (Rossi 1997, 175). This study found that bureaucrats do appear to be responsive to feedback they receive from participants during comment periods. Occasionally, the input provided is associated with meaningful modifications to proposed regulations if a proposed rule unintentionally imposed a high cost on individuals or a group. However, the results developed here indicate clearly that the overwhelming majority of changes administrators make in proposed rules are insignificant. In consequence, this analysis should be important to scholars seeking to address the question of whether notice-and-comment rulemaking offers citizens a meaningful opportunity to participate in the regulatory process. The results outlined here suggest that the answer to this concern depends on how one defines "meaningful."

Don Elliot has claimed that "notice-and-comment rulemaking is to public participation as Japanese Kabuki theater is to human passions—a highly stylized process for displaying in a formal way the essence of something which in real life takes place in other venues" (1992, 1492).

The empirical evidence provided by this study corroborates this assessment. Administrators demonstrate a high-degree of receptivity to input provided by participants, but only regarding those provisions situated at the margins of proposed rules.

This finding raises at least two questions that merit serious consideration from interested scholars:

(1) Should notice-and-comment periods be eliminated from the regulatory process?

(2) How useful is the data generated through this process in addressing questions of interest such as the value of citizen participation in the regulatory process; bureaucratic control, responsiveness, and autonomy; and the democratic legitimacy of the administrative state?

The results of this empirical analysis suggest the answer to the first question is *maybe*. I remain optimistic (perhaps irrationally so) that technology can be used to increase the diversity of voices in the rulemaking process as well as the quality of input they offer. Understanding how the various dimensions of comments increases or reduces their usefulness is an important first step toward developing tools that prompt participants to provide more substantive information to administrators. Additionally, technology appears

ideally suited for raising awareness concerning proposed agency actions and potentially promoting a more robust exchange of ideas.

But this research also indicates that in its current form the benefits of participation in notice-and-comment rulemaking may be few and insufficient to outweigh its associated costs. Whether the net-value of this form of participating in rulemaking in its current form is positive or negative remains an open question, but this study's findings are important for those seeking to reform the regulatory process or to develop hypotheses regarding the characteristics or merits of participation.

The second question is particularly vexing for researchers. Stakeholder comments submitted on proposed regulations offer a potentially rich source of data. However, this study suggests the usefulness of that information may be limited. This analysis also demonstrates that although a benchmark enables one to identify situations of interest, for example, when agencies appeared more or less inclined to implement changes to proposed rules, such an approach does not necessarily reveal bias.

This statement may appear at odds with the five outcomes I noted in Table 5-3, but consider an example: a study that examines the results of comments submitted by businesses during the tenure of Republican and Democratic governors. For the sake of simplicity, assume the model yields an expectation that 30 percent of recommendations should be associated with changes regardless of which party occupied the governor's mansion. If the actual percentage of change is 20 percent under Republicans leadership and 40 percent under that of Democrats, an interesting case has been identified, but it would be a mistake to conclude on this basis that Democratic leadership fosters a pro-business bias among administrators. Of course, that may be the case. But it is also possible that

regulations written during Republican administrations are generally much more business-friendly than those promulgated when Democrats control the executive branch. As a result, requests by businesses to make additional modifications meet resistance from agency officials. In contrast, when the proposed regulations are less favorable to businesses, administrators may be more inclined to offer concessions to them and alter rules at the margins. The method outlined in this analysis cannot provide a definitive answer to this question. It illuminates a piece of the puzzle—one required for interpreting the results of these types of studies—but only one.

Additionally, these results suggest that the data provided by notice-and-comment rulemaking may be poorly suited for exploring questions such as whether participation in the regulatory process makes bureaucracy more democratic or results in higher quality decisions by agencies. Stakeholders submitted the comments examined in this study during a period of more than a decade. The criteria I employed for inclusion of rules in this investigation were broad. Yet, they yielded a sample with 2,534 comments submitted on 67 proposed rules. These participants generated only 687 unique recommendations to modify the rules under investigation. Excluding insignificant suggestions such as those that note a regulation references a section that had been re-numbered or deleted from a previous draft, the number of unique requests for changes was 484, or a little less than 50 per year. To frame the level of participation more broadly, I queried the VRTH database on November 20, 2013 to determine how many comment periods closed within the last 365 days and how many regulations received at least 1, 5, and 10 comments. I found that citizens had the opportunity to submit feedback on 382 proposed rules during this period, but less than one-third (100) received at least 1 comment, a little more than one-tenth (40)

garnered 5 or more submissions, and only 7 percent (27) merited 10 or more comments. Despite the fact that regulations affect almost everyone in astonishingly numerous ways, this analysis strongly suggests that notice-and-comment rulemaking interests almost no one except agency officials, a small fraction of people who are directly affected by regulations, and an intrepid band of scholars. Therefore, it may offer few insights into the actual dynamics of administrative rulemaking, the interaction of stakeholders in the regulatory process, or the bureaucratic state.

Finally, some have argued that web technologies have the potential to democratize the rulemaking process, increase participation rates (Johnson 1998), interject new voices into the debate, expand the range of interests considered (Stanley and Weare 2004) and improve transparency (Brandon and Carlitz 2002). Others have been less optimistic (Benjamin 2006, Shulman 2004-2005) and suggested that information technology has been used primarily to digitize paper processes (Noveck 2004-2005, Emery and Emery 2005).

For administrators and elected officials committed to a participatory rulemaking process, this research underscores the importance of developing tools and implementing practices that encourage participating stakeholders to provide high-quality feedback, and, perhaps, create deterrents to forms of participation that impose excessive costs on agencies, soak up their limited resources, yet provide little substantive benefit in drafting regulations.

This analysis also strongly suggests that people must be willing to absorb the costs of becoming educated about the regulatory process—for example, what facets of a proposed regulation administrators may modify and which are mandated by legislation— and knowledgeable about the issues under discussion. An all too common refrain in the

literature on participation, particularly among proponents of deliberative democracy, is that citizen apathy is the product of institutional shortcomings, procedural or otherwise (Barber 2004, Benhabib 1996, Dryzek 2000, Gutmann and Thompson 2004, Mansbridge 1980, Nabatchi 2010, Pateman 1970, Young 2000). However, this study demonstrates that not only do few people appear interested in participating in the regulatory process in the first instance; even fewer demonstrate a willingness to do the work necessary to make substantive contributions.

Recall that the 2,534 comments submitted over an 11-year period generated 3,777 recommendations, statements, and questions (Tables 3.1 and 3.2). This total included 296 suggestions based on misinterpretations of the proposed rule, 153 observations that could not be implemented because the targeted provisions were mandated by legislation, 164 requests for changes that fell outside the scope of the regulation or the purview of the agency, and 492 general statements or questions. The passion of these participants was often evident in their comments. However, vitriolic rants or requests to modify rules in ways that require legislative action do not make a positive contribution to agency decision-making. Nonetheless, they do impose costs and sometimes quite significant ones as an agency works both to consider and respond to them.

As I note above, these results strongly suggest that those committed to participation should seek to reform notice-and-comment rulemaking or, at a minimum, develop better digital tools that persuade participants to provide more substantive input. But in doing so it would be prudent to recall the saw about the horse—the one who was led to water—because although some old adages may be considered trite, they nevertheless often embody practical wisdom.

5.5 Future research

This study produced four key findings:

(1) Comments submitted on proposed rules vary considerably along a number of dimensions;

(2) These differences are directly related to the likelihood that recommendations will be associated with changes in proposed rules;

(3) These characteristics can be systematically identified and incorporated into a model with high predictive accuracy; and

(4) Failure to account for these differences undermines the legitimacy of the conclusions that can be drawn from studies of notice-and-comment rulemaking.

Despite the strength of these conclusions, this inquiry had a number of limitations (see Section 5.3) that can be addressed by future research, most importantly, extending the analysis to include multiple states and refining the operationalization of certain concepts, such as the "sophistication" of recommendations. Also, as noted in the previous section, the results of this inquiry have important implications for those who focus on notice-and-comment rulemaking to explore theories of interest group influence, citizen participation in the regulatory process, and the responsiveness of administrative organizations to their many stakeholders. I conclude this dissertation with several suggestions for future research.

I believe one of the most intriguing extensions of this analysis would be to use its model as a tool to identify interesting scenarios that merit further investigation. The list of possible comparison cases is rich and effectively endless. For example, analysts might investigate how agencies' responses vary over time and how their stances shift (if at all) under Democratic and Republican leadership in the executive office or when state legislatures are controlled by one party relative to the other. One might also compare the regulatory behavior of agencies that focus on similar issues such as health and human services or agriculture and forestry across states with different regulatory regimes, local economies, and population demographics. State agencies often promulgate similar rules. Examining who submits comments, what recommendations participants make, how different groups frame their arguments, and how public regulatory institutions respond may also prove instructive.

Perhaps the most important and potentially fruitful avenue for future research is extending this study to include other forms of participation such as advisory committees and public meetings. Transcripts of both lend themselves to analysis similar to the sort undertaken in this study. Such research will provide a much more comprehensive understanding of the regulatory process, particularly how administrators interact with and respond to the demands of various stakeholders. By putting the earlier stages of the rulemaking process under the microscope, a richer understanding of interest group influence and bureaucratic autonomy in rulemaking may emerge.

Finally, future scholarship should include a much more thorough textual analysis of comments, other forms of participation, and administrator response to each of these. When one sets out to examine *who controls the bureaucracy*, the resulting analysis and discussion

inevitability centers on dimensions of power, who has it and who does not. But the rulemaking process may also be framed as a conversation among multiple parties. In doing so, power does not disappear. It remains potent and ever-present. However, the focus shifts to who says what, how it is said, and what response(s) it elicits from others. I believe research that explores the regulatory process from this perspective—how problems are framed and how arguments are crafted as participants struggle to define ideas, identify problems, and propose solutions—has the greatest potential to illuminate the complexities, dynamics, and dilemmas of the administrative state in our democratic society.

APPENDIX A: DESCRIPTIONS OF THE ADMINISTRATIVE ACTIONS INCLUDED IN THE ANALYSIS

I provide below (1) a list of the secretariats in the Commonwealth of Virginia, (2) their agencies, (3) a description of the administrative rules included in the analysis, (4) the stage, its assigned number, and the number of comments included in the agency's examination, and (5) at the bottom of each table a running tally of the number of stages and comments included in the study.

Administration	Stages	Comments
Department of Human Resources Management	**0**	**0**
State Board of Elections	**0**	**0**
Auditor of Public Accounts	**0**	**0**
Virginia Human Rights Council	**0**	**0**
Department of General Services	**0**	**0**
Department of Minority Business Enterprise	**0**	**0**
		0 stages and 0 comments

Agriculture and Forestry	Stages	Comments
Department of Agriculture and Consumer Services	**4**	**28**

A regulation that establishes: (1) the requirements to produce and sell cow's milk for manufacturing purposes; (2) the requirements to obtain a permit to process and sell cheese, butter, condensed milk, powdered milk, and similar products; (3) and minimum standards that dairy farms and dairy plants must meet in producing and processing milk for manufacturing. (Action ID: 588)

Proposed (1451)		**6**

Charitable Gaming Rules and Regulations: The primary focus of the amendments is to reflect numerous relevant changes that have occurred in the Code of Virginia since the current regulations became effective (January 1, 1998). Other substantive changes include establishing a uniform use-of-proceeds requirement and establishing standardized reporting requirements for all permitted organizations. Other changes simplify, clarify and in some instances eliminate unnecessary regulations. (Action ID: 1500)

Proposed (2793)		**7**

This regulatory action proposes to amend language to clarify that testing requirements apply to all horses involved in activities on properties where horses owned by two or more owners may come into contact with each other and to eliminate the alternate testing requirements for horses assembled for sale or auction in Virginia. (Action ID: 2464)

Proposed (5253)		**6**

The proposed regulation consists of five parts pertaining to (1) definitions, (2) charitable gaming organizations and the conduct of charitable gaming, (3) charitable gaming suppliers, (4) electronic games of chance systems, and (5) administrative process. The existence of two separate but closely interrelated regulations governing charitable gaming has resulted in duplicative, burdensome, and unnecessarily lengthy efforts in those instances when the agency has had to amend both regulations in response to a single change in the statute, as was the case with the passage of HB 1998 (Chapter 264 of the 2007 Acts of Assembly). The promulgation of a single, consolidated regulation will greatly facilitate the agency's administration of the charitable gaming program. (Action ID: 3347)

NOIRA (5633)		**9**
Department of Forestry	**0**	**0**
	4 stages and *28* comments	

Commerce and Trade	Stages	Comments
Department of Housing and Community Development	0	0
Department of Labor and Industry	0	0
Virginia Employment Commission	0	0
Department of Professional and Occupational Regulation	13	385

The intent of the proposed changes in regulations is to increase fees for applicants and regulants of the Professional Boxing and Wrestling Program. The program must establish fees adequate to support the costs of operations and a proportionate share of the Department's operations. By the close of the current biennium, fees will not provide adequate revenue for those costs. The Department of Professional and Occupational Regulation (DPOR) receives no general fund money, but instead is funded almost entirely from revenue collected for regulants and event licensure and gate fees. The Department is self-supporting, and must collect adequate revenue to support its mandated and approved activities and operations. The Professional Boxing and Wrestling Program is the only activity funded under Fund 0200 Special Revenue. Fees must be established at amounts that will provide sufficient revenue to continue the ability of the program to fulfill its statutory duty contained in subsection 1 of § 54.1-831 to "protect the public against incompetent, unqualified, unscrupulous or unfit persons engaging" in boxing and wrestling. (Action ID: 1276)

Proposed (2766)	**15**

General clarifying changes are made, including restructuring the regulations to better distinguish between boxing, (including kick boxing, mixed martial arts, and other similar contests) and wrestling. The changes separate duties of event officials into two parts: 1) boxing, kick boxing and similar contests; and 2) wrestling. The changes separate the event licensing and standards of conduct into three parts: 1) boxing; 2) kick boxing and similar contests; and 3) wrestling. The changes are made to comply with Chapter 287, 2005 Acts of Assembly, to incorporate generally accepted industry standards; and to make the regulations easier to use. (Action ID: 1673)

Proposed (3313)	**10**

Chapter 829 of the 2005 Acts of the Assembly mandated separate licensing categories under the Board for Barbers and Cosmetology for esthetics practitioners, schools, and spas where esthetic services are provided. The regulations contain the requirements for obtaining a license, renewal and reinstatement, safety and sanitation procedures, and standards of professional conduct. To comply with Chapter 829 of the 2005 Acts of the Assembly and fulfill the Board for Barbers and Cosmetology responsibility to promulgate regulations, new regulations are promulgated to ensure competence and integrity of all licensees, ensure that the health and sanitary standards and safety procedures are adequate in parlors and other facilities where esthetics services are provided, and to administer the regulatory program. (Action ID: 1854)

Proposed (3681)	**21**

HB1054 was passed during the 2006 legislative session. It mandates that the Board implement a continuing education program for the renewal and reinstatement of architect, professional engineer, and land surveyor licenses. This regulatory action is intended to fulfill the requirements as established by HB1054. (Action ID: 2230)

NOIRA (3905)   **7**

This action is necessary to increase the protections for the health, safety and welfare of individuals receiving services from licensed providers. These revisions strengthen the ability of the Department of Behavioral Health and Developmental Services (DBHDS) to deny applications for licensing, revoke licenses, and restrict the activities of provider applicants that do not meet service standards during the provisional period. The agency has determined that these updates are needed to resolve issues pertaining to the regulation of service areas where problems have occurred. These revisions also update the definitions for consistency with other regulations of the Board and with the current mission of the DBHDS, which includes the provision of person-centered planning, and goals of recovery and self-determination for individuals receiving services. Updates will also ensure that the regulations reflect current standards of practice, statutes, and regulatory requirements. (Action ID: 2288)

Proposed (4901)   **10**

The proposed amendments establish a program for licensing individuals as onsite soil evaluators, onsite sewage system installers, and onsite sewage system operators as mandated by § 54.1-2301 C of the Code of Virginia. The amendments were developed in consultation with the Board of Health to adopt regulations for the licensure of onsite soil evaluators as well as installers and operators of alternative onsite sewage systems. The amendments include requirements for minimum education and training, relevant work experience, demonstrated knowledge and skill, fees to cover program costs, and other criteria that the Board deems necessary, as mandated by § 54.1-2301 D of the Code of Virginia. (Action ID: 2430)

Proposed (4705)   **203**

The proposed amendments change the language in specific sections of the regulations, reduce redundancy, and replace ambiguous language with more specific terms to eliminate confusion in determining various license entry and renewal requirements. The proposed changes will assist applicants and licensees to better understand the licensing requirements specific to each classification of licensure in waterworks and wastewater works. The language detailing experience exemption requirements is changed to be consistent throughout the regulations, the scope of the Board's disciplinary authority is clarified, continued professional education (CPE) becomes a renewal requirement for wastewater works operator licenses, and restricted Class VI waterworks licenses have been repealed. (Action ID: 2431)

Proposed (4782)   **8**

The proposed regulations will increase fees for the Contractors Board to ensure that revenues are sufficient but not excessive to cover its ongoing operating expenses. The Board's most recent fee increases became effective in August 2005. The Board has incurred an increase in costs for enforcement activities, Information Systems development costs, and application processing and customer support services. Current fees are not adequate to reduce the deficit and pay continuing operating costs. Without the proposed fee increases, the Board's deficit will continue to increase and the Department will not collect adequate revenue to pay for operations. (Action ID: 2589)

Proposed (4760)   **25**

The new regulation establishes qualifications and standards of practice and conduct for common interest community managers. The new regulation is necessary to implement Chapters 851 and 871 of the Acts of the 2008 General Assembly, which were the result of HB 516 and SB 301. The goal of the regulation is to establish qualifications and standards of practice and conduct for common interest community managers in accordance with HB 516 and SB 301. (Action ID: 2799)

Emergency NOIRA (4797)   **8**

The proposed regulations will increase fees for the Board for Barbers and Cosmetology to ensure that revenues are sufficient but not excessive to cover its ongoing operating expenses. The Board's most recent fee increases became effective in July 2002. Since 2002, licensure programs have become effective for the following professions: wax technician (2004), tattooing (2006), hair braiding (2006), body piercing (2007), and esthetics (2007). The Board has incurred an increase in costs for enforcement activities, Information Systems development costs, and application processing and customer support services. Current fees are not adequate to reduce the deficit and pay continuing operating costs. Without the proposed fee increases, the Board's deficit will continue to increase and the Department will not collect adequate revenue to pay for operations. All costs incurred in support of board activities and regulatory operations are paid by the department and funded through fees paid by applicants and licensees. All boards within the Department of Professional and Occupational Regulation must operate within the Code provisions of the Callahan Act (54.1-113), and the general provisions of 54.1-201. Each regulatory program's revenues must be adequate to support both its direct costs and a proportional share of agency operating costs. The Department allocates costs to its regulatory programs based on consistent, equitable, and cost-effective methodologies. (Action ID: 2916)

Proposed (5269)   **5**

This new regulation creates the requirement that, pursuant to § 55-530 of the Code of Virginia, each association establish and adopt written complaint procedures for the resolution of written complaints from the members of the association and other citizens, establishes minimum requirements for such procedures, provides for the distribution of these procedures to the members of the association and citizens, requires the maintenance of association records of complaints, and indicates the consequences for failure of an association to establish and utilize a complaint procedure. The regulation also establishes procedures and forms for filing a notice of final adverse decision with the Board. (Action ID: 2956)

Proposed (5362)   **5**

HB 2032 of the 2009 Session of the Virginia General Assembly charged the Board with the creation of a licensure program for the regulation of mold inspectors and mold remediators. The proposed regulations create the licensure entry requirements, renewal requirements and standards of practice and conduct for this group of regulants as well as the disciplinary authority of the Board. (Action ID: 3087)

Proposed (5470)	62

Architects, professional engineers, land surveyors, certified interior designers, and landscape architects have complex requirements for licensure and certification regarding entry and professional conduct. The complexity of these requirements results from the nature of their professions. Questions often arise from both regulants and applicants in an array of situations. The Board is proposing the new language for the purpose of ensuring that these requirements are the most up-to-date for what is necessary for each profession. Further, the Board's intention is to simplify the existing regulatory language to make entry and performance requirements as clear as possible for both regulants and other members of the public. (Action ID: 3250)

NOIRA (5473)	6
Certified Seed Board	0	0
Virginia Racing Commission	0	0
Board of Accountancy	0	0
Virginia Housing Development Authority	0	0
Department of Mines, Minerals and Energy	0	0
	17 stages and 413 comments

Education	Stages	Comments
Department of Education	**4**	**196**

The Regulations Governing Educational Services for Gifted Students were last approved in 1993, with an effective date of February 1995. Those regulations specify which gifted education services school divisions in the Commonwealth of Virginia shall provide students from kindergarten through high school graduation. The regulations speak to the area(s) of giftedness to be served, the identification of students in the selected area(s) of service, the criteria for screening and identification, the components of local plan that each division must have approved by the Department of Education, the assurances the school division must provide to the department regarding elements within the local plan, and provisions of use of state funds designated for division-wide gifted education services. The proposed revisions will allow the Virginia Board of Education to consider contemporary research and best practices in the field that have occurred in the last decade and to ensure that Virginia's regulations are consistent with that information. (Action ID: 1933)

NOIRA (3839)		**17**
Final (5074)		**62**

The present action proposes substantive changes in the Regulations Governing Special Education Programs for Children with Disabilities in Virginia. In a concurrent action, the Board of Education proposes to repeal the text of the current regulations (8 VAC 20-80) and promulgate new regulations (8 VAC 20-81). Substantive new changes are proposed for the following areas: 1) Functions of the Virginia Department of Education (VDOE); 2) Referral for evaluation; 3) Eligibility determinations; 4) The development, review and revision of a student's individualized education program (IEP); 5) Parentallyplaced private school students; 6) Discipline; 7) Procedural safeguards, including the appointment of surrogate parents and dispute resolution 8) Local educational agency administration and governance; 9) Funding; and 10) The requirements regarding highly qualified personnel. (Action ID: 2221)

Final (4828)		**62**

This action is essential to protect the health, safety, and welfare of the Commonwealth's most vulnerable citizens—its school-age population. The goals of the proposal are to strengthen the quality of instruction in public schools in Virginia and to bring the standards into conformity with amended or new state laws. These regulations form the basis for the day-to-day operation of the educational program in each public school in Virginia. The regulations contain provisions to govern student achievement expectations; requirements for graduation; transfer students; college and career preparation programs and opportunities for postsecondary credit; role of the school principal; school and community communications; school accountability; procedures for certifying school accountability; application of the standards; and recognition and rewards for school and division accountability performance. (Action ID: 2300)

Proposed (4541)		**55**

Library of Virginia	**1**	**7**

The purpose of the proposed action is to protect individuals from identity theft by eliminating unauthorized access to social security numbers in public records whose retention periods have expired. The regulation addresses best methods for destruction of public records containing social security numbers so that the social security numbers in these records cannot be used for identity theft. Any public records, regardless of media, that contain social security numbers are to be destroyed at the end of their retention period in a manner that protects the confidentiality of the information. These records are to be destroyed, made electronically inaccessible, or erased so as to make social security numbers unreadable by any means. (Action ID: 1660)

Proposed (4079)		**7**
College of William and Mary	**0**	**0**
University of Virginia	**0**	**0**
Virginia Polytechnic Institute and State University	**0**	**0**
Longwood University	**0**	**0**
Virginia Commonwealth University	**0**	**0**
Virginia Museum of Fine Arts	**0**	**0**
Christopher Newport University	**0**	**0**
State Council of Higher Education for Virginia	**0**	**0**
George Mason University	**0**	**0**
Radford University	**0**	**0**

22 stages and 616 comments

Finance	Stages	Comments
Department of Planning and Budget	**0**	**0**
Department of the State Internal Auditor	**0**	**0**
Department of Accounts	**0**	**0**
Department of Treasury	**0**	**0**
Department of Taxation	**0**	**0**
		22 stages and 616 comments

Health and Human Resources	Stages	Comments
Department of Aging	**0**	**0**
Department of Health Professions	**15**	**424**

Regulations are promulgated to provide educational, examination and practice requirements for the licensure of respiratory care practitioners. Provisions establish requirements for renewal or reinstatement of a license, standards for practice, and fees to support the regulatory and disciplinary activities of the board. (Action ID: 690)

NOIRA (971)	**7**

Regulations Governing the Practice of Medicine, Osteopathy, Podiatry and Chiropractic: In this regulatory action, the Board proposes to expand the current regulations on professional conduct to include standards for treating and prescribing for self and family; maintenance, retention and release of patient records; patient confidentiality; practitioner-patient communication and termination of that relationship; and practitioner responsibilities. In addition, substantive amendments are proposed for advertising ethics, the recommendation for vitamins and minerals, pharmacotherapy for weight loss, and sexual contact. (Action ID: 1334)

Proposed (2830)	**16**

Pursuant to the 2005 Acts of the Assembly (Chapters 610 and 924), the Board of Nursing has promulgated proposed regulations for registration of medication aides who administer drugs to residents of assisted living facilities, for approval of training programs in medication administration, and for standards of practice and grounds for disciplinary action. Requirements for Board approved training programs include qualifications for instructors, hours of classroom instruction and practical skills training, content of the curriculum and maintenance of certain records. To be registered as a medication aide, an applicant must document completion of an approved training program and passage of a competency evaluation as determined by the Board. Currently practicing medication aides will not be required to complete an approved training program but will be required to take an eight-hour refresher course and pass the competency examination. Requirements for renewal and reinstatement are set, including four hours of in-service training each year. Fees are established for program approval, application, and renewal as necessary to provide funding for the Board to administer the regulatory program. (Action ID: 1765)

Proposed (3509)   **13**

Regulations for the licensure of assisted living facility administrators include requirements for initial licensure to include a minimum of 30 hours of college-level courses, training in assisted living care, and passage of both a national credentialing examination and a state jurisprudence examination. Persons who have been serving as an administrator of an assisted living facility for two of the three years immediately preceding the effective date of regulations will be able to apply for licensure with documentation of their service and passage of the state jurisprudence examination. Provisions are also adopted for licensure by endorsement of persons who have held a license, certification or registration in another state. Regulations also set out requirements for an administrator-in-training program including registration of persons who serve as preceptors, the number of hours to be completed, the program content, and approved facilities for training. Fees are established for applicants and licensees, which are the same as those charged under the same board for nursing home administrators. For annual renewal of licensure, there are provisions for 20 hours of continuing education and for recognition and documentation of approved courses. Finally, the regulations set out the acts of unprofessional conduct that may cause the Board to refuse to license an applicant or to take some disciplinary action against a licensee. (Action ID: 1850)

Proposed (3599)   **24**

As a result of the periodic review of regulations, the following changes are being proposed: 1) expansion of the criteria for cases that may be delegated to an agency subordinate for informal fact-finding; 2) expansion of courses and the provider list for approved continuing education; 3) acceptance of accreditation by the Canadian Veterinary Medical Association for technician education; 4) additional alternative for meeting requirements for licensure by endorsement for veterinary technicians; 5) additional grounds for disciplinary action; 6) clarification of rules for delegation of veterinary tasks to unlicensed persons; 7) establishment of rules for injection of microchips; 8) allowing biennial inventory to be performed by licensee other than the veterinarian-in-charge; 9) clarification of regulations for drug storage, recordkeeping and reconstitution; 10) clarification of minimal requirements for a patient record; and 11) definition of companion animals that includes horses. (Action ID: 2421)

Proposed (4509)   **5**

The amended regulations will: 1) establish the qualifications and application requirements for certification in direct access; 2) set out the responsibility for the physical therapist to obtain the medical release and patient consent required by the statute; 3) establish a biennial renewal of certification with continuing education hours; and 4) establish the fees for direct access certification. (Action ID: 2451)

Emergency NOIRA (4279)	**5**
Proposed (4558)	**6**

The Board of Nursing has amended its requirements for foreign-trained nurses to eliminate the qualifying examination requirement for registered nurses but retain the educational and licensure review for comparability and the requirement for a test of English proficiency. For practical nurses educated in other countries, the credentials review is retained and a test of English proficiency is included in regulations as it is now required for an occupational visa into the United States. For both professions, the Commission on Graduate of Foreign Nursing Schools (CGFNS) is recognized in federal law and in Virginia regulation as the body that is approved to certify comparability and eligibility. However, the Board may accept other agencies that provide a similar level of assurance and thoroughness in reviewing documents and tests for English proficiency. (Action ID: 2604)

Proposed (4960)	**133**

The Board has reviewed the role delineations for occupational therapy and adopted regulations that specify the extent of responsibilities within the education and experience of the two levels of licensees. While the OTA can be an active participant in patient care from the initial assessment through discharge decisions and planning, the OT is ultimately responsible and accountable for patient care and outcomes under clinical supervision The role of an OTA is to perform those tasks assigned, document in the patient record, consult with the OT on patient responses and functionality and provide for resources necessary upon discharge. The OTA renders services under the supervision of an OT that do not require the clinical decision or specific knowledge, skills and judgment of a licensed OT and do not include the discretionary aspects of the initial assessment, evaluation or development of a treatment plan for a patient. By clearly specifying the scope of practice for an OTA and the requirements of the OT for supervision, co-signing patient records and re-evaluating patients, there is some assurance that the health and safety of citizens receiving occupational therapy services are protected. (Action ID: 2758)

Proposed (5030)	**23**

Amendments to Chapter 101, Regulations Governing the Licensure of Radiologic Technologists and Radiologists-Limited; the title of the regulations will be changed to Regulations Governing the Practice of Radiologic Technology to encompass the new profession of radiologist assistants RA's). Amendments are adopted to specify the requirements for licensure of RA's, including the education and examination that will assure minimum competency to practice; provisions for applicant and licensure fees; requirements for renewal and reinstatement to include some evidence of continuing competency to practice; and provisions for scope of practice, including supervision by a doctor of medicine or osteopathic medicine with a specialty in radiology. Current regulations, such as requirements for unprofessional conduct and renewal schedules, are amended to be applicable to RA's as well as radiologic technologists and radiologic technologists, limited. (Action ID: 3108)

Proposed (5405)	**46**

The purpose of the planned regulatory action is compliance with a legislative mandate for the adoption of regulations relating to disclosures of risk to certain patients. The law was amended by HB2163 (Chapter 646 of the 2009 Acts of the Assembly) to require the Board to adopt regulations governing the practice of midwifery, upon consultation with the Advisory Board on Midwifery. The regulations shall require midwives to "disclose to their patients, when appropriate, options for consultation and referral to a physician and evidence-based information on health risks associated with birth of a child outside of a hospital or birthing center, as defined in subsection E of § 32.1-11.5, including but not limited to risks associated with vaginal births after a prior cesarean section, breech births, births by women experiencing high-risk pregnancies, and births involving multiple gestation." The amendments will set out the conditions or risks factors for which it is "appropriate" to disclose the options available for referral and consultation and to provide the evidence-based information to a client about risks associated with birth outside of a hospital or birthing center for women with certain conditions or clinical situations. (Action ID: 3109)

   NOIRA (5236)   **43**

The Board of Veterinary Medicine is proposing amendments to increase fees charged to regulants and applicants. Annual renewal fees would be increased as follows: 1) For veterinarians, the increase is $40 per year; 2) For veterinary technicians, the increase is $20 per year; 3) For veterinary establishments, the increase is $60 per year; and 4) For equine dental technicians, the increase is $20 per year. Other fees are increased proportionally. For the renewal cycle ending January 1, 2013, there would be a one-time debt reduction assessment of $100 for veterinarians, $200 for veterinary establishments, and $50 for veterinary technicians and equine dental technicians. Other fees set proportionally to the renewal fees would also be increased. Licensees would be allowed to renew a lapsed license for one year (one renewal cycle) with payment of the renewal fee and a late fee; thereafter, the licensee would be required to reinstate the license and pay the reinstatement fee. (Action ID: 3112)

   Proposed (5383)   **12**

The provisions for approval of nursing education programs have been reorganized to clarify in Article 1 all criteria that must be met to obtain initial approval. To attain full approval, a program is required meet the criteria of Article 1 and comply with provisions set out in Article 2. To continue to have full approval, a program is required to continue compliance with Articles 1 and 2 and to meet the criteria of Article 3. To address deficiencies and problems that the Board has encountered with educational programs in recent years, it has made more explicit rules and has incorporated current guidance on observational experiences and simulation. Additionally, the process and procedures for granting initial or full approval, for placing a program on conditional approval, and for denial or withdrawal of approval are set out in specific sections, so it is not necessary to piece together the requirements throughout the regulation. (Action ID: 3238)

   NOIRA (5459)   **59**

The Board of Nursing has adopted requirements for continuing competency activities or courses in order to renew an active license as a registered nurse or a practical nurse each biennium. The options available include a refresher course, post-licensure academic course, current specialty certification, research and teaching, active practice for 640 hours and 15 hours of courses or 30 hours of approved courses. The entities and organizations that can recognize or approve a continuing education provider are listed in regulation. Regulations provide an exemption for nurses who have an active license as a nurse practitioner and for the second license if someone is licensed as an RN and LPN. Finally, there is a requirement for documentation of completion to be maintained for two years following renewal, and the documentation required for each type of activity or requirement is specified (Action ID: 3253)

NOIRA (5485)	**7**

Proposed regulations set forth the educational qualifications, the supervised experience and the certification necessary for performance of an endoscopic evaluation of swallowing by speech language pathologists. Additional requirements include referral from a qualified physician, performance in a health care facility with protocols for emergency medical backup, and reports to the referring physician. (Action ID: 3390)

NOIRA (5712)	**25**

Department of Aging and Rehabilitative Services	**0**	**0**

Department of Health	**5**	**222**

The Virginia Department of Health (VDH) intends to abolish the existing Radiation Protection Regulations (12 VAC 5- 480) and promulgate new regulations (12 VAC 5-481) containing current radiological health standards, including federal standards, and state legislation. These proposed regulations are intended to supercede the Radiation Protection Regulations, which became effective July 6, 1988. (Action ID: 895)

Proposed (2926)	**8**

The Biosolids Use Regulations (12 VAC 5-585) are to be amended to provide regulations and standards for enforcement related to local oversight of land application operations and provide requirements for land application site management practices to protect odor sensitive receptors, ensure permit compliance and address nutrient management concerns. (Action ID: 1684)

Proposed (3453)	**49**

The provision of Emergency Medical Services is a dynamic process that is continually changing due to advances in science, technology, legislative changes, federal mandates, evidence based practices, and more. This revision incorporates such changes as in terminology, practices in testing, enforcement, agency responsibilities, certification levels, reporting requirements, training and EMS physician requirements. (Action ID: 2446)

Proposed (5047)	**65**

The regulations create an inspection, sampling, and reporting frequency for all alternative onsite sewage systems (AOSS). The regulations establish the performance requirements for AOSS, as well as horizontal setbacks for those designed in accordance with Title 32.1-163.6 of the Code of Virginia. The regulations require owners to have a relationship with a licensed operator for the purpose of providing operation and maintenance to the AOSS. The regulations establish nitrogen limitations for all large AOSS and require all small AOSS to reduce nutrient loads within the Chesapeake Bay Watershed. The regulations establish treatment levels for performance and provide a methodology for evaluating treatment unit efficacy. The new regulations are supplemental to the existing Sewage Handling and Disposal Regulations (12VAC5-610-20 et seq., "SHDR") which contain permitting and enforcement procedures and other requirements for onsite sewage systems, including AOSS. (Action ID: 3184)

Emergency NOIRA (5364)	**9**
Proposed (5632)	**91**

Department of Medical Assistance Services	**3**	**23**

This regulatory action updates the Alzheimer's Assisted Living Waiver (AAL) in order to accommodate changes in the industry and to provide greater clarity to the regulations. These changes will bring current Virginia Department of Social Services (VDSS) licensing standards and DMAS' waiver expectations more in sync with each other while reducing provider confusion and duplication of effort. Proposed changes clarify clinical staff requirements and the number of activity hours and who is permitted to provide supervision. Initiation of these changes is expected to increase the available provider pool and provide enhanced participation in the waiver by eligible recipients. (Action ID: 3019)

Proposed (5209)	**9**

This regulatory action is intended to clarify that the cost effectiveness evaluation includes whether family healthcare coverage exists at time of application as factor in the cost evaluation process per the requirement of the 2009 Appropriations Act. Upon implementation of this change, having existing family health care coverage at time of application will be considered in the cost evaluation determination. This change will require the amendment of regulations addressing HIPP eligibility, family healthcare coverage, and a clarification of the cost effectiveness methodology. These changes are needed to ensure that HIPP payments made for the participants enrolled in the HIPP program are cost effective for the State. (Action ID: 3068)

Emergency NOIRA (5180)	**9**

This regulation is required in order to meet the Centers for Medicare and Medicaid Services (CMS) requirements for the renewal of the Mental Retardation/Intellectual Disability (MR/ID) Waiver (previously referred to as the Mental Retardation Waiver). DMAS covers these services pursuant to a waiver of certain federal requirements, permitted by application to CMS, the federal Medicaid authority. CMS approved the request for the renewal effective July 1, 2009; the current MR/ID waiver will expire June 30, 2014. (Action ID: 3095)

Emergency NOIRA (5213)	**5**

Department for the Blind and Vision Impaired	0	0
Department for Behavioral Health and Developmental Services	1	32

Provisions have been revised to align with the applicable state and federal law including, the federal regulations pursuant to the Health Insurance Portability and Accountability Act (HIPAA), and the recodification of Title 37.1 of the Code of Virginia, which became effective October 1, 2005. The regulations have been substantially reorganized and re-written to promote clarity. Some administrative processes have been expedited and simplified (i.e. process to address complaints). (Action ID: 1703)

Proposed (3440)		32

Department for the Deaf and Hard-of-Hearing	0	0
Department of Social Services	6	162

This regulation establishes minimum standards for licensed child day centers. The purpose of these standards is to protect children under the age of 13 who are separated from their parents during a part of the day by: ensuring that the activities, services, and facilities of centers are conducive to the well-being of children and reducing risks in the environment. The regulation covers the following topics: administration, staff qualifications and training, physical plant, staffing and supervision, programs, special care provisions and emergencies, and special services. (Action ID: 925)

Proposed (2388)		35

This is a joint action to repeal 22 VAC 42-10 and adopt a new regulation, 22 VAC 42-11, Standards for Interdepartmental Regulation of Children's Residential Facilities. The regulation applies to all children's residential facilities licensed or certified by the Departments of Education; Juvenile Justice; Mental Health, Mental Retardation and Substance Abuse Services; and Social Services. The changes made to this regulation reflect changes to the children's residential facility industry in recent years, and in federal requirements regarding record keeping and behavior management. The changes also incorporate the requirements found in Chapters 168 and 781 of the 2006 Acts of Assembly. The new regulation replaces an emergency regulation. Substantive changes address: changes in the types of licenses issued in response to compliance issues; summary suspensions; staff training requirements and qualifications; timely educational services; record keeping requirements; medication; staff supervision ratios; behavior management; recreation; emergency procedures; and community relations. The new regulation will better ensure that safeguards are in place to protect residents of children's residential facilities and that services are appropriate for these children. (Action ID: 1383)

Proposed (4052)		27

The proposed regulatory action is a joint action to repeal the existing regulation, 22 VAC 40-71, and establish a new regulation, 22 VAC 40-72. The new regulation includes additional requirements for assisted living facilities in the following areas: care and services to residents; staff qualifications, training, and responsibilities; management of the facility; physical plant features; coordination with mental health systems; disclosure of information; and emergency preparedness. The proposed standards emphasize resident-centered care and services. The standards include requirements that strive for a more homelike environment for residents. Additionally, the new regulation replaces an emergency regulation for 22 VAC 40-71. (Action ID: 1677)

Proposed (3303)   **5**

This regulatory action establishes a structure for an enhanced maintenance payment for children who require increased supervision or support (additional daily supervision) because of identified needs, as is required by the Administration for Children and Families (ACF) to draw down Title IV-E funds to reimburse Virginia for these payments. The regulation requires the use of an assessment instrument developed by the Department of Social Services (DSS), establishes how and when the instrument will be used, and sets forth the responsibilities of the agency making the payments and parents receiving payments. The regulation also establishes an enhanced maintenance payment process for emergency placements and a process for reviewing the results of the assessment process. This regulatory action addresses only maintenance payments for the additional daily supervision needs of the child. It does not address the provision of services funded through the Comprehensive Services Act. (Action ID: 1853)

NOIRA (5066)   **61**

The new regulation for resource, foster and adoptive family home providers approved by local departments of social services (local departments) will ensure compliance with changes to federal and state laws and regulations regarding resource, foster and adoptive family homes. Regulations addressing approval of providers by local departments were contained in 22 VAC 40-770 which was repealed in 2007. This action is necessary to provide local departments with guidance in the approval of provider homes. In addition, the new regulations will create consistency between providers approved by local departments of social services and licensed child placing agencies. This consistency was an action step of the Performance Improvement Plan developed in response to the federal Child and Family Services Review and is required by federal regulations. Major components of the regulation include: making all definitions and requirements to be consistent with other social services regulations and applicable approval requirements that fall under the purview of other State agencies; mandating training for resource, foster and adoptive home providers; requiring a narrative home study report; creating one set of standards for the approval of all types of family home providers (i.e.; resource, foster and adoptive) to streamline the process of approval; requiring proof of provider approval to be maintained in the child's file; ensuring safety through standards for the home of the provider and requirements for criminal background checks. (Action ID: 2383)

Proposed (4510)   **13**

Proposed changes to the regulation include (1) removing the requirement that assisted living facilities (ALFs) accepting individuals with an Auxiliary Grant (AG) submit an annual audit report to the Department of Social Services (DSS) and replacing it with a requirement for an annual AG certification; (2) the addition of a Virginia residency requirement for AG eligibility; (3) clarifications regarding ALFs' participation in the AG Program and the submission of the provider agreement; (4) amendments to the assessment process for emergency ALF placements; (5) clarification for ALF providers regarding procedures surrounding resident discharges from facilities; and (6) use of person-centered language throughout the proposed text. (Action ID: 2652)

Proposed (5054)	**21**

	52 *stages and* **1,479** *comments*

Independent Agencies	Stages	Comments
Department of Law	**0**	**0**
State Corporation Commission	**0**	**0**
State Lottery Department	**0**	**0**
Virginia Office for Protection and Advocacy	**0**	**0**
Board of Bar Examiners	**0**	**0**
Virginia Workers' Compensation Commission	**0**	**0**
Commission on the Virginia Alcohol Safety Action Program	**0**	**0**
Virginia Indigent Defense Commission	**0**	**0**
Virginia State Bar	**0**	**0**
	52 *stages and* **1,479** *comments*	

Natural Resources	Stages	Comments
Department of Conservation and Recreation	**5**	**471**

Existing nutrient management training and certification regulations will be amended to include revised criteria for nutrient management plans capable of reducing nitrogen and phosphorus loss from land to ground and surface waters. Modifications to phosphorus management practices are necessary to reduce water quality impacts from the land application of fertilizer, animal manure, sewage sludge, and industrial wastes. Amendments in nitrogen application criteria in nutrient management plans will be primarily addressed through improved timing of land application of nitrogen containing materials. Additional changes include a revised listing of Virginia soils to include those soil series established since the last regulatory adoption in 1995 and other technical changes. (Action ID: 1445)

Proposed (3068)		**18**

This regulatory action amends the Virginia Soil and Water Conservation Board's Impounding Structure Regulations and is being advanced to protect the safety and welfare of the public and their property from the impact of dam failures. (Action ID: 1914)

Proposed (4047)		**15**

The purpose of this proposed action is to develop regulations that establish statewide stormwater permit fees at a level sufficient to carry out the stormwater management program per §10.1-603.4.5 of the Code of Virginia and to revise the related provisions in the regulations, as needed, to improve the administration and implementation of fees under the Virginia Stormwater Management Act (§10.1-603.2 et seq.). (Action ID: 1915)

Proposed (5106)		**35**

This proposed regulatory action amends the technical criteria applicable to stormwater discharges from construction activities, establishes minimum criteria for locality-administered stormwater management programs (qualifying local programs) and Department of Conservation and Recreation (Department) administered local stormwater management programs, as well as authorization procedures and review procedures for qualifying local programs, and amends the definitions section applicable to all of the Virginia Stormwater Management Program (VSMP) regulations. (Action ID: 1916)

NOIRA (4407)		**5**
Proposed (5070)		**398**
Marine Resources Commission	**0**	**0**
Department of Game and Inland Fisheries	**0**	**0**
Department of Historic Resources	**0**	**0**

Department of Environmental Quality   **5**   **266**

The subject matter of the rulemaking will include a new designation of "Aquaculture Enhancement Zones" on the Eastern Shore of Virginia and narrative criteria to provide additional protection to these waters that are used or could reasonably be used for shellfish aquaculture or to support aquaculture by requiring applicants to demonstrate that practicable alternatives to discharging pollutants to the listed waters have been evaluated and that the proposed discharge is the alternative that produces the least environmental impact. The rulemaking will also consider how the shellfish policy in 9 VAC-25-370 and the water quality standards in 9 VAC 25-260-270 should be amended for the purposes of improving the clarity and efficiency of implementation of these related activities and how they would be coordinated with the requirements under the proposed shellfish Aquaculture Enhancement Zones. The intent of this rulemaking is to protect state waters by adopting regulations that are technically correct, necessary and reasonable to protect the aquaculture uses of the specified waters. These standards will be used in determining whether new point source discharges will be permitted and, if so, in setting Virginia Pollutant Discharge Elimination System Permit limits. (Action ID: 2425)

 NOIRA (4240)   **6**

The State Water Control Board is considering amending the existing Virginia Pollution Abatement (VPA) Permit Regulation for Poultry Waste Management in order to establish requirements for end-users of poultry waste to ensure that poultry waste is being used in a manner in which state waters are being protected and nutrients losses are being reduced and that these reductions can be measured. The proposed amendments include provisions regarding transferred off-site poultry waste used for land application by another entity other than the poultry grower. These provisions will establish end-user requirements such as: land application record keeping, poultry waste storage, land application timing and rates, land application buffer requirements. These provisions will also include the option of coverage under a general permit for a poultry waste end-user or poultry waste broker if non-compliance with the requirements of the proposed technical regulations found in 9VAC25-630-60, 9VAC25-630-70 and 9VAC25-630-80 is determined. (Action ID: 2525)

 NOIRA (4398)   **6**
 Proposed (5172)   **237**

The changes proposed in this regulatory action address the regulation of biosolids (treated sewage sludge) in a comprehensive manner that covers land application permitted under the Virginia Pollutant Abatement Permit (VPA) Regulation as well as the Virginia Pollutant Discharge Elimination System (VPDES) Permit Regulation. The changes address various issues related to the land application of biosolids, including the following major topics: 1) storage requirements 2) permit fees 3) site access control 4) consistency between VPA and VPDES permit requirements 5) public notice processes 6) permit modification procedures 7) processes to establish appropriate buffers to address health concerns 8) sampling requirements 9) nutrient management requirements (Action ID: 2625)

 NOIRA (4574)   **7**

The purpose of this regulatory action is to implement 2009 state legislation requiring the Department of Environmental Quality to develop one or more permits by rule for wind-energy projects with rated capacity not exceeding 100 megawatts. By means of this legislation, the General Assembly moved permitting authority for these projects from the State Corporation Commission to DEQ. By requiring a "permit by rule," the legislature is mandating that permit requirements be set forth "up front" within this regulation, rather than being developed on a case-by-case basis. The legislation mandates that the permit by rule include conditions and standards necessary to protect the Commonwealth's natural resources. The proposal establishes requirements for potential environmental impacts analyses, mitigation plans, facility site planning, public participation, permit fees, inter-agency consultations, compliance and enforcement. The legislation requires DEQ to determine if multiple permits by rule are necessary to address all the renewable-energy media. DEQ determined that multiple permits by rule are necessary. This proposal constitutes DEQ's permit by rule for wind energy projects (Action ID: 3089)

Proposed (5451)	**10**

62 stages and 2,216 comments	

Public Safety	Stages	Comments
Department of Emergency Management	0	0
Department of Criminal Justice Services	1	36

The proposed regulation establishes a licensure, registration and certification process for locksmiths, detector canine handlers and detector canine handler examiners in accordance with legislative amendments to the Code of Virginia §9.1-138 et seq. The regulation establishes a regulatory fee structure, compulsory minimum entry-level training standards including firearms training and qualifications, standards of conduct and administration of the regulatory system. These regulations will replace emergency regulations in effect for the locksmith industry. The proposed regulations also are the result of a comprehensive review of the entire regulatory program for private security services in which amendments and new language effect the fee structure, training sessions, firearms training enhancement, administrative requirements and standards of conduct as well as minor changes for purposes of clear and concise language. (Action ID: 2725)

NOIRA (4712)		**36**
Department of State Police	0	0
Department of Corrections	0	0
Department of Correctional Education	0	0
Department of Juvenile Justice	0	0
Department of Forensic Science	0	0
Department of Fire Programs	0	0

Department of Alcoholic Beverage Control	**2**	**162**

The Alcoholic Beverage Control Board is proposing amendments to its regulations governing operations by retail licensees. The new provisions will (1) provide a process for licensees to apply for permission to employ individuals with certain criminal convictions, (2) allow persons 18 and over to serve wine at a counter in establishments selling wine only, (3) allow wine to be placed in containers of ice by farm wineries at wine festivals, (4) simplify food requirements for grocery stores and convenience grocery stores, (5) simplify the limitations of non-member use of licensed club facilities, and (6) clarify the rules with respect to partially nude entertainers at licensed establishments to define the separation that must be maintained from customers, specify the minimum clothing required at mixed beverage establishments, and clarify that this regulation does not restrict legitimate theatrical productions. (Action ID: 2153)

Fast-track (3794)	**11**
Proposed (4349)	**151**

Board for Towing & Recovery Operators	**1**	**115**

These regulations govern the licensure, practice, and discipline of towing and recovery operators. The Virginia Board (the Board) for Towing and Recovery Operators (BTRO) was established by the enactment of Chapters 874 and 891 of the 2006 General Assembly. The operation of the Board became effective July 1, 2006. Licensure, regulation, and enforcement of standards of practice are intended to become effective July 1, 2008. Continuing education requirements contained herein are intended to become effective July 1, 2011, thereby affording the Board time to evaluate and perhaps cause to have developed, appropriate training courses and systems. (Action ID: 2290)

Proposed (4348)	**115**

66 stages and 2,529 comments

Transportation	Stages	Comments
Department of Motor Vehicles	0	0
Virginia Port Authority	0	0
Department of Transportation	1	5

This replacement regulation has the same purpose as the existing one – it defines what uses may be permitted on the right-of-way under the control of the Commonwealth Transportation Board (CTB) and the Virginia Department of Transportation (VDOT). Under this revision, certain uses such as logging entrances will require site-specific review, permits for utilities in subdivisions have been simplified, roadside memorial signing is permitted under certain conditions, private driveways will no longer be installed by VDOT, and commercial entrance review will include a concept called access management, which has been defined as "the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway." It is composed of many different components, including special geometric design criteria, intersection and traffic signal spacing standards, and other traffic control measures applied to a specific corridor or at the regional or statewide level. Fees for permits have been increased and accommodation fees for utilities within limited access right-of-way have been added. The manual has been rewritten to eliminate redundant or obsolete provisions, and to provide clarity. Sections have been rearranged to improve readability. The regulation has been reduced from 250 to approximately 90 pages. (Action ID: 769)

Proposed (3107)		5
Department of Rail and Public Transportation	0	0
Motor Vehicle Dealer Board	0	0
Virginia Department of Aviation	0	0
		67 stages and 2,534 comments

APPENDIX B: CODE BOOK

I applied the following rules in coding the data.

SOPHISTICATION

For each recommendation assign 1 point for each affirmative answer to the following questions:

1. Has a specific problem been identified?

2. If a specific issue has been identified, has the commenter provided at least one tangible reason why it is problematic?

3. Has the participant provided more than one tangible reason why it is a challenge?

4. Is the solution to the problem supported by data and/or analysis at least in theory?

If the total is 2 or less, code as 0; otherwise, code as 1.

SIGNIFICANCE

Does the participant recommend an insignificant change?

Example 1:   A spelling correction.

Example 2:   A reference to a section that had been deleted or renumbered from a previous version of the proposed rule.

If the recommendation is insignificant, code as 0.

Does the suggestion require a major change?

Example 1:   The proposed regulation prohibits the spreading of poultry waste on land situated within 400 yards of a dwelling, school, or place of worship. A request to increase the prohibited range to 5 miles, if adopted, would fundamentally alter poultry waste dispersal practices in the Commonwealth; therefore, the recommended change is major.

Example 2:   If a proposed rule places no explicit requirements on public elementary schools to test students for admittance to their gifted program, a recommendation to add a provision that would require schools to test a third of students annually is a major change.

If the recommendation is major, code as 2. All suggestions not coded 0 or 2 are minor and, therefore, coded as 1.

REQUEST

Does the participant request that a provision of the proposed rule be modified or deleted? If so, assign a value of 1; otherwise, designate as 0.

Example 1 for *significance, major* is a modification. Example 2 is an addition.

CONFLICT

Did one or more commenters oppose the requested change?

In the agency statement summarizing and providing responses to comments submitted, was opposition to the recommendation noted (for example, from participants at a public hearing)?

If the answer to either of these questions is "yes," code as 1; otherwise, assign a value of 0.

BURDEN IMPOSED

Has the commenter requested a change to a provision that imposes no or an insignificant burden on him or a group for which he is advocating?

Example 1:   A recommendation to insert a word that had been inadvertently deleted from a previous version of the regulation may impose no burden.

NOTE: All "editorial" changes cannot be automatically considered insignificant. They must be evaluated to determine if the requested modification is truly insignificant.

Example 2:   If a proposed rule requires schools to maintain a list of students enrolled in the gifted program, the burden imposed is also insignificant.

If the burden imposed was none or insignificant, code as 0.

If the recommendation imposed a major burden on the commenter or party he represented or for which advocated, assign a value of 2.

Example 1:   If a proposed regulation requires the following from a landowner who wishes to spread poultry litter on his property—(a) two weeks prior to the application, the landowners must inform every resident who lives within a two-mile radius of the outer perimeter of the fields receiving the litter about the intended action; (b) the landowner must inform all residents in person; (c) (s)he must also receive signed verification from every resident indicating that they received notice and understood it—the burden imposed is major.

Example 2:   If a proposed rule requires public schools to test one-third of elementary students annually, the burden imposed on schools is major.

Example 3:   The requirements of the regulation are identical to the previous example, but an additional provision requires the Commonwealth to provide the funds necessary to hire personnel to administer and grade the exams, the burden imposed on schools is minor.

If the recommendation addressed an issue in which the burden imposed was not major, insignificant, or none, assign a value of 1.

IMPOSE BURDEN

Apply the rules outlined for *burden imposed* in coding this variable, i.e., no burden and insignificant burdens are assigned a value of 0, major burdens receive a value of 2, and all other recommendations are coded as 1.

The difference between this variable and *burden imposed* is the source of the imposition of the burden. *Burden imposed* applied to costs imposed by the agency in a proposed

regulation. *Impose burden* reflected costs the participant seeks to impose through a modification of the regulation.

SALIENCE

1. How many people will be directly affected by all of the provisions of this regulation?

For example, if a proposed rule increases the annual fee on licensed tow-truck drivers, this question is answered by determining the number of licensed tow-truck drivers.

2. How many people will be indirectly affected by this regulation if it is finalized?

Building off the previous example, if the fee increase is relatively small, e.g., from $25 to $35, few people other than the drivers will absorb costs (or realize benefits). In contrast, if the fee increases from $25 to $4,500, then many operators may be unable to afford a license, competition may decrease, and the price for towing services may increase substantially. In this scenario, quite a few people would be indirectly harmed (while a few would undoubtedly benefit).

3. How significant is the burden or benefit realized by those directly and indirectly affected by the proposed regulations?

Categorizing the salience of recommendations requires consideration of these three elements. For guidance in answering these questions refer to the agency statements, which provide an estimate of the number of people affected and the financial impact of the proposed regulation.

Ultimately, however, assessing salience requires judgment.

Judgment should be informed through the following steps:

1. Record the agency's assessment of the number of people affected by each proposed rule.

2. Sort the rules based from lowest to highest and determine appropriate cut-off values for high (3), medium (2), and low (1). These values should not "split hairs," i.e., a rule that affects an estimated 4,585 people is categorized as "low" while one that imposes conditions on 5,220 is sorted in the "medium" bin.

3. Review the content of each rule and estimate whether the impact on those affected by the regulation will be high (3), medium (2), or low (1).

4. Apply a "best" estimate of the number of people indirectly affected by the proposed rule and assign values for low (1), medium (2), and high (3).

5. Calculate the product of these estimates.

6. Sort the results from highest to lowest.

7. Review the results and correct any estimates that appear inappropriate.

8. Repeat steps 5 through 7 until no additional changes are required.

COMPLEXITY

If an average person should be able to provide meaningful input that will shape the provisions of the rule and complexity is low, assign a value of 0 to the rule.

If an average person should be able to provide meaningful input about the general concepts addressed by the regulation but not technical specifications, complexity is medium, assign a value of 1 to the rule.

If the technical specifications of the proposed regulation are intricately tied to the substance and general concepts of the rule, complexity is high, assign a value of 2.

Example 1: A rule proposes raising the annual licensing fee for professional wrestling promoters from $50 to $75. This regulation is not complex and should be coded as 0.

Example 2: A regulation that imposes standards on the producers of goat-milk cheese similar to the standards applied to those who use cows' milk in the production of cheese includes a number of general concepts that are likely easily understood by an average person. However, some provisions of the regulation will likely be highly technical in nature and the contribution of the average person who lacks expertise in this area will be minimal (e.g., "The standard plate count requirement for unpasteurized milk would decrease from the current 1,000,000 cells/ml to 500,000 cells/ml. The somatic cell count for unpasteurized milk would also decrease

from the current level of 1,000,000 cells/ml to 750,000 cells/ml."). Assign a value of 1 to rules that meet these criteria.

Example 3:   A proposed rule establishes standards for the application of nitrogen and phosphorous on turf grass. Although the average person may have an opinion, perhaps even a passionate one, about the degradation of rivers and streams, unless he is an expert in the field of turf grass management, soil science, or a related field, he likely will not provide administrators substantive information they had not previously considered. These types of regulation have high technical complexity and should be coded as 2.

COMMENTS

If two or more people offered the recommendation, assign a value of 1; otherwise, code as 0.

HEARINGS

If the agency did not conduct any public hearings during the stage, code as 0. If one or two public hearings were held, assign a value of 1. If the agency provided the general public three or more opportunities to meet with officials and provide feedback on the proposed rule, code as 2.

COMMITTEE

Review the agency statements for the proposed regulation. If the agency reported enlisting the assistance of an ad hoc advisory committee or technical advisory committee, assign a value of 1; otherwise, code as 0.

STAGE

If the participant provided a recommendation on a proposed rule in the NOIRA, emergency NOIRA, or fast-track stage, assign a value of 1. If the regulation is in the proposed stage, code as two. Assign a value of 0 to rules in the final stage.

ACTION

Code proposed regulations that the agency advanced to the next stage of the regulatory process as 1. Assign a value of 2 to rules suspended by the agency following the comment period. Code regulations withdrawn by the agency as 0.

EXEMPT

If the proposed action was exempt from Article 2 of the Virginia Administrative Process Act and, therefore, the normal executive branch review process was not required, code as 1; otherwise, assign a value of 0.

ACTION TYPE

If the agency sought to promulgate a new rule, code as 1. If the proposed action was an amendment to an existing administrative regulation, code as 0.

FEDERAL STANDARDS

If federal requirements or standards were applicable to the proposed regulation, assign a value of 1; otherwise, code as 0.

IDENTITY

If the author of the comment included a name, e.g., John Smith, J. Smith, or Smith, code as 1; otherwise, assign a value of 0.

ROLE

If the person submitting the recommendation was a private citizen or consumer or if the commenter was a business directly affected by the proposed regulation but not the targeted principal, assign a value of 1.

Example 1:   On a proposed rule to regulate the application of poultry waste on farms, a commenter who indicated he or she uses streams and rivers for recreational purposes is a private citizen/consumer, code as 1.

Example 2:   A fly-fishing guide whose business was negatively impacted by poultry waste run-off is not the regulated entity but absorbs direct costs (or realizes direct benefits) as a result of the rule, code as 2.

If the participant is a regulated entity or an advocate for such a stakeholder, assign a value of 2.

Example 3:   Building upon the previous example, poultry farmers and landowners who wished to spread chicken manure on their property would be directly affected by the rule, code as 2.

Code all other recommendations as 0.

APPENDIX C: OVERVIEW OF RULEMAKING IN THE COMMONWEALTH OF VIRGINIA

This section provides a brief overview of the standard rulemaking process in the Commonwealth of Virginia.[31] A more detailed description may be found in the user manual, which may be accessed from the Virginia Regulatory Town Hall website at virginia.townhall.gov/um/toc.cfm.

The process of promulgating or amending a rule in the Commonwealth proceeds in three steps. First, an agency submits a Notice of Intended Regulatory Action (NOIRA) to the Department of Planning & Budget (DPB) highlighting the key provisions of the proposed regulatory action. DPB has 14 days to review that submission. If the cabinet secretary or the governor raises no objections within 14 days of the DPB review, the agency receives authorization to submit the NOIRA to the Registrar for publication in *The Virginia Register of Regulations*. The agency must complete the submission within 14 days of authorization. Ten days prior to publication of the NOIRA in the *Register*, DPB automatically sends email notifications to registered users of Town Hall. Following publication, a 30-day public comment period commences and the Town Hall forum opens for observations from registered and unregistered users. At the end of the comment period, the agency has 180 days to draft the proposed regulation and submit it for executive branch review.

The second step of the process begins with executive branch review by four parties. The Office of the Attorney General (OAG) receives the proposed regulation first and has no deadline for review. Once the proposal receives OAG approval, DPB has 45 days for a fresh review and to complete an economic impact analysis (EIA). Following DPB appraisal, the

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[31] The Department of Planning & Budget provides a flow chart of this process on the Town Hall website at virginia.townhall.gov/um/chartstandardstate.pdf.

cabinet secretary has 14 days to review the proposal. Finally, the proposed regulation heads to the Office of the Governor without a deadline for review. Within 14 days of receiving the Governor's approval, the agency must submit the rule to the *Register* for publication. Similar to the NOIRA stage, 10 days prior to publication, Town Hall automatically generates email notifications that are sent to registered users. Following publication, a 60-day public-comment period begins and Town Hall opens to receive feedback from citizens. When the comment period ends, the agency has 180 days to draft and submit the final rule for review, but it must wait a minimum of 15 days before submission.

The final step follows a process similar to the second. It begins with Office of the Attorney General review (without a deadline), followed by DPB and cabinet secretary review (each 14 days), and review by the Governor (no deadline). If the regulation receives approval from the Governor, the agency has 14 days to submit it to the *Register*. Once again, email notifications are automatically sent to registered users of Town Hall 10 days prior to publication. Upon publication, a 30-day adoption period begins and interested parties may submit comments to the agency via Town Hall. After this period ends, the regulation becomes effective or is suspended by the agency. Alternatively, if "substantial" changes have been made between the proposed and final stages and 25 or more people and/or the Governor requests it, the agency is required to hold another public comment period.

APPENDIX D: RESULTS OF BOOTSTRAP ANALYSIS

This section provides distribution charts for the coefficients of the variables included in the final model optimized for the one thousand bootstrap samples I simulated.

Figure D-1: Sophistication, coefficient distribution from bootstrap analysis
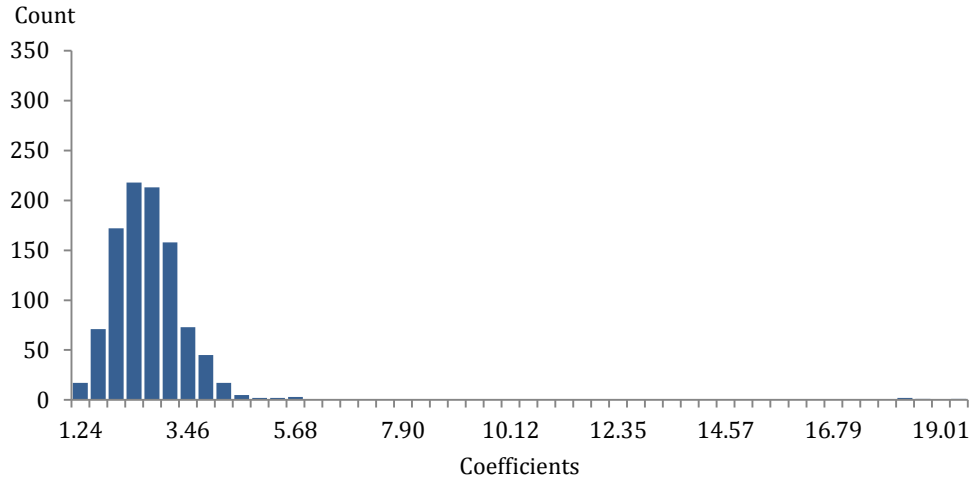
Figure D-2: Significance, coefficient distribution from bootstrap analysis
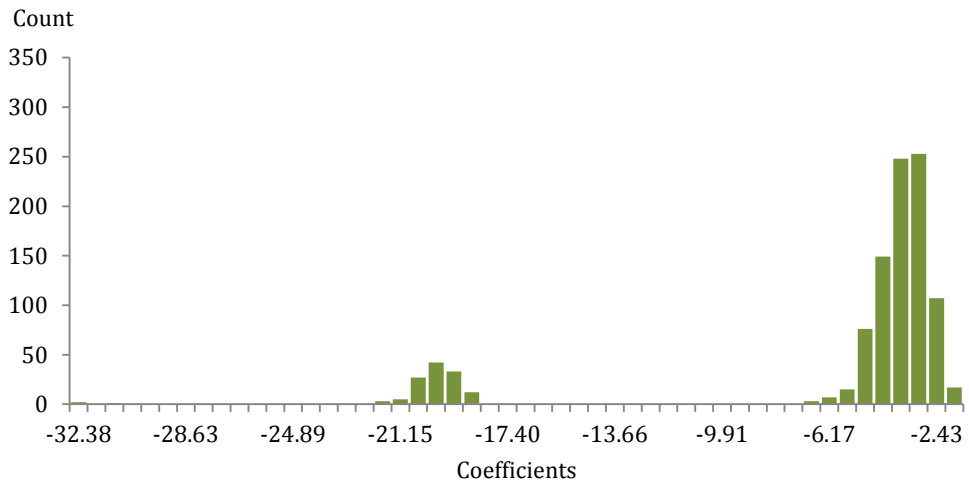
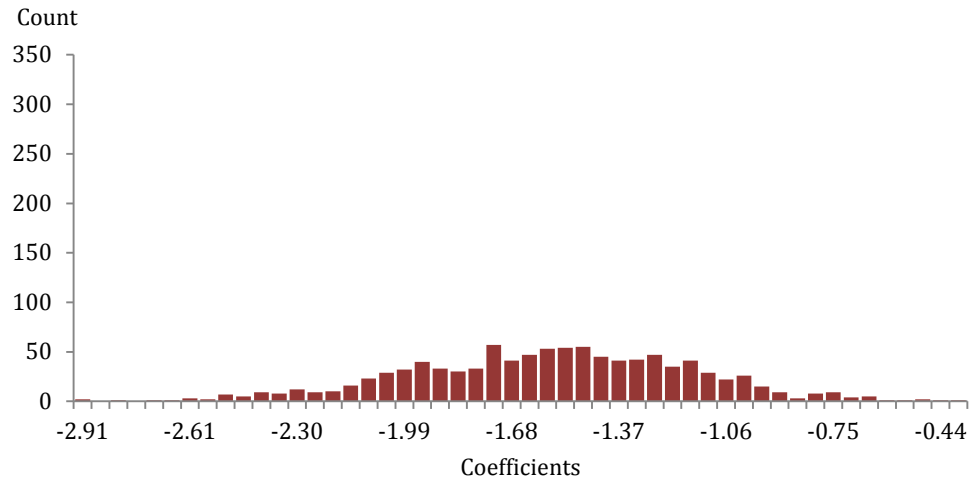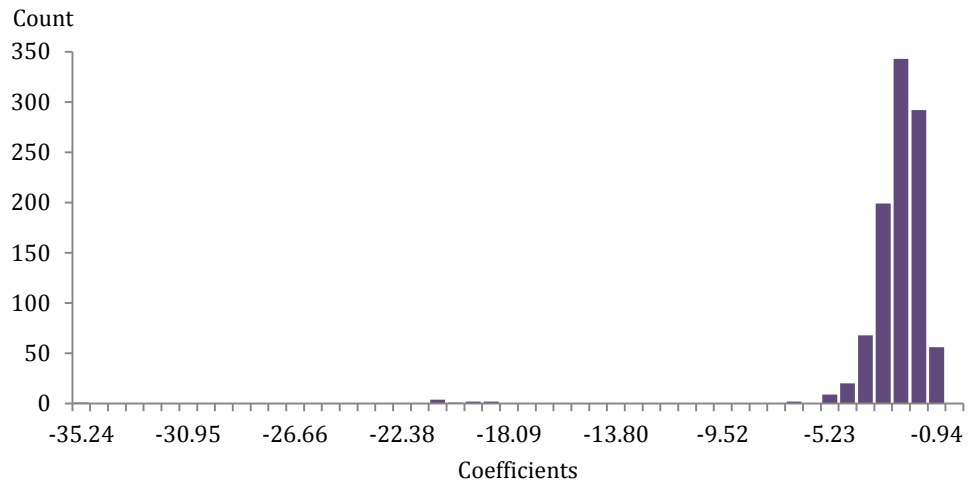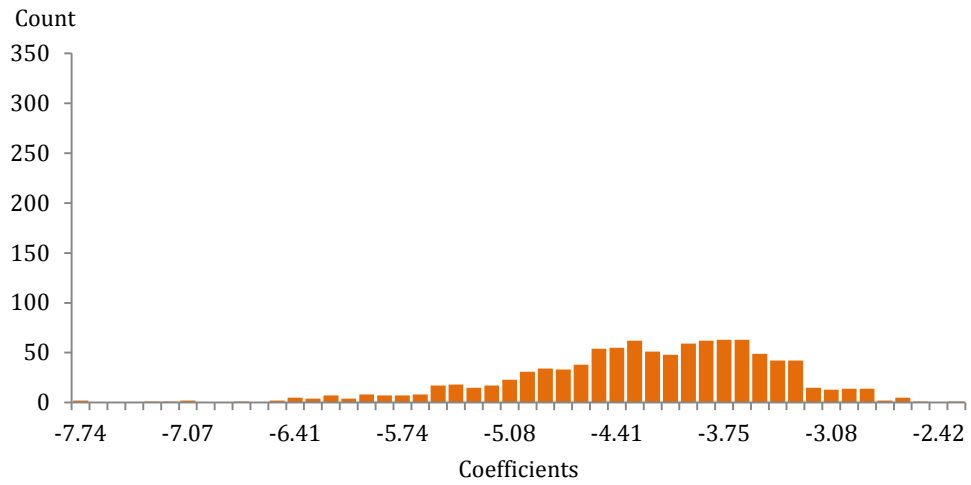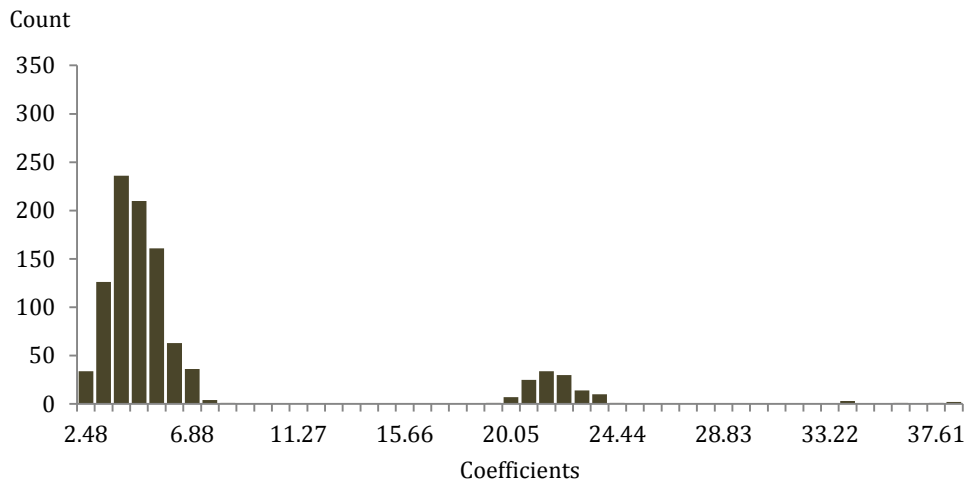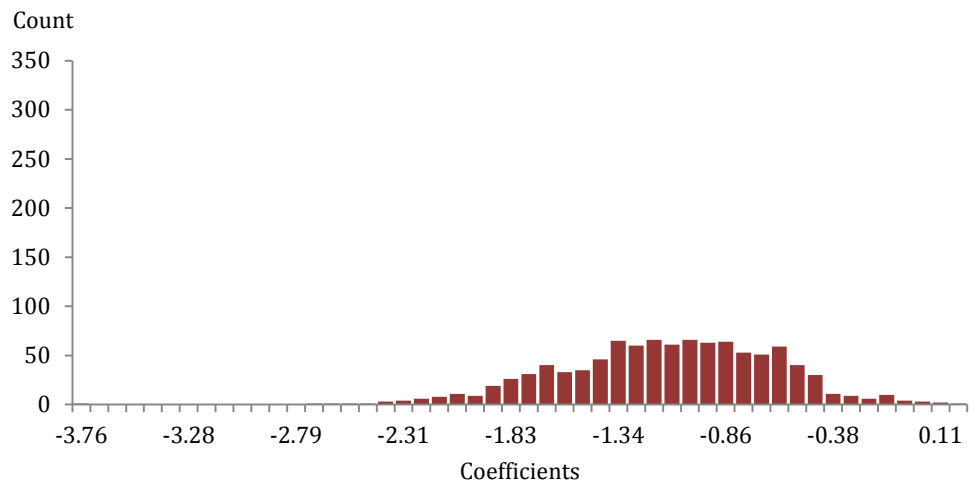**Figure D-3: Request, coefficient distribution from bootstrap analysis**

Figure D-1: Conflict, coefficient distribution from bootstrap analysis

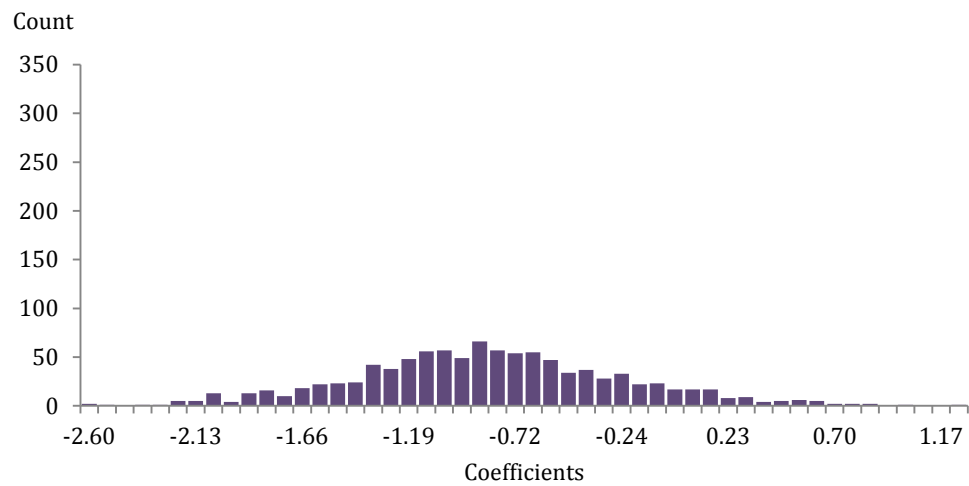**Figure D-2: Burden (minor), coefficient distribution from bootstrap analysis**

Count

Coefficients

Figure D-3: Burden (major), coefficient distribution from bootstrap analysis

Count

Coefficients

Figure D-4: Impose (minor), coefficient distribution from bootstrap analysis
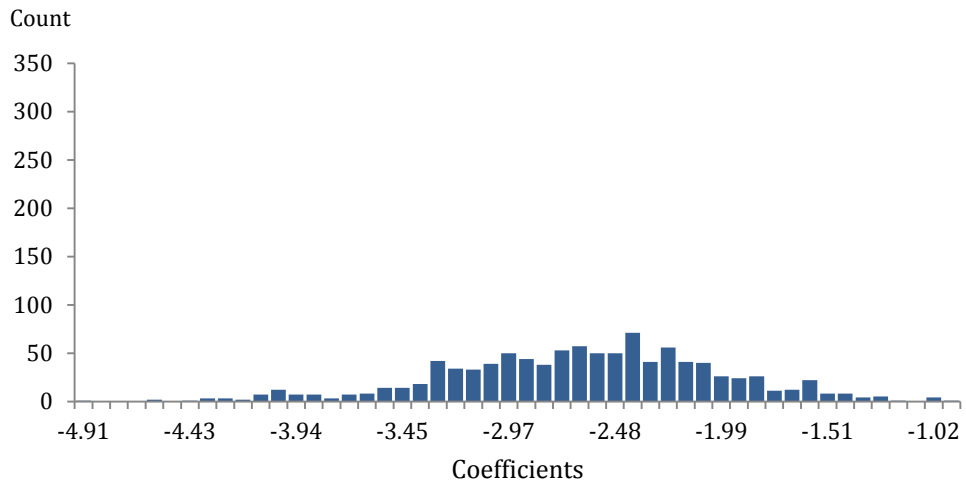
Figure D-5: Impose (major), coefficient distribution from bootstrap analysis
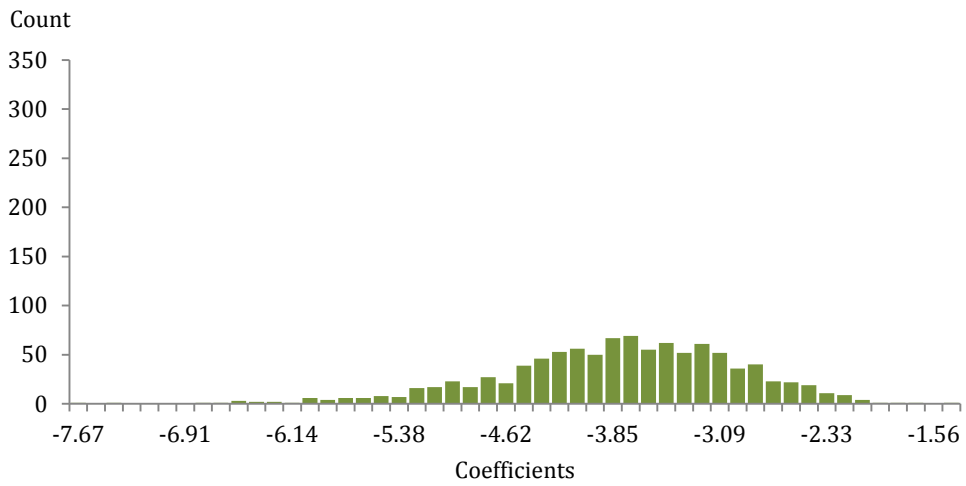
Figure D-6: Complexity (medium), coefficient distribution from bootstrap analysis

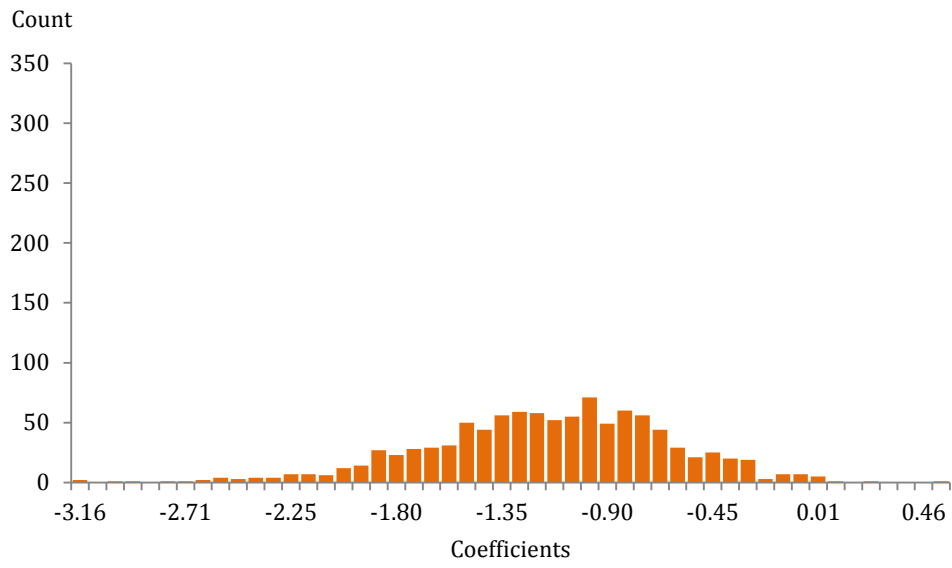**Figure D-7: Complexity (high), coefficient distribution from bootstrap analysis**

Figure D-8: Comments, coefficient distribution from bootstrap analysis

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APPENDIX E: HOW MANY BOOTSTRAPS?

As noted in Chapter Four, determining an appropriate minimum number of bootstraps to include in an analysis is not a primary focus of this study. However, given that I constructed a data set of 1,000 samples from my data, assessing the potential impact of increasing the number of replications on a specific metric of interest, say, the estimated mean predictive efficiency of the model was relatively simple.

First, I selected at random 100 bootstraps from the 1,000 I generated for the analysis and calculated the mean accuracy for the final model. Repeating this process 10,000 times, I determined that if I had generated only 100 bootstraps, the mean accuracy I estimated for the model would have fallen within a range of 87 basis points (i.e., the lowest predictive efficiency of the 10,000 randomly selected 100-count bootstraps was 0.9067 while the highest was 0.9154).

Increasing the number of bootstraps to 500 (again, selected at random and repeating this process 10,000 times) narrowed the range of estimated means to 33 basis points—a low estimated accuracy of 0.9095 and a high of 0.9128. In other words, by increasing the number of bootstraps from 100 to 500, I increased the precision of my calculation by 62 percent. When I increased the number of bootstraps to 900, I realized even greater gains in precision: 88 percent relative to the 100-count estimate (i.e., a range of 10 basis points vs. 87 basis points).

Gains such as these often sound impressive, but are not necessarily meaningful in practical terms.

Framing this issue somewhat differently, one can ask: should two models that differ in predictive accuracy by one-tenth of one percent be considered essentially equivalent? The intuitive answer seems to be "yes." But when B=100, the question hinges not on 10 basis points but approximately nine-tenths of 1 percent. Again, intuition may lead one to conclude that the answer remains the same—a model that is accurate 90.7 percent of the time, on average, is likely not substantively different from one that is accurate, on average, 91.5 times out of 100.

The point of this brief exploration is not to suggest that increasing the number of bootstraps included in an analysis offers no value in interpreting results. As the number of replications in a study increases, so should our confidence in the results. But it is intended as a note of caution in placing too much importance on relatively minor differences merely because an analysis draws on a large number of replications.

In my study, 1,000 bootstraps yielded an estimated mean predictive accuracy of 0.911. If I opted to use 100 replications instead, my simulation suggests my estimate likely would have fallen somewhere in a range from 0.907 to 0.915. Given that the accuracy of the model varies across bootstraps from 0.872 to 0.946, it appears that the additional 900 iterations used to calculate a more accurate estimate of mean predictive efficiency yielded little substantive benefit.

APPENDIX F: CALCULATING CONFIDENCE INTERVALS FOR GROUPS OF COMMENTS

The predictive accuracy of the final model is 0.911; however, if the objective is to estimate how many recommendations in a basket will coincide with changes to a proposed rule, then the framework will likely offer greater predictive accuracy due to the canceling of errors.

This effect can be illustrated via a simple example. Setting aside recommendations for a moment, consider the following scenario: You are lazing on a porch with a friend—let's call him Buster. The previous evening the two of you palavered while watching the fireflies light up the lawn. Just before parting ways, you mentioned that you had invented a tool that enabled you to predict the color of an item chosen from a bag filled with red and green balls. With little patience for bluster and doubting your claim, Buster decided this evening he would tote along his bag of balls, the one he keeps stashed in the hall closet for just such an occasion, and put your grand invention to the test.

One by one he selects balls from the bag, careful to keep them hidden from you, and asks what color each is. And each time you give your invention—which looks like not much more than a black box—a shake, open a door, and pull out a green or red ball. You show it to Buster then toss it in a bucket. Buster dutifully jots on a piece of paper whether you are correct then tosses the ball he selected into a different bucket.

After repeating this sequence 100 times, Buster decides to call it quits. He tallies the scribbles on his notepad and notes that 94 percent of the time your model guessed a green ball it was correct. When it predicted the ball was red, it hit the mark 88 percent of the time. Overall, you nailed the color of 91 balls and missed on 9.

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Before setting aside the balls, tucking into a pair of sauerkraut sandwiches, and watching the fireflies, you match the balls by color to see how well the model "predicted" the contents of the bucket. What you discover is that despite guessing correctly on only 91 percent of the balls, the model was 97 percent accurate in "predicting" the contents of the bucket: Buster had an extra 3 green balls in his and you had 3 extra red ones in yours, and the 97 others matched.

Of course, as Buster points out, your invention does not know anything about the contents of buckets. All it knows is red and green balls selected one at a time. How well or poorly the model estimates the contents of the bucket depends on the ratio of red and green balls that had been drawn and the model's accuracy in predicting them. For example, consider if the model predicted that 35 red balls had been selected out of 100. Assuming its accuracy was 0.88 and 0.94 on predictions of red and green balls, respectively, it would have been correct on 31 of its 35 red guesses and 61 of its 65 greens predictions. Those errors would have canceled each other and its estimate of the contents of the bucket would have been perfect.

Before turning my attention to a sauerkraut sandwich, I summarized these examples in the table below.

Table F-1: Example of error canceling in the prediction of group outcomes

	50% change=1	35% change=1
No. of balls	100	100
Estimated RED balls	50	35
Estimated GREEN balls	50	65
Model accuracy, RED balls	0.88	0.88
Model accuracy, GREEN balls	0.94	0.94
Estimated RED balls & actual RED balls (rounded)	44	31
Estimated RED balls & actual GREEN balls	6	4
Estimated GREEN balls & actual GREEN balls (rounded)	47	61
Estimated GREEN balls & actual RED balls	3	4
Actual RED balls	47	35
Net, actual RED balls less estimated RED balls	-3	0
Model accuracy, per recommendations	0.91	0.91
Model accuracy, count of RED balls & count of GREEN balls	0.97	1.00

Across all recommendations, the model has a predictive efficiency of 91 percent, but its accuracy in estimating baskets of requests is 98.5 percent on average (as I noted in section 4.4 in a summary of my bootstrap analyses). One of the primary strengths of the framework is that it effectively sorts recommendations into the upper and lower tenths of the probability range—71 percent have estimated probabilities of 0.9 or greater or less than 0.1—and its predictive accuracy for those recommendations is exceptionally high, in excess of 99.7 percent. Therefore, in constructing a confidence interval for a group estimate, consideration should be given to the composition of the basket of recommendations. If 7 out of 10 fall into the upper and lower-tenths, then an interval calculated with 0.985 may be appropriate. A more conservative estimate, e.g., 0.985 less one or two standard deviations (0.011), may be preferable if a greater percentage of the observations fall into the middle range of probabilities.

A final consideration in estimating outcomes for groups is whether to use a threshold, e.g., 0.5, to predict *change*=1 or to sum the probabilities of the recommendations. In many scenarios, the results will be similar. For example, if a group contains 100 items, the probability of *change*=1 of 40 of them averages 0.98 while the average probability of the rest is 0.02. With a 0.5 threshold, the estimated number of suggestions coinciding with a change is 40. Similarly, summing probabilities, the estimate is 40 * 0.98 + 60 * 0.02 = 40.4, which can be rounded down to 40. However, if the group contained only items with estimated probabilities ranging from 0.2 to 0.4 with a mean of 0.25, all observations would fall below the threshold, so the estimate is zero. In contrast, by summing probabilities, one expects 25 observations to coincide with a change, a prediction that may be much more accurate.

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