Improving Regulatory Performance: Does Executive Office Oversight Matter?

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Abstract

Executive Office review and oversight of proposed federal regulations have been a bipartisan action of presidents and some governors. Proposals for regulatory improvement regularly highlight the role of benefit-cost analysis in this process. Supporters argue that the purpose of a benefit-cost review is to improve the social (net) benefits of implemented regulations. The evaluation question is whether Executive Office review has actually improved performance.

This paper uses information on the status of regulations and their estimated economic impact to determine if Executive Office review has changed the outcome in different Administrations. The study is based on cost-effectiveness data that have had a large role in the debate about regulation and while an extensive critique of the data exists, its issues are addressed.

The results indicate that while Executive Office review is associated with rejecting some regulations that would have been economically inefficient, such review appears to have no efficiency improving impact on the difference between proposed and final regulations or on the cost effectiveness of regulations that are implemented.

Key words: regulation, performance, benefit-cost

1.0 Issues and Background

Improving governmental performance is a bipartisan objective. At the Federal level, each Administration for over 25 years has required agencies to submit material on the expected performance of regulations as part of a review process in the Executive Office of the President (e.g. Executive Orders 11949, 12044, 12291, 12866). While some research exists on regulatory performance (e.g. Morrall, 1986; Hahn, 1996) relatively less attention has been devoted to evaluating the bureaucratic processes designed to improve regulatory performance. In particular, this paper investigates whether Executive Office oversight improves the economic performance of regulation. Such investigation is particularly relevant as the substance of Executive Office review has surfaced in legislative proposals and could also be applied to agency performance under the Governmental Performance and Results Act.

Federal regulations are typically developed through processes identified in the Administrative Procedures Act. The regulatory process leads to legally binding rules that are a central means by which Government regulates the economy, the environment, health, safety, and a variety of other activities. The prototypical (informal) regulatory process involves: statutory delegation to an agency to develop a rule, internal agency development, internal administration review, release for public comment leading to possible revisions, and in many cases, judicial review following final publication. While courts may guard the process, the performance outcome of the process is amenable to quantitative analysis.

Unfortunately, the performance society wants from a regulation is ambiguous as society speaks with many voices. Various attributes of regulation have been identified as desirable, including substantive efficacy, economic efficiency, equity, transparency, and so on (NAPA, 1995; OTA, 1995). While society may want a complex mixture of these attributes, a substantial amount of current policy interest focuses on issues of risk and benefit-cost analysis, which can be viewed as elements of substantive efficacy and economic efficiency. Benefit-cost analysis in turn provides the core of official review criteria for regulation within the Executive Office of the President, with recent changes providing for concern about the impacts on small business and minorities.

This paper investigates the quantitative impact on regulatory performance of changes in Executive Office review of regulations, as implemented by the establishment of the Office of Information and Regulatory Affairs. The primary units of measurement are those regulations that become law while attention is also devoted to regulations that are withdrawn, rejected or proposed.

2.0 Regulatory Evaluation: Process and Performance

Presidents since the 1970s have issued Executive Orders that call for analysis of the benefits and costs of major regulations. The Executive Orders attempt to create an Executive Branch performance criteria for regulations from all agencies. While the criteria are not currently actionable by law in the absence of statutory direction, they do address accountability in the political arena where the President and Vice-President are the only elected officials in the Executive Branch.

A watershed in presidential guidance on regulatory performance was Executive Order 12291, issued in 1981 right after President Reagan took office. That Order called

for Federal agencies to prepare economic analyses that to the extent practicable calculate benefits and costs of major rules on a comparable monetized footing. It further required that agencies should promulgate regulations only if the benefits "outweigh" costs, unless this explicit and quantitative balancing was precluded by the underlying statute. These analyses are processed and reviewed in the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB).

President Clinton in 1993 issued Executive Order 12866 which, along with a newly revised guidance document, retained most of the specific analytical requirements for major rules. However, this later Order stipulated that benefits should "justify" costs and that the choice among alternative regulatory approaches should "maximize net benefits unless a statute requires another regulatory approach." Analyses should take into account a variety of quantitative and qualitative factors, including distributional considerations (impacts on different groups) and factors that might be difficult to monetize. Consistent with this altered "decision criterion," the Order and the guidelines issued by OMB put increased emphasis on the calculation of distributional impacts and the assessment of qualitative as well as quantitative factors. The performance concept was not much changed however; the agencies are to show that regulations can meet an economic performance test.

Most existing reviews of OIRA tend to be descriptive (McGarity, 1991; Shane, 1995; Morgenstern, 1997; U.S. GAO, 1998) and involve perceptions of participants at various parts of the process. The approach followed here assesses the statistical evidence for an impact of OIRA on economic measures of performance. The point of departure is an important data set prepared by John Morrall, first released in 1986, presenting the cost-per-life saved for various regulations. As surveyed by Heinzerling (1995), these data were widely interpreted as evidence of performance failure based on the lack of cost effectiveness and efficiency in federal health and safety regulations. The evidence for the lack of cost-effectiveness (least cost to achieve a given goal) was that the data covered a

range of cost-per-life saved from .1 to 72 billion (1984) dollars. Cost-effective regulation, with the implicit assumption that funds or regulatory powers are transferable across programs would require that cost-per-life-saved be equal for all regulations (or following some declining time trend if the least costly regulations are implemented first.) The spread in performance values suggested that more lives could be saved for less money by a different portfolio of regulations.

Cost effectiveness is a necessary but not sufficient condition for economic efficiency and so other readers further interpreted the results as indicating a failure of economic efficiency. Instead of taking the goal (lives saved) as given, economic efficiency asks if the additional benefits equal the additional costs for each program. If the additional benefits are primarily lives saved (on which there is more discussion below), then a commonly used measure of the economic benefit is the value of a statistical life. While differing estimates of this value exist as surveyed by EPA (1997), typically ranging from 1 to 12 million (1990) dollars, various researchers identified regulations as efficient if they saved lives for less than a threshold amount and inefficient if the cost-per-life-saved exceeded the threshold. The general findings of Morrall regarding cost effectiveness and economic inefficiency were upheld in a series of articles by Teng, et al. (1996) and Hahn (1996) who developed larger data sets.

Heinzerling disputes the standard interpretation of the cost-per-life-saved numbers by focusing on the variety of legal outcomes that occurred, as some of the apparently expensive rules were never finalized, and on the method of calculating the performance measure—the cost-per-life-saved.

This investigation relates to, but is separate from the questions of cost-effectiveness and efficiency while needing to take into account the Heinzerling critique of the data. The question asked here is whether regulatory performance improved with an OIRA review process? This is important in part because advocates of regulatory improvement have sought to create a statute instead of Executive Order based

requirement for the benefit-cost review of regulations. They seek an increase in the benefit-cost reporting of OIRA, and have considered the creation in Congress of institutions similar to OIRA. This evaluation of program evaluators might reasonably inform suggestions for reform. The basic questions, developed more formally in the following section, are:

- Has Executive Office review changed the probability of rejection for high cost-per-life-saved regulations?
- Has Executive Office review changed the cost-per-life-saved for finalized regulations?
- Has Executive Office review changed the cost-per-life-saved between the officially proposed and the final version of a regulation?

Foreshadowing later results, for all the sound and the fury about the role and impact of Executive Office review, the evidence is remarkably weak that OIRA has had a substantial quantitative impact. While some may argue that the policy conclusion is to remove Executive Office review, this author will argue that a stronger dose is appropriate.

3.0 Analytical Structure and Previous Work

The statistical analysis of government regulatory decisionmaking has a small but vital literature, (e.g. McFadden 1976; Congleton, et. al., 1996). Such analyses as exist typically use data sets about some performance measures of regulation, and seek to identify the statistical determinants of the outcome. This research generally has analyzed decisions within one program, such as hazardous site clean-ups under CERCLA, or a set of decisions within a single agency. With reference to environmental regulation, various authors have analyzed the statistical determinants of decisions involving: 1) pesticide regulation (Cropper, et al., 1992), 2) superfund clean-ups (Viscusi and Hamilton, 1999),

3) water effluent regulation (Magat, Krupnick and Harrington, 1986), 4) air toxics (Van Houtven, 1996), and 5) government sales of environmentally sensitive petroleum resources among other applications (Farrow, 1991). While various statistical models are fit to the data, for instance depending on whether the decision being analyzed is discrete (yes/no) or continuous (e.g. concentration limits in a standard), the basic approach is to ask if the outcome of a decision, D, depends statistically on some aspects of the process or information, X, while simultaneously taking into account other factors that might affect the outcome. The resulting analysis identifies which factors are statistically associated with the decision, how large an impact a change in X has on the decision, and the overall predictive power of the statistical equation that links the Xs to D.

Surprisingly, little statistical analysis has been done on the performance of regulation that cuts across agencies. Executive Office review provides an opportunity for such a cross-cutting analysis. Previously, Morrall simply computed some descriptive statistics of his sample while Heinzerling did not carry out any statistical analysis. Hahn (1999) while extending the analysis of Morrall, primarily investigated a different set of questions. In the bulk of his work, Hahn investigates whether the type of regulation (cancer, or not) or promulgating agency (EPA or not) is a determinant of the cost-per-life-saved, while also testing for differences between his data set and that reported by Morrall. In his analysis, the type of regulation, cancer or not, appears almost synonymous with Morrall's focus on health-based regulations. Hahn's regression results lead him to the conclusion that rules focused on reducing cancer are less cost effective than others, an effect exacerbated in his analysis if the EPA promulgated the rule. That line of questioning can indeed direct policy makers to question whether cancer (or health

in general) should be more or less tightly regulated and who should promulgate cancer (health) focused regulations. However, they provide little guidance for the impact of regulatory review.

A regression approach to the impact of Executive Office review of regulation seems to have first surfaced in preliminary results mentioned by Farrow and Toman (1999) and in an initial analysis by Hahn (1999). Those results indicated that the existence of OIRA did not significantly affect the cost effectiveness of final regulations. The results in this paper investigate additional questions regarding rules that are rejected, changes from proposed to final rules and the robustness of the prior findings that OIRA has not had an effect on the cost-effectiveness of regulation.

The several models to be estimated are summarized here. The first model concerns the hypothesis that Executive Office review alters the probability of rejection of a rule. A rule is deemed "rejected" if it is proposed but is withdrawn or never implemented by the agency[1]. Such rejection might be considered a success for regulatory reformers if cost effectiveness data were important in their rejection and accurately measured. This hypothesis refines the simple visual clues provided to a reader when final, proposed, and rejected rules have been lumped together in one table, as has been the standard practice.

Briefly, define R as whether a rule is rejected or not. Define X as a set of variables, including: the estimated cost effectiveness of the rule (C); "Reagan" and "Bush" as variables indicating each Administration; OIRA as the presence of the Office of Information and Regulatory Affairs (since 1981); "Health " as whether the rule is

focused on that issue (almost a perfect overlap with "cancer"); "EPA" as the agency; "Year" as the year of promulgation; and "Budget" as the budgets of relevant trade associations that were likely to oppose the rule. A regretful statistical reality given the Morrall data is that the presence of OIRA, begun in 1981, exactly overlaps the Republican years of 1981 to 1992. Thus, with the current data set, we cannot distinguish between the impact of OIRA and the Republican administrations[2] although a test for differences between the Republican Administrations can be implemented.

A statistical approach to the rejection hypothesis is to use a Probit type of analysis which models a two outcome (rejected or not) situation as:

R=1 (rejected) if $Y^* \geq f(X\beta) + e$ and Y^* is an unobservable index of preference and where e is an error term, β are parameters

=0 (not rejected) otherwise. Here one asks if the presence of OIRA or the budgets of trade associations affected the probability rejections

The second hypothesis is whether any Administration or the presence of OIRA reduced the cost-per-life-saved compared to what it would otherwise have been. This is the extension of the preliminary results in Farrow and Toman, and in Hahn. The structure of that model, where only data for final rules are included, is:

$C=f(X\beta)+e$ where e is a standard error term, β are parameters

If an Administration or OIRA had an effect in reducing the cost-per-life-saved, then we would expect to see a negative relationship between those variables and cost-per-life-saved.

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[1] The case of rejection by the courts, as with Corrosion Proof Fittings v. EPA , 947 F.2d 1201 (5th Cir. 1991), took place after Executive Office Review. Its rejection can be modeled if one asks about the entire regulatory system including agency development, executive office, and eventually, judicial review.

[2] In part, this paper can be viewed as an outline for OIRA to carry out its own updated analysis of statistical effectiveness.

Finally, we can ask if the cost-per-life-saved changed between the proposed and final rule($C_p - C_f$) as a function of the Administration or presence of OIRA.

4.0 Data

The data available for this analysis have been published in several forms, all with Morrall as a participant (Morrall, 1986; OMB, 1992; Viscusi, 1996; Lutter and Morrall, 1994). The data were the subject of an intensive critique by Heinzerling (1995). A summary of the issues is presented here as the debate tends to break down along economist/non-economist lines. Readers interested in further detail are referred to the original publications.

John Morrall, an economist originally in the Council on Wage and Price Stability in the Carter Administration and later in the Office of the Management and Budget, prepared and updated a table (Morrall, 1986) that reports the cost-per-life-saved for individual regulation. Various additional information was provided in the table (and its later extensions) including the originating agency, whether it was health or safety based, the year of the regulations, and its status such as "final," "proposed" or "rejected." Morrall reported some aspects of his calculations, such as being "generally based on agencies' estimates at the time of decision," "adjusted ..temporal variations using a uniform 10-percent discount rate for both benefits and costs," and because "many regulations were projected to yield benefits in addition to saving lives, such as reducing non-fatal injuries and property damage. I accounted for these additional benefits by subtracting monetary benefits from costs and converting non-lifesaving benefits into an index equivalent to additional lives saved, (Morrall, 1986, p. 27-28)." The starting data

set for this study is a composite of four presentations of the data (comprising 73 regulations from 1967 to 1991)[3]. As discussed below, some adjustment is made to the coding of 12 of those regulations including the deletion of 4 observations.

In the absence of debate it may have been appropriate to use the data as published. However, Heinzerling's critique raises five questions for users (and interpreters) of the data. Those questions are: 1) overinclusion due to rules rejected, 2) overinclusion due to rules that do not exist, 3) underinclusion due excluded rules and the failure to regulate, 4) discounting, and 5) estimating risks. Her careful review of various regulations led to some modification of the data for use in this study and where not modified, is worthy of a response. Each point is taken in turn with respect to the data used for this analysis.

4.1 Overinclusion and under inclusion

An important element of Heinzerling's critique is that data presented by Morrall both incorrectly includes and excludes some regulations. Her first concern is with rules that are rejected, but her concern in this case appears to be less with the data per se but that their inclusion to reformers should imply a success of regulation and not a failure[4].

The specific cases of concern to Heinzerling and their treatment in this paper are summarized in Table 1 (the other 61 cases remain as coded by Morrall and co-authors). For instance, the Asbestos regulation, which was finalized by the Administration but

[3] The four presentations are: Morrall (1986); OMB (1992); Viscusi (1996); and Lutter and Morrall (1994). Related data sets exist, such as those by: Tengs, et al. (1996) which, as published, do not contain the additional information necessary for this analysis; Hahn (1999) who cites results from extending the Morrall data but has not published the data; and the Office of Management and Budget (1997-1999) who have changed their reporting methods so that the data are not readily comparable to those of Morrall. As the Heinzerling critique is aimed at the Morrall data, and Hahn reports little statistical difference between his data and Morrall's, the analysis is based on the Morrall data while anticipating that OMB or other researchers can and should carry out extensions of the analysis.

rejected by the court[5], is included as final for the purpose of assessing the impact of Administrations or OIRA. Similarly, the data in front of EPA at the time of withdrawing three benzene related rules and two radionuclide regulations are included as information on "rejected" rules prior to any judicial process. One Morrall observation excluded from this analysis is a regulatory alternative for Acrylonitrile that was one of several considered but never finalized. If more observations of this kind were available, statistical tests could be conducted of the internal agency decision process (Cropper, et al., 1991; Hoagland and Farrow, 1996) but lacking comparable data it seems inappropriate to include secondary alternatives.

The second concern of Heinzerling is with the inclusion of rules that "don't exist" in the sense that they never became final. These are included either as rejected rules or deleted from the data set as "alternatives" as summarized in Table 1.

Table 1: Use of Disputed Regulations

Regulation	Heinzerling comment	Coding for this analysis	Notes
Various rejected rules	Rejected rules	Rejected rules	Basis of new test
Asbestos	Rejected by court	Final	Passed administration
Acrylonitrile (rejected)	Alternative	Not included	
Benzene (3)	Withdrawn by agency	Rejected	
Radionuclides (2)	Withdrawn by agency	Rejected	
Ethylene Dibromide	Never finalized	Rejected	
Arsenic Copper Smelter NESHAP	One rejected	NESHAP included, other is deleted	Agency withdrew rule due to closing of one plant to which it applied.
Arsenic glass (2)	Rejected rule does not exist	Not included	
Uranium mines	Withdrawn by agency	Rejected	

[4] Heinzerling notes that her critique does not accept the rules as inefficient as she also disputes the

4.2 Underexclusion and failure to regulate

Heinzerling's concern in this category is that some rules were promulgated and others "should be" promulgated but do not appear in Morrall's tables. Though Heinzerling mixes a variety of sources, including regulatory impact analyses and non-governmental or academic studies, the point remains as to the sample of regulations reviewed by Morrall. While the nature of the sample cannot be fully resolved, some insight can be gained by looking at an EPA (U.S. EPA, 1987) report on its use of benefit-cost analysis in the years 1981 to 1985. During that time EPA reports issuing 925 proposed regulations and 1,021 final regulations (with many proposed regulations also counted as becoming final). Of those regulations, regulatory impacts analyses were prepared for the 15 regulations considered "major" by EPA and hence appropriate for a review by OIRA. It is clear that the data omit over 95% of the regulations promulgated by EPA although individually they are relatively small[6]. Within the set of 15 major regulations; two were included in the Morrall sample (Land disposal ban and Asbestos). EPA reported that most major rules did not quantify expected lives saved and so would not be an expected part of the sample with at least the exception of used oil regulation under RCRA, new source performance review for surface coal mines, and national ambient air quality standards for particulate matter although the analytical focus on the latter had been on a per unit of pollution removed.

In general, as long as the sample is not biased in its selection of unusually high or low-cost regulations, then there should be no bias imparted to the statistical analysis of

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calculations underlying the estimates.

[5] See Corrosion Proof Fittings v. EPA 947 F.2d 1201 (5th Cir. 1991)

[6] EPA's recent concern with cumulative environmental impacts may have a parallel in its own regulatory impact when it issues numerous small regulations.

this study. Although Heinzerling presents examples of excluded air regulations that may be quite cost effective, at the same time other examples exist of excluded regulations that were not cost effective. Tengs et al. provide 587 estimates of the cost effectiveness of life-saving interventions, 151 of them regulatory and 310 of them relating to health care, which add cases of both cost effective and ineffective interventions.

Heinzerling surfaced a second concern for underinclusion: those risks that have not been proposed for regulation. This question returns to the purpose of the analysis. If the purpose is to set priorities by considering the full set of potential regulations, then indeed the reported regulations are underinclusive. If one focuses on the performance of the regulatory system as including those problems it has for whatever reason, seen fit to attack, then the revealed preference of the system is captured in what actually occurs. Unregulated opportunities represent an opportunity cost of action, just as potential opportunities to shift resources among many kinds of risk reducing categories represent an opportunity cost. It is a good question, but not germane to the present analysis on the impact of Administrations and OIRA on rules actually developed.

4.3 Discounting

A lengthy discussion by Heinzerling (1995, p. 2039) on the appropriateness of discounting concludes with a table titled "Competing Estimates of the Costs of Various Risk Reducing Regulations Per Life Saved." While different estimates of risk reduction are an element in some cases, the unifying difference in the estimates presented by Heinzerling and Morrall appears to be discounting, in particular, the practice of discounting lives saved. Her suggested corrections to the data are not accepted in this

study for reasons primarily economic and legal, but also informed by prior statistical analysis.

Heinzerling asserts that "the decision to discount lives saved in the future involves a choice about values, as to which reasonable people may disagree." This critique can be viewed as a question regarding whether any special credence can or should be attached to expert or professional consensus. First, a distinction should be made between an individual's values and the aggregate interaction of those values sought by economists. Individuals when acting on their own behalf are indeed expected to have their own values. Those different values for goods and services interact in the market place where a price yields a balance between all the different values. In just such a manner economists consider that some positive level of discounting is an observed social outcome of individual time preferences. There is no ambiguity that the professional standard for economists requires discounting. Morrall's data would not be accepted among the vast majority of mainstream economists without discounting. While the parallel is not exact, a similar professional offense for a lawyer may be preparing a case without researching precedent. Some variation could be accepted among economists as to the specific rate of discount. However, Morrall, as a federal and more specifically an OMB employee unsurprisingly uses OMB's discount rate identified in guidance for the preparation of regulatory impact analyses. In such a situation to avoid discounting would have made Morrall professionally negligent in the court of economic opinion and inconsistent with Federal guidelines. An individual may certainly apply any form or rate of discounting to their own decisions; an individual representing good or best practice of their profession does not have that flexibility.

The question of discounting in environmental regulation has also been commented on in Corrosion Proof Fittings v. EPA [947 F.2d 1201 (5th Cir. 1991)], whose subject was an asbestos regulation that was remanded to the Agency. The decision stated:

> "Although various commentators dispute whether it ever is appropriate to discount benefits when they are measured in human lives, we note that it would skew the results to discount only costs without according similar treatment to the benefits side of the equation….Because the EPA must discount costs to perform its evaluations properly, the EPA also should discount benefits to preserve an apples-to-apples comparison, even if this entails discounting benefits of a non-monetary nature."

Heinzerling's alternative of not discounting is inconsistent with this finding from a legal source usually accorded some deference and in a setting where both costs and benefits were being considered.

Finally, Hahn (1996) developed a database that includes the Morrall data as well as information on other regulations. He importantly notes the potential variability in cost-effectiveness computations, as when using life years or lives saved as the unit of benefit. Finally, he carries out a statistical analysis that pools his data, somewhat less adjusted from the EPA data but still discounted, with the Morrall data. His results led to a statistical rejection that the intercept of the Morrall data differed from the rest of the data[7]. Consequently there is some statistical evidence that the concerns of Heinzerling, other than discounting, do not statistically affect the cost-per-life-saved data.

[7] Hahn also carried out a Chow or F test for pooling of data which did not reject pooling.

As a result of the above review, the analysis carried out in the following section recodes or deletes 12 of the potential 73 observations based on Heinzerling's critique as indicated in Table 1. Values are adjusted to 1992 dollars.[8]

5.0 Results

In keeping with some earlier analysis by Morrall, descriptive statistics of the cost-per-life-saved data set are presented in Table 2 for different subsets of the data.

Table 2: Descriptive Statistics – Cost-per-life-saved

Sample	Cases	Mean Mil. 1992$	Std. Dev.	Min. Mil. 1992$	Max. Mil. 1992$
1. Total data set	69	94,320	735,992	.1	6,116,100
2. All final rules	49	129,401	873,333	.1	6,116,100
3. Final rules, pre-OIRA (before 1981)	13	36	58	.1	178
4. Final rules, post OIRA (after 1981)	36	176,117	1,018,598	.3	6,116,100
5. Rejected rules	7	3,393	7,797	9.3	21,059

As a harbinger of more elaborate tests, in contrast with means first reported in 1986 by Morrall, the cost effectiveness of final regulations deteriorated after 1981 (rows 3 and 4) when OIRA was created, although later analysis fails to indicate any simple time trend. The standard deviation of rules also increased since the creation of OIRA. Those rules that were rejected (column 5) are seen as likely inefficient from an economic perspective (their minimum cost-per-life-saved was 9.3 million dollars) but their mean and maximum values are less than that for the post-OIRA sample.

[8] Heinzerling identified some inconsistencies with the inflation adjustments made by the Office of Management and Budget in its 1992 version of the Morrall table. Where possible I have avoided using the

5.1 Rejection Hypothesis

Using only data on final and rejected regulations (56 cases), the first observation is that the presence of OIRA is perfectly correlated with rules being rejected (or withdrawn), as all rejected rules in the sample occurred after 1981. While perhaps an artifact of the sample in which about 23 percent of the rules are pre-1981, the finding is consistent with the power of rejection as a success story for regulatory improvement as the rejected rules were among those likely deemed inefficient.

However, it is also meaningful to ask if higher cost-per-life saved or other factors affect the probability of rejection. Statistical results for a Probit analysis are presented in Table 3. The dependent variable records whether the rule was final (0) or rejected (1). Only independent variables for which there is variation among rejected rules can be used, hence OIRA and health cannot be used as explanatory variables (all rejected rules were post OIRA and health related.)

In a minimalist approach, columns 2 and 3 report the results of trying to predict rejection by the cost-per-life-saved, either in its level or its logarithm The statistical significance of the logarithm of cost-per-life-saved in column 3 indicates that higher cost-per-life saved does increase the probability of rejection in contrast to the level of cost-per-life-saved in column 2. However, no rule actually rejected is correctly predicted by the equation when the threshold for rejection is a predicted probability greater than .5. Also, the impact of a higher cost-per-life-saved on the probability of rejection is non-linear. When evaluated at the mean of the sample (cost-per-life-saved of 20 million dollars), an increase in cost-per-life-saved up to 54 million dollars increases the

1992 version of the table and based the data on the other sources.

probability of rejection by about 2.4 percent[9]. Thus, while (the logarithm of) cost-per-life-saved is a statistically significant determinant of rejection, it may not be policy significant as cost-per-life-saved must increase by very large amounts in order to change the probability of rejection by a large factor.

Table 3: Probability of Rejection

Column 1 Variable	Column 2:	Column 3	Column 4	Column 5
Constant	-1.13* (-5.13)	-1.72* (-4.71)	-2.7* (-3.76)	-2.70* (-3.65)
Cost-per-life-saved	-.21e-05 (-.17)	X	-.21e-05 (-.15)	X
Log. of cost-per-life-saved	X	.139* (2.36)	X	.072 (.98)
EPA*Health	X	X	1.52* (2.59)	1.24* (2.02)
Budget	X	X	.62e-02** (1.95)	.02 (1.06)
Log. Likelihood	-20.9	-18.2	-15.5	-15.6
Number correctly predicted of 7	0	0	3	0

coeff/std.err in parentheses, * if signficant at the 5% level, ** if significant at the 10% level.

In parallel with other studies of regulation, we may ask if variables other than cost affect the probability of rejection. Columns 4 and 5 present results with the interaction of EPA and health (as opposed to safety) based rules, and the budget of likely trade-groups opposing the regulation. The first variable is suggested by the work of Hahn, the second by Magat, et al. Adding these terms increases the prediction capability for the equation using the level of cost (column 4) and decreases the significance of the logarithm of cost. The best equation for predicting rejection is column 4 which includes the interaction of

[9] The "marginal impact" for a Probit model is $\Phi(XB)B_I$ where Φ is the normal density function.

EPA and health-related rules, combined with rules opposed by well funded trade associations. As with cost, however, changes in budgets of trade associations must be very large to change the probability of rejection by a few percent.

Thus results regarding rejection are mixed. The rejected rules appear to be economically inefficient and occurred during the existence of executive office review. However, the particular rules rejected are <u>better</u> predicted by whether or not they were EPA health rules, combined with the budgetary resources to oppose that agency instead of being predicted by continuously decreasing economic performance.

5.2 Differences between proposed and final regulations

Secondly, consider the question of whether OIRA affects the estimated economic performance of regulations from the time of the proposal to its finalization. In the data set there are 8 matches of proposed and final regulations during OIRA's tenure (there is only one match of a proposed and rejected regulation.) In six cases there is not change in economic performance. In only two cases, the grain dust elevator rule and the formaldehyde exposure rule, do the cost-per-life saved estimates change between the proposed and the final rule. In fact, the-cost-per-life saved <u>increases</u> between the proposed and the final rule for these two cases. While there are too few observations for a statistical analysis, the changes that exist are in the wrong direction for efficiency. The suggested effect of OIRA is either no impact (6 cases) or to increase (2 cases) the estimated cost-per-life-saved between the proposed and final rule. This finding only hints at what may be an unintended effect of OIRA. OIRA may serve the role of getting

agencies to provide information in a particular format and providing a critical review of estimation methods as opposed to significantly altering major regulatory designs.

5.3 Cost effectivness

Finally, the preliminary result of the lack of impact of OIRA on the cost effectiveness of regulation as mentioned in Farrow and Toman, and in Hahn are confirmed and extended in Table 4.

Table 4: Cost-per-life-saved-Final Rules

Column 1	Column 2 Level	Column 3 Log	Column 4 Level	Column 5 Log
Constant	71,369 (.03)	-6.00 (-.84)	-1,201,303 (-.38)	-12.23 (-1.15)
Year	-7,565 (-.28)	.07 (.80)	9,524 (.22)	.15 (1.04)
Health	-204,118 (-.54)	4.01* (3.22)	-277,953 (-.77)	3.38* (2.78)
EPA*Health	514,584 (1.20)	.05 (.04)	602,432 (1.53)	.80 (.60)
Reagan	63,292 (.19)	-.71 (-.64)	X	X
Bush	264,609 (.58)	1.05 (.70)	X	X
OIRA	X	X	-131,831 (-.22)	-.96 (-.47)
Budgets	22,730** (1.78)	.01 (.32)	24,490* (2.03)	.03 (.77)
R Squared	.14	.45	.14	.43

T statistics in parentheses; * significant at 5% level; ** significant at 10% level

The full models that include the impact of different administrations, type of regulation, and trade association budgets on either cost-per-life-saved or the logarithm of cost-per-life-saved are shown in columns 2 and 3. When the level of cost-per-life-saved is the dependent variable (column 2), only the budgets of the trade-associations are statistically significant and seem to increase the cost-per-life-saved by a large amount,

possibly through the budget's association with the industries that are large and the subject of health regulation. When the logarithm of cost-per-life-saved is used as the dependent variable (column 3), health-focused regulations become the sole statistically significant determinant of cost per life-saved. In each case, the specific Reagan and Bush Administrations are insignificant determinants of cost-per-life-saved. Overall, the explanatory power of the regressions are relatively low as measured by R-squared. Columns 4 and 5 combine the two Republican Administrations into one "OIRA" variable which is equivalent to a joint test of significance of the two Administrations. While Budget and Health continue to be significant in their respective equations, OIRA is not even close to significance in either equation.

These results are consistent with Morrall's original interpretation—that health regulations are significantly more expensive than safety regulations although the effect found by Hahn of an added impact of EPA on cancer regulation is not found here. The insignificance both of OIRA and individual administrations expands on previous preliminary findings.

The occasional significance of the budgets of trade associations suggests more complex political economic factors at work. Budgets were seen as significant predictors of the probability of rejection, and here they help predict high cost-per-life saved regulations. This provides a hint, perhaps unsurprising, of the simultaneous determination of trade-association budget and high cost regulation when looking at the two sets of results[10].

[10] There is only moderate correlation between Budgets and the two cost variables. The highest correlation is .27.

6.0 Conclusions

This quantitative analysis of the effectiveness of Executive Office review of regulations illustrates the usefulness of collecting regulatory performance data from Governmental programs. The data suggest that such review might help to reject some uneconomic regulation, but that such rejected regulations have **not** been strongly correlated with increasing cost-per-life-saved. Instead, budgets of trade associations and health regulations from EPA are important predictors of regulations that are actually rejected. There seems to be either no effect or a perverse effect of Executive Office review on the cost-per-life-saved between the proposed and final stages of regulation. Finally, Executive Office review does not seem to improve (reduce) the cost-per-life-saved of regulation.

This weak performance record for Executive Office review seems consistent with qualitative descriptions of the modest adjustments made in regulations as a result of such review. To speculate somewhat, what does this say about the usefulness of such review? First, the actual size of OIRA is relatively small as are preparation costs for regulatory analyses. OIRA's association with rejecting inefficient rules or influencing minor changes may be sufficient to justify economically their existence[11]. Second, such review may serve a different purpose than that of directly increasing economic efficiency, even if that is one of its stated purposes. For instance, the review may generate information that is useful outside of Executive Office review per se. Third, just as end-of-pipe treatment may not be efficient, so too may end-of-pipe regulatory review be inefficient. The process of producing regulatory benefit-cost analyses, the use of scientific information in

agencies, and the role of personnel and bureaucratic organization all continue to be possibilities for improving the performance of government through greater investment through benefit-cost development and review. For instance, some progress is occurring in the development of computerized templates and bibliographies for benefit-cost analysis (Farrow, et al, 2000). Similarly, it seems odd to this author that Executive Orders have created a benefit-cost review for proposed regulations but there is no mandate for a similar review of ongoing regulations through a mechanism such as the Governmental Performance and Results Act. Finally, some individuals can argue that if the net benefits of review are small, then such review is only a facade and could be omitted. It is this author's view that benefit-cost analysis is at the borderline of looking at regulation in a different way. As long as the legal structure of regulation, organizational culture, and personnel rest on a non-economic philosophy, then economic arguments will be minority voices with only occasional impact. Changing some or all of the structure, culture, and personnel may lead to a different conclusion.

[11] OIRA's new format of reporting the net present value of regulations could be used in a similar analysis to that above to determine if OIRA increases the net present value of regulations. Such potential benefits could be compared to the costs of the process.

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