

**Evaluating the Regulatory Process  
and Government 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 since Richard Nixon. Proposals for regulatory improvement regularly highlight the role of benefit-cost analysis in this process and some states have adopted a similar policy within their executive branches. The evaluation question for government performance is whether such review improves the outcome of regulation. Supporters argue that the purpose of a benefit-cost review is to improve net benefits of the regulation. Another possible impact is that some regulations are withdrawn which otherwise might have appeared.

This paper uses information on the status of regulations and their economic evaluation to determine if Executive Office review has changed the outcome in different Administrations. The study is based on data that have had a large impact on the debate about regulation. Those data, combined with more recent data from annual reports of the Office of Management and Budget, are used in a regression analysis to determine the statistical significance and size of any economic impact of Executive Office review. While the data have been criticized by Heinzerling, many of the criticisms are addressed in the analysis.

The outcome of the study provides insight into a popular proposal for regulatory reform. 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 and on the cost effectiveness of regulation.

# **Evaluating the Regulatory Process and Government Performance: Does Executive Office Oversight Matter?**

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## **I. 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<sup>1</sup>. While some research exists on regulatory performance<sup>2</sup>, relatively less attention has been devoted to evaluating whether Executive Office oversight improves regulation, the topic of this paper.

The development of regulations that carry the force of law are carried out through processes identified in the Administrative Procedures Act<sup>3</sup>. The regulatory process leads to legally binding rules that are a central method by which Government regulates the economy, the environment, health, safety, and a variety of other activities. While courts

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<sup>1</sup> OMB memo October 5, 1971 (Quality of Life Review); Executive Order 11821 (1974), Inflation Impact Statement; Executive Order 11949 (1976) Economic Impact Statement; Executive Order 12044 (1978) Regulatory Analysis; Executive Order 12291 (1981) Regulatory Impact Analysis; Executive Order 12866 (1993).

<sup>2</sup> See for example, John F. Morrall III, *A Review of the Record*, REGULATION, Nov./Dec., 1986; Robert Hahn, *Regulatory Reform: What do the numbers tell us?* In RISK, COSTS, AND LIVES SAVED, Oxford University Press, Oxford, 1996; Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, YALE LAW REVIEW, 107:1081-2070, 1995.; W. Kip Viscusi, *The Dangers of Unbounded Commitments*, in RISK, COSTS, AND LIVES SAVED, ed. Robert Hahn, Oxford University Press, Oxford, 1996; Tengs, etl. Al, *The Opportunity Costs of Haphazard Social Investments in Life Saving*, in RISK, COSTS, AND LIVES SAVED, ed. Robert Hahn, Oxford University Press, Oxford, 1996.

<sup>3</sup> Administrative Conference of the United States, A Guide to Federal Agency Rulemaking, 2<sup>nd</sup> Edition, Washington, D.C. 1991.

may guard the process, the performance of the process is amenable to objective and subject analysis.

The prototypical regulatory process involves statutory delegation to an agency to develop a rule on a topic, internal agency development, internal administration review, release for public comment leading to possible formal revisions, and in many cases, judicial review following final publication.

Unfortunately, the performance society wants from a regulation is unclear as society speaks with many voices. Various attributes of regulation are identified as desirable, including substantive efficacy, economic efficiency, equity, transparency, and so on<sup>4</sup>. Researchers at Carnegie Mellon University are using the regulatory attributes of: 1) adaptive, 2) democratic, 3) efficient, 4) equitable, and 5) scientifically sound. Preliminary results already indicate that different stakeholders place different weights on different attributes with substance matter experts focusing somewhat more on attributes of scientific soundness and efficiency, and public stakeholders placing somewhat more emphasis on the democratic attribute. While society may want a complex mixture of these attributes, a substantial amount of policy interest focuses on issues of risk and benefit-cost analysis which are contained within the attributes of scientific information and efficient regulation. Benefit-cost analysis in turn provides the 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 impact of changes in Executive Office review of regulations as implemented by the establishment of the Office of Information and

Regulatory Affairs. The primary unit of measurement are those regulations that become law while attention is also devoted to regulations that are withdrawn (rejected) or proposed.

## II. 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 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).

Executive Order 12866, along with a guidance document issued not long after President Clinton took office, retained most of the specific analytical requirements for major rules. However, this 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

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<sup>4</sup> See for example, Office of Technology Assessment, ENVIRONMENTAL POLICY TOOLS, Washington, D.C. 1995; National Academy of Public Administration, SETTING PRIORITIES, GETTING RESULTS, Washington, D.C. 1995.

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<sup>5</sup> and involve perceptions of participants at various parts of the process. The approach taken here is to assess what statistical evidence exists for the impact of OIRA on economic measures of performance. The point of departure is an important data set prepared by John Morrall<sup>6</sup>, first released in 1986, presenting the cost per life saved for various regulations. As surveyed by Heinzerling<sup>7</sup>, these data were widely interpreted as indicating the lack of cost effectiveness and of efficiency in Federal health and safety regulations, hence a performance failure. The arguments for the lack of cost-effectiveness (least cost to achieve a given goal) were that the data reported 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<sup>8</sup>, would require that cost per life saved be equal for all regulations (or following some declining trend if the least

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<sup>5</sup> Peter Shane, *Political Accountability in a System of Checks and Balances: The Case of Presidential Review of Rulemaking*, ARKANSAS LAW REVIEW, 48(1):161-214, 1995; Thomas McGarity, REINVENTING RATIONALITY: THE ROLE OF REGULATORY ANALYSIS IN THE FEDERAL BUREAUCRACY, Cambridge University Press, Cambridge, 1991. U.S. General Accounting Office, *Regulatory Reform: Agencies Could Improve Development, Documentation, and Clarity of Regulatory Impact Analyses*, GAO/RCED-98-142, Washington, D.C. 1998; Richard Morgenstern, ed., ECONOMIC ANALYSIS AT THE EPA, Resources for the Future, Washington, D.C. 1997.

<sup>6</sup> John Morrall, 1986, op. Cit.

<sup>7</sup> Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, YALE LAW REVIEW, 107:1081-2070, 1995.

<sup>8</sup> The quantitative implications of this assumption are investigated in Tengs, etl. Al, *The Opportunity Costs of Haphazard Social Investments in Life Saving*,” in RISKS, COSTS, AND LIVES SAVED, ed. Robert Hahn, Oxford University Press, Oxford, 1996.

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.

Other readers interpreted the results as indicating a lack of economic efficiency. Instead of taking the goal (lives saved) as given, performance as measured by 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 the economic benefit is the value of a statistical life. While various estimates exist, typically ranging from 1 to 12 million (1990) dollars<sup>9</sup>, various research identified regulations as efficient if they saved lives for less than some indicated amount and inefficient if the cost per life saved exceeded an identified value threshold. The general findings of Morrell were upheld in a series of articles by Teng<sup>10</sup>, et. al. and Hahn<sup>11</sup> 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, some of the apparently expensive rules were never finalized, and on the method of calculating the cost per life saved.

This article investigates a question related to but separate from the question of cost-effectiveness and efficiency, while needing to take into account the Heinzerling critique. Advocates of regulatory improvement have sought to create a statutorially based instead of Executive Order based requirement for benefit-cost analysis. They seek an increase in the benefit-cost reporting of OIRA, and considered creating institutions similar to OIRA to be based in Congress.<sup>12</sup> The performance evaluation question

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<sup>9</sup> U.S. EPA, *Final Report to Congress on Benefits and Costs of the Clean Air Act, 1970-1990*, Document EPA410-R-97-002 (Washington, DC: EPA, 1997).

<sup>10</sup> Tammy Tengs, et. al., *Five-Hundred Life-Saving Interventions and Their Cost Effectiveness*, RISK ANALYSIS, 15(3):369-390, 1995.

<sup>11</sup> Robert Hahn, *Regulatory Reform: What do the numbers tell us?* In RISK, COSTS, AND LIVES SAVED, Oxford University Press, Oxford, 1996.

<sup>12</sup> See for example, S.746, "Regulatory Improvement Act of 1999"; S.59, "Regulatory Right to Know Act"; S. 1244, "Truth in Regulating Act of 1999," all 106<sup>th</sup> Congress, First Session.

investigated here is whether the existing Executive Office review has had an impact on the economic performance measures of finalized regulations. Such an evaluation 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 regulations that become final?
- Has Executive Office review changed the cost per life saved between the officially proposed and the final version of a regulation?

### III. Analytical Structure and Previous Work

The statistical analysis of government regulatory decisionmaking has a small but vital literature<sup>13</sup>. One type of analysis develops a data set about some performance measures of regulation, and typically compares a measure of central tendency for several different break-downs of the data. 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<sup>14</sup> have analyzed the statistical determinants of decisions involving: 1) pesticide regulation, 2) superfund clean-ups, 3) water effluent regulation, 4) air toxics, and 5) government

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<sup>13</sup> See for instance: McFadden, D. 1976, “*The Revealed Preferences of a Government Bureaucracy: Empirical Evidence*,” Bell journal of economics, 7(1):55-72(Spring); Congleton, R., ed. The political economy of environmental protection,” University of Michigan Press, Ann Arbor, 1996.

<sup>14</sup> See for example, Maureen Cropper, et. al, *The Determinants of Pesticide Regulation*, THE JOURNAL OF POLITICAL ECONOMY, 100(1, 1992; W. Kip Viscusi, *Are Risk Regulators Rational?*, THE AMERICAN ECONOMIC REVIEW, 89(4):1010-1027, 1999; WESLEY A. MAGAT, ALAN J. KRUPNICK AND WINSTON HARRINGTON, *RULES IN THE MAKING: A STATISTICAL ANALYSIS OF REGULATORY AGENCY BEHAVIOR*, Resources for the Future, Washington, D.C. 1986; George Van Houtven, “*Bureaucratic Discretion in Environmental Regulations*” IN THE POLITICAL ECONOMY OF ENVIRONMENTAL PROTECTION, ROGER



sales of environmentally sensitive petroleum resources among others. 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 aspect 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. Morrall computes some descriptive statistics of his sample while Heinzerling does not carry out any statistical analysis of the arguments. Hahn<sup>15</sup> has primarily investigated a different set of questions than those posed here. 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

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CONGLETON, ED, OP. CIT.; Scott Farrow, "Does Analysis Matter? *Economics and Planning in the Department of the Interior*," THE REVIEW OF ECONOMICS AND STATISTICS, 78(1):172-176(February), 1991.

tightly regulated and who should promulgate cancer (health) focused regulations. However, they provide little guidance for the process of regulatory improvement.

A regression approach to the impact of Executive Office review seems to have first surfaced in preliminary results mentioned by Farrow and Toman<sup>16</sup> and in an initial analysis by Hahn<sup>17</sup>. 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 structures of the models to be estimated are briefly summarized here. The first model concerns the hypothesis that executive office review has altered 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<sup>18</sup>. Heinzerling importantly notes that several regulations that would seem to fail an economic efficiency test were in fact rejected (data specifics will be discussed below.) Such rejection might be considered a success for regulatory reformers if cost effectiveness data were important in their rejection. This hypothesis refines the simple visual clues provided to a reader when final, proposed, and rejected rules are lumped together in one table, as has been the standard practice.

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<sup>15</sup> Robert Hahn, 1996, op. cit. and Robert Hahn, “Regulatory Reform: Assessing the Government’s Numbers,” AEI/Bookings Joint Center for Regulatory Studies, Working Paper 99-6, American Enterprise Institute, Washington, D.C.

<sup>16</sup> Farrow, S. and M. Toman, “Commentary: Benefit-Cost Analysis,” Environment 41(4):45(May), 1999. Following up on Farrow, S. and M. Toman, “Using Environmental Benefit-Cost Analysis to Improve Government Performance,” Environment 41(2):12-15,33-37 (March) 1999.

<sup>17</sup> Robert Hahn, 1999, op.cit.

Briefly, define R as whether a rule is rejected or not. Define X as a set of variable, 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. 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<sup>19</sup>.

A standard statistical approach, called a Probit analysis<sup>20</sup>, models a two outcome situation as:

$$R=1 \text{ (rejected)} \quad \text{if } Y^* \geq f(X\beta) + e \text{ where } e \text{ is an error term, } \beta \text{ are parameters}$$

$$=0 \text{ (not rejected)} \quad \text{otherwise}$$

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 rules that were finalized is included, is:

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<sup>18</sup> The case of rejection by the courts, as with Corrosion Proof Fittings v. EPA , 947 F.2d 1201 (5<sup>th</sup> 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.

<sup>19</sup> In part, this paper can be viewed as an outline for OIRA to carry out its own GPRA analysis on statistical effectiveness.

<sup>20</sup> Most econometric texts discuss this model, see for example, William Greene, ECONOMETRIC ANALYSIS, Third Edition, Prentice Hall, Upper Saddle River, New Jersey, 1997, p. 871-882.

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

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.

#### IV. Data

The data available for this analysis have been published in several forms<sup>21</sup> and been the subject of an intensive critique<sup>22</sup>. A summary of the issues is presented here as it relates to the data used. 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<sup>23</sup> that reports the cost per life saved for individual regulations. Various additional information was provided in the table and its variations 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

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<sup>21</sup> Sources of data, with various combinations of regulations are: John F. Morrall III, 1986 op. Cit. tbl. 4; W. Kip Viscusi, 1996, op. Cit.; Office of Management and Budget, *Budget of the United States, 1992*, part 2, page 370; Randall Luttter & John F. Morrall III, *Health-health Analysis: A New Way to Evaluate Health and Safety Regulation*, in THE MORTALITY COSTS OF REGULATORY EXPENDITURES 43,59 tbl. 6.

<sup>22</sup> Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, YALE LAW JOURNAL, 107:1981-2071.

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.<sup>24</sup>” The starting data set for this study is a composite of four presentations of the analysis (comprising regulations from 1967 to 1991).<sup>25</sup>.

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--rules rejected, 2) overinclusion--rules do not exist, 3) underinclusion--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 as published and where not modified, is worthy of a response. Each point is taken in turn with respect to the data used for this analysis.

#### A. Overinclusion and under inclusion

An important element of Heinzerling’s critique is that data presented by Morrall both include and exclude some regulations incorrectly included in most versions of the Morrall data. Her first concern is with rules that are rejected, but her concern in this case is not with the data per se but that their inclusion implies a success of regulation and not a

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<sup>23</sup> Op. Cit.

<sup>24</sup> Morrall, op. Cit, 1986, p. 27-28.

<sup>25</sup> Related data sets exist such as those by: Tengs, et. al. (op. Cit.) which as published do not contain the additional information necessary for this analysis; Hahn (op. Cit) who cites results from extending the Morrall data but has not published the data; and the Office of Management and Budget (op. Cit) who have changed their reporting methods so that that 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.

failure, as is more popularly interpreted. This concern forms one of the hypothesis tests of this paper, namely, do rejected rules have a higher cost per life saved than finalized rules? As such, the concern is not about data but about methods of testing and rhetoric.

The specific cases of concern to Heinzerling and their treatment in this paper are summarized in Table 1. For instance, the Asbestos regulation, which was finalized in regulation but rejected by the court<sup>26</sup>, 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 the judicial process. One Morrall observation excluded from this analysis is a regulatory alternative for Acrylonitrile that was one of several considered but never finalized<sup>27</sup>. If more observations of this kind were available, statistical tests could be conducted of the internal agency decision process<sup>28</sup>, but lacking other data it seems inappropriate to include alternatives considered but not finalized.

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.

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<sup>26</sup> See *Corrosion Proof Fittings v. EPA* 947 F.2d 1201 (5<sup>th</sup> Cir. 1991)

<sup>27</sup> Heinzerling, 2008.

<sup>28</sup> For related analyses, see Maurren Cropper, et. al, *The Determinants of Pesticide Regulation: A Statistical Analysis of EPA Decision Making*, and Porter Hoagland and Scott Farrow, *Planning v. Reality: Political and Scientific Determinants of Outer Continental Shelf Lease Sales*, in *THE POLITICAL ECONOMY OF ENVIRONMENTAL PROTECTION* (Roger D. Congleton, Ed.) University of Michigan Press, 1996.

**Table 1: Use of Disputed Regulations**

<b>Regulation</b>	<b>Heinzerling comment</b>	<b>Coding for analysis</b>	<b>Notes</b>
Various rejected rules	Rejected rules	Rejected rules	Basis of new test
Asbestos	Rejected by court	Final	Passed administration
Acrylonitrile	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	Deleted	
Uranium mines	Withdrawn by agency	Rejected	

## B. 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 (p. 2015) and non-governmental or academic studies, the point remains as to the sample of regulations reviewed by Morrall. Some insight can be gained by looking at an EPA report on its use of benefit-cost analysis<sup>29</sup> 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

<sup>29</sup> U.S. Environmental Protection Agency, "EPA's Use of Benefit-Cost Analysis: 1981-1986," EPA-2230-05-87-028, Office of Policy Planning and Evaluation, August, 1987, Table. 4-3.

regulations promulgated by EPA although individually they are relatively small<sup>30</sup>. 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 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. For most air regulations, cost effectiveness was described as per unit of pollution removed although EPA is careful to state that the Regulatory Impact Analysis was not a part of the regulatory decision as the Clean Air Act does not allow cost as a consideration in setting ambient air quality standards<sup>31</sup>. A small number of other case studies of regulation are presented in a collection edited by Richard Morgenstern.<sup>32</sup> These and other rules may or may not appear in the sample studied by Hahn.

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 this study. Although Heinzerling presents examples of air regulations that may be quite cost-effective, at the same time other examples exist of excluded studies that were not cost effective. Tengs et.al provide cost-effectiveness data on 587 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. They find that the median cost per life saved for toxin based interventions is the highest in comparison to medical and injury reduction interventions. Furthermore, they find that among proposed government

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<sup>30</sup> EPA's recent concern with cumulative environmental impacts may have a parallel in its own regulatory impacts when it issues numerous small regulations.

<sup>31</sup> Clean Air Act (42 U.S.C. 7401 Section 109(b)(1))



regulations, the median cost per life saved for those proposed by the EPA are 86 times higher than the median of those proposed by the next highest agency, OSHA.

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 including those problems it has for whatever reasons, internal, congressional guidance or otherwise, 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.

### C. Discounting

A lengthy discussion by Heinzerling on discounting concludes with a table titled “Competing Estimates of the Costs of Various Risk Reducing Regulations Per Life Saved.”<sup>32</sup> While risk reductions 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 the 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

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<sup>32</sup> Richard Morgenstern, ed., *ECONOMIC ANALYSIS AT THE EPA, Resources for the Future*, Washington, D.C. 1997/

viewed as part of a post-modernist critique as to whether any special credence 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. An individual, when acting on their own behalf, is indeed expected to have their own values. Those different values for some 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<sup>34</sup>. Morrall's data would not be accepted among the vast majority of mainstream economists without discounting<sup>35</sup>. While the parallel is not exact, a similar professional offense for a lawyer may be arguing 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 each case to do otherwise would likely 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. While professional consensus can change, Heinzerling's critique of the practice and rate of discounting would be more

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<sup>33</sup> Heinzerling, p. 2039, tbl. 3.

<sup>34</sup> See for example, Nick Hanley and Clive L. Spash, *COST-BENEFIT ANALYSIS AND THE ENVIRONMENT*, Edward Elgar, Brookfield, 1993; Kenneth J. Arrow, et. al., *BENEFIT-COST ANALYSIS IN ENVIRONMENTAL, HEALTH AND SAFETY REGULATION*, American Enterprise Institute, Washington, D.C. 1996.

<sup>35</sup> Work by Tengs, et. al, op. Cit; and Hahn, op. Cit. Adopt discounting without major discussion.

appropriately addressed in a methodological forum where the epistemological standards would be different but the general concept of discounting is being reviewed<sup>36</sup>.

The question of discounting in environmental regulation has also been commented on in *Corrosion Proof Fittings v. EPA*, 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.<sup>37</sup>

Heinzerling's alternative of not discounting is inconsistent with this finding from a legal source usually accorded some deference.

Finally, Robert Hahn has developed a database that includes both the Morrall data as well as information on other regulations<sup>38</sup>. 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<sup>39</sup>. Consequently there is some statistical evidence that the concerns of Heinzerling, other than discounting, do not statistically affect cost per life saved data.

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<sup>36</sup> See for example, Paul R. Portney and John P. Weyant, Editors, *DISCOUNTING AND EQUITY, Resources for the Future*, Washington, D.C. 1999.

<sup>37</sup> *Op. Cit.*, 947 F.2d 1219.

<sup>38</sup> Hahn, *op. Cit.*, 1996.

<sup>39</sup> 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 investigates the “rejection” hypothesis of Heinzerling and recodes or deletes some observations based on her analysis, as indicated in Table 1. However, where included, the observations used are those of Morrall with a common price adjustment to 1992.<sup>40</sup>

## V. 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**

<b>Sample</b>	<b>Cases</b>	<b>Mean Mil. 1992\$</b>	<b>Std. Dev.</b>	<b>Min. Mil. 1992\$</b>	<b>Max. Mil. 1992\$</b>
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 rule, 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. 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

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<sup>40</sup> 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 1992 version of the table and based the data on the other sources.

million dollars) but their mean and maximum values are less than that for the post-OIRA sample.

### **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 as all rejected rules 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 Heinzerling's interpretation of rejection as a success story for regulatory improvement. This can be viewed by some as a success of political accountability and performance. 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 indicates 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 variables 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 the logarithm. The statistical significance of the logarithm of cost in column 3 indicates that higher cost-per-life saved does increase the probability of rejection in contrast to the level of cost in column 2. However, no rule actually rejected is correctly predicted by the equation. Also, the impact of a higher cost 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 to 54 million dollars increases the probability of rejection by about 2.4 percent<sup>41</sup>. Thus, while (the logarithm of) cost 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**

<b>Column 1 Variable</b>	<b>Column 2: Cost</b>	<b>Column 3 Log of Cost</b>	<b>Column 4 Other variables: cost</b>	<b>Column 5 Other variables: log cost</b>
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	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 significant 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, 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

<sup>41</sup> The “marginal impact” for a Probit model is estimated as  $\phi(XB)B_1$  where  $\phi$  is the normal density function, see Greene, op. Cit.

predicting rejection focuses on the interaction of EPA and health related rules, combined with rules opposed by well funded trade associations.

Thus Heinzerling's critique regarding rejection contains some mixed results. The rejected rules appear to be economically inefficient and occurred during the existence of executive office review. However, the particular rules rejected are better predicted by the interaction of type of rule and issuing agency, combined with the resources to oppose that agency.

### **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 the final outcome. 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 only 2 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 increases between the proposed and the final rule for the two cases. While there are too few observations of changes for a statistical analysis, the changes that exist are in the wrong direction for efficiency. The suggested impact of OIRA is either not to change or to increase 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 major design features.

## Cost effectiveness

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 Variable	Column 2 Full Model:Cost	Column 3 Full Model: log Cost	Column 4 OIRA:cost	Column 5 OIRA: log cost
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 model that includes the impact of different administrations, type of regulation, and trade association budgets on either cost (per life saved) or the logarithm of cost is shown in columns 2 and 3. When the level of cost is the dependent variable, only the Budgets of the trade-associations are statistically significant and seem to increase the cost-per-life saved, possibly through the Budget's association with the



industries that are large and the subject of health regulation. When the logarithm of cost is used as the dependent variable, health 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 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 significant 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 budget 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.<sup>42</sup>

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<sup>42</sup> There is only moderate correlation between Budgets and the two cost variables. The highest correlation is .27.

## Conclusions

This quantitative analysis of the effectiveness of Executive Office review of regulations illustrates the usefulness of collecting 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 cost. Instead, budgets of trade associations 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<sup>43</sup>. 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<sup>44</sup>.. OIRA's association with rejecting inefficient rules may be sufficient to economically justify their existence<sup>45</sup>.. 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. Second, just as end-of-pipe treatment is may not be the most efficient, so too may end-of-pipe regulatory review be relatively inefficient. Further work on the process of producing regulatory benefit-cost analyses,

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<sup>43</sup> General Accounting Office, Op.cit.; McGarity, op. Cit; Morgenstern, Op. Cit.

<sup>44</sup> Morgenstern, et. al., Op. Cit.

the use of scientific information in agencies, and the role of personnel and bureaucratic organization continue to be possible avenues for increasing the performance of government through a review based on benefit-cost analysis. . It is my personal view that benefit-cost analysis is at the borderline of looking at regulation in a different way. As long as the legal structure, organizational culture and personnel rest on a non-economic philosophy, then economic arguments will be minority voices with only occasional impact.

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<sup>45</sup> 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.