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The Empirical Roots of the 'Regulatory Reform' Movement: A Critical Appraisal

Richard Parker
University of Connecticut School of Law

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RICHARD W. PARKER*

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* Professor of Law, University of Connecticut School of Law; Co-Chair, ABA Administrative Law Section Committee on E-Rulemaking, Vice-Chair, Committee on Regulatory Policy. I am grateful for the comments of Lynn Goldman, Tom McGarity, Sidney Shapiro, and Larry Weinstock. Special thanks to Vimala George and Douglas Heim for valuable research assistance and to the ABA Administrative Law Section for insightful comments and questions during the presentations of papers that led to this Article.

INTRODUCTION

Hurricanes Rita and Katrina may be reawakening Americans to some of the benefits of big government in preventing and responding to natural disasters, but where the mitigation of subtler and longer-term risks to our health, safety, and environment are concerned, the tide of sentiment still runs powerfully the other way.

Here, the prevailing view still holds that government regulation is over-zealous and needs to be reined in.[1] Hence the continuing campaign—now well into its third decade—to review and roll-back regulations that are deemed unduly costly; constrain the budget and the authority of regulatory agencies; require ever more elaborate and cost-conscious analysis of proposed regulations with more searching external review; and cap the costs that agencies may impose on businesses, regardless of any benefits to the public.[2]

Environmental and public health advocates tend to assume, at least in their public rhetoric, that this campaign is the product of ideological extremism, "astroturf" lobbying, and special interest pandering by the political right.[3] This explanation is incomplete, however, because it fails to account for the fact that the regulatory rollback movement draws on a widely shared attitude of regulatory skepticism which rests, in turn, on a

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1. The "prevailing view" to which I refer is the view that prevails in the White House, the Congress, the appellate courts, and, to a considerable degree, the news media. The opinion of scholars on this subject is sharply divided, as is public opinion. *See infra* notes 2, 4, 11, 23, 25.

2. *See generally* Unfunded Mandates Reform Act of 1995, Pub. L. No. 104-4, 109 Stat. 48 (codified as amended at 2 U.S.C. §§ 1501–1571 (2000)) (requiring quantitative and qualitative cost-benefit analysis before proposing or promulgating any significant rule); Contract with America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (codified as amended at 5 U.S.C. §§ 601, 801–808 (2000)) (providing for congressional review of all major regulations issued by government agencies with the possibility of joint resolution override); Government Performance and Results Act of 1993, Pub. L. No. 103-62, 107 Stat. 285 (codified at 31 U.S.C. §§ 1115–1119 (2000)) (requiring agencies to develop multi-year strategic plans along with annual performance plans and reports). *See also* Clyde Wayne Crews, Jr., Op-Ed., *Regulatory Overhaul Report Card*, WASH. TIMES, June 10, 2002, at A17; Ellen Nakashima, *For Bush's Regulatory 'Czar,' The Equation Is Persuasion*, WASH. POST, May 10, 2002, at A35; *Recommendations for Improving Federal Regulation: Testimony Before the Subcomm. on Regulatory Reform and Oversight of the House Comm. on Small Business*, 107th Cong. 12-21 (2002) (statement of Robert W. Hahn, Dir., AEI-Brookings Joint Center for Regulatory Studies); Erin M. Hymel & Laurence H. Whiteman, *Regulation: Reining in the Federal Bureaucracy*, *in* ISSUES 2002: THE CANDIDATE'S BRIEFING BOOK 45 (Stuart M. Butler & Kim R. Holmes eds., The Heritage Foundation 2002); C. Boyden Gray, *Obstacles to Regulatory Reform*, 1997 U. CHI. LEGAL F. 1, 1–5; W. Kip Viscusi, *Regulating the Regulators*, 63 U. CHI. L. REV. 1423, 1436–55 (1996). Historians will note that the campaign has largely succeeded in all the endeavors listed above but the last.

3. *See, e.g.*, Natural Resources Defense Council (NRDC), Science Under Attack: An Interview with NRDC's Science Watchdog Jennifer Sass, http://www.nrdc.org/health/science/ijsscience.asp (last visited May 5, 2006) (discussing corporate influence in environmental regulation).

carefully laid foundation of empirical evidence—evidence persuasive enough to have made skeptics of such non-ideologues as Justice Steven Breyer, Professor Cass Sunstein, and Professor Richard Stewart, among others.[4] So it is not enough to question the motives of regulatory skeptics. We also must look at the evidence.

The evidence for regulatory skepticism consists mainly of a stream of largely unverified tales of regulatory overkill, along with three groups of more rigorous studies ("regulatory scorecards") that tabulate cost-benefit or cost-effectiveness ratios across a broad array of social regulations. One widely cited study claims that government regulations cost up to $72 billion per life saved.[5] Another study claims that over 60,000 people lose their lives needlessly each year as a direct result of irrational government regulation.[6] A third scorecard concludes that over half of all major regulations issued since 1981 fail cost-benefit tests.[7]

Prepared by well-known scholars and widely accepted as credible, these scorecards have proved immensely influential in undermining confidence in social regulation. Indeed, it is safe to say that they constitute the main empirical foundation for the regulatory reform movement itself. However, these studies also have aroused a vigorous scholarly debate. Critics have challenged the methods of these studies and questioned the validity of their conclusions. Undaunted, the authors of two of these three studies recently responded with published articles that not only reject such criticisms, but offer updated analyses that examine more recent rules using the same disputed methods to reach the same negative verdict on regulation. The authors conclude by calling for yet more scorecards.[8]

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4. *See, e.g.*, STEPHEN BREYER, BREAKING THE VICIOUS CIRCLE (1993) (citing Morrall's table as evidence that regulation tends to be tunnel-visioned and over-zealous); J. CLARENCE DAVIES & JAN MAZUREK, POLLUTION CONTROL IN THE UNITED STATES: EVALUATING THE SYSTEM 135, 137, 140-41 (1998) (relying on Hahn and Graham/Tengs scorecards to show that the cost of many regulatory programs outweighs the benefits); Richard B. Stewart, *A New Generation of Environmental Regulation?*, 29 CAP. U. L. REV. 21, 33 (2001) (citing Hahn's scorecard as evidence that many environmental regulatory programs "entail costs that substantially exceed benefits"); Cass R. Sunstein, *Paradoxes of the Regulatory State*, 57 U. CHI. L. REV. 407, 411-12 (1990) (discussing frequent failures of the regulatory system).

5. *See* John F. Morrall III, *A Review of the Record*, 10 REGULATION 25, 30 (1986) [hereinafter Morrall 1986].

6. Tammy O. Tengs & John Graham, *The Opportunity Costs of Haphazard Social Investments in Life-Saving*, *in* RISKS, COSTS AND LIVES SAVED: GETTING BETTER RESULTS FROM REGULATION 172-73 (Robert W. Hahn ed., 1996) [hereinafter Tengs & Graham, *Opportunity Costs*].

7. ROBERT W. HAHN, REVIVING REGULATORY REFORM: A GLOBAL PERSPECTIVE 37-39 (2000) [hereinafter HAHN 2000]. Hahn published a similar analysis earlier. Robert Hahn, *Regulatory Reform: What Do the Government's Numbers Tell Us?*, *in* RISKS, COSTS AND LIVES SAVED, *supra* note 6, at 208 [hereinafter Hahn 1996].

8. John Morrall, *Saving Lives: A Review of the Record*, 27 J. RISK & UNCERTAINTY 221 (2003) [hereinafter Morrall 2003]; Robert W. Hahn, *The Economic Analysis of Regulation: A Response to the Critics*, 71 U. CHI. L. REV. 1021, 1032-33 (2004) [hereinafter Hahn, *Response to Critics*].

The debate is joined. At stake is the rationality, or reputation for rationality, of social regulation overall and the empirical *bona fides* of the regulatory reform movement itself, with all its policy prescriptions. Given the stakes involved, it is important that the issues be fully ventilated, confusions eliminated, and the air cleared wherever possible. This Article seeks to accomplish that goal.

Part I offers a brief history of the regulatory rationality debate for the benefit of readers new to the controversy.

Part II reviews the leading issues implicated in the controversy and evaluates the arguments put forward by both sides with respect to these issues. It will be seen that, notwithstanding the defenses offered on their behalf, the methodological shortcomings of strictly numerical scorecards are serious, far-reaching, and probably fatal to their validity. The problems arise not from the fact that scorecards compare costs and benefits of regulation, but from the fact that they employ highly reductionist methods to do so, methods that violate basic and widely-agreed principles of sound analysis.

Part III responds to the main defense of scorecards—in essence, that any number is better than no number and that there is no viable alternative to strictly numerical scorecards. This Article will show that there *is* an alternative—a very simple and obvious alternative. It involves careful, retrospective analysis of the qualitative *and* quantitative costs and benefits of allegedly flawed regulations in individual cases, along with careful evaluation of the apparent reason for the "mistake" in cases in which mistakes genuinely appear to have been made. Indeed, the Office of Management and Budget (OMB) seems to be inching towards recognition of this alternative in its recent proposal to undertake retrospective analyses of important and controversial regulations.

I. A BRIEF HISTORY OF THE REGULATORY RATIONALITY DEBATE

Any evaluation of regulatory rationality must begin with a choice of criterion for evaluation. Do we judge regulations by whether they minimize social cost, maximize public protection, maximize agency budgets or power, respond to public wishes (or wishes of the regulated industry), faithfully implement particular statutory mandates, or reasonably balance costs and benefits?

Although all these criteria, and others, are conceivable, the single criterion most frequently applied in practice is the last one—the reasonableness of the costs of regulation when weighed against the benefits—and the conventional wisdom holds that many, if not most, "social regulations" (that is, health, safety, and environmental regulations)

do not fare well on a cost-benefit comparison.[9] Indeed, for over a decade critics of regulation have launched withering attacks on health, safety, and environmental regulation on cost-benefit grounds.

These attacks have taken two forms. The first involves a stream of oft-repeated tales of regulatory over-kill: companies forced to clean up Superfund sites to the point that children can eat the soil 245 days a year, property owners denied development rights when the footprints of cows were declared wetlands, and so forth.[10] Such tales—vivid, provocative, influential—suffer from the usual pitfalls of anecdotes. They are often circulated without prior verification. Among those (a relative handful) that are ever truth-checked, a minority turn out to be largely true; others turn out to have been distorted or exaggerated; still others simply fabricated.[11] Even for the true stories, one has no way of knowing, without further analysis, whether the incident is typical of agency practice, or an aberration.

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9. Conservative critics of regulation apply this criterion almost ubiquitously. Likewise, Congress requires agencies to perform a cost-benefit analysis for all major individual rules and that the Office of Management and Budget (OMB) submit an annual report on the costs and benefits of federal regulation overall. 2 U.S.C. § 1511(b) (2000).

10. *See, e.g.*, BREYER, *supra* note 4, at 12 (reporting the Superfund anecdote among many others); 141 CONG. REC. H4690 (daily ed. May 10, 1995) (statement of Rep. DeLay) (retelling the footprints of cows anecdote); *see also* PHILIP K. HOWARD, THE DEATH OF COMMON SENSE: HOW LAW IS SUFFOCATING AMERICA (1995) (reciting a long litany of examples of regulatory overkill).

11. For example, though the anecdote dealing with the Superfund sites has not been squarely rebutted, it appears to be less clear-cut than Breyer's account would suggest. *See* Adam M. Finkel, *A Second Opinion on an Environmental Misdiagnosis: The Risky Prescriptions of Breaking the Vicious Circle*, 3 N.Y.U. ENVTL. L.J. 295, 313-15 (1995) (noting that the Superfund site in question was zoned for residential development and that Breyer's allegation turns on disputed assumptions about the concentration of polychlorinated biphenyls (PCBs) on the site). The second anecdote is pure fabrication. The "footprints of cows" to which former House Majority Leader Tom DeLay referred (in successfully opposing Clean Water Act reauthorization) were not footprints at all. They were "wetland sloughs" several feet deep and up to two hundred feet wide, which fill with water every year to provide vital sustenance to local and migrating birds. In fact, the land in question is not a pasture, but a forest that forms a part of the "only [remaining] large forest habitat adjacent to the Gulf of Mexico." *See* Letter from David L. Hankla, Field Supervisor, U.S. Fish & Wildlife Serv., to Colonel Robert B. Gatlin, U.S. Army Corps of Eng'rs (Apr. 19, 1995) (on file with author).

For evidence of the broader veracity problem in the use of anecdotes, see, for example, Citizens for Sensible Safeguards, Myths & Consequences: Paying for the Use of Myths and Distortions by Anti-Regulatory Zealots (May 17, 1995) (unpublished manuscript on file with author), which collected 27 widely circulating, but false, anecdotes about government regulation. *See also* Tom Kenworthy, *Truth Is Victim in Rules Debate: Facts Don't Burden Some Hill Tales of Regulatory Abuse*, WASH. POST, Mar 19, 1995, at A1 (relating anecdotes that "have the ring of truth, but not the substance"); Jessica Mathews, *Horror in the House*, WASH. POST, Mar. 5, 1995, at C7 ("Every one of the most frequently cited [anecdotes] is a fabrication."). Journalist Richard Lacayo reported that THE DEATH OF COMMON SENSE, *supra* note 10, is "amply stocked with . . . loosely detailed horror stories about regulatory mischief. Some of them are memorable; some partial or misleading; some flatly wrong." Richard Lacayo, *Anecdotes Not Antidotes: Philip Howard Is Everyone's Favorite Anti-Regulatory Guru, But His Best-Selling Book Is Flawed*, TIME, Apr. 10, 1995, at 40.

The well-known shortcomings of anecdotes as vehicles of proof have given rise to the second line of criticism, in the form of regulatory scorecards. Regulatory scorecards are cross-cutting tabulations of key statistics (costs, benefits, net benefits, or cost-per-life-saved) associated with each of a large number of major federal regulations. These statistics are then offered as objective and rigorous measures of the cost-benefit rationality (or cost-effectiveness) of particular regulations, regulatory programs, and regulatory agencies overall. While any number of scorecards have been constructed, three Main Scorecards (actually groups of scorecards) have been particularly influential and provide the focus of the remainder of this Article:

- John Morrall's *Review of the Record* reports that more than one-third of the 44 regulations in the sample cost over $100 million for every life saved, with one regulation costing $72 *billion* per life.[12] Dominating the cost-ineffective bottom third of his table are environmental toxin controls.
- In *Five-Hundred Life-Saving Interventions and Their Cost Effectiveness*, John Graham and Tammy Tengs examine 587 interventions for which cost information were available and report that the interventions in their sample impose wildly disparate costs ranging from less than zero (saving money) to more than $1 trillion per life saved.[13] Again, the least cost-effective interventions in their sample are those aimed at controlling environmental toxins.[14] Their subsequent study, *The Opportunity Costs of Haphazard Social Investments in Life-Saving*, uses a computer simulation to calculate how many additional lives might be saved at constant cost by hypothetically reallocating funds to fully implement the most cost-effective yet under-utilized lifesaving programs, with money obtained by defunding cost-ineffective measures. Their finding, that 60,000 additional lives could be saved at constant cost, has been a staple of regulatory skepticism since its publication.[15] Based on this study, Graham has referred to the current pattern of regulation as "statistical murder."[16]

12. Morrall 1986, *supra* note 5, at 30. Morrall's 2003 reply contains an updated table that reaches essentially the same conclusions. *See* Morrall, *supra* note 8, at 221, 223-24.

13. Tammy O. Tengs et al., *Five-Hundred Life-Saving Interventions and Their Cost-Effectiveness*, 15 RISK ANALYSIS 369 (1995). The $1 trillion figure is derived by multiplying $99 billion, the highest cost per life-year in the Tengs database, by 15, a conservative estimate of the number of life-years associated with each life saved.

14. *See id.* (describing the results of the study, which show the most money spent per life is spent on regulating toxins).

15. Tengs & Graham, *Opportunity Costs*, *supra* note 6, at 172.

16. *Risk Assessment and Cost-Benefit Analysis*: *Hearing Before the H. Comm. on Science*, 104th Cong. 71, 79 (1995) [hereinafter Graham, *Testimony on Risk Assessment and Cost-Benefit Analysis*] (statement of John D. Graham).

- In 1996, Robert Hahn, current Director of the AEI-Brookings Joint Center for Regulatory Studies, published *Regulatory Reform: What Do the Government's Numbers Tell Us?*, which calculates and compares costs and benefits for 92 major regulations enacted or proposed over the period from 1990 to mid-1995.[17] His updated study in 2000, *Regulatory Reform: Assessing the U.S. Government's Numbers*, examines 106 final regulations and 30 proposed regulations issued over the period from 1981 to 1996.[18] In both studies of his studies Hahn concludes that, while regulations confer a net benefit on society overall, "[l]ess than half the rules pass a neutral economist's benefit-cost test" using the government's own numbers.[19]

The Morrall table has fueled sweeping critiques of regulation by Justice Stephen Breyer, W. Kip Viscusi, Cass Sunstein, and other prominent legal scholars.[20] Leading economists (including Nobel Laureate Kenneth Arrow) have relied on the Morrall study to argue for more "rational" approaches to regulation.[21] His study also was cited as evidence of regulatory irrationality in the OMB annual reports to Congress and in congressional testimony.[22] Likewise, dozens of newspapers and magazines have reported Tengs and Graham's claim that irrational federal regulation is killing over 60,000 people per year, along with Hahn's conclusion that a majority of major regulations fail cost-benefit tests.[23] These claims have reappeared in testimony before congressional committees, congressional floor debates, scholarly journals, and the publications of some of Washington's leading think tanks.[24]

The initial version of these scorecards circulated for eleven years, five years, and seven years, respectively, before anyone stepped forward to scrutinize their methods. That fact alone is sufficient to highlight the

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17. *See generally*, Hahn 1996, *supra* note 7.
18. HAHN 2000, *supra* note 7, at 32.
19. *Id.* at 38.
20. *See, e.g.*, BREYER, *supra* note 4, at 24-27; W. KIP VISCUSI, FATAL TRADEOFFS: PUBLIC AND PRIVATE RESPONSIBILITIES FOR RISK 264 (1992); Viscusi, *supra* note 2, at 1436-55; Cass R. Sunstein, *Health-Health Tradeoffs*, 63 U. CHI. L. REV. 1533, 1547-48 (1996).
21. *See* Kenneth J. Arrow, et al., *Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?*, 272 SCIENCE 221, 221 (1996) (claiming a reallocation of regulation priorities could save more lives at the current cost or save the same number of lives at a much lower cost); Richard J. Zeckhauser & W. Kip Viscusi, *Risk Within Reason*, 248 SCIENCE 559, 562-63 (1990).
22. For a thorough discussion of the myriad channels by which the Morrall table has percolated through both the scholarly and policy communities, see Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 YALE L.J. 1981, 1982-84, 1987-91 (1998) [hereinafter Heinzerling, *Regulatory Costs of Mythic Proportions*].
23. *See, e.g.*, Richard W. Parker, *Grading the Government*, 70 U. CHI. L. REV. 1345, 1350-53 (2003) (documenting the influence of all three scorecards on the debate over regulatory rationality).
24. *Id.* at 1352 nn.25-27 (citing examples).

dysfunction in the current regulatory debate. In some cases, the public interest community has seemed so intent on opposing cost-benefit analysis in principle that they have tended to give individual studies, even highly influential studies, a free ride in practice by failing to inquire whether such studies conform to basic principles of sound analysis.

Only relatively recently a few academics have begun to re-examine these studies and the methods they employ. Lisa Heinzerling opened the debate in 1998 with a critical review of the Morrall table,[25] followed in 2000 by the Heinzerling and Ackerman critiques of the Tengs and Graham scorecards,[26] and by *Grading the Government,* my comprehensive review of all three scorecards (and the first to scrutinize the Hahn studies), in 2003.[27]

The principal authors of the Main Scorecards have since replied to their critics: Tengs in 2002 (replying to the Heinzerling/Ackerman critique),[28] followed by Morrall in 2003,[29] and Hahn in 2004.[30] All authors defend their methodologies and stand by their conclusions. Morrall and Hahn offer updated analyses that apply the same methodology to reach substantially the same conclusions as before.

The next Part reviews and evaluates the substantive issues and arguments that have surfaced in this debate to date. As observers of the controversy over cost-benefit analysis will appreciate, the debate over the validity of scorecards tracks and illuminates the fault lines of the larger debate over the merits of cost-benefit analysis of individual regulations. Thus, the issues raised by the scorecards controversy shape not only the way we view our government overall, but the way we assess each individual regulatory decision that it makes.

II. THE PROBLEM WITH REGULATORY SCORECARDS

We begin with a threshold question: What is a regulatory scorecard? In *Grading the Government,* I coined the term to refer to a study that is built by extracting a few summary statistics—costs, benefits, net benefits, and/or

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25. *See* Heinzerling, *Regulatory Costs of Mythic Proportions, supra* note 22, at 2069 (critiquing the Morrall study as overly narrow); Lisa Heinzerling, *Five-Hundred Life-Saving Interventions and Their Misuse in the Debate over Regulatory Reform,* 13 RISK 151 (2002) [hereinafter *Misuse of Life-Saving Interventions Study*].

26. Lisa Heinzerling & Frank Ackerman, *The Humbugs of the Anti-Regulatory Movement,* 87 CORNELL L. REV. 648, 664 (2002) [hereinafter Heinzerling & Ackerman, *Humbugs*].

27. Parker, *supra* note 23.

28. *See generally* Tammy O. Tengs, *A Response to Lisa Heinzerling's Article "Five-Hundred Life-Saving Interventions and Their Misuse in the Debate over Regulatory Reform,"* 1 PIERCE L. REV. 115 (2002). For Heinzerling's rejoinder to that reply, see Lisa Heinzerling, *Reply to Dr. Tengs' Response,* 1 PIERCE L. REV. 121 (2003).

29. *See* Morrall 2003, *supra* note 12, at 221.

30. *See* Hahn, *Response to Critics, supra* note 8.

cost per life saved—from the lengthy cost-benefit analyses that accompany each of a host of individual rules, and then tabulating these summary statistics across all rules in the sample in order to generate what appears to be a comprehensive picture of the cost-benefit rationality of programs, agencies, or social regulation overall.[31] This definition accurately describes the Main Scorecards and several others like them.

One scorecardist has defended the scorecard enterprise by redefining the term "regulatory scorecard" to encompass "either an accounting framework or a description of summary statistics that help shed light on the measurement of costs, benefits, or costs and benefits of a regulation or several regulations."[32] Elsewhere, he expands the term even further to sweep in studies of the quality of the agency analysis as opposed to the substantive rationality of the rules themselves.[33]

By this point, the redefined term has become so vague that it could include virtually any study of regulation or regulatory assessment. Scorecards, redefined, become rather easy to defend. However, they also lose any individualized identity. It is easy to answer a critique of A by re-defining it to mean B and then alleging that the original criticism of A does not apply to B. But this line of argument proves little and certainly does not offer a defense of A.

Fortunately, all the scorecardists seem to have recognized the need also to address the substantive issues in the debate, to which we now turn. These issues arise first from concerns that the Tengs/Graham conclusions are not robust and do not even follow logically from their own data, and second from the discovery that all the Main Scorecards:

- rely on undisclosed data and nonreplicable calculations,
- employ nonrandom and biased sampling methods,
- misrepresent *ex ante* guesses about costs and benefits as actual measurements,
- zero out all unquantified costs and benefits along with important categories of quantified benefits,
- paper over the large uncertainties that are present in virtually every regulatory analysis, and
- disregard all questions about the fairness of the distribution of cost and risk.[34]

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31. *See* Parker, *supra* note 23, at 1348-49.
32. Hahn, *Response to Critics*, *supra* note 8, at 1024.
33. *See id.* at 1045.
34. In *Grading the Government*, I pointed out other errors that I do not address here. For example, I argued that Hahn and Morrall probably undervalue the benefit of reducing risk to human life and health and erroneously discount the value of lifesaving benefits accruing in the future. *See* Parker, *supra* note 23, at 1370-75. Hahn accurately points out, in response, that his estimate is supported by OMB practice, by a meta-analysis of several studies by W. Kip Viscusi and Joseph E. Aldy, and by the Environmental Protection

It will be seen that the first three of these defects are curable by better practice. The last three pitfalls, however, are endemic to the enterprise of compiling strictly numerical scorecards, rendering them a defunct mode of analysis.

A. Avoidable Errors

1. Illogical or Nonrobust Conclusions (Tengs and Graham)

One of the most well-known and widely cited claims in the regulatory literature—and in media coverage of regulatory issues—is the claim put forward by Tammy Tengs, John Graham, and their co-authors that 60,000 additional lives could be saved each year at the current level of regulatory expenditure by simply reallocating spending away from expensive lifesaving interventions to more cost-effective interventions that are now being under-funded or over-looked altogether.[35] They also identify Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) programs aimed at controlling environmental toxins as among the most wasteful of the bunch.[36]

Scholars and pundits have cited this finding as evidence of a symptom of "paranoia and neglect" or even "statistical murder."[37] But does the study actually establish such a malady?

Critics have pointed out that the study assumes, counter-factually, the existence of some mechanism for efficiently shuffling funds among many agencies and programs in order to achieve the "ideal" allocation imagined in their computer scenario.[38] Without such a (currently nonexistent) reallocation mechanism, no additional lives could be saved.

Critics also have pointed out that it is arbitrary and illogical to assume that all the money for funding efficient Intervention A must come from defunding inefficient Intervention B, as opposed to getting the funds from, for example, a reduction in pork barrel spending. Yet without that assumption, there is no statistical murder.[39]

Agency's (EPA) Science Advisory Board. *See* Hahn, *Response to Critics*, *supra* note 8, at 1038-39. While a number of other scholars have taken issue with the studies and conventional wisdom on which Hahn relies, a full exploration of this complex issue lies well outside the scope of this Article, and so I omit it here. *See also Regulatory Costs of Mythic Proportions*, *supra* note 25, at 2042-56. *See generally* Lisa Heinzerling, *The Rights of Statistical People*, 24 HARV. ENVTL. L. REV. 189 (2000). The omission does not affect any of the other critiques contained in this Article or alter my fundamental conclusion as to the unavoidable invalidity of strictly numerical scorecards.

35. Tengs & Graham, *Opportunity Costs*, *supra* note 6, at 172.

36. *See id.* at 177.

37. Graham, *Testimony on Risk Assessment and Cost-Benefit Analysis*, *supra* note 16, at 79.

38. *See* Parker, *supra* note 23, at 1375.

39. *See* Heinzerling, *Misuse of Life-Saving Interventions Study*, *supra* note 23, at 162.

The most fundamental issue, however, is whether Tengs and Graham have truly shown that the current pattern of intervention is pervasively irrational in the first place. On this point, Heinzerling has complained that the authors' database includes a significant number of very expensive but nonexistent interventions—interventions that are not implemented and which exist only as hypothetical constructs in the mind of some analyst. Heinzerling complains that these inclusions serve no purpose but to make regulation look bad.[40]

This is a valid criticism of the earlier *Five-Hundred Interventions Study and Their Cost-Effectiveness*, which lists the costs-per-life-year-saved without any disclosure of whether the intervention in question is actual or hypothetical.[41] However, it is not a fair objection to the *Opportunity Costs* study that produced the 60,000 lives claim because the design of that study requires the identification of regulatory opportunities (that is, currently unimplemented interventions) in order to perform the hypothetical reallocation.[42] Moreover, inclusion of hypothetical high-cost interventions does no harm in this study because such interventions by definition neither supply funds (they are currently unimplemented) nor receive funds (they are too costly). So the 60,000 lives claim is not affected in any way by the inclusion of hypothetical, high-cost interventions.

The more basic problem with the *Opportunity Costs* study is that its findings are not at all robust. Examining the unpublished database reveals that over two thirds of the 60,000 additional lives saved through reallocation are associated with fully implementing just two interventions: continuous (versus nocturnal) oxygen for hypoxemic obstructive lung disease and implementing a universal flu vaccine.[43] Significantly, Graham has done nothing to promote either intervention since taking office as President Bush's regulatory czar. One wonders whether he is aware of his

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Tengs' reply to Heinzerling treats this point as a matter of mere policy advocacy: "As a matter of policy advocacy, Dr. Heinzerling is entitled to suggest that defense dollars should be reallocated to environmental protection. Yet such a belief is not relevant to the validity of our research design or the interpretation of our results." Tengs, *supra* note 25, at 117. This response misunderstands the issue. The issue is not one of policy advocacy but of logic: The charge of "statistical murder" (the main interpretation of their results offered by Graham himself) requires the assumption that any dollar spent on Intervention A is thereby deducted from funds allocated to Intervention B. Otherwise, the failure to implement B cannot be laid at the door of A. If the assumption is groundless (and it is) because there are many other potential sources of funding for Intervention B, then the interpretation fails, and the "statistical murder" charge is left unsupported.

40. *See* Heinzerling, *Misuse of Life-Saving Interventions Study*, *supra* note 25, at 156 ("[O]f the 90 environmental measures included in [the study], only eleven were ever implemented.").

41. *See* Tengs, *supra* note 13, at 370-71.

42. *See* Tengs & Graham, *Opportunity Costs*, *supra* note 6, at 170-71.

43. Hahn's database is reproduced as Appendix B in Parker, *supra* note 23. The interventions described above occupy rows 20 and 22, respectively.

own data. Or, is inoculating the entire population of the United States against the flu perhaps a little more complicated, and a little less cost-effective, than the analyst who predicted such great results for it assumed?

Likewise, on the expenditure side, the data suggest a rather different picture than the conclusions Tengs and Graham draw from them. It turns out that much of the $17 billion that gets reallocated, hypothetically, in the optimization scenario aimed at maximizing lives saved, is generated not by withholding funds from costly yet ineffective interventions but by investing in a handful of *negative-cost* interventions. Indeed, half of that $17 billion is generated by the opinion of a single author that banning residential growth in tsunami-prone (or hurricane-prone?) areas would save $8.5 billion annually.[44] If only life were as easy as that!

We are now in a position to appreciate the central problem with the study. The *Opportunity Costs* study compares the actual costs of existing interventions with starry-eyed advocates' estimates of what competing interventions might cost, and accomplish, if they were fully implemented (assuming they could be fully implemented). No wonder reality fares poorly. How does any real intervention, or real person, compete with the Glorified Alternative?

Having examined a problem unique to *Opportunity Costs* (with its unusual reallocation exercise), we now proceed to a more general examination of problems that plague all the scorecards.

2. Reliance on Undisclosed Data and Nonreplicable Calculations

At the heart of the scientific enterprise lies the requirement that scholars publishing new findings be willing and able to furnish their raw data and analysis to outside scholars who seek to replicate their results. When this is not done, the relevant studies tend to be heavily discounted, as they should be.

In this case, Morrall has not furnished any of his supporting data or calculations, and Hahn and Tengs have offered only limited and partial disclosures which, though helpful, still preclude outside verification of their results.[45]

Heinzerling and I both raised this issue in our initial critiques of these scorecards. Significantly, only one of the scorecardists has responded to these criticisms. Morrall replies that his findings are "replicable" because

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44. *See* Parker, *supra* note 23. Rows 3 and 139 discuss the costs of "ban[ning] residential growth in tsunami-prone areas" and "construct[ing] sea walls to protect against 100-year storm surge heights."

45. *See* Parker, *supra* note 23, at 1359-62 (analyzing the gaps in disclosure that preclude verification of the Hahn and Tengs/Graham results).

the documentation supporting those findings is "on file"[46] and because he has gone over his own calculations and found them plausible.[47]

These statements misapprehend what replicability means. "Replicability" in the sense that scientists and other scholars use that word requires that findings must be derivable by *outside* reviewers drawing on the assumptions, sources, data, and methods of the original study. That cannot be done without documentation that no scorecardist has yet seen fit to provide.[48]

Writing in the influential journal, *Science*, Hahn recently opined, "Government should be allowed to use those research findings in developing regulations only after the agency has replicated the results or has certified that the results have been independently replicated. Replication is a key to ensuring the quality of results."[49] Unfortunately, none of the scorecardists practice what Hahn has so eloquently preached. That fact alone, by the standards applied in the scientific community, is sufficient to disqualify these scorecards from further consideration.

3. Sampling Errors

The Main Scorecards rely on samples of rules drawn from the larger population of social regulation. Their conclusions are valid only if the samples chosen are shown to be fairly representative of the universe of regulations from which these samples are drawn.

Tengs and Graham have acknowledged that their "dataset may not represent a random sample of all life-saving interventions" because "those economic analyses that researchers have chosen to perform and journal editors have chosen to publish may be disproportionately expensive or inexpensive."[50] The bias toward extremes in sampling yields a corollary bias in favor of greater lifesaving through reallocation of funds.

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46. Morrall 2003, *supra* note 8, at 228-29.

47. *See id.* ("I have examined each of the cost-effectiveness estimates questioned by Heinzerling and Parker, and reviewed sources and reasons for the estimates that were published. . . . I am convinced that my estimates are plausible . . . .").

48. The Journal of Risk and Uncertainty, which published Morrall's reply, is a peer reviewed journal. Yet it would appear that peer review, in Morrall's case, did not involve an audit of his data, adjustments to agency data, or authority for those adjustments because that information is unavailable.

49. Linda R. Cohen & Robert W. Hahn, *A Solution to Concerns Over Public Access to Scientific Data; Suggestions to Improve Process Under Freedom of Information Act*, 285 SCIENCE 535 (1999) (drawing on nearly identical conclusions derived from Hahn's previous work). A note on the terms is in order here. I do not read this passage to suggest that "replication" requires at least two comparable studies yielding the same result. It is unreasonable, for instance, to expect a ten-year epidemiological study to be confirmed by a similar separate study. Replication simply means that outside analysts are able to apply the calculations described in the original study to the data used by the study and achieve the results reported by that study.

50. Tengs, *supra* note 13, at 372.

Morrall claims that he selected regulations meeting the criteria that "lifesaving benefits must provide the majority of benefits and that non-health benefits must not exceed compliance costs."[51] However, as I indicated in my earlier critique, perusal of the rules in his database reveal that these criteria are not consistently applied: He includes rules that offer significant health and ecological benefits that would appear to be excluded from his numerical tally.[52] However, given that Morrall altered agency numbers in undisclosed ways, there is no way for any outside observer to be absolutely sure of any statement about how he counted benefits.[53]

Hahn includes regulations expected to *cost* more than $100 million annually, which by law must be accompanied by a Regulatory Impact Assessment (RIA) that yields cost and benefit information.[54] However, this criterion excludes from consideration all regulations that cost less than $100 million but yield large *benefits* (the clearest success stories of regulation) along with all unexploited "regulatory opportunities" (opportunities for cost-effective regulations that were never taken or that were made too weak). Both of these exclusions would tend to bias his scorecards against regulation.

Hahn has replied that "Morrall's research provides a notable refutation of this criticism" because Morrall later identified a few "new regulatory opportunities that are both socially beneficial and attractive from an efficiency standpoint," as did OMB.[55] However, the relevance of this observation to a defense of scorecards is unclear. One does not "refute" a criticism by correcting, after the fact, a problem first raised by the critics. That would appear more like an acknowledgment. Moreover, Morrall's reissued analysis—which mentions a grand total of *four* regulatory

51. Morrall 2003, *supra* note 8, at 225. Heinzerling's initial critique of the Morrall table pointed out that Morrall included a number of rules that were never actually promulgated and that therefore should not be cited as instances of regulatory folly. *See* Heinzerling, *Regulatory Costs of Mythic Proportions*, *supra* note 25, at 2000-14. Morrall's reissued table includes only final rules, yet he comes to the same conclusions as he did in his initial study. *See* Morrall 2003, *supra* note 8, at 223. Therefore, reliance on rules that have not been promulgated does not appear to be a major factor in his results.

52. *See* Morrall 2003, *supra* note 8, at 230-31 (listing the following rules with abbreviated titles: Uranium Mill Tailings, Hazardous Waste Listings for Petroleum Sludge, Sewage Sludge Disposal, Hazardous Waste Solids Dioxin, Prohibit Land Disposal, Land Disposal Restrictions/Phase II, Solid Waste Disposal Facility Criteria—all of which offer clear environmental benefits beyond human health protection); *see also* text accompanying note 77 (discussing the formaldehyde rule).

53. Moreover, even if his criteria are straightforwardly applied, they are not clearly neutral. Reading the fine print reveals that by "health benefits" Morrall means only quantifiable and quantified benefits of avoiding hospitalization or permanent disability. How is it neutral, one wonders, to include rules with significant unquantified benefits (which may account for a significant share of their cost) but exclude those with large quantified benefits that exceed costs, unless they involve avoidance of death, hospitalization, or permanent disability?

54. *See* Hahn 1996, *supra* note 7, at 209.

55. *See* Hahn, *Response to Critics*, *supra* note 8, at 1027.

opportunities—does not purport to reflect, and clearly does not reflect, the full number or range of unexploited options for beneficial regulation.[56]

Hahn's reply also points to two countervailing omissions that he believes might offset the exclusion of some of the most beneficial rules and all regulatory opportunities. First, he claims that sampling only "significant" rules had the effect of omitting minor rules that lack the benefit of OMB review and hence are more likely to be over-zealous and irrational than large-scale rules that undergo OMB review.[57] That rejoinder, however, assumes the very point in issue—that agencies are systematically over zealous and will over-regulate whenever they are not subject to an outside check. An equally plausible scenario is that small rules flying "under the radar" without the benefit of OMB oversight will also lack the impetus of concerted public interest group pressure for greater stringency. In these situations agency capture by regulated entities with concentrated interests would seem at least as likely as over-regulation.

Second, citing Justice Breyer's concern with a "tunnel vision" that allegedly causes agencies to regulate with irrational zeal, Hahn observes that tunnel vision might cause agencies to overstate benefits and understate costs in order to avoid OMB review or help their regulations pass OMB review.[58] If so, this too would be a source of contrary bias that might offset any bias induced by his sampling methods. But this defense likewise assumes the proposition—agencies are over-zealous—that scorecards are meant to test.

Moreover, even if a countervailing bias were shown, one cannot answer concerns with selection bias in one direction simply by coming up with a

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56. *See* Morrall 2003, *supra* note 8, at 233. The handful of regulatory opportunities identified by Morrall and OMB must be weighed against the scores of existing regulations that OMB has recently put on the table for rollback or rescission. *See* OMB, OFFICE OF INFORMATION AND REGULATORY AFFAIRS, PROGRESS IN REGULATORY REFORM: 2004 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES (2004) (Executive Summary of Final Report at 1), *available at* http://www.whitehouse.gov/omb/inforeg/2004_cb_execsumm.pdf (identifying 189 regulations nominated and scheduled for reviewed for possible modification or rescission). Significantly, the third scorecard, Tengs & Graham, *Opportunity Costs*, *supra* note 6, *did* try to canvas unexploited regulatory opportunities in a sustained way and found at least 60 such opportunities solely within the population of published articles addressing unexploited life saving interventions. *See* Parker, *supra* note 23, at 1441-52 app. B-3a (counting all regulations that cost less than $7 million per life and are less than 90% implemented).

57. *See* Hahn, *Response to Critics*, *supra* note 8, at 1028 (suggesting that agencies might intentionally characterize new rules as "minor" so as to avoid OMB scrutiny).

58. *See id.* at 1028-29 ("[T]unnel vision [is] a 'classic administrative disease [that] arises when an agency so organizes or subdivides its tasks that each employee's individual conscientious performance effectively carries out single-minded pursuit of a single goal too far, to the point where it brings about more harm than good.'").

couple of unquantified factors that might cause bias in the other direction. Two or three biases running in opposite directions do not automatically cancel each other out.

Finally, proponents of scorecards defend their skewed sampling methods by claiming that there is no alternative.[59] As it happens, there *is* an alternative. It entails systematically canvassing agencies, outside analysts, and policy advocates for leads to unexploited regulatory opportunities and for high-benefit-low-cost regulations, and doing so with the same systematic method and zeal that Graham has recently exhibited in soliciting outside suggestions for regulatory modification or rescission.[60]

Granted, such an undertaking would require considerable effort, probably one organized by OMB. Even so, if proponents of regulatory scorecards are committed to devising a fair test of government rationality then they should call for, and commit to, that effort, not continue to promulgate the results of partial and biased tests.

4. Reliance on Ex Ante *Predictions (Reported as* Ex Post *Findings)*

All three of the Main Scorecards routinely report *ex ante* estimates of the costs and benefits of proposals for new regulation as if they were the actual costs and benefits of the rules in question—a practice that has been compared to reporting pre-game guesses about the outcome of an upcoming Super Bowl as the actual score of the game.[61]

Grading the Government suggested, and scorecardists do not dispute, that pre-rule assessments harbor a built-in tendency to understate net benefits for the following reason: most regulatory assessments assume one hundred percent compliance with the rule, that is, no waivers, variances, or modifications. Yet most rules contain waiver or variance provisions, and all rules are subject to later modification.[62] If it turns out that compliance with a regulation costs more than expected in particular cases, these flexibility mechanisms can be, and routinely are, used.

Of course, such waivers and modifications may be expected to reduce benefits as well as costs. But if such instruments are used sensibly (to focus on situations in which inflexible application of a rule would impose costs grossly disproportionate to benefits), use of these flexibility mechanisms should reduce incremental costs more than benefits, yielding

59. *See id.* at 1029.
60. *See* Parker, *supra* note 23, at 1417-20.
61. *See id.* at 1367.
62. *See id.* at 1368-69 (arguing that predictive estimates that ignore the flexibility of implemented regulations necessarily underestimate their benefits).

an overall increase in net benefits.[63] By the same token, ignoring such mechanisms may be expected to yield a downwardly biased estimate of net benefits.

Once again scorecardists defend principally on grounds that "there is no obvious alternative."[64] Once again, this is incorrect. There is an alternative to relying exclusively on *ex ante* estimates. A number of scholars, including Hahn himself, have called for increased use of *retrospective* studies of regulatory costs and benefits, as has OMB.[65]

Moreover, even if there were no alternative to *ex ante* studies, there obviously is an alternative to reporting the results of such forecasts as "the" costs and benefits of regulation. One at least can be clear about what one is doing.

B. Intrinsic Errors

The shortcomings mentioned above are curable by better practice. We now come to a series of shortcomings which cannot be cured because they are endemic to scorecards. These are the shortcomings that categorically undermine scorecards as a genre of analysis.

1. Excluding Unquantified Benefits

The widely recognized "Annapolis Principles" for responsible cost-benefit analysis state: "Not all impacts of a decision can be quantified or expressed in dollar terms. Care should be taken to assure that quantitative factors do not dominate important qualitative factors in decisionmaking."[66]

Notwithstanding this admonition from within their own discipline, the Morrall and Tengs/Graham scorecards focus exclusively on lifesaving benefits, or quantified benefits of avoiding hospitalization or disability, which are converted to life-equivalents. Hahn's *Government's Numbers* scorecards sweep only slightly more broadly, counting benefits of reducing risk of accidental death or injury as well as cancer, heart disease, lead poisoning, and harms (both health and ecological) arising from five listed air pollutants.[67]

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63. For an excellent overview of the opportunities offered by variances and waivers to improve regulation after the rule, see Robert L. Glicksman & Sidney A. Shapiro, *Improving Regulation Through Incremental Adjustment*, 52 U. KAN. L. REV. 1179 (2004).

64. *See* Hahn, *Response to Critics*, *supra* note 8, at 1029 ("[T]here is no obvious alternative at this point to using the ex ante studies, though it may be possible to improve their reliability in the future.").

65. *See* HAHN 2000, *supra* note 7, at 63 (suggesting retrospective studies to complement prospective studies); Parker, *supra* note 23, at 1369-70 (noting that obstacles of expense and difficulty are insufficient to excuse retrospective analysis of regulation).

66. KENNETH J. ARROW ET AL., BENEFIT-COST ANALYSIS IN ENVIRONMENTAL, HEALTH AND SAFETY REGULATION: A STATEMENT OF PRINCIPLES 10 (1996).

67. *See* HAHN 2000, *supra* note 7, at 40.

Omitted from these tallies are all benefits of procedural rules, disclosure rules, and rules promoting compliance assurance and enforcement, since such rules do not directly lead to countable health or ecological endpoints. Yet, strangely, rules aimed or yielding such benefits are not excluded from Hahn's database. The rules are included, but their benefits are not. Also excluded from the scorecard tally are an assortment of health benefits, including reproductive and developmental health benefits, which are described but not quantified in agency analyses (or which may have been quantified but fall outside the scorecardists' narrow categories of countable benefits).

As a direct result of such omissions, it turns out that 41 of the 136 major regulations appearing in Hahn's tabulation are assigned a *zero benefit*. Not a zero net benefit, but a zero benefit, meaning the regulations have no use whatsoever. Moreover, even rules that show a positive number in the benefits column have had whole categories of benefits excluded from the tally.[68]

Gauging the precise impact of all these exclusions would require a case-by-case analysis of all the rules in scorecardists' databases, a project well beyond my scope. However, the nature and potential significance of these exclusions are well illustrated in the following three examples, two of which are drawn from Hahn's study and one from Morrall's.

The EPA's Great Lakes Water Quality Guidance. EPA's Great Lakes Water Quality Guidance was issued to reduce, by six to eight million pounds a year, the discharge of persistent, toxic, and bio-accumulative pollutants such as mercury, cadmium, lead, PCBs, DDT, dioxin, chlordane, heptachlor, dieldrin, pentachlorobenzene, and mirex into the Great Lakes.[69] These are compounds of undeniable toxicity whose risks, as EPA pointed out, include neurotoxicity, fetotoxicity, endocrine disruption, hematological impairment, reproductive dysfunction, sensory and equilibrium disturbances, hyperactivity, and impairment of peripheral vision, hearing, and speech. These compounds pose special risks to fetuses and infants because they bio-accumulate in the mother's fatty tissues and pass through to the fetus and the breast-fed infant. They also threaten significant ecological harm to the Great Lakes system and the wildlife inhabiting it, since wildlife obviously do not have the options that humans have in choosing the food they eat and treating and filtering the water they drink.[70]

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68. Parker, *supra* note 23, at 1383.

69. *See* Final Water Quality Guidance for the Great Lakes System, 60 Fed. Reg. 15,366 (Mar. 23, 1995) (codified at 40 C.F.R. pts. 9, 122, 123, 131, 132) (attempting to provide protection for fish and shellfish in the Great Lakes area).

70. *See* Proposal to Amend the Final Water Quality Guidance for the Great Lakes System to Prohibit Mixing Zones for Bioaccumulative Chemicals of Concern, 64 Fed. Reg. 53,632, 53,638-53 (Oct. 4, 1999) (describing the negative health effects on both humans and

Despite their evident hazard, the noncancer risks of these toxins are very hard to quantify on a mass scale, even for humans. Unlike cancer, which is widely assumed to have a linear dose-response down to a zero exposure level (making the calculation of population risk from aggregate exposure data relatively simple), noncancer endpoints generally have nonlinear risk thresholds. This means that, to calculate a population risk from any given discharge, you have to know not only the exact exposure of the population to the pollutants targeted by the particular regulation, but you also have to know the cumulative exposure of individuals in the population to these and other interacting pollutants from other sources.[71]

Data at this level of detail is simply not available for most compounds and most people most of the time. As a result, noncancer risks from these compounds are exceedingly difficult, if not impossible, to quantify at the population level.[72] Moreover, the persistent and bio-accumulative character of toxins addressed in this rule means that past experience—even if it could be accurately characterized—may not be a valid guide to future risk. In this case, EPA concluded that available data permitted quantification only of the benefits of reducing incidence of fatal cancer to sports anglers and Native American subsistence fishermen who eat fish they themselves have caught in the Great Lakes. That number, after extensive manipulation, became Hahn's number for the total benefit of the rule.

To believe that the agency's numbers tell the whole story of EPA's Great Lakes Water Quality guidance, one would also have to believe that the sole benefit of reducing toxic, bio-accumulative discharges into the Great Lakes by six to eight million pounds a year is a single incident of cancer prevented every three years.[73] That is not the case, and it is not the picture that emerges from a fair reading of EPA's explanation of the basis and purpose of the rule.

The EPA's 1995 Municipal Waste Combustor Rule. EPA's Municipal Waste Combustor Rule required the installation of filters that will reduce particulate matter and sulfur dioxide emissions from waste combustors, a

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the wildlife of the region).

71. *See id.* at 53,638-39 (explaining the adverse human health effects that may result from the consumption of contaminated fish).

72. *See id.* at 53,639 (identifying various environmental conditions that make these calculations difficult).

73. Ironically, Hahn's own unpublished spreadsheet (supplied in a more detailed form to this author) narratively records some of the benefits that his tabulation excludes. *See* Hahn Unpublished Spreadsheet, at cell CA-14 (noting that pollutant loadings under the rule would be reduced by 5.8 to 7.6 million lbs-eq/yr.) (unpublished manuscript on file with author); *id.* at cell AV-14 (calculating, after discounting, that the rule will avert only .3 cancer deaths per year); *id.* at cell BG-14 (remarking erroneously "no non-fatal benefits listed").

benefit that Hahn monetizes.[74] This benefit, however, misses the primary purpose of the rule, which was to reduce, by 70 to 99 percent, combustor emissions of dioxin, cadmium, mercury, and lead, all of which issued from combustor smokestacks and were not then subject to any federal controls. These are toxic, persistent, and bio-accumulative compounds that are known to be hazardous to human health in very small doses. The rulemaking record makes clear that EPA considered reducing emissions of dioxin and heavy metals a major benefit of the rule.[75] Yet because EPA could not find a scientifically defensible method for quantifying and monetizing the benefits of reducing exposure to these toxins, the entire benefit of reducing dioxin and heavy metals emissions is zeroed out in Hahn's accounting system, leaving the rule quantitatively defended only by what are arguably its least important benefits.[76]

Formaldehyde. The most exorbitantly costly rule in Morrall's original tabulation is an OSHA rule regulating formaldehyde exposure in the workplace. At $72 billion per life saved, that rule does indeed appear unreasonably expensive. What Morrall's table fails to disclose is that OSHA's rule—beyond preventing about one cancer fatality per year (or one hundredth of a fatality per year after Morrall's adjustment and discounting)—was also expected to yield a host of benefits that were not monetized but were clearly substantial: reduced or avoided burning eyes or noses, sore or burning throats, asthma attacks, chronic bronchitis, allergic reactions, dermatitis, and skin sensitization for up to 500,000 American workers per year.[77]

Is avoiding such discomforts and health hazards for half a million American workers "worth" the expenditure of $36 million a year by a $30 *billion* dollar group of industries? Will installing ventilators in the workplace also reduce employee exposure to other irritating and possibly hazardous chemical vapors?

These are the central questions of the formaldehyde rulemaking. They are quite unlike (and far more complex than) the question implicitly posed by the Morrall table: How could OSHA be so foolish as to propose a rule that will cost $72 billion for every life saved?

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74. EPA, Emissions Guidelines: Municipal Waste Combustors, 59 Fed. Reg. 48,228 (proposed Sept. 20, 1994) (to be codified at 40 C.F.R. pt. 60) [hereinafter Emissions Guidelines Municipal Waste Combustors Proposed Rule]. Hahn's spreadsheet tally for this rule is reproduced in Parker, *supra* note 23, at 1467 app. C, row 32.

75. *See* Emissions Guidelines Municipal Waste Combustors Proposed Rule, *supra* note 74, at 48,239 (documenting, without quantifying, significant risks of heavy metals emissions and corollary benefits of reducing such emissions).

76. *Id.* at 48,238; Standards of Performance for New Stationary Sources: Municipal Waste Combustors, 59 Fed. Reg. 48,198, 48,207 (proposed Sept. 20, 1994) [hereinafter NSPS Municipal Waste Combustors Proposed Rule].

77. *See generally* Dep't of Labor, Occupational Exposure to Formaldehyde, 50 Fed. Reg. 50,412 (Dec. 10, 1985) (codified at 29 C.F.R. pt. 1910).

Although a full delineation of the regulatory benefits excluded from the scorecards is beyond my present scope, there is no reason to assume that the formaldehyde rule is atypical. Most toxins that cause cancer may be expected to cause a rash of other health problems, avoidance of which (through use of simple devices such as ventilators) might well justify a moderately priced rule. If you focus only on quantified benefits to the exclusion of all benefits the agency narratively describes, you may miss the main point of the rule. That is why OMB has recently advised agencies that when "you are unable to estimate the value of some of the ancillary benefits [of a rule], the cost-effectiveness ratio will be overstated, and this should be acknowledged in your analysis."[78] Regrettably, scorecards fail to follow this sound advice.

The list of examples could go on. Many rules are accompanied by preambles or impact assessments that describe substantial categories of benefit—disclosure benefits, compliance oversight benefits, noncancer health and ecological benefits—which the agency recognized as potentially significant but lacked the data to quantify or monetize precisely, and which numerical scorecards therefore inherently zero out.[79] No one attempts to defend exclusions of unquantified benefits, or benefits that are quantified but not monetized, on principled grounds. Instead, it will be seen that scorecardists have offered five practical justifications for their accounting methods:

- zeroing out unquantified benefits makes little difference to results,
- certain costs are also excluded, and omitted costs may cancel out omitted benefits,
- assigning a nonzero monetary number to unquantified benefits would be "totally arbitrary,"
- zeroing out unquantified benefits is appropriate because it will give agencies an incentive to try harder to quantify benefits, and/or
- comparing monetized costs and benefits is useful even if the comparison does not capture all costs or benefits.

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78. *See* OMB Circular A-4, Regulatory Analysis: Memorandum to the Heads of Executive Agencies and Establishments, *reprinted in* OMB, INFORMING REGULATORY DECISIONS: 2003 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL AND TRIBAL ENTITIES, app. D , at 131 (2003) [hereinafter OMB GUIDANCE (2003)], *available at* http://www.whitehouse.gov/omb/inforeg/2003_cost-ben_final_rpt.pdf.

79. Hahn's reply also suggests that adding back "non-standard benefits," which agencies monetized but which he zeroed out, would only add two more successes. *See* Hahn, *Response to Critics*, *supra* note 8, at 1039. Even if this is the case—we have to take his word since his calculations are not available—this does not address the impact of ignoring benefits that agencies quantified but did not monetize, along with all benefits that they considered significant but were unable to quantify.

The remainder of this subsection examines and responds to each of these defenses in turn. It will be seen that none of these defenses withstands scrutiny.

The Harmless Error Defense. One possible response to concerns with excluded variables is that the omissions are harmless, either because such benefits are small or because omitted benefits are cancelled out by omitted indirect costs. Hahn's reply, for example, claims that excluding "rules with zero benefits" from the database only increases the pass rate of the remaining regulations, in this case from 43 percent to 59 percent.[80]

At least four things are problematic about this response. First, increasing the pass rate from 43 percent to 59 percent is not exactly a trivial impact. Second, as I showed in *Grading the Government*, Hahn's so-called "rules with zero benefits" are not, in fact, rules with zero benefits. They are simply regulations for which Hahn has inscribed a zero in the benefit column of the spreadsheet, notwithstanding the fact that the agency in question may have described substantial benefits narratively and may even have monetized them in some cases.[81]

Third, one cannot correct the erroneous treatment out of beneficial regulations by simply excluding them from the database. One has to reckon with the possibility that some or all of these excluded regulations (such as requiring major air polluters to have a permit or requiring reporting of toxic chemical releases) may actually have been cost-justified. If all are justified, then the pass rate increases from 43 percent to 74 percent.[82]

Fourth, and this is by far the most important point, the practice of zeroing out benefits is not confined to rules that yield exclusively unquantified benefits. Scorecards also exclude large categories of nonzero but only partially quantified benefits. Indeed, all the examples cited above

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80. Hahn, *Response to Critics*, *supra* note 8, at 1039.

81. Parker, *supra* note 23, at 1381-1400 (giving multiple examples of rules yielding substantial benefits that the agency narratively described but could not quantify and that therefore received a zero in the benefit column of Hahn's spreadsheet). *See id.* at 1463-84 app. C (reproducing Hahn's spreadsheet). Hahn's "zero-benefit rules" include a rule requiring double hull construction for oil tankers to help prevent massive oil spills (row 29); a procedural rule requiring major air polluters to hold emissions permits, thereby facilitating compliance with and enforcement of emissions standards (row 51); a rule requiring the public reporting of releases of certain toxic chemicals from manufacturing facilities (row 67); a Clean Water Act rule aimed at protecting sensitive coastal areas from nonpoint source water pollution (row 73); and a rule to protect millions of agricultural workers from unsafe exposure to harmful pesticides (row 78). *Id.* at 1382.

82. This number is derived as follows: Of the 106 final rules in Hahn's database, 34 were assigned a zero benefit. *See* Parker, *supra* note 23, at app C. With these 34 rules excluded, Hahn reports that "59[%] of the remaining 74 regulations pass a benefit-cost test in the base case." Hahn, *Response to Critics, supra* note 8, at 1038. That corresponds to 44 rules. Adding 44 and 34 yields a total of 78 successes, which is 74% of the 106 rules in the database.

(and many more) are rules for which some lifesaving benefits are quantified, while other significant benefits are mentioned but left unquantified.

The Omitted Cost Defense. One variant on the theme that omitted benefits are insignificant is the allegation that they are, in essence, canceled out by omitted costs. Scorecard proponents rightly point out that regulatory agencies also fail to quantify certain costs of complying with social regulation, an omission that may tend to cancel out the impact of omitting unquantified benefits. From this they conclude that "it is virtually impossible to argue on the basis of first principles that there is a clear antiregulatory bias" to scorecards.[83]

This rejoinder, however, overlooks the fact that excluded costs are often not likely to be of the same order of magnitude as excluded benefits. In practice, unquantified costs usually take the form of lost competitiveness, profitability, and employment that accompany large compliance costs measured as a proportion of net revenues. Agencies generally bend over backwards to avoid imposing such costs, and studies have routinely shown that competitiveness impacts of existing social regulations have been small.[84] The record thus lends little or no basis for simply assuming that excluded costs generally cancel out the exclusion of many health, and virtually all ecological, benefits.

Again, two biases of unknown magnitude and opposite signs cannot be assumed to cancel each other out. If the relative magnitudes of these opposing biases cannot be assessed categorically, then the net effect must be determined case-by-case—which returns us to the need for individualized investigation of each case.

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83. Hahn, *Response to Critics*, *supra* note 8, at 1040.

84. For examples of agencies examining and voicing concern to avoid competitiveness impacts, see EPA, Federal Standards for Marine Vessel Loading and Unloading Operations and NESHAP for Marine Tank Vessel Loading and Unloading Operations, Regulatory Impact Assessment, RIN 2060-AD02, June 10, 1995, Addendum to Ch. 7 (unpublished document on file with author) (noting that rule had been revised in the late stages of development to reduce the number of affected facilities from 61 to 28 in order to "greatly reduce" the "number of terminal facilities potentially put under competitive pressure"). *See also* Parker, *supra* note 23, at 1400-02 (listing the omitted indirect costs and their importance). For evidence that the competitive impacts of regulation are generally small, see Adam B. Jaffe et al., *Environmental Regulation and the Competitiveness of U.S. Manufacturing: What Does the Evidence Tell Us?*, 33 J. ECON. LITERATURE 132, 157-58 (1995) (discussing the low impact of excluded costs on the manufacturing sector specifically); Michael E. Porter & Claas van der Linde, *Toward a New Conception of the Environment-Competitiveness Relationship*, 9 J. ECON. PERSPECTIVE 97, 98 (1995) (suggesting that environmental regulations may *enhance* corporate competitiveness, yielding negative omitted costs).

The Arbitrariness Defense. Scorecardists tend to insist that they have no choice but to assign unquantified benefits a zero value because any other value would have been "totally arbitrary."[85] We are left to wonder why scorecardists assume that zero is somehow plausible and not arbitrary. One can imagine a wide range of plausible numbers that might be used to summarize the incompletely quantified benefits of eliminating the discharge of six to eight millions pounds per year of persistent and bio-accumulative toxins into the Great Lakes or eliminating 80 percent of mercury emissions from municipal waste combustors. The one value that is not a plausible proxy for such benefits is zero. Yet that is the value that numerical scorecardists implicitly choose for any variable that they cannot reliably quantify.

The Policy Defense. A fourth common justification for zeroing out unquantified benefits is that it is good policy to do so because "it gives regulatory agencies an incentive to provide more information on quantifiable benefits and costs."[86] There are at least two flaws in this line of reasoning. The first flaw is that scorecardists do not disclose in their studies that they are using scorecards as an instrument to punish agencies for failing to quantify benefits in order to encourage them to make greater efforts at quantification in the future. Rather, they offer their scorecards as measures of the costs and benefits of regulation.

The second flaw arises from the fact (discussed above) that some benefits are impossible to quantify. How does one quantify the benefit of a procedural rule requiring that major sources of air pollutants hold a permit or requiring that factories disclose their emissions of toxic chemicals into the air we breathe? How does one quantify or monetize, given the state of existing knowledge, the benefit of avoiding the build-up of persistent and bio-accumulative toxins in the Great Lakes?

Scholars have wrestled with such questions for decades, without resolution. Scorecardists offer no answers. Agencies are routinely excoriated for making arbitrary choices and advised to rely on "sound science" alone. Yet no one has yet identified a sound scientific method that would permit the rigorous quantification of many of the benefits (particularly in the realm of process, noncancer health protection, and ecological risk reduction) that social regulations aim to achieve.

Of course, agencies *could* come up with a number. But in many cases the number would not have a sound scientific foundation, and regulatory critics would complain that it is groundless. Herein lies the catch-22 that numerical cost-benefit analyses (including scorecards) pose for agencies:

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85. *See* Hahn, *Response to Critics*, *supra* note 8, at 1037 (noting his rationale for assigning "a zero dollar value to unquantified benefits and cost categories").

86. *Id.*

If agencies try to assign numbers to a benefit that cannot, in fact, be scientifically quantified and monetized based on available data and methods, they will be accused of fudging the numbers and practicing unsound science. But if they do *not* assign a number and simply describe the benefit narratively, the critics of regulation will zero that benefit out. Under these circumstances, it is hard for this observer to see the merit of zeroing out unquantifiable benefits in order to encourage agencies to work harder to quantify them.

The Partial Truth Defense. Scorecardists' final argument in defense of zeroing out unquantified benefits is that counting such benefits is not their purpose and that there is something to be gained from comparing the "government's numbers" (that is, monetized costs and benefits) even if one grants that such numbers do not tell the whole story.[87]

There are two things wrong with this line of defense. First, when scorecardists assign arbitrary zero values to unquantified benefits that are clearly described and are clearly substantial—such as the benefit of requiring air polluters to have a permit or eliminating the discharge of millions of pounds of persistent, bio-accumulative toxins into the Great Lakes ecosystem[88]—the zeros in the benefits column are not government numbers. They are made-up, scorecardists' numbers.

Second, scorecards generally are not presented to the public as studies of the degree to which agencies quantify and monetize benefits or as tests of the degree to which monetized benefits exceed monetized costs. They are touted as studies of "the costs" and "the benefits" of regulations, with no caveat in view, the unmistakable implication being that the studies tell us something meaningful about the substantive rationality of the regulations in question and the regulatory system overall.[89] For that to be the case it must

87. *See id.* at 1037-38.

88. *See* discussion *supra* Part II.B.1.

89. Thus, Hahn observes that "[o]nly regulations based on the Clean Air Act and the Safe Drinking Water Act yield positive net benefits." HAHN 2000, *supra* note 7, at 44. He claims his analysis shows that "[l]ess than half the rules pass a neutral economist's benefit-cost test;" that "net benefits would increase substantially if agencies rejected such rules;" that "society could spend its regulatory dollars more wisely;" and that all manner of "regulatory reform" proposals, which he details in that and later studies, are therefore justified. *Id.* at 38, 57. Note that the reference is to "net benefits," not "net monetized benefits" or even net "quantified benefits." Morrall likewise claims to have examined "the benefits and costs of the regulations" in his database and to have concluded that "safety regulation appears to be far more cost-effective than health regulation" and that, "[t]aken as a group, the final rules issued by the three Department of Transportation agencies . . . are about 83 times more cost-effective than those of EPA." Morrall 1986, *supra* note 5, at 32. One will look in vain through either study for a clear declaration that numbers tell only part of the story about regulatory rationality and that focusing on potentially significant but unquantified benefits (which agencies describe) might well yield a different, and more benign, picture of regulation.

be shown, empirically, that excluded costs and benefits are, as a general matter, immaterial to the analysis. To date, no scorecardist has even attempted such a showing.

What are the consequences of acknowledging the reality that some perfectly real and valid benefits (such as the benefit of capturing Osama bin Laden) simply cannot be quantified? Do contributions that are neither quantified nor monetized—when combined with the quantified and monetized benefits—justify the expense of the rule in each case? These are harder questions that this study cannot answer definitively. A careful answer would require a detailed study of the facts of each case and inevitably would require expert judgments about which people might disagree. In short, it would require the kind of in-depth, three-dimensional investigation that I call for and that is the antithesis of the numerical scorecard approach.[90]

2. Occluding Uncertainties

The Main Scorecards all present their findings about regulatory costs and benefits to three or more significant digits, thereby implying that measured costs and benefits are certain to at least one-tenth of one percent.[91] In response to criticism from this author, Hahn concedes that he should not have used three significant digits but that "rounding to two significant digits is probably reasonable," thereby speciously claiming a margin of error within one percent.[92]

In fact, it is not uncommon for the costs, benefits, and net benefits of a rule to be unknown even to within an order of magnitude. In some cases, the range of uncertainty left at the end of agency cost-benefit analysis may extend several orders of magnitude.[93] Even this level of uncertainty

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90. *See* discussion *infra* Part III.

91. *Compare* Morrall 1986, *supra* note 5, at 30 (presenting cost-per-life-saved data with three significant digits), *with* HAHN 2000, *supra* note 7, at 43 tbl. 3-5 (presenting net benefits to three significant digits), *and* Tengs & Graham, *Opportunity Costs*, *supra* note 6, at 176 (claiming that more rational pattern of lifesaving interventions could save an additional 60,200 lives per year).

92. Hahn, *Response to Critics*, *supra* note 8, at 1033 n.57.

93. *See, e.g.*, OMB GUIDANCE, *supra* note 78, at 87-91 tbl. 18 (2003) (listing the benefit of complying with EPA's accelerated phase-out of ozone depleting chemicals at $1 to $4 billion, a factor-of-four variation; listing the benefit of reducing evaporative emissions from light-duty vehicles at $274 to $1246 million, another factor-of-four range of uncertainty; listing the annual benefit of the acid rain program at $1 to $5 billion, a factor-of-five range; listing the benefit of reducing nitrogen oxide (NOx) emissions from non-road compression ignition engines at $600 to $3,000 million, a factor of five range). Moreover, these large ranges ignore the uncertainty introduced by the inclusion of unquantified but policy-significant variables. *See, e.g.*, Cass R. Sunstein, *The Arithmetic of Arsenic*, 90 GEO. L.J. 2255, 2258 (2002) (noting that, depending on one's assumptions, estimates of the benefits of President Clinton's new federal standards for permissible arsenic concentrations in drinking water ranged from $10 million to $1.2 billion, a factor-of-100 range of uncertainty).

ignores the impact of including benefits that are narrated and known to be significant but are not quantified.

Principles of sound cost-benefit practice require full and candid disclosure of uncertainty and sensitivity analysis to explore the impact of varying key parameters, individually and collectively, across their range of uncertainty. The policy of scorecardists, by contrast, is to ignore most uncertainties and just report the "best estimate" (usually the median value) of any range.

Hahn's is the only scorecard to offer any sensitivity analysis whatsoever, and his sensitivity analysis examines only the impact of (a) varying life value and discount rate over a range from three to seven million dollars and three to seven percent, respectively; and (b) choosing a range of possible values for the estimated benefit of reducing emissions of five listed air pollutants.[94] His 2004 reply to his critics offers a further sensitivity analysis that explores the impact of varying each cost and benefit estimate over an arbitrary range that extends from 50 percent of the base case to 150 percent. In the simplest case of equal base-case costs and benefits, Hahn's sensitivity analysis thus creates a factor-of-three ratio between net benefits for the best case and worst case scenarios. Reporting that this sensitivity analysis yields only a ten percentage point swing in regulatory success rate, Hahn concludes that his findings are robust.[95]

Despite his earlier objection to assigning "totally arbitrary" values to unquantified benefits, Hahn appears to be little bothered by this resort to an equally arbitrary range of uncertainty. How plausible is Hahn's range? In some cases, Hahn's range actually overstates the level of uncertainty reflected in the agency's RIA, mainly because the agency's own assessment (in violation of canons of responsible cost-benefit analysis) fails to acknowledge uncertainties, fails to state the assumptions used to fill gaps in knowledge, and fails to offer a sensitivity analysis exploring the consequences of altering these assumptions over plausible values in order to establish ranges of plausible estimates of cost, risk and regulatory benefit.[96] In other cases, however, agencies do follow good practice and do

94. *See* HAHN 2000, *supra* note 7, at 40.

95. *See* Hahn, *Response to Critics*, *supra* note 8, at 1034-35.

96. *See, e.g.*, EPA, Office of Emergency and Remedial Response, Emergency Response Division, Regulatory Impact Analysis of Proposed Revisions to the Oil Pollution Prevention Regulation, 40 C.F.R. § 112, at 4-30, 5-16, 5-19, 5-34 (1993) (noting that a midpoint "best estimate" has been provided in place of cost or benefit estimate ranges); Permit-Required Confined Spaces, 58 Fed. Reg. 4,462, 4,543-48 (Jan. 14, 1993) (codified at 29 C.F.R. pt. 1910) (offering only single estimates for benefits in terms of fatalities prevented and lost work avoided, and single estimates for costs of compliance); Process Safety Management of Highly Hazardous Chemicals; Explosives and Blasting Agents, 57 Fed. Reg. 6,356, 6,401-02 (Feb. 24, 1992) (codified at 29 C.F.R. pt. 1910) (providing annual best estimates for costs and benefits in terms of risk reduction and injuries avoided); Rule for Underground Construction, 54 Fed. Reg. 23,824, 23,847 (June 2, 1989) (codified at 29 C.F.R. pt. 1926)

generate ranges of cost and benefit estimates. When this is done, the ranges that result often greatly exceed the three-fold interval arbitrarily established by Hahn. Indeed, it is easily shown that simply altering discount rates and life values across the range identified by Hahn (three to seven percent and three to seven million dollars) can yield a factor-of-six variation in calculated net benefits—before taking into account any uncertainties in *ex ante* estimates of cost and physical benefit.[97] Marrying this six-fold valuation uncertainty to the two- to ten-fold (and sometimes higher) range of uncertainty found in estimates of many quantified physical benefits yields a total uncertainty that plausibly spans a 12- to 60-fold range of uncertainty.[98] Then one must factor in the additional uncertainties associated with unquantified costs and benefits.[99]

(providing approximate annual costs and benefits in single numbers rather than ranges). When agencies or their contractors generate artificially "certain" point estimates by failing to follow good practice for cost-benefit analysis, there are two possible responses. One response, which Hahn seems to favor, is simply to take the agency estimate at face value and proceed to judge the rule by the numbers generated in the Regulatory Impact Assessment (RIA) (adjusted by Hahn's standardizing assumptions). The other response, which I favor, is to conclude that the agency study is not well-done, that the outcome is numerically indeterminate, and that there is a need for a closer look at the rule.

97. To see this, consider a hypothetical rule that saves one life per year for ten years, after a 20-year latency period. Valuing those lives at $3 million each and discounting at 7% yields a net present value of $5.5 million. Valuing those same lives at $7 million each and discounting at 3% yields a present value of $33 million, a factor-of-six range of variation.

98. Consider, for example, the EPA's RIA for the rule on marine vessel loading and unloading, which is included in Hahn's database. *See* Hahn Unpublished Spreadsheet, *supra* note 73, at row 31. The EPA estimated the health benefits of one option at $77 million to $4.8 billion (in 1994 dollars) and a second, more limited, alternative at $3.1 to $37 million in 1994 dollars. The same RIA offers variant estimates for benefits to agriculture on the order of $1.4 to $27 billion in 1994 dollars, yielding a total range that extends from $80 million to nearly $1.4 billion. *See* EPA, OFFICE OF AIR AND RADIATION, REGULATORY IMPACT ANALYSIS FOR MARINE VESSEL LOADING AND UNLOADING OPERATIONS AND NESHAP FOR MARINE VESSEL LOADING AND UNLOADING OPERATIONS, RIN No. 2060-AD02, at ES-2, 6-1 to 6-10 (1995); *see also* Final Water Quality Guidance for the Great Lakes System, 60 Fed. Reg. 15,366 (Mar. 23, 1995) (codified at 40 C.F.R. pts. 9, 122, 123, 131, 132) (costs ranging from $60 to $380 million per year in 1994 dollars); EPA, OFFICE OF GROUND WATER AND DRINKING WATER, REGULATORY IMPACT ANALYSIS: NATIONAL PRIMARY DRINKING WATER REGULATIONS: PHASE V SYNTHETIC ORGANIC AND INORGANIC CHEMICALS, RIN No. 2040-AB11, at 1-4, 1-5 (1992) (estimating costs at between $64 to $760 million, and benefits between $11 and $304 million); EPA, OFFICE OF AIR AND RADIATION, OFFICE OF AIR QUALITY PLANNING AND STANDARDS, REGULATORY IMPACT ANALYSIS: RESIDENTIAL WOOD HEATER NEW SOURCE PERFORMANCE STANDARD, RIN No. 2060-AB68, at 10-11 to 10-14 (1986) (offering ranges of PM reduction benefits under three scenarios, with a range of over $1.7 billion between low and high estimates).

99. Hahn potentially seriously undervalues even regulations to which he assigns positive benefits. RIAs often have narratively described benefits that are not monetized and cannot be shoe-horned into Hahn's limited list of benefits. *See, e.g.*, EPA, OFFICE OF AIR AND RADIATION, REGULATORY IMPACT ANALYSIS FOR MARINE VESSEL LOADING AND UNLOADING OPERATIONS AND NESHAP FOR MARINE VESSEL LOADING AND UNLOADING OPERATIONS, RIN No. 2060-AD02, at ES-2, 6-1 to 6-10 (1995) (discussing unquantified benefits of reduced noncarcinogenic pollutant exposure, decreased materials damage, and increased productivity); EPA, OFFICE OF AIR AND RADIATION, OFFICE OF AIR QUALITY STANDARDS AND PLANNING, REGULATORY IMPACT ANALYSIS OF AIR POLLUTANT EMISSION STANDARDS AND GUIDELINES FOR MUNICIPAL SOLID WASTE LANDFILLS, RIN No. 2060-

As recent experience with weapons of mass destruction in Iraq makes clear in rather dramatic fashion, the confidence level of an estimate is often just as important to report as the estimate itself. That is why widely agreed principles of cost-benefit analysis hold that "[b]est estimates should be presented along with a description of the uncertainties."[100] This means all uncertainties, sans imposition of artificial boundaries.

What of the scorecardists' habit of using mid-points of agency ranges as "best" estimates of costs and benefits? It is defensible only if two rather heroic assumptions hold: (1) the distribution of probabilities across the range of possible outcomes is known, and (2) the distribution happens to be centered on the mid-point of the agency range.

These assumptions are not easy to defend as categorical propositions. As I and others have pointed out, many benefits (particularly those involving reduction of noncancer health and ecological risks) preclude such assumptions because the distribution of probabilities is unknown, making "best guess" an elusive concept.[101]

That is why OMB recently advised agencies that, rather than relying exclusively on best guess estimates, "[i]f the uncertainty in the estimates—for example, fundamental scientific disagreement or lack of knowledge—prevents construction of a scientifically defensible probability distribution, you should describe the benefits and costs under plausible alternative

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AC42, at 12-10, 12-11 (1994) (devoting subchapters to unquantified benefits such as decreasing greenhouse gas emissions and reducing landfill odor); EPA, OFFICE OF AIR AND RADIATION, OFFICE OF MOBILE SOURCES, REGULATORY IMPACT ANALYSIS: CLEAN FUEL FLEET PROGRAM, RIN No. 2060-AD32, 32, 41-43 (June 1993) (noting that decreased petroleum consumption, energy conservation, and new technology development may be significant additional benefits).

100. ARROW, *supra* note 66, at 222.

101. *See, e.g.*, ABA ADMINISTRATIVE LAW SECTION, COMMENTS ON OMB'S DRAFT GUIDELINES FOR THE CONDUCT OF REGULATORY ANALYSIS AND THE FORMAT OF ACCOUNTING STATEMENTS, *in* Letter from William Funk, Section Chair-Elect, to Lorraine Hunt, Office of Information and Regulatory Affairs, OMB, at 3-4 (April 20, 2003) (on file with author); *see also* Parker, *supra* note 23, at 1391-92 (making note of the difficulties in assigning a monetary value to benefits). It is important to remember, in this regard, that noncancer health and ecological risks, in particular, are poorly understood and thought to exhibit sharp discontinuities or thresholds that require careful consideration of the contribution of multiple sources to cumulative risk. *See, e.g.*, EPA, Unfinished Business: A Comparative Assessment of Environmental Problems app. 2, at 1-1, 1-2 (1987) [hereinafter Unfinished Business] (unpublished manuscript on file with the author). According to Unfinished Business,

> There are thousands of different chemicals in the environment that may cause adverse human health effects . . . . EPA has had great difficulty in analyzing non-cancer health effects . . . . Most program offices do not actually assess risks from non-carcinogens. . . . They merely evaluate the extent to which a regulatory option prevents exposures above the RfD [reference dose or acceptable daily intake] without an explicit calculation of risk.

Id. app. 2, at 1-1, 1-2; *see also id.* app. 3, Report of the Ecological Risk Group, at 5 (noting that due to massive data gaps and conceptual uncertainties ecological risk assessment "only rarely is quantitative and almost never probabilistic").

assumptions."[102] Scorecards acquire the appearance of objectivity and precision only by ignoring good practice and occluding these uncertainties.

3. Ignoring Distributive Impacts and Ethical Concerns

According to the Annapolis Principles of sound cost-benefit analysis, "a good [cost-benefit] analysis will also identify important distributional consequences [of a policy]."[103] This advice is likewise the counsel of both OMB and EPA guidelines for economic analysis.[104] The Regulatory Flexibility Act requires separate analysis of the economic impact of a rule on small businesses.[105] The statistical life values now in use presume that the incremental risk in question is small[106] and may not be mechanistically applied in situations involving higher-than-incremental risk since that would raise separate ethical issues.[107]

Cost-benefit analysis typically focuses on estimating aggregate social costs and benefits. Though actual examples of such analysis on the benefit side can be rather hard to find, nothing precludes an agency or analyst from also including in its assessment a separate analysis of the likely impacts of the rule on racial minorities, poor people, small businesses, medically vulnerable groups, or simply people who may bear a disproportionate share of risk (in the absence of the rule) or burden (if the rule is passed). Strictly numerical scorecards, however, have no way to accommodate such nuances, and so they invariably ignore them.

C. Why Such Errors Are Inherent to Scorecards

Though they seldom do so in practice, one can imagine rule-specific cost-benefit analyses taking account of unquantified costs and benefits,

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102. OMB, Guidelines to Standardize Measures of Costs and Benefits and the Format of Accounting Statements: Memorandum for the Heads of Departments and Agencies from Jacob J. Lew, Director, M-00-08, at 15 (Mar. 22, 2000).

103. *See* ARROW, *supra* note 66, at 8.

104. *See* OMB GUIDANCE (2003), *supra* note 75, at 131 ("[Y]our regulatory analysis should provide a separate description of distributional effects (i.e. how both benefits and costs are distributed among sub-populations of particular concern). . ."); EPA, GUIDELINES FOR PREPARING ECONOMIC ANALYSIS 139-40 (2000) (calling for analysis of the impact of regulatory costs on employment, profitability, plant closure, competitiveness, and small businesses, as well as "disproportionate" impacts on minorities, low-income populations, children, and any risk to individuals above generally accepted norms).

105. Regulatory Flexibility Act, 5 U.S.C. § 601 (2004).

106. *See* OMB GUIDANCE (2003), *supra* note 75, at 146 ("You should make clear that these terms [value of a statistical life] refer to the measure of willingness to pay for reductions in small risks of premature death. They have no application to an identifiable individual or the very large reductions in individual risks.").

107. *See, e.g.*, Robert M. Solow, Replies to Steven Kelman, *Cost-Benefit Analysis: An Ethical Critique*, *in* ECONOMICS OF THE ENVIRONMENT: SELECTED READINGS 368 (Robert N. Stavins ed., 4th ed. 2000) ("Treatises on the subject make clear that certain ethical or political principles may irreversibly dominate the advantages and disadvantages capturable by cost-benefit analyses.").

faithfully and accurately describing the uncertainties afflicting the analysis, and exploring the distributive impacts and ethical concerns that arise, on occasion, to trump the results of aggregate cost-benefit analysis. One also can imagine rule-specific RIAs that examine the consequences of erring in one direction or another and assign special weight to avoiding large and irreversible harms.[108]

The Main Scorecards, however, pay no attention to such matters, and it is hard to see how they could do so while remaining true to the mechanistic and deterministic methodology that traditionally has both defined them and garnered them wide publicity.

Proponents of scorecards suggest that they might be adapted by "add[ing] a column to Morrall's famous table that specifies important qualitative factors that should also be considered in reaching a decision."[109] The problem with this answer is that the entries in such a column either would have to be quite long and nuanced, in many cases, or else they would fail to shed light on how important these qualitative factors are, why they are important, and on whether, how, and to what degree they alter (or should alter) the decision. Moreover, I suspect that the crafting of each entry in that column inevitably would embroil one in making heuristic judgments that other analysts might contest, thereby undermining the seeming objectivity and determinism for which scorecards are well-known and widely cited.

In short, such a column would either be (1) a meaningless vertical appendix included for appearances' sake, or (2) if given weight and meaning, a series of contestable entries, the crafting of which would propel analysts far down the road toward the approach I favor—careful investigation (or reinvestigation) of the quantitative and qualitative merits of each individual rule.

III. THE ALTERNATIVE TO SCORECARDS: RETROSPECTIVE REVIEWS BASED ON IMPROVED AGENCY ANALYSIS AND EXPLANATION

Proponents of scorecards often claim victory by default. Citing the maxim that "it takes a theory to beat a theory," one scorecardist has alleged that since scorecard critics have not offered an alternative the method therefore stands vindicated, *faux de mieux*.[110]

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108. In fact, Hahn and Sunstein have recently proposed a new executive order that would call on agencies to consider both quantified and unquantifiable costs and benefits as well as uncertainties and distributive impacts. Robert W. Hahn & Cass R. Sunstein, *A New Executive Order for Improving Federal Regulation? Deeper and Wider Cost-Benefit Analysis*, 150 U. PA. L. REV. 1489, 1498 (2002).

109. Hahn, *Response to Critics*, *supra* note 8, at 1030.

110. *Id.* at 1052.

The maxim is witty but wrong. As anyone knowledgeable in the scientific method will appreciate, it does *not* take a theory to beat a theory. All it takes is one well-established fact that contradicts the theory. Moreover, science has never proceeded on the basis that theories are presumed valid until a superior alternative theory is provided. On the contrary, the burden of persuasion in science has always rested, as it should, on the proponent of the theory, who must show that his or her theory explains all the relevant data.

The "theory" at issue in this case, of course, is the claim that a numbers-only approach to multi-rule analysis yields an unbiased and reasonably accurate picture of the cost-benefit rationality of social regulation. I have argued that scorecardists have not carried their burden of proving such methods reliable, and I have offered numerous and significant reasons to deem their methods presumptively unreliable. Under this circumstance, one obvious alternative to unreliable scorecards is simple humility about the state of our knowledge. As scholars have understood since at least the time of Socrates, wisdom sometimes lies in acknowledging that one doesn't know the answer.

Beyond a recommendation of all appropriate humility, this Part outlines three affirmative recommendations for reform. First, I argue that we should replace reductionist, cross-cutting scorecards with case-by-case investigation of leading examples (or allegations) of regulatory failure, whether such failure takes the form of under-regulation, over-regulation, or simply ineffective regulation. Second, agencies need to establish a basis for such programmatic reviews by improving their rule-specific analysis in specific ways that this Part will describe. Third, agencies also should improve the quality and clarity of their explanations of reasons for adopting particular rules.

A. The Case for Retrospective Reviews

If numbers-only scorecards are excessively reductionist, the obvious alternative approach to evaluating regulatory performance is careful case-by-case analysis of the most controversial rules in a manner loosely analogous to FAA investigations of airplane crashes. This alternative approach does not require the abandonment of economic analysis. It simply requires conducting such analysis in accordance with established principles of responsible cost-benefit analysis that scorecardists themselves (in other contexts) have embraced. This requires carefully investigating both the quantitative and qualitative aspects of each regulatory decision, taking into account what is known and not known about the costs and benefits of various options for response, looking retrospectively (where possible) at actual costs and benefits rather than *ex ante* guesses, and giving

full consideration to ethical and moral issues raised along the way. Because it is time- and labor-intensive, this approach should be reserved for the most significant new regulations and for reanalysis of selected past regulations—or failures to regulate—that have been frequently or prominently cited as leading exemplars of regulatory irrationality.[111]

Scorecardists appear to assume that irrational regulation is invariably caused by insufficient efforts to quantify and monetize costs and benefits; hence their focus on requiring ever more elaborate numeric and monetary analysis.[112] But failure to quantify and monetize is not the universal culprit. Regulatory failures often arise from gaps in agencies' jurisdiction or from congressional micromanagement that compels particular actions.[113] The case-study (or accident investigation) approach that I recommend is not only superior as an indicator of *whether* a regulation is excessively or insufficiently zealous, it is the only method that has a chance of revealing *why* the error occurred.

Of course, I am not so optimistic as to assume that my approach will lead different observers, bringing different professional skills or ideological propensities, to arrive at identical conclusions at the end of the in-depth investigations that I prescribe. Indeed, I foresee disagreements. This means that some attention will need to be paid, if my approach is adopted, to finding suitable arrangements for insuring that investigations are conducted by small but professionally and ideologically balanced panels of experts, rather than by single individuals who emerge periodically from behind a green curtain (so to speak) to report their findings.[114]

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111. *See* Parker, *supra* note 23, at 1414-22.

112. *See, e.g.*, Robert W. Hahn & Robert E. Litan, *A Review of the Office of Management and Budget's Draft Guidelines for Conducting Regulatory Analysis*, REG. ANALYSIS 03-6, 2 (2003) ("Recommendation 1: OMB should emphasize that benefit-cost analysis (BCA) is generally preferred to cost-effectiveness analysis (CEA) and encourage agencies to monetize as many costs and benefits as possible."); *see also* HAHN 2000, *supra* note 7, at 36 (rating agencies based on degree to which they monetize benefits).

113. Well-known examples of regulatory gaps include the Food and Drug Administration's notorious lack of statutory jurisdiction to regulate tobacco or dietary supplements and EPA's lack of clear and direct regulatory jurisdiction over emissions of non-point sources of water pollution. Instances of congressional micromanagement likewise abound. For two examples involving rules in Hahn's database, see National Oil and Hazardous Substances Pollution Contingency Plan, 55 Fed. Reg. 8,666 (Mar. 8, 1990) (codified at 40 C.F.R. pt. 300) (implementing a statutory mandate to elect cleanup of waste sites over containment in most cases); Double Hull Standards For Vessels Carrying Oil in Bulk, 57 Fed. Reg. 36,222, 36,222 (Aug. 12, 1992) (codified at 33 C.F.R. pts. 155, 157; 46 C.F.R. pts. 30, 32, 70, 90, 172) (imposing specific requirements for double hulls on vessels carrying oil in bulk).

114. The Negotiated Rulemaking Act of 1996, 5 U.S.C. §§ 561, 563, 565 (2004), outlines a mechanism for convening balanced committees that are roughly analogous, though much larger, than the investigative panels I have in mind. However, given the polarization of American opinion on all sorts of issues, including regulatory policy, I expect that the credibility of regulatory review panels will depend on their being situated outside of the primary agency. More suitable candidates for convening authority might include the Government Accountability Office (formerly General Accounting Office) and the National

The reports of these panels may not (probably will not) end all regulatory controversies. Nonetheless, their analyses (which may include minority opinions) are almost certain to prove far more enlightening in the end, and much more transparent, than the jargon-laden abracadabra of cost-benefit analysis traditionally conceived—a genre that virtually requires the reader to take the word of the analyst and accept conclusions at face value, unless she is prepared to incur the huge transactions costs involved in attempting to peer behind the wizard's curtain of numbers.

That said, even retrospective analysis will not succeed in exposing errors of judgment or rebuilding public trust in government unless and until agencies (EPA, in particular) improve both the quality of their initial regulatory impact analysis of each rule and the quality of their public explanations.

B. Improving Regulatory Impact Assessment

Despite our many disagreements, there is one important conclusion on which I broadly agree with scorecardists and their allies. It is that agency explanations and analyses are often inadequate and almost certainly could be improved.[115] This is an important point because all outside appraisals of agency rationality—be they executive, judicial, legislative, or academic—rest on the foundation laid by these initial agency analyses. Yet the analyses themselves often supply, at best, a through-the-glass-darkly view of agency thinking.

One example, drawn from among many that could have been selected, will illustrate the point. The EPA's Municipal Waste Combustor Rule was promulgated to reduce air emissions of particulate matter: sulfur dioxide, nitrogen oxides, dioxins, and three heavy metals (mercury, cadmium, and lead).[116] The EPA's RIA devotes three full chapters (87 pages) to quantifying compliance costs and the distribution of costs among firms, state and local governments, and households.[117] The RIA devotes one chapter (ten pages) to describing the benefits of the rule, of which four pages are devoted to monetizing the benefits of reducing particulate matter and sulfur dioxide emissions. Six pages are devoted to describing the adverse health consequences of exposure to lead, cadmium, and mercury—without any effort to tie that narrative to a demonstration of risk from the

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Academy of Sciences.

115. *See* HAHN 2000, *supra* note 7, at 34-35 (critiquing the incompleteness of agency RIAs).

116. *See* EPA, OAQPS, Economic Impact Analysis for Proposed Emissions Standards and Guidelines for Municipal Waste Combustors, EPA-450/3-91-029, Ch. 5-7 (Mar. 1994) (unpublished manuscript on file with the author) [hereinafter Municipal Waste Combustor RIA].

117. *See id.*

quantities of these compounds that issue from municipal waste combustors, or to place municipal waste combustor emissions in the perspective of total nationwide emissions of, or population exposure to, these toxins.[118]

As a result, nowhere in EPA's preambular explanation or in its 171-page Economic Impact Analysis does EPA actually address the fundamental questions that confronted risk managers in that rule: (1) Are current levels of emissions of heavy metals and dioxin from municipal waste combustors creating a significant human health or ecosystem risk?, (2) What portion of total emissions, and associated risk, is accounted for by air emissions of dioxins and heavy metals from municipal hazardous waste combustors, and how significant an improvement will the proposed rule yield?, and (3) If the evidence of significant and direct risk from these sources is inconclusive, is the potential harm from municipal waste combustor emissions great enough—due to the persistence and capability for bio-accumulation of the toxins involved—to warrant strict regulation nonetheless?

The agency observes: "The absence of sufficient exposure-response and valuation information precludes a comprehensive benefits analysis for many of the [multiple waste combustors] pollutants."[119] This being the case, it certainly is unfair to expect the agency to comprehensively quantify and monetize the benefit of reducing combustor emissions of dioxin and heavy metals by 99 percent and 70 to 80 percent, respectively. But surely courts, policymakers, and the public are entitled to some explanation of why it is that agency risk managers deem emissions of dioxin and heavy metals from municipal waste combustors a sufficient risk to warrant a very considerable expenditure of public and private funds. Surely that explanation should go beyond a general description of the toxicity of these substances followed by the observation that "[t]he total benefits would be higher if benefits from reductions of other pollutants were valuated [sic]."[120]

From the deficiency of the agency analysis in this case, I do not draw the inference that Hahn draws, that EPA's municipal waste combustor rule is a seven billion dollar example of regulatory overkill.[121] Nor do I conclude that it is a regulatory success story. I simply conclude that the analysis should have been better.

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118. *See id.* at 8-1 to 8-10.
119. Emissions Guidelines Municipal Waste Combustors Proposed Rule, *supra* note 74, at 48,239.
120. *Id.*
121. *See* Parker, *supra* note 23, at 1467 app. C, row 32.

In fact, the municipal waste combustor rule supplies one of many examples that might be adduced of what I will call the "all-or-nothing syndrome" in agency regulatory impact assessment.[122] This syndrome manifests itself when the agency arrives at the point that the agency must decide whether to try to quantify and monetize a benefit. If the decision is made to quantify and/or monetize—because the data are available or the agency deems the magnitude of the rule worth the resources required to assemble the data—then the agency (more precisely, its contractor) will go to great lengths and spare no expense in the effort, yielding an analysis that is often impressively detailed and rigorous.[123] If, on the other hand, the agency decides that full quantification and monetization is either impossible or not cost-effective in that case, then the agency tends to dismiss the whole issue with a placeholder of the kind quoted above. In analytical terms, all or (almost) nothing.

Agencies must do better if they hope for public acceptance of their regulatory program. The American public will not accept large costs from regulation if they do not understand or appreciate the benefits.

What is to be done? Hahn takes the view that the road to improvement lies in requiring greater quantification and monetization (indeed, he rates agencies according to the frequency with which they monetize costs and benefits).[124] I obviously do not share that view. But I do concede that agency analysis needs to be improved, particularly in its treatment of noncancer health and ecosystem benefits.

In my view, the way forward lies in the search for a middle way between all or nothing analytically: between insistence on complete quantification and/or monetization (disregarding everything not quantified) at one extreme and renouncing all effort at even first-order approximation at the

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122. *Compare* Administrative Procedure Act, 5 U.S.C. § 553(c) (2000); *see, e.g.*, National Ambient Air Quality Standards for Ozone, 62 Fed. Reg. 38,856 (July 18, 1997) (codified at 40 C.F.R. pt. 50) (undertaking elaborate and extensive risk assessment of zone health impacts), *with* NSPS Municipal Waste Combustors Proposed Rule, *supra* note 76, at 48,198 (stating only that the rule complies with a consent decree and is based on the Administrator's determination that emissions from municipal waste combustors cause or contribute significantly to pollution that may reasonably be anticipated to endanger public health or welfare).

123. The combustor rule is not a great example of agency zeal in tracking down and monetizing benefits since the agency merely estimated incremental reductions in emissions of sulfur oxides and particulate matter and then applied a standard per-ton formula for monetizing those benefits. (The effort had been expended previously.) For a clearer example, see EPA, National Ambient Air Quality Standard for Particulate Matter: Proposed Decision, 61 Fed. Reg. 65,638 (Dec. 13, 1996), which presents a very detailed, sophisticated, and high estimate of health and welfare benefits of reducing particulate matter National Ambient Air Quality Standard (NAAQS) standard.

124. *See, e.g.*, HAHN 2000, *supra* note 7, at 36 tbl. 3-1.

other. This middle path lies in encouraging and helping agencies find new ways to capture and explain heuristically the general significance (if not the precise magnitude) of hitherto unquantified risks and regulatory benefits, and the consequences of erring through over- or under-regulation.

This need not require additional time and resources, only more careful thought about how best to utilize existing resources. Surely some of the money and effort spent trying to quantify costs and cancer benefits to three significant digits would be better spent if redirected to the task of forming a grounded judgment of the ordinal significance of benefits that cannot be quantified.

The approach just outlined, I recognize, is not a specific "solution" so much as a general direction for constructive change. Nonetheless, I believe it is a useful direction—and a useful alternative to the all-or-nothing tendency in agency analysis and the all-or-nothing debate over cost-benefit analysis that currently divides the scholarly community.

While the foregoing recommendation seeks to improve agency analysis, it is also vitally important, for reasons seen in more detail below, for agencies not only to deepen their analysis, but to tighten and clarify their explanations.

C. Clarifying Agency Explanations

Anyone who has picked up the *Federal Register* and waded through a preambular explanation and a final rule will have encountered a familiar phenomenon: five or six pages of rule, preceded by fifty or more *Federal Register* pages setting forth detailed agency explanations and/or responses to the most technical and arcane comments, and nowhere in sight any sign of the one thing the Administrative Procedure Act (APA) and common sense require—a clear, concise, coherent explanation of why the agency chose to adopt that particular rule.

Take, for example, the EPA's promulgation of its controversial revision of the National Primary Drinking Standards for Arsenic.[125] Table 1 provides a brief overview of the contents of the preamble and final rule published in the *Federal Register* on January 22, 2001. It is typical of the EPA's approach to rule explanation.

125. *See* EPA, National Primary Drinking Water Regulations, Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring, 66 Fed. Reg. 6976 (Jan. 22, 2001) (to be codified at 40 C.F.R. pts. 9, 141, 142).

Table 1
Contents of EPA Notice of Final Rule on
National Primary Drinking Standards for Arsenic

Item	Length
Summary of what rule does	2 para.
Effective Dates	2 para.
List of Abbreviations	1 page
Table of Contents	2 pages
Procedural Background and Summary of Final Rule	15 pages
Statement of Statutory Authority	1 page
Rationales for Regulatory Decisions	29 pages
Response to Major Comments	23 pages
Administrative and Other Requirements	8 pages
Text of Rule	6 pages

Needless to say, an explanation of "rationales" that occupies 29 *Federal Register* pages (or 52 such pages if one includes responses to comments) hardly qualifies as the "concise and general" explanation for which the APA calls. Moreover, as far as this writer is able to discern, EPA's sole concession to President Clinton's "Plain English" directive was to present its lengthy, jargon-laden explanation of the rule in a question and answer format.[126] One will search that notice in vain for anything resembling a concise, readable explanation of why EPA chose the particular maximum concentration limit (MCL) for arsenic (10 micrograms/liter) that it adopted.

Equally impossible to find in the final notice is any single place where the *major* objections that would come back to haunt the rulemaking in later months—and which were already vociferously sounding in the administrative process—are collected, reported, and cogently and persuasively addressed.[127]

126. *Compare* William J. Clinton, Plain Language in Government Writing: Memorandum to the Heads of Executive Departments and Agencies, 63 Fed. Reg. 31,885 (June 1, 1998), *with* EPA, National Primary Drinking Water Regulations, Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring, 66 Fed. Reg. at 7052 (explaining that the agency implemented the Plain Language directive mainly by organizing explanations in question and answer format).

127. A clear early warning sign of trouble was seen, or might have been seen, in the fact that the Clinton EPA's RIA found only $35 to $190 million in quantifiable benefits (depending on one's assumptions about discount rate, latency period and value of cancer averted) versus a predicted $170 to $200 million in costs. A disproportionate share of these costs would be passed on to relatively poor, rural users of small water systems. *See* EPA, National Primary Drinking Water Regulations, Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring, 66 Fed. Reg. at 7010, 7016. The EPA also pointed out, deep in the bowels of its 50-page explanation, that only bladder and lung cancer benefits were quantified, that other health benefits of arsenic exposure reduction were expected, and that the technologies used to control arsenic would also filter out other

The result was entirely predictable: Opposing interests, and denizens of opposing ideological camps, took their own meaning out of the turgid mass of text that made up the EPA explanation, supplied the gaps in that explanation with their own interpretations, and went to war.[128] Alas, arsenic is not an isolated example.

What is going on? It would appear that, goaded by judicial appeals and court decisions, agencies have developed the tradition of offering extremely long explanations densely packed with technical detail and responsive to a host of comments but targeted only at an insider audience. The implicit assumption behind current practice seems to be that if the APA requires "a concise general statement" of a rule's basis, then an extremely detailed, lengthy, and arcane explanation is so much the better.[129]

I respectfully disagree. Democratic accountability is defeated when agency explanations are so long, diffuse, and technical that no one but insiders can fathom them.

Agencies traditionally have written explanations in language which implicitly assume that the only audience that matters is rule participants, litigants, and reviewing courts. What has changed in recent years is that the relevant audience has widened. With the advent of congressional review and the politicization of administrative law generally, the relevant audience for the explanation of complex agency decisions now includes Congress, the media, the scholarly community (including both academics and think tanks), and the public. In a very real sense, agencies are now "on trial," in the court of public opinion, with every rule they issue. Yet their explanations to date show little or no awareness that times have changed as has their relevant audience.

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harmful pollutants. Unfortunately, the EPA did not see fit to specify what those pollutants were or how much they would be reduced, nor did it offer any clear judgment as to the significance of the ancillary benefits expected from reducing arsenic exposure. The discussion of unquantified benefits was vague: suggesting significance but not documenting it, even to the extent of naming the other pollutants that would be filtered out. *See id.* at 7012. What was not vague was the EPA's prediction that the rule would cost (largely rural) users of very small water systems over $300 per year. *See id.* at 7011.

128. *See* Cass R. Sunstein, *The Arithmetic of Arsenic*, 90 GEO. L.J. 225 (2002); Thomas O. McGarity, *Professor Sunstein's Fuzzy Math*, 90 GEO. L.J. 2341 (2002); Floyd Frost, *Poisonous Decision, A Low Arsenic Standard Carries a High Cost*, WASH. POST, Sept. 16, 2001, at B5; Editorial, *Don't Mix Politics with Arsenic*, DETROIT NEWS, May 1, 2001, at A6 (praising President Bush's stance on the EPA rule); Dennis Byrne, Commentary, *Hiding the Real Pictures; Two Web Sites Expose Facts Advocates Won't Tell You*, CHI. TRIB., Apr. 30, 2001, at 15 (contemplating the cost of regulations and society's gain from these costs); Ian Murray, *Needless Worry About Arsenic in Our Water*, Mar. 29, 2001, THE RECORD (Bergen County, NJ), *available at* http://www.stats.org/record (giving information about the costs of implementing the EPA's regulations); Jason K. Burnett & Robert W. Hahn, *EPA's Arsenic Rule: The Benefits of the Standard Do Not Justify the Costs*, AEI-Brookings Joint Ctr. for Reg. Analysis, REG. ANALYSIS 01-021 (2001).

129. 5 U.S.C. § 553(c) (2000).

Overworked journalists, OMB economists, and Hill staff are not going to slog through forty to fifty *Federal Register*-length pages of technical jargon *for each major rule* in an effort to tease out the agency rationale for its action. And if the agency's explanation gives no clear basis for its judgment that unquantified risks and regulatory benefits are significant, then it should come as little surprise to agencies when entrenched regulatory skeptics assume such benefits are insignificant and zero them out—even though doing so is methodologically wrong.

The end result of continuing the old tradition of legal explanation to a new, larger, politically polarized but technically uninformed audience is an all too predictable cycle of special interest spinning, he-says-she-says journalism, public confusion, and political polarization.

To this problem one remedy, at least, seems as simple and obvious as it is contrary to current practice: While agencies should continue to offer however long an explanation they please (or feel they must to preserve their options on appeal), they also should furnish the clear and concise statement that the APA requires as to why the agency decided to adopt the rule that it adopted. This concise statement, written in plain English, should include an explanation of why the agency concluded that the problem addressed in that rule is significant, the alternative responses the agency considered, and why the agency chose the alternative that it adopted. The statement also should include, in cases in which cost is a legally relevant variable, a concise explanation of both the relevant uncertainties in the data and the reasons the agency concluded that the quantified and unquantified benefits of the rule are "worth" the quantified and unquantified costs.

To speak clearly is to think clearly. While the changes I have just recommended are not panaceas—disagreements at some level will never go away—it is hard for this observer to imagine any changes that are more straightforward or more likely to improve both agency decisions and public acceptance of them than the two simple changes outlined above.

CONCLUSION

No serious scholar believes that health, safety, and environmental regulation has been, on balance, a bad deal for the American public. On the contrary, even its critics concede that social regulation, overall, has yielded far more benefits—even within their accounting system—than costs.[130] The majority of these numerically measured benefits derive from a relative handful of very large rules, however, and certain scholars have

130. *See, e.g.*, OMB GUIDANCE (2003), *supra* note 78, at 9 (charting out "annual benefits and costs of major federal rules"); HAHN 2000, *supra* note 7, at 38 (finding that large positive net benefits stem from major regulations overall).

raised serious concerns about whether many other rules, large and small, cost more than they are worth. Numerical scorecards have been created, and gained influence, as a way of addressing that question. They have answered that question emphatically in the negative and, in so doing, have helped launch and propel an antiregulatory backlash that is now in full flower and that seeks both to curb the advance of health, safety, and environmental regulation in most (though not all) areas and to roll it back in others.

For the reasons discussed above, I continue to believe that regulatory decisions cannot be reduced to numbers alone, and that numbers-only regulatory scorecards are not a valid way to measure the rationality of regulation. There is an alternative, and better, way to address the valid concern that preoccupies critics of regulation. It begins with improving agencies' primary analysis and their presentation of that analysis in the ways described above. It continues by recommending the occasional convening—in the case of highly controversial regulations, attempts to deregulate, or failures to regulate—of small yet ideologically diverse advisory panels to investigate the facts and agency's analyses with the goal of crafting a consensus view (or at least a clearly articulated set of views) as to the justification, or lack thereof, for the agency decision. Gradually, case-by-case, an empirically grounded picture of regulation will emerge and, with it, a clearer understanding of the causes of validly demonstrated failures, and the remedy.

Will this alternative work? There is no clear reason why it shouldn't. It is, after all, simply a variant of the old-fashioned case study method, a method which has been employed with positive results since roughly the time of Aristotle in a wide variety of fields, including regulatory reform.[131] The only things that my alternative adds to this time-honored tradition are a proposal that the case studies be linked to prominent claims of regulatory failure (the better to clear the poisoned air that now envelops regulation) and that investigations be undertaken by "balanced" panels of investigators (reflecting my judgment that the climate of opinion, sadly, is now so polarized that liberals and conservatives often will not trust a case study unless it is done, at least in part, by one of "theirs").

131. *See, e.g.*, Nat'l Acad. of Pub. Admin., Ctr. for the Econ. and the Environ., Learning from Innovations in Environmental Protection: Commissioned Research Papers, http://www.napawash.org/pc_economy_environment/learning_texts.html (last visited May 5, 2006).

Granted, the inductive path is arduous and expensive, but the stakes are measured in billions of dollars and thousands of lives. Given the extreme complexity of most regulatory decisions—particularly in the realm of health, safety, and the environment—it may well be the only viable alternative.