

THE HUMBUGS OF THE ANTI-REGULATORY MOVEMENT†

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It is so hard to get beyond cynicism these days. Even a symposium devoted to this goal has, as reflected in the articles by Professors Cynthia Farina, Jeffrey Rachlinski, and Mark Seidenfeld, succeeded primarily in suggesting that regulators are not so much selfish as they are obtuse, stubborn, and sometimes downright dumb. Undoubtedly this is true some of the time. But Farina, Rachlinski, and Seidenfeld want to convince us that it is true enough of the time to warrant quite large-scale solutions. In this Comment, we take issue with this pessimistic assessment of regulatory behavior by discrediting the most prominent empirical demonstrations of this gloomy account.

These empirical studies have focused in particular on environmental regulation. Critics of environmental regulation frequently invoke a body of research purporting to show that such regulation costs too much and achieves too little, and that either the same benefit could be achieved at a far lower cost or that a much higher benefit could be achieved at the same cost. This body of research consists of three basic kinds of studies: first, some studies have concluded that current regulatory strategies cost a huge amount of money for every life they save; second, some studies have used the findings of the first set of studies in order to demonstrate how a reordering of our regulatory priorities could save either many lives or a lot of money; and finally, several studies have purported to find that above a certain level of regulatory expenditures, lives will be lost due to the expenditures alone.

The numbers served up by these studies cannot help but perplex and disturb you, even if (maybe especially if) you are in favor of protecting human health and the environment. We spend, we are told, \$72 billion to save a single person from dying from exposure to formaldehyde.¹ We spend \$99 billion to reduce chloroform exposures

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¹ John F. Morrall III, *A Review of the Record*, REGULATION, Nov./Dec. 1986, at 25, 30 tbl.4.

enough to save a single year of one person's life.² We could save 60,000 more lives every year if we regulated more intelligently.³ The Environmental Protection Agency's (EPA) proposed standards for soot and smog will kill 27,000 people every year because they cost so much money.⁴

If these numbers are right, then the current system is not only expensive; it is deadly. Thus, it is no wonder that critics of regulation have fixated on the kinds of figures cited above—figures used to show that the current system is wildly cost-ineffective and that we could easily find better ways to spend our life-saving money. Statistics like these are widely circulated and widely accepted in the academic and popular literature on risk regulation. They have also become ubiquitous in political debates on environmental law. Scarcely a congressional hearing on this subject occurs in which these kinds of figures do not figure prominently.

In this Comment, we aim to show that, for all their wide circulation and widespread acceptance, these studies deserve no credence. They are based on studies of the costs of a wide range of hypothetical regulations, most of which were never implemented, studies undertaken under the assumptions that the only benefits of regulation are the most easily studied reduced risks of death and that even these benefits can essentially be ignored at present because they are assumed to occur so far in the future.

It is not hard to discover who started the myths of absurdly expensive regulations. Follow the footnotes back to the original sources, and again and again they lead to the same few, repeatedly cited studies, by John Morrall, John Graham, Tammy Tengs, Ralph Keeney, W. Kip Viscusi, and Randall Lutter. The tales of "killer regulations" are based on just a handful of authors, and on an even smaller handful of hard facts.

² JOHN D. GRAHAM, *COMPARING OPPORTUNITIES TO REDUCE HEALTH RISKS: TOXIN CONTROL, MEDICINE AND INJURY PREVENTION 2* (Nat'l Ctr. for Policy Analysis, Policy Report No. 192, 1995), available at <http://www.ncpa.org/studies/s192/s192.html>.

³ *Regulatory Improvement Act of 1999: Hearing on S. 746 Before the Senate Comm. on Governmental Affairs*, 106th Cong. 34 (1999) [hereinafter *Regulatory Improvement Act of 1999 Hearing*] (testimony of John D. Graham, Ph.D., Director, Center for Risk Analysis, Harvard School of Public Health).

⁴ Brief for Respondents Appalachian Power Co. et al. in Support of Petitioners at 18, *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457 (2001) (No. 99-1426) (citing RALPH L. KEENEY & KENNETH GREEN, *ESTIMATING FATALITIES INDUCED BY ECONOMIC IMPACTS OF EPA'S PROPOSED OZONE AND PARTICULATE STANDARDS 13* (Reason Pub. Policy Inst., Policy Study 225, 1997), available at <http://www.rppi.org/environment/ps225.html>), available at 2000 WL 1299500.

I

REGULATORY COSTS OF MYTHIC PROPORTIONS

One does not have to read very far into the literature on risk regulation before running across huge tables listing the costs per life saved of various federal regulations. The numbers in such tables are fantastic: according to these lists, we are often spending hundreds of millions, and sometimes billions, of dollars for every single human life we save through regulation. Numbers like these have contributed to the fashionable idea that more attention to such numbers will promote greater objectivity in risk regulation. The trouble is that the numbers themselves are not objective.

The most famous of the studies on costs per life saved is one published in 1986 by John Morrall, a long-time economist at the Office of Management and Budget.⁵ A table in this study, reproduced in part as Table 1, purports to show the cost per life saved of various risk-reducing federal regulations.⁶ According to the table, this cost varies dramatically from regulation to regulation, from a low of \$100,000 per life saved to a high of \$72 billion.⁷ One-third of the regulations on the original list reportedly cost over \$100 million for every life they save.⁸ Not surprisingly, these stunning numbers have been used to demonstrate that current regulatory costs are not only chaotically variable but also unacceptably high.

As the table shows, the regulations that fare best in Morrall's analysis—that is, the ones that cost the least per human life saved—are safety regulations designed to prevent deaths from accidents.⁹ These include rules relating to such things as fire extinguishers on airplanes and safety devices for space heaters.¹⁰ The regulations that fare worst—indeed, all of the regulations in the costly right-hand side of Table 1—are regulations designed to limit exposures to hazardous substances, such as arsenic, asbestos, benzene, and formaldehyde.¹¹

A second, now almost equally famous, study on life-saving costs essentially replicated John Morrall's results. In research supervised by John D. Graham—the former director of Harvard's Center for Risk Analysis and President George W. Bush's nominee to be the White House's "regulatory czar"—graduate student Tammy O. Tengs and several co-authors analyzed the costs of 587 life-saving interventions.¹²

⁵ See Morrall, *supra* note 1.

⁶ See *id.* at 30 tbl.4.

⁷ See *id.*

⁸ See *id.*

⁹ See *id.*

¹⁰ See *id.*

¹¹ See *id.*

¹² Tammy O. Tengs et al., *Five-Hundred Life-Saving Interventions and Their Cost-Effectiveness*, 15 RISK ANALYSIS 369 (1995).

TABLE I
THE COST OF VARIOUS RISK-REDUCING REGULATIONS
PER LIFE SAVED

Regulation (Agency)	Costs per Life Saved (\$1000s)	Regulation (Agency)	Costs per Life Saved (\$1000s)
Steering Column Protection (NHTSA)	100	Arsenic/Glass Plant (EPA)	19,200
Unvented Space Heaters (CPSC)	100	Ethylene Oxide (OSHA)	25,600
Cabin Fire Protection (FAA)	200	Uranium Mill Tailings/Inactive (EPA)	27,600
Passive Restraints/Belts (NHTSA)	300	Coke Ovens (OSHA)	61,800
Trihalomethanes (EPA)	300	Asbestos (EPA)	104,200
Servicing Wheel Rims (OSHA)	500	Arsenic/Glass Manufacturing (EPA)	142,000
Floor Emergency Lighting (FAA)	700	Radionuclides/DOE Facilities (EPA)	210,000
Crane Suspended Personnel Platform (OSHA)	900	Acrylonitrile (OSHA)	308,000
Side Doors (NHTSA)	1300	Benzene/Ethylbenzenol Styrene (EPA)	483,000
Hazard Communication (OSHA)	1800	Arsenic/Low-Arsenic Copper (EPA)	764,000
Grain Dust (OSHA)	2800	Benzene/Maleic Anhydride (EPA)	820,000
Benzene/Fugitive Emissions (EPA)	2800	Land Disposal (EPA)	3,500,000
Radionuclides/Uranium Mines (EPA)	6900	EDB (OSHA)	15,600,000
Asbestos (OSHA)	7400	Formaldehyde (OSHA)	72,000,000

Source: John F. Morrall III, *A Review of the Record*, REGULATION, Nov./Dec. 1986, at 25, 30 tbl.4

(For brevity, we will refer only to the lead and senior authors, Tengs and Graham.) The interventions examined by Tengs and Graham fell into three broad categories: fatal injury reduction, toxin control, and medicine.¹³ Fatal injury reduction encompassed measures like airplane safety, automobile safety, and fire prevention.¹⁴ Toxin control included measures to control arsenic, asbestos, benzene, and other hazardous substances.¹⁵ The medical category included a wide variety of preventive and curative measures ranging from childhood vaccines to advice about quitting smoking.¹⁶

Like John Morrall before them, Tengs and Graham found that cost-effectiveness ranged widely across interventions and that costs per

¹³ See *id.* at 370.

¹⁴ See *id.* app. A, at 373-75.

¹⁵ See *id.* app. A, at 375-78.

¹⁶ See *id.* app. A, at 378-84.

life-year saved often reached very high levels.¹⁷ They also found, just as Morrall did, that controlling toxins was generally the most expensive way to save human lives.¹⁸ They found that the costs of toxin control ranged from less than or equal to zero (meaning that the interventions saved more money than they cost) to an incredible \$99 billion for every *life-year* saved.¹⁹ Tengs and Graham's estimates of costs have, like Morrall's estimates, figured prominently in critiques of environmental law. Table 2 reproduces one portion of Tengs and Graham's table, reporting the costs of controlling pollution at paper mills.

TABLE 2
THE COSTS PER LIFE-YEAR SAVED OF POLLUTION CONTROL
AT PAPER MILLS

Intervention	Cost/Life-Year (\$)
Chloroform emission standard at 17 low cost pulp mills	≤ 0
Chloroform private well emission standard at 7 papergrade sulfite mills	25,000
Chloroform private well emission standard at 7 pulp mills	620,000
Chloroform reduction by replacing hypochlorite with chlorine dioxide at 1 mill	990,000
Dioxin emission standard of 5 lbs/air dried ton at pulp mills	4,500,000
Dioxin emission standard of 3 (vs. 5) lbs/air dried ton at pulp mills	7,500,000
Chloroform emission standard of 0.001 (vs. 0.01) risk level at pulp mills	7,700,000
Chloroform reduction by replace [sic] hypochlorite with chlorine dioxide at 70 mills	8,700,000
Chloroform reduction at 70 (vs. 33 worst) pulp and paper mills	15,000,000
Chloroform reduction at 33 worst pulp and paper mills	57,000,000
Chloroform private well emission standard at 48 pulp mills	99,000,000,000

Source: Tammy O. Tengs et al., *Five-Hundred Life-Saving Interventions and Their Cost-Effectiveness*, 15 RISK ANALYSIS 369, app. A, at 377 (1995)

There are three major problems with these studies on regulatory costs:

- they are full of regulations that were never adopted, in some cases never even proposed;
- they ignore risks and benefits other than human deaths, and rely on shoddy and incomplete assessments of risks in general; and

¹⁷ See *id.* app. A.

¹⁸ See *id.* at 371.

¹⁹ See *id.* app. A, at 375-78.

- they play a statistical trick with future cancer deaths that devalues the lives of the elderly, and is dismissive of long-term risks to everyone.

Far from offering an objective basis for reforming our regulatory system, these studies simply, and quite invisibly, translate political objections to environmental regulation into numerical form.

A. Regulations That Aren't

The first big problem with these studies is that they include many life-saving interventions that have never been implemented by any agency; indeed, they include many interventions that have never even been *proposed* by any agency. Yet those regulations that never happened have been treated as reflections of the way the current regulatory system operates.

For example, fully half of the regulations on John Morrall's list costing more than \$5 million per life saved were never implemented by any regulatory agency. Many of them were rejected for the very reason that their benefits were not deemed to justify their costs. The rules regarding benzene provide a case in point.

In 1980, EPA proposed new rules for benzene emissions under the Clean Air Act.²⁰ Four years later, while President Reagan was in office, EPA withdrew the proposed standards²¹ in a rulemaking proceeding cited in three different places in Morrall's original table (and reflected in the standards shown in Table 1 that cost \$483 million and \$820 million per life saved). In withdrawing the proposed standards, EPA asserted that "both the benzene health risks (annual leukemia incidence and individual lifetime risk from high exposure) to the public from these source categories and the potential reductions in health risks achievable with available control techniques are too small to warrant Federal regulatory action under . . . the Clean Air Act."²² The agency emphasized that, since the time that the standards had been proposed, the benzene emissions in question had been reduced by a larger amount than could be achieved by new control measures.²³ As

²⁰ See Benzene Emissions from Benzene Storage Vessels; National Emission Standard for Hazardous Air Pollutants, 45 Fed. Reg. 83,952 (proposed Dec. 19, 1980); National Emissions Standards for Hazardous Air Pollutants; Benzene Emissions from Ethylbenzene/Styrene Plants, 45 Fed. Reg. 83,448 (proposed Dec. 18, 1980); National Emission Standard for Hazardous Air Pollutants; Benzene Emissions from Maleic Anhydride Plants, 45 Fed. Reg. 26,660 (proposed Apr. 18, 1980).

²¹ National Emission Standards for Hazardous Air Pollutants; Benzene Emissions from Maleic Anhydride Plants, Ethylbenzene/Styrene Plants, and Benzene Storage Vessels, 49 Fed. Reg. 23,558 (proposed June 6, 1983).

²² *Id.* at 23,558.

²³ See *id.* at 23,562.

a result, the remaining risks from these facilities were lower than EPA had originally estimated.²⁴

The agency analyzed several possibilities for regulating these remaining risks, concluded that they were all too expensive for the modest benefits they provided, and therefore declined to make any new proposals to replace the withdrawn standards.²⁵ The benzene standards cited by Morrall are precisely the ones for the remaining risks that EPA analyzed and rejected as too expensive.

Given this history, the inclusion of EPA's 1984 decisions on Morrall's list is puzzling. Regulations having the risk and cost profiles cited by Morrall were never even proposed. The risk estimates cited by Morrall were reported by EPA as a reason to reject further regulation of benzene.

Thus, no one ever spent the \$483 million or \$820 million per life saved that is reported in Table 1, and no government agency ever proposed spending these amounts. Moreover, these regulations were withdrawn because EPA concluded that the risks they would have regulated were too small to warrant regulatory action. At least according to critics of regulation, these non-regulations deserve a place of honor on any table documenting agency performance. Instead, they are among the ten most expensive regulations at the very bottom of Morrall's list. To be sure, in his original table, Morrall noted that these rules had been rejected.²⁶ But this is a subtlety that subsequent uses of the table have largely missed.

The gulf between reported costs and actual programs is even greater in Tengs and Graham's study. Unlike Morrall, Tengs and Graham do not limit themselves to discussing measures, or potential measures, under existing regulatory programs. Their only criterion for the inclusion of a life-saving intervention on their list was the availability of quantitative estimates of the costs and benefits of the intervention.²⁷ As they acknowledge, their analysis did not include information on the extent to which any given intervention was actually implemented.²⁸ The result is, predictably, the same as with Morrall. Although nine of the ten most expensive life-saving interventions in the Tengs and Graham study involved toxin control, not one of these nine interventions was ever implemented by a regulatory agency. Similarly, not one of the Tengs and Graham paper-mill interventions listed in Table 2 was ever even proposed by a regulatory agency.

²⁴ See *id.*

²⁵ See *id.*

²⁶ Morrall, *supra* note 1, at 30 tbl.4.

²⁷ See Tengs et al., *supra* note 12, at 369-70.

²⁸ See *id.* at 372.

Thus the studies by Morrall, and by Tengs and Graham, demonstrate conclusively that it is possible to describe a collection of non-regulations that would have been expensive, had they ever been adopted. To interpret this "analysis" as describing the real-world performance of any actual regulatory agency is both misdirected and deeply misleading. Despite the (subtle) concessions of the researchers that their cost estimates include measures that were not implemented, it is easy enough to take away from these studies the impression that they describe the systematic workings, and failures, of current regulation. John Graham himself has drawn this erroneous lesson from his own research;²⁹ imagine how confused his readers must be.

B. Regulations That Aren't About Death

A second important problem with reports like Morrall's and Tengs and Graham's is that they imply that the only important benefit of health and environmental protection is to prevent human deaths. Thus the reports ignore many significant benefits of environmental programs.³⁰ Most obviously, their fixation on human lives saved ignores nonfatal harms to human health as well as harms to ecosystems, two categories of harm that often lie at the core of environmentally protective programs. It also ignores damages to widely shared values, such as autonomy, community, and equity, that are peculiarly affected by the kinds of risks posed by toxic substances.

Many health and environmental programs may not be aimed at preventing cancer and yet may have as a happy by-product the prevention of a handful of cases of cancer. Consider the case of formaldehyde regulation, which at \$72 billion per life saved, is the most expensive item on Morrall's list (see Table 1). When the Occupational Safety and Health Administration (OSHA) decided to regulate formaldehyde, it did so because of the huge number of cases of painful and irritating, but nonfatal, skin conditions that would be avoided by limiting workers' exposure to the chemical. Incidentally, formaldehyde regulation also prevents a few cases of nasal cancer. To get to Morrall's \$72 billion number, just ignore all the real reasons for formaldehyde regulation, and imagine that someone was foolish enough to propose it solely as a way of reducing deaths from cancer. Sure enough, it is an inefficient way of reducing cancer deaths. Workplace regulation of formaldehyde is not a bad answer, but it does happen to be an answer to a different question.

²⁹ See GRAHAM, *supra* note 2.

³⁰ Tengs and Graham themselves acknowledge this fact. See Tengs et al., *supra* note 12, at 372.

The risk assessments that underlie the figures on regulatory costs are not only incomplete, focusing only on avoided human deaths, they are also questionable on their own terms. Morrall frequently saw fit to adjust the risk estimates of agencies like EPA and OSHA, despite the agencies' expertise in this area and his own lack of it. In all cases in which he adjusted the agencies' estimates of risk, he lowered those estimates rather than raised them.³¹ These adjustments amounted to claiming that the same number of dollars saved fewer lives, thus inflating Morrall's estimates of costs per life saved—sometimes quite substantially.³²

For their part, Tengs and Graham (neither of whom is a scientist) did not undertake their own scientific assessments of risk. Instead, they adopted the risk estimates of the analysts upon whose work they relied for the costs and benefits of various life-saving interventions. This approach, however, created problems of its own. In numerous cases, Tengs and Graham examined the same life-saving measure more than once, but from the perspective of different analysts with incompatible views. For example, they report two estimates of the cost per life-year saved of a ban on urea-formaldehyde foam insulation in homes; one estimate puts the cost at \$11,000 per life-year saved, and another at \$220,000 per life-year saved.³³ Tengs and Graham also offer two estimates of the costs of controlling arsenic emissions at glass plants: one estimate is \$2.3 million per life-year saved, the other is \$51 million per life-year saved.³⁴ The researchers provide no guidance as to how one might choose between these strikingly different perspectives on the cost-effectiveness of the very same life-saving measures. They also do not face up to the strange consequence of their duplication of life-saving measures: one might conclude that we could save a large amount of money in arsenic control simply by adopting the views of the \$2 million analyst rather than the \$51 million analyst!

C. Deaths That Aren't About to Happen

The final problem with these studies involves their treatment of policies that are designed to avoid deaths or other harms in the future. This is particularly important in evaluating regulation of toxins. Often the only quantified benefit of toxic substance control is the prevention of cancer. Because cancer has a long latency period, today's

³¹ See Morrall, *supra* note 1, at 28–29.

³² See Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 YALE L.J. 1981, 2025–38 (1998), reprinted in 30 LAND USE & ENV'T L. REV. 227 (1999) (selected as one of the best environmental law articles of 1998).

³³ Tengs et al., *supra* note 12, app. A, at 377.

³⁴ *Id.* app. A, at 375. Tengs and Graham's study refers to regulation of arsenic emissions at "glass plants" and "glass manufacturing plants"; these are one and the same in EPA's regulations. See Heinzerling, *supra* note 32, at 2013.

new regulation may have benefits in avoiding cancer deaths some decades from now. Morrall, and Tengs and Graham, discount those future deaths, treating them as less significant than deaths today.³⁵ This statistical maneuver devalues the life-saving benefits of measures that prevent cancer, and creates moral dilemmas by implying that some people's lives are more valuable than others.

Discounting is a procedure developed by economists, originally used to evaluate investments that produce future income. A dollar ten years from now is worth less than a dollar today, even in the absence of inflation. So it makes sense to "discount" a dollar you will receive ten years from now, treating it as worth somewhat less than a dollar today. However, the indiscriminate extension of discounting techniques to health and environmental benefits causes numerous difficulties, and encourages dismissal of serious future events.³⁶ The two "costs per life saved" studies we have been discussing implement discounting in different ways, both of them problematic and internally contradictory.

We begin with Morrall's methodology. As noted, his table focuses on costs per life saved, and virtually all of the lives saved by environmental regulations on his list reflect cancer cases avoided. His practice is to discount the number of lives saved to reflect the latency period of cancer, which typically ranges from ten to forty years depending on the type of cancer.³⁷ Thus, even if a regulation issued today begins to reduce exposures to a carcinogen today, and hence begins to reduce the risk of cancer today, Morrall would not "credit" this regulation with saving any lives until the latency period for the cancer caused by this substance had passed.

For example, whereas the OSHA rule limiting arsenic exposures in the workplace would prevent an estimated 11.7 *future* cancer cases per year, Morrall's discounting converted this estimate to approximately 0.35 *current* cases prevented per year.³⁸ Discounting along these lines, applied throughout his table, systematically downgrades the importance of actions taken to prevent long-latency diseases and long-term ecological harm. Yet these long-term aspirations are among

³⁵ See Morrall, *supra* note 1, at 28; Tengs et al., *supra* note 12, at 370.

³⁶ This issue is addressed at length in our forthcoming book. See ACKERMAN & HEINZERLING, *supra* note † (forthcoming 2002); accord FRANK ACKERMAN, WHY DO WE RECYCLE? MARKETS, VALUES, AND PUBLIC POLICY 45-60 (1997); Frank Ackerman & Kevin Gallagher, *Getting the Prices Wrong: The Uses and Abuses of Market-Based Environmental Policy*, in TAKING SIDES ON ECONOMIC ISSUES (T. Swartz & F. Bonello eds., 2001); Lisa Heinzerling, *Discounting Life*, 108 YALE I.J. 1911 (1999); Lisa Heinzerling, *Discounting Our Future*, 34 LAND & WATER L. REV. 39 (1999); Lisa Heinzerling, *Environmental Law and the Present Future*, 87 GEO. L.J. 2025 (1999), reprinted in 31 LAND USE & ENV'T L. REV. 305 (2000) (selected as one of the best environmental law articles of 1999).

³⁷ See Morrall, *supra* note 1, at 28.

³⁸ See *id.* at 30 tbl.4.

the major aims of the health and environmental rules that have fared so poorly in analyses of costs per life saved.

By greatly deflating life-saving benefits, discounting greatly inflates costs per life saved. In Morrall's study, if one adopts the agencies' estimates of risk and does not discount for latency, the costs per life saved of virtually all of the regulations on his list drop to below \$5 million—the number viewed by some economists as the “value of a statistical life.”³⁹ Table 3 compares the regulatory agencies' own estimates for selected regulations (without discounting), to Morrall's estimates, reflecting both his re-estimation of risks and his discounting of future deaths.

TABLE 3
COMPARISON OF AGENCIES' ESTIMATES TO
MORRALL'S ESTIMATES

Regulation (Agency, Year)	Agency Estimate (in thousands of 1995 dollars per life saved)	Morrall's Estimate (in thousands of 1995 dollars per life saved)
Asbestos (OSHA 1972)	700	11,000
Benzene (OSHA 1985)	2570	25,400
Arsenic/Glass Plant (EPA 1986)	6610	28,500
Ethylene Oxide (OSHA 1984)	3020–5780	38,000
Uranium Mill Tailings/Inactive (EPA 1983)	2410	41,000
Acrylonitrile (OSHA 1978)	8570	55,900
Uranium Mill Tailings/Active (EPA 1983)	3840	78,800
Coke Ovens (OSHA 1976)	12,420	91,900
Asbestos (OSHA 1986)	3860	132,600
Arsenic (OSHA 1978)	24,490	137,600
Arsenic/Low-Arsenic Copper (EPA 1986)	5740	1,136,600
Land Disposal (EPA 1986)	3280	5,207,000
Formaldehyde (OSHA 1985)	31,100	107,120,000

Source: Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 YALE L.J. 1981, 2039–40 tbls.3–4 (1998)

Discounting along these lines assumes that a particular kind of life-saving intervention—one that prevents long-latency human disease and therefore usually saves older people's lives—represents a less-valued use of our regulatory resources. Starting from this premise, one will inevitably end up concluding that regulation that saves the lives of the elderly and that prevents cancer is not as important as

³⁹ Cf. W. KIP VISCUSI, FATAL TRADEOFFS: PUBLIC AND PRIVATE RESPONSIBILITIES FOR RISK 20 (1992) [hereinafter VISCUSI, FATAL TRADEOFFS] (proposing that the value of a statistical life is between \$3 and \$7 million); W. KIP VISCUSI, RATIONAL RISK POLICY (1998); W. Kip Viscusi, *The Value of Risks to Life and Health*, 31 J. ECON. LITERATURE 1912, 1942 (1993) (same).

other kinds of regulation. This is a very sophisticated and circuitous form of question-begging, but it is question-begging nonetheless.

Discounting of avoided future cancer deaths is also flatly inconsistent with the reigning economic method for calculating the value of life-saving measures. It would be absurd to assign a monetary value to certain death; virtually everyone would refuse to accept any amount of money in exchange for their own death. Rather, economists seek to assign a value to small reductions (or increases) in risk.⁴⁰ If the “commodity” being priced in economic analyses of life-saving measures is risk, and not life itself, then the practice of discounting from the end of the latency period for cancer is misguided. One should instead discount only from the date when risk is reduced. This seemingly minor and technical change would have a large effect on estimates of regulatory costs because most regulations begin to reduce risks as soon as they impose costs—which, from any perspective, eliminates the need for discounting.

Tengs and Graham, focusing on life-years saved by regulations, adopt a different, but equally suspect, approach to discounting. Rather than discounting each avoided death from the year in which it would have occurred (Morrall’s method), Tengs and Graham separately discount each year of life saved by regulatory intervention,⁴¹ yielding results that are both morally problematic and technically incompatible with the way almost everyone else describes costs and benefits.

By counting life-years instead of lives, Tengs and Graham assume that it is better to save more rather than fewer life-years. Put simply, this means that, in their view, a measure that saves the lives of the elderly is not as good as one saving the lives of the middle-aged, and likewise, a measure saving the lives of the middle-aged is not as good as one saving the lives of the young. However, their unusual approach to discounting (revealed only by digging deep into their equations, not by reading their text) means that their bias toward the young is not as pronounced in practice as one might expect.

To put the point more concretely, suppose that a regulation prevents a kind of accident that, on average, kills 35-year-olds. Further suppose that the average life expectancy of the entire population is 77 years.⁴² A regulation preventing this kind of accident would, on average, save 42 life-years per accident prevented. Preventing this accident is more valuable, for Tengs and Graham, than saving the last

⁴⁰ See, e.g., VISCUSI, *FATAL TRADEOFFS*, *supra* note 39, at 20; Viscusi, *supra* note 39.

⁴¹ See Tengs et al., *supra* note 12, at 370.

⁴² Tengs and Graham appear to make this assumption, using the same life expectancy for people of all ages—a mistaken assumption, given that life expectancy increases as one ages.

remaining year of life for a 76-year-old, but thanks to discounting it is not 42 times as valuable. In calculating the "present value" of the accident prevention measure, Tengs and Graham would separately discount each of the 42 saved life-years, since each would be lived at a different time in the future. For example, the forty-second life-year saved by the hypothetical regulation would not have been lived until 42 years from now; Tengs and Graham discount that forty-second life-year to a "present value" of approximately 1/8 of a current year.⁴³

Any number of calculator games can be played, exploring the odd and unexpected biases introduced by this approach to discounting. Measures that save younger people's lives now are the most valuable; but measures that will save the lives of today's younger people when they are older are deeply discounted. The last expected year of life is worth one full year for a 76 year-old, one-eighth of a current year for a 35 year-old, and only three-one hundredths of a current year for a 5 year-old.

Tengs and Graham's peculiar approach to life-years and discounting also means that no one can ever lose a "whole" life. When the lost years of life are discounted and added up in every case of death, then no one ever loses the full measure of a life; everyone loses just a part of a life as measured in life-years. But human lives do not come in fractions.

Killing older people who have shorter remaining life expectancies is, in most moral or legal systems, just as serious a crime as killing the young. The stealth rejection of this principle of equality through Tengs and Graham's dubious arithmetic of risk analysis threatens to create a startling change in our approach to life and death.

Widely circulated studies on costs per life saved suffer, in short, from three major flaws. First, they include large numbers of life-saving measures that were never implemented nor, in many cases, proposed by any regulatory agency. Second, they fix on human lives saved as the sole measure of the success of regulatory programs designed to achieve multifarious goals. And third, they rely on morally problematic and internally inconsistent perspectives on the value of life.

These flaws have not prevented the widespread acceptance of these studies in the literature on risk regulation. Indeed, despite their flaws, such studies have served as the foundation for a second body of research, attempting to show how many more lives we could save if we did things differently. We turn now to two aspects of this additional research. One study produces the widely cited claim that different regulatory priorities could save 60,000 lives annually, at no additional

⁴³ Using a discount rate of five percent.

cost. And several studies assert that we could save more lives by regulating less. Neither of these conclusions survives careful scrutiny.

II

A STATISTICAL MURDER MYSTERY

If you could save 60,000 lives every year at no cost, would you do it? This enticing question is the implicit punch line of an additional study by Tengs and Graham, building upon their "*Five-Hundred Life-Saving Interventions*" study. The second study sets out "to assess the opportunity costs of our present pattern of social investments in life-saving."⁴⁴ In other words, what, they purported to ask, do we give up by addressing life-threatening risks the way we now do?

This later study considered a subset of the 587 interventions included in their earlier work—specifically, the 185 interventions for which data on costs and effectiveness were national in scope.⁴⁵ Of the 185 measures, 90 were toxin control measures that were under the jurisdiction of EPA (or would have been, if they had ever been proposed).⁴⁶

In this study, Tengs and Graham found that if our resources were directed to the most cost-effective of the interventions they considered, we could either save 60,000 more lives every year with the same amount of money, or save the same number of lives we do now while cutting costs by \$31 billion.⁴⁷ Either way one looks at it, if the numbers are believable then something is seriously amiss, and even lethal, in our current way of doing things. Indeed, Graham provocatively calls the resulting state of affairs "statistical murder":⁴⁸ we are, he suggests, literally killing people because our life-saving priorities are so misguided.

Many observers have cited this study as if it shows that *government regulation* results in the "statistical murder" of 60,000 Americans every year. In the introduction to the book in which the study appears, Robert Hahn claims that the study "compiles new data on hundreds of

⁴⁴ Tammy O. Tengs & John D. Graham, *The Opportunity Costs of Haphazard Social Investments in Life-Saving*, in RISKS, COSTS, AND LIVES SAVED: GETTING BETTER RESULTS FROM REGULATION 167, 168 (Robert W. Hahn ed., 1996).

⁴⁵ See *id.* at 169.

⁴⁶ We obtained a complete list of the interventions considered in this study from Tammy Tengs. Personal Communication from Tammy Tengs to Lisa Heinzerling (April 2001) [hereinafter Tengs Personal Communication] (on file with author). This list indicates that ninety of the interventions were environmental measures. See also Tammy O. Tengs, *Optimizing Societal Investments in Prevention of Premature Death*, app. Q, at 150 (1994) (unpublished Sc.D. dissertation, Harvard University) (on file with author) (indicating that ninety interventions based on "EPA Regulation" were considered in the dissertation which formed the basis of Tengs and Graham's "Opportunity Costs" study).

⁴⁷ Tengs & Graham, *supra* note 44, at 172-77.

⁴⁸ GRAHAM, *supra* note 2, at 1.

regulatory interventions and estimates their costs and life-saving benefits.”⁴⁹ This study, Hahn continues, “assesses the opportunity costs of the current activity and determines an ‘optimal portfolio’ of *regulatory activity* that could save more lives at less cost.”⁵⁰ The ink was not even dry on Tengs and Graham’s study, in other words, before it was being used as an indictment of government regulation.

Subsequent uses of this study have followed the same vein. Congress, for example, has been frequently told that Tengs and Graham’s research shows that a rearrangement of regulatory priorities would save 60,000 lives per year.⁵¹ John Graham himself has testified that his research demonstrates that federal regulation is in serious need of reform. Testifying in favor of Newt Gingrich’s “Contract With America” bills several years ago, Graham asserted that, based on his research with Tengs, he was convinced that “a smarter regulatory system” could “provide the public with more protection against hazards at less cost than we are achieving today.”⁵²

Similarly, Graham recently joined a group of economists in signing onto a brief filed in the United States Supreme Court in *Whitman v. American Trucking Ass’ns*, a case challenging the constitutionality of the federal Clean Air Act.⁵³ In that brief, Graham and his co-signatories urged the Court to interpret the Clean Air Act to require cost-benefit analysis of national air quality standards.⁵⁴ They premised their argument on the perceived failings of current health, safety, and environmental regulation.⁵⁵ Citing Tengs and Graham’s study, they asserted:

Both the *direct benefits and costs of environmental, health, and safety regulations* are substantial—estimated to be several hundred billion dollars annually. If *these resources* were better allocated with the objective of reducing human health risk, scholars have predicted that tens of thousands more lives could be saved each year.⁵⁶

⁴⁹ Robert W. Hahn, *Introduction to RISKS, COSTS, AND LIVES SAVED: GETTING BETTER RESULTS FROM REGULATION*, *supra* note 44, at 1, 3 (emphasis added).

⁵⁰ *Id.* (emphasis added).

⁵¹ *The Regulatory Improvement Act of 1998: Hearing on S. 981 Before the Senate Comm. on Governmental Affairs*, 105th Cong., app. at 100 & n.4 (1998) (joint prepared statement of Robert W. Hahn, Resident Scholar, The American Enterprise Institute & Robert E. Litan, Director of Economic Studies, The Brookings Institution).

⁵² *Regulatory Improvement Act of 1999 Hearing*, *supra* note 3, app. at 113 (prepared statement of John D. Graham, Ph.D., Director, Center for Risk Analysis, Harvard School of Public Health).

⁵³ Brief of Amici Curiae of AEI-Brookings Joint Center for Regulatory Studies et al., *Whitman v. Am. Trucking Ass’ns*, 531 U.S. 457 (2001) (No. 99-1426), *available at* 2000 WL 1015407.

⁵⁴ *See id.* at 1–2.

⁵⁵ *See id.*

⁵⁶ *See id.* (citing Tengs & Graham, *supra* note 44).

In the context of his academic work, moreover, Graham has used his research with Dr. Tengs to launch a large-scale attack on regulatory programs that protect health, safety, and the environment, calling the "public's general reaction to health, safety, and environmental risks" a "syndrome of paranoia and neglect."⁵⁷ Likewise, Tengs has based her own support of regulatory reform on her collaborative work with Graham.⁵⁸

Yet the startling, sound-bite conclusions about the cost-ineffectiveness of current health and environmental regulation do not follow from Tengs and Graham's research. They have failed to identify a huge body of overly expensive regulations that are actually in effect, and have proposed only trivial opportunities to enact cheaper life-saving rules.

Most of the life-saving potential found in Tengs and Graham's research comes from reallocating expenditures in the field of medicine, not from reallocating resources used by regulatory agencies such as EPA or OSHA. Equally important in the area of toxin control, is the fact that most of the 90 life-saving interventions that Tengs and Graham considered have never been implemented, *and they never will be*. Indeed, as explained above, many of these interventions were rejected by the very agencies Tengs and Graham think have their priorities wrong, and they were often rejected for the very reason that their costs were not justified by their benefits. Many other interventions were never even proposed by any regulatory agency.

Specifically, of the 90 environmental measures included in this second study (representing almost half of all the life-saving measures considered), only 11 were ever implemented by the relevant agency, EPA. In other words, 79 of the environmental measures included in this study were *never implemented*. Most of these were rejected (or never even proposed) by EPA itself.⁵⁹ Thirty-one of the environmental measures were part of EPA's nationwide ban on asbestos products, which was overturned in a single, controversial judicial decision.⁶⁰

⁵⁷ John D. Graham, *Legislative Approaches to Achieving More Protection Against Risk at Less Cost*, 1997 U. CHI. LEGAL F. 13, 22.

⁵⁸ See *News Conference with Senator Bob Dole, C. Everett Koop, and Others Regarding Regulatory Reform*, at *8 (Federal News Service, July 17, 1995), available at LEXIS, Nexis Library.

⁵⁹ For example, 10 of the 90 environmental measures included in the study are bans on certain asbestos products. However, the study on which Tengs and Graham relied for their data on the costs and effectiveness of these measures clearly states these products were never banned by EPA. See GEORGE L. VAN HOUTVEN & MAUREEN L. CROPPER, WHEN IS A LIFE TOO COSTLY TO SAVE? 23 tbl.1 (Env't, Infrastructure, & Agric. Div., World Bank, Policy Research Working Paper 1260, 1994), cited in Tengs et al., *supra* note 12, app. B, at 388.

⁶⁰ See *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201 (5th Cir. 1991) (overturning EPA's nationwide ban on asbestos products in part because the court disagreed with the agency's cost-benefit analysis).

Tengs and Graham assert that they considered the extent to which the interventions they discuss have been implemented. Their explanation strains the meaning of the English language: because they believe that “some degree of implementation can exist even in the presence of a ‘no-go’ decision or can be absent even with a ‘go’ decision,” they gathered information on the “‘percent implementation’” of each intervention.⁶¹ Rather than accepting the naive notion that the public record shows whether regulations have been implemented or not, they consulted “independent experts” to determine the percentage of implementation.⁶²

Unfortunately, however, Tengs and Graham do not say which measures they considered implemented, which unimplemented, and which partially implemented, and requests for this information have gone unanswered by Tengs and Graham. However, in a letter supporting Graham’s nomination to lead the Office of Information and Regulatory Affairs within the Office of Management and Budget (OMB), Tengs stated that their study assumed zero implementation for only 20 of the 185 interventions considered.⁶³ Yet, as noted above, fully 79 of the environmental interventions alone were never implemented. The reasons for Tengs and Graham’s apparent assumption that at least 59 rules that were never issued were nevertheless implemented remain mysterious.⁶⁴ Here is the sum total of what Tengs has had to say on the point: “Toxin control interventions that were never promulgated (or even considered) by the EPA might nevertheless have some percent implementation, at least according to the experts we interviewed.”⁶⁵

The truth of this statement appears to depend on what we mean by “implementation.” The only obvious literal meaning is that, even absent government regulation, firms were undertaking the environmentally protective measures discussed in the study. If the measures are as expensive as we are led to believe, this would be economically absurd for a profit-conscious firm. No empirical evidence about vol-

⁶¹ Tengs & Graham, *supra* note 44, at 170.

⁶² *See id.*

⁶³ Letter from Tammy Tengs, Sc.D., Assistant Professor, Harvard University, to Senator Fred Thompson, Chairman, Committee on Governmental Affairs, regarding confirmation of John Graham as Administrator, Office of Information and Regulatory Affairs, Office of Management and Budget (May 14, 2001) [hereinafter Tengs Letter], *available at* <http://www.hcra.harvard.edu/nomination/17.html>.

⁶⁴ For example, based on information provided in related research, it is clear that Tengs and Graham assumed that EPA’s nationwide ban on asbestos was fully implemented—which, as noted above, it was not. *See* TAMMY O. TENGs, DYING TOO SOON: HOW COST-EFFECTIVENESS ANALYSIS CAN SAVE LIVES 6 tbl.II (Nat’l Ctr. for Policy Analysis, Policy Report No. 204, 1997) (showing assumption of “100%” implementation of invalidated asbestos rule), *available at* <http://www.ncpa.org/studies/s204/s204.html>.

⁶⁵ Tengs Letter, *supra* note 63.

untary toxin control undertaken by firms is provided by Tengs and Graham, nor do they reveal the identity or area of expertise of any of the "experts" who purportedly endorsed this assumption.

The peculiar treatment of implementation reveals a fundamental flaw in Tengs and Graham's study. Their entire project is aimed at identifying a group of life-saving opportunities that are highly cost-ineffective and another group that are highly cost-effective, in order to support their argument that to move from the former to the latter would save lives or dollars or both. The implication of their analysis is that there is a large pool of resources available from the cost-ineffective interventions that can be diverted to the cost-effective ones. But if so many of the cost-ineffective interventions have never been implemented, no such vast pool of wasted resources exists.

Equally important, Tengs and Graham appear to have made no effort to identify those cost-effective regulations that have already been implemented to the fullest extent possible. Some of the regulations that Tengs and Graham like best fall into this category. For example, the measure that fares best in Tengs and Graham's first study (and reappears in their second study)⁶⁶ is the phasedown of lead in gasoline, a regulation which in their view produced cost *savings* rather than imposing costs.⁶⁷ But we did this already: there is, thankfully, no more lead in gasoline. In other words, this is not a regulation that we can have "more" of; we cannot keep banning lead in gasoline, over and over again, in order to produce more low-cost, life-saving results.

It is a myth to think, based on Tengs and Graham's work, that toxin regulation systematically produces bad results. We have neither implemented the large set of cost-ineffective regulations that Tengs and Graham describe nor failed to fully implement the cost-effective measures they do cite. There are certainly highly efficacious environmental measures still to be implemented; but they are, for the most part, not addressed in Tengs and Graham's study.

Tengs and Graham are, in fact, curiously silent about exactly what interventions they are proposing as an alternative to what they represent (wrongly) as our current portfolio of toxin controls. Only by studying Tengs's unpublished doctoral dissertation, written under Graham's supervision,⁶⁸ can one learn which toxin controls these researchers favor. As it turns out, most of the toxin controls that fared well in Tengs and Graham's analysis have already been implemented. A handful of apparently cost-effective interventions regulating asbestos and benzene were not implemented, but these rules together would have saved a total of only 24 lives—nowhere close to the 60,000

⁶⁶ See Tengs Personal Communication, *supra* note 46, at 21.

⁶⁷ See Tengs et al., *supra* note 12, app. A, at 377.

⁶⁸ See Tengs, *supra* note 46.

lives cited in the Tengs and Graham study. The only large life-saving opportunity in the area of toxin control that is identified by Tengs and Graham is radon remediation in homes, as encouraged by government funding of low-cost loans, tax write-offs, or other financial incentives.⁶⁹

In effect, then, what Tengs and Graham are really arguing for is a wholesale shift of EPA's responsibilities from the regulation of pollution of the air, water, and land through mandatory controls on polluters to the encouragement of residential radon remediation—which typically involves simply caulking basements—through loans and tax incentives. Nowhere do Tengs and Graham face up to the shrinking, indeed trivialization, of environmental law that their proposals would entail.

III

IS RICHER SAFER?

A final set of studies purports to show that regulation designed to save lives actually can kill people by making them poorer. The claim is that the cost of regulation may itself increase risk through effects on personal income. "Richer is safer": income affects health, and so decreases in income brought about by regulation may impair health as well as wealth.⁷⁰

Building on studies that find a correlation between wealth and health, researchers have attempted to identify the level at which regulatory expenditures will produce one fatality by reducing individual wealth. One frequently cited range of estimates for this level is \$3 million to \$7.5 million, based on a study by Ralph Keeney.⁷¹ Kip Viscusi's estimate is much higher: he has reported that a regulatory expenditure of approximately \$50 million is required to induce one fatality,⁷² although his more recent work, with John Morrall and Randall Lutter, suggests that the lethal level is closer to \$15 million.⁷³

Each of these studies—by Keeney, by Viscusi alone, and by Viscusi, Morrall, and Lutter—is based on a different methodology. For his part, Keeney simply considered the relationship, as reflected in

⁶⁹ See generally Kenneth L. Mossman & Marissa A. Sollitto, *Regulatory Control of Indoor Rn*, 60 HEALTH PHYSICS 169 (1991) (evaluating the costs and benefits of various forms of radon remediation).

⁷⁰ For the seminal statement of this hypothesis, see Aaron Wildavsky, *Richer is Safer*, PUB. INT., Summer 1980, at 23, 27–29.

⁷¹ For the original study, see Ralph L. Keeney, *Mortality Risks Induced by Economic Expenditures*, 10 RISK ANALYSIS 147 (1990).

⁷² See W. Kip Viscusi, *Risk-Risk Analysis*, in THE MORTALITY COSTS OF REGULATORY EXPENDITURES 9–12 (W. Kip Viscusi ed., 1994).

⁷³ Randall Lutter et al., *The Cost-Per-Life-Saved Cutoff for Safety-Enhancing Regulations*, 37 ECON. INQUIRY 599 (1999).

census data from 1959, between income and life expectancy.⁷⁴ Drawing on this relationship, Keeney offered a set of "illustrative" examples of how regulatory expenditures might affect life expectancy.⁷⁵ The most frequently cited of these illustrations found that a regulatory expenditure of \$7.25 million would induce one fatality.⁷⁶ In coming to this finding, Keeney assumed that wealthier people are healthier because they are wealthier, not vice versa, and that the costs of the hypothetical regulation would be borne equally by all income groups.⁷⁷ He also assumed that income losses of any size, no matter how small for each household, would kill some people.⁷⁸ Even assuming that a regulatory expenditure decreased annual household income by only \$10, Keeney was able to conclude that hundreds of people might die as a result.⁷⁹ Because there are about 100 million households in the U.S., an annual income loss of *seven cents* per household amounts to a total of \$7 million nationwide, and thus should cause the loss of one statistical life according to Keeney's method. This result seems to us far-fetched.

Kip Viscusi's initial methodology for defining the wealth-health relationship was very different from Keeney's. In research published several years ago, Viscusi asserted, consistent with his previous research,⁸⁰ that the value of a statistical life was approximately \$5 million.⁸¹ He also claimed that people tend to spend about ten percent of any increase in income on risk-reducing measures.⁸² Thus, he concluded, if society had \$50 million of additional income, it would spend \$5 million and save one life. If the \$50 million were unavailable to spend (because, for example, it has been spent on regulation), that life would not be saved, and thus one life will be lost through the \$50 million expenditure.⁸³

In the most recent study in this area, Viscusi teamed with Randall Lutter and John Morrall to produce yet a third methodology for calculating the relationship between regulatory expenditures and premature mortality.⁸⁴ Viscusi and his co-authors used the same basic approach initially used by Viscusi, but with one new twist: they included in their calculations the facts that poorer people are more likely to engage in risky activities (like smoking) than wealthier people

74 See Keeney, *supra* note 71, at 153 tbl.III.

75 See *id.* at 154-55 & tbl.IV.

76 See *id.*

77 See *id.* at 149.

78 See *id.*

79 See *id.* at 155.

80 See *supra* note 39.

81 See Viscusi, *supra* note 72, at 9.

82 See *id.* at 9-12 & tbls.2-3.

83 See *id.*

84 See Lutter et al., *supra* note 73.

are, and that thus not only do poorer people have less to spend on health-improving commodities, but they also are more likely to engage in activities that damage their health.⁸⁵ Based on this approach, Viscusi and his co-authors found that one fatality would be induced for every approximately \$15 million in regulatory expenditures.⁸⁶

There are numerous problems with all of these studies.⁸⁷ First, the socioeconomic determinants of health are more complicated than Keeney's work assumes. Wealthy people might be wealthy partly because they are healthy.⁸⁸ Also, wealth is strongly correlated with other socioeconomic indicators, like education and social class, that may be more important determinants of health than wealth itself. In a famous study of British civil servants, for example, researchers found that health was more closely tied to social class than to income.⁸⁹

"Richer is safer" studies also make the unlikely assumption that the relationship between health and wealth is the same at all income levels.⁹⁰ Surely this is untrue in extreme cases: Ted Turner is not likely to be less healthy than Bill Gates because he has less money than Bill Gates. Thus the distribution of regulatory costs, which is ignored in most of the studies, will make a large difference in determining whether the costs impair anyone's health. In fact, in his first study of the subject, Keeney acknowledged that at incomes above approximately \$20,000 per year, health-wealth trade-offs level off.⁹¹ In other words, the effect is strong only at low incomes, and vanishes far below the Ted Turner level: a person who earns \$50,000 is unlikely to be less healthy than a person who earns \$70,000, merely as a result of this difference in income.

⁸⁵ See *id.* at 604 & 606 tbl.III.

⁸⁶ See *id.* at 605.

⁸⁷ For a critique of OMB's proposal to use Keeney's study to evaluate a workplace health rule, see PROGRAM EVALUATION & METHODOLOGY DIV., U.S. GEN. ACCOUNTING OFFICE, REPORT TO THE CHAIRMAN, COMMITTEE ON GOVERNMENTAL AFFAIRS, U.S. SENATE, NO. GAO/PEMD-92-33, RISK-RISK ANALYSIS: OMB'S REVIEW OF A PROPOSED OSHA RULE (1992). For the most extensive critique of the "richer is safer" thesis in the legal literature, see Thomas O. McGarity, *A Cost-Benefit State*, 50 ADMIN. L. REV. 7, 40-49 (1998). Accord 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, 324-27 (1995).

⁸⁸ See, e.g., C.P. Wen et al., *Anatomy of the Healthy Worker Effect: A Critical Review*, 25 J. OCCUPATIONAL MED. 283, 283 (1983) (discussing studies suggesting that "healthy worker effect" is a result of selection for employability, meaning that healthy people are the ones who get jobs).

⁸⁹ Eric Brunner, *The Social and Biological Basis of Cardiovascular Disease in Office Workers*, in HEALTH AND SOCIAL ORGANIZATION: TOWARDS A HEALTH POLICY FOR THE TWENTY-FIRST CENTURY 272 (David Blane et al. eds., 1996).

⁹⁰ Paul R. Portney & Robert N. Stavins, *Regulatory Review of Environmental Policy: The Potential Role of Health-Health Analysis*, in THE MORTALITY COSTS OF REGULATORY EXPENDITURES, *supra* note 72, at 116.

⁹¹ See Keeney, *supra* note 71, at 153-54 & tbls.IV-V.

These points have, however, been completely lost in the literature relying on Keeney to justify an anti-regulatory stance. Indeed, Keeney himself seems to have forgotten his initial caveats about his own calculations. In a study purporting to calculate the fatalities induced by revised national air quality standards for particulate matter and ozone, Keeney asserted that as many as 27,000 people would die as a result of regulatory expenditures associated with the standards.⁹²

Perhaps most absurdly, the “richer is safer” argument assumes that money spent on regulation simply vanishes—it creates no jobs, no business, no productive gains whatsoever. This assumption, too, is in error: environmental protection is big business in this country, employing people who make and install the complicated, expensive pollution-control technologies (even though the costs of these technologies are, in fact, frequently exaggerated when estimated in advance of regulation),⁹³ inspect and measure environmental compliance, fill out forms documenting environmental performance, file lawsuits to enforce regulations, and so on. The people in those jobs are not poorer as a result of regulation; they are richer. Yet the studies purporting to find a relationship between regulatory expenditures and mortality are completely dependent on the assumption that “we” are worse off as a result of regulation. This, in the end, is the crucial assumption: the studies prove that environmental regulation is bad for us only by first assuming that we do not benefit from it.

To uncover the hidden bias in the studies drawing a connection between government-induced expenditures and mortality, one need look no further than the limited use to which they have been put. Every large program, whether it has an educational, military, environmental, or other purpose, imposes costs on some people and creates jobs and incomes for others. If the “richer is safer” crowd were really serious about their argument, one would expect them to be concerned about the big-ticket items in the federal budget like national defense. From Keeney’s perspective, for example, this year’s budget for national defense (\$325 billion) will kill almost 45,000 people. Yet no one—not Keeney, or Viscusi, or anyone else who has criticized environmental law for making people poorer—has suggested that the military or public schools or other kinds of non-environmental government programs should be scrutinized for their indirect lethal effects.

⁹² KEENEY & GREEN, *supra* note 4, at 13.

⁹³ See, e.g., WINSTON HARRINGTON ET AL., ON THE ACCURACY OF REGULATORY COST ESTIMATES 23 (Res. for the Future, Discussion Paper 99-18, 1999), available at http://www.iff.org/disc_papers/PDF_files/9918.pdf; Eban Goodstein & Hart Hodges, *Polluted Data: Overestimating Environmental Costs*, AM. PROSPECT, Nov.–Dec. 1997, at 64.

There are real debates to be held about the usefulness and effectiveness of education, national parks, missile defense, environmental protection, and other public programs. But the argument that a program makes us poorer is a sure sign of a hidden judgment that the program is undesirable on other grounds.

IV

THE POWER OF PERVERSITY

In *The Rhetoric of Reaction*, Albert O. Hirschman surveyed the intellectual history of conservative responses to the social movements for social, political, and economic equality.⁹⁴ He found that few people reacting to these social movements would come right out and say that they were opposed to equality.⁹⁵ Instead, they invoked arguments based on perversity, futility, and jeopardy—that is, they argued that the proposed social reforms would backfire, or do nothing at all, or jeopardize other social progress, or, impossibly, do all three at once.⁹⁶ The beauty of this rhetoric, for the reactionary critic, is that it hides stubborn resistance behind a mask of constructive criticism.

Modern regulatory critics' style of argument bears an uncanny resemblance to these modes of argument which other reactionary movements have historically found useful. That the critics' general mode of argument follows a well-worn path might explain why the empirical details of their argument have escaped critical scrutiny. Indeed, the statistics drawn from the studies discussed in this Comment have been cited uncritically in everything from law review articles to congressional testimony to newspaper opinion pieces. No one seems to have considered the possibility that these numbers might be wrong, and wrong by a wide margin.

Of course, affinities between the rhetoric used to oppose universal suffrage and the rhetoric used to oppose environmental regulation do not necessarily establish anything about the underlying social merits of these reforms or their rivals. But it is instructive to keep ever in mind, while one is reviewing yet another daunting set of numerical findings about the regulatory state and its failings, the possibility that one is dealing with merely a modern incarnation of an ancient form of rhetoric.

⁹⁴ See ALBERT O. HIRSHMAN, *THE RHETORIC OF REACTION: PERVERSITY, FUTILITY, JEOPARDY* (1991).

⁹⁵ See *id.* at 7.

⁹⁶ See *id.*