Title
Discounting, EPA's Nonroad Spark-Engine Rule, and the Hidden Anti-Regulatory Agenda of Cost-Benefit Analysis

Journal
UCLA Journal of Environmental Law and Policy, 22(1)

Author
Corey, Jeffrey C.

Publication Date
2003

DOI
10.5070/L5221019404

Discounting, EPA's Nonroad Spark-Engine Rule, and the Hidden Anti-Regulatory Agenda of Cost-Benefit Analysis

*Jeffrey C. Corey**

I. INTRODUCTION

In the past twenty years, it has become increasingly common for administrative agencies to use cost-benefit analysis to evaluate proposed regulatory programs.[1] As part of their cost-benefit analysis, agency policymakers typically assign a monetary value to the health benefits of a given regulatory program. This monetization of human health benefits allows agencies to assess a proposed regulation by comparing the theoretical monetary benefits of a new regulation with its projected costs. Scholars have criticized many aspects of this cost-benefit analysis, with perhaps the most attention given to the ethical implications associated with assigning a dollar value to a life saved by a regulation.[2] However, less attention has focused on a potentially more controversial component of cost-benefit analysis known as *discounting*.[3]

* Judicial Clerk to the Honorable Thomas K. Moore, United States District Court Judge, District Court of the United States Virgin Islands. J.D., Georgetown University Law Center, 2003. B.S., University of Florida, 2000. Special thanks to Professor Lisa Heinzerling for advice and research guidance, and for being an inspiring teacher. I would also like to thank Brittany Nelson for her unwavering support and encouragement.

1. *See, e.g.*, Safe Drinking Water Act (SDWA), 42 U.S.C. §§ 300f-300j-26 (2000); Exec. Order No. 12,866, 3 C.F.R. § 638 (1993), *reprinted in* 5 U.S.C. § 601 (1994) (reinstating a 1981 executive order that mandated cost-benefit analysis for all major agency rules); *see also infra* text accompanying notes 36-58.

2. *See, e.g.*, W. Kip Viscusi, *Equivalent Frames of Reference for Judging Risk Regulation Policies*, 3 N.Y.U. ENVTL. L.J. 431 (1995).

3. "Discounting" is the term most commonly used for the component of cost-benefit analysis that I am focusing on in this article. However, sometimes this practice is called "social discounting" to reflect its application of economic principles in the context of social regulation. *See, e.g.*, U.S. ENVTL. PROT. AGENCY, EPA GUIDE-

On a basic level, discounting is a way of assessing the present value of a cost or benefit that will take place in the future. Discounting is founded on two assumptions that, when mathematically factored into a cost-benefit analysis, reduce the value of both costs and benefits that occur in the future. The first assumption, generally referred to as the "time value" of money,[4] views money as worth less in the future than today because money can be invested to increase its value over time. In this sense, discounting is simply the application of a reverse interest rate, minimizing costs or benefits depending on how far they occur in the future. The second assumption justifies discounting based on people's preferences.[5] Discounting assumes that people prefer to have a benefit now instead of in the future and incorporates this preference into cost-benefit analysis by reducing the present-day valuation of a future benefit. Similarly, discounting assumes that people prefer to incur costs in the future rather than today, and therefore reduces the present-day valuation of a future cost.

The logic of discounting is deceptively simple. In the abstract, discounting may seem like a reasonable method for evaluating future benefits. However, when applied to a regulation that imposes present costs but does not provide benefits until many years into the future, discounting skews the analysis against regu-

LINES FOR PREPARING ECONOMIC ANALYSES § 6.2.1 [hereinafter ECONOMIC ANALYSES GUIDELINES].

The debate over discounting has only been discussed at any length in a handful of law review articles. *See* Daniel A. Farber and Paul A. Hemmersbaugh, *The Shadow of the Future: Discount Rates, Later Generations, and the Environment*, 46 VAND. L. REV. 267 (1993); Lisa Heinzerling, *Discounting Life*, 108 YALE L.J. 1911 (1999); Lisa Heinzerling, *Discounting Our Future*, 34 LAND & WATER L. REV. 39 (1999) [hereinafter Heinzerling, *Discounting*]; Lisa Heinzerling, *Environmental Law and the Present Future,* 87 GEO. L.J. 2025, 2069-74(1999) [hereinafter Heinzerling, *Environmental Law*]; Lisa Heinzerling, *Five-Hundred Life-Saving Interventions and Their Misuse in the Debate Over Regulatory Reform*, 13 RISK 151, 164-68 (2002); Richard L. Revesz, *Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives*, 99 COLUM. L. REV. 941 (1999); Cass R. Sunstein, *Cost-Benefit Default Principles*, 99 MICH L. REV. 1651, 1711-15 (2001). Although legal scholarship on the topic of discounting before the last few years is sparse, Revesz notes that discounting first received political attention in the mid-1980s after the U.S. Environmental Protection Agency (EPA) discounted the value of human life in deciding to partially ban asbestos. Revesz, *supra* at 950-53.

4. *See* Farber & Hemmersbaugh, *supra* note 3, at 277.

5. *See, e.g.*, ECONOMIC ANALYSES GUIDELINES, *supra* note 3, at § 6.2.2.

lation.[6] In other words, discounting acts as a default presumption in favor of small benefits today over much larger benefits far in the future.[7] The way in which discounting skews cost-benefit analysis is perhaps best seen in the field of environmental regulation in general, and, more specifically, in efforts to improve air quality.[8] Air pollution is largely created by the bedrock components of modern society: the internal combustion engine and industrial production processes.[9] Any effort to improve air quality by changing the internal combustion engine and industrial production processes will naturally require significant up-front expenditures such as research and development costs, new technology costs, and implementation costs. In contrast, the sheer size of the task of improving air quality means that widespread improvements in air quality may not occur for many years, perhaps many generations, into the future. Although cost-benefit analysis of air quality regulations are highly susceptible to being skewed against regulation, the U.S. Environmental Protection Agency (EPA) has continued to employ discounting in its three most recent proposals to improve air quality: the

---

6. *See infra* text accompanying notes 15-16 for more information on how discounting can be applied to both monetary costs and benefits as well as non-monetary measurements, such as lives saved.

7. *Id.*

8. For purposes of this paper, I will analyze environmental regulatory measures in the same manner that the federal government generally does, i.e., from a perspective that environmental regulation typically imposes present costs in exchange for future benefits (as opposed to present benefits). However, as Lisa Heinzerling has argued, this may be an improper way to characterize the benefits of environmental regulation. Heinzerling, *Environmental Law*, *supra* note 3, *passim*. As I discuss in Part II, Section C, *infra*, the government's failure to tailor its accounting practices to the fact that environmental regulation provides both future and present benefits is one of the major theoretical flaws underlying discounting. However, this paper analyzes discounting using the government's assumption that environmental regulation imposes present costs and future benefits in order to show discounting makes little sense even if one follows this traditional view.

9. *See* ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY, 539 (4th Ed. 2003).

Clear Skies Initiative,[10] the Nonroad Diesel Engine Rule,[11] and the Nonroad Spark-Engine Rule.[12]

This paper focuses specifically on EPA's use of discounting in support of its Nonroad Spark-Engine Rule. I focus on this particular rule for two reasons. First, it provides a good example of how discounting can skew cost-benefit analysis against regulation, particularly when the regulation is aimed at a substantial problem where benefits may not be realized until many years into the future.[13] Second, it shows how discounting can play a supporting role in a cost-benefit analysis using several unorthodox valuation practices to produce a highly questionable comparison of costs and benefits. In examining this particular application of discounting in the context of a highly unusual cost-benefit analysis, this paper also asks why EPA would engage in

10. The Clear Skies Initiative is a proposal from the EPA to "set strict, mandatory emissions caps on three of the most harmful air pollutants from power generators — sulfur dioxide (SO2), nitrogen oxides (NOx), and mercury." *See* U.S. ENVTL. PROT. AGENCY, LEGISLATIVE INFORMATION ON CLEAR SKIES INITIATIVE, *available at* http://www.epa.gov/air/clearskies/legis.html. The Clear Skies Initiative was introduced as a bill in Congress in both 2002 and 2003, but has yet to pass both houses. The EPA has produced documents in support of this legislation which utilize discounting and other suspect valuation practices. *See* U.S. ENVTL. PROT. AGENCY, TECHNICAL ADDENDUM: METHODOLOGIES FOR THE BENEFIT ANALYSIS OF THE CLEAR SKIES INITIATIVE 35-36 (2002) [hereinafter CLEAR SKIES TECHNICAL ADDENDUM], *available at* http://www.epa.gov/air/clearskies/tech_adden.pdf.

11. Nonroad Diesel Engine Rule, 68 Fed. Reg. 28,328 (May 23, 2003) (to be codified at 40 C.F.R. pts. 69, 80, 89, 1039, 1065, 1068); *see also* Press Release, EPA, Bush Administration Proposes Dramatic Reductions of Pollution from Nonroad Diesel Engines (April 15, 2003), *available at* http://www.epa.gov/newsroom/headline2_041503.htm. In support of its rule, EPA produced a document that included a cost-benefit analysis. *See* U.S. ENVTL. PROT. AGENCY, DRAFT REGULATORY IMPACT ANALYSIS: CONTROL OF EMISSIONS FROM NONROAD DIESEL ENGINES (2003)[hereinafter NONROAD DIESEL ENGINE RULE DRAFT ANALYSIS], *available at* http://www.epa.gov/nonroad/r03008.pdf.

12. Control of Emissions From Nonroad Large Spark-Ignition Engines, and Recreational Engines (Marine and Land-Based), 67 Fed. Reg. 68242-01 (Nov 8, 2002) (to be codified at 40 C.F.R. pts. 89, 90, 91, 94, 1048, 1051, 1065, and 1068).

13. As described further in Part III, the Nonroad Spark-Engine Rule's cost-benefit analysis was one component of a broad regulatory analysis. Thus, I am not focusing on this cost-benefit analysis because it was the deciding factor in EPA's decision to institute this new regulation; in fact, this analysis probably had no bearing on EPA's decision to implement this regulation, given that it was an alternative analysis adopted only after OIRA disapproved of the agency's first comparison of costs and benefits. *See infra* Part III. I have chosen to focus on this particular cost-benefit analysis not because of its impact on this particular regulation, but because of the manner in which it was done, including its unorthodox valuation and discounting practices. As seen in the Clear Skies Initiative and the Nonroad Diesel Engine Rule, these practices are becoming increasingly commonplace. See *supra* text accompanying notes 10-12.

such suspect valuation practices. In asking this question, I focus particularly on the relationship between EPA and the Office of Information and Regulatory Affairs (OIRA), an office within the Office of Management and Budget (OMB). As the office charged with reviewing proposed and final agency rules to ensure that agency administrators are keeping in line with executive branch policies, OIRA has substantial power to influence agency action.[14] In the case of the Nonroad Spark-Engine Rule, OIRA exerted that power in an extreme manner by demanding that EPA go back to the drawing board and engage in an alternative cost-benefit analysis that employed suspect discounting calculations, despite the fact that the agency's initial review of costs and benefits concluded that the regulation would more than pay for itself.

Before delving into the details of the cost-benefit analysis of the Nonroad Spark-Engine Rule and OIRA's influence on this analysis, Part II of this paper provides general information about discounting. It explains the basic mechanics of discounting, addresses some of the theoretical problems of discounting, and examines the government's official positions on discounting. Part III focuses on the cost-benefit analysis used to support EPA's Nonroad Spark-Engine Rule. My goal in Part III is to show how, in a real-word context, discounting can be used in conjunction with other suspect valuation practices to bias cost-benefit analysis against regulation. Finally, I use Part III's discussion of the Nonroad Spark-Engine Rule's cost-benefit analysis as a basis for my cautionary conclusion that both the practice of discounting and, more generally, cost-benefit analysis, are far less scientific than their mathematical formulas indicate. Instead, as shown in the case of the Nonroad Spark-Engine Rule, discounting can allow manipulation of any cost-benefit analysis to the point where the analysis is more of a policy statement against regulation than an even-handed consideration of benefits and costs.

II.
UNDERSTANDING DISCOUNTING

This Part provides background information on discounting by considering discounting from three different perspectives. Sec-

14. For general background on OIRA, *see* STRAUSS ET AL., GELLHORN AND BYSE'S ADMINISTRATIVE LAW: CASES AND COMMENTS, 615, 616-25, 638-45 (10th ed. 2003).

tion A looks at discounting from a mathematical point of view by demonstrating how the basic discounting equation minimizes the value of costs or benefits that occur in the future. Section B looks at the theory underlying the discounting formula and highlights some of the logical flaws hiding behind any discounting calculation. Section C examines federal government policies on discounting. Finally, Section D provides a brief conclusion for this Part's overview of discounting.

A. *The Mechanics of Discounting*

As noted above, discounting is founded on two premises: (1) the time value of money; and (2) people's preference to receive a benefit today rather than to wait for that benefit to occur at a later date. The following formula incorporates these two premises, allowing policymakers to mathematically reduce the value of future costs and benefits:

$$\text{“present value”} = \frac{\text{“actual value”}}{(1 + \text{discount rate})^{\text{years}}}$$

In this discounting formula, the "present value" represents the discounted value of the future benefit.[15] Proponents of discounting have labeled this the present value because, in accordance with the theory that a benefit in the future is not as valuable as a benefit today, they believe that the present value is substantially less than the actual value.[16] The "actual value" is the thing being discounted. When evaluating life-saving regulation, policymakers can use the discounting formula to discount projected monetary benefits or costs of a proposed regulation. Alternatively, they can use the discounting formula to directly discount the number of lives saved by the proposed regulation. In other words, the formula can be used to discount any form of future benefit or

15. It is important to note that future costs are also discounted under cost-benefit analysis. However, because this paper is focused on the impact of discounting on environmental regulation, I will normally speak solely in terms of future benefits being discounted. The focus here is on future benefits (as opposed to both future costs and benefits) because new environmental regulations, such as the Nonroad Spark-Engine Rule discussed in Part III, often require present investment in exchange for benefits that occur years in the future. *See also* PERCIVAL, *supra* note 9.

16. When using the term "actual value," I am referring to the price of a future cost or benefit if that cost or benefit were to be incurred or received today. Some proponents of discounting may disagree with this terminology because they believe that the "actual value" of a future cost or benefit is, in fact, its discounted value. Because I believe discounting is contestable, I use the term "actual value" in the traditional, non-discounted sense.

cost, whether that benefit or cost is expressed in monetary terms or in some other unit, such as the number of lives saved.

For illustrative purposes, suppose an agency is considering a regulation that is projected to prevent 200 acute asthma attacks in ten years and the agency wants to determine the monetary value of those future asthma attacks. If an emergency room visit to treat an acute asthma attack costs $300, then the present (i.e. discounted) value of those 200 asthma attacks would be calculated according to the following formula:

$$\text{“present value”} = \frac{(200 \text{ asthma attacks})\ (\$300/\text{attack})}{(1 + \text{discount rate})^{10}}$$

To complete this calculation, the agency would have to choose a particular discount rate. This is the most critical step in the calculation because the discount rate determines how little or how much any future benefits will be discounted.[17] Even slight differences in discount rates can have a dramatic impact on the calculation of the present value of a future benefit. For example, if a 7% discount rate is used, the above calculation would result in a determination that 200 asthma attacks in ten years have a present value of about $30,000. In contrast, the same assessment using a 3% discount rate would value the same 200 asthma attacks at approximately $45,000. The difference between these two calculations becomes even more extreme as the time horizon is expanded. A policymaker calculating the present value of avoiding 200 asthma attacks in 100 years would find that those asthma attacks are worth just $69 if a 7% discount rate is used, whereas they are worth over $3000 if a 3% discount rate is used.

Given this disparity, how is one supposed to determine whether a few hundred asthma attacks in the next century are "worth" $69 or $3000? As detailed in Section C below, the federal government has never provided a clear answer to this question; instead, federal agencies employ a wide range of discount rates.[18] One possible explanation for the lack of consensus on the proper discount rate is that the discount rate represents a judgment of the worth of the lives of future generations. When a case of chronic bronchitis or a premature mortality is valued at more today than it is in twenty years, the government is embrac-

17. *See* Economic Analyses Guidelines, *supra* note 3, at § 6.2.3 ("[T]he choice of the discount rate largely determines whether [a] policy is considered, at least on economic efficiency grounds, to offer society positive or negative net benefits.").

18. *See infra* text accompanying notes 40-58.

ing the notion that our lives are worth more than our children's lives. Ironically, because discounting is so well-accepted by administrative policymakers, the debate is not over *whether* our lives are worth more than our children's, but over *how much more* they are worth.

There is no solution to this debate because there is no consensus among economists on the perfect discount rate.[19] Instead, the determination of the discount rate varies depending on how the economists and policymakers charged with setting it evaluate the rate of return on certain kinds of private investments. Discounting is founded (at least in part) on the premise that money today is worth more than money in the future because money today can be invested to increase in value. Economists have thus typically set the discount rate according to analyses of average investment returns.[20] Most often, their analysis is based on so-called no-risk or low-risk investments, such as U.S. Treasury bonds.[21] Depending on the precise type of investment used, as well as factors such as rates of return, taxes, and opportunity costs, the determination of the discount rate can vary signifi-

---

19. *See* ECONOMIC ANALYSES GUIDELINES, *supra* note 3, at § 6.1 ("[C]hoosing a discount rate has been one of the most contentious and controversial aspects of EPA's economic analyses of environmental policies."); *see also* Heinzerling, *Discounting*, *supra* note 3, at 42. *But see* Revesz, *supra* note 3, at 978-79 ("[T]here appears to be a growing consensus in the economics literature that the appropriate real discount rate for government projects is the real return on long-term government debt . . . .").

Scholars who have written on discounting have reached varying conclusions on the appropriate discount rate. Lisa Heinzerling has questioned whether there should be any discounting at all. *See* Heinzerling, *Discounting*, *supra* note 3, at *passim*; *see also* Heinzerling, *Environmental Law*, *supra* note 3, at 2074 ("The temporal analysis I have offered in this article thus casts considerable doubt on both the practicability and the theoretical foundations of discounting as applied to the life-saving benefits of environmental law."). Daniel Farber and Paul Hemmersbaug have argued that the discount rate should be set at 1 or 2%. *See* Farber & Hemmersbaugh, *supra* note 3, at 284, 296. Although Farber and Hemmersbaugh acknowledge that "arguably, we should weigh the welfare of our (collective) children equally with our own," they nonetheless endorse this small discount rate even in the intergenerational context. *Id.* at 296. In contrast, Richard Revesz has argued for a 2 or 3% discount rate in intragenerational contexts, but has said that discounting is ethically unjustified when dealing with policies that have intergenerational effects. Revesz, *supra* note 3, at 947, 984-88.

20. *See* ECONOMIC ANALYSES GUIDELINES, *supra* note 3, at § 6.3.1.2 (discussing various approaches such as the consumption rate of interest, the shadow price of capital, and the opportunity costs of capital); *see also* Farber & Hemmersbaugh, *supra* note 3, at 287-90; Heinzerling, *Discounting*, *supra* note 3, at 41-45; Revesz, *supra* note 3, at 977-81.

21. *See* Farber & Hemmersbaugh, *supra* note 3, at 286; Heinzerling, *Discounting*, *supra* note 3, at 43; Revesz, *supra* note 3, at 979.

cantly. Efforts have been made to factor empirical studies of actual consumer behavior into the determination of the discount rate.[22] In theory, individual consumers should engage in discounting-type analysis when making purchasing decisions and should apply discount rates relatively similar to prevailing interest rates or rates on low-risk investments.[23] However, these empirical studies have been of little use because consumers employ unpredictable discount rates, if they choose to discount at all.[24]

The fact that there is so much uncertainty over what particular discount rate should be used shows that the discounting formula is far more complex than it might initially appear. In one sense, the mechanics of discounting are relatively simple; anyone with basic arithmetic skills could discount a future benefit if given enough values to "plug into" the equation. Yet as the above discussion shows, difficult questions regarding the discount rate lurk behind the discounting formula, making any discounting calculation far more complicated than the discounting equation indicates.

B. *Discounting's Faulty Logic*

The previous section reviewed discounting from a perspective of a mathematician, noting the significant judgment call involved in setting the discount rate. This section takes a broader view of discounting by considering several general problems associated with the basic concept of discounting.[25] This review of some of discounting's logical flaws serves as a backdrop to Part III's investigation of EPA's (mis)use of discounting in its Nonroad Spark-Engine Rule analysis.

Discounting's logic is premised on a series of questionable assumptions. First, as already mentioned, discounting is based on

---

22. Heinzerling, *Discounting*, *supra* note 3, at 43.

23. *See* Economic Analyses Guidelines, *supra* note 3, at § 6.3.1.2 (showing that EPA's economic model for setting discount rates relies in part on rational discounting behavior by individuals); *see also id.* at § 6.3.1.1 (justifying discounting because "the government should also discount future costs and benefits in the same way that affected individuals do").

24. *See* Heinzerling, *Discounting*, *supra* note 3, at 43 (reporting that some studies have shown consumers discount at rates as high as 90%, whereas other evidence indicates that consumers actually employ negative discount rates).

25. A full analysis of the problems associated with discounting is beyond the scope of this paper. My intention here is to simply point out some of the more egregious theoretical problems associated with discounting.

the "time value" of money.[26] Due to inflation, the value of money decreases over time. Thus, it is better to have a given amount of money today than to have the same amount of money next year or in ten years. This conceptualization of the "time value" of money may make logical sense when applied to investments and savings accounts, but it simply cannot apply to human health. One cannot put a human life in a savings account and have it accrue interest and thus be worth 1.2 human lives at the end of the year. But in the world of discounting, one life today is worth the same as 0.744 lives in ten years – despite the fact that you either have a life or you don't.[27]

Second, discounting assumes that, if the benefits of a proposed policy do not outweigh the costs, it will be possible to delay regulation and obtain the same benefits at a later date. However, some types of future benefits will never be obtained unless regulation occurs now. For example, the ability of future generations to have a sufficient ozone layer or clean waterways depends on current generations investing in regulatory protection today. If current generations do not make such investments, certain natural resources will be extinguished and their replacement may not be possible at any price. Thus, in this context, discounting has no relevance because it is impossible to place the money the government would have spent on regulation in a mythical savings or investment account, allow it to grow in value, and then spend the money to solve the problem. By the time the hypothetical policymaker takes the money out of the mythical savings account, it is too late to repair the very real damage that has occurred.

Third, discounting fails to account for the fact that environmental regulation typically prevents both present and future harms. As Lisa Heinzerling has noted, "the beneficial consequences of environmental regulation do not occur within a single time frame. . . . Instead, life-saving environmental regulation produces benefits from the very moment it takes effect, until the moment that the last person helped by the regulation would

26. OFFICE OF MGMT. & BUDGET, CIRCULAR A-94 (2002) [hereinafter OMB CIRCULAR A-94 (2002)]; *see also* Heinzerling, *Discounting*, *supra* note 3, at 53.

27. One life today is worth approximately 0.744 of a life in ten years if a 3% interest rate is applied. The results are equally illogical if the analysis is done with monetary values instead of discounting lives directly. For example, if a life today is worth $6 million, a life in ten years, when discounted, would be worth just below $4.5 million. Yet, if a life is valued at $6 million, this is tantamount to saying that, in ten years, only a fraction of that life will remain.

otherwise have drawn her last breath."[28] For example, imagine an environmental regulation that was projected to prevent fifty cases of cancer in twenty years. A cost-benefit analysis employing discounting would likely view the harm of the cancer as starting at the moment of death and discount the harm from that point, rather than from, for example, the day the individual is told they have cancer or the day symptoms of the cancer first begin to appear.[29] Discounting also ignores the more immediate, non-cancer related benefits of environmental regulation because it targets the most serious health consequences that would occur years into the future.[30] Furthermore, discounting fails to consider that some individuals would prefer to avoid risk altogether, even if a particular ailment was not to arise until several years down the road.[31] For example, reasonably risk-averse people might be as interested in avoiding cancer in ten years as they are in avoiding cancer next year. Such risk-averse people might derive substantial present benefit from knowing that they are avoiding future risk because their government is as concerned about their health in ten years as it is with their health today. Whether in the form of non-cancer-related health benefits or the psychological comfort of avoiding future risk, environment regulations provide many present benefits that are simply not taken into account in a cost-benefit analysis that focuses on future ailments.[32]

Finally, discounting fundamentally misconstrues the purpose of government. As noted above, one of the two major arguments used to support discounting is that it reflects people's preference for immediate benefits rather than having to wait for benefits many years into the future.[33] Discounting has thus elevated people's short-term, materialistic preferences to a new height, al-

28. Heinzerling, *Environmental Law*, *supra* note 3, at 2026.

29. *Id.* at 2072-73.

30. Agencies have often characterized benefits of regulations according to cancer-related benefits. Even when the analysis does not focus solely on cancer, the vast majority of the attention is given to major ailments that will not arise for years into the future. However, as Lisa Heinzerling has noted, environmental regulation often provides a wide range of more immediate benefits, such as avoidance of skin disorders, asthma attacks, headaches, and increased rates of birth disorders, just to name a few. *See id.* at 2047-53. A cost-benefit analysis that focuses on a more distant health benefit such as cancer avoidance would fail to account for this entire range of more immediate benefits.

31. *Id.* at 2029-46 (discussing risk).

32. *Id.* at 2069-74.

33. *See supra* text accompanying note 10; *see infra* text accompanying notes 34-35.

lowing impatience to drive important public policy decisions. One could hardly imagine what would happen if every governmental decision was subject to an analysis that hinged on the whims of people's preferences. After all, many people would probably *prefer* to not pay income taxes or to drive the speed limit. Yet, when the government sets tax rates or speed limits, it does not discount the benefit of having taxes or speed limits simply because many people would prefer not to have them. Instead, the government exists to make difficult decisions that may not be made if subject to an analysis that hinges on people's impulses. Likewise, one would hope that our administrative agencies would be willing to make difficult decisions on regulatory policy without letting people's impulses dictate their analysis. Simply, we trust our government to restrain people's individualistic impulses.[34] Instead of restraining these impulses, discounting embraces them and permits them to govern important regulatory decisions.

C. *The Government's Policies on Discounting*

Before moving on to Part III's analysis of EPA's Nonroad Spark-Engine Rule, it is important to briefly review the government's official positions on discounting. In 1981, President Ronald Reagan issued Executive Order 12,291, which required agencies to conduct a cost-benefit analysis for all major rules.[35] Although OMB endorsed discounting well before 1981,[36] Reagan's establishment of cost-benefit analysis on a widespread scale opened the door for discounting to become a constant feature in regulatory assessment.[37] Over the course of the 1980s, OMB be-

34. EPA seems to have missed this point entirely. Instead, EPA's *Guidelines for Economic Analyses* adopts the libertarian view that "strict adherence to the principles of consumer sovereignty is necessary in order to determine how much each person would agree he or she is made better or worse off by a given policy in present value terms." *See* ECONOMIC ANALYSES GUIDELINES, *supra* note 3, at § 6.3.1.1.

35. Exec. Order No. 12,291, 3 C.F.R. § 128 (1981). Instead of calling it a cost-benefit analysis, President Reagan's Executive Order ordered agencies to do what it described as a "regulatory impact analysis." *Id.*

36. *See, e.g.*, OFFICE OF MGMT. & BUDGET, CIRCULAR A-94 (1972); *see also* Heinzerling, *Discounting*, *supra* note 3, at 45-49.

37. In 1993, President Clinton replaced President Reagan's order with his own command to agencies to conduct cost-benefit analysis. *See* Exec. Order No. 12,866, 3 C.F.R. § 638 (1993). However, Clinton's order was not substantially different than Reagan's, leaving all of the requirements of Reagan's executive order in place. *Id.* *See also* Robert W. Hahn and Robert E. Litan, *Recommendations for Improving Accountability and Transparency*, 3 n.8 (March 2003), *available at* http://www.aei.brookings.org.

came more aggressive in insisting that agencies apply discounting to all future costs and benefits, even if it meant discounting nonmonetized factors such as human lives saved. Today, OMB continues to endorse discounting based on the notion that discounting reflects the "time value of money."[38] OMB provides little analysis in support of its decision to use discounting, stating simply that "benefits and costs are worth more if they are experienced sooner."[39]

Generally, federal agencies have fallen in line behind OMB's commands to use discounting in their cost-benefit analyses.[40] However, the federal government has not spoken with one voice in regards to the most important decision in any discounting analysis – setting the discount rate.[41] Federal agencies tend to set the discount rate anywhere between 3% and 10%.[42] Although there is a vast difference between a discounting calculation that uses a 3% discount rate and one that uses a 10% discount rate, federal agencies have not reached an agreement on the proper rate at which to discount future costs and benefits. OMB has historically based its suggested discount rate according to what it thought was an average rate of return on private investments.[43] Since 1992, OMB has advised agencies to use a 7% discount rate, arguing that 7% is the proper estimate of a rate of return on private investment.[44] However, agencies have not strictly adhered to this suggested discount rate. For example, in its Nonroad Spark-Engine Rule, EPA used a 3% discount rate in evaluating the costs and benefits of the regulation.[45] It also provided alternative calculations using a 7% discount rate, perhaps in an effort to win OMB approval.[46]

Despite substantial disagreement over the proper discount rate, nearly every agency has endorsed discounting and used it in one form or another in its analyses. Like OMB, most agencies

---

38. OMB CIRCULAR A-94 (2002), *supra* note 26.

39. *Id.*

40. For discussion of the position of several different agencies on discounting, *see* Heinzerling, *Discounting*, *supra* note 3, at 49-52, 54-57.

41. *Id.*

42. *Id.* at 45-57; *see also* Revesz, *supra* note 3, at 977-81.

43. Heinzerling, *Discounting*, *supra* note 3, at 45-47.

44. *Id.* at 47-48; *see also* OMB CIRCULAR A-94 (2002), *supra* note 26.

45. *See* U.S. ENVTL. PROT. AGENCY, FINAL REGULATORY SUPPORT DOCUMENT: CONTROL OF EMISSIONS FROM UNREGULATED NONROAD ENGINES, § 10.3.4, tbl. 10.3-7 n.p. (2002) [hereinafter FINAL REGULATORY SUPPORT DOCUMENT], *available at* http://www.epa.gov/otaq/regs/nonroad/2002/cleanrec-final.htm.

46. *Id.*

discount without much comment, seemingly ignoring the many ethical and theoretical problems associated with discounting.[47] EPA, however, does provide considerable commentary by devoting an entire chapter to discounting in its *Guidelines for Preparing Economic Analyses*.[48] In these guidelines, EPA states that "the conceptual foundation of discounting is based *on the fact that* present consumption is valued differently from future consumption."[49] The unequivocal nature of this statement indicates that EPA whole-heartedly endorses discounting. However, later in the chapter, EPA briefly acknowledges that discounting in an inter-generational context raises serious moral issues and that the decision to discount the lives of future generations "cannot be made on economic grounds alone."[50] Somewhat astonishingly, EPA then quickly dismisses these ethical problems by stating that long-term environmental regulations aimed at benefiting multiple generations "are uncommon because most environmental programs are relatively short in duration and are reversible."[51] Thus, after some brief discussion of the problems associated with discounting, EPA has arrived at the same position as its fellow administrative agencies – i.e. that discounting is an important component of any cost-benefit analysis.

Aside from the many executive branch statements on discounting, on a few occasions the judicial branch has ventured into the debate over discounting. However, when courts address the issue of discounting, their focus tends to be on a single component of the discounting calculation rather than a broad assessment of the practice and its shortcomings. For example, in 1983, the Tenth Circuit Court of Appeals looked at discounting in the context of an Environmental Impact Statement (EIS).[52] In *Johnston v. Davis*, the plaintiffs appealed the district court's approval of an

47. *See* Heinzerling, *Discounting*, *supra* note 3, at 54. *See* discussion *infra* Part II.C. (addressing some of the ethical and theoretical problems that these agencies ignore).

48. ECONOMIC ANALYSES GUIDELINES, *supra* note 3, at § 6.2.2.

49. *Id.* (emphasis added).

50. *Id.* at § 6.3.2.3.

51. *Id.* This flies in the face of the traditional notion that the entire purpose of environmental regulation is to incur present costs in exchange for far greater returns to future generations.

52. Johnston v. Davis, 698 F.2d 1088 (10th Cir. 1983). The National Environmental Policy Act requires that all federal agencies prepare a detailed statement of environmental consequences "in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(C) (2003). This detailed statement is known as an Environmental Impact Statement, or EIS. For a challenge to a 3.25%

EIS done by the U.S. Department of Agriculture for a proposed reservoir.[53] The plaintiffs argued that EPA used an unrealistically low discount rate of 3.25% which exaggerated the benefits of the proposed reservoir, thereby preventing a reasonable comparison of alternatives.[54] The Tenth Circuit held that the agency was entitled to use the 3.25% discount rate because the federal statute under which the reservoir was being built specifically authorized the use of such a "low" rate.[55] However, the Tenth Circuit apparently agreed with the plaintiff's assessment that the 3.25% discount rate was "unrealistically" low because the court demanded that, even though the agency had a statutory right to use the 3.25% rate, it must state in its EIS that "this discount rate is unrealistically low compared to rates presently used to evaluate water resource projects."[56] Beyond simply noting that other water resource projects use higher discount rates, the Tenth's Circuit's opinion provides no explanation as to why a 3.25% rate is low or why a discount rate should be used at all.

In its 1991 decision in *Corrosion Proof Fittings v. U.S. Envtl. Prot. Agency*, the Fifth Circuit Court of Appeals at least acknowledged that there were questions surrounding the practice of discounting.[57] In *Corrosion Proof Fittings*, The Fifth Circuit reviewed EPA's decision to discount costs but not benefits.[58] The court found this comparison of discounted costs to non-discounted benefits was unacceptable, ruling that "the EPA also should discount benefits to preserve an apples-to-apples comparison." Beyond requiring that EPA discount both costs and benefits if it chooses to discount at all, the Fifth Circuit admitted that "various commentators dispute whether it ever is appropriate to discount benefits when they are measured in human lives."[59] Yet, the Fifth Circuit effectively dodged the larger debate surrounding discounting by narrowly focusing its decision on EPA's decision to discount costs but not benefits.[60] Thus, *Corrosion*

discount rate similar to the one brought by the plaintiffs in *Johnston*, *see* Mardis v. Big Nance Creek Water Mgmt. Dist., 578 F. Supp. 770, 791-94 (N.D. Alabama 1983).

53. *Johnston*, 698 F.2d at 1090.

54. *Id.* at 1092.

55. *Id.* at 1092-95.

56. *Id.* The court also said that the agency "may not pretend that the cost-benefit analysis prepared under this discount rate represents a realistic assessment of the economic value of the project." *Id.*

57. 947 F.2d 1201, 1218 (1991).

58. *Id.*

59. *Id.*

60. *Id.*

Proof Fittings and *Johnston* show that courts have focused on particular aspects of discounting without ever considering the merits - or lack thereof - of the practice more generally. Even though courts such as the Fifth Circuit in *Corrosion Proof Fittings* may recognize that there are some questions concerning whether the government should discount at all, case law on the subject thus far provides no evidence that courts will be willing to stop or limit its use.

D. *A Concluding Note on this Overview of Discounting*

This Part has provided an overview of discounting from three different perspectives: Section A examined the basic mathematics of discounting, Section B highlighted several of the logical flaws of discounting, and Section C reviewed how administrative agencies and the courts have dealt with discounting. Besides providing an introduction to discounting, this Part also showed that discounting raises many unanswered questions. Section A showed that there is no agreement on the proper discount rate, Section B pointed out flaws in the theoretical foundation of discounting, and Section C demonstrated that executive branch agencies have never fully justified their use of discounting. As we turn to Part III's investigation of the use of discounting in the Nonroad Spark-Engine Rule, these general uncertainties will combine with a real-word look at a questionable application of discounting, further raising a concern that discounting in cost-benefit analysis is more of a tool to defeat regulation than a method of evenhandedly evaluating proposed regulations.

III.
THE CASE STUDY: DISCOUNTING AND THE NONROAD SPARK-ENGINE RULE

On October 5, 2001, EPA proposed regulating emissions from certain categories of nonroad engines.[61] The proposed standards focused on three types of nonroad engines: (1) large industrial spark ignition engines, including engines used in forklifts, airport ground equipment, and construction vehicles; (2) nonroad recreational engines, such as those used in all-terrain-vehicles (ATVs) and snowmobiles; and (3) recreational marine diesel engines,

61. Control of Emissions from Nonroad Large Spark Ignition Engines and Recreational Engines (Marine and Land-Based), 66 Fed. Reg. 51,098 (proposed Oct. 5, 2001)(to be codified in scattered sections at 40 C.F.R.).

commonly used in yachts and other marine pleasure crafts.[62] EPA forged new ground with this proposal, because emissions from these types of vehicles had never before been regulated by the agency.[63]

In support of its proposal, EPA showed that the costs of implementing the rule would be more than outweighed by the fuel-savings generated by the rule's demand that manufacturers produce more efficient engines.[64] In fact, EPA determined that consumers would save $410 million per year in fuel, which would more than double the costs incurred for purchasing the more expensive, more fuel-efficient vehicles.[65]

As required by executive order, EPA submitted its draft Notice of Proposed Rulemaking to OMB.[66] As discussed above, an office within OMB known as OIRA reviews all proposed rules before they become final to ensure that the agencies have sufficient support for their rules. As John D. Graham, the Administrator of OIRA, noted in a 2001 memorandum to agency heads, OIRA review also gives the executive branch an opportunity to police the agencies and to determine if significant agency actions are in line with the president's political agenda.[67] If OIRA disagrees with the agency's action, it has authority to send the agency what is known as a "return letter," requiring the agency to reconsider its action.[68] According to Graham's memorandum, a return letter may be issued for a wide range of reasons, including if, in OIRA's opinion, "the quality of the agency's analyses is inadequate, if the regulatory standards adopted are not justified by the analyses, if the rule is not consistent with the regulatory

62. *See* U.S. ENVTL. PROT. AGENCY, DRAFT REGULATORY SUPPORT DOCUMENT, PROPOSED RULE FOR CLEANER RECREATIONAL VEHICLES (MARINE AND LAND BASED), HIGHWAY MOTORCYCLES, AND NONROAD LARGE SPARK-IGNITION ENGINES, at i-iii (Oct. 5, 2001) [hereinafter DRAFT REGULATORY SUPPORT DOCUMENT], *available at* www.epa.gov/otaq/regs/nonroad/proposal/cleanrec.htm.

63. U.S. ENVTL. PROT. AGENCY, PROGRAM UPDATE: REDUCING AIR POLLUTION FROM NONROAD ENGINES 2 (April 2003), *available at* http://www.epa.gov/nonroad/f03011.pdf.

64. *Id.* at §§ 5-1 to 5-49.

65. *Id.* at § 7.3 & tbl. 7.3-12.

66. Exec. Order No. 12,866, 3 C.F.R. § 638 (1993) (Clinton Exec. Order on discounting).

67. Memorandum from John D. Graham, Administrator, Office of Information and Regulatory Affairs, to Agency Heads (Sept. 20, 2001), *available at* http://www.whitehouse.gov/omb/inforeg/oira_review-process.html.

68. *Id.* Graham has also instituted a procedure known as a "prompt letter," where OMB proposes that the agency consider new regulation, or "consider rescinding or modifying an existing rule." *Id.*

principles stated in [Executive] Order [12866, which requires cost-benefit analysis,] or with the President's policies and priorities."[69]

In the case of the Nonroad Spark-Engine Rule, OIRA exerted this authority, demanding that EPA completely revise its assessment of costs and benefits.[70] Although EPA had already determined that the rule would more than pay for itself based on fuel savings alone, OIRA wanted to see a broader cost-benefit analysis that monetized the health benefits of reducing emissions.[71] Ironically, in demanding this extra analysis, Graham admitted that he was "quite open to the possibility that additional analysis will further support the proposed regulatory options."[72] Indeed, it would seem certain that any additional analysis of health benefits would simply provide more evidence that the benefits of the Nonroad Spark-Engine Rule were worth the costs. After all, given that EPA already determined the fuel savings were more than *double* the costs of the new engines, it would seem that an analysis of the health benefits of the proposed rule would simply make the benefits even larger.[73] However, Graham thought that the added information provided by such an analysis – even if it did not make any difference in the final decision – was worth sending the agency back to the drawing board and further delaying implementation of the regulations.[74]

---

69. *Id.*

70. Letter from John D. Graham, Administrator, Office of Information and Regulatory Affairs, to Jeffrey R. Holmstead, Assistant Administrator, U.S. Environmental Protection Agency (Sept. 24, 2001) [hereinafter Graham letter to EPA], *available at* http://www.whitehouse.gov/omb/inforeg/spark_engines_epa_sep2001.html (reacting to EPA's Proposed Rule, which was later published in the Federal Register at 66 Fed. Reg. 51,098 (Oct. 5, 2001)).

71. Apparently, OIRA was skeptical that monetizing the health benefits would increase the benefits estimate, because its letter to EPA suggested that these nonroad engines were used in rural areas, whereas air pollution was most problematic in urban areas: "[S]nowmobiles are generally used in rural areas and the pollutants of concern for this engine category . . . are typically of concern in more densely populated urban settings." *See* Graham letter to EPA, *supra* note 70.

72. *Id.*

73. This is exactly what happened. In its Proposed Rule, EPA estimated a yearly benefit of $430 million based on just fuel savings. *See* Draft Regulatory Support Document, *supra* note 61, at Ch. 5. After expanding its cost-benefit analysis in accordance with OIRA's wishes, this benefit estimate grew substantially to over $8 billion. *See* Final Regulatory Support Document, *supra* note 45, at tbl. 10.6-1.

74. *See* Graham letter to EPA, *supra* note 70. In support of his decision to require more analysis, Graham said, "It is important to provide decisionmakers, the Congress, and the public with a better understanding of the effects of this rule. Moreover, the refined analysis that EPA will generate may justify alternate standards,

The fact that OIRA so easily rejected EPA's analysis raises several questions. First, one wonders whether, when Congress delegated lawmaking authority to EPA, it ever imagined that the executive branch (speaking through OIRA) would be so involved in second-guessing the agency's scientific and economic analyses. Second, in this case it seems that OIRA is operating as a tool to stall or block regulation. Given the Bush administration's anti-regulatory political leanings, it seems quite possible that part of the motivation behind OIRA's demand for additional analysis of what was already a well-supported, economically efficient regulation was a desire to stall EPA's process simply for the sake of opposing further regulation. Finally, OIRA's demand for more analysis from EPA leads one to ask a practical question: how should EPA respond in order to win OIRA's approval?

It is EPA's response – specifically, its new cost-benefit analysis – that I will focus on for the remainder of this Part. This response deserves careful attention for several reasons. First, in its new cost-benefit analysis, EPA utilized several questionable valuation techniques that minimized benefit estimates compared to the estimates that would have been generated by more traditional valuation methods. In order to examine these techniques more closely, I have broken EPA's valuation process into what I refer to as two "maneuvers." I employ this term to highlight that EPA's valuation methods are not typical and appear to be creative ways to avoid a straightforward and honest benefits analysis. Section A focuses on EPA's first maneuver in this valuation process. In this maneuver, EPA made the unprecedented decision to value lives of the elderly at approximately two-thirds the value of the non-elderly. Section B discusses EPA's second maneuver. In this second and more complex maneuver, EPA used discounting in a highly unusual manner to calculate the statistical value of a human life. This unorthodox use of discounting resulted in a far lower estimate of the value of human life than is normally used in regulatory analysis. Finally, Section C examines the broader implications for this type of cost-benefit analysis by asking why EPA would go so far in response to OIRA's request for more analysis, and how this kind of analysis could be used to block proposed regulations.

---

phase-in periods and/or scope of engines covered, leading to a final rule that differs from the proposed." *Id.*

A. *Maneuver #1: Making the Elderly Worth Less*

The valuation of human life is a critical step in the cost-benefit analysis of any regulation with the potential to prevent death. This step is especially important in the context of environmental regulation because environmental policies are often justified by their ability to save lives over the long run. Because there is no natural market for human lives, policymakers calculate the value of a statistical life (VSL) by relying on analyses of people's attitudes toward potentially life-threatening risks. These analyses come in two general forms.[75] One form estimates VSLs based on wage-risk studies that examine wages that workers are paid for accepting risky jobs.[76] Contingent valuation studies provide the other basis for estimating VSLs. Contingent valuation studies use survey methods to ask people how much they would be willing to pay for a good if a given hypothetical market existed. For example, such a survey may ask healthy individuals how much they would have to be paid before accepting an added risk to their health. One might expect similar VSL estimates based on these two types of studies. However, contingent valuation studies consistently result in lower VSL estimates than those produced by wage-risk studies.[77]

In choosing a VSL for its Nonroad Spark-Engine Rule, EPA relied on contingent valuation studies rather than wage-risk studies. This decision – a controversial choice by itself – was not explained in the documents supporting EPA's Nonroad Spark-Engine Rule.[78] After settling on a $3.7 million VSL estimate based on contingent valuation studies, EPA then took the unprecedented step of assigning a lower value to lives of the eld-

75. *See* Farber & Hemmersbaugh, *supra* note 3, at 274; Heinzerling, *Markets for Arsenic*, 90 GEO. L.J. 2311, 2315 (2002).

76. *See* Farber & Hemmersbaugh, *supra* note 3, at 274; Heinzerling, *supra* note 74, at 2315; *see also* Revesz, *supra* note 3, at 955-57.

77. Often the difference in the estimates produced by the two types of studies is substantial, with wage-risk studies regularly estimating VSLs in the ballpark of $6 million and contingent valuation studies estimating VSL in the neighborhood of $3 million. *See* Cass Sunstein, *Hazardous Heuristics*, 70 U. CHI. L. REV. 751, 759 n.42 (Spring 2003) (citing VALUING ENVIRONMENTAL PREFERENCES: THEORY AND PRACTICE OF THE CONTINGENT VALUATION METHOD IN THE U.S., E.U., AND DEVELOPING COUNTRIES (Ian J. Bateman and Kenneth G. Willis eds., 1999)).

78. *See* FINAL REGULATORY SUPPORT DOCUMENT, *supra* note 45, at § 10.3.9 (adopting a $3.7 million VSL based on five contingent valuation studies and providing no explanation for why contingent valuation studies were used instead of wage-risk studies).

erly.[79] EPA assigned a value of $2.3 million to individuals over the age of seventy – a 37% decrease from the $3.7 million value of life of those less than seventy years old.[80] To support this differentiation, EPA cited a single study conducted in the United Kingdom in 1982.[81] This study, based on questionnaire responses from 1150 British citizens, made general conclusions regarding the impact of one's age on self-evaluations of risk, stating that there is "a significant relationship between valuation of safety and age."[82] However, the authors never stated that their results merited a 37% decrease in the valuation of life for those above the age of seventy. In fact, when questioned about EPA's reliance on this study to support such a decrease, the study's principal investigator, Michael Jones-Lee, indicated that the decades-old study should not have been used by EPA to support the 37% decrease .[83] According to Jones-Lee, the study was out-of-date and did not apply to views of the elderly in the United States.[84]

Reliance on the Jones-Lee study was not EPA's only questionable maneuver in supporting a lower VSL for the elderly. EPA also cited a 2000 study by Krupnick et al. to support distinguishing between individuals over and under the age of seventy.[85] Although the Krupnick data analysis did, in fact, produce some findings indicating that those above the age of seventy valued increased risk at less than those below the age of seventy, these findings were not statistically significant.[86] Reliance upon non-statistically significant data is generally discouraged,[87] and it seems particularly troublesome that EPA would rely on such

79. *Id.* at § 10.3.9.

80. *Id.*

81. *Id.* (citing M.W. JONES-LEE, THE ECONOMICS OF SAFETY AND PHYSICAL RISK (1989)).

82. M.W. JONES-LEE, THE ECONOMICS OF SAFETY AND PHYSICAL RISK 202-04 (1989).

83. Seth Borenstein, *Youth Fare Better than Elderly in Bush Administration's Cost-Benefit Analyses*, KNIGHT-RIDDER TRIBUNE/BUS. NEWS (Dec. 19, 2002).

84. *Id.* When questioned about EPA's use of his data to support a 37% reduction in the VSL for the elderly, Jones-Lee responded: "The bottom line is the picture is fuzzy. . . . I certainly wouldn't argue for my 1982 figure." *Id.*

85. FINAL REGULATORY SUPPORT DOCUMENT, *supra* note 45, at § 10.3.9.

86. KRUPNICK ET AL., AGE, HEALTH, AND THE WILLINGNESS TO PAY FOR MORTALITY RISK REDUCTION: A CONTINGENT VALUATION SURVEY OF ONTARIO RESIDENTS 31, 36, 40 (2000) (Resources for the Future Discussion Paper 00-37).

87. *See* JESSICA M. UTTS, SEEING THROUGH STATISTICS 159-60 (2nd ed. 1999) ("To be convincing, an observed relationship must be statistically significant."); *see also* FINKELSTEIN & LEVIN, STATISTICS FOR LAWYERS 120-22 (2nd ed. 2001).

data as evidence that an elderly life is less valuable than a non-elderly life.[88]

A recent study by V. Kerry Smith indicates that EPA might have had a stronger scientific base to stand on if they took the opposite approach and valued life of the elderly at a *higher* level than life of the non-elderly.[89] The Smith study suggests that EPA should have assigned a higher value to VSLs of individuals over the age of seventy.[90] After analyzing risk-perception survey data of over 12,000 individuals, Smith concluded that "in all cases the VSL estimates *increase* with age, and range between 7 and 14 million dollars."[91]

When the conclusions of the Smith study are coupled with EPA's questionable reliance on the Jones-Lee and Krupnick studies, EPA's decision to treat the life of the elderly as less valuable than the life of the non-elderly appears to be without scientific merit. Given the lack of scholarly support for differentiating between the elderly and non-elderly when calculating VSLs, one is left to wonder why EPA would base its cost-benefit analysis on such shaky science. The differentiation also makes little sense in the context of a regulation aimed at improving air quality because the elderly are harmed most by air pollution and thus would actually derive greater benefit from a regulation like the Nonroad Spark-Engine Rule than would the rest of the population.[92] It is tempting to explain away EPA's analysis as a one-time mistake. However, this devaluation of elderly life has been repeated in the Clear Skies Initiative, making one wonder whether forces within the executive branch are cloaking an anti-regulatory policy agenda behind a veneer of cost benefit analysis.[93] After all, an administration that would prefer to prevent new emissions regulations from being passed would have a motive to manipulate a cost-benefit analysis so as to reduce benefits

---

88. The EPA relied on this same Krupnick study in its Clear Skies Initiative. *See* CLEAR SKIES TECHNICAL ADDENDUM, *supra* note 10, at 35-36.

89. *See* V. Kerry Smith et al., Do the "Near" Elderly Value Mortality Risks Differently? 2-3, 10, 12 (2003) (unpublished manuscript; currently under review for publication) (on file with author).

90. *Id.*

91. *Id.* at 10 (emphasis in original).

92. *See, e.g.*, R.O. Morris et. al., *Ambient Air Pollution and Hospitalization for Congestive Heart Failure Among Elderly People in Seven Large U.S. Cities*, 85 AMER. J. PUB. HEALTH 1343, 1361-65 (1995) ("In summary, this study demonstrates a clear and consistent association between ambient levels of carbon monoxide and hospital admissions for congestive heart failure among elderly people.").

93. *See* CLEAR SKIES TECHNICAL ADDENDUM, *supra* note 10, at 35-36.

calculations as much as possible, even if it meant treating our elders as worth one-third less than the rest of the population.

B. *Maneuver #2: Using Discounting to Create an Even Smaller VSL*

In some respects, EPA's decision to value lives of the elderly at approximately one-third less than the rest of the population was a relatively straightforward means of making the Nonroad Spark-Engine Rule's benefits calculation smaller, and thus tipping the scales of the cost-benefit analysis against regulation. After all, it is fairly obvious that if we assign a certain segment of the population a lower VSL value, then the total value of saving their lives will be less. However, EPA's second maneuver in this devaluation of benefits was much less straightforward. This second maneuver, which involved two separate steps, used discounting to produce an even lower VSL value.

1. Maneuver #2, Step 1: Breaking Up the Statistical Life Measurement (VSL) into Individual Life Years (VSLY)

EPA began its second maneuver by deconstructing the two-tiered VSL from the first maneuver into individual life-year estimates.[94] In other words, EPA viewed its Nonroad Spark-Engine Rule as not saving anyone's *entire* life, but merely giving people a few extra years of life. From this perspective, the proper measurement of benefits is a "value of statistical life years" (VSLY) instead of VSL.[95] Measuring the benefits of regulation in life-years saved (i.e. in VSLYs), rather than in lives saved is said to be a superior way to assess regulation.[96] According to the argument, if the regulation saves the life of an elderly person, then it has really only saved a few years, whereas if the regulation saves the life of a child, it allegedly has saved much more.[97] This argu-

94. *See* FINAL REGULATORY SUPPORT DOCUMENT, *supra* note 45, at § 10.3.9 ("In order to value the expected life years lost . . . we need to construct estimates of the value of a statistical life year.").

95. *Id.* ("The valuation approach used is a value of statistical life years . . . based on amortizing the base VSL for each age cohort."). Although the benefits of environmental regulations are more typically analyzed simply in terms of VSL rather than VSLY, this conversion is at least logically supportable and has been utilized in other scientific contexts. The VSLY measurement is most commonly seen in the medical context where the benefits of drugs are studied by assessing the number of individual life years they add to a patient's life.

96. Heinzerling, *Environmental Law*, *supra* note 3, at 2074.

97. *Id.*

ment has several flaws, and a full critique of relying on VSLYs is beyond the scope of this paper.[98] However, it is worth mentioning one general and one specific criticism of the life-year measurement.

First, when a person dies from, for example, chronic obstructive pulmonary disease brought about by poor air quality, they die completely. Their death is not a partial one and should not be measured as such. Second, in the specific context of the Nonroad Spark-Engine Rule, the use of VSLYs makes little sense because, as described in the discussion of Maneuver #1 above, EPA already made a distinction between the elderly and non-elderly by assigning the elderly a lower VSL value. Proponents of the VSLY measurement argue that it is a superior means of evaluating regulations because it accounts for the difference between saving the life of the elderly and saving the life of someone who has comparatively many more years to live.[99] Yet if EPA already accounted for this difference by assigning the elderly a lower VSL value, why is a second distinction necessary? EPA already devalued elderly life once when it assigned elderly lives a lower worth. It then went a step further, compounding that devaluation by breaking the already-stratified VSL values into VSLY values. EPA provides no real explanation for this second devaluation of elderly life,[100] leaving one to again wonder why they would view benefits that the elderly derive from improved air quality as so insignificant.

2. Maneuver #2, Step 2: Using the Life Year Values (VSLYs) to Construct a New, and Much Lower, Statistical Life Value (VSL)

Due to EPA's use of discounting, the logic breaks down even further on the second step of maneuver two. In this step, EPA created a new VSL by adding together its newly calculated VSLY estimates.[101] If this were done without discounting, then the task would be circular: EPA would have taken a VSL, broken it down into individual years, and then added those same years back up

98. For further discussion, *see id.* at 2074-77.

99. *See* FINAL REGULATORY SUPPORT DOCUMENT, *supra* note 45.

100. *See id.*, at § 10.3.9 ("[I]n order to value the expected life years lost for CPOD [chronic obstructive pulmonary disease] and non-CPOD deaths, we need to construct estimates of the value of a statistical life-year.").

101. *See* FINAL REGULATORY SUPPORT DOCUMENT, *supra* note 45, at § 10.3.9 ("The VSL applied in this analysis is then built up from that VSLY by taking the present value of the stream of life years, again assuming a 3% discount rate.").

to construct the exact same VSL it began with. But in this case, EPA discounted the life years before adding them back up.[102] This alternative VSL, built using discounted life years, is a logically flawed means of assessing the benefits of life-saving regulation for several reasons.

First, under this alternative VSL, the value of elderly life ends up being *more* than the value of the non-elderly life. To illustrate this point, consider the following: EPA constructed a new VSL for the elderly by adding together discounted VSLY estimates, resulting in a new VSL for the elderly of $1.25 million.[103] EPA also used discounted life-years to construct a life value for the non-elderly. This non-elderly life value was $2.3 million.[104] If average life expectancy is set at age seventy-five and Person "A" is seventy years old, then her remaining five years would have a value of $1.25 million divided by five, or $150,000. If Person "B" is forty years old and thus is expected to live for thirty-five more years, his remaining thirty-five years would have a value of $2.3 million divided by thirty-five, approximately $65,000. Thus, under EPA's own calculations, the seventy-year-old (Person A) has a life that is worth $150,000 per year, whereas the forty-year-old (Person B) has a life that is worth just $65,000 per year. Of course, the irony — and the illogic — of this result is that on the page of its Support Document immediately preceding the construction of these new VSL values, EPA concluded that the lives of the elderly were worth *less* than the lives of the non-elderly.[105] At one moment EPA states that the elderly are worth merely two-thirds the value of the non-elderly, but then at the next moment EPA effectively says a year of a seventy-year-old's life is worth nearly three times as much as a year of a forty-year-old's life.

Second, by deconstructing the original VSL estimates into individual VSLY values and *then* applying discounting, EPA is discounting a measurement that is highly speculative, rendering the new VSL value even more speculative. Normally, when life-saving regulation is under consideration, discounting is applied to VSL estimates. Even in this context, discounting is a rough exer-

---

102. *Id.* ("The VSL applied to this analysis is then built up from that VSLY . . . *assuming a 3% discount rate.*") (emphasis added).

103. *Id.* (setting forth a $3.7 million VSL for individuals below the age of seventy and a $2.3 million VSL for individuals seventy and over).

104. *Id.*

105. *Id.*

cise because it is extremely difficult to determine the "actual value" of a life. However, the level of uncertainty is increased when the original VSL values are broken into VSLY estimates because the studies done to support the original VSL values do not necessarily support VSLY estimates. For example, simply because a survey of workers in risky jobs leads to the conclusion that a statistical life is worth a given amount does not mean that one should assume those same workers would logically view a single year of their life to be worth an equally proportional amount. If EPA was insistent on using VSLY values, a better approach would have been to base VSLY estimates on studies focused on the value of life years instead of studies measuring the value of a life.

This flaw in EPA's analysis reveals a broader problem associated with discounting: the "present value" that you arrive at after discounting is only as reliable as the number that you use for the "actual value" part of the formula. If you are discounting a marketable object (such as a car) whose "actual value" can be easily determined because there is a market in such goods, your discounting calculation will produce a relatively accurate result. In this case, EPA was basing its calculations on the value of individual life years, a "good" that has no equivalent in the marketplace and whose value is even more nebulous than a statistical life. Thus, when you start with a speculative VSL value and then break this up into an unsupported VSLY estimate, you have effectively increased your level of speculation. Despite these compounding layers of speculation, EPA did not hesitate to build a new VSL value on top of this uncertainty.

C. *OIRA, EPA, and Discounting: A Deregulatory Political Partnership?*

The policy analysts at EPA have extensive experience using cost-benefit analysis to analyze regulation. They did not engage in the kind of maneuvers described above by accident. Instead, they made a conscious decision to devalue the worth of the elderly and derive a low VSL estimate based on a highly unusual use of discounting and individual life-year estimates. Given the odd nature of this analysis and its many flaws, one must ask why EPA would engage in such an atypical cost-benefit assessment. Furthermore, the maneuvers and questionable discounting practices of the Nonroad Spark-Engine Rule cannot be explained away as a one-time anomaly. Instead, the discounting practices in EPA's

Clear Skies Initiative[106] and Nonroad Diesel-Engine Rule[107] show that questionable cost-benefit analyses may be becoming more commonplace at EPA. Of course, it is difficult to speculate on the motivations behind these cost-benefit analyses. Even though EPA devoted a full chapter of the Nonroad Spark-Engine Rule's Final Regulatory Support Document to the cost-benefit analysis, the chapter only provides basic information on data, calculations, and studies the agency used. It does not provide information on the motives behind these calculations. Given this lack of information, one can only speculate about what prompted the agency's decisions.

Although such speculation is an admittedly dangerous exercise, OIRA's involvement in this process indicates that EPA's cost-benefit analysis was tailored to meet OIRA's specifications. As noted in the introduction to this Part, EPA only engaged in this questionable cost-benefit analysis after OIRA disapproved of its initial assessment of costs and benefits. Given the need to win approval, one could easily conclude that EPA presented this analysis in order to please the economists on OIRA's staff. It is far from a conspiracy theory to suggest that EPA engaged in this analysis in order to win OIRA approval, considering that EPA has shown a willingness to work closely with OIRA in other areas. For example, in June of 2002, EPA announced that it was entering into what it called an "unusual collaboration" with OIRA to regulate emissions from on-road diesel-powered trucks and buses.[108] EPA specifically noted that it would collaborate with OIRA on "the design of an innovative regulatory analysis" that would involve analysis of risks, benefits, and costs.[109] Thus, it seems perfectly reasonable to suggest that OIRA had substantial influence over the cost-benefit analysis used to support EPA's Nonroad Spark-Engine Rule.

In some respects, none of this should be a surprise. After all, the executive branch should exert control over its administration, and OIRA involvement is a perfectly reasonable method of doing so. However, this particular form of control becomes unreasonable when it uses allegedly non-political methods of

106. *See* CLEAR SKIES TECHNICAL ADDENDUM, *supra* note 10, at 35-36.

107. *See* NONROAD DIESEL ENGINE RULE DRAFT ANALYSIS, *supra* note 11, at 9-146 to 9-147.

108. Press Release, EPA and OMB Working to Speed the Reduction of Pollution from Nonroad Diesel Engines (June 7, 2002), *available at* http://yosemite.epa.gov/opa/admpress.nsf.

109. *Id.*

evaluating policy in a manner that turns them into tools to support a deregulatory agenda. At a first glance, discounting does not seem to be a political device because the equations and basic theories behind discounting appear impartial. But when applied to the context of environmental regulation, discounting starts to bias the analysis against regulation because the many costs of environmental regulation occur in the present while the benefits often do not appear for decades into the future. From the beginning, discounting tips the scales of the cost-benefit analysis against regulation by devaluing future benefits. EPA and OIRA can tip the scales even further through economic parlor tricks such as those employed in the Nonroad Spark-Engine Rule analysis and replicated in the Clear Skies Initiative[110] and the Nonroad Diesel Engine Rule.[111] If OIRA is pressuring agencies to engage in these suspect valuating techniques to further President Bush's deregulatory agenda, the use of discounting as a political tool is really only a secondary concern. The more serious consequence is that discounting and cost-benefit analysis are not recognized as political tools, but instead continue to be viewed as nonpartisan, scientific methods of evaluating regulation, when they are actually being used to further a deregulatory political agenda.

IV.
CONCLUSION

According to EPA, "benefit-cost analysis is not a precise tool that yields firm numerical results, rather, it is a general framework for more carefully accounting for the potential and varied effects of government programs."[112] However, cost-benefit analysis may not even be useful as a general framework for evaluating regulatory proposals if it is biased by anti-regulatory assumptions. The preceding discussion of EPA's Nonroad Spark-Engine Rule shows how discounting biases cost-benefit analysis against regulatory proposals that impose present costs in exchange for benefits that do not occur for many years into the future. Because environmental regulation typically involves such present costs and future benefits, discounting acts as a default presumption against proposed environmental policies. The

110. CLEAR SKIES TECHNICAL ADDENDUM, *supra* note 10, at 35-36.

111. *See* NONROAD DIESEL ENGINE RULE DRAFT ANALYSIS, *supra* note 11, at 9-146 to 9-147.

112. *See* GUIDELINES FOR ECONOMIC ANALYSES, *supra* note 3, at § 6.1.

Nonroad Spark-Engine Rule also demonstrates how this bias grows when discounting is made part of an analysis that includes several other questionable valuation decisions — such as relying on non-statistically significant data, devaluing the life of the elderly, and inventing a new VSL value far lower than values normally assigned to human life. Finally, the use of discounting and other suspect valuation methods in support of the Nonroad Spark-Engine Rule gives rise to concerns that cost-benefit analysis is being used as a tool to further a deregulatory political agenda rather than as a nonpartisan means of evaluating regulation. This concern grows when one considers that similarly suspect discounting practices have been used subsequently in EPA's Clear Skies Initiative and in EPA's Nonroad-Diesel Engine Rule. Without a better explanation and justification from EPA, observers are left to wonder if the agency is playing politics with its cost-benefit assessments. Such a politically-driven answer is perhaps the only reasonable explanation, given that the above analysis shows that the Nonroad Spark-Engine Rule's cost-benefit analysis does not make logical sense on its own merits. If, as this article indicates, discounting and cost-benefit analysis are simply vehicles to further a deregulatory political agenda, then we should view them as political tools rather than, in the words of EPA, as part of an even-handed "general framework for more carefully accounting for the potential and varied effects of government programs."[113]

113. *Id.*