

**BEN TRACHTENBERG\***

## Health Inflation, Wealth Inflation, and the Discounting of Human Life

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ABSTRACT

This Article presents two new arguments against “discounting” future human lives during cost-benefit analysis, arguing that even absent ethical objections to the disparate treatment of present and future humanity, the economic calculations of cost-benefit analysis itself—if properly performed—counsel against discounting lives at anything close to current rates. In other words, even if society sets aside all concerns with the discounting of future generations in principle, current discounting of future human lives cannot be justified even on the discounters’ own terms. First, because cost-benefit analysis has thus far ignored evidence of rising health care expenditures, it underestimates the “willingness to pay” for health and safety that future citizens will likely exhibit, thereby undervaluing their lives. Second, cost-benefit analysis ignores the trend of improved material conditions in developed countries. As time advances, residents of rich countries tend to live better and spend more, meaning that a strict economic monetization of future persons values the lives of our expected descendents above those of present citizens. These two factors justify “inflation” of future lives that would offset, perhaps completely, the discount rate used for human life. Until regulators correct their method of discounting the benefits of saving human lives in the future, the United States will continue to suffer the fatal costs of underregulation, and agencies will remain in violation of legal requirements to maximize net benefits.

INTRODUCTION

Underregulation kills. When a sensible and effective regulation is proposed but then not implemented, society loses whatever benefits the regulation would have provided. When those benefits take the form of saved lives—if, for example, the regulation would have kept a certain carcinogen out of the workplace—failing to enact and enforce a regulation means people die. For at least two reasons,

federal agencies in the United States systematically undercount the benefits of regulation, causing regulators to forsake the implementation of lifesaving laws that would have been enacted were benefits estimated more accurately. The result is countless American lives lost every year.<sup>1</sup>

This Article presents two new arguments against the “discounting” of future human lives as part of cost-benefit analysis (CBA), arguing that even absent ethical objections to the disparate treatment of present and future humanity, the economic calculations of cost-benefit analysis itself—if properly performed—counsel against discounting lives. In other words, even if society sets aside all concerns with the discounting of future generations in principle, the current practice of discounting future human lives cannot be justified even on the discounters’ own terms. First, because cost-benefit analysis has thus far ignored evidence of rising health care expenditures, it underestimates the “willingness to pay” for health and safety that future citizens will likely exhibit, thereby undervaluing their lives. Second, cost-benefit analysis ignores the trend of improved material conditions in developed countries. As time advances, residents of rich countries tend to live better and spend more, meaning that a strict economic evaluation of future lives would discount the relatively impoverished lives of present citizens compared to the projected luxurious and healthy existence of our expected descendants.

Because all federal regulatory agencies calculate costs and benefits, the underregulation resulting from overdiscounting deprives Americans of benefits in several diverse ways. By undercounting the benefits of environmental protection, the Environmental Protection Agency (EPA) deprives Americans of clean air and clean water. By undercounting the benefits of workplace safety, the Occupational Safety and Health Administration (OSHA) exposes Americans to health hazards. By undercounting the benefits of automobile accident prevention, the National Highway Traffic Safety Administration increases the number of fatal crashes. Examples are limited only by the number of federal agencies and the scope of their regulatory mandate, meaning there is effectively no limit. Regulations concerning global climate change, the benefits of which would be realized far into the future, are especially impeded by

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<sup>1</sup> I use the word “countless” advisedly; the number of needless deaths literally cannot be counted with any reliability.

overdiscounting. Until regulators correct their method for discounting the benefits of saving human lives in the future, the United States will continue to suffer the fatal costs of underregulation, and agencies will remain in violation of legal requirements to maximize net benefits.

## I

### HOW PRESENT LIVES ARE VALUED, AND THE PROBLEM OF DISCOUNTING

When deciding whether and how to regulate, federal agencies evaluate the costs and benefits of proposed regulatory strategies, comparing one strategy against another and against doing nothing.<sup>2</sup> Because the purpose of regulation is often to save lives—or at least to reduce risks to life—the benefits of many potential policies cannot be quantified without setting a value on human life. For example, imagine a potential Department of Transportation (DOT) regulation providing that any city receiving federal highway construction funds must employ a specified number of school crossing guards to prevent students from being struck by cars.<sup>3</sup> The costs of the regulations, while uncertain, could be estimated with some pretense of accuracy. How many crossing guards do recipient cities employ today? How much would each additional guard’s salary, fringe benefits, and overhead cost? Although some estimation will be necessary, a plausible number can be offered. For this exercise, assume extra crossing guards cost a total of \$100 million yearly. The benefits of extra guards, however, defy straightforward quantification. Even if the sole benefit is the prevention of fatal car accidents,<sup>4</sup> the magnitude

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<sup>2</sup> See Exec. Order No. 12,866, 3 C.F.R. 638 (1993), *reprinted as amended in* 5 U.S.C. § 601 (requiring that agencies conduct cost-benefit analysis before promulgating major regulation). See generally Frank Ackerman & Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U. PA. L. REV. 1553 (2002).

<sup>3</sup> Although I have not found such a crossing-guard mandate, DOT regulations concerning local school crossing guards do exist. See, e.g., National Standards for Traffic Control Devices, 73 Fed. Reg. 268, 273 (Jan. 2, 2008) (discussing Federal Highway Administration standards for “STOP paddles used by adult crossing guards”); Amendments to Highway Safety Program Guidelines, 74 Fed. Reg. 14,843, 14,857 (Apr. 1, 2009) (“Local school officials and law enforcement personnel should work together to establish crossing guard programs.”); see also 32 C.F.R. § 634.24(b)(3) (2009) (directing Army “installation commanders” to develop traffic circulation plans that should “includ[e] trained school-crossing guards”).

<sup>4</sup> One would expect additional benefits; the crossing guards may prevent non-fatal accidents, reduce street crime, provide lost motorists with directions, and perform other useful services.

of the benefit remains unknowable—or at least not capable of being weighed against the \$100 million cost—unless the policy maker ascribes a monetary value to each life saved. If the extra guards would save twenty lives annually, then the value of the benefits exceeds the value of the costs only if each life saved is valued above \$5 million.

Is it worth \$5 million dollars to save a schoolchild from being killed by a speeding car? At some level, the question is preposterous, unanswerable. But both cost-benefit analysis and the laws requiring that it be performed demand a number. To calculate the value of a human life—sometimes called the “value of a statistical life” (VSL)—economists have attempted to determine how persons value the elimination of risks of death. For example, if a person would pay  $x$  dollars to avoid a one-in-a-hundred chance of instant death, then the person values his own life at 100-times- $x$  dollars. To determine a person’s “willingness to pay” (WTP) to avoid risk, one can simply ask (i.e., collect survey data), or one can extrapolate willingness to pay based on real-world phenomena, such as wage premiums for dangerous jobs.<sup>5</sup> If two jobs are otherwise identical but one presents a one-in-a-thousand risk of death each year for every worker, then employees at the dangerous job should demand higher compensation.<sup>6</sup> An annual wage premium of \$8000 would imply that workers are willing to accept the risk in exchange for that amount (or that workers at the safe job are willing to pay \$8000 to avoid the risk),<sup>7</sup> leading to a statistical life valued at \$8 million.<sup>8</sup>

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<sup>5</sup> See Richard L. Revesz, *Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives*, 99 COLUM. L. REV. 941, 955–57 (1999).

<sup>6</sup> See W. Kip Viscusi, *The Value of Risks to Life and Health*, 31 J. ECON. LITERATURE 1912 (1993). The workers “should” demand higher compensation in a world wherein certain assumptions of economists, such as workers possessing accurate information about wages and risks at their own and other workplaces, are true. The validity of such assumptions is a question beyond the scope of this work.

<sup>7</sup> For purposes of this Article, the difference between calculations relying on “willingness to pay” (WTP) and “willingness to accept” (WTA) is not especially important. The key is that, one way or another, economists can determine a VSL based on wage premiums and other market phenomena. For more detail on the distinction between WTP and WTA, as well as the potential relevance of so-called “endowment effects” in deciding which is more useful, see Scott A. Moss & Peter H. Huang, *How the New Economics Can Improve Employment Discrimination Law, and How Economics Can Survive the Demise of the “Rational Actor,”* 51 WM. & MARY L. REV. 183, 206–10 (2009); see also Cass R. Sunstein, *Valuing Life: A Plea for Disaggregation*, 54 DUKE L.J. 385, 400 (2004).

<sup>8</sup> See STEPHEN BREYER, *BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION* (1993); Lewis A. Kornhauser, *The Value of Life*, 38 CLEV. ST. L. REV. 209

In addition to calculating the values of costs and benefits, regulators must consider when costs will be borne and when benefits will be enjoyed. A benefit reaped today is normally worth more than the same benefit tomorrow, and a cost incurred today normally hurts more than the prospect of an identical future cost.<sup>9</sup> This concept explains why banks charge interest and why J. Wellington Wimpy so often told Popeye, “I will gladly pay you Tuesday for a hamburger today.”<sup>10</sup> Because many regulations impose up-front costs to achieve future benefits,<sup>11</sup> a cost-benefit analysis incorporates the “present value” of future costs and benefits.<sup>12</sup> So far, so good. Few would dispute that a hamburger today is worth more than the promise of a future hamburger, even if one is absolutely certain that the future hamburger will be delivered as promised. Why is a hamburger today better than a guaranteed future hamburger? The theory is that one could sell the hamburger today, invest the proceeds, and then buy the future hamburger later. If the investment beats inflation, one can enjoy the future hamburger and extra cash. In practice, an investment in U.S. Treasury bonds would likely provide at least some extra cash at close to zero risk. Another reason hamburgers today are worth more than guaranteed future hamburgers is that someone entitled to a hamburger today has additional options. For example, if she is at the brink of starvation, the hamburger today (or its cash value) could save her life, and the promised hamburger will be worth nothing if she dies before its delivery. Unless there exists a market for selling the rights to future hamburgers, one entitled to a promised burger has a highly illiquid asset. For all these reasons, regulators sensibly discount the value of most future benefits.

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(1990). Other data one might use to calculate VSLs include wrongful death verdicts, life insurance purchases, and payments by the September 11th Victim Compensation Fund.

<sup>9</sup> See N. GREGORY MANKIW, *PRINCIPLES OF ECONOMICS* 598 (5th ed. 2008); RICHARD A. BREALEY & STEWART C. MYERS, *PRINCIPLES OF CORPORATE FINANCE* 14 (7th ed. 2003) (“[A] dollar today is worth more than a dollar tomorrow, because the dollar today can be invested to start earning interest immediately.”).

<sup>10</sup> See ELZIE CRISLER SEGAR, *THIMBLE THEATER, INTRODUCING POPEYE: A COMPLETE COMPILATION OF THE FIRST ADVENTURES OF POPEYE, 1928–1930* (1977).

<sup>11</sup> A simple example: When the Environmental Protection Agency mandated the reduction of lead in automotive fuel, industry incurred up-front costs, and the benefits (a reduction in lead poisoning) came later. See OFFICE OF POL’Y ANALYSIS, U.S. EPA, *COSTS AND BENEFITS OF REDUCING LEAD IN GASOLINE: FINAL REGULATORY IMPACT ANALYSIS I-23* (1985) (“[W]e use a 10 percent real discount rate to compute present values . . . . Generally, the higher the discount rate, the lower the net benefits, because costs usually are incurred sooner than benefits.”).

<sup>12</sup> See Ackerman & Heinzerling, *supra* note 2, at 1559–60.

Controversy results from the combination of these two practices—the valuation of statistical lives and the discounting of future benefits. The problem is that while a hamburger available today is worth more than a hamburger provided in the future, it is far less clear that a life saved today is more valuable than a life saved a few years from now. If one regulation can deliver  $x$  dollars immediately and another regulation costing the same amount would take ten years to deliver the same dollar amount, then the first regulation wins any cost-benefit contest.<sup>13</sup> But if one regulation saves a schoolchild today, and another regulation costing the same amount would save a schoolchild ten years from now,<sup>14</sup> which regulation should be enacted?

### A. *The Status Quo*

The consensus among policy makers is that the life saved today is indeed worth more than the one saved in the future, and cost-benefit analyses generally discount future VSLs just as they discount future economic benefits.<sup>15</sup> In a recent rule-making proposal, the Federal Railroad Administration (FRA) announced a plan to restrict mobile telephone use by train operators.<sup>16</sup> To justify the proposed rule, the FRA produced a CBA as part of its regulatory impact analysis.<sup>17</sup>

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<sup>13</sup> Note that if the delay is sufficiently long (say, a generation or two), discounting becomes problematic even without monetization of human lives. One who spends recklessly now will suffer the consequences in her own future, but persons spending recklessly the patrimony of future generations suffer no such reckoning. *See* sources cited *infra* note 42; *see also* Coleman Bazelon & Kent Smetters, *Discounting in the Long Term*, 35 LOY. L.A. L. REV. 277, 281 (2001); JOHN RAWLS, A THEORY OF JUSTICE 251–58 (rev. ed. 1999).

<sup>14</sup> The dichotomy contemplates two different children potentially saved, each the same age at the time saved. For the same person, a risk (or certainty) of death now is worse than that same risk (or certainty) ten years from now. Humans being mortal, efforts to avoid fatalities (such as driving carefully or seeking medical attention for injuries) reflect a desire to postpone—not to prevent—bearing the ultimate “cost” faced by us all.

<sup>15</sup> *See generally* Douglas A. Kysar, *Discounting . . . on Stilts*, 74 U. CHI. L. REV. 119 (2007) (objecting to current practice); Dexter Samida & David A. Weisbach, *Paretian Intergenerational Discounting*, 74 U. CHI. L. REV. 145, 145 (2007) (arguing that “discounting future costs and benefits of projects [including lives] does not undervalue future generations”).

<sup>16</sup> *See* Restrictions on Railroad Operating Employees’ Use of Cellular Telephones and Other Electronic Devices, 75 Fed. Reg. 27,672, 27,673 (May 18, 2010) (to be codified at 49 C.F.R. pt. 220) (proposing a rule that would replace an emergency temporary rule currently in force).

<sup>17</sup> *Id.* at 27,683. Because the regulation at issue is so straightforward and the benefits so clear, this document offers a good starting point for readers relatively unfamiliar with CBAs and the process of creating them.

Costs included training railroad employees, as well as the “opportunity costs” of additional time spent in safety briefings, which employees could otherwise spend somewhere else.<sup>18</sup> The FRA then considered what benefits would be necessary to justify the costs. In the agency’s words, “FRA compared the costs of the proposed rule to the minimum number of statistical fatalities that would need to be prevented for the rule to be cost-beneficial.”<sup>19</sup> With the costs measured in dollars, such a comparison was possible only if the FRA assigned a monetary value to the prevention of “statistical fatalities.” Concluding that “the regulation would yield positive net benefits if it prevented the loss of just half of the value of a statistical life each year over the twenty-year period examined,”<sup>20</sup> which the agency considered quite likely,<sup>21</sup> the FRA proposed that the regulation be enacted. Perhaps because the benefits of preventing train operators from chatting on mobile phones so obviously outweigh the costs of the regulation, no explicit discussion of discounting saved lives appears in the FRA’s notice of proposed rulemaking. Regardless, discounting is silently included in the agency’s assessment of “the value of a statistical life [saved] each year” for twenty years.

Explicit discounting of future saved lives appears in a proposed rule concerning food labeling announced by the Food Safety and Inspection Service (FSIS) of the Department of Agriculture. The rule requires labels disclosing the percentage of fat in certain meat products, including ground hamburger meat, where such labeling was previously voluntary.<sup>22</sup> The rule would cost meat producers and retailers hundreds of millions of dollars.<sup>23</sup> The benefits would appear in the form of improved health enjoyed by meat consumers caused by

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<sup>18</sup> *Id.* The FRA’s conclusion about costs was that “[a]pplying highly conservative assumptions, 20-year direct and indirect costs could total as much as \$22.4 million (discounted at 7%) or \$30.2 million (discounted at 3%).” *Id.* at 27,674.

<sup>19</sup> *Id.* at 27,684.

<sup>20</sup> *Id.*

<sup>21</sup> *Id.* (“For some perspective on the achievability of such prevention, FRA notes that over the period from 2000 to 2008, electronic device usage in trains likely caused or contributed to accidents resulting in at least 30 fatalities and over 100 injuries—an average of over three deaths per year, as well as significant train delay and property damages.”).

<sup>22</sup> Nutrition Labeling of Single-Ingredient Products and Ground or Chopped Meat and Poultry Products, 74 Fed. Reg. 67,736, 67,739 (Dec. 18, 2009) [hereinafter Nutrition Labeling Rule] (to be codified at 9 C.F.R. pts. 317, 381).

<sup>23</sup> Depending on the discount rate, FSIS estimated the present value of the costs between \$348 million and \$472 million. *Id.* at 67,773.



greater access to nutritional information.<sup>24</sup> FSIS estimated that after the labeling rules have been in force for several years, the regulation will save about 114.5 lives annually.<sup>25</sup> Accordingly, like so many regulations, the meat-labeling rule would have up-front costs and distant benefits, making the discount rate an important factor in the FSIS cost-benefit analysis. The higher the discount rate, the lower the present value of the benefits, and the less likely the regulation will be enacted. The value of a statistical life chosen by the agency will also significantly affect the result, with a higher VSL leading to higher benefit numbers. Here, FSIS calculated a range of expected benefits, using VSLs from \$5 million to \$6.5 million and discount rates of 3% and 7%.<sup>26</sup> The vastly different outcomes starkly illustrate the importance of the discount rate and VSL chosen by the agency.<sup>27</sup> With a VSL of \$6.5 million and a discount rate of 3%, the total benefits are estimated to equal \$5.9 billion. With a VSL of \$5 million and a discount rate of 7%, the total benefits are estimated to equal \$1.1 billion.<sup>28</sup> In other words, with no changes in assumptions concerning the effectiveness of food labeling in changing consumption habits, the relationship between meat consumption and fatal diseases, or the likelihood that industry will obey new regulations, the estimated benefits can nonetheless increase more than fivefold (or, from the other perspective, decrease by more than 80%) depending on procedural choices made by an agency during the CBA process.<sup>29</sup>

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<sup>24</sup> *Id.* at 67,782 (“The benefits of this supplemental proposed rule would be the lives saved due to the estimated reductions in mortality rates associated with coronary heart disease and selected cancers.”).

<sup>25</sup> *Id.* at 67,783 (“Decreases in intake of saturated fat, fat, and cholesterol will reduce the incidence of heart disease and cancer, but not immediately—the reductions in illness and death will begin to occur years into the future.”).

<sup>26</sup> *Id.* at 67,783–84.

<sup>27</sup> See Bazelon & Smetters, *supra* note 13, at 278; Cass R. Sunstein, *Cost-Benefit Default Principles*, 99 MICH. L. REV. 1651, 1711–12 (2001) (noting “erratic” fluctuation in discount rates used by federal agencies, with even the same agency adopting different rates for different future costs and benefits “for no apparent reason”).

<sup>28</sup> Nutrition Labeling Rule, *supra* note 22, at 67,783–84.

<sup>29</sup> References in CBA to ranges of VSLs and discount rates are quite common. See, e.g., Prevention of Salmonella Enteritidis in Shell Eggs During Production, Storage, and Transportation, 74 Fed. Reg. 33,030, 33,055 (July 9, 2009) (to be codified at 21 C.F.R. pts. 16, 118) (FDA: “The values in this column will vary depending upon the particular estimates of the value of a statistical life (VSL) . . . and the discount rate.”); Aircraft Repair Station Security, 74 Fed. Reg. 59,874, 59,884 (Nov. 18, 2009) (to be codified at 49 C.F.R. pts. 1520, 1554) (TSA); Proposed Rulemaking to Establish Light-Duty Vehicle

The FSIS regulatory impact analysis also illustrates another reason that discounting of human lives plays such an important role when regulations are under review. Even though FSIS believed that its proposed meat-labeling rule would have benefits in addition to saving human lives, those benefits were ignored when the agency quantified the rule's estimated monetary benefits.<sup>30</sup> As a result, for purposes of the CBA, the value of preventing a nonfatal cancer was zero.<sup>31</sup> Similarly, in the regulatory impact analysis justifying a recent OSHA regulation aimed at preventing crane accidents, "the Agency did not estimate cost savings from avoiding crane accidents, but only estimated monetized benefits for avoiding fatalities . . . or injuries."<sup>32</sup> Scholars have long criticized the tendency of agencies to ignore entirely benefits they cannot easily quantify,<sup>33</sup> a problem particularly acute when regulations have mostly noneconomic benefits such as the protection of an endangered species with no obvious monetary value

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Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 74 Fed. Reg. 49,454, 49,460 (Sept. 28, 2009) (to be codified at 49 C.F.R. pts. 86, 600) (EPA).

<sup>30</sup> Nutrition Labeling Rule, *supra* note 22, at 67,782 ("Given questions concerning data quality and unsettled methodological issues in estimating the benefits of a reduction in non-fatal cases of coronary heart disease, FSIS is restricting its analysis of benefits to reductions in premature death.").

<sup>31</sup> The common practice of disregarding important (but difficult to calculate) benefits is behind the decision to ignore all benefits other than prevention of fatal accidents in the crossing guard example above. See *supra* note 4 and accompanying text; see also Matthew D. Adler & Eric A. Posner, *Rethinking Cost-Benefit Analysis*, 109 YALE L.J. 165, 173 (1999) ("Although EPA estimated the benefits from reducing lead damage to plumbing components, it did not include this estimate in the CBA published with the final rule [concerning lead in drinking water]."); James K. Hammitt, *Stratospheric-Ozone Depletion*, in ECONOMIC ANALYSES AT EPA: ASSESSING REGULATORY IMPACT 131, 149 (Richard D. Morgenstern ed., 1997) (reporting the EPA's ignoring, in CBA for regulation protecting stratospheric ozone, benefits of preventing certain skin cancers).

<sup>32</sup> Cranes and Derricks in Construction, 75 Fed. Reg. 47,906, 48,095 (Aug. 9, 2010) (to be codified at 29 C.F.R. pt. 1926) ("These cost savings do not represent other losses associated with accidents, such as production time lost to provide medical services to injured employees, damage to cranes, damage to the work site or beyond, damage to the load materials or rigging, lost time in cleaning up and repairing damage to the worksite, lost production time while the crane is removed, repaired, or replaced with a substitute.").

<sup>33</sup> E.g., William Funk, *Public Participation and Transparency in Administrative Law—Three Examples as an Object Lesson*, 61 ADMIN. L. REV. 171, 182 (2009) (arguing that the cost-benefit analysis process has elevated monetary costs over often intangible benefits); see also David M. Driesen, *Is Cost-Benefit Analysis Neutral?*, 77 U. COLO. L. REV. 335, 398–99 (2006); Thomas O. McGarity, *A Cost-Benefit State*, 50 ADMIN. L. REV. 7, 58 (1998) ("neglecting 'soft' considerations like fairness, dignity, and intrinsic beauty does bias the analysis against regulatory intervention").

or the preservation of unspoiled wilderness.<sup>34</sup> Pervasive dismissal of unquantifiable benefits may be explained by the tendency of courts to deem arbitrary and capricious—and accordingly to strike down—regulations justified by benefits with no numeric value.<sup>35</sup> Agencies have limited time to devote to regulation, and if appellate judges have no respect for unquantifiable benefits, agencies are wise to focus on what works, irrespective of whether such judicial policy making is appropriate.<sup>36</sup> Whatever the reason for the outsized attention given to benefits with dollar values, and in particular to lives saved, any change in the procedure for assigning monetary values to human lives has tremendous potential to affect the day-to-day ability of agencies to respond to problems.

### B. *Ethical Problems with the Status Quo*

In addition to practical concerns, to which this Article devotes most of its attention, critics such as Frank Ackerman and Lisa Heinzerling have attacked the discounting of future lives during CBA calculations as unethical.<sup>37</sup> The simplest argument against discounting future lives is that one should not value present persons above future persons. As evidence for this moral claim, critics note that with a positive discount rate, even enormous future benefits have minimal present value. Imagine, for example, that scientists announce that one thousand years from today, an asteroid will destroy the Earth, killing everyone on it. Fear not, however. For \$100, NASA can build an

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<sup>34</sup> See Lisa Heinzerling & Frank Ackerman, *The Humbugs of the Anti-Regulatory Movement*, 87 CORNELL L. REV. 648, 655 (2002); see generally Amy Sinden, *The Economics of Endangered Species: Why Less Is More in the Economic Analysis of Critical Habitat Designations*, 28 HARV. ENVTL. L. REV. 129 (2004).

<sup>35</sup> See, e.g., *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201 (5th Cir. 1991) (vacating EPA rule promulgated under the Toxic Substances Control Act that would have banned most uses of asbestos); see also Thomas O. McGarity, *The Courts and the Ossification of Rulemaking: A Response to Professor Seidenfeld*, 75 TEX. L. REV. 525, 541–49 (1997). “The judges [in *Corrosion Proof Fittings*], in short, lacked the breadth and depth of experience and expertise necessary to support such confident assertions about how the agency should go about its assigned business. And they almost certainly got it wrong.” *Id.* at 547.

<sup>36</sup> The decision in *Corrosion Proof Fittings* was particularly demoralizing to EPA staff. See Jennifer L. Leonardi, *It’s Still Here! The Continuing Battle over Asbestos in America*, 16 VILL. ENVTL. L.J. 129, 137–38 (2005) (recounting EPA staffers lamenting that asbestos is “killing people and that the court ruling was not going to make that fact disappear”). The Department of Justice declined to appeal the Fifth Circuit decision. *Id.* at 138.

<sup>37</sup> See FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING 179–203 (2004).

asteroid deflector, launch it into space, and redirect the giant rock elsewhere, saving all humanity. The deflector must be launched immediately for the procedure to work.<sup>38</sup> Let us consider the costs and benefits of the project.

Costs: \$100. Benefits: *About nine billion human lives saved in one thousand years.*

Do the benefits outweigh the costs? The economists say no. With a world population of nine billion persons, each of whom is worth \$7 million,<sup>39</sup> the total benefits equal  $\$6.3 \times 10^{16}$ . But these future benefits must be discounted. With a discount rate of 3.5% per year,<sup>40</sup> the standard formula of

$$\text{Present Value} = \text{Future Benefit} / (1 + \text{Discount Rate})^{\text{Years}}$$

reveals that the value of saving nine billion lives in one thousand years equals

$$(\$6.3 \cdot 10^{16}) / 1.035^{1000} = \$72.28$$

Seventy-two dollars, twenty-eight cents. If NASA devoted \$100 to this effort, it would waste nearly \$28. A discount rate of 4% yields a

<sup>38</sup> Although this scenario may strain credulity, societies often face the choice of acting quickly or never. The passenger pigeon, once one of the most abundant birds in the world, disappeared forever when the last bird died in the Cincinnati Zoo in 1914. See David Wilcove, *In Memory of Martha and Her Kind*, 91 AUDUBON, Sept. 1989, at 52. Americans cannot correct the regulatory failure that allowed the extinction of the species. In addition, some chemicals (such as dense nonaqueous phase liquids) have proven impossible to fully remove from contaminated groundwater. See, e.g., OFFICE OF SOLID WASTE & EMERGENCY RESPONSES, U.S. EPA, RECOMMENDATIONS FROM THE EPA GROUND WATER TASK FORCE 23–25 (2007) (discussing sites where cleanup would be wasteful or impossible because of “technical impracticability”); THE DNAPL REMEDIATION CHALLENGE: IS THERE A CASE FOR SOURCE DEPLETION?, EPA/600/R-03/143, at xiii (2003) (acknowledging that full remediation of certain sites is “unlikely”).

<sup>39</sup> These numbers are conservative; they likely overestimate the future monetary benefits. See U.N. Dep’t of Econ. & Soc. Affairs, *World Population to 2300* 1, U.N. Doc. ST/ESA/SER.A/236 (2004) (projecting a population around nine billion); Seth Borenstein, *An American Life Worth Less Today*, ASSOCIATED PRESS, July 10, 2008, available at [http://www.usatoday.com/news/nation/2008-07-10-796349025\\_x.htm](http://www.usatoday.com/news/nation/2008-07-10-796349025_x.htm) (reporting that in May 2008, EPA calculated a VSL of \$6.9 million); Nutrition Labeling Rule, *supra* note 22, at 67,783 (discussing VSL of \$5 million and noting that other agencies, such as the Food and Drug Administration, use that figure).

<sup>40</sup> This is another conservative number. Federal agencies often use much higher discount rates, and higher discount rates yield smaller present values. E.g., Nutrition Labeling Rule, *supra* note 22, at 67,773 (stating that the agency prepared estimates using discount rates of 3% and 7%); see OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, REGULATORY ANALYSIS 31, 34 (2003) (“For regulatory analysis, you should provide estimates of net benefits using both 3 percent and 7 percent.”); Revesz, *supra* note 5, at 977–78; see also *supra* note 11 (showing EPA’s use of a 10% discount rate).

total value of less than one dollar,<sup>41</sup> and discount rates of 5% or higher yield totals well below one cent. Little training in moral philosophy is required to recognize that the economists have offered a monstrous definition of “value.” It is difficult to imagine a constructive dialogue concerning the proper use of tax dollars in which one participant truly deems it wasteful to devote a penny (or \$100, for that matter) to saving the planet and all its inhabitants in the distant future.

These arguments are not new,<sup>42</sup> and the proponents of discounting future lives have various answers for them.<sup>43</sup> For now, I would like to put aside the attacks on discounting future lives, at least those attacks which challenge the foundation of CBA generally. It will suffice to state that while the issue remains hotly debated, the moral and ethical arguments appear to have little chance of changing the actual calculations of costs and benefits conducted by federal agencies.<sup>44</sup> When considering this Article’s subsequent discussion of how discount rates should properly be calculated in a regulatory environment that insists on using them, it will be useful to recall that if the ethical criticisms reviewed in this Part are justified, any practice that tends to inflate the CBA discount rate is especially pernicious, for it exacerbates the effects of an already lethal, immoral procedure.

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<sup>41</sup> Fifty-eight cents.

<sup>42</sup> See DEREK PARFIT, REASONS AND PERSONS 357 (1984); Revesz, *supra* note 5, at 947 n.21 (and sources cited therein); see also Tyler Cowen & Derek Parfit, *Against the Social Discount Rate*, in JUSTICE BETWEEN AGE GROUPS AND GENERATIONS 144, 145 (Peter Laslett & James S. Fishkin eds., 1992) (“Imagine finding out that you, having just reached your twenty-first birthday, must soon die of cancer because one evening Cleopatra wanted an extra helping of dessert.”).

<sup>43</sup> E.g., Cass R. Sunstein, *Your Money or Your Life*, NEW REPUBLIC, Mar. 15, 2004, <http://www.tnr.com/article/books-and-arts/your-money-or-your-life> (reviewing ACKERMAN & HEINZERLING, *supra* note 37, and concluding that “we cannot rely entirely on cost-benefit analysis, but we will do a lot better, morally as well as practically, with it than without it”); see also Kysar, *supra* note 15, at 131 (collecting defenses of discounting future lives).

<sup>44</sup> Indeed, although Heinzerling has been appointed Senior Policy Counsel on climate change for the EPA, agency regulations must go through the Office of Management and Budget’s Office of Information and Regulatory Affairs, which is currently run by Sunstein.

## II

WHY CBA DEFENDERS ARE WRONG ON THE NUMBERS EVEN IF  
THEY ARE RIGHT ON THE ETHICS

Even if CBA, the monetization of human life, and the discounting of future benefits are all taken as givens—if all moral objections are tabled—the current practice of discounting future human life cannot be justified even on a purely economic basis. Within the current CBA discounting regime, the discount rate for future lives should be radically reduced for two reasons. First, the inflation of health care costs, which are increasing far faster than the price of other goods and services, indicates that future generations will exhibit far greater “willingness to pay” to avoid fatal risks than economists measure today, meaning that the value of future lives—which is discounted to find a present value—is currently underestimated by CBA practitioners. Second, modern industrialized societies tend to increase in wealth, meaning that even if health care does not increase as a portion of the U.S. gross domestic product, future generations of Americans will be richer than Americans are today, meaning they will have more money to spend avoiding risk. These factors combine to cause a massive undervaluation of future human lives, thereby causing the underestimation of the benefits of environmental and other regulation, which accordingly—even if the CBA proponents are granted their primary premises—leads to needless deaths.<sup>45</sup>

*A. Health Care Costs Inflate Faster than Costs of Normal Goods*

In recent years, rapid health care cost inflation has captured the attention of American politicians and scholars.<sup>46</sup> CBA calculations, however, have not considered health inflation when calculating the value of future lives. Ignoring health inflation undervalues future

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<sup>45</sup> Inaccurate CBA calculations also prevent agencies from obeying executive orders and statutes requiring that they maximize the “net benefits” of regulations. *See infra* Part IV.B.3.

<sup>46</sup> *See* President Barack Obama, Remarks to a Joint Session of Congress on Health Care (Sept. 9, 2009) (“If we do nothing to slow these skyrocketing costs, we will eventually be spending more on Medicare and Medicaid than every other government program combined.”); Nan D. Hunter, *Risk Governance and Deliberative Democracy in Health Care*, 97 GEO. L.J. 1, 9–10 (2008) (“After a pause in the mid-1990s, the sharp upward spiral in costs has resumed.”). Hereinafter, I will use “health inflation” as shorthand for the increase of health care costs at rates higher than the rate of inflation measured for other goods and services.

lives no matter what discount rate is applied to future benefits. Accordingly, regardless of whether agencies should use 3%, 7%, 10%, or some other number—or even if they should use no discount rate at all, that is, a rate of 0%—underestimating the future value of a life saved will cause a CBA calculation to lowball the present value of that future benefit.<sup>47</sup>

From 1960 to 2006, health care costs tripled as a portion of the U.S. gross domestic product (GDP), rising from consuming 5.2% to consuming 16% of GDP.<sup>48</sup> Since 1980, health inflation has outpaced general inflation on average by more than 3% annually.<sup>49</sup> With Americans devoting a greater percentage of their income to health care, it would appear that their “willingness to pay” to avoid death is rising. In other words, even in inflation-adjusted dollars, a future American will likely exhibit a willingness to pay more money to preserve his health (by, for example, avoiding a risk of death caused by exposure to workplace contaminants) than Americans do today. Assuming for the moment that health inflation will continue to outpace general inflation by 3% annually over the coming decade, then someone’s willingness to pay in 2021 can be calculated as follows:

$$\begin{aligned} \text{WTP}_{2021} &= \text{WTP}_{2011} \cdot 1.03^{10} \\ &= \text{WTP}_{2011} \cdot 1.34 \end{aligned}$$

Accounting for health inflation increases the value of a 2021 life by more than a third. Substituting a twenty-year time period increases the value of a 2031 life by 81%. The resulting future value could then be discounted to determine its present value. Note, however, that the closer the discount rate is to the excess health inflation rate, the closer the “real discount rate” for future lives comes to zero. For example, if

<sup>47</sup> See *supra* note 40 (collecting various discount rates).

<sup>48</sup> U.S. DEP’T OF HEALTH & HUMAN SERVS., HEALTH, UNITED STATES, 2008 WITH SPECIAL FEATURE ON THE HEALTH OF YOUNG ADULTS 412 tbl.124 (2008), available at <http://www.cdc.gov/nchs/data/hus/hus08.pdf>.

<sup>49</sup> KAISER FAMILY FOUND. & HEALTH RESEARCH & EDUC. TRUST, EMPLOYER HEALTH BENEFITS: 2007 ANNUAL SURVEY 18–19 (2007), available at <http://www.kff.org/insurance/7672/upload/76723.pdf>. While some of the increased health care costs are attributable to waste—in the form of insurance company profits, medical billing overhead, and the like—much of the rising costs reflect improved care. Drugs and devices, among other forms of health care, have improved tremendously in recent decades. See Elizabeth Arias, U.S. Ctrs. for Disease Control & Prevention, *United States Life Tables, 2006*, 58 NAT’L VITAL STATS. REPS., June 28, 2010, at 1, 4 fig.1 (showing growth of life expectancy for Americans between 1970 and 2006).

the appropriate discount rate for future benefits is 3% per year, then the above calculation yields this result:

$$\text{Future Benefit} = \text{WTP}_{2011} \cdot 1.03^{\text{Years}}$$

Recalling that present value equals

$$\text{Future Benefit} / (1 + \text{Discount Rate})^{\text{Years}},$$

one next determines that

$$\begin{aligned} \text{Present Value} &= (\text{WTP}_{2011} \cdot 1.03^{\text{Years}}) / 1.03^{\text{Years}} \\ &= \text{WTP}_{2011} \end{aligned}$$

The result is that, with a 3% discount rate, the present value of a human life, regardless of when in the future that life is saved, becomes precisely equal to the value of a life saved today once one accounts for health inflation. Of course, one could quibble about the precise numbers selected, but the point is clear. As long as health care costs are expected to inflate at a rate above general inflation—and an increasing share of GDP devoted to health care seems widely expected,<sup>50</sup> if not universally applauded—then current CBA calculations undervalue future lives at least somewhat.<sup>51</sup>

If one uses an annual discount rate of 7%, then the present value of a life saved in ten years is worth about 51% of a present life, according to current CBA practices. If health care inflation is considered, that same life saved in ten years is worth about 68% of a present life, meaning that accounting for health inflation increases the

<sup>50</sup> See, e.g., Henry J. Aaron & Isabel V. Sawhill, *Bend the Revenue Curve: Health Reform Alone Won't End Deficits*, WASH. POST, Oct. 13, 2009, <http://www.washingtonpost.com/wp-dyn/content/article/2009/10/12/AR2009101202389.html> (supporting Obama's health reform effort while acknowledging that, "as improved efficiency 'bends' the curve, the best we will be able to do is slow the growth of health-care spending"); CONG. BUDGET OFFICE, *THE LONG-TERM OUTLOOK FOR HEALTH CARE SPENDING 9–10* (2007) ("In the absence of an unprecedented change in the long-term trends, national spending on health care will grow substantially over the coming decades. . . . [T]he excess cost growth rate for . . . spending on health care . . . in 2018 is assumed to equal the average of the rates from 1975 to 2005 . . . ."); Sean Keehan et al., *Health Spending Projections Through 2017: The Baby-Boom Generation is Coming to Medicare*, 27 HEALTH AFF. w145, w146 exhibit 1 (2008), available at <http://www.cnbcasia.com/images/documents/CMC%20Healthcare%20Study.PDF>. "Over the projection period in this paper (2007–2017), growth is anticipated to remain steady at around 6.7 percent per year . . ." *Id.* at w145.

<sup>51</sup> Because this argument rests on an assumption that health inflation will continue into the future, it is obviously weakened by evidence that the phenomenon is waning. I believe health inflation will be with us for some time but must acknowledge that my argument will not persuade those who disagree with that presumption, perhaps correctly.



present value of 2021 lives by about 34%. Accordingly, a proposed regulation that seems too expensive under current CBA practices might become a bargain when the benefits are recalculated. Because human lives are often the only monetized benefits considered in a CBA,<sup>52</sup> the verdict on many lifesaving regulations might be reversed.<sup>53</sup> Under our current system, in which an agency's expert scientific analysis will be reviewed by generalist appellate judges who may have no relevant scientific background, a procedural change that credibly increases the expected benefits of a proposed regulation should be especially welcome to agency staff eager to avoid seeing years of work undone by the judiciary.<sup>54</sup>

To be sure, the link between rising health care expenditures and rising WTP—which if established would imply a link between rising health care expenditures and rising VSLs—may not be obvious. Health inflation justifies the inflation of future VSLs only if money spent on health care somehow demonstrates a similar “willingness” to

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<sup>52</sup> See *supra* note 30 and accompanying text.

<sup>53</sup> In practice, the “verdicts” at issue are mostly determined before the CBA is even published, for regulators have little interest in publishing proposed regulations that will not be enacted. Proper accounting for health inflation would decrease underregulation in two ways. It would cause agencies to propose some regulations that otherwise might have been shelved after initial internal agency calculation of costs and benefits, and it would allow agencies to draft stronger versions (i.e., versions that cost regulated entities more) of regulations already likely to be proposed and enacted. See Binyamin Appelbaum, *As U.S. Agencies Put More Value on a Life, Businesses Fret*, N.Y. TIMES, Feb. 17, 2011, <http://www.nytimes.com/2011/02/17/business/economy/17regulation.html> (describing promulgation of “stricter and more expensive” regulation after an agency upwardly recalculated its VSL figure).

<sup>54</sup> For an example of lay judges rejecting a sensible regulation and consequentially dooming tens or hundreds of Americans to preventable cancer deaths, see *Industrial Union Department v. American Petroleum Institute*, 448 U.S. 607 (1980), commonly known as the “Benzene decision.” In *Benzene*, the Supreme Court voted 5–4 to vacate an OSHA regulation that would have lowered the permissible workplace benzene exposure from ten parts per million (ppm) to one ppm, holding that the agency provided insufficient proof of the expected benefits. *Id.* at 631 (“The evidence in the administrative record of adverse effects of benzene exposure at 10 ppm is sketchy at best.”). Seven years later, OSHA promulgated an identical rule on the basis of additional scientific evidence. See William J. Nicholson & Philip J. Landrigan, *Quantitative Assessment of Lives Lost Due to Delay in the Regulation of Occupational Exposure to Benzene*, 82 ENVTL. HEALTH PERSP. 185, 187 (calculating, among other harms, “that 30 to 105 premature leukemia deaths will eventually be caused by benzene exposures resulting from the delay in implementing a 1-ppm standard between February 1978 and September 1987” and noting that the “number of excess deaths” could exceed 1000); see also *Benzene*, 448 U.S. at 688 (Marshall, J. dissenting) (correctly predicting that the “unfortunate consequence [of *Benzene*] is that the Federal Government’s efforts to protect American workers from cancer and other crippling diseases may be substantially impaired”).

trade money for longevity that economists assume exists when calculating VSLs on the basis of wage premiums and similar phenomena. And while the concept of a wage premium is fairly straightforward, at least in the simple example provided above,<sup>55</sup> the economics of health care could hardly be more complicated. Below are but a few of the complications.

### 1. Agency

Health care expenditures often involve middlemen, creating concerns about agency. Because the amount of money spent on a person's health is often affected by insurance companies,<sup>56</sup> by government,<sup>57</sup> and by patients' family members,<sup>58</sup> rather than by the person whose health is at issue, one might question whether money spent on a particular patient's health reflects a true willingness of that person to "pay" for longevity. Particularly when a patient pays no money at all for her health care,<sup>59</sup> can one really ascribe her consumption of health care services to a willingness to pay for them?

### 2. International Comparisons

During the debates over the Patient Protection and Affordable Care Act,<sup>60</sup> observers noted that the American health care system is substantially less efficient than those of other industrialized nations.<sup>61</sup>

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<sup>55</sup> See *supra* notes 6–8 and accompanying text. In reality, determining a real-life wage premium—an essential precondition to using such a premium to calculate a VSL—is beset by confounding factors. How can economists, for example, determine how dangerous two different jobs are? Assuming such information is available to researchers, is it available to workers choosing among jobs? What about transaction costs associated with changing jobs and acquiring safety information?

<sup>56</sup> Whether a procedure is performed may depend on whether an insurance company grants advance approval (i.e., agrees that the company will pay if the procedure is performed).

<sup>57</sup> Even in a nation without "death panels," government actors affect health care spending through mechanisms like Medicare and Medicaid reimbursement rates, the approval process for drugs, and regulation of the health insurance business. Also, actions taken by "the government" are themselves not easy to attribute to any particular person—or even to a single branch of government.

<sup>58</sup> Family members make health care decisions for, among others, children and much of the elderly. Nonrelatives, such as guardians ad litem, act on behalf of additional patients.

<sup>59</sup> Consider an indigent person who arrives at the emergency room, receives care, and then pays nothing to the hospital.

<sup>60</sup> Pub. L. No. 111-148, 124 Stat. 119 (2010). This Act is the health care reform bill signed by President Obama in March 2010.

<sup>61</sup> See Maggie Fox, *U.S. Scores Dead Last Again in Healthcare Study*, REUTERS (July 23, 2010), available at <http://www.reuters.com/article/2010/06/23/us-usa-healthcare-last>

The Netherlands, Germany, Canada, and the United Kingdom achieve comparable results (as measured by the health of their populations) while spending far less money than the United States.<sup>62</sup> If health care spending reflects willingness to pay and accordingly translates into VSLs, the implication would be that Americans are willing to pay more for their lives than are the citizens of countries boasting more efficient health care systems. If true, then the life of an American would be more “valuable” for purposes of CBA calculations than the life of someone in the Netherlands, Germany, Canada, or the United Kingdom. Perhaps such American exceptionalism is justified. If not, however, the substitution of health care expenses for WTP becomes problematic.

### 3. *Ignorance*

Even if we assume that a patient spends her own money on health, chooses for herself what care to purchase, and participates in a reasonably efficient health care marketplace—that is, if we ignore agency problems and shelve concerns about international comparisons—honest observers must recognize that health care consumers lack information essential to evaluating the worth of medical treatments. Even trained physicians cannot know of every latest change in drugs, devices, procedures, and other care options, much less the marginal utility of adopting one over another. And while in theory a patient could educate herself extensively about her options, such study costs time and money, causing a rational participant in the health care market (should such a person exist) to sensibly rely on the advice of health care professionals. In addition, a patient otherwise inclined to devote substantial effort to self-education will likely defer to others upon having a sudden heart attack.

Must we then reject health care expenses as a substitute for “willingness to pay” in the calculation of the value of statistical lives, leaving us with wage premiums and similarly weak data?<sup>63</sup> I think

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-idUSTRE65M0SU20100623 (“Americans spend twice as much as residents of other developed countries on healthcare, but get lower quality, less efficiency and have the least equitable system.”).

<sup>62</sup> KAREN DAVIS ET AL., COMMONWEALTH FUND, MIRROR ON THE WALL: HOW THE PERFORMANCE OF THE U.S. HEALTH CARE SYSTEM COMPARES INTERNATIONALLY, at v–vii (2010), available at [http://www.commonwealthfund.org/~media/Files/Publications/Fund%20Report/2010/Jun/1400\\_Davis\\_Mirror\\_Mirror\\_on\\_the\\_wall\\_2010.pdf](http://www.commonwealthfund.org/~media/Files/Publications/Fund%20Report/2010/Jun/1400_Davis_Mirror_Mirror_on_the_wall_2010.pdf).

<sup>63</sup> See *supra* note 55.

not. When considering VSLs, one must remember that the lives are *statistical*, not real. When the Federal Railroad Administration projects saving “the loss of . . . half of the value of a statistical life each year,”<sup>64</sup> readers understand that no “half person” will be saved from a train crash because of the proposed FRA regulation. Although some have criticized the common agency practice of adopting a single VSL and using that number in all regulatory impact analyses,<sup>65</sup> the practice persists. When a coal miner’s wage premium is used to calculate a VSL, the result is not the value of the miner’s life but rather a number used for all Americans. Similarly, health care expenses do not illuminate the “value” of any specific patient’s life—nor the assessment of that value by her doctor, insurer, government, or herself. Instead, just as the total outlays devoted to road construction and maintenance demonstrate Americans’ collective interest in road building and repair, so do our total outlays on health care demonstrate our collective interest in maintaining our health and prolonging our lives. If one state spends more money per capita than another on roads, observers could fairly conclude that, all other things being equal, the higher-spending state values roads more than the lower-spending state. Agency problems can obscure the value placed on roads by any specific resident of either state, but the collective valuation is made clear by collective action. Similarly, just as the United States values military equipment far more than any other nation,<sup>66</sup> the United States actually does value health care more than the United Kingdom does.<sup>67</sup> If the United Kingdom enjoys greater efficiency, its doctors and citizens should be proud of their thrift, but the balance sheet is clear: Americans are willing to pay more. Do Americans desire greater efficiency? Perhaps. Regardless, that desired efficiency is not currently available to Americans, and we have collectively decided to pay what we must to get the care we want.

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<sup>64</sup> See *supra* text accompanying note 20.

<sup>65</sup> See, e.g., Sunstein, *supra* note 7.

<sup>66</sup> Gerard O’Dwyer, *World Military Spending Rose by 5.9% in '09: SIPRI*, DEFENSE NEWS (June 8, 2010), <http://www.defensenews.com/story.php?i=4661977> (“The United States retained its position as the world’s biggest spender, investing \$661 billion on military equipment in 2009. This represented 43 percent of the total global spend . . .”).

<sup>67</sup> Again, this Article accepts the premises of CBA and the use of VSL, among which is the principle that the value one places on something is equal to how much money one spends on it.

As noted above,<sup>68</sup> some uncertainty surrounds the future of American health expenditures. Indeed, federal budget projections vary tremendously depending on assumptions concerning future health spending.<sup>69</sup> For purposes of CBA calculations, however, the uncertainty is less significant because the time window is narrower. While budget projections offer guesses many decades into the future,<sup>70</sup> CBAs created by regulatory agencies commonly estimate costs and benefits over only ten or twenty years, a period in which health care expenses are more predictable.<sup>71</sup> Accordingly, while a critic might sensibly observe that health care cost inflation cannot outpace general inflation forever—otherwise the entire economy will one day consist of health care provision—a federal agency preparing a regulatory impact analysis today need not worry about the expected rate of health inflation in 2050. Instead, if health inflation is expected to exist during the time period covered by the cost-benefit analysis prepared for a particular proposed regulation, something almost surely true for any regulation proposed in the coming decade, the agency proposing the regulation should properly account for the expected economic reality.<sup>72</sup>

### *B. Human Lives in Rich Countries Improve over Time*

Current CBA discounting further undervalues future lives because discounters ignore rising per capita wealth in developed countries. Because the “willingness to pay” for safety is at least somewhat correlated with wealth, richer countries should use higher VSLs when assessing policies.<sup>73</sup> Yet, when valuing the lives of persons saved in

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<sup>68</sup> See *supra* notes 50–51 and accompanying text.

<sup>69</sup> See CONG. BUDGET OFFICE, THE LONG-TERM BUDGET OUTLOOK 27 (2010), available at <http://www.cbo.gov/doc.cfm?index=11579&zzz=40884>.

<sup>70</sup> See *id.* at app. A (offering projections through 2080).

<sup>71</sup> See *id.* at 28 (“CBO’s projections of health care spending for the next few decades probably provide more real information than its projections for the longer term.”).

<sup>72</sup> Agencies deciding to consider health inflation during CBA calculations today might well reevaluate their decision a decade or two from now if the health care “cost curve” has been “bent” sufficiently that health inflation is predicted to disappear. The prospect that a policy appropriate today might require revision if conditions change in twenty years is not, however, a good excuse for rejecting the proposed policy now.

<sup>73</sup> Again, this Article attacks the economics of current CBA practices on their own terms. A normative critique might well question whether the lives of the rich should count more than those of the poor. *E.g.*, DANIEL M. HAUSMAN & MICHAEL S. MCPHERSON, ECONOMIC ANALYSIS AND MORAL PHILOSOPHY 97–98 (1996) (“[P]references in cost-benefit analysis are weighted with dollars, and the poor have fewer of these. Exactly those people whom it seems policymakers should be most concerned to protect are those who

the future, CBA calculators do not account for the growth of GDP in excess of inflation and population growth.<sup>74</sup> Developed countries, such as the United States, see increases in real GDP (that is, GDP adjusted for inflation) nearly every year.<sup>75</sup> Indeed, a drop in real GDP causes great alarm.<sup>76</sup> Although part of increased GDP results from population growth, the United States has enjoyed rising real GDP per capita for decades,<sup>77</sup> with an annual increase of about 1.8%.<sup>78</sup> Accordingly, the economic output of each American rises over time, even in inflation-adjusted dollars.<sup>79</sup> Gains in output are divided among business profits, employee wages, and taxation, meaning that almost every year, the average American sees a real increase in the total money coming to her from profits (if, for

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are most likely to be harmed.” (citation omitted)); Robert H. Frank, *Melding Sociology and Economics: James Coleman’s Foundations of Social Theory*, 30 J. ECON. LITERATURE 147, 160 (1992) (agreeing that it “is probably true, as critics of cost-benefit analysis complain, that the willingness-to-pay criterion systematically favors the interests of the rich” and defending that practice on the ground that “the poor can be compensated by simply lowering their tax rates”).

<sup>74</sup> For a pithy explanation of this neglect, see James Kwak, *Doing Discounting Wrong*, THE BASELINE SCENARIO (Feb. 16, 2010), <http://baselinescenario.com/2010/02/16/doing-discounting-wrong/> (criticizing CBA practices because “the real value of lives is continually increasing”).

<sup>75</sup> See *Real GDP*, FED. RESERVE BANK OF N.Y., [http://www.newyorkfed.org/research/directors\\_charts/pi\\_9.pdf](http://www.newyorkfed.org/research/directors_charts/pi_9.pdf) (last updated Mar. 25, 2011). GDP is defined as “the market value of all the final goods produced in the entire country in the course of a year.” PAUL HEYNE ET AL., *THE ECONOMIC WAY OF THINKING* 352 (10th ed. 2002); see also *National Income and Product Accounts Table: Table 1.1.5. Gross Domestic Product*, BUREAU OF ECON. ANALYSIS, U.S. DEP’T OF COMMERCE, <http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=5&ViewSeries=NO&Java=no&Request3Place=N&3Place=N&FromView=YES&Freq=Year&FirstYear=1929&LastYear=2009&3Place=N&Update=Update&JavaBox=no> (last updated Apr. 28, 2011).

<sup>76</sup> See, e.g., Marcus Walker, *Record GDP Drop Sharpens Pain Across Euro Zone*, WALL ST. J., May 16, 2009, at A5.

<sup>77</sup> See U.S. BUREAU OF LABOR STATISTICS, INTERNATIONAL COMPARISONS OF GDP PER CAPITA AND PER EMPLOYED PERSON 12 tbl.1 (2009), available at <http://www.bls.gov/fls/flsgdp.pdf> (showing that United States real GDP per capita nearly tripled between 1960 and 2008).

<sup>78</sup> *Id.* at 13 tbl.2.

<sup>79</sup> Increased per capita output is largely caused by increased productivity. See JOHN M. ROBERTS, FED. RESERVE, ESTIMATES OF THE PRODUCTIVITY TREND USING TIME-VARYING PARAMETER TECHNIQUES (2000), available at <http://www.federalreserve.gov/pubs/feds/2001/200108/200108pap.pdf>; Rafael Doménech & Víctor Gómez, *Estimating Potential Output, Core Inflation, and the NAIRU as Latent Variables*, 24 J. BUS. & ECON. STAT. 354 (2006); *Productivity Change in the Nonfarm Business Sector, 1947–2010*, U.S. BUREAU OF LABOR STATS., <http://www.bls.gov/lpc/prodybar.htm> (last modified Mar. 3, 2011) (showing annual productivity increases averaging above 2% since 1990).

example, she owns shares in for-profit companies), pay, and government outlays.<sup>80</sup>

Any calculation of a VSL that incorporates “willingness to pay” for safety or “willingness to accept” risk will tend to place greater value on persons with more disposable money. The reason is simple: Willingness to pay for goods increases when one has money in the first place (or at least has access to credit). Only someone with money can exhibit willingness to part with it. Similarly, the toleration of harms—such as dirty air or dangerous working conditions that a government agency might regulate—in exchange for money should increase with poverty.<sup>81</sup> One does not hear news accounts of bankers selling kidneys.<sup>82</sup>

A simple example illustrates the principle. If we assume an annual increase in real per capita GDP of 1.8%,<sup>83</sup> then for every \$1000

<sup>80</sup> Much depends on the definition of the “average” American. Regardless, the fruits of increased output are going back into the economy one way or another, even if they are not distributed in an equitable manner.

<sup>81</sup> The society-wide existence of this phenomenon—that is, the tendency for richer countries to spend more on clean air and other environmental benefits—is well documented. For example, the “environmental Kuznets curve” illustrates a theory that, as a country’s economy grows, pollution increases, peaks, and then eventually decreases. Gene M. Grossman & Alan B. Krueger, *Economic Growth and the Environment*, 110 Q.J. ECON. 353, 370 (1995). The relationship of pollution to economic growth resembles the “inverted U” of the original Kuznets curve, which concerns the relationship between income distribution inequality and economic growth. *See id.* at 363; Simon Kuznets, *Economic Growth and Income Inequality*, 45 AM. ECON. REV. 1, 18 (1955) (suggesting that, as a country’s economy develops over time, income inequality will rise, peak, and then decrease). The upshot of the environmental Kuznets curve theory is that economic growth does not inevitably result in degradation of the environment. Grossman & Krueger, *supra*. Scholars have questioned, however, whether the theory holds up in an era of global climate change. *See, e.g.*, Jie He & Patrick Richard, *Environmental Kuznets Curve for CO<sub>2</sub> in Canada*, 69 ECOLOGICAL ECON. 1083, 1083–85 (2010).

<sup>82</sup> Compare Larry Rohter, *The Organ Trade: A Global Black Market; Tracking the Sale of a Kidney on a Path of Poverty and Hope*, N.Y. TIMES, May 23, 2004, at A1 (following a kidney from Recife, Brazil, to Brooklyn), with Graham Bowley, *With Big Profit, Goldman Sees Big Payday Ahead*, N.Y. TIMES, July 15, 2009, at A1 (“Goldman . . . announced that it had earmarked \$11.4 billion so far this year to compensate its workers.”).

<sup>83</sup> *See, e.g.*, INT’L MONETARY FUND, WORLD ECONOMIC OUTLOOK 186 tbl.A17 (2010) (predicting real GDP growth of 2.4% annually in advanced economies); Sewell Chan, *No Fed Plans to Give More Support, Bernanke Says*, N.Y. TIMES, July 22, 2010, at B1 (“The Fed expects the economy to grow this year by 3 to 3.5 percent, picking up only slightly, to 3.5 to 4.5 percent, in 2011 and 2012.”); Neil H. Buchanan, *What Do We Owe Future Generations?*, 77 GEO. WASH. L. REV. 1237, 1273 (2009) (“Even with the aging of Baby Boomers, changes in productivity will apparently be more than sufficient to offset the demographic changes and allow future GDP per capita to grow dramatically over the next seventy-five years and perhaps beyond.”).

produced by each person in the United States today, each American in ten years will produce \$1195.<sup>84</sup> When the increased output returns to the economy in profits, wages, and government outlays, Americans will have that much more real wealth to spend. All things being equal, someone in 2021 would pay \$1195 to avoid a risk that someone would pay \$1000 to avoid today. The “wealth-adjusted” value of a 2021 benefit is therefore 19.5% greater than the same benefit today, at least before discounting.

Much as the section concerning health inflation depends on the assumption that health inflation will continue to exist,<sup>85</sup> the argument presented here concerning rising real GDP per capita will not convince those who expect real GDP per capita to remain flat (or even decrease) into the future. Again, I believe my assumption is a fair one but recognize that rejection of the assumption vitiates my argument.<sup>86</sup>

Next, one can apply discounting to these figures. If one ignores increased future wealth and then imagines a future harm of the kind Americans today would pay \$1000 to ameliorate, the present value of removing the future harm in 2021 is equal to

$$\text{Future Benefit} / (1 + \text{Discount Rate})^{\text{Years}}$$

which, with a discount rate of 7%,<sup>87</sup> equals

$$\$1000 / (1 + 0.07)^{10} = \$508$$

<sup>84</sup> The 2021 figure is in inflation-adjusted dollars, meaning that ten years from now Americans will likely be about 20% more productive than today. Increased productivity is made possible by technological advances that increase worker efficiency, increased hours spent working, or some combination.

<sup>85</sup> See *supra* note 51.

<sup>86</sup> While theories such as “peak oil” or an inevitable “clash of civilizations” predict an impending long-term drop in living standards, I take comfort in the record of past doomsayers. See, e.g., THOMAS MALTHUS, AN ESSAY ON THE PRINCIPLE OF POPULATION (1798) (predicting that British population could not grow beyond eighteenth century levels without depressing the standard of living); PAUL R. EHRLICH, THE POPULATION BOMB xi (1968) (predicting that in “the 1970’s . . . hundreds of millions of people are going to starve to death in spite of any crash programs embarked upon” and advocating “population control [in the United States] hopefully through a system of incentives and penalties, but by compulsion if voluntary methods fail”); see also WILLIAM FAULKNER, *Nobel Prize Address*, in THE FAULKNER READER 3, 4 (1954) (“I believe that man will not merely endure: he will prevail.”).

<sup>87</sup> This example uses a discount rate of 7%, and the example in Part II.A used 3%. Different rates have been chosen to reflect the multiple rates commonly provided in agency CBAs. See *supra* note 40. Regardless of the discount rate chosen, future lives are undervalued when agencies ignore health inflation and wealth inflation.



If the future benefit is valued at \$1195 instead of \$1000—that is, if the benefit calculation accounts for the increased wealth of future Americans—then the value of removing the future harm in 2021 is equal to

$$\text{Future Benefit} / (1 + \text{Discount Rate})^{\text{Years}}$$

which, with a discount rate of 7%, equals

$$\$1195 / (1 + 0.07)^{10} = \$607$$

The failure to use wealth-adjusted WTP and WTA figures when calculating the future benefits of health and safety regulations thereby leads to an undervaluation of about 16% for benefits obtained in 2021. For benefits accruing in twenty years, the undervaluation is about 30%.<sup>88</sup>

In addition, future Americans will likely devote at least part of their extra income directly to risk reduction. One cannot predict with any certainty what wealthier Americans will do with their additional real dollars. If history is any guide, however, they will spend those dollars on one thing or another.<sup>89</sup> Absent good evidence that no increased wealth will cover safety costs, CBA calculators cannot justify their inattention to future purchasing power. Especially as the quality of safety technology improves—which seems nearly certain to occur, at least for those who can afford it—it would be bizarre for Americans enjoying unprecedented wealth to skimp on their own safety.

Indeed, evidence abounds of Americans choosing to spend increasing amounts of money on safety. Automobiles, for example, come standard today with safety technology unavailable at any price just a few decades ago.<sup>90</sup> Child car seats, unknown to drivers of

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<sup>88</sup> The calculation is 1.018 to the twentieth power, which equals 1.43, meaning real per capita U.S. GDP in 2031 is projected to be 1.43 times that of today. Removing this factor when assessing future benefits causes an undervaluation of about 30%, calculated as

$$1 - (1 / 1.43)$$

<sup>89</sup> See Martin Feldstein, *The Return of Saving*, 85 FOREIGN AFF. 87, 87 (2006) (“The savings rate of American households has been declining for more than a decade and recently turned negative.”); Kathleen Pender, *Personal Saving Rate Drops to Zero Percent*, S.F. CHRON., Aug. 7, 2005, [http://articles.sfgate.com/2005-08-07/business/17388187\\_1\\_stanford-institute-federal-reserve-data-economic-policy-research/2](http://articles.sfgate.com/2005-08-07/business/17388187_1_stanford-institute-federal-reserve-data-economic-policy-research/2).

<sup>90</sup> See 49 C.F.R. § 571.208 (2010) (regulating, among other safety devices, mandatory air bags); *Key Dates in the History of Automobile Air Bags*, USA TODAY, July 8, 1996, at 3B (“1971: Ford builds experimental air bag fleet”); see also RALPH NADER, UNSAFE AT ANY SPEED (1965).

previous generations, are so commonplace as to be required by law.<sup>91</sup> Manufacturers offer particularly safe vehicles to buyers willing to pay extra.<sup>92</sup> These devices cost money, and Americans have decided to pay for them.<sup>93</sup> Increased presence of safety equipment is of course not limited to cars. The automatic external defibrillator present not only on ambulances and in hospitals but also in a growing number of restaurants and other public places was invented in the early 1970s.<sup>94</sup> Users of bicycle helmets, ski equipment, and mountain climbing gear enjoy substantially greater safety than was available in the recent past. The same is true of purchasers of innumerable other products. Before 1972, the Consumer Product Safety Commission (CPSC) did not even exist.<sup>95</sup> Current CPSC regulations cover 15,000 kinds of consumer products.<sup>96</sup> One may presume that such regulations would not be necessary if consumer product manufacturers were adopting the mandated specifications absent legal compulsion, and the absence of such voluntary adoption strongly suggests that the legal requirements impose at least some costs on producers. Both through their government and through individual purchasing choices, Americans have demonstrated increased concern about risk over time—concern that translates into increased willingness to pay for safety.

When one combines the effects of health inflation and wealth-adjusted future WTP, the undervaluation of future benefits in current CBA practice becomes especially stark. Using the 3% figure from above for excess health inflation (that is, the rate at which health care costs increase above general inflation) and 1.8% for increased per

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<sup>91</sup> *E.g.*, N.Y. VEH. & TRAF. LAW § 1229-c (McKinney 2010); *see also* 49 C.F.R. § 571.213 (2010).

<sup>92</sup> *See, e.g.*, INS. INST. FOR HIGHWAY SAFETY, SHOPPING FOR A SAFER CAR 2011 (2011), available at <http://www.iihs.org/brochures/pdf/sfsc.pdf>. Consider the reputation of Volvo, which sells expensive cars known for safety.

<sup>93</sup> The decision to pay for mandatory items was made collectively. In general, however, safety devices exist for some time—and are purchased voluntarily—before regulators require their use.

<sup>94</sup> *See* Pete Bysom, *Retired Portland Physician Dies at 85*, OREGONIAN, Aug. 28, 1993, at D5.

<sup>95</sup> *See* Pub. L. No. 92-573, § 4, 86 Stat. 1207, 1210 (1972) (codified as amended at 15 U.S.C. § 2053) (creating CPSC).

<sup>96</sup> *See Frequently Asked Questions*, U.S. CONSUMER PROD. SAFETY COMM'N, <http://www.cpsc.gov/about/faq.html> (last visited Mar. 6, 2011); 16 C.F.R. ch. II (2011) (codifying regulations on products from cigarette lighters to pacifiers to swimming pool slides).

capita GDP,<sup>97</sup> the future value of a benefit can be calculated as follows: The future value of a benefit equals the value Americans would assign to the same benefit available today, increased each year by a factor of 1.03 and a factor of 1.018.<sup>98</sup> As an equation:

$$\begin{aligned} \text{Benefit}_{\text{future}} &= \text{Benefit}_{\text{present}} \cdot 1.03^{\text{years}} \cdot 1.018^{\text{years}} \\ &= \text{Benefit}_{\text{present}} \cdot 1.049^{\text{years}} \end{aligned}$$

A benefit that would be worth \$1000 today would therefore be worth about \$1606 to Americans able to obtain the benefit in 2021. With an annual discount rate of 7%, the present value of the \$1606 future benefit equals \$816. If one instead calculated the present value of receiving only \$1000 in 2021, the result would be \$508, an undervaluation of about 38%. And if one uses a discount rate of 4.9%,<sup>99</sup> then the discounting of future lives is completely counteracted by the proper attention to health inflation and rising wealth.

Unless CBA calculators can justify their failure to account for health inflation and increasing per capita real GDP, they should immediately begin increasing the future value of future health and safety benefits. While controversy would remain as to what discount rate is appropriate when determining the present value of such future benefits, a CBA that correctly values future benefits will find more accurate present values for any correctly chosen discount rate, and current practice arbitrarily reduces the values of future benefits.

### C. Weaknesses

The brevity of this Article, along with its use of equations, may obscure some weaknesses in its argument that deserve attention.<sup>100</sup> Perhaps most important, the two factors identified as causing

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<sup>97</sup> Note that the figure of 1.8% is another conservative assumption. If we were to use productivity instead of per capita real GDP, the annual increase would exceed 2%. See *supra* note 79 and accompanying text.

<sup>98</sup> The factors combine for an annual increase of about 4.9%.

<sup>99</sup> Although this number is suggested to match the calculation above, it is not far-fetched. Many scholars advocate using far lower rates. See, e.g., Kwak, *supra* note 74 (proposing a discount rate of 1%); see also INTERAGENCY WORKING GRP. ON SOC. COST OF CARBON, U.S. GOV'T, TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS UNDER EXECUTIVE ORDER 12866, at 23 (2010) (“[W]e use three discount rates to span a plausible range of certainty-equivalent constant discount rates: 2.5, 3, and 5 percent per year.”).

<sup>100</sup> These weaknesses are in addition to the concerns raised *supra* notes 51, 83.

overdiscounting of human lives as opposed to other future goods—health inflation and rising per capita GDP—are related to one another and are difficult to separate completely for purposes of analysis. For example, perhaps health inflation is possible because of increased wealth, and we see continued health inflation because a society that has already covered many of its most basic needs can devote much of any additional surplus to health care.<sup>101</sup> In addition, money spent on health care is not precisely equal to money spent on health. If administrative overhead is the cause of all (or even most) health inflation,<sup>102</sup> then increased spending is not as good an indicator of willingness to pay to avoid risks of death. Further, some money spent on health care is not strongly related to saving lives. The availability of laser vision correction surgery may contribute to health inflation by causing Americans to spend money on a procedure that previously did not exist, but unless laser-corrected eyes prevent fatal accidents better than old-fashioned eye glasses, paying for surgery does not indicate much, if anything, about the patient’s “willingness to pay” to avoid fatal risks, which is the willingness used to calculate a VSL.<sup>103</sup>

These critiques are fair, at least in part. While we cannot run an experiment to determine if a parallel United States would have experienced health inflation in recent decades even in the absence of rising per capita wealth, it is likely true that at least some portion of health inflation is attributable to rising wealth. If the “Great Recession” were to deepen and endure for years, chances are that health inflation would be checked if only out of necessity.<sup>104</sup>

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<sup>101</sup> In other words, one might argue that health inflation should be included among the forms of safety technology discussed in Part II.B, such as safer cars. See Robert E. Hall & Charles I. Jones, *The Value of Life and the Rise in Health Spending*, 122 Q.J. ECON. 39 (2007).

<sup>102</sup> I cannot imagine that this is true—treatment options today seem so clearly superior to those of the past, even the recent past—but I am neither a doctor nor a health economist and will leave the dispute to others.

<sup>103</sup> Cosmetic procedures such as Botox injections are another example of novel health care expenses unrelated to preventing fatalities.

<sup>104</sup> While the federal government can borrow at low rates, many states are prohibited by their constitutions from deficit spending, meaning that when revenues fall (as they do during recessions), expenses must drop, and health expenses of states and their political subdivisions are no exception. See, e.g., Li Lou, *Budget Cuts Squeeze Home Health Care Workers*, SACRAMENTO BEE, July 26, 2009, <http://www.sacbee.com/2009/07/26/2054581/budget-cuts-squeeze-home-health.html>; Editorial, *Helping States Make Good Choices*, N.Y. TIMES, Jan. 24, 2009, at A20 (“Since a majority of state constitutions require balanced budgets, the only alternatives are to raise taxes or cut spending. To cope, many states are spending less on health care and education, which take up a large percentage of most state budgets.”).

Because the amount of overlap between health inflation and wealth inflation is something about which reasonable persons can disagree, federal agencies might sensibly adopt different figures when deciding how much to inflate future VSLs before discounting their monetary worth to present value. Just as federal agencies choose varying discount rates based on their own calculations and public policy judgments, so too may they choose divergent VSL inflation rates.<sup>105</sup> Even if every bit of health inflation were somehow attributable to rising per capita wealth—an implausible assumption because at least some health inflation must be caused by consumption of newly available therapies<sup>106</sup>—VSL inflation would nonetheless be justified by the rate of wealth inflation.

A more sweeping critique might begin with the premise that overregulation kills, and anything tending to decrease the apparent benefits of proposed regulation serves to ameliorate the problem of unduly burdensome regulation.<sup>107</sup> For example, critics of the Food and Drug Administration argue that the lengthy approval process for drugs and devices causes needless deaths by denying patients lifesaving cures.<sup>108</sup> And complaints of overregulation are common in

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<sup>105</sup> The appropriate VSL inflation rate should become a subject commonly addressed in comments made to agencies that have proposed regulations. Regulated entities and other advocacy groups have strong interests in seeing their preferred figures selected and will therefore have incentives to justify their proposals in thoughtful submissions.

<sup>106</sup> In a society with no real increase in wealth, residents would nonetheless spend more on health care over time (by shifting consumption from other goods and services to health care) unless no new drugs, devices, or techniques became available that are both expensive and worth the price.

<sup>107</sup> See generally Jeffrey J. Rachlinski & Cynthia R. Farina, *Cognitive Psychology and Optimal Government Design*, 87 CORNELL L. REV. 549 (2002); Cass R. Sunstein, *Paradoxes of the Regulatory State*, 57 U. CHI. L. REV. 407, 407 (1990) (describing what the author characterized as “self-defeating regulatory strategies—strategies that achieve an end precisely opposite to the one intended, or to the only public-regarding justification that can be brought forward in their support”).

<sup>108</sup> See, e.g., James L. Zelenay, Jr., *The Prescription Drug User Fee Act: Is a Faster Food and Drug Administration Always a Better Food and Drug Administration?*, 60 FOOD & DRUG L.J. 261, 273 & nn.109–10 (2005) (listing certain FDA delays that may have cost tens of thousands of lives); Richard A. Deyo, *Gaps, Tensions, and Conflicts in the FDA Approval Process: Implications for Clinical Practice*, 17 J. AM. BOARD FAM. PRAC. 142, 146 (2004) (“[M]anufacturers argue that the agency drags its feet and kills people waiting for new cures.”). But see Gardiner Harris, *Diabetes Drug Maker Hid Test Data, Files Indicate*, N.Y. TIMES, July 13, 2010, at A1 (“[D]ocuments demonstrate that the company had data hinting at Avandia’s extensive heart problems almost as soon as the drug was introduced in 1999, and sought intensively to keep those risks from becoming public.”).

American political discourse.<sup>109</sup> Even advocates for workplace safety occasionally object to regulations they believe will cost an unreasonable number of jobs.<sup>110</sup> If the United States truly regulates too much, however, the solution is not to create arbitrary errors in the calculation of the costs and benefits of regulation. Instead, those convinced that America suffers from surplus regulation instead of insufficient concern for human life should advance their arguments on the merits. Particularly in the context of cost-benefit analysis, which already accepts the premise that human lives can be assigned a price and that the price should be based upon factors such as wage premiums that value rich persons above poor ones, stacking the deck further with a systematic devaluation of human lives is not justified.

Another potential weakness concerns traditional economic arguments about the marginal utility of money. Put simply, the more money a person has, the less her position is improved by receiving an additional dollar. The “utility” of the dollar decreases as the wealth of the recipient increases. Accordingly, if—as is argued above—Americans are likely to become richer over time,<sup>111</sup> then the marginal utility of their money will decrease, implying that a higher discount rate is appropriate.<sup>112</sup> It is worth recalling, however, that VSLs are calculated not on the basis of utility but instead on the basis of dollars. In other words, when an economist determines someone’s “willingness to pay” for a reduction of risk, the WTP number reflects

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<sup>109</sup> *E.g.*, 156 CONG. REC. S3,952-02 (daily ed. May 19, 2010) (statement of Sen. McConnell) (“The fact is, Washington can’t even pay its bills. Yet over the last 16 months it has taken over banks, insurance companies, car companies, the student loan business, and health care. Now it has its sights set on anyone in America who engages in a financial transaction.”); Andrew Edgecliffe-Johnson, *FCC Head Warns of Regulatory Excess*, FIN. TIMES, Jan. 19, 2009, at 3 (quoting a Bush administration official warning the new administration that, “with too much of an interventionist approach, you could actually deter people from investing in the infrastructure”).

<sup>110</sup> *See, e.g.*, *Reserve Mining Co. v. EPA*, 514 F.2d 492, 537 (8th Cir. 1975) (en banc) (“[T]he intervening union argues, with some persuasiveness, that ill health effects resulting from the prolonged unemployment of the head of the family on a closing of the Reserve facility may be more certain than the harm from drinking Lake Superior water or breathing Silver Bay air.”).

<sup>111</sup> *See supra* notes 73–86 and accompanying text.

<sup>112</sup> *See* NICHOLAS STERN, *THE ECONOMICS OF CLIMATE CHANGE: THE STERN REVIEW* 35 (2007) (“[I]f consumption grows, people are better off in the future than they are now and an extra unit of consumption is generally taken to be worth less.”). The theory is that the present value of a dollar projected to be delivered in the future should be discounted to reflect the minimal impact of that dollar on the wealthy recipient’s utility. THE STERN REVIEW eventually settles on a discount rate close to zero, largely for ethical reasons. *Id.* at 49–50, 54.

how much money is actually spent on, for example, safe cars. When an economist determines someone's "willingness to accept" risk in exchange for money, the WTA number reflects how much money is actually paid as a "wage premium." These WTP and WTA figures are then used to calculate the values of statistical lives. If anything, the decreased marginal utility of future wealth should increase the amount future Americans are willing to pay to avoid risk. The extra money enjoyed by our rich descendants, who will already enjoy material comforts greater than our own, can easily be diverted to avoiding risks of early death. After all, what good is a big house or a fancy car to someone not alive to enjoy them?<sup>113</sup>

### III

#### SOME ILLUSTRATIONS

Two illustrations should help to demonstrate the practical importance of the proper calculations of regulatory benefits. The first concerns potential regulation of greenhouse gases (GHGs) under the Clean Air Act. The second revisits the NASA asteroid deflector discussed in Part II.B.

##### *A. Regulation of GHGs in Response to Climate Change*

In *Massachusetts v. EPA*, the Supreme Court held that greenhouse gases are air pollutants covered by the Clean Air Act.<sup>114</sup> The EPA was accordingly required to determine whether GHG emissions from cars "may reasonably be anticipated to endanger public health or

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<sup>113</sup> It may be true that a more rigorous calculation of the interests of future generations would consider the marginal (as opposed to the total) amount of consumption across time periods. See *id.* at 35–36 (quoting Robert M. Solow, *The Economics of Resources or the Resources of Economics*, 64 AM. ECON. REV., May 1974, at 1, 9) (arguing that even if the welfare of future generations is valued as highly as that of our own, we should "discount future consumption if we expect[] the future to be richer than the present."). That said, such criticisms apply also to the current calculation of VSLs based on WTP and WTA data. For example, if a poor person is "willing to pay" only a small amount to avoid risk, his WTP is small, but the marginal utility (to him) of the dollars he is willing to pay is large. If agencies were to calculate "utility" rather than dollars during the CBA process, regulations expected to help the poor (for example, by toughening air quality standards for trash incinerators, which tend to be in poor neighborhoods) would suddenly seem more cost-beneficial. For now, however, agencies seem focused on willingness to pay money, not on the utility of the money one is willing to pay, and this Article operates under that premise.

<sup>114</sup> 549 U.S. 497 (2007).

welfare” and, if so, what regulations are appropriate.<sup>115</sup> Having already issued an “endangerment finding” concluding that GHGs indeed pose a threat to public health,<sup>116</sup> the Agency has begun its regulatory response.<sup>117</sup> The full extent of the EPA’s response remains uncertain, and any significant regulation is sure to be challenged.<sup>118</sup>

Accordingly, the EPA will face tremendous pressure—both from outside groups and from employees eager to avoid wasting effort on vacated regulations—to ensure that any climate change rules have monetary benefits that exceed their costs. A federal Interagency Working Group has already produced an estimate of the “social cost of carbon (SCC)” emissions, “to allow agencies to incorporate the social benefits of reducing carbon dioxide (CO<sub>2</sub>) emissions into cost-benefit analyses of regulatory actions that have small, or ‘marginal,’ impacts on cumulative global emissions.”<sup>119</sup> Among the costs of climate change—and, accordingly, the benefits of regulations that combat climate change—are negative human health outcomes.<sup>120</sup> As is common in discussions of regulatory costs and benefits, the Interagency Working Group discounted the present value of the social

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<sup>115</sup> 42 U.S.C. § 7521(a)(1) (“The [EPA] Administrator shall by regulation prescribe . . . standards applicable to the emission of any air pollutant from . . . new motor vehicles or . . . engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.”).

<sup>116</sup> See Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,496 (Dec. 15, 2009) (to be codified at 40 C.F.R. ch. I) (“The Administrator also finds that the combined emissions of these greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas air pollution that endangers public health and welfare under CAA section 202(a).”).

<sup>117</sup> See Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 75 Fed. Reg. 25,324 (May 7, 2010) (to be codified at 49 C.F.R. pts. 85, 86, 600) (promulgating, along with National Highway Traffic Safety Administration, regulations on GHG emissions from passenger cars, pickup trucks, sport-utility vehicles, minivans, and passenger vans).

<sup>118</sup> See, e.g., Carl Hulse, *Senate Rejects Republican Effort to Thwart Carbon Limits*, N.Y. TIMES, June 11, 2010, at A22 (“The Senate voted 53–47 to reject an attempt by Senator Lisa Murkowski, Republican of Alaska, to block the E.P.A. from imposing new limits on carbon emissions based on its 2009 finding that such gases from industry, vehicles and other sources represent a threat to human health and the environment.”); Jenna Greene, *Air Assault: 38 Suits Filed over New Greenhouse Gas Rules*, NAT’L L.J., June 14, 2010, at 1.

<sup>119</sup> INTERAGENCY WORKING GRP. ON SOC. COST OF CARBON, *supra* note 99, at 1.

<sup>120</sup> *Id.* (stating that the SCC estimate “is intended to include (but is not limited to) changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change”).



cost of carbon emitted in the future.<sup>121</sup> The report contains a fairly robust discussion of discounting, noting the particular problems that arise when one discounts benefits expected to accrue to future generations.<sup>122</sup> The discussion concludes, “In light of disagreement in the literature on the appropriate market interest rate to use in this context and uncertainty about how interest rates may change over time, we use three discount rates to span a plausible range of certainty-equivalent constant discount rates: 2.5, 3, and 5% per year.”<sup>123</sup> The Working Group has rejected the commonly employed discount rate of 7%, but even the lowest annual discount rate proposed, 2.5%, will vastly decrease the present value of many benefits associated with preventing severe anthropogenic climate change.

Consider the effects of various discount rates on benefits predicted to arrive twenty years in the future. For benefits whose future value is \$100 million, the present value is displayed below.<sup>124</sup>

Table 1. Valuation of benefits twenty years in the future

Discount Rate	0.0%	1.0%	2.0%	2.5%	3.0%	5.0%
Present Value (in millions)	\$100	\$81.95	\$67.30	\$61.03	\$55.37	\$37.69

In short, the effect is tremendous. A discount rate of 2% cuts the present value by about one-third. Increasing the discount rate to 2.5%—the lowest rate used by the Working Group—reduces present value of the \$100 million by almost two-fifths. And so on along the table.

The effect on more distant benefits is even more severe. The following table displays the present value of benefits expected to arrive in fifty years, with a future value of \$100 million.

<sup>121</sup> Or, from the other perspective, the Working Group discounted the benefits of preventing such emissions.

<sup>122</sup> INTERAGENCY WORKING GRP. ON SOC. COST OF CARBON, *supra* note 99, at 17.

<sup>123</sup> *Id.* at 23.

<sup>124</sup> Again, the formula is

$$\text{Present Value} = \text{Future Benefit} / (1 + \text{Discount Rate})^{\text{Years}}$$

Table 2. Valuation of benefits fifty years in the future

Discount Rate	0.0%	1.0%	2.0%	2.5%	3.0%	5.0%
Present Value (in millions)	\$100	\$60.80	\$37.15	\$29.09	\$22.81	\$8.72

The 5% annual discount rate destroys more than 90% of the present value. Even the 2.5% rate destroys more than three-fifths of the present value.

For any proposed climate change regulation, at least some of the expected benefits should come in improved human health and saved lives. If regulators continue to discount human health and lives as they do dollars, the true present value of these future benefits will be vastly understated, leading to an inadequate response to a colossal environmental peril. Agencies preparing regulatory impact analyses for climate change rules should properly account for the increased value of human life and health in the future. By recognizing that according to the economic assumptions underlying CBA, future American VSLs should be greater than those measured today, regulators can increase their estimates of the expected future benefits of proposed rules. The increased future benefits, regardless of the discount rate chosen, will have greater present values than would benefits calculated with no consideration of health inflation and increased wealth.

### B. Revisiting the NASA Asteroid Deflector

Earlier, the power of discounting was demonstrated by an illustration of how economists might deem it wasteful to spend one hundred dollars today to save the entire planet in one thousand years.<sup>125</sup> The table below shows the present value of saving the Earth under a few different sets of assumptions. The left column displays

<sup>125</sup> See *supra* Part II.B. The standard formula of

$$\text{Present Value} = \text{Future Benefit} / (1 + \text{Discount Rate})^{\text{Years}}$$

reveals that with a discount rate of 3.5%, the value of saving nine billion lives in one thousand years equals

$$(\$6.3 \times 10^{16}) / (1.035^{1000}) = \$72.28$$

discount rates, and the top row displays a factor used to increase the future value of human lives.<sup>126</sup>

Table 3. Accounting for increased VSLs in the future: present dollar value (in 2011) of saving the Earth in 3011

	0.0% increase	1.0% increase	2.0% increase	3.0% increase	4.0% increase	5.0% increase
0.0% discount	6.30 x 10 <sup>16</sup>	1.32 x 10 <sup>21</sup>	2.51 x 10 <sup>25</sup>	4.33 x 10 <sup>29</sup>	6.80 x 10 <sup>33</sup>	9.74 x 10 <sup>37</sup>
2.0% discount	158 million	3.32 x 10 <sup>12</sup>	6.30 x 10 <sup>16</sup>	1.09 x 10 <sup>21</sup>	1.71 x 10 <sup>25</sup>	2.45 x 10 <sup>29</sup>
3.5% discount	72.28	1.51 million	2.88 x 10 <sup>10</sup>	4.97 x 10 <sup>14</sup>	7.80 x 10 <sup>18</sup>	1.12 x 10 <sup>23</sup>
5.0% discount	less than one cent	85 cents	16,226	280 million	4.40 x 10 <sup>12</sup>	6.30 x 10 <sup>16</sup>

The bottom row of Table 3, which uses a 5.0% discount rate (the highest suggested by the cost of carbon working group), shows that VSL inflation of even a few percent per year completely changes the cost-benefit figures for the NASA proposal. Similar effects are seen with other discount rates. Instead of discovering that spending one hundred dollars is wasteful—as is seen with a 3.5% discount rate and zero VSL inflation—with a 5.0% discount rate and a 3.0% VSL inflation figure, the benefits of deflecting the asteroid have a present value of \$280 million. Increasing the VSL inflation figure to 4.0%

<sup>126</sup> The VSL inflation figures in the top row of the table represent the product of expected health inflation and expected real growth in GDP per capita. For example, with expected health inflation of 1% and expected real GDP per capita growth of 2%, the result would be

$$1.01 \cdot 1.02 = 1.03$$

or a 3% annual increase in VSL. As is discussed above, these figures are difficult to estimate with precision, but I expect they are almost certainly positive, and a product of 5% seems well within the range of plausible figures.

yields a present value of about \$4.4 trillion.<sup>127</sup> And because a VSL of 5.0% would precisely equal the discount rate for the bottom row, the final figure on the table displays a present value of  $\$6.30 \times 10^{16}$ , a value reflecting an effective discount rate of zero.

While it is of course impossible to set a price on the salvation of the planet and all of its inhabitants, I believe that the further one moves to the right on the table, the more reasonable the numbers should seem.<sup>128</sup> Absent VSL inflation, even fairly low discount rates eviscerate the present value of saving the world in 3011. Including VSL inflation eliminates one of the more preposterous results of the mechanical application of common CBA techniques, and it brings the results of economic calculations closer to those suggested by ethical intuition.

#### IV

##### FURTHER THOUGHTS ON COST-BENEFIT ANALYSIS

If the theories presented in this Article are correct—that is, (1) CBA calculations ignore health inflation and wealth inflation, (2) they accordingly fail to inflate the value of future statistical lives before discounting them to present value, and (3) as a result, federal agencies systematically undervalue human lives predicted to be saved in the future by proposed regulations—then so what? I offer two answers, the first immediate and practical, and the second more theoretical.

##### *A. Immediate Implications*

Readers persuaded by this Article will recognize that until federal agencies reform their CBA processes, Americans will die needlessly, largely because regulated entities will be spared the imposition of regulations authorized by statute and justified by appropriate calculation of costs and benefits. For the workers who will inhale carcinogens if OSHA fails to lower the permissible workplace exposure, for the municipal water drinkers who will swallow poison if

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<sup>127</sup> This figure is in the neighborhood of the entire annual budget of the U.S. government. See OFFICE OF MGMT. & BUDGET, A NEW ERA OF RESPONSIBILITY: RENEWING AMERICA'S PROMISE 114 tbl.S-1 (2009) (President's proposed budget for fiscal year 2010).

<sup>128</sup> I recognize that my moral intuition on the proper value cannot be proven accurate. I doubt, however, that many proponents of current CBA practices truly wish to defend the valuations at the bottom left of the table.

the EPA fails to set a maximum contaminant level,<sup>129</sup> for the children whose toys the CPSC may or may not regulate, cost-benefit calculations are no theoretical matter. Fortunately, the current administration has already indicated a desire to reconsider the CBA process, and President Obama has ordered the Office of Management and Budget (OMB) to produce, along with federal regulatory agencies, “a set of recommendations for a new Executive Order on Federal regulatory review.”<sup>130</sup>

A revised executive order could improve CBA calculations across the federal government. Short of a presidential directive that the ideas of this Article be adopted, the OMB recommendations could suggest that agencies consider incorporating VSL inflation into their CBA calculation process, allowing agencies, regulated entities, and activists to begin a dialogue in search of the appropriate VSL inflation figure.<sup>131</sup> In addition, agencies should consider unilateral adoption of improved procedures rather than awaiting explicit direction from OMB or the President. Every time an agency seeks comment on a proposed regulation whose benefits include saving human lives in the future, supporters of the regulation can supplement the agency record by submitting comments urging the use of VSL inflation during the preparation of the final regulatory impact analysis (RIA). RIAs including these improved procedures could inform the administration’s ongoing deliberations.

The practical effect of considering health inflation and wealth inflation during the CBA process—that is, of inflating the value of future statistical lives—would be a lower effective discount rate for human life. In other words, whatever discount rate an agency uses to discount future costs and benefits to their present value, future human lives would be discounted at a lower annual rate. Using equations, the present value of future life equals

$$\text{Future VSL} / (1 + \text{discount rate})^{\text{years}}$$

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<sup>129</sup> See 42 U.S.C. § 300g-1.

<sup>130</sup> See Regulatory Review, 74 Fed. Reg. 5977, 5977 (Jan. 30, 2009) (memorandum from the President to “Heads of Executive Departments and Agencies” requesting “suggestions on the role of cost-benefit analysis”).

<sup>131</sup> Instead of a single figure, agencies might adopt principles to guide future calculations, including identification of trustworthy sources of health inflation and wealth inflation data and methods of determining to what extent these phenomena overlap, if at all.

Because the future VSL is equal to

$$\text{Present VSL} \cdot (1 + \text{inflation factor})^{\text{years}}$$

the present value of a future life equals

$$\text{Present VSL} \cdot (1 + \text{inflation factor})^{\text{years}} / (1 + \text{discount rate})^{\text{years}}$$

which equals

$$\text{Present VSL} \cdot ((1 + \text{inflation factor}) / (1 + \text{discount rate}))^{\text{years}}$$

An agency can determine the appropriate discount rate for future human lives by dividing the VSL inflation factor (based on the agency's predictions of health inflation and wealth inflation) by the discount rate used for normal costs and benefits, and then subtracting the result from 1.<sup>132</sup> If, for example, an agency uses a discount rate of 5%, and health inflation and wealth inflation justify VSL inflation of 4% per year, then the effective discount rate for future human lives expected to be saved by proposed regulations would be about 1%.<sup>133</sup> With agencies commonly using discount rates of 3% and 7% during their CBA processes, even extremely conservative estimates of health inflation and wealth inflation would halve the effective discount rate for human life.<sup>134</sup> By adopting this simple procedural change, agencies can immediately cease their pervasive underestimation of the benefits of proposed regulations, which would reduce the fatal underregulation that kills Americans every year.

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<sup>132</sup> In other words, the discount rate for human life equals

$$1 - (\text{VSL inflation rate} / \text{discount rate})$$

If the VSL inflation rate is the same as the discount rate for normal costs and benefits, the discount rate for life would equal zero because

$$1 - (\text{VSL inflation rate} / \text{normal discount rate})$$

would become

$$1 - (x / x)$$

with  $x$  representing the identical rate.

<sup>133</sup> The precise discount rate would be

$$1 - (1.04 / 1.05)$$

or about 0.95%.

<sup>134</sup> Starting with some of the discount rates proposed by INTERAGENCY WORKING GRP. ON SOC. COST OF CARBON, *supra* note 99, conservative estimates of health inflation and wealth inflation might bring the effective discount rate for human life to zero. Note that if the VSL inflation rate were higher than the discount rate for normal costs and benefits, this formula would yield a *negative* discount rate for human life, meaning that future lives would be valued above present ones. I recommend that agencies set zero as their minimum discount rate rather than using a negative rate.

## *B. Stepping Back*

Persuaded readers might also consider the implications of this Article's premises on CBA more generally. Although I have attempted to rebut the pro-CBA consensus on its own terms, I will not insult readers by pretending to have no opinion on the ongoing debate.<sup>135</sup> A few conclusions follow if the central premises of this Article are accepted.

### *1. Cost-Benefit Analysis Figures Resemble Wild Guesses*

With federal agencies using discount rates from 0 to 10%, and with there being no apparent justification for an agency's choice of discount rates,<sup>136</sup> the estimated costs and benefits of a proposed regulation can fluctuate wildly based on arbitrary procedural calculations.<sup>137</sup> If these estimates have undercounted benefits because of a widespread failure to account for health inflation and wealth inflation, an already capricious process becomes increasingly detached from reality. To be sure, agencies would benefit from accurate predictions of costs and benefits of proposed regulations. But if the estimated benefits can vary by 25, 50, or 90% because of accounting choices,<sup>138</sup> then agencies are presented with nearly random figures instead of anything accurate.<sup>139</sup>

The possibility that a mechanical application of CBA principles might yield a negative discount rate for some future costs and benefits,<sup>140</sup> requiring that agencies value future Americans *above*

<sup>135</sup> See *supra* notes 37, 42–44 and accompanying text.

<sup>136</sup> See *supra* note 27 and accompanying text; see also ORG. FOR ECON. CO-OPERATION & DEV., REGULATORY IMPACT ANALYSIS: A TOOL FOR POLICY COHERENCE 38–39 (2009) (cataloguing wide divergence in discount rates used across the world, including 4.5% in the European Community, 7.5 to 12% in Canada, and 6% in Denmark).

<sup>137</sup> For an illustration of the power of small changes to discount rates, see *supra* Part IV.A. Net benefits will also fluctuate substantially depending on an agency's choice of VSL, another decision about which there is little consensus. See, e.g., ORG. FOR ECON. CO-OPERATION & DEV., *supra* note 136, at 36–37 (noting that primary Canadian and American guidance documents suggest VSLs in the range of \$1 million to \$10 million, allowing fluctuation by an order of magnitude).

<sup>138</sup> See Yang Wang, *Now, Later, or Never: Applying Asymmetric Discount Rates in Nuisance Remedies and Federal Regulations*, 105 MICH. L. REV. 2035, 2038 (2007) (noting “that even a minute discrepancy in the estimated discount rate can” drastically change the desirability of a proposed regulation).

<sup>139</sup> Recall that even before any monetization or discounting of life occurs, CBA already involves numerous estimates that build uncertainty into the process. See *supra* notes 22–29 and accompanying text (discussing estimates related to food-labeling regulation).

<sup>140</sup> See *supra* note 134.

those living today (instead of as equals, which critics of discounting life advocate, or as less valuable than current Americans, which the status quo CBA practice deems them to be) further illustrates the questionable assumptions imbedded in current practice. Debates about intergenerational equity and the duty owed by present governments to future citizens raise complex questions concerning ethics, human behavior, and science.<sup>141</sup> When agency heads, appointed by the President and confirmed by the Senate, delegate to number crunchers the question of how Americans today should value our expected descendants, they artificially convert policy questions into math problems. It may be sound to discount future Americans at some annual rate, or the practice may be unethical. The answer is not available on any spreadsheet. Converting guesses into numbers cloaks uncertainty with the appearance of rigor and provides no real answer to the question justifying the exercise of CBA in the first place: Is this proposed regulation worth enacting?<sup>142</sup>

## *2. These Guesses Systematically Harm Americans and Their Environment*

As explained more fully above,<sup>143</sup> accounting for health inflation and wealth inflation would sharply reduce the effective discount rate for future human lives, potentially reducing the effective rate to zero. Today, however, agencies do not account for health inflation and wealth inflation, meaning that across the federal government, every single exercise in cost-benefit analysis undervalues the lives of

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<sup>141</sup> For example, whether the world should respond to climate change soon or instead should avoid carbon emission reductions that might slow economic growth, thereby having greater resources to tackle the problem later, depends on—among other things—(1) how technology is likely to develop, (2) whether certain “tipping points” make adverse consequences of climate change irreversible, and (3) whether doctrines like the “precautionary principle” mandate prompt action despite uncertainty.

<sup>142</sup> For example, economists can predict the future price of emissions credits under a “cap and trade” regime. See Olivier Durand-Lasserve, Axel Pierru & Yves Smeers, *Uncertain Long-Run Emissions Targets, CO<sub>2</sub> Price and Global Energy Transition: A General Equilibrium Approach*, 38 ENERGY POL’Y 5108, 5113–18 (2010) (predicting that in regions where banking emissions permits is possible, the prices of the permits are predicted to follow the “Hotelling rule”); Harold Hotelling, *The Economics of Exhaustible Resources*, 39 J. POL. ECON. 137, 139–41 (1931) (concluding that, under certain conditions, the price of a nonrenewable resource will vary according to the rate of interest); see also Shantayanan Devarajan & Anthony C. Fisher, *Hotelling’s “Economics of Exhaustible Resources”: Fifty Years Later*, 19 J. ECON. LITERATURE 65, 66 (1981). Economists cannot, however, tell us how much we should care about our grandchildren’s quality of life.

<sup>143</sup> See *supra* text accompanying notes 98–99.



Americans whom proposed regulations are designed to protect. Where regulations would protect the environment—bringing aesthetic benefits along with improvements to human health that accompany a cleaner environment—the undervaluation of future human lives systematically devalues environmental protection. Several statutes empower (and require) agencies to protect the environment with the explicit purpose of safeguarding human health,<sup>144</sup> and current CBA procedures impede that work every time an agency seeks to fulfill its duties by promulgating regulation. In particular, statutes that invite or require a balancing of costs and benefits—for example, by mandating safety “to the extent feasible” or by stating that an agency shall prevent “unreasonable” risks—are thwarted when agencies employ procedures that devalue expected benefits.

Accordingly, critics who have complained that CBA calculations improperly ignore benefits lacking obvious economic value, often treating as worthless those benefits officials cannot easily quantify,<sup>145</sup> were more correct than they realized. Current CBA procedures not only ignore a host of important benefits but also devalue the remaining benefits assigned a monetary value. For example, after ignoring certain skin cancers altogether when calculating the benefits of saving the ozone layer, the EPA then overdiscounted the benefits of preventing fatal cancers.<sup>146</sup> Incidental benefits—those benefits identified in a regulatory impact analysis but left out of the numerical table—are provided only to the extent the quantified benefits suffice to justify enactment of a regulation. When the monetized benefits are devalued across the board, the inchoate benefits disappear also.

### *3. Systemic Inaccuracy May Violate Legal Mandates*

Executive Order (EO) 12,866, which requires agencies to produce CBAs and for the Office of Information and Regulatory Affairs

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<sup>144</sup> See, e.g., 15 U.S.C. § 2605(a) (Toxic Substances Control Act provision requiring the EPA Administrator to regulate chemicals presenting “an unreasonable risk of injury to health or the environment”); 29 U.S.C. § 655(b)(5) (Occupational Safety and Health Act provision requiring the Secretary of Labor to ensure, to the extent feasible, “that no employee will suffer material impairment of health or functional capacity” because of toxic workplace conditions); 42 U.S.C. § 7408(a)(1)(A) (Clean Air Act provision requiring control of emissions that “cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare”). Other relevant statutes include the Safe Drinking Water Act and the Clean Water Act.

<sup>145</sup> See *supra* notes 31–33.

<sup>146</sup> *Id.*

(OIRA) to review them,<sup>147</sup> states that “agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.”<sup>148</sup> If agencies are systematically undercounting the benefits of proposed regulation, then they almost surely are not promulgating regulations that “maximize net benefits” and accordingly are violating EO 12,866. The OIRA could rectify this widespread pattern of violation by “returning” draft regulations to agencies with instructions to consider health inflation and wealth inflation. The White House describes OIRA’s review as follows:

In some cases, when OMB believes that an agency rule is not consistent with the principles set forth in Executive Order 12866, OIRA “returns” the rule to the agency for further consideration. “Returning” a rule means that OIRA has concluded that the draft is not consistent with the principles of Executive Order 12866 and that further agency effort is needed before the agency may publish the rule. For example, the agency may have provided inadequate analysis regarding alternatives.<sup>149</sup>

Near universal undercounting of benefits is “not consistent with the principles of” EO 12,866, and procedural choices causing systemic underprotection of health and the environment by definition yield “inadequate analysis regarding alternatives.”

In addition, even without any executive orders concerning CBA, agencies are required by multiple federal statutes to seek accurate assessments of the costs and benefits of regulation.<sup>150</sup> Certain

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<sup>147</sup> Exec. Order No. 12,866, 3 C.F.R. 638 (1993), *reprinted in* 5 U.S.C. § 601; *see also* OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, OMB MEMORANDUM M-09-13, GUIDANCE FOR REGULATORY REVIEW (2009) (“On January 30, 2009, the President issued Executive Order 13497, revoking the previous Administration’s amendments to Executive Order 12866, which governs centralized review of significant agency actions by [OIRA]. Revocation of these amendments restored the regulatory review process to what it had been under Executive Order 12866 between 1993 and 2007.”).

<sup>148</sup> Exec. Order No. 12,866 § 1.

<sup>149</sup> *See Office of Information and Regulatory Affairs (OIRA) Q&A’s*, OFFICE OF MGMT. & BUDGET, [http://www.whitehouse.gov/omb/OIRA\\_QsandAs/](http://www.whitehouse.gov/omb/OIRA_QsandAs/) (last visited Mar. 5, 2011) (describing OIRA review of draft regulations).

<sup>150</sup> The Regulatory Flexibility Act, 5 U.S.C. § 604, and the Unfunded Mandates Reform Act both require cost-benefit analysis in certain contexts. *See, e.g.*, 2 U.S.C. § 1532(a)(2) (requiring “a qualitative and quantitative assessment of the anticipated costs and benefits of [proposed federal mandates]”); *see also supra* note 144 (listing provisions requiring agencies to act “to the extent feasible” and to eliminate “unreasonable risks,” both standards necessitating accurate assessments of costs and benefits).

statutes provide for judicial review of whether agencies have complied with these procedural requirements.<sup>151</sup> Other actions by regulatory agencies, such as the issuance of permits and waivers, also involve considerations of costs and benefits required by statutes.<sup>152</sup> Here too, pervasive undercounting of benefits prevents agencies from obeying statutory mandates.

#### CONCLUSION

The two simple corrections to CBA calculations proposed in this Article would immensely increase the monetized benefits of regulations expected to save lives in the future. By accounting for health inflation and rising wealth, policy makers can more easily justify regulations concerning workplace safety, clean air, clean water, and highway safety, to name just a few. In particular, the long-term benefits of ameliorating global warming would have substantially greater monetary value if properly calculated. Without silencing their ethical and moral critiques of discounting future human lives, those opposed to the practice should demand that if CBA calculations will incorporate such discounting, they must at least begin with a proper assessment of the future value to be discounted, a value one can accurately find only with a consideration of health care cost inflation and rising per capita wealth.

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<sup>151</sup> *See, e.g.*, 5 U.S.C. § 611 (allowing judicial review of agency compliance with the Regulatory Flexibility Act).

<sup>152</sup> *See, e.g.*, 33 U.S.C. § 1311(m)(1)(B) (allowing the issuance of a permit under the Clean Water Act when the costs of strict application of other CWA provisions would “exceed by an unreasonable amount the benefits to be obtained”).

