Valuing Life: A Plea for Disaggregation

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VALUING LIFE: A PLEA FOR DISAGGREGATION

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ABSTRACT

Each government agency uses a uniform figure to measure the value of a statistical life (VSL). This is a serious mistake. The very theory that underlies current practice calls for far more individuation of the relevant values. According to that theory, VSL should vary across risks. More controversially, VSL should vary across individuals—even or especially if the result would be to produce a lower number for some people than for others. One practical implication is that a higher value should be given to programs that reduce cancer risks. Another is that government should use a higher VSL for programs that disproportionately benefit the wealthy—and a lower VSL for programs that disproportionately benefit the poor. But there are two serious complications here. First, bounded rationality raises problems for the use of private willingness to pay, which underlies current calculations of VSL. Second, the beneficiaries of regulation sometimes pay only a fraction or even none of its cost; when this is so, the appropriate VSL for poor people might be higher, on distributional grounds, than market evidence suggests. An understanding of this point has implications for foundational issues about government regulation, including valuation of persons in poor and wealthy nations.

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INTRODUCTION

For over two decades, executive orders have required regulatory agencies to engage in cost-benefit analysis of major regulations,[1] and Congress has imposed similar requirements in several statutes.[2] To

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1. *See* STEPHEN BREYER ET AL., ADMINISTRATIVE LAW AND REGULATORY POLICY 120–35 (5th ed. 2002) (examining executive orders that require federal agencies to balance the benefits of their decisions against the cost).

2. *See, e.g.*, Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 136(bb) (2000) (defining "unreasonable adverse effects on the environment" as "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticides"); Toxic Substances Control Act, 15 U.S.C. § 2605(c)(1)

conduct cost-benefit analysis, agencies must assign monetary values to human lives that are potentially saved by a proposed regulation. How do they come up with the numbers that they use? Do some deaths count for more than others?

The Environmental Protection Agency (EPA) uses a uniform value for a statistical life (VSL): $6.1 million.[3] Other agencies use numbers that are both higher and lower than the EPA's VSL, with a range, in recent years, between $1.5 million (the Federal Aviation Administration (FAA) in 1990[4]) and the Food and Drug Administration's (FDA's) current figure of $6.5 million.[5] Although substantial differences can be found across agencies,[6] uniformity is the intended practice within each agency.[7] No agency treats cancer risks,

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(2000) (mandating that the administrator consider and publish a statement documenting the effects, benefits, and economic impacts of proposed toxic substance regulations); Safe Drinking Water Act, 42 U.S.C. § 300g-1(b)(3)(c) (2000) (requiring the documentation of quantifiable and nonquantifiable costs and benefits in the establishment of maximum contaminant levels).

3. National Primary Drinking Water Regulations; Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring, 66 Fed. Reg. 6976, 7012 (Jan. 22, 2001) (codified at 40 C.F.R. pts. 9, 141, and 142). I refer throughout to uniform numbers, but this is of course a simplification. There are differences across agencies, and within agencies practices are variable over time and across regulations. By referring to a uniform number, I mean that regulatory agencies do not distinguish among risks or among protected classes, so as to produce the variations that I emphasize here. Within regulations, uniform numbers are used, and when disparate numbers are used across regulations, it is not because of a judgment about different risks or different protected classes.

In its July 2003 regulation governing food labeling of trans-fatty acids, the Food and Drug Administration used a VSL of $6.5 million. Food Labeling: Trans Fatty Acids in Nutrition Labeling, Nutrient Content Claims, and Health Claims, 68 Fed. Reg. 41,434, 41,489 (July 11, 2003) (codified at 21 C.F.R. pt. 101). In its March 2003 proposed rule on dietary ingredients and dietary supplements, the same agency suggested a VSL of $5 million. *See* Current Good Manufacturing Practice in Manufacturing, Packing, or Holding Dietary Ingredients and Dietary Supplements, 68 Fed. Reg. 12,158, 12,229 (proposed Mar. 13, 2003) (to be codified at 21 C.F.R. pts. 111, 112) (using this value to calculate the "value of a statistical life day").

4. The Department of Transportation now uses a higher figure, but one that is still lower than the VSL used by most agencies. *See* Brake System Safety Standards for Freight and Other Non-Passenger Trains and Equipment; End-of-Train Devices, 67 Fed. Reg. 17,556, 17,560 (Apr. 10, 2002) (codified at 49 C.F.R. pt. 232) (recording the Department of Transportation's VSL as $2.7 million).

5. *Infra* Table 1; *see* Matthew D. Adler & Eric A. Posner, *Implementing Cost-Benefit Analysis When Preferences Are Distorted*, 29 J. LEGAL STUD. 1105, 1146 (2000) (comparing the "valuations of life" advanced by multiple agencies).

6. These differences seem inexplicable.

7. *See* Adler & Posner, *supra* note 5, at 1122–23 (explaining that an agency's use of "a constant figure for the monetized value of life" is one means of correcting for wealth distortions in individual preferences). There are some differences within agencies across contexts and across time, but those differences do not seem deliberate. *See supra* note 3 (comparing VSLs both within and across agencies). The most explicit discussions of varying VSLs have come from

or other mortality risks that produce unusual fear or involve special suffering, as worthy of more concern (and a higher valuation) than other risks. No agency contends that distinctive values should be assigned to the risks associated with airplane deaths, motor vehicle deaths, or deaths from defective children's toys. No agency treats young people as worth more than old people.[8] No agency values the lives of poor people less than the lives of rich people. No agency distinguishes between whites and African Americans or between men and women. For statistical lives, the governing idea is that each life is

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the EPA. In its 2003 discussion of hazardous air pollutants, National Emission Standards for Hazardous Air Pollutants for Industrial/Commercial/Institutional Boilers and Process Heaters, 68 Fed. Reg. 1660 (proposed Jan. 13, 2003) (to be codified at 40 C.F.R. pt. 63), the EPA noted:

> There is general agreement that the value to an individual of a reduction in mortality risk can vary based on several factors, including the age of the individual, the type of risk, the level of control the individual has over the risk, the individual's attitude toward risk, and the health status of the individual.

Id. at 1695. Nonetheless, the agency announced, without explanation, that it "prefers not to draw distinctions in the monetary value assigned to the lives saved even if they differ in age, health status, socioeconomic status, gender or other characteristic of the adult population." *Id.*

An extended discussion of related issues can be found in the EPA's arsenic proposal, National Primary Drinking Water Regulations; Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring, 65 Fed. Reg. 38,888 (proposed June 22, 2000) (to be codified at 40 C.F.R. pts. 141, 142). In this proposal, the EPA noted that the

> factors which may influence the estimate of economic benefits associated with avoided cancer fatalities include (1) a possible 'cancer premium' (i.e., the additional value or sum that people may be willing to pay to avoid the experiences of dread, pain and suffering, and diminished quality of life associated with cancer-related illness and ultimate fatality); (2) the willingness of people to pay more over time to avoid mortality risk as their income rises; (3) a possible premium for accepting involuntary risks as opposed to voluntary [*sic*] assumed risks; (4) the greater risk aversion of the general population as compared to workers in the wage-risk valuation studies; (5) 'altruism' or the willingness of people to pay more to reduce risk in other sectors of the population; and (6) a consideration of health status and life years remaining at the time of premature mortality.

Id. at 38,945. The EPA acknowledged that these factors "may significantly increase the present value estimate," but said that "there is currently neither a clear consensus among economists about how to simultaneously analyze each of these adjustments nor is there adequate empirical data to support definitive quantitative estimates for all potentially significant adjustment factors." *Id*. Hence the EPA solicited comments on these issues and said that it would ask its Scientific Advisory Board (SAB) to conduct a review. *Id*. As noted below, the comments produced a sensitivity analysis that contains several upward adjustments from the $6.1 million figure, *see infra* note 100 and accompanying text, but the SAB's review suggested that at the present time, upward adjustments were not justified by existing evidence, *see infra* note 141 and accompanying text.

    8.   With the interest in focusing on "life-years," however, this might change. *See* Cass R. Sunstein, *Lives, Life-Years, and Willingness to Pay*, 104 COLUM. L. REV. 205, 206 (2004) ("[G]overnment should consider not simply . . . the VSL; it should concern itself also or instead with the number of life-years at stake, or the value of statistical life-years (VSLY). At the very least, the number of statistical life-years is a more precise measure of what is involved.").

worth exactly the same. With respect to cost-benefit analysis, much is disputed.[9] But on the idea of a uniform value per life saved, there is a solid consensus, at least in terms of regulatory practice.[10]

The stakes are exceedingly high. If cost-benefit analysis is the basis for the ultimate decision to approve or reject a proposed regulation, everything turns on the selected VSL. If an agency uses a VSL of, say, $15 million, many more regulations will be justified than if it uses a VSL of, say, $2 million. And if a uniform number is rejected, the pattern of justified regulations will shift dramatically. Some existing regulations will be revealed as too weak, and more stringency will be required; others will seem too aggressive and will have to be weakened or even eliminated. If agencies shifted to using VSLs that varied along one or more variables, the regulatory system would look very different from how it does today.

In this Article, I intend to question the consensus in favor of a uniform VSL, and to do so in a way that raises foundational issues about the economic valuation of human lives. I suggest that a uniform value is obtuse. Under the very approach that agencies use to produce the current numbers, VSL should vary along two dimensions. VSL is calculated based on people's willingness to pay (WTP) to avoid particular risks, and if WTP is particularly high, VSL will be high as well. For two reasons, VSL should be expected to be highly variable, in a way that makes a uniform number senseless.

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9. *See generally* FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING (2004) (attacking the very practice of assigning dollar values to lives and health as part of cost-benefit analysis); W. KIP VISCUSI, FATAL TRADEOFFS: PUBLIC AND PRIVATE RESPONSIBILITIES FOR RISK (1992) (suggesting that the government should "respect citizens' preferences" in assigning valuation and thus should consider subjective valuation in cost-benefit analysis, even when such valuation is irrational); Adler & Posner, *supra* note 5, at 1106 ("The problem with the traditional definition of [cost-benefit analysis] in terms of actual preferences is that satisfaction of actual preference and maximization of well-being are not equivalent. . . . Cost-benefit analysis can be redefined as the sum of welfare equivalents . . . .").

10. An arguable exception, noted above, involves the debate over whether agencies should focus on lives or instead life-years; the latter approach might well value older people less than younger ones. For discussion, see Sunstein, *supra* note 8, at 205. Professor W. Kip Viscusi implicitly challenges the consensus, stating: "The current approach of ignoring length-of-life issues creates inequities by valuing the life of a person with . . . a 6-month life expectancy the same as a . . . person with a 40-year life expectancy." W. Kip Viscusi, *Risk Equity*, 29 J. LEGAL STUD. 843, 870 (2000). W. Kip Viscusi and Joseph E. Aldy note the existence of heterogeneity by income, union status, and age, and they explain that the "existence of such heterogeneity provides a cautionary note for policy." W. Kip Viscusi & Joseph E. Aldy, *The Value of a Statistical Life: A Critical Review of Market Estimates Throughout the World*, 27 J. RISK & UNCERTAINTY 5, 7 (2003).

First, VSL should vary across risks. For example, people are willing to pay high amounts to avoid cancer risks, and hence there is reason to think that people's VSL is higher for cancer deaths than for sudden, unanticipated deaths.[11] Cancer risks are involved in the work of many regulatory agencies, and people seem to be particularly concerned about such risks, in a way that should produce a high VSL—almost unquestionably higher than the values that agencies now use. More generally, deaths that produce unusual fear,[12] or that are accompanied by high levels of pain and suffering, should be expected to produce a higher VSL. Human beings face countless mortality risks, and it would be truly bizarre to maintain that people value avoiding each of those risks identically.

Second, VSL should vary across individuals, simply because different people are willing to pay different amounts to avoid risks.[13] People who are risk averse will be willing to pay more, and will therefore show a higher VSL, than people who are risk-seeking.[14] Those who are rich will show a higher VSL than those who are poor. People who are thirty might well show a higher VSL than people who are sixty.[15] It follows that different demographic groups will show diversity in their VSLs as well.[16]

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11. *See* James K. Hammitt & Jin-Tan Liu, *Effects of Disease Type and Latency on the Value of Mortality Risk*, 28 J. RISK & UNCERTAINTY 73, 80 (2004) ("The value of preventing a fatal cancer is often considered to be greater than the value of preventing a fatal trauma in a workplace or transportation accident.").

12. For evidence of a higher VSL for airline risks than for automotive risks, see Fredrik Carlsson et al., *Is Transport Safety More Valuable in the Air?*, 28 J. RISK & UNCERTAINTY 147, 148 (2004) ("There are several reasons why individuals would be willing to pay more for the same risk reduction when traveling by air compared to by other transport modes, such as car or train.").

13. *See* Viscusi & Aldy, *supra* note 10, at 18 ("[T]ransferring the estimates of a value of a statistical life to non-labor market contexts, as is the case in benefit-cost analyses of environmental health policies for example, should recognize that different populations have different preferences over risks and different values on life-saving.").

14. *See* Carlsson et al., *supra* note 12, at 158 (finding that people who are scared of flying are willing to pay especially high amounts to reduce the risks associated with flying).

15. *See* JOSEPH E. ALDY & W. KIP VISCUSI, AGE VARIATIONS IN WORKERS' VALUE OF STATISTICAL LIFE 1 (Nat'l Bureau of Econ. Research, Working Paper No. 10199, 2003) ("[O]ne might expect that older individuals may value reducing risks to their lives less because they have shorter remaining life expectancy.").

16. Such differences are found in W. Kip Viscusi, *Racial Differences in Labor Market Values of a Statistical Life*, 27 J. RISK & UNCERTAINTY 239, 252 tbl.5 (2003). To get a bit ahead of the story: I am not arguing that government should assign a higher VSL to white lives than to African-American lives. I am speaking here of demographic differences that would emerge from a fully individuated approach to VSL, in which each person's WTP was calculated on an individual basis. Once these values are aggregated, the white VSL would likely be higher than

If these two forms of variability—across risks and across persons—are put together, it will be clear that the unitary $6.1 million figure used by the EPA is far too crude.[17] Each person in society is willing to pay a distinctive amount to avoid each risk. It follows that in theory, each person should have a particular VSL for each and every risk, resulting in a fully individuated VSL.[18] Such a fully individuated VSL would mean, for example, that agencies would value avoidance of cancer risks more highly than many other mortality risks—and that the VSL of some racial groups would likely be lower than that of others.[19] But the latter differences would not be the result of a governmental decision to take racial characteristics into account; in fact it would not be a product of any kind of group-level discrimination on the government's part.[20] The differences would be the result of aggregating the VSLs calculated for each individual.

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the African-American VSL, simply because of disparities in wealth and income. Richer people pay more for safe cars and smoke alarms than poor people do. *See infra* text accompanying notes 17–21.

17. I use the EPA's $6.1 million VSL throughout as a convenient example of a unitary figure, but the analysis applies equally to any agency's unitary figure, and to uniformity across agencies.

18. I am putting to one side the complication that values sometimes are constructed, rather than elicited, by social situations—an especially serious complication for contingent valuation studies. *See* John W. Payne et al., *Measuring Constructed Preferences: Toward a Building Code*, 19 J. RISK & UNCERTAINTY 243, 244 (1999) (addressing the "alternate viewpoint . . . that preferences are generally constructed—not revealed—at the time a valuation question is asked"); Cass R. Sunstein & Richard H. Thaler, *Libertarian Paternalism Is Not an Oxymoron*, 70 U. CHI. L. REV. 1159, 1177–78 (2003) ("[I]n the contexts in which [contingent valuation] studies are used, . . . it is unclear that people have straightforward 'values' that can actually be found. Hence some form of paternalism verges on the inevitable: Stated values will often be affected . . . by how the questions are set up." (footnote omitted)).

19. *See* John D. Leeth & John Ruser, *Compensating Wage Differentials for Fatal and Nonfatal Injury Risk by Gender and Race*, 27 J. RISK & UNCERTAINTY 257, 270 (2003) (finding that the implied VSL for Hispanic males is $5.0 million overall and $4.2 million for blue-collar workers, whereas the implied VSL for white males is $3.4 million overall and $4.2 million for blue-collar workers); Viscusi, *supra* note 16, at 252 (finding VSLs of $15 million for whites and $7.2 million for African Americans, $18.8 million for white males and $9.4 million for white females, and $6.9 million for African-American females and $5.9 million for African-American males).

20. Discrimination might well lay in the background, of course; it almost certainly accounts for the unequal opportunities that produce lower VSLs for African Americans than for whites. *See* Viscusi, *supra* note 16, at 255. Professor Viscusi goes on to suggest that "it is inappropriate to attribute the observed differences to a greater willingness by black workers to bear risk." *Id*. In a sense Professor Viscusi is correct; there is no reason to think that African-American workers have an intrinsically greater predisposition to take risks. But in the market, one's willingness to bear risks is a product of "market opportunities," and hence those with fewer opportunities will show a greater willingness to bear risk.

Such aggregation occurs today in, for example, ordinary consumer markets that price reduction of the statistical risks associated with smoke alarms, unusually safe cars, and much more.[21]

In practice, of course, a fully individuated VSL is not feasible, for two different reasons. First, government lacks the information that would permit the calculation. Regulators do not know how much each person would be willing to pay to reduce each statistical risk; generalizations through the use of categories are therefore inevitable. Second, many regulatory programs involve collective goods and protect many people at once. A clean air program, for example, cannot easily ensure that some people in a geographical region are exposed to no more than 10 parts per billion (ppb) of some pollutant, while others in the same region are subjected to 50 ppb. Because collective goods are typically involved in regulation, the problem is pervasive. When government is providing a regulatory good to many people at once, feasibility requires that it use a single VSL, not a range of VSLs.

Notwithstanding issues of feasibility, an understanding of the reasons for individuating VSL is important for two reasons. The first involves conceptual clarity. The theory behind the use of VSL and WTP remains poorly understood. In brief, VSL, as currently understood, is a product of agency judgments about people's WTP to reduce or eliminate certain risks. When a particular VSL is used (say, $6 million), it is because the agency estimates that people are willing to pay a certain amount to reduce statistical risks of a specified magnitude. This point should be enough to show that whatever terminology agencies use, there is no "value of a statistical life"; there are only values for the reduction of statistical risks.[22] Once regulators identify the real question as the identification of those values, they will find it difficult to defend a unitary VSL, simply because there is no such thing. An appreciation of the case for individuation will clarify the theory—both its rationale and its limitations, empirical and ethical. I emphasize that the theory is undergirded by considerations

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21. *See* VISCUSI, *supra* note 9, at 31–32 (discussing the value of life issue in economic terms).

22. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants for Industrial/Commercial/Institutional Boilers and Process Heaters, 68 Fed. Reg. 1660, 1695 (proposed Jan. 13, 2003) (to be codified at 40 C.F.R. pt. 63) (noting that the value of a statistical life is "the value to an individual of a reduction in mortality risk").

of both autonomy and welfare—and that those considerations also show when the use of WTP to calculate VSL is misguided.

The second reason involves the possibility of moving a long way toward greater individuation, even if full individuation is not feasible. With respect to the reduction of cancer risks, for example, there is reason to believe that people are willing to pay an extra amount; hence VSL, based on WTP, is significantly higher than studies of risks not involving cancer suggest.[23] For this reason, the government's current valuation of cancer risks is probably too low, resulting in widespread underprotection of the public. Similarly, there is reason to think that VSL should be higher for mortality risks from airplanes than for statistically identical risks on the highways.[24] More generally, different agencies, dealing with qualitatively different risks, might well use different VSLs, simply because market evidence is likely to show just those differences.[25] Full individuation is not feasible, but greater individuation would be quite easy. The result would be different judgments from agencies, simply because new VSLs—some higher, others lower—would produce different conclusions about when regulation is justified.

A far more troublesome problem, to which I will devote considerable attention, involves disparities along demographic lines. For now, notice a simple factual point: WTP is dependent on ability to pay, and those with little income and wealth will show little WTP.[26] It follows that the VSL of poor people, when calculated based on WTP, will be lower than the VSL of rich people, simply because poor people are poorer. Suppose that the $6.1 million figure used by the EPA represents the average WTP of a population-wide sample. When risks are faced disproportionately by wealthy people, VSL,

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23. *See supra* note 11 and accompanying text.

24. *See* Carlsson, *supra* note 12, at 148 (finding that individuals' WTP to reduce the risk of airline deaths is more than double their WTP to reduce the risk of taxi deaths).

25. As I explain in Part I.A, different agencies now use different numbers for VSL, but these differences seem random and do not stem from a careful inquiry into the questions that I am emphasizing here.

26. If the tax laws ensured the right level of redistribution, there would be little reason to use regulatory policy to promote redistributive goals. Regulation would be based on WTP, and tax laws would ensure such redistribution. Hence the analysis of VSL and WTP would be different with an optimal tax policy from what it must be without such a policy. If tax policy were optimal, a highly variable WTP would be appropriate and there would be no need to take account of distributional concerns. The discussion below is based on the assumption that more redistribution is desirable and that regulatory policy can sometimes help to promote that goal, though less effectively than an optimal tax.

based on actual WTP, should be higher than $6.1 million—just as it should be lower when the regulated risks are faced disproportionately by poor people.[27] It is inevitable that people in poor nations will have a lower VSL than people in rich nations, a point with implications for valuation of the harms from global warming.[28] Similarly, people in poor areas will have a lower VSL than those in wealthy areas, a point with implications for valuation of a variety of risks in the domestic setting. If variations across risks and persons are significant, the question of individuation should be a central part of the second generation of cost-benefit analysis—a step beyond the first-generation debate about whether to do such analysis at all, and a step toward doing such analysis in a way that is more refined and more closely attuned to the consequences of regulations in terms of choice, welfare, and distributional equity.

Of course it is offensive and wrong to suggest that in principle, poor people are "worth less" than rich people. If poor people are subject to a risk of 1/10,000, they do not have less of a claim to public attention than wealthy people who are subject to the same risk; in fact they may have a greater claim, if only because they lack the resources to reduce that risk on their own. But the topic here is regulation rather than subsidy, and the two ought not to be confused. In principle, government should not force people to buy protection against statistical risks at a price that seems excessive to them.[29] At least as a general rule, people should not be required to pay $70 to reduce a risk of 1/100,000 if they are willing to pay no more than $50.

If a uniform VSL would benefit the poor, there is a strong argument for a uniform VSL. But regulation based on a uniform VSL may or may not produce a more equitable distribution of income; in fact any redistribution may be perverse, and a single VSL might not promote equality at all.[30] And if poor people are forced to pay an amount for risk reduction that exceeds their WTP, desirable redistribution will hardly result; forced exchanges, on terms that people would voluntarily reject, are not a good way of redistributing

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27. With this qualification: If poor people would be disproportionately benefited by assigning them a higher VSL, then there is a good argument for assigning them a higher VSL. I explore this issue in Part III.B.

28. *See infra* Part IV.

29. I offer a number of qualifications below. *See infra* Part III.B.

30. If wealthy people are the principal beneficiaries of a particular regulation chosen on the basis of a uniform VSL, and if the public as a whole pays for it, then any redistribution will benefit the wealthy, not the poor.

wealth to the disadvantaged. (Requiring poor people to buy Volvos is not the most sensible means of assisting them.) On the other hand, it is possible that some regulatory programs, based on a uniform VSL, will help those in need, if their beneficiaries receive risk reduction for which they pay little or nothing—an issue to which I will devote considerable attention.

A larger lesson follows from this discussion. For purposes of law and politics, there is no sensible answer to the abstract question about the correct monetary value of human life. Any judgment about the appropriate VSL, and about individuation, must be heavily pragmatic; it must rest on the consequences of one or another choice. Whether government should use a higher or lower VSL across demographic lines cannot be answered simply. An important implication involves the assessment of VSL across nations. A poor nation would do well to adopt a lower VSL than a wealthy nation; for China or India, it would be disastrous to use a VSL equivalent to that of the United States or Canada. But this point should not be taken to support the ludicrous proposition that donor institutions, both public and private, should value risk reduction in a wealthy nation above equivalent risk reduction in a poor nation.

This Article is organized as follows. Part I clarifies the theory behind the valuation of statistical lives. The major point is that regulators do not really use a VSL; instead they use a mean WTP to eliminate a statistical risk. For example, agencies might say that they are using a VSL of $6 million, but when they do so, they are relying on evidence more or less establishing that the average person is paid $600 to face a risk of 1/10,000. The case for using this evidence depends on considerations of both autonomy and welfare. Part II, in some ways the heart of the Article, explores the need for individuation across both risks and persons. Part III offers a more ambitious discussion of the uses and limits of WTP in regulatory policy. It distinguishes between easy and hard cases for using WTP to calculate VSL. The central claim in Part III is that the argument for using WTP is strongest when the beneficiaries of regulation must pay all of its cost—though even in that event, the argument is subject to important qualifications, above all involving bounded rationality. The argument for using WTP is weaker when the beneficiaries of regulation pay only a fraction of that cost. When this is so, some people will benefit from regulation even if it is inefficient in economic terms. I discuss the implications of this point for a uniform or fully individuated VSL. Part IV turns to global regulation and the question

of cross-national differences in VSL. My conclusion is that while third-party donors should help those people who need help most, without reference to lower VSLs in poor countries, governments in wealthy nations should use a higher VSL than governments in poor ones.

I. WTP: THEORY AND PRACTICE

I begin with an explanation of existing agency practice in calculating VSL and of the theory that underlies it. As discussed below, agencies calculate VSL on the basis of market evidence of WTP. Agencies are not really able to identify a "value of a statistical life"; instead they take advantage of information about how much people are willing to pay for facing statistical risks. I suggest that considerations of both welfare and autonomy make it reasonable for agencies to consult WTP. Unfortunately, many questions might be raised about the numbers that agencies now use.

A. Agency Practice

It has now become standard for regulatory agencies to assign monetary values to human lives. Consider the following table, which captures several examples of agency practices from 1996 through 2003:

TABLE 1: AGENCY VALUES OF LIFE, 1996–2003

Agency	Regulation and Date	VSL (in US$)
Department of Transportation/Federal Motor Carrier Safety Administration	Safety Requirements for Operators of Small Passenger-Carrying Commercial Motor Vehicles Used in Interstate Commerce (Aug. 12, 2003)[31]	3 million
Department of Health & Human Services/FDA	Food Labeling: Trans Fatty Acids in Nutrition Labeling, Nutrient Content Claims, and Health Claims (July 11, 2003)[32]	6.5 million
Department of Agriculture/Food Safety and Inspection Service	Control of Listeria Monocytogenes in Ready-to-Eat Meat and Poultry Products (June 6, 2003)[33]	4.8 million
Department of Health & Human Services/FDA	Labeling Requirements for Systemic Antibacterial Drug Products Intended for Human Use (Feb. 6, 2003)[34]	5 million

31. 68 Fed. Reg. 47,860, 47,869 (Aug. 12, 2003) (codified at 49 C.F.R. pts. 390, 398).

32. 68 Fed. Reg. 41,434, 41,490 (July 11, 2003) (codified at 21 C.F.R. pt. 101).

33. 68 Fed. Reg. 34,208, 34,222 (June 6, 2003) (codified at 9 C.F.R. pt. 430).

34. 68 Fed. Reg. 6062, 6076 (Feb. 6, 2003) (codified at 21 C.F.R. pt. 201).

Office of Management and Budget	Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations (Feb. 3, 2003)[35]	5 million
EPA	Control of Emissions from Nonroad Large Spark-Ignition Engines, and Recreational Engines (Marine and Land-Based) (Nov. 8, 2002)[36]	6 million
EPA	National Primary Drinking Water Regulations; Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring (Jan. 22, 2001)[37]	6.1 million
EPA	Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements (Jan. 18, 2001)[38]	6 million
EPA	Control of Air Pollution from New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements (Feb. 10, 2000)[39]	5.9 million
EPA	Findings of Significant Contribution and Rulemaking on Section 126 Petitions for Purposes of Reducing Interstate Ozone Transport (Jan. 18, 2000)[40]	5.9 million
EPA	Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors (Sept. 30, 1999)[41]	5.6 million
EPA	National Primary Drinking Water Regulations: Disinfectants and Disinfection Byproducts (Dec. 16, 1998)[42]	5.6 million

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35. 68 Fed. Reg. 5492, 5500 (proposed Feb. 3, 2003).

36. 67 Fed. Reg. 68,242, 68,327 (Nov. 8, 2002) (codified at 40 C.F.R. pts. 89–91, 94, 1048, 1051, 1065, and 1068).

37. 66 Fed. Reg. 6976, 7012 (Jan. 22, 2001) (codified at 40 C.F.R. pts. 9, 141, and 142).

38. 66 Fed. Reg. 5002, 5103 (Jan. 18, 2001) (codified at 40 C.F.R. pts. 69 and 80).

39. 65 Fed. Reg. 6698, 6784 (Feb. 10, 2000) (codified at 40 C.F.R. pts. 80, 85, and 86).

40. 65 Fed. Reg. 2674, 2721 (Jan. 18, 2000) (codified at 40 C.F.R. pts. 52, 97).

41. 64 Fed. Reg. 52,828, 53,020 (Sept. 30, 1999) (codified at 40 C.F.R. pts. 60, et al.).

42. 63 Fed. Reg. 69,390, 69,440–41 (Dec. 16, 1998) (codified at 40 C.F.R. pts. 141 and 142).

Department of Transportation/FAA	Financial Responsibility Requirements for Licensed Launch Activities (Aug. 26, 1998)[43]	3 million
Department of Health & Human Services/FDA	Quality Mammography Standards (Oct. 28, 1997)[44]	5 million
Department of Health & Human Services/FDA	Regulations Restricting the Sale and Distribution of Cigarettes and Smokeless Tobacco to Protect Children and Adolescents (Aug. 28, 1996)[45]	2.5 million
Department of Agriculture/Food Safety and Inspection Service	Pathogen Reduction; Hazard Analysis and Critical Control Point (HACCP) Systems (July 25, 1996)[46]	1.6 million
Department of Transportation/FAA	Aircraft Flight Simulator Use in Pilot Training, Testing and Checking and at Training Centers (July 2, 1996)[47]	2.7 million
Consumer Product Safety Commission	Requirements for Labeling of Retail Containers of Charcoal (May 3, 1996)[48]	5 million
Consumer Product Safety Commission	Large Multiple-Tube Fireworks Devices (May 3, 1996)[49]	4.5–8 million

These numbers show substantial variations, though less so than even ten years ago.[50] The variations appear not to have any rationale behind them; agencies with higher or lower numbers have not explained their choices (and this is a significant problem). But the most fundamental question is how agencies generate monetary amounts of this kind. Agencies rely on two kinds of evidence. The first and most important involves real-world markets, producing

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43. 63 Fed. Reg. 45,592, 45,604 (Aug. 26, 1998) (codified at 14 C.F.R. pt. 440).

44. 62 Fed. Reg. 55,852, 55,964 (Oct. 28, 1997) (codified at 21 C.F.R. pts. 16, 900).

45. 61 Fed. Reg. 44,396, 44,576 (Aug. 28, 1996) (codified at 21 C.F.R. pts. 803, 807, and 820).

46. 61 Fed. Reg. 38,806, 38,958 (July 25, 1996) (codified at 9 C.F.R. pts. 310, 327, 381, 416, and 417).

47. 61 Fed. Reg. 34,508, 34,546 (July 2, 1996) (codified at 14 C.F.R. pt. 1).

48. 61 Fed. Reg. 19,818, 19,825 (May 3, 1996) (codified at 16 C.F.R. pt. 1500).

49. 61 Fed. Reg. 13,084, 13,094 (Mar. 26, 1996) (codified at 16 C.F.R. pts. 1500, 1507).

50. *See* Adler & Posner, *supra* note 5, at 1146 (showing an ever larger disparity in VSL numbers used by agencies between 1988 and 1997).

evidence of compensation levels for actual risks.[51] In the workplace and in the market for consumer goods, additional safety has a price; market evidence is investigated to identify that price.[52] The second kind of evidence comes from contingent valuation studies, which ask people how much they are willing to pay to reduce statistical risks.[53] The EPA's $6.1 million figure, for example, is a product of studies of actual workplace risks; such studies attempt to determine how much workers are paid to assume mortality hazards.[54] The relevant risks usually are in the general range of 1/10,000 to 1/100,000.[55] The calculation of VSL is a product of simple arithmetic. Suppose that workers must be paid $600, on average, to assume a risk of 1/10,000. If so, the VSL would be said to be $6 million.

For some of the two dozen labor market studies on which agencies currently rely,[56] consider the following table:[57]

TABLE 2: LABOR MARKET STUDIES ON THE VALUE OF LIFE

Study	*VSL (in US$)*
Kniesner and Leith (1991)	.7 million
Smith and Gilbert (1984)	.8 million
Dillingham (1985)	1.1 million
Marin and Psacharopoulos (1982)	3.4 million
V.K. Smith (1976)	5.7 million
Viscusi (1981)	7.9 million
Leigh and Folsom (1984)	11.7 million
Leigh (1987)	12.6 million
Garen (1988)	16.3 million

51. *See* VISCUSI, *supra* note 9, at 35 (explaining how labor markets compensate workers for taking on risk).

52. *See generally* Viscusi & Aldy, *supra* note 10 (providing a valuable and comprehensive overview of how market evidence is used to set prices).

53. *See, e.g.*, Hammitt & Liu, *supra* note 11, at 74 (using contingent valuation in a study of WTP in the context of cancer and other degenerative diseases).

54. Cass R. Sunstein, *The Arithmetic of Arsenic*, 90 GEO. L.J. 2255, 2274 (2002); VISCUSI, *supra* note 9 (discussing WTP studies and how agencies use them to calculate VSL).

55. *See, e.g.*, W. Kip Viscusi, *The Value of Life: Estimates with Risks by Occupation and Industry*, 42 ECON. INQUIRY 29, 33 (2004) (showing fatality risks ranging from about 1/100,000 to 45/100,000).

56. *See* Richard W. Parker, *Grading the Government*, 70 U. CHI. L. REV. 1345, 1485–86 (2003) (providing an accessible outline of labor market studies).

57. ENVTL. PROT. AGENCY, GUIDELINES FOR PREPARING ECONOMIC ANALYSES 89 (2000).

A large advantage of labor market studies of this kind is that they avoid the lively disputes over the use of "willingness to pay" or "willingness to accept" (WTA) in regulatory policy.[58] In many contexts, in both experiments and the real world, people demand more to give up a good than they are willing to pay to obtain it in the first instance—a disparity that significantly complicates efforts to assign monetary values to regulatory benefits, including mortality and morbidity.[59] If people are willing to pay $25 to eliminate an existing risk of 1/100,000, but demand $100 to incur a new risk of 1/100,000, then it is difficult to know how to proceed for purposes of monetary valuation of risks. Should agencies use $25, $100, or some intermediate figure? Fortunately, this problem dissipates in the context of labor market studies. If workers who face a risk of 1/10,000 are paid $600 more for doing so, and if workers who refuse to face such a risk are paid $600 less, then it is irrelevant whether agencies speak in terms of WTP or WTA.

B. *Of Welfare and Autonomy*

Why do regulators care about market valuations of statistical risks? There are two possible answers. The first and more conventional involves welfare. The second and perhaps more interesting involves autonomy.

In economic terms, these valuations provide a clue to the welfare consequences, for individuals, of one or another outcome. If people are willing to pay $60, but no more, to eliminate a risk of 1/100,000, then it can be reasonably assumed that their welfare is increased by asking them to pay that amount—and that their welfare is decreased by asking them to pay more. There are many demands on people's budgets, and if they prefer not to spend more than $60 to eliminate a risk of 1/100,000, it may be because they would like to use their money for food, shelter, recreation, education, or any number of other goods. With respect to mortality risks, it is possible that people

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58. *See generally* Russell Korobkin, *The Endowment Effect and Legal Analysis*, 97 Nw. U. L. REV. 1227 (2003) (explaining the so-called "endowment effect," by which individuals often demand more to relinquish an item (WTA) than they would pay to obtain that same item (WTP)).

59. *See id.* at 1228 ("[P]eople will often demand a higher price to sell a good that they possess than they would pay for the same good if they did not possess it at present." (footnote omitted)); Cass R. Sunstein, *Endogenous Preferences, Environmental Law*, 22 J. LEGAL STUD. 217, 226–27 (1993) ("The range of the disparity appears to vary from slight amounts to a ratio of more than four to one, with WTA usually doubling WTP.").

are sometimes inadequately informed, and there might be reason to override their judgments. But so long as information is available, the welfare argument is straightforward.[60]

Perhaps regulatory policy should not be based on welfare; perhaps it is unclear what "welfare" really means, and WTP might be defended instead on the ground of personal autonomy.[61] On this view, people should be sovereign over their own lives, and government should respect personal choices about how to use limited resources (again so long as those choices are informed). When people decline to devote more than $60 to the elimination of a 1/100,000 risk, it is because they would prefer to spend the money in a way that seems to them more desirable. If regulators do not use people's actual judgments, then they are insulting their dignity. The use of WTP therefore can claim a simultaneous defense from both utilitarian and deontological accounts.

C. Questions and Doubts

Nonetheless, some questions might be raised about the use of the relevant studies by the EPA and other agencies.[62] Most obviously, the studies show significant variety in the crucial numbers, ranging from $16.3 million in 1988 to $.7 million in 1991. The EPA has adopted the $6.1 million figure on the ground that it represents the median in the relevant studies.[63] But there is a risk of arbitrariness in fastening on that median figure, particularly if there is no reason to believe that the relevant study is the most accurate. In fact a more general look at the VSL data produces further puzzles and wider ranges. Some studies find no compensating differentials at all, indicating a VSL of zero[64]—implausibly low, to say the least, for purposes of policy. Others find that nonunionized workers receive *negative* compensating differentials for risk—that is, they appear to be paid less because they

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60.   I deal with some complexities in Part III.

61.   *See* RONALD DWORKIN, SOVEREIGN VIRTUE: THE THEORY AND PRACTICE OF EQUALITY 122 (2000) (arguing that liberty "is essential to any process in which equality is defined and secured").

62.   For several such questions, see Robert H. Frank & Cass R. Sunstein, *Cost-Benefit Analysis and Relative Position*, 68 U. CHI. L. REV. 323, 323–28 (2001), and Parker, *supra* note 56, at 1348–57.

63.   *See supra* note 54 and accompanying text.

64.   *See* Peter Dorman & Paul Hagstrom, *Wage Compensation for Dangerous Work Revisited*, 52 INDUS. & LAB. REL. REV. 116, 133 (1998) (finding "statistically significant positive compensation" for only a few categories of workers).

face mortality risks.[65] Another study finds that African Americans receive no significant compensating wage differential and hence that their particular VSL is zero.[66] On the other hand, some studies find VSLs actually above the VSLs presented in Table 1; consider the finding that for people who choose jobs with low level risks, the VSL is as much as $22 million.[67]

The most recent metastudy, far more comprehensive than the EPA's own analysis, finds that most studies produce VSLs ranging from $3.8 million to $9 million.[68] The range is fairly compressed, in a way that disciplines agency decisions; for many regulations, the "bottom line" of the cost-benefit assessment will not be affected by a choice of $3.8 million or $9 million. But that range still leaves significant room for discretion, in a way that would have significant implications for policy and law. Consider the fact that the monetized value of a program that saves two hundred lives would range from $760 million to $1.8 billion; note also that the EPA's highly publicized arsenic regulation would easily fail cost-benefit analysis with a $3.8 million VSL but easily pass with a $9 million VSL.[69] The simple point is that the variety of the outcomes raises questions about the reliability of any particular figure.

In addition, most of the studies on which the EPA relies are based on data from the 1970s.[70] Since that time, there has been significant growth in national income.[71] This change suggests that any VSL derived from 1970s data is too low. Of course people with more money are expected to be willing to pay more, other things being equal, to reduce statistical risks. One study finds that at the beginning of the twentieth century, VSL was about $150,000 in current dollars— less than one-twentieth of the corresponding amount a century later.[72] On reasonable assumptions, the EPA's use of 1970s data has

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65. Viscusi & Aldy, *supra* note 10, at 44.

66. Leeth & Ruser, *supra* note 19, at 270.

67. Viscusi & Aldy, *supra* note 10, at 23.

68. *Id.* at 18.

69. *See* Sunstein, *supra* note 54, at 2274–76 (discussing the EPA's use of a $6.1 million VSL in evaluating the arsenic regulation). The regulation was projected to cost about $200 million, and its monetized benefits, with a $6.1 million VSL, were around $190 million. *Id.* at 2275. It should be easy to see that a $3.8 million VSL would make the regulation impossible to defend— and a $9 million VSL would make it impossible to challenge.

70. *Id.* at 2274.

71. *Id.* at 2284–85.

72. Viscusi & Aldy, *supra* note 10, at 22.

produced a significant undervaluation of the monetary value of the lives at stake; the $6.1 million figure reflects no adjustment to account for changes in national real income growth.[73] In principle, the failure to undertake an adjustment is a serious mistake. The actual mean WTP might be substantially higher.[74]

Even more fundamentally, the relevant numbers deserve respect only if they do not result from bounded rationality or an absence of information on the part of the people whose choices generate them. Suppose, for example, that workers do not know the risks that they face or that their decisions are products of the availability heuristic or optimistic bias.[75] In either case, regulators should not use, for purposes of policy, a finding that workers are paid $60 to run a risk of 1/100,000; by hypothesis, that number does not reflect a rational tradeoff by informed workers. I return to these points below.[76] Current practice is based on an assumption, not that all or even most workers make informed choices, but that market processes ensure the right "price" for various degrees of safety.[77] Compare pricing for soap, cereals, and telephones: most consumers do not have full information and use heuristics that lead them astray, but market competition produces a sensible structure of prices, at least most of the time.

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73.   The EPA has updated the relevant numbers for inflation, but it has not otherwise made adjustments. Sunstein, *supra* note 54, at 2284.

74.   *See* Dora L. Costa & Matthew E. Kahn, *The Rising Price of Nonmarket Goods*, 93 AM. ECON. REV. PAPERS & PROC. 227, 229 tbl.1 (2003) (suggesting a likely current value of $12 million); Viscusi, *supra* note 16, at 252 tbl.5 (finding values as high as $15.1 million for white males). In the context of arsenic regulation, the EPA also noted in its sensitivity analysis that the appropriate adjustment would increase the VSL from $6.1 million to $6.7 million. National Primary Drinking Water Regulations; Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring, 66 Fed. Reg. 6976, 7012 (Jan. 22, 2001) (codified at 40 C.F.R. pts. 9, 141, and 142). Recent evidence suggests that the current VSL is $4.7 million for the entire population, $7 million for blue-collar males, and $8.5 million for blue-collar females. Viscusi, *supra* note 55, at 39.

75.   The availability heuristic suggests that people will overestimate risks when an event is readily "available" to people's minds, and underestimate risks when no such event is available. Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 STAN. L. REV. 683, 685 (1999). Optimistic bias suggests that people will be excessively optimistic about risks that they themselves face. Cass R. Sunstein, *Hazardous Heuristics*, 70 U. CHI. L. REV. 751, 772 (2003).

76.   *See infra* Part III.A.2.

77.   *See* VISCUSI, *supra* note 9.

D. *The Value of Statistical Risks, Not the Value of Statistical Lives*

Suppose that the relevant problems can be solved and that regulators can identify a number, call it $6 million, that really represents people's valuations. It should be clear that even if this were so, it would be grossly misleading to offer the following suggestion: *The value of a statistical life is $6 million*. It would be much more accurate to say that for risks of 1/10,000, the median WTP in the relevant population is $600—or that for risks of 1/100,000, the median WTP is $60. If true, these statements would, on assumptions later explored, be extremely helpful for purposes of policy. But even at first glance, it is clear that these numbers need not be taken to support a VSL that is independent of probability.[78] Suppose that people would be willing to pay $60 to reduce a risk of 1/100,000. From this it does not automatically follow that people would be willing to pay $6 to eliminate a risk of 1/1,000,000, or $6,000 to reduce a risk of 1/1,000, or $60,000 to reduce a risk of 1/100. It is plausible to think that people's WTP to reduce statistical risks is nonlinear.[79] As the probability approaches 100 percent, people become willing to pay an amount for risk reduction that rises nonlinearly to 100 percent of their wealth; as the risk approaches zero, WTP nonlinearly approaches nothing. For a risk of 1/1,000,000, for example, many reasonable people would be unwilling to pay anything, treating that risk as inconsequential.

Hence the claim that VSL is $6 million is merely a shorthand way of saying that people are willing to pay from $600 to $60 to eliminate risks of 1/10,000 to 1/100,000. Because this is the range for risks with which most agencies deal, the relevant data are highly informative. For current purposes, this point is the crucial one.

II. INDIVIDUATION

My basic claim is that VSL will inevitably vary across both risks and persons. If people's WTP is higher to avoid cancer risks than risks of unanticipated, sudden deaths, then the use of a VSL, drawn from studies of the latter risks, will provide insufficient protection of the exposed population. If people in different occupations are paid

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78. *See* RICHARD POSNER, CATASTROPHE: RISK AND RESPONSE 166 (2004) ("[T]here is no reason to think that the relation between the risk of death and the perceived cost of the risk is linear.").

79. *Id*.

different amounts to incur a risk, then use of a uniform VSL will not track actual behavior, which is what it is supposed to do.[80] If wealthy people show a higher WTP than poor people, then a uniform WTP based on a population-wide median will ensure insufficient protection of wealthy people and excessive protection of poor people in a way that might well prove harmful to both groups.[81] And if the use of WTP is justified on grounds of welfare and autonomy, then a more individuated approach is justified on those same grounds.

This Part begins by considering differences among risks and then explores differences among persons. It explains and endorses the claim that in theory, full individuation, giving all people the risk reduction for which they are willing to pay, is required by the prevailing theory. From this point, it emphasizes the problem with full individuation, which is that it is not feasible. But an intermediate approach, moving in that direction, would make a great deal of sense. The Part concludes with a discussion of the implications for administrative law.

A. Risks

I have emphasized that the data that underlie the $6.1 million VSL used by the EPA come from risks of accidents in the workplace—and that even if these data could be generalized, they would not justify a probability-independent VSL. But there is a point of greater practical importance. A 1/100,000 risk of dying in a workplace accident might well produce a different WTP from a 1/100,000 risk of dying of cancer from air pollution, which might in turn be different from a 1/100,000 risk of dying in an airplane as a result of a terrorist attack or a 1/100,000 risk of dying as a result of a defective snowmobile. The very theory that lies behind the government's current use of VSL justifies a simple conclusion: *VSL should be risk-specific; it should not be the same across statistically equivalent risks*. The use of a single number almost certainly produces significant blunders and incorrect decisions about the appropriate amount of regulatory protection.

1. *Data.* To test these issues in a highly preliminary way, I conducted a small contingent valuation study. Eighty-four University

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80. Viscusi, *supra* note 55, at 33, 39–41.

81. On the "might well," see *infra* Part III.B.

of Chicago law students were asked about their WTP to eliminate each of five risks of 1/100,000. The simplest of these risks involved dying from an automobile accident as a result of a defective brake. The four other risks might be expected to occasion greater concern; they involved deaths from lung cancer, AIDS, Alzheimer's disease, and airplane crashes resulting from terrorist attacks. The 1/100,000 risk of dying in an automobile accident produced a mean WTP of $156, whereas the four other accidents produced significantly higher values (ranging from $184 for the AIDS risk to $193 for Alzheimer's disease). In addition, there was substantial heterogeneity across individuals. For each of the questions, about ten respondents were willing to pay nothing to eliminate the 1/100,000 risk, producing a VSL of zero. At the opposite end of the spectrum, about fifteen people were willing to pay at least $500 to eliminate each of the 1/100,000 risks, producing a VSL of $50 million. This informal study suggests that even within a relatively homogenous group (law students), people do not treat statistically identical risks in the same way, and indeed there are differences across persons as well as across risks.

With respect to the data on which agencies generally rely, notice initially that the very category of "workplace risks" conceals relevant differences. The American economy contains a wide range of occupations and industries, and a uniform VSL should not be expected to emerge from each of them. Indeed, a recent study finds significant differences across both occupations and industries,[82] with blue-collar workers showing a higher VSL than others.[83] It is inevitable that a wide range of values would emerge from studies looking separately at machine operators, executives, sales associates, dental technicians, equipment cleaners, security guards, and secretaries[84]—and diverse values undoubtedly could be found within each category.

In addition, many risks controlled by the EPA are qualitatively different from the workplace risks that the EPA has used to generate its VSL. Two differences are particularly important. First, the workplace studies do not involve cancer, and cancer risks are often involved in environmental decisions. There is considerable evidence

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82. Viscusi, *supra* note 55, at 39–41.

83. *Id*.

84. *See id.* at 33 (containing data clearly indicating that separate numbers for different occupation groups would emerge).

that the risks associated with cancer produce a higher WTP than other kinds of risk.[85] For example, Professors Hammitt and Liu find that in Taiwan, WTP to eliminate a cancer risk is about one-third higher than WTP to avoid a risk of a similar, chronic degenerative disease.[86] Some contingent valuation studies suggest that people are willing to pay twice as much to prevent a cancer death as an instantaneous death.[87] People seem to have a special fear of cancer, and they seem to be willing to pay more to prevent a cancer death than a sudden, unanticipated death, or a death from heart disease.[88] The "cancer premium" might be produced by the "dread" nature of cancer; it seems well established that dreaded risks produce special social concern, holding the statistical risk constant.[89]

To be sure, existing evidence on this count is not unambiguous. One study of occupational exposures does not find a significantly higher VSL for cancer risks.[90] But that study assumes that occupational cancers account for 10 to 20 percent of all cancer deaths—an amount that is almost certainly too high. If occupational exposures account for 5 percent of all cancers—a far more realistic number—then the VSL for cancer risks may be as high as $12 million, about double the amount that the EPA now uses. The current findings conflict;[91] but in principle, the VSL figures should be risk-specific, and existing evidence generally supports the view that cancer risks produce an unusually high VSL.

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85. Richard L. Revesz, *Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives*, 99 COLUM. L. REV. 941, 972–74 (1999); Hammitt & Liu, *supra* note 11, at 74.

86. *Id.* at 84.

87. *Id.* at 81.

88. *See* George Tolley et al., *State-of-the-Art Health Values*, *in* VALUING HEALTH FOR POLICY 323, 339–40 (George Tolley et al. eds., 1994) (arguing that the value of avoiding a mortality risk preceded by morbidity includes the value of avoiding an instantaneous death plus the value of avoiding the preceding years afflicted with the particular condition).

89. *See* Revesz, *supra* note 85, at 972–74 (discussing "the dread aspects of carcinogenic deaths" and their impact on WTP studies). *See generally* PAUL SLOVIC, THE PERCEPTION OF RISK (2000) (exploring how risk perception affects individual behavior).

90. *See* Viscusi & Aldy, *supra* note 10, at 57 (finding that estimates of values for cancer mortality and accidental death were similar); *see also* Wesley A. Magat et al., *A Reference Lottery Metric for Valuing Health*, 42 MGMT. SCI. 1118, 1129 (1996) (finding no difference between valuations of cancer deaths and auto accident deaths).

91. *See* Viscusi & Aldy, *supra* note 10, at 57 (contrasting the United Kingdom Health and Safety Executive's use of a higher VSL for cancer deaths with the recommendation of the EPA's SAB not to make any "dread" modification to VSL for certain risks).

The second difference between workplace risks and the risks that concern the EPA is that the latter risks seem peculiarly involuntary and uncontrollable.[92] Unlike the risks of workplace accidents, pollution risks are not assumed voluntarily in return for compensation.[93] A great deal of literature suggests that involuntary, dread, uncontrollable, and potentially catastrophic risks produce unusually high levels of public concern.[94] If so, the numbers that derive from workplace accidents will substantially understate WTP for regulatory benefits provided by the EPA and many other agencies.[95]

The implications of risk-specific VSL go well beyond the distinction between workplace accidents and environmental risks. For example, people appear to be willing to pay far more to produce safety in the air than on the highways;[96] it follows that VSL should be higher for the FAA than for the National Highway Traffic Safety Administration. Oddly, the former agency has an unusually low rather than an unusually high VSL.[97] Some diseases would produce a higher VSL than others. A 1/100,000 risk of death from Alzheimer's disease, for example, would almost certainly produce a higher VSL

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92. *See, e.g.*, ACKERMAN & HEINZERLING, *supra* note 9, at 147 (arguing that environmental risks are involuntary because they are "not allocated, even in theory, according to market transactions"); Sunstein, *supra* note 54, at 2285 ("The risk of cancer from drinking water is qualitatively different from the workplace risks that the EPA used to generate its VSL. The risks from drinking water seem peculiarly involuntary and uncontrollable, and a great deal of literature suggests that involuntary and uncontrollable risks produce individual concern.").

93. Of course it is possible to question the idea that workplace risks are assumed voluntarily and in return for compensation. For example, many workers probably do not know the risks that they face. The distinction that I am drawing here is one of kind rather than degree. *See* Cass R. Sunstein, *Bad Deaths*, 14 J. RISK & UNCERTAINTY 259, 272 (1997) (proposing that low-wage workers involuntarily assume risks because they lack information).

94. *See, e.g.*, Paul Slovic, *Perception of Risk*, 236 SCIENCE 280, 282–83 (1987).

95. *See, e.g.*, Sunstein, *supra* note 54, at 2285 ("As compared to workplace risks, there can be little doubt that the risk of arsenic from drinking water is worse along the relevant dimensions. For this reason, it makes sense to think that people would be willing to pay a premium to avoid the risks associated with arsenic."). *See generally* ACKERMAN & HEINZERLING, *supra* note 9.

96. *See* Carlsson et al., *supra* note 12, at 159 (finding that people's WTP to reduce the risk of flying is double their WTP to reduce the risk of traveling by taxi, because the fear of flying produces particular mental suffering).

97. *See supra* Table 1 (listing the VSL for the FAA as $2.7 to $3 million depending on the regulation); OFFICE OF REGULATORY ANALYSIS AND EVALUATION, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., NPRM ON TIRE PRESSURE MONITORING SYSTEM FMVSS NO. 138, *available at* http://www.nhtsa.dot.gov/cars/rules/rulings/TPMS_FMVSS_No138/index.html#Contents (Sept. 2004) (documenting the cost-benefit analysis of a safety regulation using a VSL range from $3.5 to $5.5 million).

than a 1/100,000 risk of death from a heart attack; a 1/50,000 risk of an AIDS death would not produce the same VSL as a 1/50,000 risk of death from a defective brake system on an automobile; most people would pay more to reduce a risk of dying from slow-acting strokes than from strokes that kill outright. There should be a distinctive, population-wide median VSL for mortality risks of airplane accidents, of cancer from air pollution, of motor vehicle accidents, of defective toys, of cancer from water pollution.

In fact studies that have been done for seatbelt use, automobile safety, home fire detectors, and more find a wide variety of numbers, producing a VSL ranging from $770,000 (smoke detectors, based on data from the 1970s) to $9.9 million (fatality risks associated with safety belts and motorcycle helmets).[98] And within each of these categories of risk, further distinctions would undoubtedly emerge. All cancer fatalities are not the same; informed people would surely make distinctions between those that involve long periods of suffering and those that do not. If agencies are really interested in basing VSL on WTP, then a uniform number, treating all statistically identical mortality risks as the same, is fatally obtuse.

2. *Practice.* The claim that VSL should vary by the type of risk is not entirely foreign to current regulatory policy. In the context of arsenic regulation, for example, the EPA was alert to some such variations.[99] Hence its own sensitivity analysis for arsenic suggested the need for an upward revision of 7 percent because of the involuntariness and uncontrollability of the risk.[100] With this revision, along with the revision for income growth, VSL would rise from $6.1 million to $7.2 million.[101] In fact there are reasons to suggest that this amount might be far too low. Dean Revesz suggests that "the value of avoiding a death from an involuntary, carcinogenic risk should be

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98. Viscusi & Aldy, *supra* note 10, at 25.

99. *See* National Primary Drinking Water Regulations; Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring, 66 Fed. Reg. 6976, 7014 (Jan. 22, 2001) (codified at 40 C.F.R. pts. 9, 141, and 142) (demonstrating "the effects of incorporating a 7% increase for voluntariness and controllability," based on a study indicating that "individuals may place a slightly higher [WTP] on risks where exposure is neither voluntary nor controllable by the individual"); *see also* Sunstein, *supra* note 54, at 2285 (arguing that the EPA's "own sensitivity analysis suggests the need for an upwards revision of seven percent because of the involuntariness and uncontrollability of the risk").

100. National Primary Drinking Water Regulations; Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring, 66 Fed. Reg. at 7014.

101. *Id.*

estimated as four times as large as the value of avoiding an instantaneous workplace fatality."[102] Under this approach, the VSL, in the context of arsenic, jumps from $6.1 million to $24.3 million. I am not arguing that $24.3 million is the correct number; I am suggesting only that VSL, based on WTP, is almost certainly risk-specific.

3. *Qualifications*. Three qualifications are important. First, psychological studies showing heightened public concern[103] about particular risks may not translate into higher WTP. Social scientists might be able to show that certain qualitative factors make people especially concerned about certain risks, but it is an independent question whether and how much their WTP increases as a result. Fortunately, a number of studies of WTP at least suggest answers to that question, demonstrating that VSL should vary significantly across risk types.[104]

Second, there is no simple or rigid distinction between the involuntary/uncontrollable and the voluntary/controllable.[105] It is a mistake to believe that risks can be neatly separated into the two categories. Are the risks from air pollution in Los Angeles involuntarily incurred? The answer might seem to be affirmative, but people can choose whether to live in Los Angeles. Are the risks of airplane travel uncontrollable? Many people think so, but the decision to fly is itself under human control. Death from an asteroid seems to be a model case of involuntariness, at an opposite pole from hang gliding. But why? In deciding whether a risk is faced involuntarily or whether it is within personal control, the underlying issues seem to be whether those exposed to the risk are exposed knowingly and whether it is costly or otherwise difficult for people to avoid the risk.[106] When risks are approached in these terms, it is clear that some risks are worse than others, even if the probability of harm

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102. Revesz, *supra* note 85, at 982.

103. *See* SLOVIC, *supra* note 89, at 232–35 (discussing public concern about extremely minimal but highly publicized risks such as nuclear mishaps or genetic engineering).

104. For VSL calculations based on types of diseases and disease latency periods, see Hammitt & Liu, *supra* note 11, at 88. For a metalanalysis, see generally Viscusi & Aldy, *supra* note 10.

105. Sunstein, *supra* note 54, at 2285; *see* Sunstein, *supra* note 93, at 272 ("[T]he question whether a risk is run voluntarily or not is often not a categorical one but instead a matter of degree, associated with information cost, risk-reduction cost, and the existence or not of accompanying benefits.").

106. Sunstein, *supra* note 93, at 272.

is identical. This point is enough to suggest that VSL cannot be uniform across risks.

Third, it is possible that extreme aversion to certain risks reflects a form of bounded rationality[107]—and it is doubtful whether that extreme aversion should be allowed to play a role in regulatory policy. Suppose, for example, that people really are willing to pay twice as much to avoid a cancer risk as to avoid a sudden, unanticipated death. Must these numbers be decisive for purposes of policy, assuming that the contingent valuation study is reliable? They might not be *if* there is reason to believe that the WTP figures are not accurately measuring welfare. And is it even plausible to think that the "cancer premium" is so high that it actually doubles the cost of death? Is it reasonable to think that a death from cancer is actually *twice* as bad as a death that is sudden and unanticipated? To be sure, a degree of pain and suffering typically accompanies cancer, and that fact illustrates the obtuseness of using the same number for cancer risks as for risks of sudden, unanticipated deaths. But it is not easy to defend the set of (exotic) values that would lead to the conclusion that the relevant pain and suffering is as bad as death itself. If WTP does not accurately measure welfare in the case of cancer, and if the inflated numbers for cancer deaths are a product of an intuitive recoil or terror at the idea of cancer, then regulators should not use the unrealistically high monetary values.

For those who emphasize autonomy rather than welfare, perhaps this point does not amount to an objection to the use of WTP. If the goal is to respect people's autonomy, regulators should defer to their judgments even if those judgments are mistaken. But if people show an especially high WTP because of a visceral reaction to cancer, or because of insufficiently thoughtful assessments of the stakes, then it is not clear that autonomy calls for following WTP. Government does not respect people's autonomy if it follows their uninformed choices; this proposition raises doubts about government's use of uninformed WTP. To be least controversial, WTP numbers would reflect informed rather than reflexive judgments about the nature of the harms involved.

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107. *See* Sunstein, *supra* note 8, at 248 ("WTP will be a poor proxy for welfare in cases in which we have good reason to suppose that underestimation or overestimation is likely. Of course government officials should be reluctant to second-guess citizens, but in some cases, the second-guessing is well justified.").

B. Persons

Even when risks are identical, people are heterogeneous in their values and their preferences. The $6.1 million itself is the median figure—it is the median of a set of means. But everyone agrees that in workplaces and elsewhere, individual WTP is highly variable. Some of the variability stems from different degrees of aversion to different risks. Some people are especially concerned to avoid the dangers associated with pesticides, whereas others focus on the risks of air travel. Some of these differences are a product of beliefs about existing risk levels and others of tastes and values. So too, people with high levels of background risk should be expected to be willing to pay less to avoid an additional risk of 1/100,000 than those with low levels of background risk. If, for example, a relevant population faces thirty annual mortality risks of 1/10,000 or higher, it should be expected to show a lower VSL with respect to a new risk of 1/100,000 than a population whose background risks are less serious.[108] The difference between the VSL of people in wealthy nations and that of people in poor nations, taken up in Part IV, is partly a product of the fact that the latter group generally faces far higher background risks.

It is likely that WTP varies with respect to age as well. It is reasonable to predict that other things being equal, older people will show a lower WTP and hence a lower VSL, simply because they have fewer years left. One study, for example, finds that the VSL of a forty-eight-year-old is 10 percent lower than that of a thirty-six-year-old; another finds that people under forty-five have a VSL twenty times higher than people over sixty-five.[109] The most careful analysis suggests that VSL peaks around age thirty, stays constant for about a decade, but declines from that point, so much so that the VSL for a sixty-year-old is approximately half of that of a person between thirty and forty.[110] These findings raise particular conundrums in the case of people under eighteen; how should government proceed if the VSL

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108. *See* Louis R. Eeckhoudt & James K. Hammitt, *Background Risks and the Value of a Statistical Life*, 23 J. RISK & UNCERTAINTY 261, 264–65 (2001) (illustrating that VSL decreases as the aggregate risk of a population increases).

109. *See* Viscusi & Aldy, *supra* note 10, at 50–51. *But see* Sunstein, *supra* note 8, at 227 (hypothesizing that older people may be willing to pay more than younger people to eliminate risk, giving older people a higher VSL).

110. *See* ALDY & VISCUSI, *supra* note 15, at 42 (calculating a VSL of $5.76 million for people between twenty-eight and thirty-two years of age, $4.83 million for people between thirty-eight and forty-two years of age, and $2.51 million for people between fifty-eight and sixty-two years of age).

for those between infancy and fifteen years of age is low, simply because they have little or no money? It is implausible to use a tiny VSL for them, but what number should be used, and why? Little progress has been made on this question,[111] with the government using its ordinary, uniform number for children as for everyone else.[112] But if the vexing case of valuing children is put to one side, then the prevailing theory suggests a lower VSL for those in the last stages of life than for those who have many decades to live—and this difference ought to be reflected in regulatory policy.[113]

Along the same lines, many analysts suggest that regulatory policy should focus not on the value of statistical lives but on the value of statistical life-years (VSLY).[114] Suppose that they are right. If so, then the statistical lives of young people are likely to be worth more than the statistical lives of older people. The government's interest in focusing on VSLY led to widespread public objections to what, under one proposal, would seem to be a "senior death discount." That discount would have valued someone over seventy as "worth" $.62 on the dollar.[115] But assuming that people over seventy are willing to pay about 62 percent, on average, of what younger people are willing to pay, the theory that underlies current practice justifies exactly this disparity. If the theory is right (a question to which I will turn[116]), then a disparity between older people and younger people makes perfect sense to the extent that the WTP figures justify it. Note in particular that if each person has a presumptive right to a life of decent length, then the use of the life-

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111.   For an overview that turns out to be highly tentative and indeterminate, see generally ENVTL. PROT. AGENCY, CHILDREN'S HEALTH VALUATION HANDBOOK (2003). For discussion, see Eric A. Posner & Cass R. Sunstein, *Dollars and Death*, 72 U. CHI. L. REV. 537 (2005).

112.   *See* ENVTL. PROT. AGENCY, *supra* note 111, at 3–12 ("[T]here is not sufficient support in the economics literature for making adjustments to the existing estimates to account for the impact of age (including children). . . ." (citing ENVTL. PROT. AGENCY, GUIDELINES FOR PREPARING ECONOMIC ANALYSES (2000))).

113.   *See* Sunstein, *supra* note 8, at 206–08 (arguing that agencies should use VSLY when analyzing the costs and benefits of a proposed regulation, to take into account that older people have fewer life-years remaining).

114.   *Id.* at 206; *see, e.g.*, Richard Zeckhauser & Donald Shepard, *Where Now for Saving Lives?*, 40 LAW & CONTEMP. PROBS. 5, 11–15 (Autumn 1976) (measuring utility in terms of "quality-adjusted life years").

115.   *See* Sunstein, *supra* note 8, at 206–08 (discussing the EPA's proposal to vary VSL based on age by setting the VSL for those under seventy at $3.7 million and the VSL for those seventy and older at $2.3 million).

116.   *See infra* Part III.

years approach has a great deal of appeal, because it is likely to lead to special efforts to ensure that everyone enjoys that right.

Even more fundamentally, those with little to spare will show a far lower VSL than those who have plenty. WTP depends on ability to pay, and when ability to pay is low, WTP will be low as well, holding preferences constant. For this reason the VSL of people with an annual income of $50,000 will be lower than that of people with an annual income of $150,000. People in the former category might be willing to pay no more than $25 to reduce a risk of 1/100,000, whereas people in the latter group might be willing to pay as much as $100. If so, government should not require everyone to pay $100; its decision to do so would harm those unwilling to pay that amount.[117] A uniform VSL, of the sort that government now uses, threatens to "overprotect" the poor, in a way that might well be harmful to them. At the same time, the uniform VSL threatens to underprotect the wealthy, in a way that is highly likely to be harmful to them.[118]

As a simple matter of fact, it would be expected that unionized workers would receive more compensation for incurring risks—and studies almost always show a higher VSL for unionized workers, with amounts as high as $12.3 million, $18.1 million, and even $44.2 million.[119] Large differences across nations would also be expected, with VSL being higher in rich countries than in poor ones. And in fact, studies find a VSL as low as $200,000 for Taiwan, $500,000 for South Korea, and $1.2 million for India—but $21.7 million for Canada and $19 million for Australia.[120] Consider, for purposes of illustration, the following table:[121]

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117. I am assuming adequate information and unbounded rationality. *See infra* text accompanying note 158.

118. Compare this with the EPA's explicit and unexplained refusal to consider differences "in age, health status, socioeconomic status, gender or other characteristic of the adult population." National Emission Standards for Hazardous Air Pollutants for Industrial/Commercial/Institutional Boilers and Process Heaters, 68 Fed. Reg. 1660, 1695 (proposed Jan. 13, 2003) (to be codified at 40 C.F.R. pt. 63).

119. Viscusi & Aldy, *supra* note 10, at 45.

120. *Id.* at 27–28.

121. *See id.*

TABLE 3: VSL ACROSS NATIONS

Nation and Year of Study	VSL (in 2000 US$)
Taiwan (1997)	.2–.9 million
South Korea (1993)	.8 million
India (1996/97)	1.2–1.5 million
Hong Kong (1998)	1.7 million
Canada (1989)	3.9–4.7 million
Switzerland (2001)	6.3–8.6 million
Japan (1991)	9.7 million
Australia (1997)	11.3–19.1 million
United Kingdom (2000)	19.9 million

It would follow that within the United States, wealthy populations would show a higher VSL than poorer populations. If a program is designed to combat health risks in wealthy suburbs, the VSL should be above the population-wide median; if the protected population is mostly in poor areas, the VSL should be below this median. Currently agencies pay no attention to this possibility in undertaking cost-benefit analysis.[122]

What about the more controversial categories of race and gender? Recent studies show significant differences. Using workplace data from 1996 to 1998, Professors Leeth and Ruser find that women's VSL ranges from $8.1 million to $10.2 million, whereas men's VSL is less than half that amount, ranging from $2.6 million to $4.7 million.[123] Leeth and Ruser find that Hispanic males show a slightly higher VSL than white males ($5 million compared to $3.4 million).[124] Most strikingly, African Americans receive no compensation for workplace risks, producing a VSL of zero.[125] Using workplace data from 1992 through 1997, Professor Viscusi also finds a significant disparity across racial lines, though his numbers are quite

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122. *See* Adler & Posner, *supra* note 5, at 1136–39 (arguing that the failure to take into account the differences in marginal utility between wealthy and poor people distorts cost-benefit analysis).

123. Leeth & Ruser, *supra* note 19, at 266.

124. *Id.* at 270.

125. *See id.* at 275 (concluding that fatal injury risk compensation for black males is negative but insignificant).

different from those found by Leeth and Ruser.[126] In Viscusi's study, the VSL is highest for white males and lowest for African-American males, with white and African-American females falling between the poles. More particularly, Viscusi finds that the overall white VSL is $15 million, whereas the overall African-American VSL is $7.2 million.[127] For white females, the overall VSL is $9.4 million, compared to $18.8 million for white males; for African-American females, the overall VSL is $6.9 million, compared to $5.9 million for African-American males.[128] Another study by Viscusi finds a VSL of $7 million for blue-collar males and $8.5 million for blue-collar females.[129]

What accounts for these differences? It should be expected that whites as a class will show a higher WTP and hence VSL than African Americans as a class. Simply because whites are wealthier, their WTP will be higher too. Might the same be expected within job categories? Perhaps the answer is yes, if past or present discrimination, or different starting points, produce racial disparities in compensation for risk within similar jobs. The precise causes and levels of the disparities are unclear, and the differences between Professors Leeth and Ruser on the one hand and Professor Viscusi on the other remain a puzzle. There is no *a priori* reason to think that men or women would show a higher VSL. If the relevant group of women is wealthier, then its WTP should be higher too. And if women are more averse to mortality risks than men, they will show a higher WTP, just because they will demand a higher premium. For my purposes, the central point is that demographic differences in VSL are entirely to be expected, and they are found in both studies.

C. *Theory and Practice*

If the foregoing points are put together, it is apparent that there is not one VSL, but an exceptionally large number of VSLs. In fact each of us has not one VSL but a number of them, targeted to each risk that each of us faces. A policy that truly tracked WTP, and based VSL on WTP, would seek to provide all people with the level of protection for which they are willing to pay to reduce each risk.

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126. *See* Viscusi, *supra* note 16, at 252 (calculating fatality risk estimates and implicit VSL by race, sex, and income category).

127. *Id*.

128. *Id*.

129. Viscusi, *supra* note 55, at 39.

Tracking WTP is the goal that underlies current practice; and apart from questions of administrability, it calls for a maximum level of individuation.

1. *A Thought Experiment.* As a thought experiment, suppose that an all-knowing regulator could costlessly determine each person's WTP for each statistical risk that he faces—and perfectly match the level of regulatory protection to that WTP. In these circumstances, the regulator should give all people no more and no less than their WTP for each risk that they face. (In cases in which people's WTP was low because of poverty, they might be subsidized; but they would not be forced to purchase goods for an amount in excess of their WTP. I will return to this point,[130] but subsidies are not my topic here.) Under this approach, regulatory benefits would be treated the same as every other commodity that is traded on markets, including safety itself. Of course most people face extremely serious problems in dealing with risk, stemming both from an absence of information and from bounded rationality.[131] The all-knowing regulator would overcome these problems and provide people with what they would want if they did not suffer from them.

If agencies could do this, then the current theory would be perfectly implemented. It would follow that with full individuation, overall WTP would be lower for poor people than for wealthy people, for African Americans than for whites, and (possibly) for men than for women. But, under this thought experiment, government would not discriminate against groups; for example, it would neither decide on high VSLs for programs predominantly benefiting whites nor decide on low VSLs for programs predominantly benefiting African Americans. The difference would be a product of aggregation of fully individual VSLs—aggregation of the kind that most conventional markets, including those for automobiles and consumer goods, now provide. Recall that the use of WTP is justified because of its connection with welfare and individual autonomy. If so, then fully individual VSLs are justified on those same grounds.

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130.   *See infra* text accompanying notes 148–49.

131.   *See* David A. Strauss, *Why Was* Lochner *Wrong?*, 70 U. CHI. L. REV. 373, 384 (2003). *See generally* Christine Jolls et al., *A Behavioral Approach to Law and Economics*, 50 STAN L REV. 1471, 1518–20 (1998) (arguing that despite adequate information consumers sometimes do not make well-informed choices because of their inability to process the information).

Of course there are two practical problems with taking the thought experiment seriously. The first is that agencies do not know the WTP of every individual, and as a practical matter, it is not possible to find out. The second problem is that regulatory benefits are often collective goods—goods that cannot feasibly be provided to one without also being provided to many. In the context of air pollution, for example, it is not possible to provide cleaner air for some without providing cleaner air for many or all. In regulating air pollution and water pollution, individuation is simply not an option.

These problems are fatal objections to *full* individuation. But they are not fatal objections to *more* individuation. At a minimum, agencies should be encouraged to take account of existing research in their sensitivity analyses, which would result (for example) in increased "upper bound" estimates for cancer risks.[132] In addition, disparities in VSL findings might be mapped onto different agency estimates, producing reasonable rather than arbitrary differences in VSL across agencies. If, for example, the risks of death from workplace accidents produce a lower number than the risks of death from consumer products, then the Occupational Safety and Health Administration should use a lower VSL than the Consumer Products Safety Commission. It is easy to imagine a research program in which the Office of Information and Regulatory Affairs would attempt to elicit far more information on VSL across different risks. A movement in this direction need not raise troubling ethical questions.

It would be far more controversial to suggest that agencies should adopt different VSLs depending on whether the affected population is especially wealthy or especially poor. But at the very least, agencies should adjust VSL to changes in national wealth over time, producing a higher amount than would result from inflation adjustments alone.[133] Or suppose, for example, that a regulation is designed to protect migrant farmworkers, expected to show a low VSL. Current studies in fact estimate the relationship between income and WTP,[134] allowing agencies to make suitable adjustments to their VSLs. And when the population is relatively wealthy, the agency might adopt a higher VSL. For present purposes, I am

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132. *See supra* note 74 (discussing the sensitivity analysis for cancer risks from arsenic).

133. *Cf.* Sunstein, *supra* note 54, at 2284–85 (discussing the rationale behind adjusting VSL for increases in national wealth).

134. *See* Viscusi & Aldy, *supra* note 10, at 36–43 (using a metanalysis of U.S. and international VSLs to determine the relationship between income and WTP).

suggesting only that an approach of this kind is indicated by the theory that government now uses. I turn in Part III to the larger questions that such an approach would make it necessary to answer.

2. *Optimal Individuation: An Intermediate Approach*. The larger question is simple: What is the optimal level of individuation with respect to the value of life? The answer depends in part on how much is known. Even in markets, individuals are not usually asked, or charged, their particular WTP. In real estate markets, negotiation between individuals is the usual practice. But for ordinary consumer goods—cereal, soap, casebooks, subscriptions to law reviews—a standard price emerges from the forces of supply and demand. It seems clear that a uniform VSL, cutting across domains in which those forces almost certainly establish disparate amounts, fits poorly with the theory that currently underlies government practice. It is also clear that full individuation is not feasible. The appropriate approach depends on two familiar variables: the costs of decisions and the costs of errors. In the early years of cost-benefit analysis, a uniform number was probably the best that agencies could do. As better information emerges about different VSLs across risks and persons, the use of a uniform number will be increasingly difficult to support. If those differences are substantial, the argument for further differentiation will be strengthened. A uniform number might be seen as a plausible "first-generation" response to the problems posed by cost-benefit analysis. The second generation is now well underway, and hence finer distinctions will be increasingly hard to resist.

3. *Administrative Law*. How would the use of more individuated VSLs bear on the legality of agency action? Courts have started to develop principles by which to review agency decisions about how to assess the costs and benefits of regulation.[135] Some statutes explicitly require agencies to balance costs against benefits, and under such statutes an agency's choices about valuation might be

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135. The leading case is *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201 (5th Cir. 1991). There, the Fifth Circuit explained: "[T]he proper course . . . is to consider each regulatory option, beginning with the least burdensome, and the costs and benefits of regulation under each option. . . . Without doing this it is impossible . . . to know that none of these alternatives was less burdensome than the ban . . . chosen by the agency." *Id.* at 1217 (citation omitted); *see also* Am. Dental Ass'n v. Martin, 984 F.2d 823, 831 (7th Cir. 1993) (holding that the court's role is not to evaluate the quality, necessity, or cost-benefit rationale of an agency regulation, but "merely to patrol the boundary of reasonableness").

challenged as unreasonable or arbitrary.[136] If an agency used a VSL of $200,000, it would almost certainly be assigning an arbitrarily and hence unlawfully low monetary value; if it used a VSL of $40 million, its selection would be arbitrarily high.[137] In all cases agencies are required to produce a reasonable explanation for why they have proceeded one way rather than another.[138]

In view of the arguments made thus far, it is easy to imagine legal challenges to agency decisions. Suppose that the EPA continues to use the $6.1 million VSL based on workplace studies. The agency's decision would be vulnerable on several grounds. First, it might be too low in light of the growth in national income. Second, it would fail to account for evidence that pollution risks, especially if cancer is involved, produce a higher VSL than workplace risks. Third, it would not, on the facts stated, come to terms with the possibility that the protected group might be wealthier or poorer than the group involved in the workplace studies. All of these challenges are plausible under existing law. As new and better data emerge, they become stronger still. It is certainly possible that a decade from now, the use of a uniform figure will seem obtuse, even indefensible.

Is there anything that agencies might say in defense of a uniform VSL? They might urge that the existing evidence is too ambiguous and contestable to justify a change in current practice. Most studies based on more recent data find a VSL in the range of $6.1 million.[139] With respect to cancer, the EPA's Science Advisory Board (SAB) rejected an upward revision for especially dread illnesses, finding that the existing literature did not justify any such revision;[140] and some

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136. *See, e.g.*, 15 U.S.C. § 2605(c) (2000) (requiring cost-benefit analysis of regulations of chemical substances or mixtures under the Toxic Substances Control A6(ee,)0.0009(n)15.3(c)-7.2(L)N-8(o)15.3(x)d l ce.e o.84

evidence directly supports the view of the SAB.[141] To be sure, it is more than plausible to think that VSL is wealth-dependent; but the EPA might urge that a uniform number is preferable on moral and distributive grounds and is not greatly out of line with existing evidence. In any case, a single number might have the advantage of easy administrability—and produce results that in general would be the same as those produced by imaginable variations. Most of the time, the agency's choice will not be affected if it selects a VSL of $3.5 million or $10 million; in such situations, a uniform number seems acceptable.

In many cases, I believe that these responses are unconvincing as a matter of policy. But in light of the properly limited role of courts in the oversight of agency action, they are convincing as a matter of law.[142] Courts should allow agencies considerable room to maneuver here, at least until the evidence against a uniform VSL becomes overwhelming. Permission to adopt such a number has an important corollary: an agency would be on firm legal ground if it attempted to make adjustments of the sort that I have suggested, even if current evidence does not unambiguously support those adjustments.

III. WHY WTP? EASY CASES, HARD CASES

Thus far I have assumed that the theory behind current practice is straightforward—that it depends on an empirical elicitation of people's WTP as the foundation for VSL. If the assumption is correct, then a high degree of individuation is justified. But perhaps the assumption is false. Perhaps the prevailing theory does rely on elicited WTP but also adopts a norm in favor of the equality of persons (and possibly mortality risks as well).[143] Might that more complex theory be correct? In any case, what is the argument for embodying people's actual WTP in regulatory policy? Why should anyone care about actual WTP at all? Why should government conduct cost-benefit analysis with close reference to VSL?[144]

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141. *See* Viscusi & Aldy, *supra* note 10, at 57 (noting that the SAB's rejection of the "dread effect" of cancer is supported by the finding that contingent valuation estimates of cancer mortality risks are similar to estimates for accidental deaths).

142. See Sunstein, *supra* note 54, at 2292–93, for a more extended discussion.

143. Some support for this position can be found in the remarks of the EPA. *See supra* note 7.

144. These questions are pressed in ACKERMAN & HEINZERLING, *supra* note 9.

It is now time to attend to those issues in more detail. This Part begins by discussing what I call "easy cases," in which the beneficiaries of regulation must pay for it. I suggest that in such cases, WTP is the appropriate foundation for VSL, because beneficiaries are hardly helped by being forced to pay for regulatory programs that they believe not to be in their interests. The major qualification here involves lack of information and bounded rationality. I then attempt to defend the claim that the analysis must be different in "hard cases," in which beneficiaries pay for little or none of the cost of what they receive. But even in such cases, an optimal income tax, providing the right level of redistribution, would go a long way toward justifying a variable VSL. If a nation lacks an optimal income tax, and seeks greater redistribution, the use of a VSL that exceeds the WTP of the beneficiaries might produce desirable redistribution or be justified on welfare grounds. I outline the circumstances in which this might be so.

A. *Easy Cases*

For the sake of simplicity, assume a society in which people face multiple risks of 1/100,000, and in which every person is both adequately informed and willing to pay no more and no less than $60 to eliminate each of those risks. Assume too that the cost of eliminating these 1/100,000 risks is widely variable, ranging from close to zero to many billions of dollars. Assume finally that the cost of eliminating any risk is borne entirely by those who benefit from risk elimination. Under that assumption, regulation imposes the equivalent of a user fee; for example, people's water bills will entirely reflect the costs of a policy that eliminates a 1/100,000 risk of getting cancer from arsenic in drinking water. If the per-person cost is $100, each water bill will be increased by exactly that amount.

1. *Welfare and Autonomy*. With these assumptions, the argument for using WTP to calculate VSL is straightforward. Regulation amounts to a forced exchange; it tells people that they must purchase certain benefits for a certain amount. Why should government force people to pay for things that they do not want? Begin with welfare. By hypothesis, a forced exchange on terms that people dislike will make them worse off. The case for using WTP depends on the simple idea that government should make Pareto superior moves (those making at least one person better off without making anyone worse off) and that it should avoid making Pareto inferior moves (those making at least one person worse off without

making anyone better off). At first glance, use of WTP, on the assumptions that I am making, seems hard to contest.[145]

For purposes of evaluating regulation, it does not matter if the existing distribution of income is unjust or if poor people are, in an intelligible sense, coerced to run certain risks. The remedy for unjust distributions, and for that form of coercion, is not to require people to buy regulatory benefits on terms that they find unacceptable. Suppose that people are willing to pay only $60 to eliminate a 1/100,000 risk because they are not rich, and that if they had double their current wealth, they would be willing to pay $120. Government does people no favors by forcing them to pay the amount that they would pay if they had more money.

I have suggested that for those who do not believe that regulatory decisions should be based on welfare, considerations of autonomy point in the same direction.[146] Those who refuse to pay a certain amount to eliminate a risk of 1/100,000 might want to use their resources for other things—medical care, children, food, recreation, entertainment, savings. If people are entitled to a kind of sovereignty over the conduct of their own lives, then they should be permitted to make such allocations as they choose. It is most standard to justify use of WTP on welfare grounds, but the same approach is at least equally defensible as a means of respecting the autonomy of persons.[147]

Consider how this argument works with respect to risks and persons. Suppose that people are willing to pay no more than $50 to avoid a 1/100,000 risk of dying in a car crash, but that they are willing to pay up to $100 to avoid a 1/100,000 risk of dying of cancer. If government uses a WTP for both risks of $75, it will force people to

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145.   I am putting to one side the possibility that WTP and hence VSL reflect competition for better relative position; if so, the VSL numbers, based on market evidence, are too low. *See* Frank & Sunstein, *supra* note 62, at 363 (finding that the failure to take into account concerns of relative position tends to underestimate risk-reduction benefits). A brief example: Suppose that workers are willing to pay only $250 annually to eliminate a 1/10,000 risk; suppose too that worker well-being depends, in large part, on relative income, not absolute income; and suppose finally that workers would be willing to pay more than $250 if all workers were simultaneously making the same payment, because in that event, relative position would not be compromised. Under these assumptions, the WTP numbers, based on market evidence or contingent valuation studies, underestimate VSL by a significant amount. *See id.* (estimating that the failure to take relative position into account could lead to undervaluing VSL by roughly 75 percent).

146.   *See supra* text accompanying note 61.

147.   *See* DWORKIN, *supra* note 61, at 449 ("[O]ne person—the person whose life it is—has a special responsibility for each life, and [by] virtue of that special responsibility he or she has a right to make the fundamental decisions that define, for him, what a successful life would be.").

pay more than they want to avoid the risks associated with car crashes, and less than they want to avoid risks of cancer. Why should government do that? And if the argument is convincing in this example, it should apply in numerous cases in which WTP and hence VSL vary across risks.

With respect to persons, the argument is more controversial, above all because it treats poor people as less valuable (literally) than rich people. But at least at first glance, differences are appropriate here as well. The reason is not that poor people are less valuable than rich people. It is that no one, rich or poor, should be forced to pay more than he is willing to pay for the reduction of risks. This idea embodies a norm of equality. And if poor people are unwilling to pay much for the reduction of serious risks, the appropriate response is not a compelled purchase, but a subsidy. Suppose, for example, that each member of a group of relatively poor people, earning less than $30,000 annually, is willing to pay only $25 to eliminate a risk of 1/100,000—about one-half, suppose, of the nation's population-wide median of $50. Should regulators require every citizen, including those in the relatively poor group, to pay $50? Government should not force poor people to pay more than their WTP to eliminate statistical risks; forced exchanges of this kind do poor people no good and some harm.

It is tempting to justify a uniform VSL, one that does not distinguish between rich and poor, on the ground that it embodies a form of risk equity, treating every person as equal to every other person[148] and redistributing resources in the direction of poor people. But this is an error. A uniform VSL, taken from a population-wide median, does not produce redistribution toward the poor, any more than any other kind of forced exchange. Government does not require people to buy Volvos, even though Volvos would reduce statistical risks. If government required everyone to buy Volvos, it would not be producing desirable redistribution.[149] A uniform VSL

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148. *See* ACKERMAN & HEINZERLING, *supra* note 9, at 72 (arguing that varying VSL based on potential earnings is "difficult to reconcile with ideals of democracy and equal treatment under the law, let alone the sacredness of every human being").

149. Of course it is sometimes desirable for government to create "safety floors," for automobiles and other consumer goods, in part as a response to an absence of adequate information in the market. But such floors should not be seen as a redistributive tool, because they are not likely to produce good redistribution. *Cf.* Susan Rose-Ackerman, Comment, *Progressive Law and Economics—And the New Administrative Law*, 98 YALE L.J. 341, 354

has some of the same characteristics as a policy that requires people to buy Volvos. In principle, the government should force exchanges only on terms that people find acceptable, at least if it is genuinely concerned with their welfare.

Note, once again, that the argument for using WTP does not imply satisfaction with the existing distribution of wealth. The problem with forced exchanges is that they do nothing to alter existing distributions. In fact they make poor people worse off, requiring them to use their limited resources for something that they do not want to buy.

Does the easy case seem implausibly unrealistic? In many contexts, it certainly is. The costs of air pollution regulation, for example, are not fully borne by its beneficiaries.[150] But for workers' compensation regulation, for example, the situation is very different: with the enactment of workers' compensation programs, nonunionized workers faced a dollar-for-dollar wage reduction, corresponding almost perfectly to the expected value of the benefits that they received.[151] For drinking water regulation, something similar is involved. The cost of regulation is passed onto consumers in the form of higher water bills.[152] Hence the easy case finds a number of real-world analogues.

2. *Objections*. There are several possible objections to the use of WTP to calculate VSL. They point to some important qualifications, but none of them is a convincing refutation of the straightforward argument.

a. *Adaptive Preferences and "Miswanting."* The first objection emphasizes the possibility that people's preferences have adapted to existing opportunities, including deprivation.[153] Perhaps people show a

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(1988) (arguing that occupational health and safety regulations are not an effective method of redistribution).

150. Matthew E. Kahn, *The Beneficiaries of Clean Air Act Regulation*, REGULATION, Spring 2001, at 34, 35–38.

151. PRICE V. FISHBACK & SHAWN EVERETT KANTOR, A PRELUDE TO THE WELFARE STATE 69, app. D at 231–38 (2000).

152. *See* Sunstein, *supra* note 54, at 2271 (noting that a particular proposal to increase drinking water quality would have resulted in an annual increase of $30 in the water bills for most households).

153. *See* JON ELSTER, SOUR GRAPES 109–10 (1983) (defining "adaptive preferences" as what happens when "people tend to adjust their aspirations to their possibilities"); Adler &

low WTP for environmental goods, including health improvements, simply because they have adjusted to environmental bads, including health risks. Perhaps people's WTP reflects an effort to reduce cognitive dissonance through the conclusion that risks are lower than they actually are.[154] To generalize, perhaps people suffer from a problem of "miswanting";[155] they want things that do not promote their welfare, and they do not want things that would promote their welfare. If this is so, then WTP loses much of its underlying justification; people's decisions do not actually promote their welfare,[156] and their autonomy, properly understood, may not require respect for their decisions, which may be nonautonomous. If government can be confident that people are not willing to pay for goods from which they would greatly benefit, perhaps government should abandon WTP.

In some contexts, this objection raises serious problems for neoclassical economics and for unambivalent enthusiasm for freedom of choice.[157] Autonomy is implicated in addition to welfare. Suppose that people do not want risk reduction because they believe risk to be inevitable, or because their preferences have adapted to dangerous and unfair conditions. If so, people's preferences do not reflect their autonomy. In other words, the idea of autonomy requires not merely

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Posner, *supra* note 5, at 1128–30 (hypothesizing, for example, that "people are not willing to pay for parks because they have adapted to a world without parks").

154. *See generally* GEORGE A. AKERLOF & WILLIAM T. DICKENS, *The Economic Consequences of Cognitive Dissonance*, *in* AN ECONOMIC THEORIST'S BOOK OF TALES 123 (1984) (analyzing the incorporation of the psychological theory of cognitive dissonance into economic models).

155. For an analysis and explanation of the idea of "miswanting," see Daniel T. Gilbert & Timothy D. Wilson, *Miswanting*, *in* FEELING AND THINKING: THE ROLE OF AFFECT IN SOCIAL COGNITION 178, 179 (Joseph P. Forgas ed., 2000), who explain that:

> Although we tend to think of unhappiness as something that happens to us when we do not get what we want, much unhappiness . . . has less to do with not getting what we want, and more to do with not wanting what we like. When wanting and liking are uncoordinated in this way we may say that person has *miswanted*.

Id. *See generally* Timothy D. Wilson & Daniel T. Gilbert, *Affective Forecasting*, *in* 35 ADVANCES IN EXPERIMENTAL SOCIAL PSYCHOLOGY 345 (Mark P. Zanna ed., 2003) (analyzing people's ability to accurately predict their own feelings).

156. For a discussion on how preferences influence judgments, see Daniel Kahneman et al., *Back to Bentham? Explorations of Experienced Utility*, 112 Q.J. ECON. 375, 379–88 (1997) (arguing that utility's impact on human behavior can be understood better and researched more effectively by analyzing the normative idea of "total utility" as the discrete concepts of "experienced utility" and "decisional utility").

157. *See supra* note 156; George Lowenstein & David Schkade, *Wouldn't It Be Nice?: Predicting Future Feelings*, *in* WELL-BEING: THE FOUNDATIONS OF HEDONIC PSYCHOLOGY 85 (Daniel Kahneman et al. eds., 1999).

respect for whatever preferences people happen to have, but also social conditions that allow preferences to be developed in a way that does not reflect coercion or injustice. With respect to some risks, the relevant preferences are nonautonomous; consider the fact that many women face a risk of male violence under circumstances in which they believe that little can be done and hence adapt.

In the context of ordinary regulatory policy, however, this objection has more theoretical than practical interest. Typically regulation involves the reduction of low-level mortality risks (say, 1/50,000). Much of the time, there is no reason to believe that the use of informed WTP (say, $100) is a product of adaptive preferences. When people's WTP does appear to result from adaptive preferences, however, the judgment about the easy cases must be revised.

b. Inadequate Information and Bounded Rationality. A closely related objection would point to an absence of information and to bounded rationality. As I have stressed throughout, people have difficulty dealing with low-probability events.[158] If people are not aware of what they might be gaining by regulation, their WTP can be too low. Perhaps the availability heuristic will lead people to underestimate the risk. If people cannot recall a case in which some activity produced illness or death, they may conclude that the risk is trivial even if it is not. Or perhaps the same heuristic, and probability neglect, will lead people to exaggerate risks, producing a WTP that is wildly inflated in light of reality. And if people are unable to understand the meaning of ideas like "one in fifty thousand," or to respond rationally to such ideas, then there are serious problems with relying on WTP.

It is also possible that people's WTP reflects excessive discounting of future health benefits. If workers are ignoring the future, or applying an implausibly high discount rate, then there is a good argument for setting aside their WTP. In the context of global warming, for example, the temporally distant nature of the harm might well lead to insufficient concern for a potentially catastrophic risk. The same is true for less dramatic risks that people face in their daily lives. Young smokers, for example, probably give too little attention to the health harms caused by smoking. Those who choose a

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158. *See, e.g.*, Jolls et al., *supra* note 131, at 1519 ("People sometimes . . . underestimate the likelihood of low-probability or low-salience events because these threats simply do not make it onto people's 'radar screens.'").

poor diet and little exercise almost certainly fail to consider the long-term effects of their behavior. Self-control problems are an important part of bounded rationality. If a low WTP shows a failure to give adequate attention to the future, then there is reason not to use WTP.

In many cases, however, WTP is a result of adequate information and bounded rationality is not leading people to err. If so, appropriate adjustments should be made to WTP, and the VSL that emerges from WTP should be corrected.

c. Rights. A quite different objection would point to people's rights. Perhaps people have a right not to be subjected to risks of a certain magnitude, and the use of WTP will violate this right. It seems fully reasonable to say that whatever their WTP, human beings should have a right not to be subject to risks above a particular level. Imagine, for example, that poor people live in a place where they face a 1/20 annual risk of dying from water pollution; it makes sense to say that the government should reduce that risk even if people are willing to pay only $1 to eliminate it and the per-person cost is $100.[159]

As an abstract claim about people's rights, the objection is entirely correct. Something has gone badly wrong if people are exposed to serious risks and their WTP prevents them, and is invoked to prevent their government, from doing anything in response. It would be foolish to suggest that WTP is determinative of the appropriate use of government subsidies; a redistributive policy does not track people's WTP. (Would it make sense to say that government would give poor people a check for $100 only if they were willing to pay $100 for the check?) And in many cases people are subject to risks whose magnitude is indeed a violation of rights. But this point has little force against the particular argument that I am making.

The initial problem with this objection is that in the cases under discussion, rights of this kind are usually not involved; I am speaking here of statistically small risks. Suppose that this initial response is unconvincing and that rights are indeed involved. If so, there is a still more fundamental response. When rights are involved, the proper response is not to force people to buy protection that they do not want, but to provide a subsidy that will give them the benefit for free or enable them to receive the benefit at what is, for them, an

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159.   I bracket the possibility that rights are resource-dependent, and I simply assume here that risks above a certain level should count as violative of rights.

acceptable price.[160] Nothing here is meant to deny the possibility that government should provide certain goods via subsidy, or indeed that subjection to risks above a certain level is a violation of rights.[161] The question instead is one of regulation under the stated assumptions. So long as that is the question, use of WTP does not violate anyone's rights.

    d.   Democracy versus Markets. An independent objection would stress that people are citizens, not merely consumers; it would urge that regulatory choices be made after citizens have deliberated with one another about their preferences and values.[162] The argument against forced exchanges treats people as consumers; it sees their decisions about safety as the same as their decisions about all other commodities.[163] For some decisions, this approach is badly misconceived.[164] Our constitutional system is a deliberative democracy,[165] not a maximization machine, and many social judgments should be made by citizens engaged in deliberative discussion with one another rather than by aggregating the individual choices of consumers.[166]

    Consider some examples:

- In the context of race and sex discrimination, sensible societies do not aggregate people's WTP. The level of

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    160.   I put to one side the question of whether people should be given in-kind benefits or instead lump sums.

    161.   There is a separate question, not addressed here, whether and when subjection to risks of harm (as opposed to actual harm) is itself a harm. *See* Matthew D. Adler, *Risk, Death and Harm: The Normative Foundations of Risk Regulation*, 87 MINN. L. REV. 1293, 1340–88 (2003) (reviewing arguments supporting and refuting the proposition that the risk of death is itself a harm that affects welfare).

    162.   *See* AMARTYA SEN, RATIONALITY AND FREEDOM 287 (2002) (noting that "discussions and exchange, and even political arguments, contribute to the formulation and revision of values").

    163.   *See* Richard H. Pildes & Elizabeth S. Anderson, *Slinging Arrows at Democracy: Social Choice Theory, Value Pluralism, and Democratic Politics*, 90 COLUM. L. REV. 2121, 2176 (1990) ("In the highly differentiated world of the modern liberal state, the same person may have distinct interests in her role as consumer from those in her role as worker, or as citizen, or as a parent, or as member of a religious community."); s*ee generally* ELIZABETH ANDERSON, VALUE IN ETHICS AND ECONOMICS (1993).

    164.   Pildes & Anderson, *supra* note 163, at 2176 ("Individuals are better understood as approaching many choices not from a unitary, fixed perspective, but from several different perspectives that pull them in different directions.").

    165.   *See generally* JOSEPH M. BESSETTE, THE MILD VOICE OF REASON: DELIBERATIVE DEMOCRACY AND AMERICAN NATIONAL GOVERNMENT (1994).

    166.   See the discussion of "government by discussion" in SEN, *supra* note 162, at 287–89.

permissible discrimination is not set by using market evidence or contingent valuation studies to see how much people would be willing to pay to discriminate (or to be free from discrimination). Even if discriminators would be willing to pay a lot to avoid associating with members of unpopular groups, such discrimination is banned. Through political processes, citizens have decided that certain forms of discrimination are illicit, whatever people's WTP.

- The prohibition against sexual harassment does not emerge from a governmental WTP. Many harassers would be willing to pay something, perhaps a great deal, for the privilege of harassing; in imaginable circumstances, the harassers' WTP might exceed their victims' WTP to prevent harassment. Nonetheless, harassment is forbidden, and WTP is irrelevant.

- The protection of endangered species is not chosen on the basis of aggregated WTP. Whether and when to protect members of endangered species is a moral question to be resolved through democratic discussion, not through exercises in consumer sovereignty. Some people may be willing to pay a significant amount to harm endangered species, at least if that harm is necessary to undertake development activities. Their WTP is not taken to be part of the legal assessment of what they are permitted to do.

- Laws that forbid cruelty to animals, and that impose affirmative duties of protection on human beings, stem not from WTP, but from a belief that moral commitments call for such laws. When laws require that animals be protected against suffering, it does not matter that those who are regulated (university laboratories, for example) may be willing to pay a significant amount to avoid the regulation. Of course the cost of the regulatory burden might play a role in deciding whether to impose it. But the underlying moral judgment is rooted in a belief in the avoidance of suffering that does not essentially turn on WTP.

Emphasizing the limits of any approach that takes "preferences" to be the foundation of regulatory policy, Professor Amartya Sen stresses that "discussions and exchange, and even political arguments, contribute to the formation and revision of values."[167] He urges that in

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167.   *Id.* at 287.

the particular context of environmental protection, solutions require regulators "to go beyond looking only for the best reflection of given individual preferences, or the most acceptable procedures for choices based on those preferences."[168]

Professor Sen's claims are both fundamental and correct. They point to some serious limitations on the use of WTP. But it is important not to read such objections for more than they are worth. In trading off safety and health in their private lives, people do not have static values and preferences. Much of the time, human choices are a product of reflection, even if choosers are simply acting as consumers. Reflection and deliberation, including reflection and deliberation with other people, are hardly absent from the market domain. To be sure, moral questions should not be resolved by aggregating private WTP. Sometimes people's preferences, even though backed by WTP, are morally off-limits, and policy should not take account of them. In addition, people are sometimes unwilling to pay a great deal for goods that have strong moral justifications; animal welfare is an example. In these circumstances, the market model is inapplicable and WTP reveals very little.

But what about the easy case? Do these arguments suggest that government should override individual choices about how much to spend to eliminate low-level risks, even when those choices are adequately informed? For environmental protection generally, it is indeed important to go beyond "the best reflection of given individual preferences."[169] But this point does not mean that people should be required to pay $100 to eliminate mortality risks of 1/100,000 when they are willing to pay only $75. If people's WTP reflects an absence of information or insufficient deliberation, then it is important for other people, in government and elsewhere, to draw attention to that fact. And in some cases, a low WTP might be overridden on the ground that it is rooted in errors, factual or otherwise. But these points should not be taken as a general objection to my conclusion about the easy case, or to suggest that government should force people to reduce statistical risks at an expense that they deem excessive.

Here is one way to understand the argument that I am making: The American system is a deliberative democracy, to be sure, but in

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168. *Id.* at 289 (emphasis omitted).

169. *Id.* (emphasis omitted).

this democracy, it is valuable for regulators to consider more fully individuated VSLs in deciding how to proceed, at least under the stated assumptions.

    e. Very Low Probabilities and Catastrophic Risks. Suppose that everyone in the United States faces an annual death risk of 1/10,000,000—and that this risk, if it comes to fruition, will kill every person in the country. The expected number of annual deaths is twenty-six,[170] which would produce expected annual costs in excess of $158 million, assuming a VSL of $6.1 million. But if the government attempted to elicit each individual's WTP to avoid a risk of 1/10,000,000, it might well produce a number very close to zero. How much would you be willing to spend to avoid a risk of 1/10,000,000? If you say "nothing," you might well be like most people. And if most people really are like that, the supposed risk of 1/10,000,000, applicable to everyone in the United States, yields both twenty-six expected annual fatalities and expected annual costs very close to zero—an especially odd result in light of the fact that there is a 1/10,000,000 risk not simply that *each* American will die, but that *every* American will die.[171]

    This result does seem anomalous. For one thing, is it really sensible to conclude that the prevention of twenty-six deaths is worth nothing, or close to it? An affirmative answer is suggested by a perspective that is fully based on people's WTP to avoid very low probability risks. But assigning a value near zero, for the prevention of dozens of deaths, seems quite implausible. In cases of this kind, there is a serious problem with using WTP to calculate the benefit of avoiding that risk.

    This conclusion actually understates the problem. In the case at hand, the risk is potentially catastrophic. As I have said, if the 1/10,000,000 chance is realized, every American will be dead. Even if people show a WTP near zero to avoid a risk of that size, it does not seem right to think that the nation should spend almost nothing to prevent it.[172] The point has a general bearing on precautions against low probability risks of catastrophe: some degree of prevention

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170. Assuming a U.S. population of 260 million.

171. For a valuable discussion, see generally POSNER, *supra* note 78. *See also* Cass R. Sunstein, *Irreversible and Catastrophic*, CORNELL L. REV. (forthcoming 2006).

172. *See id.* at 168–69 ("[I]f the minute risk is of a 'dreadful' catastrophe, [people] may demand a very high price to bear it, however slight it is, in which event the value of life implied by their behavior may be astronomical.").

should be undertaken even if WTP numbers do not justify it. Part of the problem with those numbers is that individual behavior will not reflect the "catastrophe premium" or "extermination premium" that would almost certainly emerge if it were possible to test for it. People may be unwilling to pay anything to avoid a risk of 1/100,000,000 that they themselves face; but if they were told that every person in the nation faced this risk, they might come up with a significantly higher figure. It would take the right question to produce the higher numbers. Another the problem is that WTP is not an adequate measure of social responses to catastrophes—in part because people are not familiar with making choices about risks of that sort.

In my view, this is a sound objection to the use of a low or near-zero VSL in the context of catastrophic risks, even if the WTP calculation would produce that VSL. As Judge Richard Posner shows,[173] this is an important point when government is considering how to respond to small risks of catastrophic harm. But notice that the objection has built-in limitations. It does not apply to the overwhelming number of cases in which VSL is used. In those cases, the risks in question are 1/10,000 to 1/100,000, and no large-scale catastrophe is at issue. Here, then, is a limitation on the use of WTP, but the domain of the objection is restricted.

f.   Third-Party Effects. A final objection would point to effects on third parties. If outsiders would be adversely affected by the undervaluing of a particular risk, and if their welfare is not being considered, then the WTP calculus is seriously incomplete. This point demonstrates a general and badly neglected problem for WTP as it is currently used: agencies consider people's WTP to eliminate statistical risks, without taking account of the fact that others—especially family members and close friends—would also be willing to pay something to eliminate those risks. John might be willing to pay $25 to eliminate his own risk of 1/100,000, but his wife, Jane, might be willing to pay $25 to eliminate John's risk also. If regulators add the WTP, on John's behalf, of John's friends and relatives, the total WTP might soon exceed $100. This is a real problem for existing uses of WTP.

But thus far the discussion has been assuming that there are no third-party effects. The argument for using WTP, on the stated assumptions, is that government should not force people to buy goods

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173.   *See id.* at 196–98.

that are not worthwhile for them. At least at first glance, this argument seems sound with respect to statistical risks of the kind on which I am focusing.[174]

B. *Harder Cases: Autonomy, Kaldor-Hicks, and Welfare*

There is an obvious artificiality in the assumptions thus far. Most important, people do not always bear the full social costs of the regulatory benefits that they receive. Sometimes they pay only a fraction of those costs—or possibly nothing at all. When this is so, the normative analysis is much more complicated. In the context of air pollution regulation, for example, there is a complex set of distributional effects, and on balance, poor people, and members of minority communities, appear to be net gainers.[175] An efficiency analysis, based on WTP, might not produce an adequate account of the welfare effects of air pollution regulation. And even if it did, an account of welfare effects might not resolve the normative question, because the distributional gains are important to consider.[176] The difficulty is that a high VSL, one that exceeds what WTP studies show for poor people, may produce outcomes that are in the best interest of poor people, in the sense that the result is a welfare improvement for them.[177] And if poor people do not bear all of the costs of

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174. Note that the argument would not apply to risks faced by nonhuman animals; in that event, people's WTP could not tell the whole story.

175. *See* Kahn, *supra* note 150, at 37–38 (analyzing pollution and demographic data from California and finding that, under the Clean Air Act, "poorer, less educated populations have experienced a greater overall improvement in air quality between 1980 and 1998").

176. The Office of Management and Budget has expressly recognized this point in its most recent guidelines governing regulatory impact analysis. *See* Office of Mgmt. & Budget, Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations, 68 Fed. Reg. 5492, 5517 (Feb. 3, 2003):

> Those who bear the costs of a regulation and those who enjoy its benefits often are not the same people. . . . Your regulatory analysis should provide a separate description of distributional effects (i.e., how both benefits and costs are distributed among sub-populations of particular concern) so that decisionmakers can properly consider them along with the effects on economic efficiency.

177. For relevant discussion, see Christine Jolls, *Accommodation Mandates*, 53 STAN. L. REV. 223, 227–28, 255–61 (2000). Professor Jolls argues that accommodation mandates might produce desired redistributive gains whether or not they are efficient, and she supplies a detailed analysis of when those gains are most likely to occur. *See id.* at 250 ("Even if the value of the accommodation is less than its cost, the mandate may make disadvantaged workers better off because nondisadvantaged workers will bear some of the associated cost."). At present, there is no parallel discussion for regulation of the sort that I am discussing here. My suggestion is that under imaginable assumptions, some regulation will be defensible on distributive grounds.

programs that benefit them, the autonomy argument for WTP is greatly reduced; they are enjoying a benefit (partly) for free, and it does not insult anyone's autonomy to give them a good on terms that they find acceptable. Note that these points do not bear directly on the question of whether VSL should vary across risks. But they do bear on the issue of varying VSL across persons, and in particular across disparities in income and wealth.

Suppose, for example, that beneficiaries of a proposed drinking water regulation are willing to pay only $80 to eliminate a risk of 1/50,000. Assume, in addition, that the per-person cost of eliminating a 1/50,000 risk is $100—but that for every dollar of that cost, the beneficiaries pay only $.80. The remaining $.20 might be paid by water companies themselves, in the form of reduced profits, or by employees of the water companies, in the form of reduced wages and fewer jobs. In this example, the costs of the regulation exceed the benefits: it is inefficient. But by hypothesis, the regulation makes its beneficiaries better off. If the WTP criterion is used, the fact that the monetized costs exceed the monetized benefits is decisive. But as a normative matter, the analysis here is far harder than in the easy cases. On what assumption should the WTP numbers be decisive?

The assumption must be that economic efficiency is the goal of government, at least in the context of regulation—that to know what to do, government should aggregate the benefits and costs of regulation, and act if and only if the benefits exceed the costs. When using the WTP numbers, government is acting as a maximization machine, aggregating all benefits and costs as measured by the WTP criterion. But this is a highly contestable understanding of what government should be doing. In fact it represents a shift from the relatively uncontroversial Pareto criterion, exemplified above, to a version of the far more controversial Kaldor-Hicks criterion,[178] which assesses policy by asking this question: Are the gainers winning more than the losers are losing? The Kaldor-Hicks criterion is sometimes described as potential Pareto superiority,[179] because it asks whether in principle, the winners could compensate the losers, and a surplus

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178. It is only a version of that criterion, because it is measuring welfare in monetary equivalents. A direct assessment of welfare, if it were possible, might justify the regulation in question on Kaldor-Hicks grounds.

179. *See, e.g.*, RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 13 (6th ed. 2003) ("The Kaldor-Hicks concept is also and suggestively called potential Pareto superiority: The winners could compensate the losers, whether or not they actually do.").

could be left over. The difficulty of course is that Pareto superiority is merely potential. Some people really are losing and others are gaining.

In these harder cases, the gainers are gaining less (in monetary terms) than the losers are losing—and hence the regulation is said to be unjustified. Under the assumptions that I have given, the regulation is indeed inefficient: its social cost is higher than its social benefit. But is the regulation undesirable? This is not at all clear. The first problem is that WTP is measuring gains and losses in monetary terms, rather than in welfare terms.[180] It is possible that those who gain, in the harder cases, gain more welfare than the losers lose; WTP is not dispositive on that question. The second problem is distributional. Suppose that in terms of overall welfare, the regulation is not desirable; it makes aggregate welfare lower rather than higher. But suppose too that those who benefit are less advantaged than those who lose. If, for example, those who are willing to pay $80 are disproportionately poor, and those who pay the remainder are disproportionately wealthy, the regulation might plausibly be justified despite the welfare loss.

It is natural to respond here that, if redistribution is the goal, then it should be produced not through regulation but through the tax system, which is a more efficient way of transferring resources to people who need help.[181] I agree. But suppose that redistribution is not possible through the tax system. If so, then regulation in the harder cases cannot be ruled off-limits despite its inefficiency. The fact that a regulation is helpful to the most disadvantaged is not decisive in its favor. If it is trivially helpful, and if it inflicts huge costs on everyone else, little can be said for it. But everything depends on the magnitude of the relevant effects. A program that produced large gains for the least well-off would seem to be justified even if it imposed, in terms of WTP, slightly higher costs than benefits on balance.

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180.   On the direct measurement of welfare, see generally Kahneman et al., *supra* note 156 (exploring various methods of measuring the utility of temporally extended outcomes).

181.   *See, e.g.*, Louis Kaplow & Steven Shavell, *Why the Legal System Is Less Efficient Than the Income Tax in Redistributing Income*, 23 J. LEGAL STUD. 667, 667 (1994) ("[R]edistribution through legal rules offers no advantage over redistribution through the income tax system and typically is less efficient."); Steven Shavell, *A Note on Efficiency vs. Distributional Equity in Legal Rulemaking: Should Distributional Equity Matter Given Optimal Income Taxation?*, 71 AM. ECON. REV. PAPERS & PROC. 414, 414 (1981) (describing how an income tax can compensate for inefficient liability rules and redistribute income); David A. Weisbach, *Should*

C. *Harder Cases as Easy Ones, and VSL Again*

Is there a reason to treat the harder cases as identical to the easy ones? Is this absurd?[182] Agencies do not distinguish between them, although recent guidelines, encouraging agency attention to distributional issues, might eventually persuade them to do so.[183] A possible reason for treating the harder cases the same as the easy ones is the existence of an optimal income tax. If the tax system produced the right level of redistribution, there would be good reason for agencies to rely on individualized VSL and not to concern themselves with whether the beneficiaries of regulation were paying for any or all of the costs. The hard cases would be treated as the easy ones. For people who believe that the hard cases must be treated differently, it is because further redistribution is desirable.

Another reason for treating the harder cases as the easy ones would be optimism: perhaps everything will balance out in the end. Perhaps no group will be systematically helped or hurt, and the tax system will produce appropriate redistribution. In the real-world cases, regulators might also think that a direct inquiry into welfare, bypassing WTP, would be extremely difficult or perhaps even impossible to operationalize. If distributional considerations are relevant, interest-group warfare may be the consequence, rather than distribution to those who particularly need and deserve help.[184] More modestly, it might be concluded that agencies should generally pursue efficiency, using WTP as the foundation for decisions, but should allow distributional findings to cut the other way in cases in which there is compelling reason to do so. In fact this approach is a plausible

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Legal Rules Be Used to Redistribute Income?, 70 U. CHI. L. REV. 439, 439 (2003) ("[T]he tax system is a better tool for redistribution of income than legal rules.").

182. *See* John Broome, *Cost-Benefit Analysis and Population*, 29 J. LEGAL STUD. 953, 958 (2000) (urging that "there are separate reasons why preferences are an unsatisfactory basis for valuing lives," including that, "in contexts involving risks, people's preferences are generally muddled and incoherent" rather than rational). If preferences are in fact muddled and incoherent, current practice is of course on thin ground.

183. *See* OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, REGULATORY ANALYSIS, at 4 (Sept. 17, 2003) (noting that "possible justifications [for regulation] include . . . removing distributional unfairness"), *available at* http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

184. *See, e.g.*, Viscusi, *supra* note 10, at 844–45 (describing, as an example of interest-group warfare, how an affluent suburban neighborhood successfully thwarted the development of a nearby landfill, resulting in the landfill's being moved to a "pristine research forest and nature preserve" belonging to Duke University because the university was located in a neighboring county and thus possessed less political clout than the suburban neighborhood).

way of reading the Office of Management and Budget's current guidelines on regulatory impact analysis.[185]

In the easy cases, the resulting redistribution is almost certainly perverse, because forced exchanges, under the stated assumptions, are highly likely to harm the people who are being coerced. But in the harder cases, it cannot be said that the beneficiaries of regulation will be harmed if government uses a number that exceeds their actual VSLs. Everything depends on the distributional effects of the regulation. If the beneficiaries are well-off, a high VSL might produce perverse redistribution if those who lose are toward the bottom of the economic ladder. It is possible to envision this result, for example, with a pollution program that protects those who visit expensive recreational areas. In contrast, if the beneficiaries are poor, and if the costs are borne by the wealthy or by the general population, a high VSL might be in the interest of those who need help. Air pollution programs, providing special protection for people in cities, appear to be an example.[186] It is therefore reasonable to reject the confident view of economically inclined analysts who believe that accurate VSLs, based on actual WTP (and hence individuated), should always be the basis of regulatory policy. But it is similarly reasonable to reject the confident view of skeptics who believe that a uniform VSL, refusing to make distinctions among persons, is best on distributive grounds.

What are the implications for individuation of VSL? It remains true that according to the theory that underlies agency valuations, a higher degree of individuation would be desirable. It also remains true that with respect to risks, individuation is appropriate insofar as valuations differ depending on the nature of the risk at stake. The principal qualification is that a uniform VSL, one that gives disadvantaged people regulatory protection in excess of their WTP, might turn out to have fortunate distributional consequences in the harder cases. Regulators should be careful about this point. It will not

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185.   *See* OFFICE OF MGMT. & BUDGET, *supra* note 183, at 5:

There are justifications for regulations in addition to correcting market failures. A regulation may be appropriate when you have a clearly identified measure that can make government operate more efficiently. In addition, Congress establishes some regulatory programs to redistribute resources to select groups. Such regulations should be examined to ensure that they are both effective and cost-effective.

186.   *See* Kahn, *supra* note 150, at 38 & tbl.3 (finding that "residents of the Los Angeles basin, where regulation is especially stringent, experienced a larger pollution exposure reduction than [other] California residents").

always hold, and if the goal is to provide more assistance to those in need, a uniform VSL is hardly the best way to achieve that goal. Consider the case of poor areas of the country: a national VSL of $6.1 million would almost certainly be harmful, simply because the resulting levels of regulation would have adverse effects on wages and employment levels. My only point is that in some cases, individuation across persons will produce worse outcomes on distributional grounds and possibly on grounds of welfare as well.

IV. GLOBAL RISK REGULATION AND CROSS-NATIONAL VALUATIONS

The analysis thus far has significant implications for global risk regulation and cross-cultural variations in WTP and VSL. In this Part, I turn to those implications. My conclusion is that poor countries should use a lower VSL than wealthy countries, and that people in poor countries are not helped if the United States, or an international body, insists on a high one. But the analysis must be different if the question is the behavior of donors or donor nations. Nations who are most in need deserve help, even if their WTP is low. For purposes of regulation, however, insistence on a high VSL will not provide that help. I begin with the distinction between donor practices and government regulation and then turn to the practical question of cross-national valuations.

A. Are Indian Lives Worth Less Than American Lives?

I have suggested that people in poor nations show a lower WTP and hence VSL than people in wealthy nations.[187] Because poor people have less money than rich people, this finding should not be at all surprising. Building on evidence of this kind, some assessments of the effects of global warming find far higher monetized costs from deaths of people in rich countries than from deaths of people in poor countries.[188] These assessments have been highly controversial;

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187. *See supra* Table 3.

188. See Kirsten Halsnaes et al., *Case Studies for Zimbabwe, Botswana, Mauritius and Thailand, in* CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT: PROSPECTS FOR DEVELOPING COUNTRIES 202, 206–07 (Anil Markandya & Kirsten Halsnaes, eds., 2002) (calculating a VSL for the European Union of $3.9 million in 1995 prices, compared to VSLs of $315,000 to $1.2 million for the four developing countries in the case study); *cf.* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, THIRD ASSESSMENT REPORT: CLIMATE CHANGE 2001: MITIGATION 483 (finding that "[t]he VSL is generally lower in poor countries than in rich countries"), *available at* http://grida.no/climate/ipcc_tar/wg3.

Professor John Broome, for example, notes that under one approach, an American life is worth ten or twenty Indian lives, a judgment that he deems "absurd."[189] As a result, some analysts, including the Intergovernmental Panel on Climate Change, have opted for a worldwide VSL of $1 million, a choice that seems quite arbitrary and potentially harmful to people in rich and poor nations alike.

The issue raises important dilemmas. How should global institutions assess the monetary value of human lives? What are the monetized costs of ten thousand worldwide deaths from global warming, deaths that include eight thousand people from poor countries and two thousand from wealthy ones? The discussion thus far suggests that there is no sensible abstract answer to these questions; it is important to know what, in particular, the answer is *for*. If a general question is asked, outside of any particular context, about the monetary value of a stated number of deaths in 2020, it is best left unanswered (except perhaps with laughter). The appropriate assessments of VSL, and variations across countries, depend on their intended use. If disparate numbers are meant to identify the actual monetary values of human lives, and to suggest that people in Canada are "worth" much more than people in Argentina or that poor people are "worth" less than rich ones, the numbers are ludicrous as well as offensive.

It is possible to go further. If the disparate numbers are meant to suggest the appropriate amount that donor institutions should spend to reduce mortality risks, they make little sense. The fact that a poor person in a poor nation would be willing to pay $1 to eliminate a risk of 1/10,000, whereas a wealthy person in a wealthy nation would be willing to pay $100, cannot plausibly be used to defend the view that

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189. *See* Broome, *supra* note 182, at 957 (noting that this conclusion is a product of "a money-metric utility function to represent a person's preferences," an approach that Professor Broome rejects). In the easy cases, I suggest that a money-metric utility function is not absurd, and it is not quite absurd in the hard cases either. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 188, at 483:

> The VSL is generally lower in poor countries than in rich countries, but it is considered unacceptable by many analysts to impose different values for a policy that has to be international in scope and decided by the international community. In these circumstances, analysts use average VSL and apply it to all countries. Of course, such a value is not what individuals would pay for the reduction in risk, but it is an "equity adjusted" value, in which greater weight is given to the WTP of lower income groups. On the basis of EU and US VSLs and a weighting system that has some broad appeal in terms of government policies towards income distribution, Eyre *et al.* (1998) estimate the average world VSL at around 1 million Euros (approximately US$1 million at 1999 exchange rates).

an international agency should devote its resources to the latter rather than the former. To illustrate this point, imagine choosing between two programs:

(A)   Program A would eliminate (at a stated cost of $500) a 1/10,000 risk faced by fifty poor people in Costa Rica, each willing to pay $2 to eliminate that risk.

(B)   Program B would eliminate (also at a stated cost of $500) a 1/10,000 risk faced by fifty wealthy people in Germany, each willing to pay $350 to eliminate that same risk.

In principle, there is no reason to think that a donor should prefer to save the Germans, even though their WTP is far higher than that of the Costa Ricans. In fact, Program A has much higher priority, because it would help people who were facing extreme deprivation. What is true at the individual level is true across nations as well.

But now consider a different issue. The government in a poor nation is deciding on appropriate policy to reduce workplace risks; what VSL should it use? At least under the assumptions that I have given thus far, such a government would do well to begin by using the admittedly low WTP of its own citizens. If citizens in that nation show a WTP of $2 to eliminate risks of 1/10,000, then their government does them no favors by requiring them to pay $50 or $10 for that protection. This is the sense in which VSL properly varies across nations, and in which citizens of poor nations have lower VSLs than citizens of wealthy ones.

The point has strong implications for international labor standards. It is tempting to suggest that workers in poor countries, for example China and India, should receive the same protection as those in the United States; why should a worker in Beijing be subject to significantly higher death risks than a worker in Los Angeles? So long as the distribution of global income has the form that it does, a system that gives Chinese workers the same protection as American workers is not in the interest of Chinese workers—assuming, as I am, that the cost of that protection is borne by workers themselves. Requiring Chinese workers to have the same protection as Americans amounts to a forced exchange on terms that Chinese workers reject.

In these circumstances it is unsurprising that workers in wealthy nations, not in poor ones, often clamor the loudest for greater protection of workers in poor nations; workers in wealthier nations would be the principal beneficiaries of such regulation, which would protect them against competition from those in poorer nations. The

idea that workers in poor nations should have the "same" protection as workers in wealthy nations is an error, rooted in a "moral heuristic" involving the equal worth of all human lives—a heuristic that sometimes works well but that also misfires.[190] The real question is the effect of different numbers.

If the Chinese government uses a VSL of $6 million, on the theory that its citizens should not be valued less than those of wealthy nations, social harm will almost inevitably result. In the easy cases, the forced exchanges will be ludicrously harmful to the people whom they are supposed to help. In the hard cases, in which the beneficiaries pay only a fraction of the cost (which is mostly borne by others in the same nation), the nation will be spending far too much of its money on risk reduction (or more precisely, on reducing the risks that happen to get onto the regulatory agenda). The inefficiency of an extremely high VSL will be felt acutely and in many forms, including decreased employment. But if the costs of risk reduction will be paid by third parties—for example, wealthy nations—then people in the poor country will be helped even if risk reduction is based on an excessive VSL.

Of course the citizens of poor nations would almost certainly be helped more if they were given cash (supposing that it would not be squandered) rather than in-kind benefits. But if cash redistribution is not possible, regulatory benefits, provided for free or for a fraction of their cost, remain a blessing. If, for example, a global institution uses a worldwide VSL of $1 million, and if that amount exceeds the domestic VSL of people in poor nations, it is possible that poor people will gain a great deal if the resources for risk reduction are provided by wealthy nations. In the harder cases, the simple point is that many of the intended beneficiaries of regulation are in fact net gainers.

B. Policy and Practice

How, then, should global institutions, such as the Intergovernmental Panel on Climate Change, assess the monetary costs of risks faced by people all over the world? As I have suggested, the answer turns on the purpose of the assessment—on what issue the answer is supposed to address. There is no good acontextual way of

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   190. On moral heuristics, see generally Cass R. Sunstein, *Moral Heuristics and Moral Framing*, 88 MINN. L. REV. 1556 (2004).

asking some question about the aggregate costs of global climate change by 2050, unless it has some particular point. A far more sensible question is whether it would make sense for any particular nation to accept a particular way of responding to the problem of climate change, such as the Kyoto Protocol.[191] At the national level, an assessment of the costs and benefits of the Kyoto Protocol is not much different from an assessment of the costs and benefits of any other regulation.

For the United States, the likely costs of the Kyoto Protocol greatly exceed its likely benefits. The anticipated costs are $325 billion,[192] an amount that might be worthwhile if the anticipated benefits for the United States were in the ballpark of that number. But the overall benefits of the Kyoto Protocol are small because the mandatory emissions reduction would make only a slight dent in global warming.[193] In the United States, the benefits could not possibly justify the costs.[194] The picture for the world as a whole is more mixed, with Europe anticipated to be a net gainer.[195] But even for the world, the Kyoto Protocol appears to impose costs in excess of benefits—and this is so even if improbable catastrophic risks are taken into account. The only qualification here is that the science of global warming is disputed; if this is a realm of uncertainty rather than risk, and if worst-case scenarios are emphasized, then the Kyoto Protocol might provide a sensible impetus toward technological innovation and far more dramatic reductions.

For wealthy nations, of course, the argument for contributing to the reduction of global warming is strengthened by the fact that the harms of global warming will be felt disproportionately in poor nations—and also by the fact that wealthy nations have done by far the most to produce the situation that makes global warming a serious problem. Hence it is reasonable to say that the United States should join international agreements to combat global warming even if it loses more than it gains. The problem with the Kyoto Protocol is

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191. *See* WILLIAM D. NORDHAUS & JOSEPH BOYER, WARMING THE WORLD: ECONOMIC MODELS OF GLOBAL WARMING 168 (2000) ("Finally, the Kyoto Protocol has significant distributional consequences . . . . The lion's share of the[] costs are borne by the United States. Indeed, the United States is a net loser while the rest of the world on balance benefits from the Kyoto Protocol.").

192.   *Id.* at 161.

193.   *Id.* at 152.

194.   *Id.* at 130–31 & tbl.7.4.

195.   *Id.* at 162.

that it combines extremely high global costs with relatively low global benefits, even if the problem of global warming is taken quite seriously. A sensible approach would control emissions in developing countries, so as to increase the overall benefits, and also would use emissions trading and other strategies to reduce the overall costs. These routes could certainly produce sensible agreements to address climate change.[196] To the extent that emissions control in developing countries would impose a significant burden, wealthy nations should help to foot the bill.

But I am not attempting here to resolve any particular controversy. My major suggestions are that within nations, diverse VSLs are perfectly sensible, and that answers to questions about valuation must be closely attuned to the purposes for which those questions are being asked.

CONCLUSION

The theory that animates current valuations of mortality risks argues in favor of far more individuation. Does the risk involve cancer? What kind of cancer? Does it involve air pollution or driving on the highways? If welfare and autonomy are the guides, it is obtuse to adopt an approach that values all statistically equivalent mortality risks in the same way. In addition, individuals display a great deal of heterogeneity in their VSLs—not simply because of different tastes and values, but also because of different levels of income and wealth. WTP depends on ability to pay. Nothing that I have said here is meant to suggest approval of existing distributions of resources. Certainly poor people are not "worth less" than wealthy ones, and it is often appropriate for government to provide resources directly to poor people or subsidize the provision of regulatory benefits. But forced exchanges are not a good way to assist poor people, and a uniform VSL is often a perverse response to inequality. In theory, risk-reduction policies should be more fully individuated, giving all people regulatory protection that corresponds to their WTP for the particular risk in question.

Of course this is not practicable. Government lacks the necessary information about individual risk preferences; categorical judgments are inevitable. In any case many of the benefits provided by

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196. RICHARD B. STEWART & JONATHAN B. WIENER, RECONSTRUCTING CLIMATE POLICY 38–40, 102–09 (2003).

regulation are collective in character. Regulators cannot feasibly provide protection to one person without simultaneously providing protection to many. But it is nonetheless important to see what the current theory counsels in principle, and to understand that the limitations are practical ones, some of which may be overcome as knowledge progresses. Even with the practical limitations, a uniform VSL is increasingly difficult to justify.

It is clear that some risks produce a higher VSL than others, resulting in significantly different analyses in many cases, above all by producing a higher VSL for cancer risks. A program that protects elderly people should produce a lower VSL than one that protects younger people, and there is no ethical objection to variations on the basis of age.[197] If a program affects mostly wealthy people, a VSL based on the population-wide median will be too low. It would follow that the FAA should have a relatively high VSL, because people who fly are wealthier than the population median—and when the EPA is engaging in cost-benefit analysis for programs protecting poor people from risks associated with hazardous waste sites, it should have a relatively low VSL.

The principal qualification is that when the beneficiaries of regulation do not pay all of its cost, a high VSL may actually be in their interests. The easy cases, in which the beneficiaries are forced to pay for regulatory benefits, are not the same as those in which beneficiaries pay only a fraction of the cost. Nonetheless, current practice treats such cases as identical, perhaps because of the great difficulty in untangling the incidence of regulatory benefits and costs. My goal has not been to resolve that difficulty, but to suggest that the theory behind current practice justifies far more individuation of VSL than regulators currently provide. However regulators deal with distributional problems and the hardest cases, the use of a uniform VSL is unacceptably obtuse.

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197. *See* Aldy & Viscusi, *supra* note 15, at 24 ("[W]orkers . . . in their early 60s have a VSL . . . about 30–40 percent lower than the market average and between one-third and one-half the size of the VSLs for prime-aged workers."); Sunstein, *supra* note 8, at 210 ("If thirty-year-olds are willing to pay more (or less) to eliminate a statistical risk than sixty-year-olds, then the difference should be reflected in cost-benefit analyses of regulatory proposals. . . . [P]olicymakers should use different values for old people and young people if and only if WTP studies show such a disparity."). I am putting to one side the difficult questions raised by the need to produce a VSL for children.