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Pressing Precaution Beyond the Point of Cost-Justification

Gregory C. Keating

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Pressing Precaution Beyond the Point of Cost-Justification

Gregory C. Keating*

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I. THE PUZZLE: WHY PRESS PRECAUTION BEYOND THE POINT OF COST-JUSTIFICATION?

A. *The Clash Between Economic "Science" and Ordinary Moral Sensibility*

Years ago, Bruce Ackerman contrasted two competing perspectives on law, that of the "ordinary observer" and that of the "scientific policymaker."¹ The perceptions and discourse of the "ordinary observer," Ackerman explained, start from the common practices and language of laymen.² The "scientific policymaker" takes the realization of particular objectives—efficient precaution against risks of accidental injury and death, for example—as her end and uses the law as an instrument toward that end.³ Clashes between these two perspectives are endemic to our legal culture.⁴ Nowhere in the law of accidents is that conflict sharper than in cases where the risks imposed threaten severe and irreparable injury.

A powerful and influential tradition of thought asserts that reasonable care in the law of negligence is, and ought to be, economically efficient care. When Learned Hand devised his famous "formula" for determining the amount of care due, Richard Posner argues, he was both "adumbrating, perhaps unwittingly, an economic meaning of negligence," and attempting nothing more novel than to "make explicit the standard that the courts had long applied."⁵ Judge Hand, as Robert Cooter and Thomas Ulen explain, "set the legal standard of care by explicitly balancing the benefits and costs of precaution, just as an economist would have done"⁶ So conceived, reasonable care is the level of precaution that minimizes the combined costs of preventing and paying for accidents, thereby maximizing the wealth at society's disposal. Precaution should be taken until a penny

1. See BRUCE A. ACKERMAN, *PRIVATE PROPERTY AND THE CONSTITUTION* 10-20 (1977).

2. *Id.*

3. *Id.*

4. See, e.g., Michael Wells, *Scientific Policymaking and the Torts Revolution: The Revenge of the Ordinary Observer*, 26 GA. L. REV. 725, 728-37 (1992) (arguing that traditional tort law better fits the realm of the ordinary observer, whereas contemporary tort law is driven by scientific policymaking).

5. Richard A. Posner, *A Theory of Negligence*, 1 J. LEGAL STUD. 29, 32 (1972) (footnote omitted).

6. ROBERT COOTER & THOMAS ULEN, *LAW AND ECONOMICS* 360 (1988) [hereinafter COOTER & ULEN 1988]. In the most recent edition of their textbook, Cooter and Ulen take the same position, albeit a bit less explicitly. See ROBERT COOTER & THOMAS ULEN, *LAW AND ECONOMICS* 314-15 (3d ed. 2000) ("Repeated application of the Hand rule enables adjudicators to discover the efficient level of care.").

more spent to prevent accidents yields less than a penny's reduction in expected accident costs.

The economic interpretation of reasonable care has been enormously influential, but it remains deeply problematic. It equates reasonable care with rational care, and spells rationality out in economic terms.⁷ The average reasonable person thinks and acts as a single, economically rational actor would, if she bore both the costs and the benefits of precaution. An unreasonable person, by contrast, gives more weight to the benefits she gains by imposing risks on others than to the costs that her risks impose on others.⁸ Put this way, the economic interpretation of due care seems almost innocuous. Reasonable people, surely, take the costs and benefits of alternative courses of action into account in deciding what to do, and reasonable people weigh those costs and benefits impartially. If anything is unreasonable, assuming that my interests are objectively more important than someone else's—just because they are my interests—is unreasonable.

But the economic interpretation is not innocuous when it comes to fixing the appropriate measure of precaution when life itself is at stake.⁹ Cost-benefit analysis treats all human interests—urgent ones like adequate nutrition and physical integrity and luxuries like the consumption of fine wines—as fungible at some ratio of exchange and insists that the cost-justified level of precaution is the only level of precaution that is ever justified.¹⁰ More stringent precaution simply squanders resources. Our common law of negligence, by contrast, treats the physical integrity of the person as an especially urgent interest, and our juries are repulsed by the claim that accidental deaths should not be prevented whenever the costs of prevention

7. See Gregory C. Keating, *Reasonableness and Rationality in Negligence Theory*, 48 STAN. L. REV. 311, 325-27, 337-39 (1996).

8. COOTER & ULEN 1988, *supra* note 6, at 360:

[R]easonableness requires the decisionmaker to give similar weight to the cost of more precaution, which he bears, and the benefit of more precaution in terms of the reduced frequency and severity of accidents, which others enjoy. His behavior is unreasonable and his precaution is faulty when he gives more weight to the costs he bears than to benefits it creates for others.

This exact passage is not found in the current, third edition of the book. However, nothing in the third edition suggests that Cooter and Ulen have or would repudiate the ideas expressed in the passage.

9. It may not be innocuous in other ways as well. For one thing, reasonableness resists reduction to rationality. See, e.g., Keating, *supra* note 7, at 312.

10. For an important recent attempt by a legal economist to wrestle with this problem, see Mark Geistfeld, *Reconciling Cost-Benefit Analysis with the Principle That Safety Matters More than Money*, 76 N.Y.U. L. REV. 114 (2001).

exceed the value—economically conceived—of the lives at risk.¹¹ According to the folk wisdom of product liability lawyers:

[O]ne argument that you should almost never make is that the manufacturer deliberately included a dangerous feature in the product's design because of the high monetary cost that the manufacturer would have incurred in choosing another design. If you do argue this, you're almost certain to lose on liability, and you can expose yourself to punitive damages as well.¹²

Jury practice and economic prescription are at odds with one another.

B. The Need for a Moral Theory to Buttress Our Moral Sensibility

If the economic interpretation of reasonable care is at odds with jury practice, the claim that precaution should be pressed beyond the point of cost-justification is underdeveloped. Whatever its faults, the idea of cost-justified precaution is comparatively well articulated and understood. Negligence law's norm of reasonable care in the circumstances, by contrast, has not given rise to conceptually well-defined and clear alternatives to cost-justified precaution.¹³ Noneconomic students of negligence law have not explained why more than cost-justified precaution might indeed be appropriate when life itself is threatened with severe and irreparable injury. Nor have they explained just how much more precaution is appropriate.

My aim in this Article is to examine two statutory norms which prescribe more than cost-justified precaution—the “safety” and “feasibility” norms—and to show that an idea of fairness supports these norms. The safety and the feasibility norms both specify conceptually well-defined alternatives to cost-justified precaution.¹⁴

11. For the point about the structure of the common law, see Keating, *supra* note 7, at 364-67. For the point about jury practice, see, e.g., Gary T. Schwartz, *The Myth of the Ford Pinto Case*, 43 RUTGERS L. REV. 1013, 1038 (1991), and W. Kip Viscusi, *Jurors, Judges, and the Mistreatment of Risk by the Courts*, 30 J. LEGAL STUD. 107, 115-26 (2001).

12. Schwartz, *supra* note 11, at 1038. This lesson is taken to be the moral of *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348 (Cal. Ct. App. 1981).

13. This is largely because the practice of negligence adjudication involves jury application of the general legal standard of reasonable care to particular fact patterns. This application leads to particular judgments of reasonableness but not to a conceptual refinement of the norm itself. Reasonable care is sometimes given precise form in rules through the adoption of customarily or statutorily prescribed precautions, but this enterprise, too, does not generate much in the way of the conceptual refinement or specification of the idea of reasonableness.

14. See *Physical Harm in the Modern State*, in ROBERT E. KEETON, LEWIS D. SARGENTICH & GREGORY C. KEATING, *CASES AND MATERIALS ON TORT AND ACCIDENT LAW* 930-91 (3d ed. 1998) [hereinafter KEETON ET AL., *TORT AND ACCIDENT LAW*] (showing that these norms are articulated in federal law as alternatives to the norm of cost-justified precaution). My exposition of the safety and feasibility standards in this Article, in Part II as well as in this section, follows these materials and the accompanying chapter of ROBERT E. KEETON, LEWIS D. SARGENTICH & GREGORY C. KEATING, *TEACHER'S MANUAL TO ACCOMPANY TORT AND ACCIDENT LAW* 20-1 to 20-16 (3d ed. 1998) [hereinafter KEETON ET AL., *TEACHER'S MANUAL*].

The safety (or safe-level) standard requires the elimination of all significant risks of physical harm, and the feasibility standard requires the elimination of all significant risks which can be eliminated without crippling the activity at issue.¹⁵ The safety standard rejects the conceptual framework of cost-benefit analysis because it fixes the acceptable level of risk without inquiring into the benefit lost by not imposing more risk. The feasibility standard rejects the conceptual framework of cost-benefit analysis because feasibility analysis takes practical possibility—not maximal benefit—as its guiding aim.¹⁶

The norms of safe and feasible precaution are related to the idea of reasonableness at work in negligence law in two ways—one negative, the other positive. The negative relation is the rejection of efficient precaution as a complete and sufficient measure of appropriate precaution. The idea that care must be reasonable, not rational, asserts that it is a mistake to reduce reasonable conduct to efficient conduct, fair conduct to wealth-maximizing conduct. The safety and feasibility standards likewise reject the idea that efficient care is sufficient. Both of these norms press precaution beyond the point of cost-justification. The positive relation between the statutory norms of safety and feasibility and the common law norm of reasonableness is a shared commitment to fairness. The common law of negligence gives pride of place to fairness because it gives pride of place to reasonableness, and fairness is a prominent aspect of reasonableness.¹⁷ Statutory risk regulation in accordance with the safety and feasibility standards gives a prominent place to fairness because agencies, advocates, and courts cite fairness as a principal justification for those norms.¹⁸ In both cases, general ideas of fairness also provide a powerful justification for pressing precaution beyond the point of cost-justification.

15. See *infra* Part III.

16. I adapt this summary from Lewis Sargentich's note on "Feasibility" in KEETON ET AL., TORT AND ACCIDENT LAW, *supra* note 14, at 953. Throughout this Article, my presentation of the safety and feasibility norms follows and builds on Sargentich's casebook and teacher's manual materials. See *supra* note 14, at 20-1 to 20-16.

17. See, e.g., JOHN RAWLS, POLITICAL LIBERALISM 48-50 (rev. ed. 1996) (linking reasonableness and fairness); Keating, *supra* note 7, at 325-27, 337-39 (arguing that the fundamental commitment of negligence law is to reasonable care, not to economically rational care).

18. See KEETON ET AL., TORT AND ACCIDENT LAW, *supra* note 14, at 963-64, 968-70.

Economic theory is deeply critical of pressing precaution beyond the point of cost-justification. Cost-justified precaution is efficient precaution. Economically speaking, it is irrational to press precaution beyond the efficient point. Precautions taken once the point of cost-justified precaution has been reached yield less in dollars saved than they cost in dollars spent. We would be richer if we chose not to take the extra precautions demanded by the safety and feasibility norms. Insofar as they insist on taking more than cost-justified precaution, feasible precaution and safe precaution make us worse off, not better off.¹⁹ Our welfare could be improved by retreating back to the point of cost-justified precaution and by putting the money saved to better use elsewhere.²⁰ Why, then, should society ever press precaution beyond the point of cost-justification?

19. The claim that it is wasteful and irrational to take more than cost-justified precaution is fundamental to the economic analysis of risk and precaution. See, e.g., Herman B. Leonard & Richard J. Zeckhauser, *Cost-Benefit Analysis Applied to Risks: Its Philosophy and Legitimacy*, in *VALUES AT RISK* 31, 35 (Douglas MacClean ed., 1986) (Centralized decisions of whether or not to impose a risk should be made by choosing the “alternative . . . for which benefits most exceed costs. This standard is often referred to as ‘efficiency’.” The underlying notion is that it is wasteful to choose the alternatives that do not provide the maximum possible ‘net benefits’ or ‘surplus.’”); THOMAS C. SCHELLING, *CHOICE AND CONSEQUENCE* 17 (1984) (explaining “‘not efficient’ merely means that I can think of something better—something potentially better from the points of view of all parties concerned”); LOUIS KAPLOW & STEVEN SHAVELL, *FAIRNESS VERSUS WELFARE* 52 (2002) (“[I]ndividuals will be made worse off overall whenever consideration of fairness leads to the choice of a regime different from that which would be adopted under welfare economics . . .”). Kaplow and Shavell fault an earlier paper of mine, *Reasonableness and Rationality in Negligence Theory*, precisely because it “clearly would make everyone worse off . . .” *Id.* at 87 n.5. This Article develops the claim made in *Reasonableness and Rationality in Negligence Theory*—that fairness does justify more than efficient precaution in certain kinds of cases—in detail.

20. Guido Calabresi, perhaps the finest tort scholar of the past fifty years, has repeatedly worried about the apparent irrationality of spending “millions of dollars to save the lives of clearly identified individuals who are in immediate danger—dollars, which, if applied to generalized safety, would protect and preserve many more.” GUIDO CALABRESI, *IDEALS, BELIEFS, ATTITUDES AND THE LAW* 6 (1985). Compare *id.* at 1-19, with GUIDO CALABRESI & PHILIP BOBBITT, *TRAGIC CHOICES* 39 (1978) (stating that “[t]o the extent that our lives and institutions depend on the notion that life is beyond price, such a refusal to save lives is horribly costly”). This argument is not the tour de force it seems. For one thing, its disregard of other relevant considerations leads to some bizarre claims. One statistician, disturbed by the apparent irrationality of our appraisals of risk, suggests that “rather than introducing legislation about the nuclear power industry or diet drinks, a rational government should be setting up computer dating services . . .” Being unmarried is much more hazardous to a man’s health than more salient hazards such as smoking—“the average loss of life expectancy” associated with being a male who smokes is 2250 days, and the average loss associated with being an unmarried male is 3500 days. BRIAN S. EVERITT, *CHANCE RULES: AN INFORMAL GUIDE TO PROBABILITY, RISK, AND STATISTICS* 128-29 (1999). There is, surely, something wrong with the idea that the statute is as entitled to regulate marriage as it is to regulate diet drinks. For another thing, making ourselves better off by putting our lifesaving dollars to their highest use will almost surely result in many more deaths. There will “[a]lmost always” be “more efficient uses for our lifesaving money” than using it to save the lives we might save at any given moment. Annette Baier, *Poisoning the Wells*, in *VALUES AT RISK*, *supra* note 19, at 49, 73 n.22. Plainly, something is wrong with a logic

One answer—and there may be others—lies in considerations of fairness and urgency. Fairness is concerned with the distribution of burdens and benefits—with how well competing claims are satisfied.²¹ Treating people fairly generally requires us to align burden and benefit proportionally and to treat competing claims in ways which can be justified to those whose claims they are.²² When injuries are not devastating—when the harm they wreak can be fully repaired through ex post compensation—fairness concerns can be addressed after risks are imposed and injuries ensue. Redistribution after the fact of injury can align the burdens and benefits of the risks imposed.²³ When risks threaten devastating injury—premature death or severe harm whose debilitating effects can never be fully undone²⁴—matters are different. Fairness must be done at the time that the risk is imposed, not after it issues in injury. The safe and feasible precaution standards apply to risks of devastating injury and therefore to circumstances where fairness must be done ex ante, not ex post.

When devastating injury is risked, it is unfair to treat the harm being risked as comparable to *any* benefit which might be gained, no matter how trivial that benefit is in the lives of those who reap it. Sacrificing an urgent interest—the interest in avoiding premature death or devastating injury—for the sake of trivial gains to others cannot be justified to those whose urgent interests are sacrificed. It is only fair to ask some people to bear a significant risk of devastating injury when the burden of eliminating that risk is comparable to the burden of bearing it. Cost-benefit analysis ignores this. It treats all costs and all benefits as interests which are fungible at some ratio of exchange and aggregates costs and benefits across persons. Cost-benefit analysis supposes that loss of life or health by some can always be offset by increase in wealth to others, no matter how trivial the effect of that increased wealth may be in the lives of those who benefit from it. The mistake here lies not in undervaluing

which requires, at every given moment in time, that we refrain from saving lives now so we can save more later.

21. See, e.g., John Broome, *Fairness*, 91 PROC. OF THE ARISTOTELIAN SOC'Y, pt. V, at 87-102 (1990-91) (“[F]airness is concerned only with how well each person’s claim is satisfied compared with how well other people’s are satisfied. It is concerned only with relative satisfaction not absolute satisfaction.”); see *infra* Part II.

22. The first point is as old as Aristotle. See, e.g., ARISTOTLE, NICHOMACHEAN ETHICS 119 (Roger Crisp ed. & trans., 2000) (“[T]he just is something proportionate . . .”). The second is brought out by the “Kantian interpretation” of “justice as fairness.” See JOHN RAWLS, A THEORY OF JUSTICE § 40, at 3-46 (rev. ed. 1999).

23. This idea of fairness is fundamental to enterprise liability. See Gregory C. Keating, *The Idea of Fairness in Enterprise Liability*, 95 MICH. L. REV. 1266 (1997).

24. The permanent debilitation inflicted by brown lung disease is a case in point.

life or health. The mistake lies in assuming that trivial benefits and devastating losses are comparable. They are not, and it is unfair to treat them as if they are.

Or so I shall argue. Part II develops the claim of fairness made in the preceding paragraph. Part II.A states the essential argument directly. Part II.B advances a particular conception of fairness and explains the normative and conceptual framework which justifies this conception. This particular conception of fairness holds that risks are fairly imposed when the terms of their imposition reconcile the competing claims of two kinds of freedom—freedom to impose risks on others and freedom from accidental physical injury at the hands of others—on terms which are to the *ex ante* advantage of those affected by them, including especially those most imperiled by them. Each of these freedoms is a precondition of effective rational agency, something necessary for us to pursue the projects and activities which give shape and meaning to our lives. When a practice of risk imposition puts some—workers in cotton mills or in petroleum refineries, for example—in particular peril of devastating injury, that practice is only fair if that peril is to the long-run advantage of those so imperiled and if it could not have been reduced without imposing a greater disadvantage on a comparable class of persons affected by the practice.

Part III explains the federal statutory norms that require more than cost-justified precaution in certain kinds of cases. It begins by contrasting cost-justified, feasible, and safe precaution. Part III explicates the essential elements of feasible and safe precaution doctrine—the requirement that the risks subject to reduction be “significant” and the twin demands of “technological” and “economic” feasibility. Part IV takes up the task of justifying these elements. Its aim is to build the bridges necessary to show that the general moral arguments of Part II provide substantial justification for the legal standards of Part III. After briefly recapitulating earlier claims of fairness, Part IV turns to justifying the significance requirement. Why eliminate or feasibly reduce only significant risks of devastating injury? Why not eliminate all such risks? Part IV argues, in brief, that a significance requirement is necessary to prevent both safe and feasible risk reduction from inflicting harms to our liberty greater than the harms that insignificant risks of devastating injury inflict on our security. The imposition of insignificant—but real—risks of devastating injury is so pervasive that the elimination of insignificant risks of devastating injury would cripple our freedom of action.

The remainder of Part IV and all of Part V explore the claims of comparability that underpin both safety and feasibility analysis.

What kinds of costs are comparable to a significant risk of devastating injury? Drawing on detailed examples, common law as well as statutory, Parts IV and V argue that both safety and feasibility analysis rely on a hierarchical conception of human interests and a historically and socially contingent account of value. That hierarchical conception of human interests gives health and safety priority over lesser goods; that historically and socially contingent conception of value acknowledges that the urgency of an activity varies with time and with place. Increased agricultural productivity is a luxury for a society which can produce food in abundance. That historically contingent fact justifies subjecting the use of pesticides on agricultural products to the stringencies of safety-based risk regulation. Conversely, the historically and socially contingent importance of petroleum in our society may justify counting the elimination of petroleum refining as a harm comparable to bearing a significant risk of devastating injury, even though we know that social worlds have existed and will exist in which petroleum is unimportant. Part V argues that feasibility analysis rests on a further and more contestable claim. Feasibility analysis imposes an efficiency-based limit on its pursuit of fair risk reduction: it presumes that when an activity flourishes in a market economy, the elimination of that activity counts as a harm comparable to death and devastating injury.

Part VI entertains doubts raised by the dependence of feasibility analysis on both (1) contingent social facts and (2) a market test of value. Part VI argues that feasibility analysis's dependence on contingent social facts is less of a cause for concern than it first seems. (The concern is that physical integrity and health are essential conditions of rational agency; any given historically and socially contingent activity is not.) Taken as a class, however, historically and socially contingent activities *are* as important as the physical integrity endangered by risks of devastating injury. Historically and socially contingent activities are the media through which we meet our material needs and realize our agency. The fact that we might learn to forgo any *given* activity is not proof that we might forgo all of them. Unless we have particular reason to question the value of an activity, we have no reason to presume that the abandonment of the activity is an acceptable cost to bear. The abandonment of *all* historically and socially contingent activities would cripple our agency and is an unacceptable cost. Judgments that a particular activity's continued presence in our social world is not a game worth the candle of significant risk of devastating injury must be made on a more discriminating basis.

Part VI also argues that feasibility analysis's acceptance of a market test of value *does* limit its commitment to fairness in a way that is cause for some concern. When an activity flourishes in a market economy, it is presumptively efficient. And, as long as those who participate in efficient activities do so voluntarily, rationally, and with good information, efficient activities are to their advantage in a Pareto sense: those involved in the activities are better off than they would be had they refused to participate. But unless the activity takes place against a background of a just distribution of wealth and income and a just system of rights, Pareto superiority is no guarantee of fairness. Activities may flourish which treat those they most disadvantage unfairly, even though those so disadvantaged are made better off in a Pareto sense by their participation. In a system such as South African apartheid—where an entire class (and race) of persons is disenfranchised—it may be Pareto-superior for members of that class to accept work so hazardous that no member of an enfranchised class would ever agree to undertake it—mining diamonds at great depth and danger, for example.²⁵ The fact that diamond mining so conducted was efficient given the distribution of background entitlements against which it arose, and therefore “to everyone's advantage” in a Pareto sense, did not guarantee the fairness of the terms on which the activity was conducted. South African diamond miners were the victims of grave injustice. By accepting a market test of the value of activities, feasibility analysis accepts an efficiency limit on the fairness value it expresses. That limit may well prove problematic.

Finally, Part VI argues that there is no obvious way to eliminate this efficiency constraint on fairness. For one thing, the constraint is embedded in our practice. For another, it is often—although not always—supported by considerations of institutional competence and by an appropriate division of institutional labor. The fairness of the basic productive activities which flourish in a given society can only be guaranteed by the justice of the institutions within which those activities occur. In some circumstances, fairness can be achieved by setting aside a market test of value and by asking if an activity is to the long-run advantage of those it disadvantages, but in other circumstances fairness can only be achieved by reforming the

25. See, e.g., *Apartheid and Black Labor in South Africa: Applying Section 307 of the Smoot-Hawley Tariff Act to Goods Produced by Black South Africans*, 19 CASE W. RES. J. INT'L L. 421, 432-33 (1987) (noting that “in light of the scarcity of jobs and depressed economic conditions of the homelands” blacks must choose “between accepting a job with inhumane working conditions” and being unable to support their families).

framework of institutions within which particular activities flourish or fail.

Part VII considers the appropriate level of precaution when risks are not devastating. It argues that, when risks are fully compensable and therefore rectifiable after the fact, fairness is compatible with efficient precaution. When risks are fully compensable, fairness can be done by redistribution after the fact of injury. Efficient precaution is appropriate because it maximizes the size of the pie at society's disposal, thereby making money available to achieve a fair distribution of burden and benefit, among other things.

II. DEVASTATING INJURY AND FAIR PRECAUTION

A. Fairness and Comparability: The Moral Case for More-than-Cost-Justified Precaution Against Devastating Injury

Cost-benefit analysis draws on the idea of preference, crystallized in dollars.²⁶ Yet preference does not seem to get at the moral nerve of the problem with which these statutes grapple. That problem is defined by four characteristics. First, these standards typically apply to toxins and carcinogens which threaten devastating injury—injury which is severe and irreparable. The injuries risked are severe, because they threaten to bring life to a premature close or to impair normal physical functioning seriously, in the way that diseases like brown lung disease do.²⁷ They are irreparable because the harm

26. See, e.g., Richard Craswell, *Passing on the Costs of Legal Rules: Efficiency and Distribution in Buyer-Seller Relationships*, 43 STAN. L. REV. 361, 368-69 (1991):

I adopt the consumer sovereignty position that consumer welfare is to be judged solely by reference to consumers' own tastes and preferences. I also assume that those tastes and preferences can be meaningfully translated into a dollar amount and that the appropriate amount is whatever each consumer is willing to pay to satisfy those preferences.

Kaplow and Shavell make essentially these assumptions. See, e.g., KAPLOW & SHAVELL, *supra* note 19, at 88 n.5 (indicating that "the importance of liberty to an individual" should be "determined by the amount by which the individual values it"); *id.* at 100 n.32 (endorsing "the convention of placing a dollar value on harm" as a way of measuring "the implicit valuations of individuals reflected in the choices they make"); see also Keating, *supra* note 7, at 334-35 nn.78, 81.

27. Inhalation of cotton dust, for example, can lead to byssinosis, or "brown lung" disease. Byssinosis is a "continuum . . . disease," categorized into four grades. These are:

[Grade] ½ : slight acute effect of dust on ventilatory capacity; no evidence of chronic ventilatory impairment. [Grade] 1: definite acute effect of dust on ventilatory capacity; no evidence of chronic ventilatory impairment; [Grade] 2: evidence of slight to moderate irreversible impairment of ventilatory capacity; [Grade] 3: evidence of moderate to severe irreversible impairment of ventilatory capacity.

that these injuries inflict cannot be undone; normal functioning and normal life cannot be restored. Second, the injuries to which these standards apply are avoidable. No one need suffer brown lung disease if we are prepared to forgo milling cotton; no one need die from the effects of lifetime occupational exposure to benzene if we are prepared to forgo refining petroleum.

Third, the category of activity which produces these risks is one which society cannot avoid if it is to reproduce itself and which individual members of society cannot usually avoid if they are to lead decent lives. Unlike other kinds of activities—recreational activities, for example—basic productive activities are largely inescapable. Growing crops, milling cotton, and refining petroleum are activities that are essential to the reproduction of society. We may individually forgo eating certain foods, wearing cotton clothes, or consuming petroleum products, but our society as a whole cannot realistically forgo growing and consuming crops, refining and consuming benzene, and milling and wearing cotton. Conversely, working—earning a living—is, for most of those who mill cotton and refine benzene, an unavoidable activity which meets an urgent need. Other things being equal, the less that activities are avoidable and the more urgent the needs they meet, the more important it is that they be conducted on fair terms.²⁸ Fourth, the risks governed by these standards are certain to ripen into some incidence of the harms risked. The activities governed by these standards—growing crops, milling cotton, refining petroleum—are sufficiently large in their scope and sufficiently extended in time that there is no longer just a chance that the harms risked by conducting these activities will occur; there is certainty that such harm will occur. The only questions are how many injuries will be inflicted and who will suffer them.

The infliction of certain premature death and crippling disease on even a handful of people raises the question: What sort of gains to some people justify inflicting devastating injuries—including death—on other people? Not just any gain will do. It is unfair to make a few suffer devastating injury so that many may reap trivial benefits.

Am. Textile Mfrs. Inst., Inc. v. Donovan, 452 U.S. 490, 496 n.8 (1981). An estimated 100,000 employed and retired cotton workers suffer from the disease, with an estimated 35,000 (or one out of every twelve) suffering from grade three, the worst and most disabling form of the disease. See *id.* at 490, 496-98. Following Lewis Sargentich's usage in KEETON ET AL., TORT AND ACCIDENT LAW, *supra* note 14, at 956, I shall refer to this case as "The Cotton Dust Case."

28. Modern assumption of risk doctrine is responsive to considerations of avoidability and urgency. With the exception of the "firefighters' rule," the modern form of the defense finds its fullest expression in the context of recreational activities. Conversely, the defense has largely been abolished in the workplace context. See KEETON ET AL., TORT AND ACCIDENT LAW, *supra* note 14, at 321-46.

Suppose that a piece of transmitting equipment has toppled and crushed a television technician helping to broadcast an episode of "Baywatch" to a billion viewers worldwide,²⁹ and that the only way to save the technician's life is to interrupt the broadcast for thirty minutes, effectively thwarting the transmission of the show on this particular evening. Although the number of viewers may be vast, the harm to them is not morally comparable to the life of the technician. Inconvenience and disappointment are not morally comparable to death. No amount of inconvenience—distributed across a large number of distinct persons—sums to the loss of a single life. We therefore should not decide how to proceed by measuring the victim's preference for having her life saved in the dollars that she would pay to save it and by comparing that sum to the dollars that the viewers would pay to have the broadcast continue. The cost to the technician and the benefit to the viewers are not fungible at some ratio of exchange.

Death, or even devastation, is not essential to this example. The harms involved would not be comparable even if the harm to the technician were not death, or even devastation as I have defined it, but severe injury—thirty minutes of excruciating pain which left no long-term physical traces, for example. The gains and losses on the opposite sides of the equation—the inconvenience and disappointment of missing a favorite television show on the one side and suffering thirty minutes of excruciating pain on the other—are still not comparable in the havoc they wreak in the lives of those they affect. They are not comparable in their *urgency*.³⁰ No amount of viewer

29. I am adapting slightly an example used by Tim Scanlon. See T. M. SCANLON, WHAT WE OWE TO EACH OTHER 235 (1998) (using the World Cup soccer tournament as an example). Nothing in the example hinges on the "low cultural value" of "Baywatch." One may substitute a show of higher cultural value, but it will have a smaller audience.

30. The argument of fairness advanced here rests not on ideas of preference but on ideas of urgency, or need. On the contrast generally, see Thomas M. Scanlon, *Preference and Urgency*, 72 J. PHIL. 665 (1975). Scanlon writes that interpersonal comparisons based on considerations of urgency represent "the best available standard of justification that is mutually acceptable to people whose preferences diverge." See also Thomas M. Scanlon, *The Moral Basis of Interpersonal Comparisons*, in INTERPERSONAL COMPARISONS OF WELL-BEING 17 (Jon Elster & John E. Roemer eds., 1991). In these papers Scanlon characterizes urgency- or need-based approaches to interpersonal comparison as "objective" (in contrast to "subjective") approaches. In a later paper, Scanlon characterizes urgency-based approaches to interpersonal comparison as one kind of "substantive goods" approach. See Thomas Scanlon, *Value, Desire and Quality of Life*, in THE QUALITY OF LIFE 185 (Martha C. Nussbaum & Amartya Sen eds., 1993). For our purposes, the contrast between urgency- and preference-based approaches can be understood in either way. John Rawls's idea of "primary goods" and Amartya Sen's idea of "basic capabilities" are examples of approaches to interpersonal comparison which take fundamental needs or interests as the proper basis of comparison. See RAWLS, *supra* note 17, at 187-90; AMARTYA SEN, INEQUALITY

disappointment and inconvenience—no number of disappointed and inconvenienced viewers—can justify letting the technician suffer thirty minutes of excruciating pain, much less die. Matters would be different only if the harms on either side of the equation were comparable, if we were somehow forced to choose between inflicting death on some and quadriplegia on others, for example. Quadriplegia and death *are* comparable to one another. Both devastate the lives of those they affect. If we must choose between risking quadriplegia to some and death to others, we must consider the number of persons affected.

These intuitive judgments of comparability reflect a general idea. Harms are comparable when their impact on the lives of those they affect is similarly grave—when they impair ordinary activities, important activities, or the pursuit of rational life plans, in similarly severe ways. Harms are comparable when they strike at the preconditions of rational agency in similarly severe (or similarly mild) ways. Harms are comparable when they disrupt the lives of those they affect in similarly urgent (or similarly insignificant) ways. Burdens and benefits are comparable when they improve or impair lives in similarly important or modest ways. When burdens and benefits are comparable, they may, other things being equal, be traded off against one another. When they are not comparable it is unfair—unjust—to trade them off against one another. Trading grave injuries for trivial benefits sacrifices the essential interests of some for the sake of inessential gains by others. Justice forbids this kind of sacrifice.

This conclusion—that not just any gain, no matter how trivial, justifies inflicting death or devastating injury on someone, so long as the trivial gains sum to a large enough value—rests at bottom on considerations of fairness. Fairness has to do with the distribution of benefits and burdens.³¹ It is “concerned . . . with how well each person’s claim is satisfied *compared with* how well other people’s are satisfied.”³² Just as it is unfair for an enterprise to leave the financial costs of its nonnegligent accidents concentrated on the unlucky few who happen to be victims of those accidents while others reap the benefits of the enterprise’s activity,³³ it is also unfair to devastate a

REEXAMINED 39-42, 49 (1992). I explain the way in which the approach pursued in this paper uses urgency-based, or “objective” criteria of interpersonal comparison *infra* Part II.B

31. See, e.g., Broome, *supra* note 21, at 87-102.

32. *Id.* at 95.

33. This argument of fairness lies at the heart of an important case for preferring enterprise liability over negligence liability. See Gregory C. Keating, *The Idea of Fairness in the Law of Enterprise Liability*, 95 MICH. L. REV. 1266, 1266, 1273 (1997). This idea of fairness is

few for the sake of trivial gains to others.³⁴ Fairness requires that we inflict devastating injury on some only for the sake of comparable gains (or to avoid comparable losses) to others.

The idea of fairness thus directs our attention to a distinct domain of concerns, a domain different from that of either efficiency or rights. In the class of cases that occupy us, fairness is concerned with the distribution of burdens and benefits among distinct persons. Efficiency, by contrast, directs our attention to questions of welfare or well-being—to questions of what John Broome calls “absolute satisfaction.”³⁵ Death—the most severe form of irreparable injury—presents efficiency analysis with an exceedingly difficult question of valuation:³⁶ “What is it worth,” Thomas Schelling asks, “to reduce the probability of death . . . within some identifiable group of people none of whom expects to die except eventually?”³⁷ The answer hinges, Schelling argues, on what the affected individuals would pay to reduce the probability. For Schelling, the problem is essentially a question of individual valuation. Fairness, in the sense that concerns us, is inherently relational and interpersonal: What kinds of gains to some are sufficiently important to justify inflicting accidental death on others?

The contrast between fairness and rights is equally sharp. Rights allocate control over various decisions. They identify domains within which individuals are able to decide what to do “without any

vividly expressed in *Ira S. Bushey & Sons, Inc. v. United States*, 398 F.2d 167, 171 (2d Cir. 1968) (Friendly, J.).

34. See Sargentich, “Fairness and Feasibility,” KEETON ET AL., *TEACHER’S MANUAL*, *supra* note 14, at 20-6 to 20-7:

[The] same idea of fairness that provides a rationale for enterprise liability [also justifies feasible risk reduction]. According to this conception, it is unfair to impose the burden of one’s profitable activity on another, while reaping the benefit oneself; it is unfair to rig a common activity so that some bear its burdens while others reap its benefits.

Cf. RAWLS, *supra* note 22, at 111-12 (When “a number of persons engage in a mutually advantageous cooperative venture according to rules, and thus restrict their liberty in ways necessary to yield advantages for all,” a “principle of fairness” applies and requires each participant to do her part and accept an appropriate share of the scheme’s burdens and benefits.).

35. Broome, *supra* note 21 (noting that fairness “is concerned only with relative satisfaction not absolute satisfaction”). Broome makes his point in a language that appears to assume a subjective metric of interpersonal comparison. But the point is independent of the choice of a metric of interpersonal comparison.

36. Cass Sunstein has suggested to me that economists are likely to see only a problem of undervaluation of certain harms here.

37. Thomas C. Schelling, *The Life You Save May Be Your Own*, in *CHOICE AND CONSEQUENCE*, *supra* note 19, at 113. When it was first published in 1968, Schelling’s article inaugurated the modern economic approach to the valuation of human life.

coercive interference by or on behalf of society.”³⁸ Whereas fairness directs our attention to questions of cost and comparability—to whether “the game is worth the candle”—assignments of rights tend to exclude considerations of cost from our deliberations. When someone has been granted a right to control a certain domain—the domain of their own conscience, dress, or political associations, for example—the cost of providing that control has already been found worthwhile. When a claim is framed as a claim of right, considerations of costs and benefits recede from view.³⁹ When a claim is framed as a claim of (distributive) fairness, by contrast, the very question framed is one of “costs” and “benefits.” Are the benefits to some worth the burdens to others that is their price?

When risks of devastating injury are at stake, fairness finds fault with the metric of valuation on which cost-benefit analysis typically draws. Unrestricted cost-benefit analysis rejects the idea that harms and benefits differ qualitatively and the companion idea that harms must be comparable in value before they can sensibly be traded off against one another. Cost-benefit analysis typically⁴⁰ takes preference as its touchstone and cashes preference out in dollars,⁴¹ thereby assuming “that all human interests are commensurable, and that between any two there always exists some rate of exchange in terms of which it is rational to balance the protection of one against the protection of the other”⁴² In its unrestricted and most characteristic form, cost-benefit analysis assumes that everything is

38. Compare Brian Barry, *Lady Chatterly's Lover and Doctor Fisher's Bomb Party: Liberalism, Pareto Optimality, and the Problem of Objectionable Preferences*, in FOUNDATIONS OF SOCIAL CHOICE THEORY 11, 15 (Jon Elster & Aanund Hylland eds., 1986), with T.M. Scanlon, *Rights, Goals and Fairness in PUBLIC AND PRIVATE MORALITY* 93 (Stuart Hampshire ed., 1978) (distinguishing fairness and rights from each other and from welfare).

39. In his *Paradoxes of the Regulatory State*, Cass Sunstein describes some of the statutory standards considered in this Article as “fueled by the notion that a safe workplace, or clean air and water, should be treated as involving a right to be vindicated rather than a risk to be managed.” 57 U. CHI. L. REV. 407, 413-14 (1990). To the extent that Professor Sunstein is claiming that the safety and feasibility standards discussed in this Article are justified by a claim of moral right—and wrongly so, because the language of rights precludes adequate consideration of costs and benefits—this Article is at least in partial conflict with the claim. I agree that the conceptual apparatus of “rights talk” tends to exclude considerations of cost from consideration. But I disagree that claims of moral right provide the justification for the safety and feasibility standards. I believe that these standards are best justified by arguments of fairness. Fairness is *all about* the relation between burdens and benefits.

40. For one prominent exception, see Allan Gibbard, *Risk and Value*, in VALUES AT RISK, *supra* note 19, at 94. For examples of preference-based approaches, see *supra* note 26.

41. See *supra* note 26.

42. RAWLS, *supra* note 17, at 312.

fungible at some ratio of exchange.⁴³ In the case of the injured television technician, unrestricted cost-benefit analysis allows the disappointment and inconvenience of the viewers to outweigh the death or agony of the technician. If the preferences of a small number of viewers for the continued broadcast of "Baywatch" are intense enough (and if those viewers have the resources to back their preferences with an appropriate amount of money), or if a large enough number of viewers have even mild preferences for continued broadcast of the show, letting the technician die or suffer agonizing pain may be both the wealth-maximizing and the utility-maximizing course of action. Yet this outcome is morally grotesque. The disappointment and inconvenience of the viewers is simply not urgent enough to compete with the death or the agony of the technician.

The existence of discontinuities of value—the fact that not everything is comparable in value to undevastated human life—gives us reason *not* to fix the appropriate level of precaution against risks of devastating injury by applying the standard of cost-justification. Inflicting death and devastating injury on some person or class of persons is only justified if doing so realizes some comparable value, some equally *urgent* benefit to some other person or class of persons. It is unfair to inflict even one death for the sake of trivial gains to others, no matter how numerous those others may be, and it is equally unfair to devastate even one person so that many people may reap trivial benefits.⁴⁴ Unrestricted cost-benefit analysis is incompatible with these convictions. Unrestricted cost-benefit analysis assumes that a sufficient *quantity* of any value, no matter how trivial that value may be *qualitatively* speaking, will suffice to justify devastating some human life. This assumption of universal comparability is mistaken.

The idea of comparable value provides a reason for moving beyond the point of cost-justified precaution (beyond the point of maximal benefit economically conceived) and explains why we might sometimes insist that risks be reduced to the safe or insignificant level

43. My point here is a conceptual one: Unrestricted cost-benefit analysis aims to compare all costs and benefits and counts them fungible at some ratio of exchange. In practice, cost-benefit analysis rarely, if ever, reaches as far. The practical application of cost-benefit analysis requires making choices about how widely to cast the net of "cost" and "benefit." On this, see KEETON ET AL., *TORT AND ACCIDENT LAW*, *supra* note 14, at 955-56 (distinguishing between "focussed" and "plenary" cost-benefit analysis). "The distinction has to do with how many factors are placed in the cost-benefit scales and weighed against one another." *Id.* at 955.

44. In practice, it may not be possible to protect single individuals. We may have to evaluate practices of risk imposition by estimating their impacts on representative persons. See *infra* notes 58-61 and accompanying text.

and other times insist only that risks be reduced to the feasible level.⁴⁵ Reducing risks of devastating injury beyond the point of maximal benefit (economically conceived) is justified when the potential gains are not morally comparable to the death or devastation that is their price. Reducing risks of devastating injury to the point where they are insignificant—the demand of safety-based regulation—is justified when the benefits of bearing a significant risk of devastating injury are not comparable, morally speaking, to the burdens. Reducing risks of devastating injury to the extent feasible without crippling the beneficial activity which generates the risks—the demand of feasibility analysis—is justified when crippling the activity in question would work a harm comparable to bearing a significant risk of devastating injury. Reducing risks only so far as feasible is fair when the long-run flourishing of the activity to which the risks belong is a good morally comparable to a significant risk of devastating injury.

Considerations of comparable value are not the only reasons we have to believe that the acceptability of some risk impositions should not be settled by appealing to the standard of cost-justification. When we are considering the burdens and benefits of some risk imposition (or some practice of risk imposition), we should be concerned with *the actual burdens borne by those affected by the risky practice at issue, not with maximizing the total values involved*.⁴⁶ Maximizing total utility is misguided even if one accepts utility as the appropriate unit of value, because what counts is the utility experienced by each sentient being and total utility is experienced by no one.⁴⁷ Maximizing wealth—the practice recommended by cost-benefit analysis—is misguided for the same reason. No single person reaps all of the benefits and bears all of the burdens of any social practice. The sum of those benefits minus those burdens is therefore an unreliable guide to the actual gains and losses of the persons affected by the practice.

The failings of cost-benefit analysis in this respect echo the failings of classical utilitarianism. Like classical utilitarianism, cost-

45. In general, cost-justified precaution is less protective of safety than feasible precaution, and feasible precaution is less protective than safe precaution is—but not always. Feasible precaution will be less protective of safety than cost-justified precaution when it is not cost-justified to engage in an activity in the first place. See *infra* text accompanying notes 172-79.

46. See SCANLON, *supra* note 29, at 229-41.

47. See, e.g., RAWLS, *supra* note 22, at 140:

[W]hen population is subject to change . . . [the principle of maximizing total utility] . . . entails that so long as the average utility per person falls slowly enough when the number of individuals increases, the population should be encouraged to grow indefinitely no matter how low the average has fallen . . . the sum of utilities added by the greater number of persons is sufficiently great to make up for the decline in the share per capita. As a matter of justice . . . a very low average level of well-being may be required.

benefit analysis fails to "take seriously the distinction between persons."⁴⁸ It aggregates incommensurable benefits and burdens *across persons*. It therefore makes the permissibility of various practices of risk imposition turn on the total value involved instead of the actual burdens and benefits borne by those affected by the practices in question, and it therefore permits trivial gains to many to justify devastating harms to a few. Avoiding these mistakes requires that we attend to both the commensurability of the costs and benefits being compared and the actual distribution of those burdens.

When significant risks of devastating injury are involved, both considerations of comparability and attention to the distribution of benefit and burden suggest reasons why we may wish to press precaution beyond the point of cost-justification. Concern with comparability should make us wary of taking only cost-justified precaution, because unrestricted cost-benefit analysis fixes the point of cost-justified precaution by counting costs and benefits that are not comparable to devastating injury in its calculus of value. It is therefore likely to overstate the benefits of devastating injury. Concern with the actual distribution of burdens and benefits among those affected should likewise lead us to be wary of cost-justified precaution. When significant risks of physical injury ripen into death and incurable disease, the benefits of going beyond the cost-justified level of precaution (and the burdens of failing to do so) are measured in terms of lives saved and incurable diseases avoided. To those who reap them, these are invaluable benefits. The *distributed* costs of going beyond the cost-justified point of precaution, by contrast, may well be small—perhaps very small—losses to large numbers of people. If we set the permissible level of chemical residue on fresh produce below the cost-justified level, for example, farmers may be unable to extract as much yield per acre of crop.⁴⁹ They may forgo profit, and consumers may pay higher prices as a result. Demanding that they forgo these profits, and that consumers pay slightly higher prices, may nonetheless be fair. No farmer, no farm laborer, and no consumer will die or acquire a devastating and incurable disease. They may each suffer no more than imperceptible losses, and none will suffer a loss comparable to death.

The fact that a particular level of pesticide residue on produce, or a particular level of benzene or cotton dust in a workplace,

48. See *id.* at 24.

49. Pesticide residue on agricultural products is one setting for the application of safety-based regulation. See *infra* notes 71-73 and accompanying text.

maximizes the wealth that society extracts from the activity at issue does not supply those who stand to lose their health or their lives with good reason to accept the level of risk that efficiency licenses. Society is extracting maximum advantage from the activity by putting them in peril of great and readily avoidable harm. If the sacrifice demanded of them might be avoided without imposing a comparable sacrifice on anyone else, the risk should be reduced. When avoiding great sacrifice on the part of a few requires only minor sacrifices on the part of many, many should make minor sacrifices. It is only fair to inflict devastating injuries on a few when the cost of avoiding those injuries is at least comparable to the cost of the injuries themselves.

The economic argument that it is irrational to press precaution beyond the point of cost-justification—because doing so will make everyone worse off—therefore rests on both an inadequate metric of interpersonal comparison and insufficient attention to the actual distribution of burdens and benefits. The metric of comparison is flawed because it treats the devastation of some as comparable to the receipt of trivial benefits by others—even though the two are not morally comparable. The focus on aggregate well-being is wrong because the economic surplus realized by taking only cost-justified precaution cannot be used to restore the lives or the health of those devastated by cost-justified risks.⁵⁰ No one experiences aggregate well-being, and death and devastation are beyond rectification by redistribution.

When attention to overall well-being licenses a level of risk imposition that devastates some for the sake of trivial gains to others, *irreparable* injustice is done. Redistribution of the wealth saved by not pressing precaution further will not make those who have been killed and devastated better off than they would have been had their death and devastation been avoided. They have been harmed beyond the power of redistribution to repair. When attention to overall well-being licenses a level of risk imposition that devastates some for the sake of trivial gains to others, the claim that cost-justified precaution makes

50. The argument that it is better to redistribute a surplus maximized by adopting the legal rule recommended by welfare economics than to effect a desirable distribution through the choice of a different rule *ab initio* is essential to Louis Kaplow and Steven Shavell's claim that "individuals will be made worse off overall whenever consideration of fairness leads to the choice of a regime different from that which would be adopted under welfare economics . . ." See Kaplow & Shavell, *supra* note 19, at 33-34 (footnotes omitted) ("[D]istributional objectives can often be best accomplished directly, using the income tax and transfer (welfare) programs . . . [R]edistribution through legal rules entails both the inefficiency of redistribution generally (due to adverse effects on work incentives) and the additional cost involved in adopting less efficient rules.").

everyone better off than they would otherwise be rings hollow.⁵¹ Well-being accrues to actual persons. Pressing precaution beyond the point of cost-justification will confer great benefits on some at the cost of trivial losses to others. Each person who benefits will gain far more than each person who loses. When pressing precaution beyond the point of cost-justification confers great benefits on some at the cost of only trivial losses to others, doing so is not only fair, it is also desirable insofar as well-being itself is of primary concern.

B. Fairness and Risk

Cost-benefit analysis emerges from the value-maximizing framework of economic thought. Its particular conception of value as the rational satisfaction of subjective preferences expressed in dollars connects it to the utilitarian tradition in political philosophy. The criticisms of cost-benefit analysis that this Article has voiced sound in fairness. The fact that these criticisms can be presented directly—without invoking any particular intellectual framework—testifies to the fact that the idea of fairness is a part of our shared moral vocabulary. But these criticisms draw implicitly on a particular conception of fairness, and that conception does emerge from a particular intellectual tradition—namely, the social contract tradition in political philosophy, broadly conceived. So we need both to make our conception of fairness more specific and to explain the intellectual framework from which it emerges.

The variant of the social contract tradition on which I shall draw conceives of persons as both rational and reasonable, with their rationality being conceived in a way which differs from the conception embedded in cost-benefit analysis. Persons are taken to be rational by virtue of their capacity to govern their actions in accordance with reason, of course, but reason is understood not just instrumentally—as the ability to determine how best to satisfy independently given preferences—but also practically—as the capacity to determine that certain reasons, purposes, ends, or preferences are worth acting on.⁵²

51. Death and devastating injury thus pose special problems for Kaplow and Shavell's claim that efficient precaution always makes everyone better off. When the repeated imposition of a justified risk is certain to result in at least one person's death, it is impossible to make "everyone better off." The person who dies is not made better off by his own untimely death. Risk impositions which result in death can be to the ex ante advantage of those they kill, but they do not make those they kill "better off." Ex ante advantage and actual well-being are different matters. See John Broome, *Trying to Value a Life*, 9 J. PUB. ECON. 91, 95 (1978).

52. The idea of practical reason goes back to Aristotle, who understood it to be concerned with the proper ends of human life. More generally, practical reason is reason concerned with

This capacity for “critically reflective, rational self-governance”⁵³ gives rise to a fundamental human interest in freedom—in being free to govern one’s life in accordance with one’s own value judgments.

Our fundamental interest in shaping our own lives means that we have an enormous stake in living within institutions that provide us with favorable circumstances for making our lives answer to our aspirations for them. Our capacity to realize our ends is deeply affected by the institutions within which we live, and deeply dependent on the cooperative efforts of others.⁵⁴ Our natural habitat is not Robinson Crusoe’s isolation on his island, but rather the society of others, whose cooperation in sustaining a common economy, society, and politics is essential to our own well-being and even to our ability to realize our particular ends. It is our capacity for reasonableness which makes cooperation with others on fair terms possible. We are reasonable agents by virtue of our sense of justice, our capacity for fair social cooperation with other free and equal, rational and reasonable persons. We have not just the capacity to cooperate with each other and to treat each other fairly, but also the fundamental interest in living together on terms of equal freedom and mutual respect.⁵⁵ Terms of equal freedom and respect express our fundamental moral status as free and equal persons.

To make our lives answer to our aspirations for them we need, among other things, a substantial measure of security—of freedom from accidental injury and death at the hands of others. John Stuart Mill remarked,

Security no human being can possibly do without; on it we depend for all our immunity from evil and the whole value of all and every good, beyond the passing moment, since

action and judgment oriented towards action. It contrasts both with theoretical reason, which is concerned with understanding, and with instrumental reason, which is concerned with the realization of ends taken as given (with the effective pursuit of independently given ends). See THE CAMBRIDGE DICTIONARY OF PHILOSOPHY 728 (Robert Audi gen’l ed., 2d ed. 1999); THE OXFORD DICTIONARY OF PHILOSOPHY 287, 296 (Simon Blackburn ed., 1994).

53. T.M. Scanlon, Jr., *The Significance of Choice*, in 8 THE TANNER LECTURES ON HUMAN VALUES 149, 175 (Sterling M. McMurrin ed., 1988).

54. The idea that, as Annette Baier puts it, “morality is a cooperative scheme” is not peculiar to views with a Kantian flavor. It is also, Baier asserts, endorsed by Mill and Hume among others. For Hume, morality is a “conjunction of forces”; for Mill, a “joining to make safe the very groundwork of our existence.” This idea of moral obligation as cooperative “all the way down,” so to speak, is rejected by libertarian views. See Baier, *supra* note 20, at 56-61, 57.

55. If the conception of society and morality as cooperative ventures sets Kantian liberalism apart from libertarianism, a commitment to equal freedom and mutual respect unites Kantian liberalism with more libertarian conceptions. See, e.g., CHARLES FRIED, RIGHT AND WRONG 28-29 (1978).

nothing but the gratification of the instant could be of any worth to us if we could be deprived of everything the next instant.⁵⁶

Our need for security, however, is only half the story. We also need a substantial measure of liberty—of freedom to put others at risk of physical harm in pursuit of our own ends—if we are to lead our own lives in accordance with our aspirations for them. When we act we put others at peril, even if only very slightly and even when we act with appropriate caution. If we cannot put others at peril—cannot endanger their security—we cannot act and so cannot pursue our ends and lead our lives. Maximal security extinguishes liberty, and maximal liberty extinguishes security. Yet substantial measures of both liberty and security are essential if we are to have the chance to make our lives answer to our aspirations.⁵⁷ Liberty and security are both essential conditions of effective rational agency. This is the dilemma at the heart of accident law.⁵⁸

When the law of accidents licenses the imposition of a risk, it enhances the freedom of some and imperils the security of others. Those who impose the risk are free to pursue ends and activities that they value, and their pursuit exposes others to risks of physical harm. When the law of accidents forbids the imposition of some risk, it does the reverse—it curbs the freedom of prospective injurers and enhances the security of potential victims. Risk impositions thus pit the liberty of injurers against the security of victims, and the law of accidents

56. JOHN STUART MILL, *UTILITARIANISM* 53 (Roger Crisp ed., 1998) (1861).

57. Although this conception of the problem of accidental harm has its roots in the social contract tradition in political theory, especially as articulated by John Rawls, “liberty” and “security” in the sense used here do not identify “primary goods” lexically superior to income and wealth in the manner of the liberties covered by Rawls’s first principle of justice. “Liberty” and “security” are general cover terms designed to characterize, at a fairly high level of generality, the stakes in accidental risk imposition. The burdens and benefits of risk include increases and losses in wealth and income, so there is no question of these freedoms being lexically prior to the primary goods of wealth and income. Thus, in judging the reasonableness of various risk impositions or liability rules, we should assess the significance of gains and losses in wealth and income in terms of their impacts on liberty and security.

58. It is possible to accept this account of the interests at stake in accidental risk impositions from an economic perspective. See, e.g., Geistfeld, *supra* note 10, at 138:

In the context of nonconsensual risky interactions, entitlements embody the legal resolution of how conflicting liberty and security interests should be mediated. Potential injurers have liberty interests in pursuing risky behavior that imposes risks on others, whereas potential victims have interests in their bodily security. The interests of the two parties conflict.

By accepting entitlements to liberty and security as its starting point, Geistfeld’s approach breaks with purely welfarist approaches within economics such as that taken by KAPLOW & SHAVELL, *supra* note 19, at 15-16. But Geistfeld’s approach to the problem of irreparable injury also differs fundamentally from the approach taken in this Article, because it uses cost-benefit analysis to determine the appropriate weighting of the security and liberty interests.

sets the terms on which these competing freedoms are reconciled. The task of the law of accidents is to reconcile liberty and security on terms that are both favorable and fair. Favorable terms provide advantageous conditions for people to pursue their ends, aims, and aspirations. The most favorable terms (if they exist) reconcile security and liberty in the unique way which provides the most auspicious terms for people to shape their lives in accordance with their aspirations. Fair terms reconcile the competing claims of liberty and security in ways that advantage even those they most disadvantage.

Each of us must individually judge how best to reconcile the pursuit of activities we value with the physical and psychological integrity that those activities can jeopardize. What ends are worth the risks they entail? Are the risks of death and disfigurement that are the price of scaling Mount Everest worth the sense of accomplishment that comes from standing on its summit? Are increased risks of cancer worth bearing as the price of performing pathbreaking medical research? Are increased risks of cancer worth bearing as the price of earning a living?

These questions of individual choice, however, differ fundamentally from the parallel questions of social choice. Individual choice is the domain of rationality, whereas social choice is the domain of reasonableness. The *rationality* of exposing oneself to a risk depends on the importance that one attaches to the end furthered by the exposure and the efficacy with which the exposure will further those values. The canons of rationality thus give wide rein to individual subjectivity and are naturally expressed in the language of efficiency. Individuals are free to value the burdens and benefits of risks by any metric they choose, and it is natural for them to value burdens and benefits by their own subjective criteria of well-being. It is also rational for individuals to run risks whenever, by their own lights, the expected benefits of so doing exceed the expected costs, and to decline to run risks whenever the expected costs exceed the benefits. It is not, however, *reasonable* for people to expose others to risks whenever—by the potential injurer's own criteria of value—the benefits of imposing the risk exceed the burdens of having to bear exposure to it.

Why does the rationality of risk imposition not guarantee its reasonableness? The circumstance in which we voluntarily expose ourselves to risks in the pursuit of our own ends is very different from the circumstance in which others involuntarily expose us to risks in the pursuit of their ends. The lives of different people cannot be collapsed into a single life that reaps both the burdens and the benefits of rational risk impositions, and the diverse aims and

aspirations of a set of free and equal people cannot be converted into a single scale which enables us to judge collectively as we do individually. In a world of distinct persons who affirm diverse and incommensurable conceptions of the ends worth pursuing over the course of a human life, there is no reason to assume that those who are put at risk value the ends pursued through the relevant risk impositions in the way that those imposing the risks do. The fact that you are prepared to run enormous risks for the advancement of medical knowledge does not mean that I am prepared to do so. The fact that I might be prepared to run enormous risks to scale K2 without oxygen does not mean that you are prepared to do so.

The difference between individual and social choice undermines the argument that a risk should be borne because it pursues a worthy end at an acceptable cost. Given the reasonable diversity of persons' aims and aspirations, the justification for accepting risk impositions by others is not common acknowledgment of some shared final end, but mutuality of benefit. It is reasonable to expose other people to risks of serious injury and even death when it is fair to do so; and it is fair to do so when they also stand to gain, *ex ante* and over time, from the imposition of those risks. Prospective victims may benefit from the imposition of risks upon them in either of two ways. First, victims may benefit because—*ex ante* and over a reasonable span of time—they will gain from the reciprocal right to expose others to equal risks. The right to impose risks *on* others can justify the imposition of equal risks on us *by* others, because, for example, we may each gain more than we lose from having to bear the risks created by the presence of other cars on the road. When potential injurers are also potential victims, and equally so, a "community of risk" is present and in its strongest form. Within a "community of risk," practices of risk imposition are fair if and when they are to the advantage of a representative member of the community. They are to the advantage of a representative member of the community when the liberty that she gains from the right to impose the relevant risks is more valuable to her than the security she loses from having to bear exposure to equivalent risk impositions at the hands of others. Each member of the community then has her security compromised by having to bear risks imposed by others, but each also has her liberty enhanced by the ability to impose risk on others. When the gains to each person's freedom outweigh the losses to each person's liberty, the imposition of risk benefits each member of the community. When this criterion is met, no one's life or limb is sacrificed to the greater good of others, and each member of the community has better life prospects

than she would if the practice of imposing the risk in question were forbidden.

The second kind of case may be illustrated by the practice of transporting large quantities of gasoline over the roads by tanker trailer. Given the importance of driving to our daily lives, we may all benefit from this method of transportation, even though it creates risks of massive explosion, and even though most of us never expect to make use of the legal right to transport gasoline in this manner.⁵⁹ Even residents of Manhattan, who may drive so infrequently that they gain far less than residents of Los Angeles do from this method of transporting gasoline, still may gain from the practice.⁶⁰ Their life prospects may be better by virtue of the prosperity created and sustained by the practice of transporting gasoline by tractor trailer, than they would be if that practice were prohibited. If so, the practice is to their advantage, and the risks it imposes upon them are fair. When risks are not imposed within a community of risk—when a discernible group bears more of the burden or garners less of the benefit of some practice of risk imposition—practices of risk imposition are fair when they work to the greatest long-run advantage of a representative member of the class of those most disadvantaged by the practice of risk imposition.⁶¹

In both of these circumstances—driving in general and transporting gasoline by tanker trailer in particular—some people exposed to the risky practice will suffer devastating injury, including

59. The transport of gasoline in this manner precipitated the death of the plaintiff's decedent in *Siegler v. Kuhlman*, 502 P.2d 1181, 1182-83 (Wash. 1972).

60. It is tempting to think that they are also exposed to proportionately less risk from this practice of transporting gasoline so that their lesser benefit is matched by lesser burden. But it is not clear to me that they are at much less risk from the practice. Tractor-trailers towing gasoline may create risks of especially great harm in the confined quarters and crowded spaces of Manhattan, even if there are fewer of them. The risks posed by tractor-trailers hauling gasoline may not diminish commensurately with the frequency of tractor-trailer trips.

61. In an early use of Rawlsian ideas in legal theory, Frank Michelman proposes a similar criterion for determining when compensation should be granted for a "taking" under the just compensation clause.

A decision not to compensate is not unfair as long as the disappointed claimant ought to be able to appreciate how such decisions might fit into a consistent practice which holds forth a lesser long-run risk to people like him than would any consistent practice which is naturally suggested by the opposite decision.

Frank Michelman, *Property, Utility, and Fairness: Comments on the Ethical Foundations of "Just Compensation" Law*, 80 HARV. L. REV. 1165, 1223 (1967). In "Fairness and Feasibility," in KEETON ET AL., *TEACHER'S MANUAL*, *supra* note 14, at 20-6 to 20-11 and "Rawlsian Fairness," *id.* at 20-11 to 20-12, Lewis Sargentich advances a fairness justification for feasible risk reduction. That justification owes much to Rawls and explicitly analogizes feasible risk reduction to the difference principle. This Article seeks both to build on Michelman's and Sargentich's fairness arguments and to incorporate the general Rawlsian idea of fairness that they articulate into the framework sketched in this section.

death. Over time, some people will reap the benefits of letting these risks be imposed, and others will bear the burdens. Because devastating risks are not fully compensable, the actual gains of those who win cannot be used to repair the harm done to those who lose, making the practices to the *actual* advantage of everyone they affect. Devastating losses will be concentrated on an unlucky class of victims. Over time, then, practices of devastating risk imposition must work to the severe disadvantage of some of those they affect. What can be said by way of justification to those who lose? The only answer is that the relevant practices of risk imposition were to their *ex ante* advantage and that their lives and limbs were not, therefore, sacrificed either to the general good, or to the lesser interests of others. There was no alternate way of reconciling liberty and security which would have improved their life prospects, and perhaps have avoided their devastation, without working a greater hardship on another class of persons.

More particularly, in the case of a "community of risk," we can say that there was no reconciliation of these two conditions of rational agency which would have improved the prospects of a representative member of the community *ex ante* (and so would have improved the circumstances of at least a few members *ex post*). In the case of a practice which puts some in particular peril, we can say that there was no reconciliation of these two essential conditions of rational agency that would have improved the prospects of those most disadvantaged by the reconciliation at issue, without imposing a greater disadvantage on a comparable class of those affected by the practice. When these criteria of *ex ante* advantage are met, the actual distribution of winners and losers will be more favorable than any alternate arrangement, but some will still lose, and lose devastatingly. The only consolation is that their lives were not taken unfairly.

To count for something important, *ex ante* advantage must, in general, turn into actual benefit, which raises the question of time: How soon must the actual benefit accrue? Much depends upon context, but the outer limit of a reasonable time period is generally the course of a normal life. The life prospects of those who are asked to bear the risks licensed by some practice of risk imposition are usually the longest reasonable touchstone of advantage. Were we to choose a longer touchstone, those disadvantaged by a particular practice of risk

imposition could not expect to reap the benefits of the risk impositions at issue.⁶²

Discussion of advantage and disadvantage requires criteria of interpersonal comparison. Questions of interpersonal comparison—of comparable value—are at the heart of the objections that we have voiced to fixing the level of precaution against risks of death and devastating injury by cost-benefit analysis. Cost-benefit analysis makes interpersonal comparisons of well-being by deploying a subjective conception of well-being. Benefit and burden are measured by inquiring into the preferences, as expressed in dollars, of those affected by the risk impositions at issue. The unrestricted use of subjective preference (whether or not it is expressed in dollars) is objectionable because it compares harms—death and inconvenience, for example—which are not comparable, morally speaking, and permits a sufficient quantity of trivial benefit to justify some irreparable injury.⁶³ Harms must be comparable in urgency and in the benefit or injury they work on the lives of those they affect before they may be traded against one another. The idea of subjective preference satisfaction expressed in dollars underlies cost-benefit analysis: What competing ideas underlie our discussion of urgency and moral comparability? How do these relate to “liberty” and “security”?

The idea that life should be sacrificed only for something of comparable value is a considered moral judgment which is not so much the product of a moral or political theory as data for it. So, too, is the judgment that it is unfair to sacrifice one person’s life to avoid inconveniencing millions of other people. But these judgments of comparability and fairness, like other considered judgments, invite theorizing. We do not know, intuitively, what these judgments imply in the way of criteria for permissible risk imposition, where the risks at question issue in irreparable injury. We therefore have reason to search for and articulate principles which can make sense of these judgments and guide our thinking in other cases. Social contract theory makes general sense of these judgments by supposing that judgments of comparable value must be based on objective criteria of interpersonal comparison, criteria whose touchstone is urgency, not preference. “Subjective” criteria of interpersonal comparison evaluate “the level of well-being enjoyed by a person in given material

62. There may be cases in which potentially massive burdens to future generations justify present ones in bearing some cost whose benefit will be reaped by others—perhaps present sacrifices should be made now to avoid massive environmental harm later, for example. These are special cases, and the criterion proposed here would have to be adapted to cope with them.

63. See *infra*. Note that the same point could be made by saying that cost-benefit analysis compares benefits that are not comparable, such as life saved and convenience.

circumstances or the importance for that person of a given benefit or sacrifice . . . solely from the point of that person's tastes and interests."⁶⁴ "Objective" criteria appraise burdens and benefits in terms that are "the best available standard of justification . . . mutually acceptable to persons whose [aims, ends, and] preferences diverge."⁶⁵ In a world in which people's ends are diverse and incommensurable, comparisons of well-being must be made on the basis of criteria that are independent of any particular ends or preferences and sensitive to the urgency of the claims at stake.

Freedom of action and security are "objective" criteria of interpersonal comparison, albeit highly abstract ones. Their importance does not depend on affirming any *particular* conception of the good or on holding any particular set of final ends and aspirations. Their importance depends on *having* ends and aspirations, and on having a fundamental interest in being able to realize those ends and aspirations over the course of a normal life span. Freedom and security are essential conditions for the pursuit of most of the ends of human beings, especially when we consider ends pursued over the course of a lifetime.

In comparing burdens and benefits to freedom and security we must ask how much the burdens and benefits disrupt or promote the capacity of those affected to pursue their ends and aspirations over the course of a normal life. Death and devastating injury are great burdens, whereas the inconvenience of missing an evening of "Baywatch" is not—no matter how subjectively intense someone's desire to watch "Baywatch" may be—because death and devastating injury interfere with our ability to realize our ends over the course of a life far more gravely than missing an evening of one's favorite television show.⁶⁶ Considerations of urgency underlie our judgments of comparability. In turn, these considerations rest tacitly on ideas about the course of a normal life and the conditions which favor its pursuit, on judgments about the relative importance of avoiding severe pain

64. Scanlon, *supra* note 30, at 656.

65. *Id.* at 668.

66. This is what Thomas Scanlon calls a "normalizing assumption." See Scanlon, *The Moral Basis of Interpersonal Comparisons*, *supra* note 30, at 382-83.

[W]e take it as given for purposes of moral argument that it is very important that what one wears and whom one lives with be dependent on one's choices and much less important that one be able to choose what other people wear, what they eat, and how they live. And we do this despite the fact that there may be some who would not agree with this assignment of values.

Scanlon, *supra* note 53, at 183.

and avoiding inconvenience, on ideas about the goods and conditions which enable us to pursue our ends, and so on.

The abstractness of these ideas sets a challenge for objective approaches to interpersonal comparison. That challenge is to “construct a more concrete conception of welfare in terms of particular goods and conditions that are recognized as important to a good life even by people with divergent values.”⁶⁷ Negligence law constructs more concrete conceptions by making “normalizing” assumptions—assumptions that children do not need the freedom to engage in adult activities but do need the freedom to engage in risky activities appropriate to their age and development, assumptions that the need of those with various disabilities to lead independent and self-sufficient lives justify the imposition of some extra burdens on others (e.g., the extra burden of coping with blind pedestrians assisted by seeing eye dogs and canes) but not other burdens (e.g., the burden of coping with blind automobile drivers). These judgments are socially contingent and contestable. Our sense of what activities are “age appropriate” varies from era to era, in accordance with shifts in our ideas about the course of normal human development and the ordinary capacities of children of various ages, changes in our ideas of acceptable risk, and so on. Our conceptions of just how much the “disabled” are capable of leading “normal” lives, and of just how much the “normal” must accommodate the disabled and vice-versa, also shift over time.

We may hope that shifts in our sense of “age appropriate” activities, and our sense of how far we should go to accommodate various disabilities, express progress. But whether or not they express progress, shifts in our ideas about the needs and capacities of children and the developmentally disabled affect our evaluations of the burdens and benefits of various kinds of risk imposition. Safety- and feasibility-based risk regulation likewise rest on tacit claims of comparable value which are similar both in their social contingency and in their contestability. Needs that are urgent in one period—the need for enough food to prevent malnutrition, for instance—may not be urgent in another. A fundamental task of this Article is to reconstruct the “concrete conceptions of welfare,” the “particular goods and conditions” which underpin and justify these statutory standards.⁶⁸

With this sketch of the fairness framework in hand, we are in a position to take up the details of safety- and feasibility-based risk

67. Scanlon, *The Moral Basis of Interpersonal Comparisons*, *supra* note 30, at 39.

68. *Id.*

regulation. Those details are complex, but the basic normative argument in support of these standards is not. Considerations of fairness and comparable value justify reducing risks of devastating injury to the point where they are insignificant—the demand of safety-based regulation—when the benefits of significant risk, like inconvenience, are trivial in comparison to the increase in death and devastating injury that is their price. Reducing risks of devastating injury as far as we feasibly can without crippling the beneficial activity which generates the risks—the demand of feasibility analysis—is justified when the long-run flourishing of the activity is a good morally comparable to a significant risk of devastating injury. The fairness rationale is the same in both cases: It is (presumptively) unfair to devastate a few for the sake of gains which are not comparable, morally speaking, to the hardship wreaked by death and devastating injury, no matter how many others may reap those gains and even if the total quantity of “benefit,” as measured by cost-benefit analysis, exceeds the total “cost” of the devastation that is its price. Protecting the fundamental interests of each person trumps maximizing aggregate well-being. Death and devastating injury may only be inflicted to avoid comparable harms to, or to confer comparable benefits on, others.

III. LEGAL STANDARDS: COST-JUSTIFIED, FEASIBLE, AND SAFE PRECAUTION

In comparison with negligence law's notion of reasonable risk imposition—a notion which is enormously rich, but also susceptible to a variety of plausible interpretations—the cost-justified, feasible, and safe standards of acceptable risk imposition are well defined.⁶⁹ They identify distinct levels of permissible risk imposition, and they stand in linear, vertical relation to one another:⁷⁰

Cost-justified risk reduction. Among these three standards, the cost-justification standard tolerates the most risk. Costs and benefits are aggregated, with the aim of minimizing the costs of paying for and preventing accidents, thereby maximizing the benefits extracted from the risky activity at issue. “Cost-benefit” analysis requires risks to be reduced to the point where the costs of further precautions exceed

69. My discussion here follows the presentation of these standards in *Cost-Assessment*, in KEETON ET AL., TORT AND ACCIDENT LAW, *supra* note 14, at 952-56, and his commentary on that note in KEETON ET AL., TEACHER'S MANUAL, *supra* note 14, at 20-5 to 20-6.

70. See Sargentich's comments in KEETON ET AL., TEACHER'S MANUAL, *supra* note 14, at 20-6.

their benefits. If the marginal costs of eliminating significant risks exceed the marginal benefits, significant risks will continue to exist.

Feasible risk reduction. The feasibility standard tolerates less risk. Feasibility analysis looks to achieve the lowest level of risk practically attainable, not the level of risk that minimizes the combined costs of injuries and their prevention, thereby maximizing the benefits of the risky activity at issue. Feasibility analysis requires the elimination of significant risks, when they can be eliminated without threatening the long-run health of the activity to which the risks belong. The costs of risk reduction matter, but only to the extent that those costs are sufficient to impair the long-run survival of the risky enterprise. Cost-justified risks are eliminated, so long as their elimination is compatible with the long-term flourishing of the activity at issue, and significant risks remain only if their elimination would threaten the survival of the activity.

Safe level of risk imposition. The safe-level standard tolerates the least risk. Safety-based regulations require risk to be reduced to a point where no “significant risk” of devastating injury remains. Applying the safe level standard therefore does not require any inquiry into the costs of risk reduction. All that it requires is a determination of the level at which the risk created by exposure to the regulated substance ceases to be “significant.”

The two standards which most interest us—the safety and feasibility standards—also have their characteristic domains of application.

A. *The “Safe” Level of Risk Imposition*

The safe-level approach is taken in some aspects of clean air, clean water, and pure food legislation, particularly regulation of toxic substances that may endanger public health. The Food Quality Protection Act of 1996⁷¹ is a case in point. The Act regulates the amount of pesticide that may be present on foods, both fresh and processed. It requires that tolerances for pesticide be set at a level that is safe, where “safe” means that “there is reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all dietary exposures and all other exposures.”⁷² Regulators are instructed to set limits that provide “an additional margin of safety” in light of the special susceptibility of

71. Food Quality Protection Act of 1996, Pub. L. No. 104-170, 110 Stat. 1489 (1996).

72. 21 U.S.C. § 346(b)(2)(A)(ii) (2000).

infants and children to harm from toxic substances.⁷³ Pesticide chemical residue on food is therefore permissible only to the extent that it is reasonably certain to harm no one, not even those unusually susceptible to harm.

Clean air regulation also incorporates safety-based regulation.⁷⁴ A provision of the Clean Air Act Amendments of 1990, for example, focuses on carcinogenic risks remaining after technology-based regulations for hazardous pollutants have been in effect for eight years.⁷⁵ If a numerically defined level of cancer risk has not been achieved by that point, the EPA is directed to issue additional regulations which will "provide an ample margin of safety to protect public health."⁷⁶ The regulatory aim behind these provisions is "to reduce lifetime excess cancer risks to the individual most exposed to emissions . . . to less than one in one million."⁷⁷ Some residual risk thus survives safe-level regulation. Requiring that "lifetime excess cancer risks to the individual most exposed to emissions" be reduced "to less than one in one million" expresses a judgment of significance.⁷⁸ A lifetime risk of cancer (from a regulated emission) that crosses the "one in a million" threshold crosses from the domain of insignificant risk into the domain of significant risk.

The emphasis on those most exposed to risk or those most susceptible to it—those most disadvantaged by the risks being regulated—is a recurring theme in safety-based regulation. Clean water regulation supplies a closely related example: the court in *Hercules, Inc. v. Environmental Protection Agency* insists on especially stringent precaution against grave harm, even though the chances of that harm materializing cannot be estimated.⁷⁹ The Federal Water Pollution Control Act Amendments of 1972, the court held, authorized health-based regulation of toxic effluents without consideration of "feasibility, achievability, practicability, economic impact, or cost," and addressed standards for determining permissible discharge levels for such toxins. EPA discharge standards, the court ruled, must provide an "ample margin of safety" and "protect against incompletely

73. § 346(b)(2)(C)(ii)(II).

74. For a clear statement that there are aspects of the Clean Air acts which leave no room for either feasibility- or cost-based objections to compliance, see *Union Elec. Co. v. Envtl. Prot. Agency*, 427 U.S. 246 (1976).

75. 42 U.S.C.A. § 7412(f) (2000).

76. § 7412(f)(2).

77. § 7412(f)(2)(A).

78. *See id.*

79. 598 F.2d 91 (D.C. Cir. 1978).

understood dangers to public health and the environment, in addition to well-known risks.”⁸⁰ The importance of safeguarding health trumps the goods with which it competes, and the well-being of those most imperiled comes to the fore. This is only natural: those most imperiled bear the greatest burden.

B. Feasible Risk Reduction

The feasibility approach also governs aspects of clean air and water regulation. The Clean Air Act, as amended in 1990, for example, provides that regulatory standards for hazardous air pollutants “shall require the maximum degree of reduction in emissions” that the EPA, “taking into consideration the cost of achieving such emission reduction,” determines to be “achievable.”⁸¹ Feasibility is also the touchstone of the Occupational Health and Safety Act of 1970,⁸² and it is in this context that it has received its most extensive application and judicial interpretation.

Feasibility-based regulation has a more complex structure than safety-based regulation. Feasibility analysis requires, first, the identification of “a significant [workplace] health risk”⁸³ and, second, an analysis of the feasibility of reducing that risk without crippling the activity that imposes the risk. Feasibility, in turn, has two aspects—a “technological” one and an “economic” one. Technological feasibility analysis asks: “What is the lowest level of risk technically attainable?” “How much could we reduce this risk if we single-mindedly set out to reduce it as much as possible?”⁸⁴ Economic feasibility analysis asks “What is the lowest level of risk whose costs can be borne by the activity that imposes the risk at issue?”⁸⁵ The aim

80. *Id.* at 104, 111.

81. 42 U.S.C.A. § 7412(d)(2) (2000).

82. 29 U.S.C.A. § 651(b) (2000).

83. *Indus. Union Dep't v. Am. Petroleum Inst.*, 448 U.S. 607, 614 (1980) (“The Benzene Case”):

We agree with the Fifth Circuit’s holding that § 3(8) requires the Secretary to find, as a threshold matter, that the toxic substance in question poses a significant health risk in the workplace and that a new, lower standard is therefore “reasonably necessary or appropriate to provide safe or healthful employment and places of employment.” Unless and until such a finding is made, it is not necessary to address the further question whether the Court of Appeals correctly held that there must be a reasonable correlation between costs and benefits, or whether, as the federal parties argue, the Secretary is then required by § 6(b)(5) to promulgate a standard that goes as far as technologically and economically possible to eliminate the risk.

84. See *Feasibility Analysis*, in KEETON ET AL., *TORT AND ACCIDENT LAW*, *supra* note 14, at 965, 965-66 (discussing technological feasibility prong of feasibility analysis).

85. See KEETON ET AL., *TORT AND ACCIDENT LAW*, *supra* note 14, at 953-54, 966-67 (discussing economic feasibility prong of feasibility analysis).

of feasibility analysis is to protect “worker health and safety within the limits of economic possibility.”⁸⁶ “Congress itself defined the basic relationship between costs and benefits [when it enacted the Occupational Health and Safety Act of 1970 with its feasibility standard], by placing the ‘benefit’ of worker health above all other considerations save those making the attainment of this ‘benefit’ unachievable.”⁸⁷ Feasibility analysis looks to achieve the lowest level of risk practically attainable.

Feasibility analysis shares with safety analysis the idea that a risk must be significant before it is subject to regulation. “Feasibility” is, however, a new idea. Let us, then, postpone detailed exploration of significance until we have fleshed out the two dimensions of feasibility—the technological and the economic.

1. Technological Feasibility

The technological side of feasibility analysis asks, as a matter of engineering technique, what is the lowest level of risk achievable by an ongoing activity. Any limit set on risk—a “permissible exposure level” (“PEL”) for a toxic substance, for example—must be technologically attainable. Technological achievability, however, is not fixed by the outer limit of technological possibility at a given moment in time, because the most advanced techniques of risk control in place at a given moment in time may fall well short of the frontier of technological feasibility. The frontier of technological feasibility is fixed not by the best present practice, but by the engineering practice that might be achieved through a dogged commitment to feasible risk reduction. A regulatory agency promulgating a feasibility-based risk regulation may therefore specify an acceptable level of risk lower than that attainable through the application of existing techniques, if the agency can reasonably predict that technical capability will advance sufficiently to make that level of risk reduction attainable within the time frame of the regulation.

In *American Iron & Steel Institute v. Occupational Safety and Health Administration*, for example, OSHA’s standard for coke oven emissions was upheld as technologically feasible even though “the most modern and clean coke oven battery operating” met the standard

86. See *United Steelworkers of Am., AFL-CIO-CLC v. Marshall*, 647 F.2d 1189, 1264 (D.C. Cir. 1980) (Wright, J.).

87. See *Am. Textile Mfrs. Inst., Inc. v. Donovan*, 452 U.S. 490, 509 (1982) (“The Cotton Dust Case”).

only one-third of the time.⁸⁸ Evidence of one-third compliance using less than all suitable technology—plus dramatic progress toward compliance at another plant after new engineering controls were implemented—showed sufficiently that the standard was not “impossible of attainment.”⁸⁹ The question was not what could be done at the moment, but “what the industry could achieve in an effort to best protect its . . . employees,” given a determination to exploit “technological potentialities.”⁹⁰ The court therefore approved OSHA’s reliance on “innovative technology currently in the experimental stage,” and its faith in new techniques “‘looming over the horizon.’”⁹¹

In *United Steelworkers v. Marshall*, Judge J. Skelly Wright gave the following summary of the concept of “technological feasibility”:

The oft-stated view of technological feasibility under the OSH Act is that Congress meant the statute to be “technology-forcing.” This view means, at the very least, that OSHA can impose a standard which only the most technologically advanced plants in an industry have been able to achieve—even if only in some of their operations some of the time. But under this view OSHA can also force industry to develop and diffuse new technology. At least where the agency gives industry a reasonable time to develop new technology, OSHA is not bound to the technological status quo. So long as it presents substantial evidence that companies acting vigorously and in good faith can develop the technology, OSHA can require industry to meet PEL’s never attained anywhere. . . .

As for [proof of] technological feasibility, we know that we cannot require of OSHA anything like certainty. Since “technology-forcing” assumes the agency will make highly speculative projections about future technology, a standard is obviously not infeasible solely because OSHA has no hard evidence to show that the standard has been met. More to the point here, we cannot require OSHA to prove with any certainty that industry will be able to develop the necessary technology, or even to identify the single technological means by which it expects industry to meet the PEL. OSHA can force employers to invest all reasonable faith in their own capacity for technological innovation, and can thereby shift to industry some of the burden of choosing the best strategy for compliance. OSHA’s duty is to show that modern technology has at least conceived some industrial strategies or devices which are likely to be capable of meeting the PEL and which the industries are generally capable of adopting.

Our view finds support in the statutory requirement that OSHA act according to the “best available evidence.” OSHA cannot let workers suffer while it awaits the Godot of scientific certainty.⁹²

The requirement of technological feasibility thus imposes stringent risk-reducing demands. It fixes the presumptively appropriate level of precaution not by reference to what is customarily

88. 577 F.2d 825, 832 (3d Cir. 1978).

89. *Id.* at 834.

90. *Id.* at 833-34.

91. *Id.* at 833, 835.

92. *United Steelworkers of Am., AFL-CIO-CLC v. Marshall*, 647 F.2d 1189, 1264-66 (D.C. Cir. 1980) (internal citations omitted).

done, nor even by reference to the best that is now done, but by reference to the best that *might* be done, given an *unstinting commitment* to the goal of feasible risk reduction.

2. Economic Feasibility

In *Portland Cement Association v. Ruckelshaus*, the court provided an explanation of the economic side of feasibility analysis.⁹³ The court interpreted language in the Clean Air Amendments of 1970 requiring "the degree of emission limitation achievable . . . taking into account the cost of achieving such reduction."⁹⁴ It held that this language did not require the EPA to undertake "a quantified cost-benefit analysis" in order to justify its air pollution standard for new or modified cement plants.⁹⁵ The EPA's conclusion that the cement industry could absorb the cost of control devices without detriment to competition between cement and substitute products, even though some plants might have to close, sufficed to answer the "essential question" under the Act: "whether the mandated standards can be met by a particular industry for which they are set."⁹⁶ Judgments of economic feasibility require "cost-assessment," but they do not require "cost-benefit analysis."⁹⁷ Indeed, insofar as the criterion of cost-justified precaution requires less precaution than the criterion of economic feasibility does, the criterion of economic feasibility rejects the criterion of cost-justification outright.

Provisions of the Clean Water Act, which mandate pollution control to the extent "technologically and economically achievable,"⁹⁸ also illustrate the economic side of feasibility-based regulation. The Clean Water Act subjects water pollution sources to two different sorts of effluent limitations: those based on "the best practicable control technology currently available" ("BPT"), and those based on "the best available technology economically achievable" ("BAT").⁹⁹ The BPT standard generalizes "the best existing performance" in an industry—"control practices in exemplary plants"—despite an expectation of "economic hardship, including the closing of some plants."¹⁰⁰ The BAT

93. 486 F.2d 375 (D.C. Cir. 1973).

94. *Id.* at 378 (citations omitted).

95. *Id.* at 387.

96. *Id.* at 389.

97. *Id.* at 387.

98. 33 U.S.C. §§ 1311(b)(2)(A), 1314(b)(2)(B), 1317(a)(2) (2000).

99. § 1311(b)(2)(B).

100. *EPA v. Nat'l Crushed Stone Ass'n*, 449 U.S. 64, 76 n.15, 79 (1980).

standards are more stringent. They require "a commitment of the maximum resources economically possible to the ultimate goal of eliminating all polluting discharges."¹⁰¹ The setting of BPT standards involves "cost-benefit analysis," but cost-benefit analysis is not part of BAT determinations. In determining the economic achievability of a technology, the EPA must consider "the 'cost' of meeting BAT limitations, but need not compare such cost with the benefits of effluent reduction."¹⁰²

For "economic feasibility" analyses, then, the ultimate question is not whether costs are outweighed by benefits, but whether the industry is able to bear the cost. Economic feasibility regulation by OSHA means "protecting worker health and safety within the limits of economic possibility."¹⁰³ Judge Skelly Wright again explains:

The most useful general judicial criteria for economic feasibility come from Judge McGowan's opinion in *Industrial Union Department, AFL-CIO v. Hodgson*.¹⁰⁴ A standard is not infeasible simply because it is financially burdensome, or even because it threatens the survival of some companies within an industry:

Nor does the concept of economic feasibility necessarily guarantee the continued existence of individual employers. It would appear to be consistent with the purposes of the Act to envisage the economic demise of an employer who has lagged behind the rest of the industry in protecting the health and safety of employees and is consequently financially unable to comply with new standards as quickly as other employers. . . .

A standard is feasible if it does not threaten "massive dislocation" to, or imperil the existence of, the industry. No matter how initially frightening the projected total or annual costs of compliance appear, a court must examine those costs in relation to the financial health and profitability of the industry and the likely effect of such costs on unit consumer prices. . . . [T]he practical question is whether the standard threatens the competitive stability of an industry, or whether any intra-industry or inter-industry discrimination in the standard might wreck such stability or lead to undue concentration.

[A]s for [proof of] economic feasibility, OSHA must construct a reasonable estimate of compliance costs and demonstrate a reasonable likelihood that these costs will not threaten the existence or competitive structure of an industry, even if it does portend disaster for some marginal firms.¹⁰⁵

In the *Cotton Dust Case*, both the court of appeals and the Supreme Court upheld OSHA's assessment of economic feasibility.¹⁰⁶

101. *Id.* at 74.

102. *Rybachek v. EPA*, 904 F.2d 1276, 1290-91 (9th Cir. 1990).

103. *United Steelworkers v. Marshall*, 647 F.2d 1189, 1264 n.102 (D.C. Cir. 1980) (Wright, J.).

104. 499 F.2d 467 (D.C. Cir. 1974) (addressing the OSHA asbestos standard).

105. *Id.* (internal citations omitted).

106. *AFL-CIO v. Marshall*, 617 F.2d 636, 659-62 (D.C. Cir. 1979), *aff'd in part and vacated in part*, *Am. Textile Mfrs. Inst., Inc. v. Donovan*, 452 U.S. 490, 522-36 (1981).

OSHA had concluded that “ ‘compliance with the standard is well within the financial capability’ ” of the cotton industry.¹⁰⁷ The agency noted that “although some marginal employers may shut down rather than comply, the industry as a whole will not be threatened.”¹⁰⁸ Both courts agreed that OSHA had shown that the industry would be able to absorb the projected costs. Regulatory requirements remain economically feasible, the court of appeals wrote, even though they “impose substantial costs on an industry . . . or even [though they] force some employers out of business,” as long as they are not “prohibitively expensive” and do not make “ ‘financial viability generally impossible.’ ”¹⁰⁹ The cotton dust controls fit “the plain meaning of the word ‘feasible,’ ” the Supreme Court wrote, given OSHA’s conclusion “ ‘that the industry will maintain long-term profitability and competitiveness.’ ”¹¹⁰

3. Significance

Feasibility analysis, like safety analysis, requires the identification of “significant risks” of “health injury.”¹¹¹ What makes a risk “significant” and why should significant risks be singled out for special treatment? The significance requirement receives its canonical exposition in the *Benzene Case*.¹¹² Writing for the court, Justice Stevens agreed with the Fifth Circuit’s holding that

§ 3(8) [of the Occupational Health and Safety Act of 1970] requires the Secretary to find, as a threshold matter, that the toxic substance in question poses a significant health risk in the workplace and that a new, lower standard is therefore “reasonably necessary or appropriate to provide safe or healthful employment and places of employment.”¹¹³

Unless and until such a finding is made,” the requirement that the risk be reduced as far as technologically and economically feasible is

107. *Donovan*, 452 U.S. at 531 (citation omitted).

108. *Id.*

109. *Marshall*, 617 F.2d at 655, 661 (citing *Indus. Union Dep’t v. Hodgson*, 499 F.2d 467, 478 (D.C. Cir. 1974)).

110. *Donovan*, 452 U.S. at 530 n.55, 531 (citations omitted).

111. Safety-based risk regulation requires the elimination of significant risks, whereas feasibility-based regulation only requires the elimination of such risks if feasible.

112. *Indus. Union Dep’t v. Am. Petroleum Inst.*, 448 U.S. 607, 639-59 (1980).

113. Section 3(8) of the Act provides:

The term “occupational safety and health standard” means a standard which requires conditions, or the adoption or use of one or more practices, means, methods, operations, or processes, reasonably necessary or appropriate to provide safe or healthful employment and places of employment.

29 U.S.C. § 652(8) (2000).

not triggered.¹¹⁴ Justice Stevens rejected OSHA's contention that no significance requirement was necessary:

If the purpose of the statute were to eliminate completely and with absolute certainty any risk of serious harm, we would agree that [OSHA's approach] would be proper But we think it is clear that the statute was not designed to require employers to provide absolutely risk-free workplaces whenever it is technologically feasible to do so, so long as the cost is not great enough to destroy an entire industry. Rather, both the language and structure of the Act, as well as its legislative history, indicate that it was intended to require the elimination, as far as feasible, of significant risks of harm.

By empowering the Secretary to promulgate standards that are "reasonably necessary or appropriate to provide safe or healthful employment and places of employment," the Act implies that, before promulgating any standard, the Secretary must make a finding that the workplaces in question are not safe. But "safe" is not the equivalent of "risk-free." There are many activities that we engage in every day—such as driving a car or even breathing city air—that entail some risk of accident or material health impairment; nevertheless, few people would consider these activities "unsafe." Similarly, a workplace can hardly be considered "unsafe" unless it threatens the workers with a significant risk of harm.

Therefore, before he can promulgate *any* permanent health or safety standard, the Secretary is required to make a threshold finding that a place of employment is unsafe—in the sense that significant risks are present and can be eliminated or lessened by a change in practices.¹¹⁵

"Significance" appears to have two principal aspects.¹¹⁶ First, the risk must be salient—it must be distinguishable from other risks associated either with the activity in question or with social life in general.¹¹⁷ It must stand out among its fellow risks. Second, to be significant, when a risk ripens into harm it must inflict a severe injury, a devastating injury, the kind of injury that seriously impairs ordinary life.¹¹⁸ It seems natural to suppose that the same basic ideas underlie the concept of significance as it is used in safety-based risk regulation. Beyond these two points, however, just how to interpret "significance" is a difficult question. Is significance a purely quantitative notion? Some numerical threshold combining magnitude and probability? Or is it a more qualitative and contextual judgment, one which depends on the distinctive features of the context in which it arises? May the numerically same risk of death be significant in the workplace, but trivial in an extreme sport? May risks of equivalent probability and magnitude in one sense—equal risks of death, for example—vary in significance if one way of dying is more widely feared than another?

114. 448 U.S. at 614.

115. 448 U.S. at 671-72 (Rehnquist, J., concurring).

116. See KEETON ET AL., TEACHER'S MANUAL, *supra* note 14, at 20-7.

117. *Id.*

118. *Id.* at 20-8.

Significance is measured by a purely quantitative criterion at least some of the time. The amendments to the Clean Air Act of 1990, for example, aim "to reduce lifetime excess cancer risks to the individual most exposed to emissions . . . to less than one in one million."¹¹⁹ But the concept of significance cannot be exhausted by any purely quantitative criterion. For one thing, the relation of significance to serious injury—to devastating injury—builds qualitative evaluation into the concept of significance. Devastating injuries are ones which impair normal functioning—normal life—in ways which cannot be repaired, and "normal life" is an evaluative idea. Even the purely quantitative criterion of significance employed by the 1990 Amendments to the Clean Air Act operates against a background in which the gravity of the harm being considered has already been fixed qualitatively in this way. Cancer is generally a serious disease—a disease quite capable of inflicting death and devastating injury—and that is enough to establish that we have especially urgent reason to reduce the incidence of such harm.

Significance eludes purely quantitative measure for another reason as well: Significant risks are salient ones, and salience is a matter of standing out. Salient phenomena stand out in a context, against some background.¹²⁰ Salient risks are prominent ones, risks which jut out in the context of the activity subject to regulatory scrutiny. *Probability* of harm can be expressed by a purely quantitative measure—by a number—but the significance of a particular probability of harm depends in part on the background against which (or the context within which) that probability is framed. That background or context can be general or particular, or general in some ways and particular in others. Particular risks of cancer, for example, can involve the general risk of contracting the disease, the general risk of contracting that particular cancer, or the other risks of some occupation, and so on.

Consider the Clean Air Act Amendments of 1990. The significance of the risk of cancer addressed by those amendments is dependent in this way on some background. Discussion of "excess cancer risks" presumes a preexisting risk of cancer, a risk independent of exposure to the particular emission being appraised. The idea of "excess risk" implies the idea of "background risk," of cancer risk independent of exposure to any particular carcinogen (though not

119. See *supra* note 77 and accompanying text.

120. As Lewis Sargentich puts it: "The risk to be averted must be . . . noteworthy in comparison with other risks of the same activity that might also be reduced further by costly measures." KEETON ET AL., *TEACHER'S MANUAL*, *supra* note 14, at 20-7.

necessarily independent of exposure to all of them). The Clean Air Act's one-in-a-million threshold for "excess risk" thus defines an acceptable level of increased risk for a harm whose gravity we have already largely agreed upon, and of which there is a preexisting incidence. Why fix on "one in a million" as the threshold separating acceptable increases in excess risk from unacceptable ones? Three reasons readily come to mind. First, we already face greater threats in our daily lives—the annual risk of death by automobile accident, for example is one in six thousand, and the annual risk of death from cancer is a little less than one in two hundred.¹²¹ Given these other threats, we feel justifiably comfortable entirely disregarding excess risks of cancer less than one in a million—in treating them as functionally equivalent to no risk at all.¹²² Second, because the background risk of cancer is alarming, and we are eager not to see it increase. Third, "one in a million" has a natural prominence—a salience—as a measure of significance arbitrary in its exactitude but reasonable in its general order of magnitude. Who would fix on one in 997,832?¹²³

To see more clearly just how and why the concept of significance cannot be exhausted by purely quantitative criteria, consider the risk of gas tank explosions in automobile accidents—the subject of the famous Ford Pinto case.¹²⁴ Risks of gas tank explosions strike us, intuitively, as prominent risks of driving. Among the myriad risks of automobile accidents, the dangers of fire and explosion stand out. The explosive potential of gasoline makes it especially dangerous. Most of us imagine that it is particularly horrible to be burned to death, and many of us may think it worse still to survive a terrible fire horribly disfigured. These judgments involve assessments of

121. NAT'L CANCER INST., 2001 CANCER PROGRESS REPORT 53 (2001) (noting that the annual risk of dying of cancer, as of 1998, was 471 in 100,000), available at http://progressreport.cancer.gov/additionalMaterials/sectionPDFs/NCI_CPR2001.PDF. There are 15.23 automobile accident fatalities for every 100,000 people. NAT'L HIGHWAY SAFETY ADMIN., TRAFFIC SAFETY FACTS 2000, at 2 (2001), available at <http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/TSF2000/2000ovrfacts.pdf>.

122. "The term 'reasonable certainty of no harm' means an increased risk of cancer to an individual exposed over a lifetime of no more than one in a million." S. REP. NO. 103-349 § 501 (1994).

123. Kathryn A. Kelly and Nannette C. Gordon's critical account of the origins of the one-in-a-million standard lends some support to this hypothesis. They trace the standard to a one in 100 million number two scientists "pulled . . . out of a hat" in a 1961 article attempting to define when exposure to a substance could be considered "safe." The FDA adopted that number in a 1973 notice in the Federal Register, and changed it to one in 1 million by the time that the final rule was issued in 1977. Kathryn A. Kelly and Nanette C. Gordon, *The Myth of 10-6 as a Definition of Acceptable Risk*, EPA WATCH, Sept. 15, 1994.

124. *Grimshaw v. Ford Motor Co.*, 119 Cal. App. 3d 757 (Cal. Ct. App. 1981).

magnitude which might be expressed quantitatively: people might be able to rank injury by gasoline explosion on a scale with other possible injuries from automobile accidents, and we might be able to assign a number to the relative disvalue that they place on such injuries. But a judgment that the risks of gasoline tank failure are a significant risk of driving is a comparative one, in part, and this comparison cannot be made without attending to context. The difference in significance of risks of gas tank explosions in motorcycles and cars, respectively, illustrates this point.

The numerical risk of gasoline tank explosions is equal in motorcycles and in passenger cars, and the risks of gas tank explosions may well be more dangerous in motorcycles,¹²⁵ since riders are both closer to and less protected from their gas tanks.¹²⁶ Does it follow that the risk of gas tank explosions is as significant for motorcycles as it is for passenger cars? It seems unlikely to me that it does. Even if gas tank explosions are equally frequent and more dangerous in motorcycles than in passenger cars, the risk of gas tank explosion is qualitatively more significant in passenger cars. The risks associated with motorcycle gas tanks are framed by the heightened risks characteristic of motorcycles. The exposed character of motorcycle riding, and the relatively small size of motorcycles in comparison with cars and trucks, expose motorcyclists to a host of other substantial risks—to greater-than-normal risks of being crushed by collisions with other vehicles, greater-than-normal risks of being thrown from their cycles, and greater-than-normal risks of severe head trauma, to name just three. Risks of gasoline tank explosion do not stand out as comparably salient—comparably significant—in such company.

The heightened risks of gas tank explosion in passenger cars—Ford Pintos, for example—are, by contrast, salient, gratuitous, and unexpected in just the way that the risks of gas tank explosion in motorcycles are not. Ford Pintos were family cars: children rode in their back seats. Pinto purchasers sought, implicitly, a higher level of safety than motorcyclists. Implicit in the purchase of a subcompact

125. In both passenger cars and motorcycles there is a 0.1% chance of a fire occurring. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., TRAFFIC SAFETY FACTS 2000, at 66 (2001), available at <http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/TSFAnn/TSF2000.pdf>.

126. "Per vehicle mile traveled in 1999, motorcyclists were about 18 times as likely as passenger car occupants to die in a motor vehicle traffic crash and 3 times as likely to be injured." NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., TRAFFIC SAFETY FACTS 2000: MOTORCYCLES 2, available at <http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/TSF2000/2000mcyfacts.pdf>. In 1999, there were 23.5 fatalities for every 100 million vehicle miles traveled by motorcycle, but only 1.3 fatalities for every 100 million vehicle miles traveled by passenger car. *Id.*

family sedan is a desire to reduce the risks of private automotive transportation, consistent with the constraints imposed by the fact that the car being purchased is a comparatively inexpensive subcompact. In this context, the risks of gas tank fires stand out, quite independent of any hidden flaw in the car. For people who are trying to keep their children safe, the risks of an automobile's gas tank are especially salient. Gasoline explosions threaten horrible deaths, horrible disfigurements, and terrible psychological trauma.¹²⁷ These characteristics make the risks of gas tank explosion in subcompact cars qualitatively significant in a way that risks from motorcycle gas tanks are not, even if those risks are quantitatively much greater.

The significance of a risk, then, is not fundamentally a quantitative matter, a matter of statistical probability, and magnitude measured quantitatively. Significance depends on both gravity and salience. Determining the gravity of a risk requires evaluative and qualitative judgments—judgments about how much we should fear a particular kind of harm or harms, how much a particular harm impairs the pursuit of a normal life, how bad it would be to live with that harm, and so on. Determining the salience of a risk requires not just an appraisal of the risk's numerical probability, but also an evaluation of how prominent the risk is in comparison to the other risks of an activity, how expected it is, how gratuitous it is, and so forth.

IV. JUSTIFICATION: THE MORAL BASIS OF SAFETY- AND FEASIBILITY-BASED RISK REGULATION

Safety- and feasibility-based risk regulation raise three basic questions. First, why should we push beyond the cost-justified level of safety, beyond the point of maximum benefit, economically conceived? Second, if we should push beyond the cost-justified level of safety, why should we eliminate only significant risks of physical injury? Why not eliminate all risks of physical injury? Third, why should we sometimes require the elimination of all significant risks of injury and other times require only the elimination of those significant risks whose elimination is feasible? Why are we prepared to shut down some activities that cannot be made safe, but not others?

127. The specific facts of the Pinto's design made the failure of its gas tank even more salient. In comparison with other subcompact cars, the design of the Pinto's gas tank was singularly inferior, no functional necessity justified its inferiority, and that inferiority came as a shock and surprise to the owners and users of Pintos, who had no reason to think that they were purchasing a substandard subcompact. See Schwartz, *supra* note 10, at 1031-32.

A. *Why Demand More-than-Cost-Justified Precaution?*

Reasons of fairness, I have argued, justify pressing precaution beyond the point of cost-justification.¹²⁸ It is unfair to inflict even one death for the sake of trivial gains to others, no matter how numerous those others may be, and it is equally unfair to devastate even one person so that many people may reap trivial benefits. Unrestricted cost-benefit analysis is incompatible with these convictions. Unrestricted cost-benefit analysis assumes that all burdens and benefits are fungible at some ratio of exchange, so that a sufficient *quantity* of any benefit will suffice to justify the infliction of devastating injury, no matter how trivial that benefit may be *qualitatively* speaking. If enough people stand to be disappointed by the termination of a television show, terminating the life of a television technician may be preferable to terminating the broadcast of the show. Terminating the life of a television technician may maximize both wealth and utility.

This assumption of universal comparability is mistaken. Not everything is morally comparable to death and devastating injury. No amount of inconvenience, for example, can justify inflicting a devastating injury on someone. The existence of discontinuities of value—the fact that not everything is comparable in value to undevastated human life—gives us reason to reject unrestricted cost-benefit analysis and to refuse to fix the appropriate level of precaution against risks of devastating injury by applying the standard of cost-justification. Inflicting death and devastating injury on some person or class of persons is only justified if doing so realizes some comparable value, some equally *urgent* benefit to some other persons or class of persons. We therefore have good reason to press precaution beyond the point of maximal benefit, economically conceived, when the gains to be won are not morally comparable to the death or devastation that is their price.

Concern with the actual distribution of burdens and benefits among affected persons buttresses the case for moving beyond the point of cost-justified precaution. When significant risks of physical injury ripen into death and incurable disease, the benefits of going beyond the cost-justified level of precaution (and the burdens of failing to do so) are measured in terms of lives saved and incurable diseases avoided. To those who reap them, these are invaluable benefits. The *distributed* costs of going beyond the cost-justified point of precaution,

128. See *supra* Part II.A.

by contrast, may well be small—perhaps very small—losses to large numbers of people. The fact, then, that a particular level of pesticide residue on produce, or a particular level of benzene or cotton dust in a workplace, maximizes the wealth that society extracts from the activity at issue does not supply those who stand to lose their health or their lives with good reason to accept the level of risk that efficiency licenses. Society is extracting maximum advantage from the activity by putting them in peril of great and readily avoidable harm. If the sacrifice demanded of them could be avoided without imposing a comparable sacrifice on others, then the risk should be reduced. When avoiding great sacrifice on the part of a few requires only that many shoulder modest burdens, many should shoulder modest burdens. Devastating injuries are worth tolerating only if we must give up something of comparable value to eliminate them.

B. Justifying the “Significance” Requirement

Considerations of fairness and comparable value justify moving beyond the cost-justified level of precaution when risks of devastating injury are at issue and justify both safety- and feasibility-based regulation in broad outline. But by themselves they do not justify the two central and striking characteristics of safety-based regulation. First, that standard requires safety but not absolute safety. Both the 1990 Amendments to the Clean Air Act¹²⁹ and the Supreme Court’s opinion in the *Benzene Case*¹³⁰ make clear that the elimination of significant risk is not the same as the elimination of all risk. So the safe level of risk is not the same as “no risk.” Second, safety-based regulation is all risk evaluation and no cost assessment. Significant risks must be reduced until they are insignificant, without regard to cost, but insignificant risks are tolerated, again without inquiring into the cost of eliminating them. These features of the statutory standard raise a number of questions: Why draw the line at significance? Why not eliminate all risks of devastating injury? Why ignore all of the costs of eliminating significant risks? If we are prepared to eliminate “significant risks” without regard to cost, why should we refrain from eliminating insignificant risks without so much as inquiring into the costs of doing so?

129. See *supra* notes 74-78.

130. 448 U.S. 607 (1980).

1. Why Does Safety-Based Risk Regulation Leave “Insignificant” Risks of Devastating Injury Untouched?

Safety-based risk regulation is particularly stringent. As familiar as we are with cost-benefit analysis, and its insistence on balancing costs and benefits so as to extract the greatest possible benefit from risky but valuable activities, we can hardly help but be struck by the fact that categorical judgments of significance push risk-reduction beyond the point of maximal benefit, economically conceived. But the doctrine has a lax side as well—it leaves insignificant risks entirely untouched—and this lenient side is equally noteworthy. Why should a standard which forbids trading safety against costs above some threshold level of risk have a threshold to begin with? Even insignificant risks of devastating injury are risks of devastating harm. A lifetime excess cancer risk of less than one in a million is still a risk of a devastating disease, and devastating disease, when it materializes, wreaks havoc in our lives. At worst, it ends life prematurely and traumatically. At best, it impairs life severely, foreclosing the pursuit of certain activities and ways of life, seriously hampering the pursuit of others, and often leaving us with enduring, agonizing pain and suffering. The fact that it impairs our lives so seriously is, after all, what makes devastating harm devastating. Why, then, should we tolerate any risk of such harm?

An answer to that question lies in the fundamentals of the predicament we explored earlier.¹³¹ We each have various aims, ends, and aspirations to pursue over the course of our lives. We may each expect, with decent luck, to pursue our aims and aspirations over the course of normal life spans. To effectively pursue our aims and aspirations over the course of complete lives, however, we need both freedom to act (liberty) and freedom from physical harm (security). Liberty and security are preconditions of rational agency. Like Rawls’s primary goods, liberty and security are things that we each need if we are to realize any aims or aspirations. “Liberty” is essential because we cannot survive without acting, yet “security” is equally essential. Physical injury can end our lives prematurely or leave us permanently impaired in ways that prevent us from pursuing many valuable ends and aspirations, and even injuries which do not kill or permanently harm us may disrupt our lives in ways that utterly upend our life plans.

131. See *supra* notes 56-58 and accompanying text.

Our predicament is that liberty and security conflict. Risk of physical harm—diminished security—is the by-product of action. Diminished liberty is the price of increased security. We cannot farm or build or drive or fly—or mill cotton and refine benzene—without taking and imposing risks of devastating injury. Forgoing all activity would itself be a short path to death, and even if death could somehow be avoided, forgoing all activity would cripple the pursuit of our aims and aspirations as surely and severely as devastating physical injury does. A world in which no one moves is a world in which few, if any, aims, ends, and aspirations can be realized, and few, if any, lives can be led. *Some* risk of devastating injury is the price of activity. These risks are the “background risks of social life.”¹³² The only way to eliminate them is by bringing activity to a halt. Some “background” risks are typical of social life in general; they are not the price of any particular activity but of “activity” in general. Other background risks are typical of particular activities; they are the price of engaging in those activities. Background risks are acceptable—worth bearing—because eliminating them works even more harm to our ability to lead the lives we wish to lead than bearing them does, even though these risks are sure to result in some devastating injuries.

The fact that a low level of risk of devastating injury—the background level of risk—is an inescapable price of activity explains why a significance requirement must be introduced, implicitly or explicitly, to even the most stringent standards of risk regulation. The background level of risk must be accepted even though that level results in some devastating injuries, because some risk of devastating injury is the price of activity and activity is worth having. Before we attempt to reduce a risk we must, then, first conclude that it crosses the threshold which separates eliminable risks from uneliminable ones. We must decide if the risk in question crosses a threshold of “significance.”¹³³ Without a significance requirement, safety-based risk regulation would be self defeating. One essential condition for leading a worthwhile life—liberty—would be destroyed in the name of securing another essential condition—security.

132. See KEETON ET AL., TEACHER'S MANUAL, *supra* note 14, at 20-8 (“Safety means that no significant risk remains. But safety is not attainable, by assumption, unless valuable activity ceases.”); Keating, *supra* note 7, at 350-52 (discussing a “mutually imposed and mutually beneficial level of background risk” consisting of “very, very low probability risks” that are “simply the price of freedom to act”).

133. See *supra* Part III.B.3 (discussing the nature and role of the significance requirement).

2. Why May We Inflict "Insignificant" Risks of Devastating Injury for Trivial Reasons?

The inevitability of background risks presents a problem for our critique of cost-benefit analysis. I have faulted unrestricted cost-benefit analysis because it licenses the infliction of devastating injury on a few for the sake of trivial gains to many.¹³⁴ I have argued that, when trivial gains to a large number of persons stand on the credit side of the balance sheet and devastating harms to a few stand on the debit side, the imposition of the risks in question should be forbidden. No number of trivial gains to some can ever compare to a single devastating injury to another. The gains and the losses are simply not comparable, morally speaking. Our willingness to tolerate background risks of devastating injury, however, suggests that we sometimes do inflict devastation on a few for the sake of trivial gains by many. When we count certain risks of fire among the background risks of life, we countenance some incidence of death and disfigurement, and some of that death and disfigurement will be occasioned by trivial gains to others. When we count a risk which inflicts devastation on a very few a "background risk of life," are we not countenancing the infliction of devastating injury for the sake of trivial gain—for the sake of inconsequential profit? If so, must not either our critique of cost-benefit analysis or our toleration of background risk be mistaken?

The argument seems even stronger if we reflect once more on driving. Driving is the riskiest of our ordinary activities. A normal American driver exposes herself to an annual risk of death of approximately one in six thousand.¹³⁵ This, surely, is a significant risk of devastating injury. A driver subject to a one in six thousand annual risk of death is subject, over the course of a normal lifespan, to a lifetime risk of death by driving of one in seventy-five. If a lifetime excess risk of cancer of one in one million is "significant," a lifetime risk of death of one in seventy-five is much more than significant. Yet, precisely because driving is so essential to normal American life, we routinely take to the road in pursuit of trivial ends—to get to work, to go to the market, to rent videos, to take our children to softball practices, and so on. Yet each time we drive, we impose a risk of devastating injury.¹³⁶ How can this be justifiable? How can such trivial ends justify the infliction of a substantial amount of devastating injury?

134. See *supra* Part II.A.

135. NAT'L HIGHWAY SAFETY ADMIN., TRAFFIC SAFETY FACTS 1999 (2000).

136. There are 1.5 deaths per 100 million vehicle miles traveled. *Id.*

The risks of devastating injury imposed by the activity of driving today may well be unacceptably high. In all likelihood, we should be taking various steps—including encouraging people to use public transportation—to reduce these risks. But it is a mistake to believe that those risks are unacceptably high *because* each instance of driving imposes a risk of devastating injury for the sake of trivial gain. What is at stake is not individual trips, but a practice—the loose practice of private automobile use as it now exists in this country. Within the practice as we now conduct it, each of the innumerable risk impositions which put others at risk of devastating injury for trivial gain are essentially indistinguishable from each other. No trip to the grocery store, to the movies, or to the theater, is especially urgent. (Contrast an ambulance taking a critically ill person to a hospital.) So if we judge any one of them unacceptable because it wrongly risks devastating injury for trivial gain, we should judge all of them unacceptable. When we do this, we encounter a cost which is not trivial. Collectively, these mundane trips are an important part of a normal life in our society. Doing without a private automobile in contemporary Los Angeles, for instance, is a hardship—the kind of hardship that makes the lives of the working poor in Los Angeles so onerous.¹³⁷

There is an important lesson here, and it is independent of the acceptability of the practice of private automobile use as it now exists in our society. Even an acceptable practice of transportation will impose some risk of devastating injury for trivial gain. By car, by train, by foot, or by bike, we will still transport ourselves to work, to the market, and to the video store, and in doing so we will still risk death and devastating injury. Some “background risk” of devastating injury is the price of any practice of transportation. That risk can be avoided only by ceasing the practice of transportation entirely—an unacceptably high cost. Some risks of devastating injury are therefore justifiably imposed even though each instance of their imposition realizes only trivial benefit, because there is no plausible way of distinguishing among the instances of risk imposition that we are considering, and the burden of eliminating all instances of such risk imposition *is* comparable to the significant risk of devastating injury

137. This Article is not the place for an extended discussion of how best to reduce the risks of driving to an acceptable level, but it is worth pointing out that this is an instance of a “lottery paradox.” “Lottery paradoxes” are discussed in connection with the significance requirement in the text accompanying note 139 *infra*. In the case of driving the relevant paradox is that none of us have good reason to change our practices individually—the burden to our lives is too great—but we all have reason to change the practice collectively—the level of risk that it imposes is unacceptably high. Systemic change, not individual action, is required.

that the practice creates. The other side of this coin is that we have reason to engage in particular instances of risk imposition falling within the practice at issue, even though those instances risk devastating injury for trivial gain. If we have reason not to forgo driving as an activity, then we have reason to take to the road for trivial reasons, even though we impose significant risks of devastating injury when we do so. We cannot tell which trip to the grocery store or to the movies will end in devastating injury. We therefore have no good reason to forgo any particular trip, and good reason not to forgo all of them.

Once we think of ourselves as adopting a principle to cover a class of cases—once we train our gaze on a *practice* of risk imposition—the dissimilarity between the activity of driving and the hypothetical involving the endangered television technician becomes evident. Life-threatening injuries to television technicians are not so common that a practice of rescuing endangered technicians at the price of shutting down television transmission for the duration of the rescue is likely to jeopardize the very practice of transmitting television signals. The burden of rescue will not seriously disrupt a normal life, even over the long run. Forbidding going to the grocery store, to the movies, or to work whenever doing so risks devastating injury would, by contrast, profoundly disrupt our lives. It would forbid most of our going out and about in the world and would preclude living a normal life.

3. Probabilities, Precautions, and Paradoxes

This argument will likely strike some people as flatly illogical.¹³⁸ Why should it matter whether we can distinguish one risk that might be eliminated by a precaution whose cost is forgoing a trivial benefit from a host of similar risks? If the risks really are indistinguishable, the cost of eliminating each risk will be comparably small and the benefits comparably great. If the incremental benefits of the precaution needed to eliminate one of these risks exceed that precaution's costs, the incremental benefits of the precautions needed to eliminate each of these risks will exceed the combined costs of those precautions. If not, some of the risks that we have grouped together must be distinguishable from the one that we are considering. So long as each incremental benefit exceeds each incremental cost, why should it matter if the risk at issue is indistinguishable from five, fifty, one

138. Louis Kaplow pressed this charge forcefully in an exchange of letters.

hundred, or five hundred other risks? Mere addition proves that if one risk is worth eliminating, then they are all worth eliminating. It thus seems irrational—rudimentary arithmetic error—to assert that it matters whether or not a risk of devastating injury which might be eliminated by a small precaution cost is indistinguishable from a host of other risks. Our judgment about the reasonable course of action with respect to a class of indistinguishable precautions is directly opposed to our judgments about the reasonable course of action with respect to each of the constituent parts of that class. Our judgments about the correct course of action with respect to a heap of indistinguishable precautions appear to violate firmly fixed canons of rationality.

We have stumbled across a “lottery paradox,” a case in which our judgments about the correct course of action for a “class” of cases conflicts with our judgment about the correct course of action for any individual case within the class.¹³⁹ In a “lottery paradox” you have a class of events (e.g., lottery ticket 1, lottery ticket 2 . . . ; automobile errand 1, automobile errand 2 . . .) in which (1) the probability of any one of the events in the class leading to some further occurrence (e.g., winning the lottery, a serious accident) is sufficiently low as to justify acting as though the further occurrence will not occur, but (2) the probability of *one* of the events in the class resulting in that further occurrence is sufficiently high to forbid acting as though none of these further occurrences will result. (In the case of both lottery tickets and automobile errands, we can, in fact, be *certain* that the further occurrence will occur. Some ticket will win the lottery, and some errand will end in a serious accident.) In the case of the lottery, the paradox is that we are both justified and unjustified in acting as if none of the tickets will win. It is simultaneously irrational for us to purchase any particular ticket—the expected benefit is less than the cost—and irrational for us to act as if none of the tickets is worth purchasing.

In the risk imposition cases that are our concern, we seem justified in acting as if (1) no single risk imposition is justified, but not justified in acting as if (2) all identical risk impositions are unjustified. We appear, for example, to be justified in forgoing a trip to the video store to rent a movie because the expected benefits of the rental are insufficient to justify running the risk of being killed in an automobile accident. But we do not appear to be justified in forgoing all trips to

139. I am grateful to Gideon Yaffe for persuading me that the paradox at work here is a “lottery paradox” and not a “sorites paradox.” On “lottery paradoxes,” see generally Dana K. Nelkin, *The Lottery Paradox, Knowledge and Rationality*, 109 PHIL. REV. 373 (2000).

the video store to rent movies—along with all comparably trivial errands—because the cost of forgoing such a large part of normal life is unacceptably great.¹⁴⁰ Deep logical and conceptual puzzles involving the relation between probability and justification may lurk here, but the fairness puzzle that is our principal preoccupation seems both explicable and solvable. The fairness of insisting that some precaution be taken depends not so much on the cost of taking that precaution in the case at hand as it does on the cost of taking that precaution in the *class of cases* to which it applies. Practices of risk imposition, not individual instances of risk imposition, are the law's basic unit of analysis.¹⁴¹ The requirement that like cases be treated alike requires this general focus.

Questions of reasonable risk imposition are therefore questions about the conduct of practices and the design of institutions. They are not questions about the rationality of isolated individual acts. If we must eliminate a host of similar risks should we proceed to eliminate one risk whose distributed cost is small, then the cost of the precaution necessary to eliminate that risk is the cost of eliminating

140. The problem may also appear in exactly the reverse form—each individual risk imposition may be justified, while a class of such risk impositions does not appear justified. The risks of smoking any single cigarette, for example, may be so low that we are justified in smoking it even though the risks of smoking cigarettes as a habit are so great that we are not justified in doing so. Indeed, some people think that the example in the text should be stated in reverse. They believe that the risks of being killed on any particular errand may be so low that we are justified in disregarding them entirely in deciding whether or not to run any particular errand, while the risks of being killed on some errand are great enough that we are not justified in disregarding them. In the case of automobile errands I confess to finding myself unable to decide which formulation of the paradox is more appropriate. The particular form of the paradox which elucidates the significance requirement of feasibility analysis, however, is the form in which there are risks which are indistinguishable from each other—each of which, viewed individually, is worth eliminating but all of which are not worth eliminating.

141. Risk impositions take on the character of a practice when they are not, in Holmes's famous phrase, "isolated, ungeneralized wrongs," but are instead "incidents" of ongoing activities. OLIVER WENDELL HOLMES, *The Path of the Law*, in COLLECTED LEGAL PAPERS 167, 183 (Peter Smith ed., 1952) (1920). In contrast to the "practices" of sports, games, trials, and ceremonies, "practices" of risk imposition are not well defined. Games, sports, trials, and ceremonies embody sharply defined practices because they are largely autonomous, well-marked domains of social life. Practices of risk imposition, in contrast, are comparatively ill-defined, because they are aspects of activities which are thoroughly entangled in the untidiness of daily life. The identification of "practices of risk imposition" is, moreover, heavily shaped by the legal framework within which risks are appraised. The breadth with which "practices of risk imposition" can be conceived by common law courts, for example, is limited by the case-by-case character of adjudication. OSHA is, by contrast, institutionally equipped to take a wider view of practices of risk imposition. "Practices" of risk imposition are nonetheless of fundamental importance to modern accident law. Our social world is, as Holmes recognized, a world of activities, not acts. In a "world of activities," the most important risk impositions have the character of a "practice."

all similar risks. The latter cost may be unacceptably high even when the former cost is trivial.

Upon reflection, there should be nothing surprising about this discrepancy between the reasonable course of action with respect to a single action and the reasonable course of action with respect to a class of such actions. It is as familiar as it is paradoxical. Consider the rationality of smoking cigarettes.¹⁴² If you enjoy smoking cigarettes, it is always rational to smoke any given cigarette. The odds that smoking any one cigarette will kill you are trivial. The odds that habitual smoking will kill you are, by contrast, quite high. If you think the odds of death from habitual smoking are unacceptably high, it is entirely reasonable to make a habit of never smoking any cigarettes even if you enjoy smoking and even though the odds that any one cigarette will kill you are acceptably low. It is rational to do so not just because smoking is addictive, but also because it is impossible to identify the single cigarette that will kill you. A reverse phenomenon underpins the significance requirement. If it is impossible to distinguish among a substantial number of very small risks of grave harm, each of which might be eliminated by a precaution whose cost is very small, and if the aggregate cost to each prospective injurer of taking all these precautions is unacceptably high, then it is rational not to take any of the precautions even though each of them, viewed individually, appears justified.

The paradoxical fact that the reasonable course of action for a class of risks may differ from the apparently reasonable course of action for a single risk imposition within that class thus explains and justifies the significance requirement. Significance separates those risks whose elimination is desirable from those whose elimination is not. If a particular risk really *is* significant, then that risk is different from a number of other risks, and the distributed cost of eliminating that risk is not the cost of eliminating a host of indistinguishable risks. If the distributed cost of the precaution necessary to eliminate the risk does not impose an equally grave burden on anyone else, the risk should be eliminated.

Significance thus distinguishes the realm of irreducible, or unavoidable, risk from the realm of avoidable risk. Without the significance requirement, safety-based regulation would require the elimination of every discernible risk of devastating injury. But the elimination of *all* discernible risk requires the elimination of all

142. This example is taken from WARREN S. QUINN, *The Puzzle of the Self-Torturer*, in *MORALITY AND ACTION* 198, 199 (1993). Quinn points out that the same is true about bites of food. *Id.* No single bite will make us fat, but it does not follow that we can eat as much as we want. *Id.*

discernible activity. And the elimination of all discernible activity is a cure worse than the disease it treats.

*C. Permissible and Impermissible Aggregation: Combining Costs
Within and Across Persons*

The preceding argument in support of the significance requirement seems, however, to escape one criticism only to run afoul of another. The argument combines separate risk impositions, each of which risks devastating injury for trivial gain, into classes of similar risk impositions whose cumulative importance is qualitatively greater than the quantitative total of the parts summed. This procedure and this claim appear inconsistent with the argument that cost-benefit analysis aggregates harms impermissibly. Unrestricted cost-benefit analysis, I have argued, is unacceptable because it allows a large number of trivial harms to justify inflicting devastating injury, even though none of the harms aggregated is comparable to the injury whose infliction they collectively license. Yet the argument that we have just advanced takes the cumulative effect of a host of trivial benefits as comparable to some risk of devastating injury. In the case of driving, for instance, we took the cumulative effects of being unable to go to the theater, to work, to restaurants, and so on to be a kind of detriment morally comparable to some risk of devastating injury. What, if anything, makes the aggregation on which this claim depends permissible?

Unlike the aggregation practiced by cost-benefit analysis—which aggregates qualitatively different costs and benefits *across* different people—the aggregation upon which our argument depends involves only the aggregation of costs *within* the same persons. It is the cumulative cost to *each* prospective driver that can rise to comparability with driving's risks of devastating injury. It is the cumulative effect on each prospective driver's life that is comparable to devastating injury. Aggregation *across* persons ignores the distinction between persons and sacrifices some for the benefits of trivial gains to others. Aggregation *within* persons does not suffer from this fault.¹⁴³ Those who extract the cumulative benefits of imposing many risks for individually trivial reasons are also those who bear the concomitant risks of devastating injury. If they could not extract the benefit without bearing the burden, and if the aggregate benefit is comparable to and greater than the burden, their lives are

143. See SCANLON, *supra* note 29, at 229-41, 237.

not sacrificed for trivial advantage to others even when they themselves suffer death or devastating injury at the hands of the activity.

D. Why Exclude Costs Entirely?

These arguments justify and explain the threshold of significance, but what of the second distinctive feature of safe-level analysis—its disregard of the costs of reducing risks to the point of insignificance? Consider, for example, the determination in the Food Quality Protection Act of 1996¹⁴⁴ that tolerances for pesticide must be set at a level that is safe, where “safe” means that “there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all anticipated dietary exposures and all other exposures for which there is reliable information.”¹⁴⁵ This determination expresses a legislative judgment that the costs of reducing pesticide residues to safe levels not only *may* be disregarded entirely, but *must* be disregarded entirely. Structurally, then, safety-based regulation is radically different from cost-benefit analysis. To determine an appropriate level of safety, cost-benefit analysis insists on balancing all relevant considerations (as it conceives them) in a comprehensive calculus. Safety-based regulation insists on *excluding* an entire class of arguably relevant reasons—namely, costs—from the exercise of fixing an acceptable level of risk.¹⁴⁶

Why—or in what contexts—should we disregard entirely the costs of eliminating significant risks, pursuing risk reduction until we have cut the risk to the point at which it is no longer significant? The answer to this question is simple enough in principle. We should eliminate significant risks of injury when the costs of doing so are not comparable to the devastation that significant risks are sure to wreak. This answer suggests a division of labor between safety- and feasibility-based risk regulation. Safety-based risk regulation is appropriate when the costs of reducing risks of devastating injury to the point at which they are no longer significant are *not* comparable to the costs of bearing those risks of devastating injury. Feasibility-based risk reduction is appropriate where the costs of reducing risks of devastating injury to the point at which they are no longer significant

144. Pub. L. No. 104-170, 110 Stat. 1489 (1996).

145. 21 U.S.C. § 346a(b)(2)(A)(ii) (2000).

146. The “exclusionary” character of safety-based risk regulation should not be considered an oddity. JOSEPH RAZ, PRACTICAL REASON AND NORMS (Princeton Univ. Press, 1990) (1975). Raz rightly emphasizes the fact that norms of practical reason are often exclusionary in character.

are comparable to the cost of bearing those risks of devastating injury. These claims, however, beg some important questions: When is a "cost" comparable to a significant risk of devastating injury? What makes a cost "comparable" to a significant risk of devastating injury?

1. Comparability: Risks and Rewards

Judgments of comparability are complex. They are qualitative, evaluative, and contestable. Consider the claim that missing an episode of one's favorite television show and dying are not comparable, while dying and being permanently paralyzed are comparable. This claim rests on the idea that severity of harm depends largely on the extent to which something interferes with a person's capacity to realize diverse values and ends and to engage in the activities constitutive of a normal life. Harms are comparable when they disrupt the lives of those they affect in similarly urgent (or insignificant) ways—when they impair ordinary activities, important activities, or the pursuit of rational life plans, in similar ways. Burdens and benefits are comparable when they improve or impair lives in similarly urgent or insignificant ways. And these remarks conceal a latent complication. In a world in which people's values, ends, and aspirations are diverse and incommensurable, our thinking about well-being and impairment must draw on ideas that people with such diverse values might find mutually acceptable. Abstracting from particular values, ends, and life plans, we can say that harms are comparable when they strike at the preconditions of rational agency in similarly severe (or similarly mild) ways.

Focusing on the ways in which risks and precautions impact our fundamental interests in liberty is helpful—up to a point. It explains, for instance, why we should bear "background" risks rather than eliminate them. Eliminating background risk works greater harm to one of the essential conditions of rational agency—the liberty to pursue our diverse aims and aspirations—than bearing background risk works to another essential condition of rational agency—the physical integrity of the person. The costs of eliminating background risk are thus not only comparable to the burdens of living with such risk, they are also plainly greater than the burdens of bearing that risk. Matters are rarely so stark, however. Most of the activities which do or might put us at significant risk of devastating injury—driving automobiles, riding motorcycles, flying planes, using pesticide on crops, refining petroleum, milling cotton—are not essential to either our liberty or our security. It is simply (or not so simply) a socially and

historically contingent fact that we engage in such activities, and that they are important to us, sometimes for instrumental reasons and sometimes for intrinsic ones. How should we think about comparability of value when the cost of reducing risk is not threatening the very existence of activity, but threatening some historically and socially contingent activity? How can comparability exist when we are comparing an essential condition of rational agency—the physical integrity of the person—to an activity whose very existence is an accident of history and technology?

2. Easy Cases

It helps to begin with a clear, and therefore easy, example of comparability and to work our way to murkier and more difficult examples. The clearest kind of comparability exists when the values involved are identical—when the very same devastating injury is on both sides of the calculus of risk and benefit. Suppose, for example, that a large population is at risk of contracting a disease—polio, for instance—which leaves a high percentage of those infected by it dead or crippled. Suppose, too, that a vaccine is developed for the disease. The vaccine is highly effective, but imperfect. Vaccination will prevent many people from contracting polio but it will also cause a significant—though far smaller—number of people to contract polio. Given the present state of medical knowledge, however, the only way to eliminate this significant risk of contracting the disease from the vaccine is by discontinuing the use of the vaccine. Attempting to reduce this risk by withdrawing the vaccine would be self-defeating. The cost of reducing the significant risk of devastating injury created by vaccinating people is more—not less—devastating injury. The benefits of the vaccine are comparable to and greater than the significant risk of injury that is its burden.¹⁴⁷

Comparability matters to fairness. Imposing risks of devastating injury is plainly fair when the imposition of those risks is to the advantage of those subject to them. Our vaccination example involves a “community of risk,” albeit in a slightly unusual form. Each member of the community is subject to the same preexisting risk of disease, and each member of the community runs the same risks and

147. Mark Geistfeld suggests that value should be maximized whenever risks of “nomonetizable” injury are traded off against one another. Geistfeld, *supra* note 10, at 122 n.26. For reasons briefly outlined below, I believe that this claim needs to be qualified. See *infra* Part V.A. But the vaccination example in the text is a case where maximizing the relevant value—life saved or disease avoided—is the correct way to proceed. More complex versions of this problem may arise whenever risks are on all sides of a problem, so that precautions against one risk increase other risks. I shall not directly address these problems in this Article.

stands an equal chance of reaping the same benefits by submitting to vaccination. The practice of vaccination is fair because the administration of our hypothetical vaccine decreases each potential victim's chances of contracting the disease. Vaccination is therefore to the ex ante advantage of a representative member of the community at risk of disease.¹⁴⁸ When the benefits of vaccination are, at least in significant part, a public good whose realization depends on everyone's doing their part by participating in the program of vaccination, it is presumptively fair to insist on a program of universal vaccination.¹⁴⁹ Those who contract the disease they are seeking to avoid as a result of the program are unlucky, but they are not the victims of injustice.

Consider next a case in which the harms involved are not identical, but are clearly comparable, because they are of the same kind. The Pasteur vaccine for rabies, a favorite example cited in the *Restatement (Second) of Torts*, illustrates this kind of case.¹⁵⁰ The Pasteur vaccine "not uncommonly leads to very serious and damaging consequences when it is injected."¹⁵¹ Because, however, "the disease itself invariably leads to a dreadful death, both the marketing and the use of the vaccine are fully justified, notwithstanding the unavoidable high degree of risk which they involve."¹⁵² Because the harms are of the same kind (they impair health) and because they are both severe—one, untreated, leads "to a dreadful death," the other often leads to severe side effects—we do not hesitate to compare them. And, because the threat to health posed by the disease is both graver and more likely than the threat posed by the vaccine, we "are fully justified" in administering the vaccine despite its unavoidable and significant risks. Once again, the benefits of the vaccine are comparable to and greater than the significant risk of injury that is their burden.

The question of fairness is more complex in this case, though. Because rabies is not easily transmitted, people infected with the disease are not a significant risk to others. So the decision to take the Pasteur vaccine is essentially a self-regarding one. The fact that it is to an infected person's advantage to take the vaccine, even given its

148. See *supra* notes 59-62 and accompanying text.

149. By "presumptively fair," I mean that there can be special circumstances, such as special religious beliefs, which justify exempting some people from an otherwise compulsory program. The fact that these people become "free clingers" on the coordinated sacrifices of others is not sufficient reason to compel them to act against their consciences.

150. Restatement (Second) of Torts § 402A cmt. k (1965).

151. *Id.*

152. *Id.*

side effects, is thus a reason why they should do so. Someone who fails to do so may be criticized as irrational—they are very likely harming themselves, but they are not treating anyone else unfairly. Individual consent is therefore usually required before the vaccine can be administered, and when consent is withheld it cannot usually be overridden. Considerations of fairness and justice control only when individual consent is impossible to obtain. Because the administration of the Pasteur vaccine is reasonably thought to be to the advantage of those infected with rabies, imputing consent through the reasonable person standard is fair¹⁵³ unless we know of special reasons why the patient at issue would refuse the vaccine. Someone who has the vaccine administered when they are incapable of consent and who now asserts that she would not have consented had she been capable cannot claim unfair treatment unless she can show that those administering the vaccine should have known that she—unlike the reasonable person—would not have consented were she capable of giving or withholding consent.

3. Hard Cases

Now, let us turn to more difficult cases of comparability. In these cases, devastating injury—threat to life and limb—is on one side of the calculus of risk and the value of some activity which does not contribute to saving life or limb is on the other side. The activity itself is historically particular and the good it realizes mundane in comparison with saving life and limb. Here, judgments of comparability depend both on appraising the good realized by the activity in question and on the particular characteristics of the risks in question. (In appraising the good in question, we must be sensitive to the plurality and diversity of values. We must ask not how valuable we find an activity, but whether some reasonable people might find it valuable and, if so, why.) So let us consider and compare two sets of plainly significant risks: the risks of riding motorcycles and the risks of smoking.¹⁵⁴

153. Physicians “may take medically indicated steps that do not risk more harm than they are likely to avoid, provided that the physician has no reason to think the plaintiff would refuse consent.” 1 DAN DOBBS, *THE LAW OF TORTS* § 106, at 247 (2001).

154. Recall that the fatality rate for motorcyclists is 59.53 per every 100,000 registered. NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 126. More than 400,000 Americans die from smoking cigarettes every year. One in every five deaths in the United States is smoking related. Centers for Disease Control and Prevention, *Cigarette Smoking—Attributable Mortality and Years of Potential Life Lost—United States, 1990*, MORBIDITY & MORTALITY WKLY. REP. 645, 645, Aug. 27, 1993, available at <http://www.cdc.gov/mmwr/PDF/wk/mm4233.pdf>.

The heightened risks characteristic of motorcycling force us to inquire into the good realized by the activity of riding motorcycles because these risks cannot, in practice, be disentangled from the aspects of the activity that make motorcycling something one might like to do. Motorcycling is exceptionally dangerous because motorcyclists travel at the speed of automobiles without the protection of passenger compartments. The cost of reducing the risks of motorcycling to a more modest level is the cost of adding passenger compartments to motorcycles. Adding passenger compartments to motorcycles, however, transforms the activity to the point of destroying it. Motorcycles with passenger compartments are no longer motorcycles. The inseparability of motorcycling's riskiness from the constitutive characteristics of the activity makes the principal cost of risk reduction the destruction of the activity. So we must ask: Is the activity of motorcycling a valuable one, an activity which some reasonable people might find enjoyable enough to be worth its very substantial risks?

Thinking about the values realized by the activity of motorcycling leads to thinking about the value of taking risks. Riskiness itself—the opportunity to put one's physical safety at more than normal peril—may well be one of the things that makes motorcycling attractive. Even if it is not—even if most motorcyclists are not risk-seekers in that sense; even if they only enjoy the sensual thrill of *experiencing* high-speed travel—that particular sensual experience can only be purchased at the price of dramatically increased risk of serious physical injury. Taking this to be some rough specification of the intrinsic goods of motorcycling, we must ask, then, how valuable these goods are. Valuable enough to justify bearing the substantial risks that are their price?

The answer to this question is powerfully affected by the fact that the risks of the activity are borne largely by participants in it—not by strangers to it—and by the fact that participation in the activity is largely a matter of voluntary choice. The distribution of some risk and the voluntariness with which it is or is not borne are critical to the risk's acceptability. We would not allow people to drive cars with unshielded, external gas tanks just for the thrill of it, for example. The risk to the rest of us—who did not choose to purchase such risky vehicles and who do not reap either their thrills or their substantial cost savings—is unacceptably high. Interfering in other people's freely chosen activities because we do not ourselves find the goods they realize worth the risks they require is, by contrast, unacceptably meddlesome—unjustifiably paternalistic. The

heightened risks of motorcycling are acceptable in part because we recognize that risk taking plays an important role in activities we recognize as valuable for at least some reasonable people (think, for example, of all extreme sports and many not-so-extreme ones). But they are also acceptable because they fall largely on motorcyclists, and because the choice to ride a motorcycle is largely an unburdened one. Motorcycling is a mode of transportation, but, in its voluntariness, the choice of motorcycling as a form of transportation is analogous to the choice to engage in a risky recreational activity. Considerations of fairness recede when risks are borne by those who impose them, and when those who impose and bear them do so voluntarily.

The substantial risks of riding motorcycles are acceptable because: (1) those risks are inseparable from the activity; (2) the activity realizes values which we can imagine figuring in a plausible and defensible human life; and (3) the special, substantial risks of motorcycling are largely born by motorcyclists, and voluntarily so. To put it differently, we may reasonably judge the costs of reducing motorcycling's substantial risks to be comparable to the costs of bearing those risks, because the value sacrificed in reducing the risk is one that figures in a valuable way of life, and the costs of realizing those values is voluntarily borne by those who find the values especially important. Unless we believe it is actually *irrational* for people to ride motorcycles, then we have no reason to insist on reducing the very substantial risks of motorcycling when the price of risk reduction is the destruction of the activity itself.

The activity of smoking contrasts nicely with motorcycling. Here, too, the risks of the activity seem inseparable from its enjoyment. Here, too, the decision to take up the activity falls on the unforced end of the spectrum (though substantial ingenuity has been and still is invested in seducing children and teenagers into taking up a powerfully addictive pastime). Here, too, the most salient way to reduce the risks of the activity to a level closer to the normal risks of life is by curtailing the activity.¹⁵⁵ But smoking and motorcycling differ in other ways, ways which affect our evaluations of the "cost" of curtailing the activity of smoking. For one thing, smoking imposes substantial risks on nonsmokers, at least when it is practiced indoors.¹⁵⁶ The risks of smoking are less self-regarding and more

155. The analogy is imperfect in this respect because the risks of smoking can be and have been substantially reduced by installing filters on cigarettes.

156. Environmental tobacco smoke ("ETS") causes three thousand lung cancer deaths annually for nonsmokers. TOBACCO INFO. PREVENTION SOURCE (Ctrs. for Disease Control & Prevention, Atlanta, Ga.), Oct. 16, 2002, *Exposure to Environmental Tobacco Smoke and Cotinine Levels—Fact Sheet*, at http://www.cdc.gov/tobacco/research_data/enviro-

other-regarding than the risks of motorcycles. For another thing, smoking is addictive. Partly for that reason, it is harder to explain just how it is that smoking figures in a comprehensible and defensible form of human flourishing. We understand how risk-taking might figure in a valuable way of life more easily than we understand how the self-destructive pursuit of pleasure might figure in a valuable way of life. We suspect smokers of irrationality. We may therefore believe that the costs of curtailing the activity are less weighty than the costs of curtailing motorcycle riding. Even those who ostensibly suffer may be the beneficiaries of a justified paternalism. Extensive efforts to discourage smoking—especially taking up smoking—and extensive efforts to stigmatize smoking as an activity, therefore seem justified. The fact that we have difficulty recognizing how the “game” of smoking might be “worth its candle” makes us unusually willing to interfere with the self-regarding risks of smoking, even though we could still consider it unjustified paternalism to ban smoking outright. The perceived *absence* of comparable value is thus essential to our current practices of regulation.

Important general lessons about comparability lurk in these examples. The most abstract (and apparently fundamental) criterion of comparability holds that comparability exists when the burden of reducing some risk threatens freedom of action as gravely as the risk itself threatens the physical integrity of the person. The kind of threat this criterion contemplates is starkly visible in the case of background risk. Eliminating background risk requires eliminating activity, and the threat that this poses to freedom of action is even more grave than the threat that background risk of devastating injury poses to the physical integrity of the person. But this general account will only take us so far. In some cases—our vaccine and treatment for rabies examples—both risk and risk reduction register their cost in harm to the physical integrity of the person. So long as the harm threatened is equally grave, comparability does not present any particular problem. Other things being equal,¹⁵⁷ the correct course of action is the one which minimizes the total life lost or disease suffered (thereby

mental/factsheet_ets.htm. Yet another study found second-hand smoke to be a cause of lung and other cancers, respiratory problems, and cardiovascular disease. U.S. DEP'T OF HEALTH AND HUMAN SERVICES, HEALTH CONSEQUENCES OF INVOLUNTARY SMOKING 6 (1986).

157. Other things are often not equal, as our examples show. It matters whether risks are borne by those who impose them, whether the decision to engage in a risky activity is an unburdened one, and whether rights are in play (as they are with the Pasteur vaccine). And this is hardly a complete list. Judith Thomson's famous transplant example is another case in which minimizing the life lost requires violating someone's rights. In that case, minimizing life lost is clearly impermissible. See JUDITH JARVIS THOMSON, THE REALM OF RIGHTS 134-38 (1990).

maximizing the lives saved or disease avoided). Comparability is, in fact, at its least problematic when the harm threatened by risk reduction is identical to the harm threatened by the risk at hand, as it is in our vaccine example. Questions of comparability are only slightly more difficult when the harm threatened by the risk at issue and by its reduction are of the same kind—health injury, in our rabies treatment example—but where the health injury threatened by the precaution is both less likely and less grave than the injury threatened by the preexisting risk. Administering the Pasteur vaccine for rabies is an easy call for both patient and doctor, even though doing so creates a substantial probability of severe physical injury, because the disease threatens more severe physical injury—painful death—with certainty.¹⁵⁸

The burden of reducing some risk is not always borne in the same coin as the burden of the risk itself, however, and the threat that risk reduction poses to freedom of action—to a fundamental condition of human agency—is rarely as stark as the threat posed by the elimination of background risk. Our motorcycle and smoking examples are cases in point. In each of these cases, the cost of risk reduction is the destruction or severe curtailment of the risky activity itself. The cost is to the *values realized by the activity*. The cost is not to one of the fundamental conditions of human agency—not to freedom of action—but to a use to which people have put their freedom. Costs of this kind are important because freedom of action is a condition of value, not a thing of value in itself. Activities of value give freedom of action its point. Freedom of action matters because there are a wide variety of things worth doing, a large set of values worth realizing. It is therefore important that a diverse range of activities be allowed to flower.

Against this deference to the wide range of values realized by diverse activities weighs the need not to endanger life and limb lightly. So we must make judgments of comparability. And if it is important that a wide range of activities be allowed to prosper because the set of values worth realizing is large, it is also difficult to make judgments of comparability when the value of some activity is pitted against devastating injury. In cases in which the value of an activity is at stake, the magnitude of the cost depends on the goods that the activity realizes, but it also depends on who bears the cost, on how voluntarily they choose to engage in the activity and shoulder its

158. However strong the case may be for administering the Pasteur vaccine for rabies to a victim of the disease, it is, of course, generally impermissible to administer it without the consent of the victim. The patient's right to refuse treatment is another example of a right that may constrain the otherwise justified pursuit of harm minimization.

costs, and on the existence or absence of alternative ways of realizing the values at stake. In cases like these, judgments of comparability are difficult, contestable, and contextual.

V. APPLICATION: COMPARABLE VALUE IN SAFETY AND FEASIBILITY ANALYSIS

A. Comparable Value and Safety-Based Risk Regulation

With these general ideas and particular examples in mind, let us return to the topic of safety-based regulation. In contrast to the risks of motorcycling and smoking, safety-based regulation is usually directed at risks (of devastating injury) that we can hardly avoid in the course of normal life in our society. Toxins in our food, air, and water are the principal targets of this kind of risk regulation.¹⁵⁹ We cannot avoid eating food, breathing air, or drinking water. By and large, moreover, we bear these risks whether or not we participate directly in farming or in discharging particular toxins into the air and water (though we are all beneficiaries of these activities in diffuse and indirect ways). The risks subject to safety-based regulation are thus markedly different from the primary risks of motorcycling and smoking not only in the voluntariness with which they are borne, but also in the extent to which they are borne by the people who participate in creating them. The risks subject to safety-based regulation are largely unavoidable.

The harms threatened by the risks subject to safety-based regulation are a particular sort of irreparable injury. The "costs" of "unsafe" food, air, and water are borne in irreparable injury to health, and health is an essential condition of effective human agency, a kind of "primary good." What about the benefits of bearing risks to health (or, the flip side of the coin, the costs of reducing such risks)? How should we characterize them? Pesticide residue on our crops is the by-product of the pursuit of greater agricultural productivity, and toxins in our air and water are by-products of ordinary, economically productive activities (ubiquitous by-products, perhaps). The enactment of safety-based regulatory statutes expresses a *categorical* judgment that the costs these productive activities must bear in order to eliminate significant risks of devastating harm are acceptable. We need not inquire into the costs of eliminating significant risk on a

159. See KEETON ET AL., TORT AND ACCIDENT LAW, *supra* note 14, at 952.

case-by-case basis, and we need not attend to the marginal balance of cost and benefit in any particular case, because the benefits of significant risk are simply not *comparable* to the incidence of harm to human health that is their price. The safety-based regime in place for the regulation of the risks of pesticide residues on agricultural products, for example, expresses the conclusion that no amount of increased agricultural productivity can justify imposing a significant risk of devastating disease. The benefits of more risk—the increased yield in crops harvested per acre planted and the like—are not the kind of benefits that can justify the increased incidence of devastating injury that is their price.

Why might a reasonable legislature come to the conclusion that the benefits of increased agricultural productivity cannot justify imposing a significant risk of devastating injury? In part, because a reasonable legislature should reject the central idea of unrestricted cost-benefit analysis—that all goods are commensurable, fungible at some ratio of exchange. Statutes like the Food Quality Protection Act of 1996 reject this idea of universal commensurability. They implicitly single out health for special protection. Safety-based statutes assume that health (like the physical integrity of the person) is a kind of primary good—something that *each person needs* in order to realize her aims and aspirations over the course of a normal life span, whatever those aims and aspirations may be.¹⁶⁰ Health has a special urgency. It is part of a package of goods which are essential conditions of rational agency, and it takes priority over lesser, inessential goods. Health should only be sacrificed when we stand to gain more of something comparable.

But a hierarchical view of human interests is only one part of the justification for safety-based risk regulation. Safety-based risk regulation also rests on particular, historically and socially contingent claims of value. The Food Quality Protection Act of 1996, for example, implicitly rests on the particular, historically contingent claim that more yield per acre of crop planted is not a good comparable to a significant risk of irreparable health injury. Why? Because health is, for each of us, an essential condition of effective agency whereas the benefits of increasing the yield of crop per acre are not—for us—measured in the attainment of an equally essential good. For us, the

160. On “primary goods as citizens’ needs,” see RAWLS, *supra* note 17, at 187-90. See *generally id.* at 173-211. The contrast between needs and preferences (or wants) is fundamental to the contrast between safety-based regulation and cost-benefit analysis. The idea here is more general than Rawls’s conception of “primary goods.” It might, for example, be possible to elaborate it in terms of Amartya Sen’s notions of “functionings” and “capabilities.” See SEN, *supra* note 30. See *generally supra* note 26 and accompanying text.

benefit of increased agricultural productivity is simply increased wealth, and the wealth obtained is not an essential condition of anyone's agency. We should not, therefore, treat risks to health and yield per acre as commensurable goods and let maximum overall benefit fix the proper balance between them. Were we poorer, matters might well be different. The benefit of increased agricultural productivity might be measured in our ability to provide adequate nutrition to each member of our society. Adequate nutrition is an essential condition of effective agency, one comparable to health in its urgency. Contingent social facts thus make the benefits of increased agricultural productivity not comparable—for us—to significant health risks.

The same combination of a hierarchical conception of human interests with historically and socially contingent facts is capable of explaining and justifying the application of safety-based risk regulation to air and water pollution. Air and water, like food, are necessities. And breathing and drinking, like eating, are unavoidable activities. Breathing the air and drinking the water should not put our health in significant peril, unless the cost of eliminating that peril threatens our agency in some comparable way. In an affluent society, when the cost of eliminating significant health risks from breathing the air and drinking the water is measured simply in wealth forgone, the cost of eliminating significant health risk is not comparable to the cost of bearing such risk. In poorer or less technologically advanced societies, matters might be different. It might, for example, be impossible to reduce the risks of air and water pollution to "insignificance" without seriously impairing the ordinary productive activities which generate such pollution, and that might make those workers most disadvantaged by the pollution worse off, rather than better off.

Safety-based risk regulation, in short, is justified when the costs of eliminating significant risks of devastating injury are simply not comparable to—and fall far short of—the benefits of doing so. When this is the case, the safe-level standard then fixes the acceptable level of risk. The Food Quality Protection Act of 1996¹⁶¹ is correct to require tolerances for pesticide residue on food products to be set at a level at which "there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all anticipated dietary exposures and all other exposures for which

161. Pub. L. No. 104-170, 110 Stat. 1489 (1996) (codified as amended at 7 U.S.C. § 136 (2000)).

there is reliable information,"¹⁶² even in light of the special susceptibility of infants and children to harm from toxic substances,¹⁶³ if attaining this level of safety will not impose a burden comparable to a significant risk of devastating physical injury. When are costs comparable? When the burden of bearing the precaution necessary to reduce a significant risk of devastating injury—and all indistinguishable risks—to the point of insignificance is of a *kind* which might outweigh the burden of devastating injury that is the price of the risk. The burden of eliminating all insignificant risks of devastating injury, for example, is comparable to the burden of bearing them, because the elimination of all risks requires the elimination of all activity.¹⁶⁴ The elimination of all activity burdens an essential condition of agency—the freedom to act—even more than insignificant risk of devastating injury burdens the physical integrity of the person, another essential condition of human agency.

The presence of comparability marks the point at which tradeoffs begin. Within the framework of federal risk regulation, comparability marks the point at which feasibility-based regulation of risks of devastating injury replaces safety-based risk regulation. When are burdens to major, productive economic activities—the kind of governed by both safety- and feasibility-based risk regulation—“comparable” to significant risks of devastating injury? Feasibility-based risk regulation is constructed around an answer to that question: Burdens to ordinary, productive economic activities—activities like milling cotton, refining petroleum, and growing crops—are comparable to significant risks of devastating injury when they threaten the long-run flourishing of those activities. Feasibility-based risk regulation supposes that the value realized by the major, productive economic activities of our society is comparable to, and generally greater than, significant risk of devastating injury. It is this claim that we must now explore.

B. Comparable Value and Feasible Risk Reduction

Workplace risks are the primary domain of feasibility-based risk regulation, OSHA is the primary practitioner of feasibility analysis, and workers are the primary beneficiaries of the feasibility standard. Feasibility-based risk regulation as practiced by OSHA

162. 21 U.S.C. § 346a(b)(2)(A)(ii) (2000).

163. § 346a(b)(2)(C).

164. *See supra* Part IV.B.1.

presumes that the productive economic activities to which it applies are sufficiently valuable that shutting them down would cause greater hardship than allowing them to continue, when their continuation involves imposing significant risks of devastating injury which can only be reduced by jeopardizing the long-run survival of those activities. The judgment of comparability at work here is a simple one: The risky activity being regulated is sufficiently valuable that shutting the activity down would work a greater hardship to those who benefit from it than would asking those workers endangered by the activity to bear significant risks of devastating injury. The well-being of workers is the natural focal point for appraising relative hardships, because workers are both the principal victims of the activities' risks and the principal beneficiaries of feasibility-based risk regulation. When would shutting down a major, productive activity like milling cotton or refining petroleum work a greater hardship upon the workers employed by those activities than bearing the significant risks of those activities does? When shutting down the activity would impair a representative worker's ability to realize her aims and aspirations over the course of her life more than bearing the activities' significant risk of injury would. When shutting down the activity would make her worse off, not better off, over the long run.

There is a strong resemblance between the view that feasibility-based risk regulation takes of the significant risks of major, productive activities and the view that safety-based risk regulation takes of insignificant risk. Feasibility analysis tolerates significant risk when it is the price of particular major, productive activities. Safety-based risk regulation tolerates insignificant risk as the price of activity itself. Even under the best of circumstances, a background level of risk of devastating physical injury must be accepted, because the cost of eliminating it is the prohibition of all activity, and the prohibition of all activity is a cure worse than the disease. It impairs our capacity to pursue our conceptions of the good over the course of complete lives more than the background level of risk itself does. Feasibility analysis applies these ideas in a more particular way. It holds that we are justified in accepting a level of risk greater than the background level of risk—a significant level of risk—when our only alternative is to shut down a valuable activity. The implicit judgment here is that shutting down the activity is a cure worse than the disease.

1. Feasibility Analysis as Practiced by OSHA

OSHA's judgments in the *Cotton Dust Case* illustrate the application of feasibility analysis in both its technological and economic aspects and the relation of feasible risk reduction to safety in some detail.¹⁶⁵ Cotton dust is the primary cause of byssinosis or "brown lung" disease, a serious, potentially disabling disease.¹⁶⁶ Because exposure to cotton dust is the primary cause of brown lung disease, the disease is "a distinct occupational hazard associated with cotton mills."¹⁶⁷ At the time of the *Cotton Dust Case*, an estimated one in twelve retired cotton workers suffered from byssinosis.¹⁶⁸ The best contemporary studies of the health effects of prolonged workplace exposure to cotton dust suggested that the exposure to "lint free cotton dust" could never be safe at any level higher than 0.2 mg of such dust per cubic meter, or 200 ug/m³. OSHA concluded that this upper limit of safe exposure should be used to define the "permissible exposure limit" ("PEL") for exposure to cotton dust over the course of an eight-hour workday. Attaining this PEL, however, was not always feasible, therefore:

OSHA interpreted the Act to require adoption of the most stringent standard to protect against material health impairment, bounded only by technological and economic feasibility. OSHA therefore rejected the industry's alternative proposal for a PEL of 500 ug/m³ in yarn manufacturing, a proposal which would produce a 25% prevalence of at least Grade ½ byssinosis. The agency expressly found the Standard to be both technologically and economically feasible based on the evidence in the record as a whole. Although recognizing that permitted levels of exposure to cotton dust would still cause some byssinosis, OSHA nevertheless rejected the union proposal for a 100 ug/m³ PEL because it was not within the "technological capabilities of the industry." Similarly, OSHA set PEL's for some segments of the cotton industry at 500 ug/m³ in part because of limitations of technological feasibility. Finally, the Secretary found that "engineering dust controls in weaving may not be feasible even with massive expenditures by the industry," and for that and other reasons adopted a less stringent PEL of 750 ug/m³ for weaving and slashing.¹⁶⁹

The "safe" level of 100 ug/m³ is thus technologically unattainable, and the best attainable level—the technologically feasible—level of 200 ug/m³ is often economically infeasible. Levels as high as 750 ug/m³ were accepted for weaving and slashing—one activity within the enterprise of milling cotton—because lower levels could not be achieved even with massive industry expenditures on safety. Bearing that higher risk of brown lung disease is justified by

165. 452 U.S. 490 (1981).

166. See *supra* note 27.

167. *The Cotton Dust Case*, 452 U.S. at 498.

168. *Id.*

169. *Id.* at 503-04 (citations omitted).

the fact that the benefits of having the activity of milling cotton outweigh that risk. Put differently, the justification for bearing the risk is that it can only be avoided by shutting down the activity, and the value of the activity is greater than the devastation that is its price.

The *Cotton Dust Case* thus makes plain the conception of comparability espoused by the feasibility test and squarely frames the issues that test raises. Feasibility analysis, as practiced by OSHA, holds that the cessation of an activity is a cost comparable to and (in general) greater than the cost of bearing a significant risk of devastating injury. The basic criterion of comparability employed by feasibility analysis is therefore a localized and more relaxed application of the criterion employed by safety analysis. Safety analysis views the shutting down of all activity as a cost sufficient to justify bearing *insignificant* risk of devastating injury from any given activity. Feasibility analysis considers the shutting down of major productive activities in our market economy as a cost sufficient to justify bearing *significant* risk of devastating injury from such activities.

By considering the cessation of significant productive activities in a market economy to be comparable in kind and generally greater than a significant risk of devastating injury, feasibility analysis extends the idea of comparable value in a way which we have not yet encountered. This case does not involve minimizing the same disease (like the vaccine example), minimizing severe health injury (like the rabies example), or realizing a distinctive form of value which might figure prominently in some plausible conception of the good (like the motorcycle example). It is a case in which the instrumental, everyday activity of earning a living and generating wealth justifies bearing a significant risk of devastating injury. Comparing significant risks of devastating injury to the termination of economically productive, but everyday, activities is plainly controversial. If we picture this tradeoff at the level of an individual life, its merits are uncertain. Losing a job—the consequence to those most severely affected of shutting down some ordinary economic activity—does not seem comparable to losing life or limb or to suffering a health impairment which will permanently and severely impair normal functioning and shorten the span of one's life—typical consequences of serious occupational diseases. We should, it seems, fear devastating injury more than job loss. We are, after all, more likely to find another job than another life or limb.

What is the case for treating the cessation of a major, productive economic activity as comparable to a significant risk of devastating injury? The claim to comparability rests, I believe, on three ideas. First, feasibility-based risk regulation assumes that the activities to which it applies are ones for whose importance the market has already vouched. It accepts—defers to—the validity of this prior test of value. Second, feasibility-based risk regulation—like safety-based risk regulation—accepts the importance of socially contingent facts. The major, productive economic activities which feasibility-based risk regulation accepts as comparable in value to a significant risk of devastating injury are contingent and historically transient—but nonetheless terribly important—features of our economy. Third, feasibility analysis appeals implicitly to the idea that, in terms of value, the major, productive activities to which it applies are indistinguishable. The case for shutting down one major productive activity is therefore a case for shutting down all similar activities. That price is too high to pay for the elimination of significant risk.

The first of these ideas is that ongoing, productive activities that flourish in a market economy have significant value. Because they have passed the market's test of value, we may presume that their overall benefits outweigh their overall costs.¹⁷⁰ Shutting down such activities therefore removes something of significant value to many people—workers, consumers, suppliers, shareholders.

The second idea asserts that contingent social facts—accidents of history, if you like—can embed themselves so deeply in the structure of our social life that what once might never have taken root can now only be uprooted at enormous cost. We can readily imagine social worlds without the activities governed by OSHA-style feasibility analysis—social worlds without cotton clothing or petroleum products. We know that such social worlds have existed in the past, and we expect a social world without petroleum products to exist at some point in the future. Those who have lived and who will live without

170. Some readers may be troubled (and rightly so, I believe) by the fact that the underlying test of value is essentially a utilitarian or economic one. I shall take this up in Part VI.C. It is worth noting, however, that feasibility analysis would proceed in the very same way if we adopted an underlying test based on fairness. Imagine a social world such as our own except that the workings of the market economy satisfied the requirements of Rawls's difference principle. We would then say that the activities in question were valuable not because they had passed a market test of cost-justification, but because they were part of an economic system which was to the advantage of all those who participated in it. This situation would give us a different reason to count the shutting down of significant productive activities in that world as a serious harm, a reason of fairness, not utility. Should the objection therefore be directed against the conception of mutual advantage (Pareto-superiority) which governs our market economy, rather than against feasibility analysis?

cotton shirts or petroleum products surely have not suffered and will not suffer great hardship—hardship comparable to devastating physical injury—because they are deprived of the fruits of these activities.

Yet feasibility analysis as practiced by OSHA treats the termination of activities such as cotton milling and refining petroleum as a harm both comparable to a significant risk of devastating injury and generally greater than such a risk. The assumption is that the worlds in which these activities would not be sorely missed are different social worlds from our own. Activities such as refining petroleum and milling cotton are deeply entrenched in our social world. Ending them abruptly would cause massive, unpredictable dislocation. Shutting down the activity of refining petroleum, for example, is essentially unthinkable. Petroleum products are knit so tightly into the fabric of our daily lives that we cannot simply decide to do without them without working inconceivable disruption in our lives.

The third idea applies a test of generalization and makes a claim about the outcome of that test. This criterion parallels and repeats, in a more localized manner, an important part of the argument for tolerating insignificant risks of devastating physical injury. If a remote risk of devastating injury is indistinguishable from many other such risks, fairness requires us to eliminate all such risks if it requires us to eliminate any of them. If, for example, the risks created by driving to the movies are indistinguishable from a host of other remote risks created by trivial errands, we must eliminate all of these risks if we choose to eliminate any of them. Eliminating all of these risks is, however, undesirable. Some very low risk of devastating injury is the price of activity, and activity is essential to the leading of any worthwhile human life. The undesirability of eliminating all risk explains and justifies the otherwise puzzling significance criterion found in both safety- and feasibility-based risk regulation.

A parallel, but more particular, argument supports the assumption that the shutting down of a productive activity is a disvalue comparable to a significant risk of devastating injury. Suppose that we chose to stop milling cotton or refining petroleum, because these activities cannot be conducted without imposing significant risks of devastating injury. Fairness would then require us to stop all similar productive activities—all major, productive activities which cannot be conducted without imposing significant risks of devastating injury. If milling cotton and refining petroleum are typical of the class of productive activities to which feasibility

analysis applies, this result is unacceptable. Perhaps the life prospects of those most endangered by cotton milling would be better if we eliminated that activity and no other class of persons would suffer a worse hardship than those most endangered by cotton milling now do. Perhaps the same is true if we ceased refining petroleum (although I doubt it), but the more activities we add to the list, the less persuasive the claim that we are gaining value, not losing it. Shutting down most of the major productive activities in our economy *would* be a harm comparable to bearing a significant risk of devastating injury. Shutting down most of the major productive activities in our economy almost certainly *would not* be to the ex ante advantage of the workers employed by those activities and most exposed to their risks.¹⁷¹

Insofar as it is correct to claim that the case for ceasing one major productive activity is a case for shutting down all of them, this is a persuasive argument. That claim, however, should give us pause. The argument against shutting down most of society's major productive activities is an argument of fairness—the workers employed by those activities would be harmed in the long run by the elimination of these activities, even though these activities exact a significant toll on the lives and health of those very workers. Yet the fact that these activities flourish in our market economy vouches not for their fairness, but for their efficiency. The major, economically productive activities to which feasibility-based risk regulation applies flourish in our market economy, and they would not if their costs exceeded their benefits. The market's test of value is roughly and loosely utilitarian. (Roughly, because actual markets do not work perfectly. Loosely, because markets measure value in wealth, and wealth is not identical to utility. These imperfections, however, are not what should give us pause.) Activities may be net beneficial in market terms—their economic benefits may exceed their costs—without being fair in the sense of working to the long-run advantage of those they

171. Cf. *Whitman v. Am. Trucking Ass'ns, Inc.*, 531 U.S. 457, 466-67 (2001) (holding, in part, that § 109(b) of the Clean Air Act does not permit the Administrator of the Environmental Protection agency to consider implementation costs in setting national ambient air quality standards).

[R]espondents argue . . . [that] the economic cost of implementing a very stringent standard might produce health losses sufficient to offset the health gains achieved in cleaning the air—for example, by closing down whole industries and thereby impoverishing the workers and consumers dependent upon those industries. That is unquestionably true, and Congress was unquestionably aware of it Section 110(f)(1) of the [Clean Air Act] permitted the Administrator to waive the compliance deadline for stationary sources if, *inter alia*, sufficient control measures were simply unavailable and “the continued operation of such sources is *essential* . . . to the public health or welfare.”

Id. (emphasis added) (citations omitted).

most disadvantage. So there is cause for concern: Feasibility-based risk regulation may realize fairness within boundaries fixed by efficiency.

2. Feasibility Analysis in the Common Law of Products Liability

The general point that market demand alone cannot guarantee the value of an activity becomes even clearer when we consider the possibility of extending feasible risk reduction from workplace risks to product risks.¹⁷² Bringing feasibility analysis to bear on product risks involves (1) presuming that the products to which our test of justified precaution applies are beneficial because they have passed the market's test of value, and (2) requiring products to be as safe as they can be without impairing their usefulness. The second element of the risk-utility test for product defectiveness articulated in *Beshada v. Johns-Manville Products Corp.*¹⁷³ embraces this second requirement:

For purposes of analysis, we can distinguish two tests for determining whether a product is safe: (1) does its utility outweigh its risk? and (2) if so, has that risk been reduced to the greatest extent possible consistent with the product's utility? . . . The second aspect of strict [products] liability . . . requires that the risk from the product be reduced to the greatest extent possible without hindering its utility.¹⁷⁴

Insisting that risk reduction not impair product usefulness sharply limits the critical bite of feasibility analysis. Some significant product risks cannot be feasibly reduced, because reducing the risk deprives the product of its usefulness. It is not, for example, feasible to eliminate the risk of devastating accidental (and intentional) injuries from sharp steak knife blades, even though dulling knife blades to the

172. It is also possible to extend the safety norm to product risks. *Potter v. Chicago Pneumatic Tool Co.* does just that: "There might be cases in which the jury would be permitted to hold the defendant liable on account of a dangerous design feature even though no safer design was feasible (or there was no evidence of a safer practicable alternative)." 694 A.2d 1319, 1333 (Conn. 1997) (citation omitted). This assertion was made in the course of explaining how the "consumer expectation" test that Connecticut applies to design defects differs from the "risk-utility" test advocated by the *Restatement (Third) of Products Liability*. *Id.* at 1333-34.

Potter and *Beshada* serve as reminders that prescriptions of more than cost-justified precaution are not confined to federal statutes or jury verdicts. Indeed, common law cases prescribing more than cost-justified precaution are easy to find. *See, e.g.*, *Bayer v. Crested Butte Mountain Resort, Inc.*, 960 P.2d 70, 72 (Colo. 1998) (holding ski lift operators to "the highest degree of care commensurate with the lift's practical operation"); *Brillhart v. Edison Light & Power Co.*, 82 A.2d 44, 47 (Pa. 1951) (ruling that a supplier of electric current is bound to use the "very highest degree of care practicable" to avoid injury: "When human life is at stake, the rule of due care and diligence requires everything that gives reasonable promise of its preservation to be done, regardless of difficulty or expense. . . .") (citation omitted).

173. 447 A.2d 539 (N.J. 1982).

174. *Id.* at 545.

point where they cannot cut human flesh poses no technological challenge at all. Dulling steak knives until they can no longer cut human flesh makes them unfit for their intended use. Tinkering a bit with our earlier discussion of the unusually great risks of motorcycles provides another example.¹⁷⁵ Suppose that the exposed character of motorcycle gas tanks creates a significant risk of devastating injury, a risk which stands out in comparison to the background risks of riding motorcycles.¹⁷⁶ Suppose, too, that we might reduce the risks of injury from gas tank explosions to the point of insignificance by encasing gas tank and passengers in separate, enclosed compartments. Would this precaution pass muster under the feasibility test? The answer, plainly, is “no.” The heightened risks associated with motorcycle gas tanks are inseparable from the characteristics that distinguish motorcycles from cars.¹⁷⁷ These characteristics define the activity of motorcycling; they give it its distinctive value as a form of recreation and as a mode of transportation. The greater safety of an encased passenger compartment separated from the gas tank comes at the price of killing the joy of the activity. The precaution transforms the activity of motorcycling to the point at which it is no longer the same activity. The precaution is “infeasible” because it destroys the product.

In both of these examples, the case for limiting precaution to the point at which further precaution would impair the usefulness of the product rests on the first element of *Beshada*'s test being met: the product's usefulness must be greater than the risk that is its price. Some products plainly fail this test. Assault weapons, for instance, are widely banned, on the ground that the risks of their illegitimate use exceeds whatever legitimate value they may have.¹⁷⁸ If we adopted a market test of value and used it to limit the reach of feasible risk reduction, we would handle assault weapons differently. There is, after all, a market demand for such weapons. If we took that market demand to vouch for the product's value we would cut precaution short at the point where further precaution impaired the weapons' usefulness. We would refuse, for example, to disable the capacity for continuous firing that makes assault weapons especially useful as

175. See *supra* notes 125-127 and accompanying text.

176. This supposition is contrary to our earlier discussion, and probably incorrect. See *supra* 125-26 and accompanying text.

177. See *supra* notes 154-55 and accompanying text.

178. See, e.g., CAL. PEN. CODE § 12275.5 (West 2000):

The Legislature has restricted the assault weapons specified in Section 12276 based upon finding that each firearm has such a high rate of fire and capacity for firepower that its function as a legitimate sports or recreational firearm is substantially outweighed by the danger that it can be used to kill and injure human beings.

instruments of mass murder. Yet limiting precaution in that way would strike most of us as perverse.

The facts of the assault weapon example are, of course, special. The market demand for assault weapons derives at least in part from their usefulness as instruments of mass murder.¹⁷⁹ The market demand for assault weapons is therefore generated in part by consumer preferences we wish not to satisfy but to thwart. That particular fear is not present in the case of most products or in the case of the productive economic activities subject to feasibility-based risk regulation by OSHA. In more typical cases, the worry is that legitimate market demand is insufficient to vouch for the value of the product or activity in light of its unavoidable risks. The original VW Beetle, for example, was driven off the market in part by increasingly stringent regulation of automobile safety.¹⁸⁰ The judgment expressed by that regulation was that the Beetle's benefits were not sufficient to overcome its substantial risks, notwithstanding substantial consumer demand for the car. The hazards of a toy gun that shoots rubber bullets might likewise be sufficient to outweigh the utility of the product whether or not consumers want to purchase the gun.¹⁸¹

The general lesson here is plain enough: Just as there are games which are not "worth their candles" even though someone might like to play them, so too there are products and activities which are not worth their unavoidable risks, even though the market demands them. The presumption built into OSHA's practice of feasibility analysis that, because the productive activities subject to that analysis flourish in our market economy, their value is comparable to and generally greater than any significant risks of devastating injury the activities may create, is therefore open to question. And we have reason to pursue this question: The practice of feasible risk reduction is justified by ideas of fairness whereas the institution of the market is justified by the idea of efficiency. Activities

179. The marketing director of the gun manufacturer whose assault weapons were used to kill eight people and wound six others in a rampage at a San Francisco law firm told the New York Times that

he welcomed damning criticism by law enforcement of the TEC-9, a popular weapon with criminals. He explained: "I'm kind of flattered. It just has that advertising tingle to it. Hey, it's talked about, it's read about, the media write about it. That generates more sales for me."

Merrill v. Navegar, Inc., 28 P.3d 116, 134 (Cal. 2001).

180. Paul Dean, *The New Beetle: 23 Smiles per Gallon*, L.A. TIMES, Feb. 19, 1998, at E1 ("[I]n 1977, plagued by poor sales . . . crimped by federal safety and pollution demands, the Beetle went away."); accord *Volkswagen Pushing Memories with Beetle: Ever-Popular Car Not the Inexpensive Model of Old*, ST. LOUIS POST-DISPATCH, Feb. 22, 1998, at E8.

181. RESTATEMENT (THIRD) OF PRODUCTS LIABILITY § 2(b) cmt. e, at 21-22 (1997).

which satisfy the test of efficiency may well fail to satisfy the demands of fairness.

VI. IS FEASIBILITY-BASED RISK REGULATION FAIR?

We need to retrace our steps a bit. Whenever we press precaution beyond the point of cost-justification, we insist that some value requires that we not maximize the net economic benefit extracted from the activity whose risks are at issue. This decision to leave wealth on the table requires justification in terms of some value urgent enough to trump the claims of efficiency. Feasibility-based risk regulation draws its justification for pressing precaution beyond the point of cost-justification from considerations of fairness. It is only fair to ask some to bear significant risk of devastating injury if the burden of eliminating that significant risk (and the devastation that is its eventual price) is comparable to the burden of bearing it. We have argued that a particular criterion of fairness best reconciles two essential conditions of rational agency: (1) the freedom to pursue valuable ends and activities and (2) security understood as the physical integrity of one's person. We have argued that—where devastating risk is concerned—practices of risk imposition are fair when they reconcile these two conditions of rational agency in a way which is (1) to the greatest long-run advantage of either a representative member of a "community of risk," or (2) when a "community of risk" is not present, to the greatest long-run advantage a representative member of the class of those most disadvantaged by the risks, unless an alternate reconciliation would work greater disadvantage to some other class of persons. For feasibility analysis to be fair in this sense, the long-run flourishing of the activities to which it applies must outweigh the significant risk of devastating injury that is the price of that flourishing. The benefit of those activities to those who bear their significant risks must be greater than the burden of the risks themselves. And here there is cause for concern.

That concern has two sources. First, feasibility analysis depends on contingent social facts. It equates the survival of particular productive economic activities with significant threats to our health and bodily integrity. OSHA's application of feasibility analysis assumes that shutting down activities such as the milling of cotton and the refining of petroleum is a harm comparable to, and generally greater than, bearing a significant risk of devastating injury at the hands of such activities. Extending feasibility analysis to a common law context—product design—involves counting the elimination of a class of products as a harm comparable to, and

generally greater than, bearing a significant risk of devastating injury. Yet our attachment to these particular activities is historically and socially contingent. They were not comparably important to us once, and they will cease to be comparably important at some point in the future. This dependence on socially contingent facts seems to threaten feasibility analysis with arbitrariness and triviality. It seems that grave harms such as death and devastating injury may be equated to almost any loss, so long as that loss is of something sufficiently entrenched in our social world.

In part, this worry has its source in the discrepancy in the degree of contingency of the goods being compared. The importance of bodily integrity and physical health to effective agency is both clear and dependent on facts about us which are contingent, but only at a very deep level. So long as we are mortal, and so long as our bodies are vulnerable to grave physical injury, death and devastating injury constitute the gravest of threats to our agency.¹⁸² The importance of milling cotton or refining petroleum is, by contrast, less clear and dependent on contingent facts which are not as deep and thus much more likely to change. The importance of particular types of products whose significant risks can only be reduced by impairing their usefulness—consider the significant risks of moderately priced subcompacts or of sport-utility vehicles and motorcycles¹⁸³—is even less clear. This discrepancy threatens the claim that the two kinds of burdens—devastating physical injury and shutting down major productive activities—really are comparable.

But this worry also has a second source, highlighted earlier. Feasible risk regulation, as practiced by OSHA, accepts a market test for the value of the activities to which it applies. Feasibility analysis cuts its criticisms of significant risk short, when pursuing that criticism would jeopardize the productive economic activities to which

182. Compare H.L.A. HART, *THE CONCEPT OF LAW* 189-95, 190 (1961) (pointing out the connection between "human vulnerability" and "the most characteristic provision of law and morals: *Thou shalt not kill.*").

183. It is infeasible to make moderately priced subcompact cars as safe as larger cars or luxury small cars because of the expense. Sport-utility vehicles are unusually prone to roll over, because of their high and narrow wheelbase, but it is infeasible to eliminate this risk because that high, narrow wheelbase is essential to their off-road capacity. We can eliminate the risk, of course, but only at the cost of transforming the product. Cf. *Denny v. Ford Motor Co.*, 662 N.E.2d 730, 736, 738-39 (N.Y. 1995) (holding that a jury might reasonably find that the high, narrow wheelbase which made a Ford Bronco sport-utility vehicle more prone to roll over than a normal passenger car did not constitute a defect under the risk-utility test—because the design and its risks were essential to the vehicle's off-road usefulness—but did constitute a defect under Ford's implied warranty of merchantability, because the vehicle was not "minimally safe for its expected purpose"—on-road driving).

it applies. Feasibility analysis thus counts the continued vitality of basic productive activities comparable to and valuable enough to justify bearing significant risk of devastating injury. The value of these activities is indicated by the fact that they prosper in our market economy. The fear raised by this acceptance of market value is that the market vouches not for fairness but for efficiency, for net social benefit in the sense of wealth-maximization, and for mutual advantage in the sense of Pareto superiority. Fairness, however, is quite a different matter from efficiency.

A. Comparability and Contingent Social Facts

Feasibility analysis is hardly unusual in its dependence on contingent social facts. Such dependence characterizes many legal norms, including both safety-based risk regulation and cost-benefit analysis. The case for prohibiting pesticide residue on agricultural products, when such residue would impose significant risk of devastating injury, for example, is justified by the contingent social fact of having achieved a level of abundance which makes greater agricultural productivity a luxury rather than a necessity. The dependence of cost-benefit analysis on contingent social facts is, if anything, often even deeper. Professor Viscusi, a leading practitioner of cost-benefit analysis as applied to risks to life and limb, attempts to tease out the actual value that people implicitly place on their own lives—not the value that they would place if their valuations were corrected for irrationality, imperfect information, and the effects of living within institutions which are not themselves fully cost-justified.¹⁸⁴ The effect of doing so, however, is to make the practice of cost-benefit analysis dependent on contingent social facts.

The acceptance of contingent social facts by both our laws and the normative frameworks we invoke to justify them open both law and justification to the charge that they are instruments of denial and apology.¹⁸⁵ By accepting so much of our existing social world, law and legal justification suppress criticism and reform. Accepting contingent facts as fixed points hides their contingency; it transforms accidents of history, which might well be otherwise, into fixed and frozen

184. See W. KIP VISCUSI, *FATAL TRADEOFFS* (1992). Viscusi's approach to valuing life is summarized in KEETON ET AL., *TORT AND ACCIDENT LAW*, *supra* note 14, at 989-90.

185. This critique has been pressed by the critical legal studies movement. See, e.g., Robert Gordon, *New Developments in Legal Theory*, in *THE POLITICS OF LAW: A PROGRESSIVE CRITIQUE* 413 (David Kairys ed., rev. ed. 1990); MARK KELMAN, *A GUIDE TO CRITICAL LEGAL STUDIES* 262-68, 263 (1987); ROBERTO MANGABEIRA UNGER, *THE CRITICAL LEGAL STUDIES MOVEMENT* 5-15, 118-19 (1986).

arrangements. This acceptance cramps our legal and political imaginations, binding them too closely to our actual practices. It preempts criticism and makes it difficult even to envision fundamental reforms. In short, the uncritical acceptance of contingent social facts converts the ideals we invoke to justify our law from powerful instruments of criticism into shameful apologies for flawed arrangements.

As a call to open our eyes to the character of the legal institutions and practices which surround us, this thesis of critical legal studies is well taken and powerful. But any constructive concern with the dependence of feasible risk reduction on contingent social facts must take more particular issue with the practice of feasible risk reduction and point us toward its reform. We need to identify some way in which feasible risk reduction betrays the values it invokes by accepting too much in the way of contingent social facts. Let us then revisit our own first premises and see how they might lead us to fault our present practices of feasible risk reduction. Our first premise is that bodily integrity and the freedom to act (and so to impose risk) are both essential conditions of rational agency. Other things being equal, more of both is always desirable, and a substantial measure of each is necessary if we are to pursue our conceptions of the good over the course of complete lives. Within this framework, the importance of avoiding serious accidents is quite evident. So long as we are mortal beings with vulnerable bodies, we will have reason to fear devastating accidental injury.¹⁸⁶

Our mortality and vulnerability are fundamental facts about us. Physical vulnerability and mortality have always characterized human beings. In contrast, the importance to us of various activities whose elimination would remove significant risks of devastating injury—driving our own cars, milling cotton, refining petroleum, having reasonably inexpensive subcompact cars—depends on contingent facts much less fundamental than having vulnerable bodies and being mortal. Indeed, our attachment to any *particular* activity is much more contingent than our need for physical health and bodily integrity and our vulnerability to devastating injury. The socially contingent character of the particular activities to which we are attached might, then, be proof that we can and should learn to live without them. We cannot live without intact bodies, but we can live without cotton shirts or private passenger automobiles. The importance of keeping our bodies intact, coupled with the socially

186. Cf. HART, *supra* note 182, at 191.

contingent character of our dependence on the activities that endanger us, might be reason for us to *criticize these activities as less important than physical integrity, not reason to equate them with physical integrity*. Bodily integrity is a precondition of rational agency in a way that cotton shirts are not. Its preservation ought, therefore, take priority over the flourishing of historically particular, socially contingent activities.

This argument, though, proves too much. Our need for any *particular* activity may not be as deep as our need for bodily integrity, but our need for activities which are socially contingent and historically transitory is as deep. It is through such activities—and only through such activities—that we sustain other conditions of rational agency and realize the diversity of values that give rational agency its point. Unless we believe that we can reproduce ourselves and realize an equivalent range of values through a set of activities which do not create a significant risk of devastating injury, we cannot take the shutting down of significantly risky activities lightly, simply because each activity that we might shut down is socially contingent and historically particular. Feasibility analysis therefore cannot be faulted simply because it considers the continued flourishing of contingent activities to be a value great enough to trump significant risk of devastating injury. If it is to be faulted, it must be faulted for the particular test of value it employs and, through that test, for the particular activities it considers comparable. The right concern about feasible risk reduction is that it counts any activity which flourishes in a market economy as valuable enough to justify imposing significant risk of devastating injury. Our first concern—our concern with feasibility analysis's dependence on contingent social facts—leads us to our second concern—that our practice of feasible risk reduction relies on a questionable test of an activity's value.

B. Feasibility and Efficiency

The difficulty is that flourishing in a market economy vouches not for the fairness of an activity, but for its efficiency. Fairness requires that an activity which imposes a significant risk of devastating injury be to the advantage of those most burdened by it, in the sense that it reconciles their competing interests in liberty and security more favorably than eliminating the activity does.¹⁸⁷ The

187. It is important to recall that matters are more complex when terminating an activity would be to the advantage of those most endangered by it in the sense we have defined, but would impose a comparable burden on others who benefit from the activity. Then we must decide if the benefit to those others is greater than the burden of significant risk to the most

risks that an activity imposes on those it most endangers—whether they are workers, as in the case of OSHA regulations, or consumers and users, as in the standard cases for product users—are fair to those it most endangers when shutting down that activity (or withdrawing that product) would make those most endangered by it worse off, not better off. An activity is efficient when it makes the pie larger—when it generates wealth, expanding the total resources at society's disposal. Efficient activities are to the advantage of those who participate in them only in a limited, Pareto sense. As long as those who participate in efficient activities do so voluntarily (as well as rationally and with adequate information), they are advantaged in the sense that taking part in those activities makes them better off than had they refused to participate. In the cases that are the objects of our concern, Pareto superiority means that workers, customers, and product users are better off by accepting the jobs they accept and purchasing the products they purchase than they would be if they did not accept those jobs or purchase those products, notwithstanding the significant risks of those occupations and products.

Pareto superiority guarantees advantage against the preexisting background of entitlements and opportunities, but it does not guarantee fairness. A transaction can be Pareto-superior for a party in a poor bargaining position, but still unfair. The deal struck may give the party with superior bargaining power an unjust share of the cooperative surplus—a share they would be unwilling to accept from behind a “veil of ignorance,” for example. Where risk of devastating injury is involved, a Pareto-superior transaction may burden the weaker party with an unfair risk—a significant risk that might be eliminated without making either that party or anyone else bear a comparable hardship. Pareto-superior transactions may be unfair because they are influenced by existing background conditions and inequalities. Inequalities of power may make it *rational* for someone in a weaker position to enter into a transaction on particular terms, but they do not make those terms *reasonable*—they do not make those terms fair. Fair (or reasonable) terms are terms that the parties would agree to if they ignored their particular advantages and disadvantages and sought only to agree to terms that neither party could reasonably reject.¹⁸⁸ Pareto-superior transactions may be ones

endangered. In the kind of case we are considering, this would happen when the burden to shareholders and consumers of shutting down a major productive activity is greater than the burden to workers of bearing a significant risk of injury. In the analysis in the text, I ignore this more complicated case.

188. On “reasonable rejection,” see SCANLON, *supra* note 29, at 195-97, 202-18, 223-31.

which would never meet this test of unforced agreement. They may express not unforced agreement, but rather the coercive force of preexisting inequalities in knowledge, wealth, bargaining power, and so on. The fact that activities flourish in a market economy thus guarantees that they are mutually advantageous in a Pareto sense (roughly speaking, at least), but it does not vouch for their fairness.

With this background in mind, let us consider the fairness of milling cotton, supposing that it is not feasible to both mill cotton and avoid exposing workers to a significant risk of brown lung disease. Is that activity valuable enough to justify the significant risk of devastating injury that is its unavoidable price? Milling cotton under the circumstances that we have supposed is fair to those workers endangered by it if those workers would be harmed by the elimination of the activity. They will be made worse off if ending the enterprise saves them from exposure to a significant risk of severe health impairment, but also leaves them unable to secure employment at all comparable in its advantages (its wages, benefits, and general desirability) to milling cotton. The loss of anything approaching comparably advantageous employment counts as a harm greater than bearing a significant risk of brown lung disease. Conversely, the enterprise of cotton milling is unfair to those workers it most endangers if shutting it down would make them better off—by securing for them more protection of health and bodily integrity without extracting an offsetting and greater loss in the benefits that employment in the enterprise of cotton milling confers. Shutting down the enterprise will make workers better off if those workers can find employment in other industries and that employment is as advantageous as milling cotton, without imposing cotton milling's significant risk of devastating harm to their health.¹⁸⁹

Let us next consider the fairness of selling subcompact cars, supposing those cars to be significantly less safe, even after all feasible safety features have been incorporated, than larger ones. The enterprise of selling subcompact cars is to the advantage of those who purchase and use them if those purchasers and users would be made worse off by the disappearance of those cars from the marketplace—if the disappearance of subcompacts, say, left them with no real choice but to purchase larger but less safe cars on the used car market. The

189. For this to be true, the stringent safety regulations that shut down the cotton mills would probably also have to stimulate other, better employment opportunities. If equally advantageous but less dangerous employment preexisted the adoption of the regulation, the workings of the market would, presumably, tend to drive cotton mills out of existence. Who would bear its significant risks without any substantial offsetting advantage? If this is so, it is a practical reason why OSHA should practice feasibility analysis as it does.

enterprise of selling subcompact cars is not to the advantage of those who purchase them if adopting stringent safety measures that would drive such cars off the market would improve the well-being of their would-be purchasers by giving them access to safer cars at a sufficiently small increase in price.¹⁹⁰ It may have been fair, for instance, for stringent safety standards to drive the original VW Beetle from the American automobile market.¹⁹¹ The disappearance of the original Beetle from the market eliminated a significantly unsafe automobile without depriving subcompact car buyers of cars to purchase.¹⁹² On the contrary, the stringent safety regulations that played a role in the disappearance of the original Beetle appear to have improved the lot of subcompact car buyers by securing substantially more safety without depriving would-be subcompact car buyers of the transportation of their choice. The improvement in their security was not cancelled out by a comparable decrease in their freedom of action.

C. Valuing Activities: Feasibility, Fairness, and the Market

We do have reason to worry about the way in which a market test of value vouches for the value of the activities governed by feasible risk reduction, in both its statutory and common-law incarnations. The market vouches for the efficiency of the activities which flourish within it, not for their fairness. The efficiency of market transactions is assured by their being mutually advantageous (Pareto-superior) for market actors, but the fairness of market transactions is not. The fairness of market transactions depends on the institutional framework within which those transactions take place. Market transactions are generally fair when they take place against a just background—against a just (or fair) assignment of initial rights and entitlements and a just distribution of resources, both governed over time by principles which prevent initially fair starting points from deteriorating into unfair distributions of rights and resources. It is the sustained presence of “background justice” which vouches for the fairness of individual transactions. In the absence of background justice, nothing guarantees the fairness of particular Pareto-superior

190. Recall that a full statement of what our fairness criterion requires would add the clause “without working a comparable hardship on anyone else.” See *supra* notes 59-62 and accompanying text. We are ignoring this complication for purposes of simplicity.

191. See *supra* note 187.

192. For completeness, we can add “and without working a harm comparable to the risk of devastating injury characteristic of VW Beetles on anyone else.”

transactions, or particular efficient activities.¹⁹³ When feasibility analysis accepts the fact of an activity's flourishing in the marketplace as proof that the activity is valuable enough to justify bearing a significant risk of injury, it accepts efficiency as a limit on fairness.

The fact that efficiency limits the critical bite of fairness in this way is cause for concern. Activities that are efficient but unfair are activities that unjustifiably burden those they most disadvantage. Unfair activities could be conducted on different terms—terms which would make those they most disadvantage better off without imposing a comparable burden on anyone else (on any other class of persons affected by the activity). When feasibility analysis counts the continued flourishing of efficient but unfair activities a value great enough to justify bearing significant risk of devastating injury, it appears to be reneging on its promise of fairness. Feasible risk reduction, it seems, should press the claims of fairness further. An activity should be counted valuable enough to justify significant risk of devastating injury only if (1) it is to the advantage of those most endangered by it in the sense that its disappearance would leave them with less favorable conditions for the exercise of their rational agency, or if (2) ending the activity would impose a greater disadvantage on another class of persons affected by the activity—would make the conditions for the exercise of their rational agency even less favorable.

It is easy to imagine how we might press the claims of fairness further than feasible risk reduction does. Two paths are possible. The first path suggests itself when we take the position of ideal legislators, fixing the respective domains of the safety and feasibility norms. When those most endangered by an activity would be made better off by the elimination of its significant risks, and no other class of persons would be made to bear a comparable burden by the elimination of the activity, we should insist that the activity satisfy the more rigorous standard of safety-based risk regulation or pass from our social world. Feasible risk reduction should govern either activities whose presence in our social world is to the advantage of those they most endanger, or activities whose disappearance would work a greater hardship on other classes of persons affected by the activity than the hardship that their significant risks work on those they most endanger. Safety-based risk regulation should govern activities whose presence in our social world is not valuable enough to justify bearing significant risk of devastating injury. If we are correct to think that a nontrivial number of the activities which flourish in our economy are not fair, not valuable enough to justify the significant risks that are the price of

193. See JOHN RAWLS, *JUSTICE AS FAIRNESS: A RESTATEMENT* §§ 14-15, at 50-55 (2001).

their presence in the world, we should expect this approach to expand the domain of safety-based risk regulation and shrink the domain of feasibility-based risk regulation.

The second path is most attractive when we assume the position of common law judges, seeking to make our law the best that it can be. We should follow the lead of the New Jersey Supreme Court in *Beshada*, whose embrace of a common law variant of feasible risk reduction was one piece of a two-part standard of acceptable product risk:

For purposes of analysis, we can distinguish two tests for determining whether a product is safe: (1) does its utility outweigh its risk? and (2) if so, has that risk been reduced to the greatest extent possible consistent with the product's utility? The first question looks to the product as it was in fact marketed. If that product caused more harm than good, it was not reasonably fit for its intended purposes. We can therefore impose strict liability for the injuries it caused without having to determine whether it could have been rendered safer. The second aspect of strict liability, however, requires that the risk from the product be reduced to the greatest extent possible without hindering its utility. Whether or not the product passes the initial risk-utility test, it is not reasonably safe if the same product could have been made or marketed more safely.¹⁹⁴

Common-law courts should be willing, in other words, to judge some products—and by extension, some activities—as not worth having, because their significant risks of devastating injury are not offset by some comparable benefit.

Both of these paths will prove well worth pursuing in many cases, but other paths may be worth pursuing, and perhaps even more so. Feasibility analysis as presently practiced by OSHA already assigns the agency a formidable institutional task. Determining if and how major productive activities can reduce their principal risks of serious physical injury without jeopardizing their long-run vitality is a complex and challenging undertaking, in both its technological and economic dimensions. Determining just which major productive activities should be driven from our world because the workers they endanger would be better off without them is an even more heroic undertaking—a worthy task for an omniscient legislator at least, if not an omniscient God. Questions of institutional competence give us equal reason to pause when we consider the common law analog to feasible risk reduction. Deciding if the Ford Pinto's gas tank presents a significant risk of injury that is feasible to reduce is a difficult but manageable task. Deciding if consumers would be better off without Ford Pintos is not a decision a judge or jury is well situated to make,

194. *Beshada v. Johns-Manville Prods. Corp.*, 447 A.2d 539, 545 (N.J. 1982) (citation omitted).

especially on the basis of the facts developed in the course of litigating a particular injury. Negligence has never been widely and effectively applied at what economists call the "activity level."¹⁹⁵ Courts may sometimes be able to make well-founded judgments that an activity's benefits do not justify the harm that is its price, but it seems unlikely that they will be able to do so routinely.¹⁹⁶

The larger problem here is that the fairness of market transactions, and of the activities that emerge from them, depends principally on the establishment of what I have been calling "background justice." In order for markets to operate fairly, initial entitlements must be fixed properly, and the operation of the market must be regularly adjusted to maintain background justice. Institutions designed to make and apply accident law are not ideally equipped to establish and maintain background justice. Their interventions in market activities are, almost inevitably, bound to be piecemeal and ad hoc. They target particular unfair activities, not the deeper conditions which allowed those activities to flourish. To be sure, accident law institutions have a role to play in the construction of a just basic structure of society. The appropriate specification of the domains of safety, feasibility, and cost-justified¹⁹⁷ risk reduction is likely part of a just basic structure, but surely not the whole of it. The allocation of basic rights and the distribution of wealth, income, and property are also essential parts of it. The lion's share of the task of ensuring that only fair activities flourish in a market economy may best be shouldered, then, by those institutions charged with ensuring the justice of the basic structure.

The best way to address the problem of unjust activities, in other words, might be indirectly, not directly. It may not be best to

195. For the distinction between "care" and "activity" levels, see generally Steven Shavell, *Strict Liability Versus Negligence*, 9 J. LEGAL STUD. 1 (1980).

196. The court in *O'Brien v. Muskin Corp.* held that it was error not to permit a jury to consider whether the risk of injury created by an above-ground pool "so outweighed the utility of the product as to constitute a defect." 463 A.2d 298, 306 (N.J. 1983). *O'Brien*, however, was overruled by New Jersey's tort reform statute. N.J. STAT. ANN. § 2A:58C-3a(2) (West 1987). See *Dewey v. R.J. Reynolds Tobacco Co.*, 577 A.2d 1239, 1251-52 (N.J. 1990). This legislative reversal places the task of determining which products should be sold firmly in the hands of the market. The *Restatement (Third) of Products Liability* concedes the possibility that an entire product—not just a design feature—may be defective, but takes the view that cases where courts should find entire products defective are exceedingly rare. Judging entire products unfit is, in general, a task better suited to legislatures. See RESTATEMENT (THIRD) PRODUCTS LIABILITY § 2(b) cmt. e (1997).

197. Taking only the cost-justified level of precaution is proper when the harm done is repairable, so that redistribution after the fact of injury can distribute the burdens and benefits of risky activity fairly. In this case, it makes sense to proceed by maximizing the size of the pie and redistributing to achieve fairness thereafter. See Sargentich in KEETON ET AL., TEACHER'S MANUAL, *supra* note 14, at 20-7.

extend the practice of feasibility analysis in regulatory and common law so that it regularly appraises the value of the activities whose risks are at issue, in light of the conception of fairness we have embraced. Instead, it may be best to seek a just basic structure. The existence of a such a structure would ensure, for the most part, that the activities flourishing within it are fair. Imagine, for example, a social world such as our own, except that the workings of the market economy satisfied a principle of fairness. (Rawls's difference principle is one such principle.) The economic activities which flourished in such a social world would be counted fair not because they had passed a market test of cost-justification, but because they arose out of a fair background situation through procedurally fair transactions and flourished in an economic system governed by principles of justice which ensured that it worked to the advantage of all those who participated in it—even those it most disadvantaged.¹⁹⁸ In this social world, we would have a reason of fairness to count the shutting down of major productive activities a grave injury, comparable to a significant risk of devastating harm. In this world, feasible risk reduction might proceed in essentially the way that it proceeds in our world, but because it would operate against a different background, its assumption that the survival of major productive activities was a value great enough to justify bearing a significant risk of devastating harm would stand on firmer ground.

Of course, the best way to realize fairness at the level of activities under ideal circumstances (or very favorable ones) may not be the best way to do so under our present, less-than-ideal circumstances. For us, it may often be the case that the best way to achieve fairness at the level of activities is by incorporating the evaluation of activities into the practice of feasible risk reduction, where possible. This question of strategy, however, lies beyond the boundary of our present inquiry. There is, however, one last question to address. We have argued that considerations of fairness justify safety- and feasibility-based regulation of risks of devastating injury. Fairness thus condemns cost-justified precaution as insufficiently protective of physical integrity in an important range of cases. But we have said nothing about other kinds of cases. Is cost-justified precaution compatible with the demands of fairness in cases in which the injuries risked are not devastating?

198. See RAWLS, *supra* note 193, at 50, 52 (noting that "background institutions which commonly with the two principles of justice are necessary to make it likely that economic and social inequalities contribute in an effective way to the general good or, more exactly, to the benefit of the least advantaged members of society").

VII. COST-JUSTIFIED PRECAUTION AND COMPENSABLE INJURY

The argument against taking only cost-justified precaution against significant risks of devastating injury rests on two basic claims. First, devastating injury is not commensurable at some ratio of exchange to all of the goods which might be gained by inflicting it. The cost-justified level of safety unfairly devastates a few for the sake of trivial gains to many. Second, devastating injuries severely impair normal functioning and normal life in ways which cannot be undone. The victims of devastating injury can never be restored to their pre-injury level of well-being. But not all harms are severe and irreparable. Not all harms must remain indivisibly concentrated on those who suffer them. When injury is inflicted on commercial property, for example, the harm is reparable even if the property is wholly destroyed.¹⁹⁹ Even the total destruction of a piece of commercial property results in a loss that money can measure and redress. The payment of money damages can undo the harm done, disperse it across those who have benefited from the imposition of the risk that issued in that harm, and rectify any unfairness in the distribution of benefit and burden. Does fairness require more than cost-justified precaution in such cases? Or can its concerns be met by redistributing the costs of accidents after they occur?

The answers to these questions are, in principle, simple and clear. When harm done can be fully repaired after the fact by the payment of money damages, and so apportioned among those who benefit from its infliction, fairness supports taking efficient precautions—and only efficient precautions—against injury. Pitching the level of precaution at the cost-justified point maximizes the dollars involved. Because reparation can undo all the damage done, we can treat the victim fairly by providing monetary reparation for the harm done. Because harms that can be measured in money can be divided and dispersed, we can apportion the costs of accidents fairly after those accidents have happened. We can spread the cost of reparation among those who have benefited from the imposition of the risk in question. Because money can both repair the damage and be redistributed to satisfy the demands of fairness, fixing the level of precaution at the point at which it will maximize the money available does not conflict with the demands of fairness. If anything, it enables the fair distribution of the burdens and benefits of the risks involved

199. See, e.g., *Vincent v. Lake Erie Transp. Co.*, 124 N.W. 221 (Minn. 1910) (upholding damages awarded to plaintiffs by trial jury as commensurate with harm inflicted by defendant upon plaintiffs' property).

by maximizing the resources available to meet the demands of fairness. When injuries are moderate and fully compensable, the economic argument that questions of fair distribution should be addressed only after efficient precautions have been taken is sound and persuasive.²⁰⁰

To be sure, two qualifications are in order. The first concerns the existence and characteristics of risk impositions which elude the sharp distinction that we have just drawn. On the one hand, there are risks which threaten both some devastating injury and some fully compensable injury. And there are cases that fall between the poles of this continuum, cases in which the harms threatened by some risk are neither plainly severe, irreparable, and indivisible, nor clearly compensable. Harm to property invested with personality may be such a case.²⁰¹ On the face of the matter, harm to property invested with personality is qualitatively different from harm to commercial property because investing property with personhood may make the property irreplaceable. This difference does not put harm to such property on a par with harm to life and limb—that is commodity fetishism—but the impossibility of fully compensating an owner of irreplaceable property for the harm caused by its destruction makes the destruction of such property a more serious harm than the destruction of commercial property. Other things being equal, this makes the benefit of avoiding injury to irreplaceable personal property greater than the benefit of avoiding injury to commercial property. Taking fair precaution against injury to such property requires responding appropriately to the intermediate urgency of the harm being risked.²⁰²

200. This argument has long been made by Louis Kaplow and Steven Shavell, albeit on a grander scale than I have in mind here. Kaplow and Shavell argue that questions of distribution ought to be left entirely to the tax system, while all other legal regimes pursue efficiency. 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 (1994); see also KAPLOW & SHAVELL, *supra* note 19. The argument in the text is that when the injuries at issue are moderate and fully compensable, tort law's legitimate concerns with the fair distribution of the burdens and benefits of risky activity supports taking only cost-justified precaution and redistributing accident costs after accidents occur. Tort suits themselves are, in my view, a permissible mechanism for effecting the appropriate distribution.

201. See Margaret Jane Radin, *Property and Personhood*, 34 STAN L. REV. 957, 1003-06 (1982).

202. Fixing the fair level of precaution against harm to property invested with personality will also require responding appropriately to other special problems that such property presents. For example, unless we can reach agreement about the kinds of property that generally are and should be invested with personality, taking into account the investment of some property with personality threatens to introduce a form of subjective valuation into the calculation of the burdens and benefits of appropriate precaution. Objective valuation of burdens and benefits is

There will, therefore, be a range of cases in which the severity of the harm risked falls in between the zones of devastation and full compensability that we have identified, either because both kinds of harm are risked or because a different, intermediate kind of harm is risked. The fair level of precaution for such cases is not settled by the distinction that we have drawn between devastating injuries and fully compensable ones. It seems likely, nonetheless, that clarifying these two ends of the continuum and the levels of precaution that they require is an important first step to identifying the fair level of precaution for mixed and intermediate cases.

The second qualification concerns the scope of the efficiency argument that we have accepted. In the law and economics literature, the normative claim that efficient precaution and *only* efficient precaution should be taken, with fairness concerns being addressed by the independent redistribution of wealth, is generally linked to the claim that redistribution should be effected by the tax system, not the tort system. Embracing the argument that efficient precaution is fair when risks are moderate and fully compensable does not entail embracing this further claim. The choice between reparation (either by tort law or by administrative plan) and redistribution by the tax system raises questions of fairness and corrective justice—questions which cannot be settled simply by showing that redistribution through the tax system is more efficient than redistribution by any other institutional mechanism (if it is). Fairness requires that those who benefit from the injury inflicted make reparation to those who have suffered those injuries; only then are burden and benefit proportional, so far as they can be. Redistribution through the tax system will not automatically realize fairness in this sense.²⁰³ The case for reparation by those who have inflicted harm to those they have harmed finds further support in what Martin Stone has called “the unity of doing and suffering”:

The situation in which one person suffers through the doing of another . . . has a natural saliency for human beings. It is bound to figure in the most basic thinking about what sorts of happenings can be controlled, and related to this, it produces such natural psychological responses as resentment and revenge.²⁰⁴

essential to securing liberty and ensuring fairness. For discussion of the problems involved in using subjective standards of well-being, see Keating, *supra* note 7, at 367-73.

203. For a general discussion of fairness and the choice among institutional mechanisms for its implementation in accident law, see Gregory C. Keating, *Fairness and Two Fundamental Questions in the Law of Accidents* 37-43 (unpublished manuscript, on file with author).

204. Martin Stone, *On the Idea of Private Law*, 9 CAN. J.L. & JURISPRUDENCE 235, 259 (1996); see also Martin Stone, *The Significance of Doing and Suffering*, in PHILOSOPHY AND THE LAW OF TORTS 131-82 (Gerald J. Postema ed., 2001). Rousseau observes, in a similar vein, that “the nature of things does not madden us, only ill will does.” Baier, *supra* note 20, at 63 (quoting

Reparation registers the moral significance of the fact that the injuries addressed by accident law are injuries inflicted by some human beings on other human beings. Separating deterrence and distribution on efficiency grounds, by contrast, ignores the moral significance of "the unity of doing and suffering."

A second caveat is therefore in order. The argument that efficient precaution is fully compatible with and supportive of fairness in the case of moderate and fully compensable injuries does not, therefore, imply the further conclusion that redistribution through the tax system is preferable to reparation, whether by tort or by administrative scheme. The choice between tax and reparation must be made with more than efficiency in mind.

VIII. CONCLUSION: VINDICATING OUR MORAL INTUITIONS

It is easy to lose the thread of an argument in its details, especially when the details are complex and the thread winds its way through them at length. It may be best, then, to conclude simply by recalling the nerve of the argument. Devastating injury presents special problems of fairness, both because devastating injuries are especially severe and because they cannot be repaired *ex post*. The fair treatment of risks of devastating injury requires that we take more than cost-justified precaution against their occurrence.

Fairness is concerned with the distribution of burdens and benefits—with how well competing claims are satisfied.²⁰⁵ Treating people fairly generally requires us to align burden and benefit proportionally. When injuries are not devastating—when the harm they wreak can be fully repaired through *ex post* compensation—redistribution after the fact can align burdens and benefits proportionally. When risks threaten devastating injury—premature death or severe harm whose debilitating effects can never be fully undone—redistribution after the fact cannot align burden and benefit proportionally. Fairness must be done at the time that the risk is imposed, not after it issues in injury. When injuries are devastating, special problems of proportionality arise. The claims of those who are put at significant risk of death or debilitation are especially urgent. It is unfair to treat devastating harm as comparable to *any* benefit which might be gained, no matter how trivial that benefit is in the lives of those who reap it. Sacrificing an urgent interest—the interest in

Rousseau). This observation should be read broadly. It is the fact of agency—not "ill will" or even negligence—which makes the issue of reparation by the harmdoer morally salient.

205. See Broome, *supra* note 21, at 95.

avoiding premature death or devastating injury—for the sake of trivial gains to others cannot be justified to those whose urgent interests are sacrificed. It is only fair to ask some people to bear a significant risk of devastating injury when the burden of eliminating that risk is comparable to the burden of bearing it. Devastating injury must only be risked either when those most imperiled by the risk would be harmed even more if the risk were curtailed, or when an improvement in their security would impose a comparable burden on others affected by the risk.

Cost-benefit analysis—and cost-justified precaution—is insensitive to the demand that death and devastation should only be risked in the name of some comparable value. Cost-benefit analysis treats all costs and all benefits as fungible at some ratio of exchange, and aggregates costs and benefits across persons. This analysis supposes that some loss of life or health can always be offset by some increase in wealth, no matter how trivial the effect of that increased wealth in the lives of those who benefit from it. Cost-justified precaution, therefore, demands too little in the way of precaution against risks of death and devastation. The safety and feasibility norms, in contrast, articulate standards of precaution which are sensitive to these requirements of fairness and comparability and which focus on the appropriate class of risks. The significance requirement singles out a class of risks of devastating injury that are worthy candidates for reduction. The safety and feasibility standards themselves embody conceptually coherent and normatively defensible alternatives to cost-justified precaution. In a society in which food is abundant enough to ensure adequate nutrition, the implicit claim of comparable value made by the Food Quality Protection Act of 1996²⁰⁶—that the benefits of increased agricultural productivity are not sufficient to justify bearing a significant risk of serious disease—is a reasonable and convincing one. In a society in which food is abundant enough to ensure adequate nutrition, forgoing more agricultural productivity is not likely, over the long run, to work a harm comparable to that worked by a significant risk of devastating disease.

The assumption embedded in feasibility analysis—that the cessation of the productive activity on which a worker or consumer depends is a hardship comparable to a significant risk of death or debilitation—is likewise often a reasonable one. When the loss of one job entails the loss of all jobs in that industry, and when that industry—milling cotton, refining petroleum—is indistinguishable

206. See *supra* note 71.

from many other basic industries, the disadvantage of eliminating significant risk of devastating injury to the workers put at risk of such injury may well be greater than the disadvantage of bearing that risk. Even when the assumption that the party most disadvantaged by the activity in question would be made worse off by the elimination of that activity is mistaken—even when the activity itself imposes an unfair burden on those it most imperils—it may still be best, in general, to accept the continued flourishing of the activity as a limit on the pursuit of fair risk reduction. Ensuring that only “fair” activities flourish is a task whose demands generally outstrip the institutional competencies of courts and administrative agencies.

Because they are sensitive to the incommensurabilities of value which help to define the problem of devastating injury, and because they articulate normatively defensible and conceptually coherent alternatives to cost-justified precaution, the safety and feasibility standards merit careful consideration. Their prescriptions of the precaution that we must take against risks of severe and irreparable injury are the best articulation our legal system has yet offered of our inchoate, but deeply held, moral intuition that especially stringent precautions must be taken against risks of death and devastation.

Darwin, Design, and Disestablishment: Teaching the Evolution Controversy in Public Schools

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In recent years, the question of how public schools ought to teach evolution has once again surfaced as an exceedingly controversial issue. In June of 2001, the U.S. Senate adopted nonbinding language in an education bill urging public schools to teach students about the evolution controversy. Although this language was ultimately taken out of the final bill, it is clear from the legislative history of the proposal that some Senators supported the proposal because they believe science classrooms should present alternatives to evolutionary theory, such as the purportedly scientific theory of "intelligent design." Moreover, in 2002, the State Board of Education in Ohio considered a number of proposals that would have required or encouraged public schools in that state to teach alternatives to evolution, including intelligent design. This Article evaluates the Senate and Ohio proposals as a vehicle for considering the more general question of whether school boards or other administrative bodies ought to encourage or require schools to teach intelligent design as an alternative to evolution. The Article argues that schools should teach about religious views on the origins of the universe and human life in separate classes about religion as a way of preparing students to participate effectively in American democratic processes. The Article further argues, however, that schools should not teach alternatives to evolution in the science classroom. Such an educational reform, the Article suggests, would bring about little if any educational benefit, would send the wrong message to students about religion, and would pose a significant risk of constitutional invalidation.
