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Toward a Proper Test for Design Defectiveness: "Micro-Balancing" Costs and Benefits

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I. Introduction

Searching for a proper way to define the elusive notion of a "defective" product design, courts increasingly frame the liability test in terms of some form of balance.[1] The *Restatement (Third) of Torts: Products Liability* explicitly adopts a "risk-utility"[2] test as the standard for determining the defectiveness of product designs,[3] and both courts and

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In view of this Symposium's dedication to Dean Page Keeton and his contributions to tort law scholarship, I am pleased to acknowledge the many ways in which my understanding of the law of torts is built upon Dean Keeton's enduring contributions to the literature. I am also especially pleased to acknowledge my privilege in working with him over the last two decades on W. PAGE KEETON, DAN B. DOBBS, ROBERT R. KEETON & DAVID G. OWEN, PROSSER AND KEETON ON THE LAW OF TORTS (5th ed. 1984) and on three editions of our casebook, DAVID G. OWEN, JOHN E. MONTGOMERY & W. PAGE KEETON, PRODUCTS LIABILITY AND SAFETY (3d ed. 1996).

1. At an early date in the development of products liability law, Dean Keeton recognized the necessity for such a liability test in design defect cases. *See, e.g.*, Page Keeton, *Product Liability and the Meaning of Defect*, 5 ST. MARY'S L.J. 30, 39 (1973) ("[T]here is no way to avoid a risk-benefit analysis in passing upon designs."). The widespread judicial use of some form of balancing test is now well established. *See, e.g.*, Mary J. Davis, *Design Defect Liability: In Search of a Standard of Responsibility*, 39 WAYNE L. REV. 1217, 1238-39 (1993); David G. Owen, *Risk-Utility Balancing in Design Defect Cases*, 30 U. MICH. J.L. REFORM 239 app. (1997) [hereinafter Owen, *Risk-Utility Balancing*] (reporting the results of a survey of such tests); *see also* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(b) cmt. d reporters' note (Proposed Final Draft 1997).

2. This form of test is also variously referred to as a "danger-utility," "risk-benefit," or "cost-benefit" test or standard. *See infra* notes 97-98 and accompanying text.

3. The *Restatement* provides as follows:

> A product . . . is defective in design when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design . . . and the omission of the alternative design renders the product not reasonably safe . . . .

commentators now largely agree that such a balancing test may finally and properly prevail as the victor in its long battle with the consumer expectations test for supremacy in the field.[4] Although the Reporters' comments to this section of the new *Restatement* provide broad guidelines on the types of factors that ought (and ought not) to be considered in rendering such a balance, they fail to provide specific guidance on the balancing method—on just how the balance should be accomplished.[5] This vagueness in describing the balancing process mirrors the failure of appellate courts and commentators to focus clearly upon the components and process of proper cost-benefit balancing determinations. Trial courts, lawyers, and juries routinely are misinformed, or are not informed at all, about the crucial question at the heart of every design defect case: *What* should be balanced against *what*? This conceptual gap leaves a gaping hole at the center of the law governing product design liability, which itself lies at the core of products liability law.

It really is quite remarkable that so little attention has been directed toward what may be the single most central definitional issue in all of products liability law. While many commentators have probed various aspects of risk-utility analysis in the process of exploring the notion of design defectiveness, few have focused closely on the purpose and nature of the risk-utility test itself. And, with the exception of a small number of economic modelers,[6] those who have looked closely at this test at play

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RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(b) (Proposed Final Draft 1997). Comments a, d, e, and f to § 2 explain this test to be a risk-utility balancing test. *See id.*; *see also infra* note 15 and accompanying text.

4. *See, e.g.*, Banks v. ICI Americas, Inc., 450 S.E.2d 671, 674 (Ga. 1994); Sperry-New Holland v. Prestage, 617 So. 2d 248, 254-56 (Miss. 1993) (both adopting the risk-utility standard for design defect cases); Michael D. Green, *The Schizophrenia of Risk-Benefit Analysis in Design Defect Litigation*, 48 VAND. L. REV. 609, 615-16 (1995); Keith Miller, *Design Defect Litigation in Iowa: The Myths of Strict Liability*, 40 DRAKE L. REV. 465, 476 (1991). Some commentators continue to object. *See, e.g.*, Jerry J. Phillips, *Achilles' Heel*, 61 TENN. L. REV. 1265, 1268 (1994) (arguing that the consumer expectation test rightly "underpins" much of the current products liability law and should be maintained); Marshall S. Shapo, *In Search of the Law of Products Liability: The ALI Restatement Project*, 48 VAND. L. REV. 631, 667-68 (1995) (rejecting the exclusivity of the risk-utility test and arguing that courts should consider both the consumer expectations and the risk-utility tests).

5. Comment f to § 2 lists several factors among "[a] broad range of factors [that may be relevant] in determining whether an alternative design is reasonable and whether its omission renders a product not reasonably safe," including "[t]he relative advantages and disadvantages of the product as designed and as it alternatively could have been designed." RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 cmt. f (Proposed Final Draft 1997).

6. Most notable is Professor Kip Viscusi, who has explored various aspects of the risk-utility test from an economic perspective. *See* W. KIP VISCUSI, REFORMING PRODUCTS LIABILITY 62-86 (1991); W. Kip Viscusi, *Wading Through the Muddle of Risk-Utility Analysis*, 39 AM. U. L. REV. 573 (1990); *see also* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW §§ 6.1 & 6.6 (4th ed. 1992) (analyzing the various complexities and misapplications of the risk-utility test through economic models); Alan Schwartz, *Proposals for Products Liability Reform: A Theoretical Synthesis*, 97 YALE L.J. 353, 386-88 (1988) (concluding that the risk-benefit test is not valuable in practice beeause of its economic

within the specific context of design defectiveness in products liability cases have been more interested in justifying or critiquing its application than in examining its definitional interior.[7]

The purpose of this Paper is to clarify the nature of the balance that defines the interior of design defect decisionmaking in an effort to purge some of the arbitrariness from such decisions. To uncover the basis of the balance, the nature and purpose of risk-utility balancing are first briefly explored. The basic enterprise here, however, is to ascertain with some precision the building blocks and proper formulation of a balancing test for use in design defect determinations. Should the risks (or "costs") and benefits (or "utility") of the manufacturer's chosen design be balanced against one another? Or should they be balanced instead against the risks and benefits of the plaintiff's proposed design alternative? Then again, should the risks of the plaintiff's alternative design be balanced against the costs of that same design? Or should one weigh the costs and benefits of moving from the chosen design to the proposed design, examining only the incremental costs and benefits of such a move? Questions such as these, concerning how the design defect test should be framed and defined, penetrate to the very heart of products liability theory and practice.

My predicate thesis is that the langnage of a liability standard matters—that the "rule of law" is dependent in no small measure upon the proper linguistic formulation of the "rules" of law.[8] This leads to the application of my two principal theses concerning design defect decisionmaking: (1) that the risk-utility test for design defectiveness is in a state of

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complexities); Mary Griffin, Note, *The Smoldering Issue in* Cipollone v. Liggett Group, Inc.*: Process Concerns in Determining Whether Cigarettes Are a Defectively Designed Product*, 73 CORNELL L. REV. 606, 616-22 (1988) (exploring certain inefficiencies involved in design defect cases under the risk-benefit test); Kim D. Larsen, Note, *Strict Products Liability and the Risk-Utility Test For Design Defect: An Economic Analysis*, 84 COLUM. L. REV. 2045, 2045 (1984) (critiquing certain extensions of the risk-utility test on grounds of inefficiency).

7. *See, e.g.*, Richard A. Epstein, *The Risks of Risk/Utility*, 48 OHIO ST. L.J. 469 (1987); Green, *supra* note 4; Miller, *supra* note 4; Barbara Ann White, *Risk-Utility Analysis and the Learned Hand Formula: A Hand that Helps or a Hand that Hides?*, 32 ARIZ. L. REV. 77 (1990). Practitioners, of course, are principally interested in how to use the test to win a design defect case. *See, e.g.*, Paul Rheingold, *The Risk/Utility Test in Product Cases*, 18 TRIAL L.Q., Summer/Fall 1987, at 49. For an abbreviated investigation of many issues examined here and a survey of recent judicial definitions of the risk-utility standard, see Owen, *Risk-Utility Balancing*, *supra* note 1.

8. Despite the inherently "open-textured" nature of language, lawgivers must strive to communicate in words, as clearly as possible, the principles, standards, and rules of law. "If it were not possible to communicate general standards of conduct, which multitudes of individuals could understand, . . . nothing that we now recognize as law could exist." H.L.A. HART, THE CONCEPT OF LAW 124 (2d ed. 1994). Thus, the goal of rule formulation should be "to solve a problem and to do so with language that is readily understandable by those who are affected by it or who must administer it." ROBERT J. MARTINEAU, DRAFTING LEGISLATION AND RULES IN PLAIN ENGLISH 8 (1991). *See generally* WALTER PROBERT, LAW, LANGUAGE AND COMMUNICATION (1972) (expounding upon the importance of linguistic form, style, and grammar in the communication of rules of law).

definitional confusion, not only between jurisdictions, but in virtually every court, and (2) that this state of confusion is unprincipled, unnecessary, and readily curable if courts (and legislatures) focus definitionally on precisely what the test should be.

The quarrel in this Paper is with the *language* of the law, not the law in practice. Indeed, the Paper concludes that the prevailing appellate court definition of the design defect balance conflicts starkly with how trial courts and lawyers commonly apply the law in design defect adjudications in courtrooms across the nation. During the 1960s and 1970s, when the very foundations of products liability law were in a state of tumultuous development, loose talk about the developing concepts was understandable. Now that the general theory and doctrine of products liability law has matured, however, with an entire *Restatement* dedicated to this subject, such loose talk concerning the central liability test should no longer be tolerated. It is high time, in other words, for the language of design defectiveness to catch up to the law in practice.

This Paper argues that design defectiveness is best determined by using a form of "*micro*-balance" which focuses on the costs and benefits of adopting the particular alternative design *feature* proposed by the plaintiff, rather than by attempting a global "*macro*-balance" of *all* the risks and benefits of either the chosen or the alternative design. Thus, if the plaintiff frames the issue in terms of the defectiveness of an outboard motor not equipped with a propeller guard,[9] the proper inquiry concerns the balance of costs and benefits that would result from *adding* such a guard—not the costs and benefits of outboard motors generally, without such guards, and certainly not the broader costs and benefits of power boats propelled by motors. Similarly, a plaintiff's proposed design feature might involve *removing* some hazardous component from the product, such as a dangerous hood ornament on a car.[10] Here, the only pertinent costs and benefits would concern the removal of the hood ornament from the car—not the broader risks and benefits of cars that sport nifty, but dangerously sharp, hood ornaments. This form of micro-balancing analysis describes quite well how design defect cases are actually litigated in the trial courts, but it does not comport at all with how most appellate courts define the balance.

Exploring the nature of the micro-balance concept reveals its justifiability, both in terms of logical theory and the practical realities of the

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9. *See* Fitzpatrick v. Madonna, 623 A.2d 322 (Pa. Super. Ct. 1993) (involving a teenager who was struck and killed by a power boat propelled by an outboard motor with unguarded propeller blades).

10. *Cf.* Hatch v. Ford Motor Co., 329 P.2d 605 (Cal. Dist. Ct. App. 1958) (involving an injury in which a child's eye was pierced by a ten-inch-long hood ornament on a parked car).

litigation process, as the proper foundation for a test of design defectiveness. The findings from this inquiry form the basis for formulating a proper micro-balance design defect test, and the Paper proceeds to develop and explain different versions of one such test. Finally, the Paper explores how the micro-balance standard should be named and how the term "cost-benefit" is superior to "risk-utility." The Paper concludes that shifting explicitly to a micro-balance formulation of the design defect liability test, and abandoning the "risk-utility" name as well, should help substantially to clarify the muddled state of "law" at the center of products liability litigation.

II. The Nature and Purpose of the Risk-Utility Test

In a products liability case in which the plaintiff attributes his injury to some aspect of a product's design, a standard or test of liability is necessary in order to determine whether the product supplier should or should not be responsible for the plaintiff's harm. The most fundamental premise of any design liability test is the necessity of limitation—manufacturers should only be accountable for the results of some, not all, product accidents.[11] And so the most fundamental purpose of the risk-utility test is to separate the bad products from the good, to hold accountable manufacturers of products designed with excessive risks, and to protect manufacturers of products that are safe enough.[12]

One may quarrel, of course, with any test that does not provide a bright-line rule in product design cases.[13] But the immense basket of complexities involved in properly designing a product (and in reviewing such a decision in court after a product accident)—a basket that includes

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11. This is expressed in an early Oregon decision:

> The problem with strict liability of products has been one of limitation. No one wants absolute liability where all the article has to do is to cause injury. To impose liability there has to be something about the article which makes it dangerously defective without regard to whether the manufacturer was or was not at fault for such condition. A test for unreasonable danger is therefore vital.

Phillips v. Kimwood Mach. Co., 525 P.2d 1033, 1036 (Or. 1974).

12. *See, e.g.*, Denny v. Ford Motor Co., 662 N.E.2d 730, 735 (N.Y. 1995) (observing "that there are both risks and benefits associated with many products and that there are instances in which a product's inherent dangers cannot be eliminated without simultaneously compromising or completely nullifying its benefits").

13. *See* RICHARD A. EPSTEIN, MODERN PRODUCTS LIABILITY LAW 88, 69-92 (1980) (noting that a defendant "has no possible way of knowing in advance whether be has properly weighed the imponderables of a cost-benefit analysis. What is needed today is some standard, be it wise or foolish, so that firms can know the rules of the game at the time of manufacture, and juries can know them at time of trial"); Epstein, *supra* note 7, at 469 (attacking "the incurable judicial fondness for replacing fixed rules of tort liability with open-ended balancing tests"). *See generally* RICHARD A. EPSTEIN, SIMPLE RULES FOR A COMPLEX WORLD 215, 211-45 (1995) (arguing that the "defect of modern product liability law" is its substitution of complex rules for "a simpler set of common law rules").

such diverse considerations as engineering constraints; expense; consumer preferences for utility, cost, and safety;[14] and human psychology—suggests the need for a liability test that is subtle, intelligent, and robust. That is, determining whether a product design is safe enough, or whether instead the product ought to have been designed more safely, involves a sophisticated balance of such factors as engineering technology, cost, the magnitude of the risk, the extent to which a design change could help reduce the risk, the effect of such a change on the product's utility, and the ability of consumers to perceive and control the risk themselves.[15] Generally, consumer expectations of product safety are best addressed through warnings and instructions, and the propriety of design decisionmaking is usually best resolved by an evaluative balance of costs and benefits.[16]

Principles of equal freedom, utilitarianism, and economic efficiency inherent in the tort law system of corrective justice support the use of cost-benefit balancing precepts to test the propriety of design decisionmaking,[17] and such balancing precepts also reflect simple common sense. Nearly all reasoned decisions reflect a weighing of the costs and benefits expected to flow from a contemplated course of action,[18] and product design decisions

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14. To say nothing of other factors such as aesthetics, reliability, durability, ease and cost of operation, maintenance, and repair.

15. The *Restatement* provides in part:

> The factors include, among others, the magnitude and probability of the foreseeable risks of harm, the instructions and warnings accompanying the product, and the nature and strength of consumer expectations regarding the product. The relative advantages and disadvantages of the product as designed and as it alternatively could have been designed may also be considered. Thus, the likely effects of the alternative design on production costs; the effects of the alternative design on product longevity, maintenance, repair, and esthetics; and the range of consumer choice among products are factors that may be taken into account.

RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 cmt. f (Proposed Final Draft 1997). Many courts recite (but infrequently apply) the much broader catalogue of considerations in Dean Wade's renowned seven liability factors. *See* John W. Wade, *On the Nature of Strict Tort Liability for Products*, 44 MISS. L.J. 825, 837-38 (1973). *See generally* VISCUSI, *supra* note 6, at 575-91 (critiquing Wade's seven liability factors).

16. *See supra* notes 1-5 and accompanying text.

17. *See generally* David G. Owen, *The Moral Foundations of Products Liability Law: Toward First Principles*, 68 NOTRE DAME L. REV. 427, 479 (1993) [hereinafter Owen, *Moral Foundations*].

18. *See, e.g.*, Letter from Benjamin Franklin (Sept. 19, 1772) (suggesting, as an aid to rendering difficult decisions, that one list and consider "all the reasons pro and con" and contemplate "where the balance lies"), *reprinted in* EDWARD M. GRAMLICH, BENEFIT-COST ANALYSIS OF GOVERNMENT PROGRAMS 1-2 (1981). Franklin said:

> [T]hough the weight of reasons cannot be taken with the precision of algebraic quantities, yet when each is thus considered, separately and comparatively, and the whole lies before me, I think I can judge better, and am less liable to make a rash step, and in fact I have found great advantage from this kind of equation, in what may be called moral or prudential algebra.

are no different. A responsible member of society contemplating action will weigh the expected costs and benefits to others as well as to himself, as reflected in Learned Hand's celebrated $B < P \times L$ formula in *United States v. Carroll Towing Co.*[19] In the products liability context, a manufacturer fairly may be charged with maximizing not only profits but also consumer welfare, which is comprised of product usefulness, affordability, and safety to consumers and third parties.[20] Testing the propriety of a manufacturer's design decisions on such a basis embraces the principles of reasonableness, optimality, and balance which support both the negligence and strict liability standards of liability for judging the quality of product design decisions.[21]

III. Judicial Definitions of the Risk-Utility Test

A. *The Problem of Definitional Confusion*

Given the widely accepted propriety of employing some form of "risk-utility" balancing test in design defect cases, the question becomes just how to define the test—precisely what should be balanced against what? Since appellate courts serve as the arbiters of such common-law liability questions, it is reasonable to begin the inquiry by examining the definitions provided by appellate courts. Yet surveys of such opinions reveal a vast disparity of definition.[22] From court to court, and from judge to judge, definitions of the risk-utility test vary widely. Even within the same opinion, it is not unusual for a single judge to enunciate the test in two, three, or even more different ways, demonstrating the definitional problem and the need for definitional focus. The existence of such disparity

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Id. at 2 (emphasis omitted). Consider also Oliver Wendell Holmes, Jr., *The Path of the Law*, 10 HARV. L. REV. 457, 474 (1897) (advising that "for everything we have to give up something else, and we are taught to set the advantage we gain against the other advantage we lose").

19. 159 F.2d 169, 173 (2d Cir. 1947) (expressing the concept algebraically as negligence being implied if $B < P \times L$, where B is the burden or cost of avoiding accidental loss, P is the probability of loss ahsent B, and L is the expected magnitude or cost of such loss). Hand first employed this approach in *Conway v. O'Brien*, 111 F.2d 611, 611-12 (2d Cir. 1940), *rev'd on other grounds*, 312 U.S. 492 (1941), and he subsequently reexamined it in *Moisan v. Loftus*, 178 F.2d 148, 149 (2d Cir. 1949). For a considered review of the origins of risk-benefit analysis in early American tort law and its path into modern products liability law, see Michael D. Green, *Negligence=Economic Efficiency: Doubts >*, 75 TEXAS L. REV. 1605 (1997).

20. *See* Owen, *Moral Foundations*, *supra* note 17, at 477-79.

21. *See* David G. Owen, *Defectiveness Restated: Exploding the "Strict" Products Liability Myth*, 1996 U. ILL. L. REV. 743, 753-61 [hereinafter Owen, *Defectiveness Restated*] (explaining the principles of reasonableness, optimality, and balance and the practical equivalence of negligence and strict liability in the design defect context).

22. For two such surveys, see Owen, *Risk-Utility Balancing*, *supra* note 1; John F. Vargo, *The Emperor's New Clothes: The American Law Institute Adorns a "New Cloth" for Section 402A Products Liability Design Defects—A Survey of the States Reveals a Different Weave*, 26 U. MEM. L. REV. 493 (1996).

surrounding the central products liability issue hardly inspires confidence in the "law" and surely is a cause for despair by those bound to govern their conduct according to its rules.

Examples of definitional confusion abound. One instructive example is *Nichols v. Union Underwear Co., Inc.*[23] At issue in *Nichols* was the design defectiveness of a young boy's cotton and polyester T-shirt that caught fire. The Kentucky Supreme Court, faced with "the difficult problem of describing the standard to which the fact finder should compare the product to decide whether it was [defective],"[24] proceeded to reject the trial court's definition of defectiveness in consumer contemplation terms and to replace it with the Wade-Keeton standard of whether a prudent clothing manufacturer, fully aware of the risk, would have placed the product on the market.[25] Of greater interest here, however, is the concurring opinion of Justice Lukowsky, worth examining in full:

> I agree with the opinion of the majority as far as it goes. However, the opinion leaves the law in products liability design defect cases amorphous. It fails to identify the gut issue.
>
> I believe that whether a design is unreasonably dangerous must be determined by a social utility standard—risk versus benefit. [1] If the benefits to be gained by the consuming public outweigh the risks of danger inherent in a particular design, such a product cannot be "unreasonably dangerous." The bottom line is that [2] the trier of fact is required to balance two pairs of factors existing at the time of manufacture: (1) the likelihood that the product would cause the claimants harm or similar harms, and the seriousness of those harms; against (2) the manufacturer's burden of designing a product that would have prevented those harms, and the adverse effect that alternative design would have on the usefulness of the product. That is to say that [3] the manufacturer is not liable unless at the time of manufacture the magnitude of the danger to the claimant outweighed the utility of the product to the public. The ultimate inquiry is risk versus benefit.

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23. 602 S.W.2d 429 (Ky. 1980).

24. *Id.* at 432-33.

25. Deans Keeton and Wade separately proposed the so-called "Wade-Keeton test," adopted by many courts, as a test for design defectiveness early in the development of products liability law. *See* W. Page Keeton, *Products Liability—Inadequacy of Information*, 48 TEXAS L. REV. 398, 403-04 (1970) [hereinafter Keeton, *Inadequacy of Information*]; Page Keeton, *Products Liability—Current Developments*, 40 TEXAS L. REV. 193, 210 (1961) [hereinafter Keeton, *Current Developments*]; Wade, *supra* note 15, at 834-35; John W. Wade, *Strict Tort Liability of Manufacturers*, 19 SW. L.J. 5, 15 (1965). For both scholars' formulations of the test, see *infra* note 74. Although many courts still embrace this test, it "has not worn well with time." RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 cmt. m reporters' note (Proposed Final Draft 1997); *see also* DAVID G. OWEN ET AL., PRODUCTS LIABILITY AND SAFETY 545 (3d ed. 1996) ("As the notion of true 'strict' products liability has been sliding into disfavor in design and warnings cases in recent years, the Wade-Keeton test has declined as well."); *infra* note 28.

> In the event of another trial, I believe the jury should be instructed as follows:
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> [4] You will find for the Plaintiff if you are satisfied from the evidence that at the time of the manufacture of the cotton and polyester T-shirt the risk of harm from its being accidentally set on fire while being worn by a child outweighed the benefit to the public from its availability in the marketplace. Otherwise, you will find for the defendant.[26]

Justice Lukowsky surely was astute in attempting to identify precisely what should be balanced against what in a "risk-benefit" test for design defectiveness. Moreover, he properly ignored the siren call of Dean Wade's troublesome seven-factor standard to which so many other courts have at least nominally succumbed.[27] Yet the definitional confusion spawned by this one, short opinion—if one takes words and the concepts they represent seriously—is simply astonishing. Examining Justice Lukowsky's opinion reveals several fundamentally different formulations of the balancing test:

[1] balance the chosen design's utility ("benefits") to the public against the chosen design's risks to the public;

[2] balance the chosen design's risks to the public against the alternative design's cost plus the diminished utility to the public;

[3] balance the chosen design's risks to the plaintiff against the chosen design's utility to the public; and

[4] balance the chosen design's risk to the public against the chosen design's utility to the public.

Formulations [1] and [4], nearly mirror images of each other, are virtually the same test: balance the chosen product design's risks to the public against its social utility. Formulation [2] shifts to a balance of the chosen design's risks against the various costs of avoiding them with an alternative, safer design. Formulation [3] substitutes the risks to the *plaintiff* for the risks to the public. Given the practical identity of formulations [1] and [4], Justice Lukowsky's opinion provides three analytically distinct risk-utility tests for design defectiveness, each of which might produce varying results on different facts.

As a partial explanation for this confusing combination of conflicting tests, it should be noted that *Nichols* was decided at a fairly early date in the development of risk-utility design defect jurisprudence. The commentators themselves had only begun to explore the advisability of using some form of risk-benefit balancing test and had offered little guidance on how properly to formulate the components of the balance. In many respects,

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26. *Nichols*, 602 S.W.2d at 434 (Lukowsky, J., concurring) (citations omitted).

27. *See generally* Epstein, *supra* note 7; Green, *supra* note 4; Viscusi, *supra* note 6.

Justice Lukowsky was actually ahead of his time in attempting to move beyond the superficial rhetoric of section 402A's "defective condition unreasonably dangerous" language and the problematic Wade-Keeton liability test[28] to a forthright cost-benefit standard. But his opinion in *Nichols* is marred, as most opinions still are today, by confusion in how to formulate the balancing test.[29] Definitional confusion, in other words, remains a problem to be solved.

B. The Disturbing Trend Toward a Macro-Balance Definition

After *Nichols* was decided in 1980, as courts across the land increasingly applied some form of risk-utility balancing test in design defect cases, it would have seemed that proper and clear formulations of a balancing test would emerge and eventually predominate. One might have expected that experience in applying the test to differing factual scenarios would reveal its strengths and weaknesses, which would permit courts to refine and purify the test both conceptually and linguistically. While a small number of courts and legislatures in recent years have indeed developed liability tests that describe the balance fairly well,[30] other courts have stumbled into and out of proper formulations almost willy-nilly,[31] and most recent efforts at judicial definition amount to little more

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28. The test is problematic because, by adopting a truly "strict" standard of responsibility for design and warnings defects, it runs counter to the now widely accepted view that foreseeability should limit liability for such defects. *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 cmt. m & reporters' note (Proposed Final Draft 1997); *see also supra* note 25.

29. Confusion in the general definition of a design defect balancing test should be distinguished from unintentionally defining it in a backwards form. *See, e.g.*, Horton v. American Tobacco Co., 667 So. 2d 1289, 1293-94 (Miss. 1995) (Hawkins, C.J., concurring in part and dissenting in part) (concluding, seemingly backwardly, that a plaintiff would "flunk" a risk-utility test if the product's risk outweighed its utility or benefit). Academics also are susceptible to "backwardsitis," as demonstrated by Dean Keeton's definition in 1961 of what was to become the Wade-Keeton risk-utility test. *See infra* note 74.

30. Consider, for example, *Westbrock v. Marshalltown Manufacturing Co.*, 473 N.W.2d 352, 356 (Minn. Ct. App. 1991) (basing design liability on "a balancing of the likelihood of harm, and the gravity of the harm if it happens, against the burden of the precaution which would be effective to avoid the harm" (quoting Billota v. Kelley Co., 346 N.W.2d 616, 624 (Minn. 1984) (quoting Micallef v. Miehle Co., 348 N.E.2d 571 (N.Y. 1976)))). *See also* Anderson v. Weslo, Inc., 906 P.2d 336, 340 (Wash. Ct. App. 1995) (ordered to be published Nov. 28, 1995) (summarizing a statute: a product is "not reasonably safe as designed" if "the likelihood and seriousness of harm outweighs the burden on the manufacturer to design a product that would have prevented that harm (and outweighs any adverse effect that an alternative design would have on the product's usefulness)"). In *Anderson*, which involved a defective design claim by a teenager who broke his neck while attempting a double flip on a trampoline, the court held that the statute precluded recovery in the absence of an alternative design that would have prevented the injury.

31. For an example of this phenomenon in a single judicial opinion, consider Judge Lukowsky's opinion, discussed above, in which his second formulation is essentially correct. For an example from a line of cases in a jurisdiction over time, consider the New York Court of Appeals decisions on design defectiveness decided over the last two decades, from *Micallef v. Miehle Co.*, 348 N.E.2d 571 (N.Y.

than reconstructions of earlier, poorly cast formulations.[32] Why the courts generally have failed to improve their design defect balancing test formulations is difficult to understand and probably reflects a number of institutional and other factors.[33] Moreover, the commentators have dropped the ball as well, for the development of products liability theory and doctrine over the years has depended to a unique degree upon the creative work of the law academy.[34] Indeed, early in the development of products liability theory, the law academy itself played a major role in thrusting the confused macro-balance conception into the law of design defectiveness.[35] Thus, responsibility fairly falls to the academy to help lead the way back to truth and clarity in the reconception of a proper balancing test for design defectiveness.

1976), to *Denny v. Ford Motor Co.*, 662 N.E.2d 730 (N.Y. 1995). An examination of the opinions from *Micallef* to *Denny* (including those in between) reveals an experimentation with most of the variety of definitions offered by courts and commentators over the years, including the now largely discredited Wade-Keeton test (reaffirmed in *Denny*), the Wade factors as liability determinants themselves, the consumer contemplations test (and rendering it equivalent to a risk-utility test), and various formulations of the risk-utility test itself. In *Voss v. Black & Decker Manufacturing Co.*, 450 N.E.2d 204, 208 (N.Y. 1983), relied upon heavily in *Denny*, the court offered many differing ways to define design defectiveness, including a version that approached a proper micro-balance formulation. The court in *Denny*, however, overlooked this sound approach and defined the risk-utility balancing test to require "a weighing of the product's dangers against its over-all advantages," an explicitly macro-balance formulation. *Denny*, 662 N.E.2d at 730.

32. See, for example, *Denny*, 662 N.E.2d at 735-36, where the court cobbled together various risk-utility test formulations and selected factors from a large variety of tests used in earlier opinions without explaining why other earlier formulations were rejected and without reconciling conflicts in the factors or justifying formulations currently in favor.

33. Such factors include the lack of judicial time for independent development of theoretical constructs, the greater interest of the parties in evidentiary matters, the courts' generally reactive nature to dispute resolution, the strength of precedent in liability definitions, and perhaps the insignificance of legal rules. For another explanation, see *infra* note 74 and accompanying text.

34. This is not to say that all commentstors have incorrectly described the nature of the design defect balancing test, for some from time to time define it properly. *See, e.g.*, Miller, *supra* note 4, at 476-77 (noting that such tests "involve a balancing of the risks inherent in the specific feature of the product's design that is being challenged as defective against the value or benefits of that design feature"). Most, however, have failed to focus closely on the nature of the balance and so, like the courts, have often spoken loosely in macro-balance terms. *See, e.g.*, W. PAGE KEETON ET AL., PROSSER & KEETON ON THE LAW OF TORTS § 99, at 699 (5th ed. 1984) ("Under [the 'danger-utility test'] approach, a product is defective as designed if, but only if, the magnitude of the danger outweighs the utility of the product."); David G. Owen, *The Graying of Products Liability Law: Paths Taken and Untaken in the New* Restatement, 61 TENN. L. REV. 1241, 1251-52 (1994) (indicating that the risk-benefit test involves "[b]alancing the risks and benefits of various designs, most particularly the design of the accident product as compared to the alternative design proposed by the plaintiff's experts"); *cf.* William C. Powers, Jr., *The Persistence of Fault in Products Liability*, 61 TEXAS L. REV. 777, 784 (1983) ("The risk-utility test evaluates the reasonableness of a product's risks by balancing the magnitude of those risks against the benefits of imposing them.").

35. In the 1960s and early 1970s, Deans Page Keeton and John Wade, in a series of articles, both proposed that design defectiveness be determined by a risk-benefit, risk-utility, or danger-utility balancing test, which they both formulated in global terms. *See infra* note 74.

In Kentucky, where *Nichols* was decided some time ago, the problematic Wade-Keeton liability standard[36] remains the law; so far, the Kentucky Supreme Court has failed to reconsider the question of how the risk-utility test should be defined.[37] Nor has there been discernable improvement in the definitions of the design defect balancing standard applied by most other courts in recent years, as state-by-state surveys plainly indicate.[38] Indeed, the quality of such definitions in some instances has markedly deteriorated.[39] Thus, rather than evidencing a movement toward clarification and refinement, the definitional "development" of the risk-utility test in the appellate courts reveals a profusion of confusion.

A survey of balancing test definitions for design defectiveness presently used by appellate courts across the nation shows a diversity of approaches,[40] but it also reveals a disturbing trend. A definition now recurring with enough frequency to be characterized as dominant may be summarized as follows: *A design is defective if the product's risks exceed its utility*.[41] Despite its increasing popularity, however, this formulation

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36. *See supra* notes 25, 28.

37. *Nichols* remains Kentucky's authority on design defectiveness. *See* Clark v. Hauck Mfg. Co., 910 S.W.2d 247, 250 (Ky. 1995).

38. *See supra* note 22.

39. For example, contrast *Denny v. Ford Motor Co.*, 662 N.E.2d 730 (N.Y. 1995) (reaffirming the Wade-Keeton test and explicitly formulating the risk-utility test in macro-balance terms), with *Micallef v. Miehle Co.*, 348 N.E.2d 571 (N.Y. 1976) (formulating the design defect negligence test in classic Learned Hand formula terms). *See also supra* note 31 and accompanying text.

40. The survey results are reported and examined in Owen, *Risk-Utility Balancing*, *supra* note 1.

41. *See, e.g.*, Soule v. General Motors Corp., 882 P.2d 298, 308 (Cal. 1994) (indicating that no design defect exists if "the benefits of the . . . design outweigh the risk of danger inherent in such design" (quoting Barker v. Lull Eng'g Co., 573 P.2d 443, 454 (Cal. 1978))); Armentrout v. FMC Corp., 842 P.2d 175, 182 (Colo. 1992) (holding that a jury was properly instructed that a product is defective in design "if it creates a risk of harm to persons which is not outweighed by the benefits to be achieved from such design"); Banks v. ICI Americas, Inc., 450 S.E.2d 671, 673 (Ga. 1994) (describing a consensus among jurisdictions that, in determining design defectiveness, "the risks inherent in a product design are weighed against the utility or benefit derived from the product"); Wagatsuma v. Patch, 879 P.2d 572, 584 (Haw. Ct. App. 1994) (stating that there is no design defect if "the benefits of the design outweigh the risk of danger inherent in that design"); Guiggey v. Bombardier, 615 A.2d 1169, 1172 (Me. 1992) ("To determine whether a product is defectively dangerous, we balance the danger presented by the product against its utility."); Haberkorn v. Chrysler Corp., 533 N.W.2d 373, 380 (Mich. Ct. App. 1995), *appeal denied*, 557 N.W.2d 310 (Mich. 1996) ("In determining whether a defect exists, the trier of fact must balance the risk of harm occasioned by the design against the design's utility."); Sperry-New Holland v. Prestage, 617 So. 2d 248, 254 (Miss. 1993) (concluding that a design is defective if "the utility of the product is outweighed by the danger that the product creates"); Roberts v. Rich Foods, Inc., 654 A.2d 1365, 1371 (N.J. 1995) (characterizing the *O'Brien* test for a product defective in design as whether "its risks outweighed its utility"); Denny v. Ford Motor Co., 662 N.E.2d 730, 735-36 (N.Y. 1995) (stating that ascertaining defectiveness requirea "a weighing of the product's benefits against its risks" and "a weighing of the product's dangers against its over-all advantages"); Hoyt v. Vitek, Inc., 894 P.2d 1225, 1230 (Or. Ct. App. 1995) (determining defectiveness "by balancing the product's utility against the magnitude of the risk associated with its use"); Caterpillar, Inc. v. Shears, 911 S.W.2d 379, 384 (Tex. 1995) (asserting

of the test is flawed as an adjudicatory standard for determining design defectiveness. Defining liability in this manner may retain linguistic fidelity to the name by which the test increasingly is known—"risk-utility"—but it is highly problematic as a liability standard in that it appears to call for a balancing of *all* the risks of "the product" against *all* the product's "utility" or "benefits." This meaning, clearly implied by many court definitions, sometimes is made explicit, as in one court's recent formulation in terms of "balancing the *overall* risk and utility of a product."[42]

This form of global "*macro*-balancing," by which *all* the risks and benefits of a product are aggregated and weighed against each other, is actually a desirable enterprise when engaged in by manufacturers. Indeed, one might well postulate that a manufacturer is duty-bound to seek to maximize "consumer welfare," which is a function of a product's benefits or usefulness (functional and psychological "utility"), affordability ("cost"), and safety.[43] That is, products should possess benefits (their sum of functional and psychological "utility") that exceed their detriments (their affordability and safety costs). Macro-balancing a product's aggregate store of utility, cost, and risk is thus precisely the type of evaluative process that we may fairly expect of product designers before they bring new products to the market.[44] If products fail to possess this kind of net utility, the market should deprive their makers of a profit for their sale, thus driving such products from the market.[45]

In addition to their macro-balance obligations, however, manufacturers have a further, more specific duty to *micro*-balance properly the costs and benefits of plausible methods for incrementally improving the safety of a product's design, and it is this much more focused obligation that trial courts regularly subject to scrutiny in products liability litigation.[46] When

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that determining design defectiveness "requires balancing the utility of the product against the risks involved in its use" (citing Turner v. General Motors Corp., 584 S.W.2d 844, 847 & n.1 (Tex. 1979))). For other examples, see Owen, *Risk-Utility Balancing*, *supra* note 1, app.

42. Penick v. Christensen, 912 S.W.2d 276, 283 (Tex. App.—Houston [14th Dist.] 1995, no writ) (emphasis added); *see also* Johnstone v. American Oil Co., 7 F.3d 1217, 1223 (5th Cir. 1993) (proceeding under Louisiana law, which, at the time, required "that the danger in fact of the product to *society as a whole* be weighed against the utility of the product to *society as a whole*" (emphasis in original) (citation omitted)); *Denny*, 662 N.E.2d at 736 (reasoning that defectiveness "requires a weighing of the product's dangers against its *over-all* advantages" (emphasis added)).

43. *See supra* note 20 and accompanying text.

44. *See* Owen, *Moral Foundations*, *supra* note 17, at 477-79.

45. This should be true except to the extent that safety costs are hidden from or unappreciated by those at risk, as frequently may be the case. A classic example is the continued manufacture, sale, and use of asbestos as a common insulation material over many decades.

46. A court theoretically might hold a manufacturer accountable on *both* macro- and micro-balance grounds. For one court's endorsement of such an approach and its explanation of how the global risk-utility standard relates to the narrower micro-balance standard, see *Beshada v. Johns-Manville Products Corp.*, 447 A.2d 539, 545 (N.J. 1982):

appellate courts instead state the general rule of design defectiveness in *macro*-balance terms, they frame the liability issue in a global manner that is fraught with problems. Putting aside the difficult question of when "product category liability" may be appropriate when no alternative designs are available to avoid a product's inherent risks,[47] the basic liability test should not be framed in terms of whether a product design passes or fails a global test of net utility, for reasons discussed below.

The great majority of products are beneficial at a *macro*-balance level, even if various risks may feasibly be designed away. In the *Nichols* case, for example, untreated cotton-polyester undershirts for young children possess considerable utility, even if they do cause (possibly unnecessary) harm and suffering. Such T-shirts keep young children warm, and they are comfortable, inexpensive, and durable, may not need ironing, and may be free of flame retardant chemicals. Even if several children (say, twenty-five) each year are injured when such T-shirts catch fire, millions of other children benefit from the shirts—they stay warm, comfortable, and free of cancer (from flame-retardant chemicals) because of the availability of such shirts, and millions of parents save money and time (by avoiding ironing). Thus, a true *macro*-balance of all of this product's aggregated risks and benefits reveals that such T-shirts are quite likely not defective in design—even if there is some simple and inexpensive way to minimize the risk (say, by altering the weave)—because they generate, on balance, more social good than harm.

> [W]e 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.

Id. (citations omitted). Despite the theoretical attractiveness of such a bifurcated approach, courts have failed to adopt this formulation of the liability standard, no doubt largely because of the many problems of adjudicating the macro-balance question.

47. The classic examples are cigarettes, handguns, and alcoholic beverages. *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY, § 2 cmts. d & e, illus.5 (Proposed Final Draft 1997) (exploding cigar). For opinions that cigarette manufacturers properly may be held liable under a risk-utility test, viewed from a macro-balance perspective, see *Horton v. American Tobacco Co.*, 667 So. 2d 1289, 1298-1301 (Miss. 1995) (Lee, P.J., concurring and dissenting) and *id.* at 1309-11 (McRae, J., concurring and dissenting). A consideration of the important embryonic issue of generic-risk-product-category liability is beyond the scope of this Paper. *See generally* OWEN ET AL., *supra* note 25, at 440-71; Symposium, *Generic Products Liability*, 72 CHI.-KENT L. REV. 3 (Carl T. Bogus ed., 1996) (both exploring the various issues surrounding product category liability). To the extent that liability may be appropriate in such special cases, however, it is best addressed as an exception to the general liability rule. *See infra* note 93 and accompanying text.

But this kind of *macro*-balance reasoning poses the issue in a problematic manner for purposes of adjudication, and it is not the issue litigated by lawyers in the vast majority of design liability cases. Rather than evaluating a product's macro-balance utility, the question of real significance actually litigated is properly much narrower—whether there was a relatively simple and inexpensive way to prevent the type of harm suffered by the plaintiff. This much more precise question does not purport to evaluate on a global basis the net value of a product. That is, the issue litigated almost always is a *micro*-balance of the pros and cons of the manufacturer's failure to adopt some alternative design that would have prevented the plaintiff's harm—an inquiry into whether the costs of *changing* the overall design in some particular manner would have been worth the resulting safety benefits.[48]

In *Nichols*, for example, if the plaintiff's experts had proposed as an alternative design a tighter weave for the cotton-poly blend material, the proper question for adjudication would have been whether the added cost of such a tight-weave process—together with any loss of comfort, durability, or other utility—was on balance worth the safety benefits of the alternative weave design. And it is the *micro*-costs and *micro*-benefits of this modification choice (or, more precisely, of the manufacturer's conscious or unconscious choice to *avoid* the modification) that is the matter truly at issue in almost every design defect case. Thus, lawyers generally litigate the defect issue by employing a true *micro*-balance test—determining whether the manufacturer could and reasonably should have modified the chosen design in a manner that would have prevented the type of harm suffered by the plaintiff—and appellate courts act antithetically by framing the design defect liability test in *macro*-balance terms.

Once again, the point here is not that macro-balancing a product's risks and benefits is undesirable. It simply is not desirable for the courts:

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48. *See, e.g.*, RICHARD J. HEAFEY & DON M. KENNEDY, PRODUCT LIABILITY: WINNING STRATEGIES AND TECHNIQUES §§ 4.04, 4.05, at 4-9 (1994) (characterizing the manufacturer's choice to forego a reasonable alternative design as "the heart of the plaintiff's case"); *see also* Rheingold, *supra* note 7, at 50 ("The usual and proper approach for a plaintiff in a design defect case is to present evidence on an alternative design which the jury can find should have been adopted for the product in question."). This is the manner in which design defectiveness is defined in the RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 cmts. d & f (Proposed Final Draft 1997) and it reflects more generally how courts and lawyers actually proceed in assessing liability under the Hand formula. One scholar noted:

> The attorney for the plaintiff will try to find some act which, if the defendant had taken it, would have significantly reduced the probability of the accident at low cost [such] that the increment in the expected loss was greater than the cost of avoidance . . . . The defendant will try to respond that the expected benefits of the proposed act were, in fact, less than the costs of undertaking it. [The decisionmaker is then] asked to compare the incremental expected benefits with the incremental costs.

John Prather Brown, *Toward An Economic Theory of Liability*, 2 J. LEGAL STUD. 323, 334-35 (1973); *see also infra* notes 77-82 and accompanying text.

the task is exceedingly complex, multi-layered, intrinsically "polycentric"[49] and "legislative,"[50] and hence especially inappropriate and prone to error in a court of law. Courts and juries are generally poorly suited to judge the overall appropriateness of design choices in the aggregate, and only manufacturers and their design engineers, markets, legislators, and safety regulators should undertake such macro-utility assessments.[51] This is not to say that a manufacturer's design decisions should not be reviewable in a court of law. The point quite simply is that judicial oversight of design decisions should be limited to the micro-balance question of whether and precisely how a product was allegedly designed improperly—provable only by examining the hypothetical costs and benefits of adopting a hypothetical design feature that the product did not possess. This inquiry comports with the way the question is framed at trial in most design defect cases, and it is the issue that most juries in such cases probably do decide.

Yet the rules for defining design defectiveness handed down by appellate courts fail to square with either logic or courtroom practice, and the gap is widening. The trend of judicial proclamation, barely discernable amid the smoke and dust from frequent definitional shifting, appears headed in the wrong direction—toward *macro*-balancing in the aggregate all of a product's risks and utility, as discussed above. This trend is ominous, and it is likely to generate confusion, unnecessary litigation (both trial and appellate), and unprincipled results in courtrooms across the nation. And while a few courts and legislatures have formulated the test in proper terms, many more remain confused and headed down the road of macro-balance folly.

But there is hope. Once courts focus carefully on the true internal structure of the cost-benefit balance, the clear superiority of the *micro*-balance approach should be apparent. The shift from a macro- to a micro-balance approach is linguistically quite simple and undramatic, yet it holds

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49. *See* James A. Henderson, Jr., *Judicial Review of Manufacturers' Conscious Design Choices: The Limits of Adjudication*, 73 COLUM. L. REV. 1531, 1539-42 (1973) (characterizing a manufacturer's process of design decisionmaking as "polycentric" and "managerial").

50. *See* Owen, *Moral Foundations*, *supra* note 17, at 468-77 (characterizing a manufacturer's process of design decisionmaking as "legislative").

51. As one scholar noted:

> [S]ociety-wide assessments . . . as to whether a product should be marketed at all seem better suited to institutions with resources of staff and expertise that juries lack—Congress and regulatory agencies. If the domain of tort liability were restricted to design defect cases involving particular design components, excluding questions of whether a class of products is inherently too risky, the scope of the courts' evaluations would be greatly simplified.

VISCUSI, *supra* note 6, at 85. *But cf.* Clayton P. Gillette & James E. Krier, *Risk, Courts, and Agencies*, 138 U. PA. L. REV. 1027 (1990) (examining the risks of resting responsibility for risk control in technocratic safety agencies).

substantial promise for improving the clarity of issues litigated in design defect cases.

IV. Toward a Proper Micro-Balance Test

The key to intelligent design defect decisionmaking begins with a test of liability that, first, is grounded in sound policy and common sense and, second, is clear, accurate, and workable. As explained in Part II, a properly formulated cost-benefit balancing test ideally suits design defect adjudication because, by nature, it inquires into the reasonableness of a manufacturer's tradeoff choices among the key consumer welfare factors of utility, cost, and safety. As argued in Part III, however, it is neither practicable nor desirable for a court of law to attempt to adjudicate the reasonableness of a manufacturer's global package of tradeoffs inherent in a product's overall design. Instead, the proper adjudicatory issue is much more narrowly confined to the tradeoffs of utility, cost, and safety in the unchosen design *feature* proposed by the plaintiff that was not included in the manufacturer's chosen design. This is the form of *micro*-balance analysis from which a proper liability test for design defectiveness may be formulated, as postulated above. This section looks more closely at the reasons supporting a micro-balance approach, formulates such a test, and inquires into how it should be named.

A. Justifying a Micro-Balance Test

1. A Case Example.—Examining another case illustration may be the best way to begin an explanation of why a design defect test should be framed in terms of *micro*-balancing. Take the notorious case of the Ford Pinto, a small subcompact car sold in the 1970s.[52] The Pinto's fuel tank was located immediately in front of sharp bolts protruding from the differential housing and in fairly close proximity to an insubstantial rear bumper. If a Pinto was hit in the rear by another car, even at relatively low speeds, the Pinto doors might jam shut and the fuel system could rupture—bursting into flames, trapping the occupants inside the car and enveloping them in a ball of fire. Assume that Ford could have avoided the many resulting deaths and burn injuries at a total cost of roughly $10 per car. Assume further that a Pinto driver is killed in a fire that results

52. Although the facts which follow derive from the Pinto litigation, certain facts are omitted and others are slightly altered to create a Pinto-type hypothetical. In fairness to Ford, it should be noted that the Pinto appears in retrospect to have been no more dangerous than most other small subcompact cars at the time. *See* David G. Owen, *Problems in Assessing Punitive Damages Against Manufacturers of Defective Products*, 49 U. CHI. L. REV. 1, 30 n.138 (1982) [hereinafter *Assessing Punitive Damages*]; Gary T. Schwartz, *The Myth of the Ford Pinto Case*, 43 RUTGERS L. REV. 1013, 1027 (1991) (noting that the Pinto's fuel tank location was "commonplace at the time in Ameriean cars").

when another driver strikes the Pinto at low speed from behind, trapping the Pinto driver inside his car. Finally, assume that the victim's estate sues Ford Motor Company, claiming that the Pinto was defectively designed.

Postulating the appropriateness of using some form of balancing test for evaluating the propriety vel non of the Pinto's design, the question of interest here is whether the balancing test should employ a *macro*-balance or a *micro*-balance approach. In either negligence or strict liability, surely the plaintiff would frame the claim in terms of how Ford failed to avoid the accident. In particular, the plaintiff would propose certain feasible, simple, and relatively inexpensive design features that Ford could have adopted but did not. For example, the plaintiff might allege that Ford should have lined the tank with a rubber bladder to prevent fuel leakage, protected the tank against puncture from the bolts with a metal shield or with a larger trunk (to increase crush space), strengthened the rear structure by adding steel support beams horizontally inside the bumper, or protected the integrity of both the tank and doors by adding steel support beams longitudinally along the sides.

Surely Ford would defend such design defect claims by showing the impracticality of the plaintiff's proposals in terms of utility, cost, and safety. For example, Ford would seek to prove that the rubber in a gas tank bladder would rapidly deteriorate and clog up the carburetor, that shielding the tank would increase the risk of its fracturing at its seams, that increasing the trunk size (and hence the car's length) would convert the Pinto from a subcompact into a compact car (making it more expensive to buy and drive and harder to park), and that buttressing the rear and sides with more steel members would make the car more expensive, heavier (and hence less fuel-efficient), and more rigid (and hence more dangerous to the necks of occupants in more typical rear-end collisions). In sum, Ford would attempt to prove that none of the plaintiff's proposed alternative designs was worth the added costs (including diminished utility and diminished safety) that would result. Putting aside the merits of such arguments, these are the kinds of issues that are properly litigated in a design defect case: they are reasonably precise and capable of rational adjudication. These are the *micro*-balance issues surrounding the manufacturer's failure to adopt the plaintiff's proposed alternative design.

Now let us examine how a *macro*-balance analysis would operate in such a case. Assume, first, that a court instructs a jury according to a *macro*-balance risk-utility test, and, second, that the lawyers and jury interpret the instruction literally. Under such an approach, the jury would be asked to determine if "the product's risks exceeded its utility,"[53] in which case the jury would be instructed to find the design defective. A

53. *See supra* note 41 and accompanying text.

jury interpreting the word "product," of course, would probably assume that it meant the Pinto *taken as a whole*, not simply its gas tank or its fuel system. The Pinto's risks would include the deaths and injuries to all persons killed and injured in fires caused by rear impacts. But the product's "risks" also would fairly seem to include all other types of risk, including injuries in every other type of collision—side-impact collisions, rollovers, car-pedestrian collisions, and drunken drivers smashing into concrete walls and driving off of cliffs—together with all types of non-collision risks, such as dashboard fires from electrical failures,[54] hot exhaust systems igniting dry leaves or hay,[55] and persons closing themselves in car trunks in an effort to kill themselves.[56]

Finally, assuming (counter-intuitively) that the parties could somehow prove and quantify all of these different kinds of risks, the next step would be to examine the utility ("benefits") side of the *macro*-balance equation. On this side of the balance, however, even theoretical evaluation is problematic, for there is no coherent way to tally up the value of all the beneficial uses of a multi-purpose product like a car. How can one list, much less compute the value of, the myriad uses of even a single model of a mass-produced automobile in our society? Over two decades, Pintos transported millions of Americans to work, to school, to church and synagogue, to visit friends and family, and to play at this and that. Surely the aggregate social "benefits" or "utility" of any such vehicle are enormous, amorphous, and practicably incalculable, and it would be hard to find a trial judge who would tolerate proof of this type of evidence in court.[57] Even if one inhabited a fantasy world where courts not only tolerated but *required* the adjudication of such macro-balances, a fair macro-balance might well yield a finding that Pintos—even if their fuel-tank problems were simply and cheaply correctable—were *not* defectively designed because, on balance, they generated *in the aggregate* more social good than harm. Yet that is what would appear to be required by a risk-utility balancing test, taken seriously, in its common *macro*-balance "product utility" or similar[58] formulation.[59]

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54. *See, e.g.*, State Farm Fire & Cas. Co. v. Chrysler Corp., 523 N.E.2d 489, 490 (Ohio 1988).

55. *See, e.g.*, Bloxom v. Bloxom, 512 So. 2d 839, 842 (La. 1987).

56. *See, e.g.*, Daniell v. Ford Motor Co., 581 F. Supp. 728, 730 (D.N.M. 1984).

57. Except in rare situations, perhaps as in the asbestos context. *See infra* note 59.

58. The same *macro*-balance problem inheres in the formulation, preferred by many courts, that speaks in terms of the (presumably global) utility of the "design" (rather than of the "product"), although this formulation is more capable of a (still strained) interpretation in *micro*-balance terms.

59. This appears to explain the jury's finding in *Owens-Corning Fiberglass Corp. v. Stone*, No. 03-94-00449-CV (Tex. App.—Austin, July 17, 1996, writ denied) (not designated for publication) 1996 WL 397435, at *2, that the defendant's asbestos product "was not defective, taking into consideration 'its utility and the risk involved in its use.'" *See also* Johnstone v. American Oil Co., 7 F.3d 1217, 1223 (5th Cir. 1993) (finding that, because the Louisiana liability standard for design defectiveness

2. *An Explanation.*—As noted earlier, tort law operates in the realm of corrective justice in which the wrongfulness of accidentally harmful conduct ordinarily depends upon whether the actor fairly considered the interests of potential victims. Typically, actors operate with a paucity of particularized duties (and correlative rights) to guide their conduct, leaving them with the vague principles of reasonable care that admonish actors to accord due respect for the interests of others. After an accident occurs, an actor's prior failure to adopt precautions that would have prevented the accident may be evaluated properly according to these same broad notions of reasonableness and balance. Such principles—supported by equal freedom, utilitarianism, and economic efficiency—are widely accepted as the moral fundamentals of the law of accidents.[60] An evaluation of the expected costs and benefits of a proposed safety precaution—costs and benefits to the actor and to other persons foreseeably benefitted and placed at risk[61]—is thus ordinarily the proper method for assessing the propriety of contemplated behavior involving risk. This form of balancing also provides a sound analytical fulcrum after the event for determining whether a defendant fairly may be held accountable for harm from an accident caused by the failure to adopt a particular safety precaution. This was the essence of Learned Hand's *Carroll Towing* formula, and it supplies a firm foundation (moral and economic) for defining design defectiveness in terms of a balance of costs and benefits.[62]

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required a consideration of the product's utility "to society as a whole," a jury could properly rest a finding that asbestos was not defective upon proof that its effectiveness as a heat insulator on Navy ships during World War II helped to win the war).

60. *See generally* David G. Owen, *Philosophical Foundations of Fault in Tort Law, in* PHILOSOPHICAL FOUNDATIONS OF TORT LAW 201, 214-15, 218-20, 225-26 (David G. Owen ed., 1995) [hereinafter Owen, *Fault in Tort Law*] (discussing the roles of equality, utility, and efficiency in tort law). For numerous contextual considerations, interest balancing—rather than rights protection—is more appropriate as the primary basis of responsibility in most product design defect contexts. *See generally* Owen, *Moral Foundations, supra* note 17 (examining the relation between individual and community values in products liability law).

61. More precisely, the relevant costs and benefits are those foreseeably accruing to the actor and to other foreseeably affected persons. Even from a micro-balance perspective, therefore, a proper balance inquires into a precaution's costs and benefits to "society"—to the manufacturer, to consumers generally, and to other persons foreseeably placed at risk—not to the manufacturer and plaintiff alone. Accordingly, a manufacturer of a mass-produced product may not properly limit accident-cost calculations to expected litigation costs such as payouts and litigation expenses. Similarly, the harm and benefits actually accruing to the plaintiff are at best only slightly relevant to the propriety of the defendant's conduct, because a proper inquiry considers the full balance of all foreseeable costs and benefits to all foreseeably affected persons. *Cf.* Craft v. Peebles, 893 P.2d 138, 148 (Haw. 1995) (ordering redaction of plaintiff's head in photographs when manufacturer sought to prove benefit of silicone breast implants through photographs showing plaintiff's post-surgical breasts and satisfied facial expression).

62. *See supra* notes 11-21 and accompanying text; *see also* Stephen G. Gilles, *The Invisible Hand Formula*, 80 VA. L. REV. 1015, 1025 (1994) (contrasting the clarity of the Hand formula with the uncertainty of the reasonable person standard); Richard A. Posner, *Wealth Maximization and Tort Law: A Philosophical Inquiry, in* PHILOSOPHICAL FOUNDATIONS OF TORT LAW, *supra* note 60, at 99, 100

While this explanation provides a general justification for using a cost-benefit balancing approach in fashioning a liability test, one needs to turn to the exigencies of the products liability adjudicatory process to understand why a design defect test of general application should be formulated only in *micro*-balance terms. The Pinto case example discussed above illustrates the desirability of the micro-balance conception and the problems of employing a *macro*-balance formulation as an adjudicatory test. The *micro*-balance technique frames and limits the issues in dispute (the factors balanced) so that they are narrow enough for practical proof, both affirmative and rebuttal, under a meaningful liability standard. Rules of law should provide actors, bound to act in accordance with the law, with at least some notice of what types of behavior are proscribed before the event,[63] and rules should provide factfinders and courts, bound to adjudicate (and review) liability after the event, with some basis for determining on particular facts whether the standard of behavior was met or breached. Fashioning liability rules according to such principles allows the adjudicatory system to operate in a principled manner, providing the citizenry with a process of law that fairly may be described as "due."

Because they seek ultimate standards of social desirability, *macro*-balancing tests are too broad, vague, abstract, politically rooted, and subjective[64] to provide meaningful notice of the legal standard to manufacturers and their design engineers. Similarly, macro-balancing tests fail to provide meaningful guidance to courts and juries attempting to determine, after a tragic human injury, whether the manufacturer ought to bear the resulting costs. The tort law adjudicatory system, which focuses on responsibility for a single product-related injury, is simply incapable of rendering a principled assessment of the *global* propriety of most products. Thus, the reasons for defining design defectiveness in *micro*-balance terms (and for rejecting *macro*-balance formulations of the liability standard) may be summarized in terms of coherence and administrability.

One might hope for more satisfying reasons to justify tinkering with the words of a liability standard. Indeed, some may heap scorn upon a justification for such tinkering based merely on coherence and administrability, attributes that concern only the structural aspects of the

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(utilizing the Hand formula as a baseline for cost-benefit analysis of tort law); White, *supra* note 7, at 106-11 (examining the Hand formula and risk-utility analysis in design defect cases).

63. (*See* OLIVER WENDELL HOLMES, JR., THE COMMON LAW 111 (Little, Brown & Co. reprint) (Mark D. Howe ed., Harvard Univ. Press 1963) (1st ed. 1881) ("When a man has to pay damages, he is supposed to have broken the law, and he is further supposed to have known what the law was."); *see also id.* at 126 ("[I]t is very desirable to know as nearly as we can the standard by which we shall be judged . . . .").

64. *See* Larsen, *supra* note 6, at 2052 & n.32 (asserting that "utility is an abstract and largely subjective notion" and that "[r]isk is as subjective as utility").

adjudicatory process within which substantive tort law operates and that lack the kind of moral power that emanates from the normative social values and policies that underlie the substantive rules of the law of torts. Yet, without a practicable adjudicatory system within which disputes may be resolved, even the most sublimely grounded substantive rules will be sapped of power. Evaluating conduct on some proper balance of expected costs and benefits is grounded in fundamentally important human values and social policies—equal freedom, utilitarianism, and economic efficiency[65]—and the adjudicatory system must be capable of assuring that these lofty goals are not trampled by a lack of principle in liability definition. In short, the power of the process lends power to the substance.[66]

Other commentators have provided important foundational work for the *micro*-balance approach to defining design defectiveness. Mark Grady compellingly explained the underlying theory in a superb essay called *Untaken Precautions*.[67] Searching for the true heart of a negligence case, Professor Grady provided a vital insight into tort litigation that applies with equal force to the adjudication of design defect cases in strict liability as well as negligence:

> By [the] orthodox theory of negligence, the critical inquiry is whether the defendant has chosen a level of precaution that globally minimizes social cost. Yet framing the inquiry in this fashion does implicit violence to the way lawyers and judges, in fact, try and decide negligence cases . . . . [T]he emphasis in practice shifts from the global to the specific[, namely,] . . . what particular precautions the defendant could have taken but did not.[68]

Although courts and scholars conventionally define negligence alternatively (both positively and negatively) in terms of what the defendant "did" *or* "failed to do," the latter formulation of the defendant's "conduct" supplies the principal basis for the adjudication of tort disputes. Grady recognized that "[f]or practicing lawyers, the critical choice is properly identifying *which* untaken precaution will be the gist of the plaintiff's case. The point is critical . . . ."[69] Bemoaning "the gap between law as it is practiced and law as it is taught [as evidenced by] the poor treatment the untaken

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65. *See* Owen, *Fault in Tort Law*, *supra* note 60, at 214-15, 218-20, 225-26.

66. Many commentators have examined and explained this important point. *See, e.g.*, HENRY M. HART, JR. & ALBERT M. SACKS, THE LEGAL PROCESS: BASIC PROBLEMS IN THE MAKING AND APPLICATION OF LAW 3-6 (1994).

67. Mark F. Grady, *Untaken Precautions*, 18 J. LEGAL STUD. 139 (1989) [hereinafter Grady, *Untaken Precautions*]; *see also* Mark F. Grady, *A New Positive Economic Theory of Negligence*, 92 YALE L.J. 799, 815, 814-17 (1983).

68. Grady, *Untaken Precautions*, *supra* note 67, at 139.

69. *Id.* at 140 (emphasis in original).

precaution has received in academic writing,"[70] Grady argued that "[t]he untaken precaution is the true center" of a negligence case.[71] That is, rather than assessing the global quality of a defendant's act, "courts seem to be pursuing a more modest endeavor: they take the plaintiff's allegations of the untaken precautions of the defendant and ask . . . whether some particular precaution promised benefits (in accident reduction) greater than its associated costs."[72]

Professor Grady's important "untaken precaution" insight applies fully to design defect litigation. As in an ordinary negligence case, it is the manufacturer's "untaken precaution" in a design defect case—the particular design precaution proposed by the plaintiff that remained untaken by the manufacturer—that lawyers place under the cost-benefit microscope in courtrooms and in briefs. The typical use of "strict" liability in design defect cases does not weaken the analogy, for the cost-benefit analysis applies in essentially the same way (or identically) in both strict liability and negligence cases.[73] Grady's untaken-precaution-as-the-heart-of-accident-law thesis seems especially applicable to the design defect context, for it helps explain the courts' unquestioning adherence to the untoward *macro*-balance "risk-utility" formulation of the liability standard.[74] After all, the macro-balance approach merely tests the propriety of what the manufacturer *did*, viewed in terms of the positive formulation of the

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70. *Id.*

71. *Id.* at 141.

72. *Id.* at 143.

73. *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 1 cmt. a, § 2 cmts. a & d (Proposed Final Draft 1997); Owen, *Defectiveness Restated*, *supra* note 21, at 753-61 (arguing that subsection 2(b) adopts a negligence standard in strict liability language).

74. While Grady's analysis helps explain why courts have *continued* to state the test improperly in global terms, the origin of the *macro*-balance problem may be traced to both Dean Keeton's and Dean Wade's early formulations of the test for design defectiveness (the Wade-Keeton test) in global product risk and "utility" terms: "A product is not [*sic*] fit . . . if a reasonable man with full knowledge of [the danger] would continue to market the product because the utility of its use outweighs the danger." Keeton, *Current Developments*, *supra* note 25, at 210; *see also* Keeton, *supra* note 1, at 38 ("Under the heading of benefits [in a risk-benefit test,] one would include anything that gives utility of some kind to the product . . . .").

Dean Wade stated the balance more circumspectly, but in a manner nevertheless susceptible to macro-balance interpretation:

> The simplest and easiest way [to define design defectiveness] is to assume that the defendant knew of the dangerous condition of the product and ask whether he was then negligent in putting it on the market . . . . Another way of saying this is to ask whether the magnitude of the risk created by the dangerous condition of the product was outweighed by the social utility attained by putting it out in this fashion.

Wade, *supra* note 15, at 834-35 (citing Keeton, *supra* note 1, at 37). The first two of Dean Wade's famous seven factors, framed in clearly global terms, set the macro-balance trap for the many courts that chose to adopt these factors as part of their design defect jurisprudence: "(1) The usefulness and desirability of the product—its utility to the user and to the public as a whole. (2) The safety aspects of the product—the likelihood that it will cause injury, and the probable seriousness of the injury." *Id.* at 837.

orthodox standard, rather than in terms of the alternative negative standard of what the defendant *failed* to do. And before Grady explained the pitfalls of trying to frame the liability standard from a "positive" perspective, no one challenged its sufficiency as a definitional norm for defining liability. Thus, Grady's "untaken precaution" thesis at once reveals the importance of defining design defectiveness in proper micro-balance (untaken precaution) terms and further helps explain the tendency of courts to fall into the seductive macro-balance trap.

Learned Hand's *Carroll Towing* negligence "formula" supports Grady's untaken precaution point and provides the *micro*-balance thesis with additional theoretical support. By the Hand formula, an actor's *failure* to adopt a burden of precaution of lower value than an expected risk of a particular probability and magnitude implies negligence.[75] Thus, the classic judicial formulation of the accident liability standard in cost-benefit terms itself is stated in terms of untaken precautions and *micro*-balancing. That is, a defendant's conduct is not judged globally in terms of what the defendant *did* to *cause* the loss, but it is examined particularistically (and hypothetically) in terms of what the defendant *failed* to do to *prevent* the loss. Noting that "the Hand formula implies that the plaintiff bears the burden of proving that the defendant omitted a cost-justified precaution," Stephen Gilles examined the central role of cost-benefit analysis in practical tort law theory in an important recent article, *The Invisible Hand Formula*.[76] By balancing the costs of accident prevention (the "burden of precaution") against the benefits of accident prevention (the expected value of the loss prevented), Hand articulated a truly *micro*-balance standard for judging the reasonableness of behavioral choices, decisional acts that logically involve (and which after an accident may be fairly evaluated by) "weighing the *marginal* costs and benefits of increments of care."[77]

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75. *See supra* note 62 and accompanying text.

76. Gilles, *supra* note 62, at 1025.

77. *Id.* at 1027 (emphasis added); *see also* POSNER, *supra* note 6, § 6.1, at 164-65. Posner notes that:

> [E]xpected accident costs and accident [prevention] costs must be compared at the margin, by measuring the costs and benefits of small increments in safety and stopping investing in more safety at the point where another dollar spent would yield a dollar or less in added safety. Fortunately the common law method facilitates a marginal approach, simply because it will usually be difficult for courts to get information on other than small changes in the safety precautions taken by the injurer.

Id. at 164, 165 (graphically illustrating the "Hand Formula in its correct marginal form"). The Hand formula may be interpreted as saying that "it is negligent to use a level of care at which the marginal cost of accident avoidance is less than the marginal benefit from avoidance." WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF TORT LAW 87 (1987); *see also supra* note 48 and accompanying text; *infra* note 82 and accompanying text. Professor Green stresses the importance of balancing costs and benefits from a marginal perspective in Green, *supra* note 19, at 1611 nn.28-32, 1632 nn.130-31 and accompanying text. *See infra* note 85 and accompanying text.

The Hand formula itself, therefore, involves a micro-balance based on change. It may be helpful to explain this concept in formulaic terms. Returning to Hand's basic formula, negligence is implied if $B < P \times L$. This may be more fully expressed as $B < P \times L \rightarrow N$, where B is the burden or cost of a precaution, P is the probability of a loss if the precaution is not undertaken, L is the probable magnitude of such loss, and $\rightarrow N$ is the implication of negligence. Thus, if the cost of adopting a particular safety precaution (B) is less than the safety gains expected to result therefrom ($P \times L$), the actor's failure to adopt the precaution implies negligence ($\rightarrow N$). The adoption of an untaken precaution implies a move or change from no precaution (of this particular type) to the full precaution. Indeed, the very notion of B, which is the cost of such a move, is by nature one of change. So, too, the safety benefits (accident costs avoided, $P \times L$) are viewed in terms of change—the reduction in danger, or, conversely, the improvement in safety from adopting the precaution. That is, the very purpose of adopting a precaution is to *change* the risk—to reduce the danger (improve the safety)—usually by reducing the probability that harm will occur.[78] What the Hand formula really asks, therefore, is whether the cost of a particular safety precaution is worth the resulting safety *improvement*, or whether $B < \Delta(P \times L)$, where $\Delta(P \times L)$ represents the *change* in danger or safety expected to result from the move from a state of no precaution to a state of a particular precaution costing B.[79] Consistent with products liability doctrine as it has evolved over time,[80] one may properly convert the Hand formula from negligence to strict liability by substituting D (Defect) for N, such that $B < \Delta(P \times L) \rightarrow D$. Thus, the Hand formula by nature implies a micro-balance of the costs and benefits of adopting a particular untaken precaution, and the formula works as well in strict products liability as it does in negligence.

The Hand formula and the analyses of the interior of tort liability by both Grady and Gilles (and Posner's account from which Gilles draws) together provide compelling theoretical justifications for rejecting the defendant's *actual* conduct (the chosen design) as the focal point of the basic liability test and for choosing instead to focus upon the particular hypothetical precaution (which the defendant failed to adopt) that the plaintiff claims was proper and would have prevented the harm. Centering the inquiry on what the defendant allegedly *did not do but ought to have done* narrows the litigation focus to a manageable (and principled)

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78. So, one may view P as the difference between P_{np}, the probability of harm if no precaution is taken, and P_p, the probability of harm if the precaution is taken, such that P really equals $P_{np} - P_p$. *See* RICHARD A. POSNER, TORT LAW—CASES AND ECONOMIC ANALYSIS 560 (1982). Thanks to John Lopatka for noting this perspective.

79. Thanks to Mark Grady for this explanation.

80. *See supra* note 20 and accompanying text.

comparison of the hypothetical, incremental ("marginal") costs and benefits that would have followed a *move* from the chosen design to the proposed alternative design. This is the *micro*-balance—balancing the alternative design *feature*'s safety benefits against its precaution costs—that provides the basis for a proper formulation of a basic cost-benefit test for design defectiveness. As Gary Schwartz emphasized some years ago, one ordinarily cannot talk sensibly about design defectiveness without focusing principally on the alternative design feature proposed by the plaintiff.[81] Lawyers for both plaintiffs and defendants generally try the liability issue in design cases on this particular *micro*-balance basis, and courts generally oversee and review such determinations (in fact if not in word) from this perspective.[82] The failure of the written law to reflect the law in practice (and common sense) is as unnecessary as it is unprincipled, for the two may be harmonized with ease.

B. Formulating a Proper Micro-Balance Test

1. Understanding the Principles.—In a design defect case, there are really two distinct designs that are separately on trial: (1) the manufacturer's chosen design and (2) the safer alternative design proposed by the plaintiff that (we shall assume) would have prevented the plaintiff's harm. The propriety (vel non) of the first (chosen) design would seem to be the more important issue in such a case, and to a real extent it is: the "defectiveness" (vel non) of the chosen design remains the ultimate issue in the trial. Yet, it is only that—the ultimate legal determination that merely characterizes, but that provides no guidelines for establishing, the outcome of a case. What *are* significant to the adjudication of the case are the facts surrounding the second (alternative) design—more specifically, the reasons for and against the manufacturer's failure to adopt it. This is the design decision properly in issue at the trial, requiring particularized cost-benefit proof by the parties and evaluative processing by the judge and jury, that lies at the heart of nearly every design defect case. Thus, although the propriety of the manufacturer's chosen design remains of ultimate consequential interest in terms of legal outcome, it ordinarily is determinable only indirectly by evaluating the desirability (on balance) of the untaken design precaution proposed by the plaintiff.[83]

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81. *See* Gary T. Schwartz, *Foreword: Understanding Products Liability*, 67 CAL. L. REV. 435, 468 (1979).

82. *See* LANDES & POSNER, *supra* note 77, at 87 ("[A] consideration of actual cases [reveals] that the courts do consider marginal rather than total values in applying the [Hand] standard. . . . The focus on the particular accident and on the particular inputs that could have prevented it invites a marginal analysis."); *see also supra* notes 48, 75 and accompanying text.

83. Notwithstanding a contrary rule in California and a couple of other states, the plaintiff logically and fairly has the burden of proof on this issue. *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS

It seems axiomatic that the basic liability test should be congruent with the basic issue that in most cases must be proved. In design defect litigation, that basic issue involves the following fundamental micro-balance question: *whether the manufacturer's failure to adopt a particular design feature proposed by the plaintiff was, on balance, right or wrong.*[84] A congruence between this central issue and the liability test requires that the test focus squarely on the issue of what, in particular, allegedly was wrong with the manufacturer's design decision. More specifically, this inquiry asks whether the increased costs (lost dollars, lost utility, and lost safety) of *altering* the design—in the particular manner the plaintiff claims was reasonably necessary to the product's safety—would have been worth the resulting safety benefits. Thus, the only factors ordinarily relevant in the risk-utility balance are the incremental or "marginal" precaution costs and safety benefits of adopting the particular design safety feature proposed by the plaintiff.[85] The notion of marginal costs and benefits implies a move which here involves the move from the chosen design to the alternative design. And so the proper balance is between the expected precaution costs and the expected safety benefits involved in *altering* the chosen design in the particular fashion proposed by the plaintiff—those costs and benefits incurred in *moving* from the manufacturer's actual chosen design to the plaintiff's hypothetical alternative design.

Although the basic principles are now in place for the formulation of a proper *micro*-balance test of design defectiveness, there still remain two common definitional booby traps for the unwary that one must understand in order to avoid. The first such pitfall involves the temptation to succumb to a *comparative macro*-balance formulation. It is often said that design defectiveness should be determined by comparing the costs and benefits of the manufacturer's chosen design with the costs and benefits of the proposed alternative design.[86] Such an approach is not logically nonsensical, but it is adventurous to say the least. One may logically compare the pros and cons of a Ford Pinto with the pros and cons of a Volkswagen Beetle, as small car buyers surely did. Presumably a jury could also make a similar global choice between a Pinto and a Beetle as to which, on

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LIABILITY § 2(b) cmt. f (Proposed Final Draft 1997); W. PAGE KEETON ET AL., *supra* note 34, § 99, at 702; Schwartz, *supra* note 81, at 466-67 (discussing the California rule); John W. Wade, *On Product "Design Defects" and Their Actionability*, 33 VAND. L. REV. 551, 573 (1980) (criticizing cases that shift the burden of proof to the defendant).

84. This is, in fact, the essence of the *Restatement*'s definition of design defectiveness in § 2(b). *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(b) (Proposed Final Draft 1997); *supra* notes 3, 5, 15 and accompanying text.

85. *See supra* note 75 and accompanying text.

86. *See, e.g.*, Green, *supra* note 4, at 616; *see also* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(b) cmt. d (Proposed Final Draft 1997).

balance, is "better" overall.[87] But this example illustrates the hazard of viewing the standard as a balance of the costs and benefits of the chosen product against the costs and benefits of the alternative "design," for it suggests a *macro*-balance of both products. Since global macro-balancing is a perverse approach by which to adjudicate responsibility for the chosen design alone, its frailty as the basis for a liability test would only seem to be compounded by such comparative macro-balancing. Thus, viewing the analytic process in comparative macro-balance terms, while not theoretically incorrect,[88] proves risky at the least; and formulating an explicit liability test for design defectiveness in such a manner would be sheer folly.

The second definitional pitfall involves the temptation to succumb to *macro*-balancing the costs and benefits of the *alternative* design alone. Since the proper focus at a design defect trial is on the proposed alternative design, one might conclude that the liability test should also be formulated in terms of the costs and benefits of the alternative design. However, for all the reasons why courts should not attempt to macro-balance the risks and benefits of "products," no good can come of attempting a judicial macro-balance of the plaintiff's proposed alternative design—if "design" is interpreted to mean the entire "product" as the plaintiff proposes it be redesigned. But this last form of definitional trap actually lies quite close to a proper formulation of a defect test, for now we are located inside the *alternative* design, which includes the untaken precaution from which a proper definition springs. If the plaintiff's "alternative *design*" is interpreted in *micro*-balance terms to mean the *particular* design *feature*

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87. Recall that "safer" is not the proper issue, since it is merely one component in the utility-cost-safety consumer welfare calculus.

88. It is theoretically possible to design a full macro-balancing comparative approach in a form that will yield correct results, but it requires no less than *three* separate balances, the first two of which are "internal" to the two competing designs on trial:

(1) the balance of costs and benefits of the manufacturer's chosen design—which generates a net value of the product overall as actually designed;

(2) the balance of costs and benefits of the plaintiff's proposed alternative design that would have prevented or reduced the harm—which generates a net value of the product overall as it might alternatively have been designed; and

(3) the net value of (1) balanced against the net value of (2)—which is the *value of the product overall as actually designed* balanced against the *value of the product overall as alternatively designed.*

Under this kind of comparative *macro*-balancing approach, the net value outcomes generated by the internal balances of (1) and (2) provide the values for the ultimate "external" balance described in (3); and the third, external balance determines which of the two competing designs—the manufacturer's chosen design or the plaintiff's proposed alternative design—is, on balance, "better" overall. While comparative macro-balancing along these lines may *theoretically* yield correct defectiveness determinations, it is far more complicated—and far more prone to error—than simply *micro*-balancing the marginal costs and benefits of the particular safety feature proposed by the plaintiff. *See* Owen, *Defectiveness Restated*, *supra* note 21, at 774 n.139.

proposed by the plaintiff—that is, the particular manner in which the chosen design should be (or, ought to have been) altered—then the test would convert to proper *micro*-balance terms. But now the analysis has simply circled back to the costs and benefits of *changing* from the chosen to the alternative design, which, as seen above, is the most straight-forward way to conceptualize a proper micro-balance test. And so one may indeed arrive at a proper formulation for a design defect test by narrowly balancing the costs and benefits of the particular proposed design *feature* lacking from the chosen design which is possessed by the alternative design. The proper balance, in other words, involves the costs and benefits of the untaken precaution that distinguishes the chosen design from the alternative design.

2. *Framing a Test.*—Just as courts and commentators have spared no ink in illustrating the variety of ways in which design defectiveness may be defined incorrectly, so too are there a multitude of ways to define a test correctly. To fall into the "good" definitional pot rather than the "bad" pot requires that a liability formulation build properly upon micro-balance principles by framing the liability issue in terms of the marginal precaution costs and marginal safety benefits that should follow a move from the chosen to the alternative design. Such a "bare-boned" definition might look something like the following:

> A product is defective in design if the safety benefits from altering the design as proposed by the plaintiff would have exceeded the costs of such an alteration.

This formulation of the test expresses the basic concepts simply, in classic economic terms of "costs" and "benefits,"[89] but perhaps more summarily than is ideal for a liability test applied to concrete cases. This bare-boned formulation of the standard embeds many important issues, some of which probably should be made explicit.

Several issues lurk within the meaning of the word "costs." While persons facile in economic theory may understand "costs" to embrace all sacrifices resulting from a particular move (including in this context diminished usefulness and diminished safety), many noneconomists interpret "costs" in terms of lost dollars alone. Yet, moving toward greater product safety produces a very real "utility cost" to consumers if it diminishes the product's usefulness: dulling the blade of a paring knife will make it safer but more difficult to cut a carrot. Moreover, switching to the

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89. *See* POSNER, *supra* note 6, at 163; Gilles, *supra* note 62, at 1015; Grady, *Untaken Precautions*, *supra* note 67, at 143; White, *supra* note 7, at 78. Note, however, that proper economic theory would define the test in terms of *expected* costs and benefits, which supports the addition of foreseeability as an element in the "enhanced" test below. *See* POSNER, *supra* note 6, at 163.

alternative design may result in a real "safety cost" as well: the adoption of such an alternative design may reduce or eliminate the particular risk that harmed the plaintiff, but it may as well introduce new hazards that did not exist before. Thus, adding longitudinal support beams to a Ford Pinto may reduce the risk of burns from fuel tank fires in rear-end collisions, but this particular danger reduction may correspondingly increase the risk of neck injuries in such collisions.[90] Another embedded issue concerns the foreseeability of the risk. After a quarter century of debate, the "state of the art" issue has finally been put to rest, such that manufacturers now are widely held not subject to liability, even in "strict" liability, for unforeseeable risks.[91]

Adding each of these three considerations—diminished utility, diminished safety, and foreseeability—as explicit elements in the liability formulation results in an "enhanced" test which might look something like the following:

> A product is defective in design if the safety benefits from altering the design as proposed by the plaintiff were foreseeably greater than the resulting costs, including any diminished usefulness or diminished safety.

An important objective of a basic liability test is to keep it pure and simple, free of distracting secondary principles that may be relegated to sub-doctrine. But the three embedded issues, added to create the enhanced version of the test, are significant enough that they should be included as explicit elements in the general formulation of the basic liability standard for defects in design.[92]

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90. Indeed, the aggregate safety cost to the public from neck injuries, which are much more common, might actually exceed the aggregate safety benefit to the public from burns prevented. The *Restatement* addresses this important point quite clearly:

> When evaluating the reasonableness of a design alternative, the overall safety of the product must be considered. It is not sufficient that the alternative design would have reduced or prevented the harm suffered by the plaintiff if it would also have introduced into the product other dangers of equal or greater magnitude.

RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 cmt. f (Proposed Final Draft 1997).

91. *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 cmt. m (Proposed Final Draft 1997). *See generally* OWEN ET AL., *supra* note 25, at 499-547 (reviewing the history of the "state of the art" issue in products liability).

92. If such a test is used as a jury instruction, a court might well include the foreseeability limitation as a standard enhancement because foreseeability is so fundamental to tort theory and often has at least a modicum of practical significance in design defect cases. When used as a jury instruction, however, a court should probably strip away the diminished usefulness and diminished safety aspects of the definition if they are not pertinent to the case. On the other hand, for each element of the formulation that has special relevance to the case, a trial court may find it helpful to provide a supplemental instruction explaining the significance of the particular element in relation to the micro-balance and how the element may (or may not) apply upon the facts. Judge Robert Keeton should be credited for this suggestion.

This enhanced formulation remains quite basic, but it is essentially complete. If the standard as so drawn is deemed too stark and rigid—too narrowly confined to the three consumer welfare issues of utility, cost, and safety—more flexibility might be introduced by draping these three components over a bough of reason. Such a "full-blown" formulation of the standard might look like this:

> A product is defective in design if it was not designed with reasonable safety, such that the safety benefits from altering the design, as proposed by the plaintiff, were foreseeably greater than the resulting costs, including any diminished usefulness or diminished safety.

Such a definition is plainly softer, for the "reasonable safety" bough adds wiggle room for cases where even the enhanced micro-balance definition—limited to the three consumer welfare components—appears too narrow to include certain issues in the case. But wiggle room may be introduced in particular cases by crafting particular additions to or deviations from the basic rule, and much may be said for keeping any basic liability rule short and simple. Even with a "reasonable safety" escape valve built into the general rule, special issues in particular cases sometimes will require adjusting the basic liability formulation in one manner or another. A test of general application is capable of being only that; special exceptions and sub-rules may be engrafted onto the general rule in order to accommodate special issues.[93] Yet the softer, full-blown formulation would seem to be a reasonable way to frame a basic micro-balance rule which should broadly capture the great majority of design defect cases.

Any of the three formulations proposed above would appear sufficient as the micro-balance standard for assessing design defectiveness in most cases. There plainly is no single "proper" way to define a micro-balance test,[94] and other formulations may be more finely tuned, precise, and rich. But both the "enhanced" and "full-blown" versions of the test proposed above should work quite well for now; and either one, or some

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93. For example, special rules (and special jury instructions) will probably be required in cases involving inherent product dangers (the generic-risk-product-category-liability issue), cases where the chosen and alternative designs both may be reasonable, and cases involving the more frequent kind of recurring special issues, such as the technological and practical feasibility of a plaintiff's proposed alternative design and obvious but unreasonable product risks. In addition, there probably should be an independent and narrowly circumscribed rule of "defect ipsa loquitur" to accommodate cases where direct proof of defectiveness and causation is unavailable but where the circumstances suggest the probability that the product was defective and caused the plaintiff's harm. *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 3 (Proposed Final Draft 1997) (providing such a rule). *See generally* Mark F. Grady, *Res Ipsa Loquitur and Compliance Error*, 142 U. PA. L. REV. 887 (1994) (laying out an economic analysis of res ipsa loquitur).

94. Indeed, the very concept of a "perfect" test is surely rubbish.

similar micro-balance test,[95] will undoubtedly improve the clarity of the definition of design defectiveness. Both formulations reflect, build upon, and enhance the liability definition in the new *Restatement*,[96] and both should help to frame decisionmaking in design defect litigation.

C. *Naming the Test: "Risk-Utility" or "Cost-Benefit"?*

The final task here is to consider the *appellation* of the liability test for design defect balancing, a balance now properly understood in micro-balance terms. Of course, a micro-balance test might be called "a micro-balance test," and so it should when distinguishing it from a *macro*-balance test. But there exist already three more general names that courts and commentators often interchange indiscriminately when referring to any formulation of a design defect test based on principles of balance: "risk-utility," "risk-benefit," and "cost-benefit." In recent years, the "risk-utility"[97] label has gained prominence in the products liability design defect context,[98] and so the inquiry here focuses upon whether the "risk-utility" name proves satisfactory or whether some alternative better name should be employed.

"What's in a name?" one might ask, to borrow an enduring query from the Bard. As with a rose, the name of a design defect micro-balance test perhaps should matter not, provided the test itself is shaped in a comely fashion. Yet test labels have a tendency to take on a life of their own, and so a test's name should embrace the process of the test, how it purports to determine liability, even if only generally. At the very least, a test's name should not mislead users as to the nature of the test.

In defining design defectiveness, the selection of a suitable label for the micro-balance test may be critical. As the "risk-utility" label has spread its tentacles in recent years, it has silently generated untold conceptual trouble for courts and commentators alike. A principal thesis of this Paper is that confusion abounds in the manner in which the liability test is formulated by the courts and that the most serious definitional problem lies in its frequent macro-balance formulation whereby a product's design defectiveness is said to depend upon whether the product's "risks" outweigh its "utility." In searching for the source of this confusion, one might well look to the name by which the liability test is widely known.

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95. For example, Judge Keeton has proposed jury instructions which very nicely capture the *micro*-balance essence. *See* Robert E. Keeton, *Warning Defect: Origins, Policies, and Directions*, 30 U. MICH. J.L. REFORM 367, 398-430 (1997).

96. *See supra* notes 3-5, 84, 90 and accompanying text.

97. Occasionally, "risk-utility" is slightly altered as "danger-utility."

98. This was a clear finding of a recent survey of design defect balancing tests. *See* Owen, *Risk-Utility Balancing*, *supra* note 1, at 242-43.

The problem, in a nutshell, is that the "risk-utility" label linguistically drives analysis into a search for "risks" and corresponding "utility," which indirectly and insidiously pre-frames the issue in macro-balance terms. As mentioned earlier, the word "risk(s)" is generally applied to the "product" as a whole or to the whole product's "design"; in either case, one tends to conceive of the "product" in terms of the manufacturer's chosen design. This leads, as seen above, to a misguided global conception of the chosen design's entire bundle of "product risks." And once the language focuses conceptually on the manufacturer's *chosen* design, the slippery slope into conceptual chaos is fully greased, for it is from there only a short slide to an interpretation of "utility" in identical chosen design macro-balance terms. That is, if one balances a product's global risks against something, it would seem logical to balance them against the product's global benefits or utility, which is what a "risk-utility" test would appear to require. The macro-balance trap is then fully set, ready to ensnare judges and law clerks (to say nothing of law students and professors) who, full of hope, peer for guidance into the language of the law to find its essence. All, perhaps, because the test has been misnamed.[99]

As argued earlier, the proper issue in such cases is whether the product should have been designed in the alternative manner proposed by the plaintiff, a focus which requires balancing the incremental safety advantages against the various incremental disadvantages of *altering* the chosen design to conform to the proposed design. Yet the "risk-utility" label simply does not succeed in describing this kind of micro-balance. One may, of course, conceive of "risks" (the $P \times L$ side of the Hand $B < P \times L$ formula) in marginal terms as the safety advantages ($P \times L$ or risks *avoided*) of altering the design as proposed by the plaintiff. However, this leaves to be addressed on the "burden" side of the Hand equation the various disadvantages of so improving the product's safety: the additional dollar costs, diminished usefulness, and increased hazards of other types. Only a linguistic magician could squeeze this negative package of disadvantages ("burdens") into the positive term "utility"—into *dis*utility, perhaps, but not utility. Even if one were to shift analysis to the risks incurred and utility saved by the defendant's *failure* to adopt the proposed alternative design, the narrowness of the word "utility" still presents a problem. To most people, "utility" is ordinarily construed narrowly to mean "usefulness," a meaning that leaves no apparent room in the balancing formula for the other two components of consumer welfare that are likely

99. It may have been Bentham who observed that "[e]rror is never so difficult to be destroyed as when it has its root in language." JESSE DUKEMINIER & STANLEY M. JOHANSON, WILLS, TRUSTS, AND ESTATES 40 (5th ed. 1995).

to be affected by altering a product's design—cost and safety. So, "risk-utility" serves poorly as a label for the design defect balancing test.

If "risk-*utility*" fails as a proper label for the standard of design defectiveness (because it drives analysis into an improper macro-balance and employs a term, "utility," that poorly defines the factors it must describe) is "risk-*benefit*" a better name? While it does appear that this label better describes the micro-balance of marginal detriments and marginal advantages of the plaintiff's proposed alternative design, it nonetheless suffers from some of the same weaknesses as the "risk-utility" label. Again, the "risks" may be viewed in marginal terms as those ($P \times L$) risks avoided by the proposed design change (or as those incurred by failing to make the change). With this label, the "benefits" term more broadly, and hence more comfortably, may be used to describe the package of detriments incurred by changing the design (higher price, lower utility, new dangers) or to describe those detriments avoided by failing to make the change. Here as well, however, it tortures the word "benefit" at least a little to force it to serve as a label for incurring (or even avoiding) *detriments*, thus converting Hand's negative "burden" concept into a positive one.

If the "risk-benefit" label does not quite work either, that leaves only "cost-benefit" among the conventional phrases to describe the micro-balance design defect test—and describe it well it does. Under a "cost-benefit" umbrella, one may balance the safety advantages or "benefits" of the risks avoided by the proposed alternative design (the $\Delta(P \times L)$) against the disadvantages or accident prevention "costs" incurred in so altering the design (the B of lost dollars, lost usefulness, and lost safety).[100] So viewed, the "cost-benefit" formulation nicely mimics the Hand formula. If the Hand formula in the design defect context[101] is viewed as

$$B < \Delta(P \times L) \rightarrow D,$$

the same concepts may be expressed comfortably in cost-benefit terms as

$$Costs < Benefits \rightarrow Defect,$$

where "costs" are the marginal (accident prevention) costs of changing from the chosen to the proposed design, and "benefits" are the marginal (accident) losses thereby prevented, that is, the safety benefits thereby achieved. By contrast, the risk-utility balance translates only awkwardly

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100. Alternatively, one might view the balance conversely—as a weighing of the accident prevention costs *avoided* by failing to adopt the design alternative against the accident reduction benefits *lost* by failing to adopt the safer design. Applying the "cost-benefit" label in this converse manner might conform it more explicitly to the untaken precaution model, but this negative formulation is more complex and probably strays too far from conventional usage.

101. *See supra* notes 78-80 and accompanying text.

into the Hand formula. "Risk," of course, must represent $P \times L$, so that "utility" must be substituted for the burden, B, as

Utility < Risk → Defect.

Although this last formulation of the risk-utility balance logically expresses the *macro*-balance concept, it fails to capture the essential micro-balance implied by the Hand formula that provides the key to rational adjudication. Moreover, as explained above, no amount of pushing or shoving can force "utility" into "burden" clothing without tearing it to shreds. This contrasts starkly with the cost-benefit balance, which slips into the Hand formula like a glove. In sum, without the linguistic and analytic contortions required by the other labels,[102] the proper micro-balance concepts of design defectiveness are best expressed in a Hand-type "cost-benefit" formula which fully, accurately, and succinctly captures the essence of the proper balance at a glance:

Costs < (Safety) Benefits → Defect.

The superiority of the "cost-benefit" name to other labels for describing the micro-balance process of design defect decisionmaking is well illustrated by a case example. In *St. Germain v. Husqvarna Corp.*,[103] a woodcutter died when his chainsaw bounced back against his chest in an accident that might have been prevented had the saw been equipped with a chain brake that would have stopped the chain in such a situation. At trial, the parties litigated the micro-balance issue properly, presenting testimony on the safety advantages of adding chain brakes to such saws, on the one hand, and the resulting disadvantages of so altering the design, on the other. The trial court directed a verdict in favor of the defendant manufacturer on the plaintiff's strict liability design defect claim. On appeal, the Supreme Judicial Court of Maine struggled valiantly to

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102. The "cost-benefit" formulation itself contains a couple of minor linguistic wrinkles. First, broadly conceiving of "cost" as a substitute for "disadvantage" may make some uncomfortable because of its economic tone. Indeed, economists have long used the term "costs" precisely in this broad manner, and lawyers would do well to borrow (rather than shun) helpful terms from other disciplines when so doing clarifies the task at hand. Second, the "cost-benefit" label requires converting one's normal conception of "risk" from a negative concept to a positive one—as the *benefit* of *avoiding* risks in moving from the chosen to the proposed design. But this wrinkle inheres in the micro-balance concept of weighing the advantages (safety "benefits") against the disadvantages ("costs") of altering a product's design to obtain those benefits. This wrinkle could be eliminated by relabeling the "cost-benefit" test as a "cost-cost" test, by which one would balance the expected accident costs against the expected accident prevention costs. The logic of this label was explained some time ago by Judge Posner. *See* Richard A. Posner, *A Theory of Negligence*, 1 J. LEGAL STUD. 29, 32-34 (1972). But this latter linguistic wrinkle really proves quite trivial, and it hardly seems worth the difficulties of attempting to bend linguistic convention to this degree. Moreover, the conventional "cost-benefit" label itself nicely captures the concept of balancing the expected disadvantages against the expected advantages of altering the chosen design as the plaintiff claims was proper.

103. 544 A.2d 1283 (Me. 1988).

squeeze the issues into the "danger utility test," language it had earlier adopted as the liability standard for design defectiveness. The court observed:

> In this case, the jury heard testimony that chain saws designed with chain brakes have a utility in protecting the user from potential injury. On the other hand, testimony was presented that saws without chain brakes may also implicate a utility interest because the brake can interfere with the function of the saw, can present maintenance problems, and can sometimes react too slowly to protect the operator.[104]

The jury also heard evidence on causation, the feasibility of chain brakes, their cost, and testimony that the brake "would minimally impair the use of the saw."[105] This was sufficient evidence to avoid a directed verdict, the high court held, "since a jury could have concluded, under the 'danger utility test,' that the [saw's design] was defective and unreasonably dangerous because its utility without a chain brake did not outweigh the risk of harm it posed for its users."[106]

The Supreme Judicial Court in *St. Germain* surely was correct in holding that the plaintiff had presented sufficient proof of a reasonable design alternative to avoid a directed verdict on the strict liability design defect claim. But its use of the "danger utility" test label—closely similar to the more common "risk-utility" test label—only interfered with its analysis of the micro-balance issue in the case. One might well agree with the logic of stating that "chain brakes have a utility in protecting the user from potential injury";[107] and it also surely seems reasonable to address the issue of the saw's diminished usefulness resulting from a chain brake (the brake might "interfere with the function of the saw"[108]) in terms of a reduction in the saw's "utility" (it might "implicate a utility interest"[109]). But here the court uses the word "utility" to describe factors on opposing sides of the balance, to describe at once both the *advantages* of adopting the plaintiff's design alternative ("protecting the user from potential injury"[110]) and the resulting *disadvantages* of so changing the design ("interfer[ing] with the function of the saw" and "maintenance problems"[111]). Finally, in concluding that the evidence was sufficient for the jury to have found the manufacturer's chosen design

104. *Id.* at 1285.
105. *Id.* at 1285-86.
106. *Id.* at 1286.
107. *Id.* at 1285.
108. *Id.*
109. *Id.*
110. *Id.*
111. *Id.*

defective "because its utility without a chain brake did not outweigh the risk of harm it posed for its users,"[112] the Supreme Judicial Court slipped into a macro-balance of the saw's aggregate utility against its aggregate risks, a bogus issue not involved in the litigation that the court had theretofore successfully avoided.

Thus, the Maine high court in *St. Germain* appeared to understand that the design defect issue was the micro-balance question of whether the safety benefits of the plaintiff's proposed design alteration (adding a chain brake) were worth the resulting costs, and it reached the right result. But the court's analysis was impeded linguistically and hence conceptually by its reliance on a "danger utility" label that failed to describe the micro-balance test. Had it addressed the balancing issue in terms of a balance between the monetary and utility "costs" of accident prevention, on the one hand, and the safety "benefits" of adding a chain brake to the saw, on the other, the court could have avoided analytic confusion and more clearly examined the competing considerations properly at issue in the case.

In sum, as a description of the balancing enterprise at the heart of design defectiveness determinations, the "cost-benefit" phrase works best among the conventional labels. One may postulate with confidence that tracing the tortured evolution of design defect balancing tests in many jurisdictions would reveal a close link between a court's initial hapless characterization of the standard as a "risk-utility" test and its ill-fated formulation of the liability standard in macro-balance terms. Logic and common sense suggest that calling a test by a name that conflicts with its own internal calculus[113] can breed confusion and little else. And while changing the name of a liability test will not alone assure that the test is formulated properly, a proper name should help at least a little to clarify the nature of a proper test.[114] Thus, a properly constituted *micro*-balance liability standard for determining design defectiveness is best referred to as a "cost-benefit" test or standard.

V. Conclusion

This Paper has explored the interior of tests and names—the tests by which courts (and commentators) define the design defect balance, and the names by which such tests are known. As a general proposition, an

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112. *Id.* at 1286.

113. The "risk-utility" label conflicts with the calculus of a proper balancing test by driving analysis into a global balance of the chosen design's aggregate risks and benefits and away from the proper micro-balance of the marginal costs and benefits of altering the chosen design as proposed by the plaintiff.

114. Moreover, the very process of switching labels, as David Fischer points out, should serve beneficially to force courts and lawyers to break old, loose habits of how the design defect balance is conceived and phrased.

inquiry into the formulations and names of tests or rules would seem quite uninteresting, even trivial. This is likely to be true if one argues merely with linguistic style and secondary notions in the hierarchy of rules and principles. Yet the quarrel in this Paper concerns the very meaning of design defectiveness and so involves the central question of how to allocate responsibility between manufacturers and users for accidental harm arising from the design of products for human use. Fundamentally important, this issue penetrates to the heart of products liability law.

Most courts and commentators have failed to critically examine the formulation of the design defect balancing test, either conceptually or linguistically, and the stated test increasingly has moved toward a global macro-balance of a product's "risks" against the product's "utility." This form of balance for defining a liability test is seriously flawed, and it needs to be reformulated (and renamed) to avoid unnecessary confusion and to conform the test to the actual issue central to design-defect litigation. Such cases ordinarily are litigated and otherwise resolved by an evaluation of the costs and benefits of *altering* the manufacturer's chosen design by adopting the specific design feature proposed by the plaintiff, *not* by balancing the aggregate costs and benefits of the chosen design itself.

This Paper argues that courts should consider shifting the test for design defectiveness explicitly to a *micro*-balance evaluation of whether the expected safety benefits of adopting the particular design feature proposed by the plaintiff would have been greater or less than the various costs expected to result from this particular precaution. The Paper develops three versions of such a test, two framed in consumer welfare terms alone, the other combining the consumer welfare components with a "reasonable-safety" harbor providing added wiggle room. The micro-balancing concept and the variations on the test proposed are all consistent with the new *Restatement*'s definition of design defectiveness in terms of a reasonable alternative design. Rejecting the common "risk-utility" appellation for the design defectiveness balancing test, the Paper concludes that a micro-balance formulation is more properly understood to be a "cost-benefit" test or standard.

One may quibble with the formulations (and perhaps the name) of the design defect tests proposed above, and that would be desirable. This Paper seeks merely to direct attention toward a silent but serious problem of design defect test definition, to offer a preliminary analysis of the problem, and to propose a few solutions. In an effort to begin debate on how ideally to define a micro-balance test for design defectiveness—surely a never-ending quest—perhaps the inquiry here may help to bring a little understanding and order to this unruly central issue in the law of products liability.