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Beyond Market Share Liability: Theory of Proportional Share Liability for Nonfungible Products

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BEYOND MARKET SHARE LIABILITY: A THEORY OF PROPORTIONAL SHARE LIABILITY FOR NONFUNGIBLE PRODUCTS

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Twenty-five years have passed since courts first adopted "market share liability," a theory under which a plaintiff unable to identify the manufacturer of the product that caused his injury can recover on a proportional basis from each manufacturer that might have made the product. Courts have severely restricted the reach of this potentially powerful theory by insisting that it can apply only to products that are perfectly "fungible." Most products vary from manufacturer to manufacturer, posing different levels of risk, and therefore do not satisfy the fungibility requirement. As a result, courts have applied market share liability to a very small number of products.

This Article argues that courts should eliminate the fungibility requirement by recognizing that market share liability is just one variant of a broader concept that the author calls "proportional share liability." Rather than deny recovery in cases involving products that pose varying degrees of danger, courts should consider whether proportional share liability can be imposed by using information other than market share data to make a reasonable and fair allocation of liability among the defendants. This Article examines the potential application of proportional share liability in a wide variety of contexts, including vaccines causing brain damage, violence fueled by negligent distribution and sales of firearms, disease resulting from exposure to asbestos or tobacco, and damage to spacecraft from collisions with orbital debris.

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Formerly a staff attorney for the Brady Center to Prevent Gun Violence, the author represented plaintiffs or amici curiae in a number of the cases discussed in Part II.C of this Article. The views expressed in this Article are strictly those of the author and do not necessarily represent the views of any parties to the cases discussed or to any other litigation.

INTRODUCTION

Leon Green arranged his torts casebooks into chapters based on factual settings, such as "horse and buggy traffic" and "railways" cases, rather than organizing them around abstract concepts such as proximate cause or contributory negligence.[1] Skeptical of whether legal doctrine truly and consistently determines the outcomes of cases, he suggested that judicial decisions represent idiosyncratic reactions to particular facts rather than consistent applications of general principles.

Courts have provided ample support to those sorts of suspicions with their treatment of "market share liability," a theory under which a plaintiff unable to identify the manufacturer of the particular product that caused his

1. LEON GREEN ET AL., CASES ON THE LAW OF TORTS (1957); LEON GREEN, THE JUDICIAL PROCESS IN TORT CASES (1931); *see* G. EDWARD WHITE, TORT LAW IN AMERICA 87 (1980).

injury can recover on a proportional basis from each of the manufacturers that might have supplied the product. Originally applied as a remedy for those injured by the pharmaceutical known as DES (diethylstilbestrol), market share liability has effectively been treated by most courts as a solution to a unique dilemma posed by that one particular product, rather than a principle applicable to any set of facts within defined limits.[2]

Courts have curtailed the reach of this theory beyond DES by emphasizing the notion that market share liability can apply only when a product is perfectly "fungible."[3] While courts often cite lack of fungibility as a reason to deny application of market share liability, they have not adequately explained what they think it means for a product to be fungible and why they believe fungibility is crucial. They have turned fungibility into an instrument that can bar use of market share liability in virtually any case. In nearly a quarter of a century since market share liability made its debut, this potentially powerful theory has been applied in only a handful of reported cases involving products other than DES.[4] The products in those cases were mineral spirits,[5] the gasoline additive methyl tertiary butyl ether (MTBE),[6] diptheria-pertussis-tetanus (DPT) vaccine,[7] blood clotting proteins,[8] and asbestos brake pads.[9] Other decisions consider even that short list of fungible products too long.[10]

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2. *See, e.g.*, Aaron D. Twerski, *Market Share—A Tale of Two Centuries*, 55 BROOK. L. REV. 869, 875 (1989) (observing that "courts have been unwilling to push market share beyond the very special facts of the DES litigation"); Andrew B. Nace, Note, *Market Share Liability: A Current Assessment of a Decade-Old Doctrine*, 44 VAND. L. REV. 395, 397 (1991) (describing "the continued vitality of market share liability in DES cases and the consistent rejection of the doctrine elsewhere").

3. *See infra* notes 103–105 and accompanying text.

4. In a few other instances, lower courts' determinations that products were fungible have been reversed on appeal. *See* discussion of market share liability for handguns *infra* Part II.C.1. "Agent Orange" herbicides apparently would have joined the short list of fungible products if the massive class action concerning their use in Vietnam had not settled. *See In re* "Agent Orange" Prod. Liab. Litig., 597 F. Supp. 740, 816–42 (E.D.N.Y. 1984), *aff'd*, 818 F.2d 145 (2d Cir. 1987). In a few other cases, courts have found fungibility among all units of a product made for one buyer by multiple suppliers according to identical specifications. *See, e.g.*, Mahar v. Hanover House Indus., Inc., No. CA 880156, 1995 WL 1146188 (Mass. Super. Ct. Dec. 12, 1995) (involving rowing-type exercise machines); Russo v. Material Handling Specialties Co., No. 9101209, 1995 WL 1146853 (Mass. Super. Ct. Aug. 29, 1995) (involving beverage carts used by airlines).

5. Hunnings v. Texaco, Inc., 29 F.3d 1480 (11th Cir. 1994).

6. *In re* Methyl Tertiary Butyl Ether ("MTBE") Prods. Liab. Litig., 175 F. Supp. 2d 593 (S.D.N.Y. 2001).

7. Morris v. Parke, Davis & Co., 667 F. Supp. 1332 (C.D. Cal. 1987).

8. Ray v. Cutter Labs., 754 F. Supp. 193 (M.D. Fla. 1991); Smith v. Cutter Biological, Inc., 823 P.2d 717 (Haw. 1991).

9. Wheeler v. Raybestos-Manhattan, 11 Cal. Rptr. 2d 109 (Ct. App. 1992).

10. *See, e.g.*, Doe v. Cutter Biological, 852 F. Supp. 909, 913 (D. Idaho 1994) (concluding that blood clotting proteins are not fungible products), *appeal dismissed*, 89 F.3d 844 (9th Cir. 1996); Andrew R. Klein, *Beyond DES: Rejecting the Application of Market Share Liability in Blood Products Litigation*, 68 TUL. L. REV. 883, 907, 922–23 (1994) (arguing that blood clotting proteins are not

Courts can and should eliminate the fungibility requirement by recognizing that market share liability is merely one variant of a broader concept which this Article will call "proportional share liability." Under that approach, market share data becomes just one among many possible means by which a reasonable allocation of liability among defendants could be made. When a product is fungible in the sense that every unit of the product poses an identical degree of risk, market share data is an ideal way to allocate liability among manufacturers. When the risk posed by each manufacturer's product varies significantly, market share data alone will not generate a reasonable allocation, but that should not be the end of the inquiry. Courts should consider whether proportional share liability can be imposed by using other available information to make a reasonable allocation of liability that fairly reflects each defendant's contribution to the risk and likelihood of having caused the harm.

Courts instead have remained firmly attached to the fungibility requirement and have refused even to consider any form of proportional or allocated recovery other than market share liability.[11] Scholars, students, and others writing about market share liability have not objected to the courts' approach.[12] Likewise, the drafters of the *Restatement (Third) of Torts* express deep skepticism about the feasibility of applying any form of apportioned liability to nonfungible products, even while acknowledging the idea's theoretical appeal.[13]

This unwillingness to consider alternative means of allocating liability among unidentifiable manufacturers of nonfungible products runs counter to a strong trend in the law of recognizing and responding creatively to the inevitability of uncertainty.[14] The concept of market share liability developed

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fungible products); *infra* Part II.A (discussing controversy over fungibility of DPT vaccine); *infra* Part II.B (discussing debate among courts over fungibility of asbestos brake pads).

11. *See infra* notes 103–105 and accompanying text.

12. *See infra* notes 106–108 and accompanying text.

13. *See infra* notes 109–111 and accompanying text.

14. *See, e.g.*, Joshua P. Davis, *Taking Uncertainty Seriously: Revising Injunction Doctrine*, 34 RUTGERS L.J. 363 (2003); Heidi Li Feldman, *Science and Uncertainty in Mass Exposure Litigation*, 74 TEX. L. REV. 1 (1995); Mark Geistfeld, *Scientific Uncertainty and Causation in Tort Law*, 54 VAND. L. REV. 1011 (2001); Douglas Lichtman, *Uncertainty and the Standard for Preliminary Relief*, 70 U. CHI. L. REV. 197 (2003); Ariel Porat & Alex Stein, *Liability for Uncertainty: Making Evidential Damage Actionable*, 18 CARDOZO L. REV. 1891 (1997); Warren F. Schwartz & C. Frederick Beckner III, *Toward a Theory of the "Meritorious Case": Legal Uncertainty as a Social Choice Problem*, 6 GEO. MASON L. REV. 801 (1998); Vern R. Walker, *Theories of Uncertainty: Explaining the Possible Sources of Error in Inferences*, 22 CARDOZO L. REV. 1523 (2001); Special Issue, *Kenneth Arrow and the Changing Economics of Health Care*, 26 J. HEALTH POL. POL'Y & L. 829 (2001). For an extensive collection of citations to earlier articles, see Nancy Levit, *Ethereal Torts*, 61 GEO. WASH. L. REV. 136, 136–38 & nn.1–14 (1992).

out of and helped to promote a growing awareness of the probabilistic nature of all evidentiary determinations.[15] In particular, legal scholars and courts alike have focused attention in recent years on the nature of science, urging that the law should reflect a more sophisticated understanding of scientific knowledge and methods.[16] The lessons that science offers to the law include the idea that all knowledge is incomplete, the realization that we are surrounded by systems too complex for traditional notions about specifically and precisely identifying causes, and the recognition that probabilistic assessments and statistical inferences permeate our thinking and understanding of the world.[17] Scientists regard causation as "not an either/or proposition but a probabilistic evaluation."[18] Recognizing that market share data is not the exclusive means by which liability could be allocated in circumstances of inherent doubt about tortfeasors' identities harmonizes perfectly with those larger trends of thought.

This Article seeks to show that proportional share liability deserves serious consideration from courts in appropriate cases. Recognizing that proportional share liability can be applied to products that are not fungible would empower courts to craft fair solutions in circumstances where defendants' conduct was tortious, plaintiffs suffered serious injuries as a result, and the only obstacle to relief is an inability to match each injury to a particular defendant.

Part I describes the basic concepts at issue in potential proportional share liability cases. After explaining how the idea of market share liability arose in DES cases, it turns to the different meanings of "fungibility" and their significance. The fact that manufacturers' products are fungible in the sense of being functionally interchangeable or physically indistinguishable could be a reason why plaintiffs have severe problems identifying a product's manufacturer, but it is not essential to application of market share liability or to any other proportional share liability theory. Other factors can create similarly difficult identification dilemmas. The fact that manufacturers' products pose identical degrees of risk is the only sense in which "fungibility" is essential

15. *See infra* notes 20–24, 95–98 and accompanying text.

16. *See, e.g.*, Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579 (1993); Edward S. Adams et al., *At the End of* Palsgraf, *There Is Chaos: An Assessment of Proximate Cause in Light of Chaos Theory*, 59 U. PITT. L. REV. 507 (1998); Erica Beecher-Monas, *A Ray of Light for Judges Blinded by Science: Triers of Science and Intellectual Due Process*, 33 GA. L. REV. 1047 (1999); Edward K. Cheng, *Changing Scientific Evidence*, 88 MINN. L. REV. 315 (2003); Edward J. Imwinkelried, *Evidence Law Visits Jurassic Park: The Far-Reaching Implication of the* Daubert *Court's Recognition of the Uncertainty of the Scientific Enterprise*, 81 IOWA L. REV. 55 (1995).

17. *See* Adams et al., *supra* note 16, at 513–16; Erica Beecher-Monas, *The Heuristics of Intellectual Due Process: A Primer for Triers of Science*, 75 N.Y.U. L. REV. 1563, 1578–84 (2000); Feldman, *supra* note 14, at 16–17; Imwinkelried, *supra* note 16, at 60–63.

18. Beecher-Monas, *supra* note 16, at 1094.

to market share liability. No sound basis for the fungibility requirement remains if one recognizes that market share liability is merely one form of proportional share liability.

Part II looks at the potential application of the proportional share liability concept to nonfungible products in a wide variety of contexts, including vaccines causing brain damage, gun violence fueled by negligent distribution and sales, disease resulting from exposure to asbestos brake pads or secondhand cigarette smoke, and damage to spacecraft from collisions with orbital debris. These examples demonstrate how injured parties can be denied fair remedies by flawed notions about market share liability and the significance of product fungibility. These examples also illustrate a number of different ways of achieving allocations of liability that reflect the variable risk of nonfungible products. In some cases, an allocation can be made by starting with market share data and adjusting it in some manner to account for variations in risk, such as by relying on product test data or expert assessments of products' relative risks. In other circumstances, an allocation can be made without using market share data at all, such as by using information about a pool of injuries that can be traced to particular manufacturers as a means of assigning liability for injuries that cannot be traced to any one manufacturer.

Part III addresses important limitations on the application of proportional share liability to nonfungible products, describing obstacles that no type of data or method of allocation may be able to overcome. Novel ways of allocating liability will not help plaintiffs with injuries resulting from a defect that is idiosyncratic to one or a few manufacturers rather than common to all producers of the product, plaintiffs exposed to a diverse array of hazardous products rather than one product or a limited set of products, plaintiffs injured by a product of unknown age and therefore unable to narrow the time period from which to draw data for allocating liability, or plaintiffs facing significant causal uncertainties beyond the inability to identify a particular defendant as the source of harm.

Part IV argues that courts should weigh the need for a remedy for plaintiffs' injuries caused by defendants' tortious conduct and the likelihood of achieving an allocation that fairly reflects defendants' contributions to the risk of those injuries. Quantifying the relative danger of products inevitably entails some imprecision, but courts should strive toward reasonable solutions rather than demand perfect ones.

Fungibility will remain a crucial requirement only if courts continue to treat market share liability as a discrete, isolated rule rather than recognize it as one example of a broader principle of proportional share liability. Liability

can be allocated among manufacturers of nonfungible products in ways that achieve just results for both plaintiffs and defendants. Courts should decide whether there are reasonable ways to allocate liability, rather than simply invoke the fungibility requirement and turn market share liability into a relic with little or no application beyond the DES cases in which it originated.

I. MARKET SHARE LIABILITY AND THE "FUNGIBILITY" REQUIREMENT

Courts frequently refer to "market share liability" and "fungibility" without being specific about the meaning of those concepts and the relationships between them. More precise language is essential.

A. Proportional Liability and Collective Liability

Traditional principles of tort law require proof, by a preponderance of the evidence, that a plaintiff suffered an injury caused by a particular defendant's conduct.[19] Under this "all or nothing" approach, a plaintiff either proves that it is more probable than not that a defendant caused injury to the plaintiff and recovers full damages, or fails to do so and recovers nothing.

For years, legal scholars have proposed various liability theories that would require a defendant to pay partial damages despite a plaintiff's inability to satisfy the traditional requirements for proving causation.[20] These proposals boil down to a plaintiff being allowed to recover x percent of damages from a defendant for proving an x percent chance that defendant caused plaintiff's injury.

Several different types of uncertainty can create a need to impose liability on a proportional basis. In some situations, no doubt exists that the correct defendant has been identified, but the odds that the defendant's conduct caused harm to the plaintiff do not rise to the "more probable than

19. *See, e.g.*, DAN B. DOBBS, THE LAW OF TORTS § 166, at 405 (2000).

20. For one of the earliest proposals for apportioning liability, see Samuel D. Estep, *Radiation Injuries and Statistics: The Need for a New Approach to Injury Litigation*, 59 MICH. L. REV. 259, 281 (1960) (advocating establishment of a "contingent injury fund" to which defendants releasing radiation "would contribute in proportion to the increased chances" that those exposed to radiation will eventually develop diseases (emphasis omitted)). For overviews of the subject, see John Makdisi, *Proportional Liability: A Comprehensive Rule to Apportion Tort Damages Based on Probability*, 67 N.C. L. REV. 1063 (1989) (proposing adoption of the probabilistic causation approach and elimination of the causation-in-fact requirement for all tort cases), and Richard Delgado, *Beyond* Sindell: *Relaxation of Cause-in-Fact Rules for Indeterminate Plaintiffs*, 70 CAL. L. REV. 881 (1982) (discussing mechanisms by which courts could afford relief in situations of uncertainty about the identity of those injured by defendant's conduct).

not" level required by the traditional causation requirements.[21] For example, liability can be imposed on a proportional basis in order to provide a means of recovery in "lost chance" situations where a doctor negligently misdiagnoses a patient who would have had less than a 50 percent chance of survival even if properly treated.[22] Likewise, liability can be imposed on a proportional basis in "indeterminate plaintiff" situations where the identity of those injured by defendants' wrongdoing is uncertain, such as where a defendant exposed a large group of individuals to toxic substances, increasing each member's risk of developing a disease, but raised the risk by an amount too low for any individual who develops the disease to prove that the toxic exposure probably caused the disease.[23]

Market share liability focuses instead on "indeterminate defendant" situations, providing a remedy where a plaintiff can identify a group of actors engaged in harmful activity but cannot prove which actor actually caused the plaintiff's injury.[24] Market share liability is not the only means by which multiple defendants can be held collectively liable in circumstances that make it impossible to determine which one of them actually caused the plaintiff's injury.[25] Other legal theories under which such collective liability can be imposed include the "alternative liability" doctrine that originated in *Summers v. Tice*,[26] under which the burden of identifying the cause of the plaintiff's injury shifts to the defendants in situations where the nature of the defendants' negligence makes it impossible for the plaintiff to know which defendant caused the harm. A second doctrine imposing collective liability

21. One alternative means of allowing recovery is to recharacterize the nature of defendant's tortious conduct or plaintiff's injury in a way that makes it possible for the traditional causation requirements to be proven by a preponderance of the evidence. *See, e.g.*, Levit, *supra* note 14, at 174–90 (discussing the "reconceptualiz[ation of] intangible injuries"); *infra* notes 182–186 and accompanying text.

22. *See* Joseph H. King, Jr., *Causation, Valuation, and Chance in Personal Injury Torts Involving Preexisting Conditions and Future Consequences*, 90 YALE L.J. 1353, 1365–70 (1981). Some courts have adopted proportional liability for "lost chance" situations, although they have done so by creating rules narrowly limited to the medical malpractice context. *See, e.g.*, Wollen v. DePaul Health Ctr., 828 S.W.2d 681, 685 (Mo. 1992).

23. *See* David Rosenberg, *The Causal Connection in Mass Exposure Cases: A "Public Law" Vision of the Tort System*, 97 HARV. L. REV. 849 (1984). Courts have not yet embraced the use of proportional liability for indeterminate plaintiff situations. *See* Cottle v. Superior Court, 5 Cal. Rptr. 2d 882, 905–06 (Ct. App. 1992) (Johnson, J., dissenting).

24. *See* Symposium, *The Problem of the Indeterminate Defendant: Market Share Liability Theory*, 55 BROOK. L. REV. 863 (1989).

25. For an example of an opinion using the term "collective liability" in this way, see Hamilton v. Accu-Tek, 62 F. Supp. 2d 802, 839 (E.D.N.Y. 1999), *questions certified sub nom.* Hamilton v. Beretta U.S.A. Corp., 222 F.3d 36 (2d Cir. 2000), *certified questions answered*, 750 N.E.2d 1055 (N.Y. 2001), *vacated by* 264 F.3d 21 (2d Cir. 2001).

26. 199 P.2d 1 (Cal. 1948) (ruling that two hunters who negligently fired simultaneously in the plaintiff's direction each have the burden of trying to prove it was other's shot that struck the plaintiff).

on multiple defendants emerged in *Hall v. E.I. DuPont De Nemours & Co.*,[27] a suit against blasting cap manufacturers, where the court developed a principle of "enterprise liability" that shifted the burden of proving causation to manufacturers that followed inadequate industry-wide safety standards. Other legal principles, such as conspiracy and concerted action, impose joint liability on a group of defendants who cooperate or agree to engage in tortious activity.[28] Any one of these legal doctrines can be used to impose collective liability and overcome a plaintiff's inability to prove exactly who caused his injury.

Market share liability thus resides at the intersection of proportional liability and collective liability. The problem is that judges and many others have come to regard it as the sole occupant of that intersection. The next parts explore how that view arose and why it is wrong.

B. The DES Problem

A wave of cases filed in the 1970s against manufacturers of the drug DES brought market share liability to center stage.[29] First synthesized in the late 1930s, DES is an artificial form of the hormone estrogen.[30] From 1947 until 1971, millions of pregnant women took the drug as a miscarriage preventative.[31] During that period, hundreds of pharmaceutical companies produced the drug, which was never patented.[32] From the beginning, medical researchers raised serious questions about the safety and effectiveness of DES for preventing miscarriages.[33] None of the companies making and selling DES

27. 345 F. Supp. 353 (E.D.N.Y. 1972) (ruling that blasting cap manufacturers have the burden of disproving causation where industry cooperated in design, manufacture, and marketing of product).

28. *See* DOBBS, *supra* note 19, § 340, at 936–37. While those principles can be employed to overcome a plaintiff's inability to identify the defendant who caused the harm, they were not developed for that purpose and apply more broadly to situations in which a plaintiff can prove the identity of the defendant causing the injury but nevertheless seeks to expand the net of liability to cover other defendants. *See* Collins v. Eli Lilly Co., 342 N.W.2d 37, 46–47 (Wis. 1984); Naomi Sheiner, Comment, *DES and a Proposed Theory of Enterprise Liability*, 46 FORDHAM L. REV. 963, 979 (1978) (noting that concerted action theory "seems to have evolved in order to deter hazardous group behavior rather than because the actual injury-producing party could not be identified").

29. *See* Sheiner, *supra* note 28, at 966–67 (citing defense counsel's estimate that eighty to one hundred cases, involving several hundred plaintiffs, were pending by the middle of 1977).

30. *See id.* at 963.

31. *See* Sindell v. Abbott Labs., 607 P.2d 924, 925, 927 (Cal. 1980); Sheiner, *supra* note 28, at 963–64.

32. *See* Sheiner, *supra* note 28, at 963 n.1, 964 n.3.

33. *See* Bichler v. Eli Lilly & Co., 436 N.Y.S.2d 625, 629 (App. Div. 1981) (describing evidence that "three prominent Chicago physiologists had administered DES to rats and mice in 1939 and concluded that the hormone crossed the placenta and had malforming action on the fetus"), *aff'd*, 436 N.E.2d 182 (N.Y. 1982); Sheiner, *supra* note 28, at 963 n.2 (describing articles published in medical journals in the early 1950s questioning the effectiveness of DES).

tested whether it affected fetuses, in animals or humans, even though they specifically marketed DES for pregnancy use and it would have taken just six months for tests on mice to reveal the danger of cancer when the offspring reached maturity.[34] The federal Food and Drug Administration put an end to the use of DES for miscarriage prevention in 1971, after scientists discovered that daughters of women who took DES during pregnancy had unusually high rates of certain rare forms of cervical and vaginal cancer.[35]

Many "DES daughters" seeking to recover compensation for their injuries faced a severe problem identifying the manufacturer or manufacturers of the DES consumed by their mothers.[36] While all manufacturers produced DES according to substantially the same chemical formula,[37] they sold it in a wide variety of forms. Most made DES into pills, while others sold it in various sorts of capsules.[38] The pills and capsules came in an assortment of sizes, dosages, shapes, coatings, and colors.[39] Some were marked with lettering or scoring, while others had no distinctive marks.[40] The manufacturers' marketing strategies varied as well. While many sold DES as a generic drug, others sold it under unique brand names.[41] Given its standard chemical formula, pharmacists generally filled prescriptions with whatever supply they had on hand in the proper dosage.[42]

If the adverse effects of the drug had appeared quickly after use, many users would have been able to identify the manufacturer of the DES they consumed, based on their recollection of the product's appearance or from records

34. *See Bichler*, 436 N.Y.S.2d at 629–30.

35. *See Sindell*, 607 P.2d at 925; Sheiner, *supra* note 28, at 964–66, 965 nn.7–10.

36. *See Sindell*, 607 P.2d at 927–28.

37. *See id.* at 932 (stating that "the formula for DES is a scientific constant . . . set forth in the United States Pharmacopoeia"). Although all diethylstilbestrol is chemically identical, the term "DES" is often used to mean not just diethylstilbestrol, but also similar synthetic nonsteroidal estrogens such as dienestrol. *See* Ferrigno v. Eli Lilly & Co., 420 A.2d 1305, 1310 & n.3 (N.J. Super. Ct. Law Div. 1980). Most DES cases drew no distinction among these different drugs, instead treating them all as though they were a single, chemically identical product. *See* Namm v. Charles E. Frosst & Co., 427 A.2d 1121, 1123–24 (N.J. Super. Ct. App. Div. 1981). *But see* Abel v. Eli Lilly & Co., 343 N.W.2d 164, 166 n.1, 174 (Mich. 1984) (requiring plaintiffs to prove that DES, dienestrol, and similar products sold by defendants "are essentially identical in their injury-producing results").

38. *See* McCormack v. Abbott Labs., 617 F. Supp. 1521, 1530 (D. Mass. 1985); *Namm*, 427 A.2d at 1124.

39. *See* Hamilton v. Accu-Tek, 32 F. Supp. 2d 47, 52 (E.D.N.Y. 1998) ("Having tried the DES cases, the court takes judicial notice that the pills manufactured by the various manufacturers were not identical, varying in shape, dosage and coloring."); *Ferrigno*, 420 A.2d at 1316; Erlich v. Abbott Labs., 5 Phila. 249, 254 (C.P. Ct. 1981); Collins v. Eli Lilly Co., 342 N.W.2d 37, 41, 50 (Wis. 1984).

40. *See Collins*, 342 N.W.2d at 44.

41. *See Abel*, 343 N.W.2d at 166 n.1; Martin v. Abbott Labs., 689 P.2d 368, 374 (Wash. 1984); Centers for Disease Control & Prevention, DES Brand Names, *at* http://www.cdc.gov/DES/hcp/brand/index.html; Sheiner, *supra* note 28, at 987.

42. *See Martin*, 689 P.2d at 381.

of their pharmacy's source of supply. Instead, the harm did not manifest for a generation.[43] By the time a "DES daughter" developed cancer or other reproductive system problems and identified DES as a likely cause, the chances of identifying a manufacturer were slim. Many mothers could no longer recall the brand or appearance of the drug they had consumed or even remember the pharmacy from which they had obtained it.[44] If they knew the pharmacy and it remained in business, its employees often had moved, retired, or died; the memories of those who remained had faded; and their records had long since been destroyed or lost.[45] The same deterioration of evidence occurred for physicians' memories and for records of prescriptions written.[46]

Under these circumstances, only a small minority of DES plaintiffs could identify the maker of the DES taken by their mothers.[47] Without the benefit of a principle permitting recovery when plaintiffs could not identify the manufacturer, a large number of those suffering injuries attributable to DES would be left without remedies.

C. Embracing an Imperfect Solution to the DES Problem

Dozens of lawsuits against DES manufacturers began working their way through the courts, with early cases failing when identification of a manufacturer could not be made.[48] Meanwhile, a comment appeared in the *Fordham Law Review* that would turn out to be one of the most influential student-written works ever published in a law journal.[49]

In that comment, Naomi Sheiner examined existing theories of collective liability, particularly concerted action and alternative liability, that might help DES plaintiffs.[50] Finding neither of those theories well suited for DES cases,[51]

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43. *See* Sindell v. Abbott Labs., 607 P.2d 924, 925 (Cal. 1980) (stating that form of cancer associated with DES manifests itself only after minimum latent period of at least ten to twelve years).

44. *See, e.g.*, Mizell v. Eli Lilly & Co., 526 F. Supp. 589, 591 n.1 (D.S.C. 1981); Mulcahy v. Eli Lilly & Co., 386 N.W.2d 67, 70 (Iowa 1986).

45. *See, e.g.*, Ryan v. Eli Lilly & Co., 514 F. Supp. 1004, 1007 (D.S.C. 1981); Gray v. United States, 445 F. Supp. 337, 338 (S.D. Tex. 1978); Erlich v. Abbott Labs., 5 Phila. 249, 254–55 (C.P. Ct. 1981).

46. *See, e.g.*, *Gray*, 445 F. Supp. at 338.

47. *See, e.g.*, *Sindell*, 607 P.2d at 927–28 (noting that the second of two plaintiffs in the case purported to have identified the manufacturer of DES used by her mother); Abel v. Eli Lilly & Co., 343 N.W.2d 164, 168 (Mich. 1984) (noting that some plaintiffs in the case identified the manufacturer and that some could not).

48. *See, e.g.*, *Gray*, 445 F. Supp. at 338; McCreery v. Eli Lilly & Co., 150 Cal. Rptr. 730, 733–35 (Ct. App. 1978); Sheiner, *supra* note 28, at 972 n.28 (citing numerous cases in which courts granted manufacturers' dismissal or summary judgment motions).

49. Sheiner, *supra* note 28.

50. *Id.* at 973–74.

Sheiner proposed a new "hybrid" theory.[52] Under her approach, a DES plaintiff could recover without identifying a particular manufacturer if she proved that all defendants "concertedly adhered to a dangerous, industrywide safety standard" and that there was a "high probability" that one of the defendants caused her injury.[53] While the existing theories of collective liability resulted in all defendants sharing joint liability for the entire injury, Sheiner proposed a proportional liability scheme based on market share data. "Since there is not an equal possibility of causation for each defendant, and the possibility of causation can best be estimated by market share," she argued, "damages should be apportioned according to market share."[54]

The objective of the market share approach was to achieve, through the combined outcomes of all DES cases, the same amount of liability for each defendant that would be imposed if identification of the true manufacturer could be accomplished in every case.[55] For example, a manufacturer that sold 4 percent of DES on the market and caused 4 percent of injuries attributable to DES would pay 4 percent of the damages owed to a plaintiff who could not identify the maker of DES consumed by her mother. Sheiner acknowledged that the correlation between actual causation and damages paid under a market share liability system would never be perfect in practice, but she believed it would be "close enough so that defendants' objections on the ground of fairness lose their value."[56]

The Supreme Court of California embraced Sheiner's proposal in *Sindell v. Abbott Laboratories*[57] and became the first court to adopt a theory of market share liability.[58] Like Sheiner, the court recognized that each manufacturer's share of the liability under this theory would roughly correlate to the share of harm it had actually caused, although the correlation would never be perfect in practice.[59] For example, market shares likely would be impossible to calculate with "mathematical exactitude."[60] Untroubled by that

51. *Id.* at 978–95.

52. *Id.* at 974. Unfortunately Sheiner contributed to the terminological difficulties plaguing this subject by calling her idea "enterprise liability" theory, although it differed significantly from the "enterprise liability" theory applied several years earlier in *Hall v. E.I. Du Pont de Nemours & Co.*, 345 F. Supp. 353 (E.D.N.Y. 1972).

53. Sheiner, *supra* note 28, at 974.

54. *Id.* at 994.

55. *Id.*

56. *Id.*

57. 607 P.2d 924 (Cal. 1980).

58. *Id.* at 936–37; *id.* at 943 (Richardson, J., dissenting) (describing Sheiner's comment as "the wellspring of the majority's new theory").

59. *Id.* at 937.

60. *Id.* at 937 & n.29.

fact, the court recognized that perfection is not the standard demanded in any other branch of tort law. The goal is to achieve a reasonable allocation of responsibility, and "where a correct division of liability cannot be made 'the trier of fact may make it the best it can.'"[61]

D. Untangling the Meanings of "Fungibility" and Their Significance

The *Sindell* opinion and Sheiner's law review comment contain only a few scattered references to DES as a "fungible" product and do not place great emphasis on that term.[62] While "fungibility" soon would become an obsession for courts discussing market share liability, no court has ever explained thoroughly what "fungibility" means or why it is important. As a result, "fungibility" has been used in several different senses throughout the case law, with these different meanings continually jumbled and confused. Similarly, commentators have failed to clarify the meaning or significance of "fungibility." For example, the leading treatise on tort law simply observed that market share liability requires injury caused by a "fungible" or "identical-type" product, without further explanation.[63] A product can be "fungible" in several different senses significant to application of market share liability.

1. Functional Interchangeability

"Fungible" literally means that each manufacturer's version of the product is functionally interchangeable with the rest.[64] When the Supreme Court of California referred to DES as a "fungible" product in its seminal *Sindell* opinion, it was using the term in that sense, calling DES "a fungible drug interchangeable with other brands of the same product."[65]

Whether a product is fungible in the sense of being functionally interchangeable obviously depends on the function that one has in mind. As one judge put it, "for signaling New Year's Eve, a blast from an auto horn and one from a saxophone may be equivalent as noise, but few would want

61. *Id.* at 937 (quoting Summers v. Tice, 199 P.2d 1, 5 (Cal. 1948)).

62. *See id.* at 926, 932, 936; Sheiner, *supra* note 28, at 974.

63. PROSSER AND KEETON ON THE LAW OF TORTS § 103, at 714 (W. Page Keeton et al. eds., 5th ed. 1984).

64. *See* WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 499 (9th ed. 1983) (defining "fungible" as "of such a kind or nature that one specimen or part may be used in place of another specimen or equal part in the satisfaction of an obligation" or "interchangeable"), *quoted in* Wheeler v. Raybestos-Manhattan, 11 Cal. Rptr. 2d 109, 111 (Ct. App. 1992).

65. *Sindell*, 607 P.2d at 926.

to dance to the former."[66] Whether a product is fungible in this sense is also a matter of degree and dependent on context. For example, all automobile makes and models are functionally interchangeable to some extent, because they all provide transportation, although one automobile would be far better suited to a particular use than another in many situations.

Functional interchangeability is significant for market share liability purposes only because it is a reason why a product may pose unusually severe identification problems. Products that are functionally interchangeable will often be intermingled. Knowing that all DES had the same effect, pharmacists filled prescriptions with whatever brand of DES they had in stock in the correct dosage.[67] This exacerbated the difficulties for plaintiffs trying to prove the manufacturer of the DES consumed by their mothers. Even if a prescription could be found and the doctor wrote a specific brand name rather than referring to DES generically, that proved little about which manufacturer's product the plaintiff's mother actually received from the pharmacy.

2. Physical Indistinguishability

Courts also have used the term "fungible" to mean that each manufacturer's version of the product is physically indistinguishable from the rest.[68] Like functional interchangeability, this sort of fungibility is a matter of degree. The extent to which products are indistinguishable also depends on how and in what context one tries to tell them apart. For example, the difference between two brands of a cola drink in their original packaging will be obvious. After being poured from the can or bottle, they might be completely indistinguishable in appearance, distinguishable by taste for some consumers and not others, and easily distinguishable to chemists analyzing them in a laboratory.

Physical indistinguishability matters for market share liability to the extent that it is, like functional interchangeability, a potential reason a product might be difficult for a plaintiff to attribute to a particular manufacturer. DES was by no means perfectly fungible in this sense, because it came in different forms, shapes, sizes, and colors, and sometimes carried unique lettering or scoring.[69] On the other hand, the similar appearance of many manufacturers'

66. Hamilton v. Accu-Tek, 32 F. Supp. 2d 47, 51 (E.D.N.Y. 1998).

67. *See Sindell*, 607 P.2d at 926; Smith v. Eli Lilly & Co., 560 N.E.2d 324, 343 (Ill. 1990) (noting that "along the chain of distribution [specific brands of DES] become commingled and less traceable").

68. *See, e.g.*, Jefferson v. Lead Indus. Ass'n, 106 F.3d 1245, 1247 n.4 (5th Cir. 1997); McCormack v. Abbott Labs., 617 F. Supp. 1521, 1525 (D. Mass. 1985); *In re* Dow Corning Corp., 250 B.R. 298, 362–63 (Bankr. E.D. Mich. 2000); Ferrigno v. Eli Lilly & Co., 420 A.2d 1305, 1314 (N.J. Super. Ct. Law Div. 1980).

69. *See supra* notes 38–41 and accompanying text.

DES products contributed to the identification problems experienced by DES plaintiffs. Not all DES products had a distinctive appearance, and some of the differences among them were too slight to be remembered many years after a woman consumed the product, even if the appearance would have enabled identification to be made if a pill or capsule had been saved.[70]

Although they exacerbated the problem, the interchangeability and similar appearance of DES were not the primary reasons why DES posed a severe identification dilemma for plaintiffs.[71] Instead, the biggest problems facing DES plaintiffs were the passage of time and consumption of the product. When women discovered their injuries, many years had gone by since their mothers had used the drug.[72] Consumed during its use, DES was inevitably unavailable by the time the harm appeared.

3. Uniformity of Risk

DES was "fungible" in another crucial respect. As a result of sharing an identical or virtually identical chemical formula,[73] each manufacturer's product posed the same amount of risk as every other manufacturer's product.[74] The products therefore were "identically defective," with none being more or less dangerous than the rest.[75] This uniformity of risk was the key to market share liability.[76] It is what made market share data the right measure to use to apportion liability among DES manufacturers. With all DES posing identical risks, each manufacturer's share of overall sales should correspond roughly to its share of the overall harm caused. For example, a manufacturer supplying 5 percent of DES nationwide presumably created 5 percent

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70. *See, e.g.*, Martin v. Abbott Labs., 689 P.2d 368, 371 (Wash. 1984) (noting that eighteen years passed between a mother's consumption of DES and a plaintiff's cancer diagnosis, leaving the mother, physician, and pharmacist unable to remember or prove anything about DES pills consumed by the mother except dosage level).

71. *See* RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL HARM (BASIC PRINCIPLES) § 28 cmt. o (Tentative Draft No. 2, 2002) ("Only products that cause harm after a lengthy latency period between exposure and development of harm are likely to create the systemic proof problems that market-share liability addresses.").

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

73. *See supra* note 37.

74. *See* Sheiner, *supra* note 28, at 987 ("In both the DES cases and *Summers*, the tortious nature of each of the defendants' conduct was identical and created the same type of risk.").

75. *See id.* at 995–96, 1002 (describing market share liability as applying to manufacturers of "identically defective" products).

76. *See, e.g.*, Susan Rose-Ackerman, *Market-Share Allocations in Tort Law: Strengths and Weaknesses*, 19 J. LEGAL STUD. 739, 739 (1990) (observing that crucial requirement is that "products supplied by all producers are homogenous with respect to risk. Thus, pills may be red, white, or yellow, but so long as their formula is a chemical constant, their riskiness is identical.").

of the overall risk posed by the product and caused approximately 5 percent of the harm suffered as a result of DES use. If some DES had been safer or more dangerous than the rest, the equivalence between market shares and the probable amount of harm caused would have been destroyed.

While the Supreme Court of California used the term "fungible" to mean functional interchangeability,[77] the uniformity of risk posed by DES was the true key to its decision. The author of the *Sindell* majority opinion, Justice Stanley Mosk, emphasized in an interview about the case that "[y]ou have to bear in mind that the DES manufacturers all use an identical formula . . . . and therefore the damage that each manufacturer's product would do was certain to be comparable."[78] Mosk added that "I do not know whether that is the case with other products such as asbestos, or Agent Orange, or the Love Canal type. Until the litigation arises in which it is claimed or proved that the manufacturers used an identical product I am not at all certain that the DES litigation would necessarily be controlling."[79]

Again, some ambiguity exists, because whether a product poses a uniform risk can depend on the choice of the unit for which risk is measured. While each milligram of DES presented the same amount of risk, each DES pill did not, because the pills came in different dosages. Courts treated the sort of mathematical adjustments required to account for the varying dosage levels of pills as part of the process of calculating market shares, rather than seeing it as an additional step that took the case beyond mere application of market share liability to a fungible product.[80]

No clear standards exist for determining when courts should fold those sorts of adjustments into the calculation of market shares and treat products as fungible although the products contain varying amounts of the hazardous substance. For example, a court recently ruled that market share liability could apply to claims brought against oil companies allegedly causing groundwater contamination through leaks of gasoline containing the additive MTBE,[81] despite the fact that defendants used MTBE in concentrations

77. *See supra* note 65 and accompanying text.

78. *Trends in Products Liability Litigation*, TRIAL, Nov. 1980, at 82, 84 (interview of Justice Stanley Mosk and Thomas F. Lambert, Jr. by Jonathan T. Zackey).

79. *Id.*

80. *See, e.g.*, George v. Parke-Davis, 733 P.2d 507, 512–13 (Wash. 1987) (en banc) (ruling that, where dosage and type of pills taken by a plaintiff's mother is known, market shares should be calculated by the number of pills of that kind sold by each defendant, and that in other cases the trial court could allocate market share by comparing total milligrams of DES sold, revenue from the sale of DES, or some other standard of measurement for which sufficiently reliable information existed).

81. *In re* Methyl Tertiary Butyl Ether ("MTBE") Prods. Liab. Litig., 175 F. Supp. 2d 593 (S.D.N.Y. 2001).

varying from as little as 2 percent to as much as 15 percent of a gallon of gasoline.[82] MTBE poses a uniform danger if one measures risk and calculates market shares by units of MTBE rather than units of gasoline sold.

Courts have been unwilling to apply the same approach in other cases. For example, in a suit alleging that exposure to benzene in gasoline caused leukemia, a court ruled that fungibility did not exist because the benzene content ranged from zero to 5 percent of the gasoline by volume.[83] Likewise, courts have ruled that latex gloves cannot be fungible if they contain different amounts of a protein that causes allergies,[84] paints cannot be fungible if they contain varying amounts of lead,[85] and products cannot be fungible if they contain varying amounts of asbestos.[86] Ambiguity in the definition of what it means for a product to pose a uniform risk thus enables courts to use the fungibility requirement to expand or restrict the reach of market share liability in ways not constrained by any rules or guided by any standards.

4. The Connection Between Fungibility and Coordinated Industry Action

Fungibility may be significant in several other, more subtle ways that can support imposition of collective liability on an industry. In some instances, the fact that a product is fungible, in any one or more of the three senses described above, may signal that there was some degree of coordinated action among the product's manufacturers in creating the risk. That coordination, ranging from independent but parallel conduct to explicit and intentional cooperation, may be a factor weighing in favor of a collective or group approach to liability even if it does not rise to the level required for conspiracy or concerted action principles to apply.[87] For example, the fact that DES was a fungible product meant that some degree of coordinated action occurred among its makers, such as their cooperation in obtaining the initial federal regulatory approval of the drug, agreement on "common

82. *Id.* at 600; Joseph F. Speelman, *The MTBE Controversy: Defending Mass Tort Claims*, 69 DEF. COUNS. J. 35, 37 (2002).

83. Bly v. Tri-Continental Indus., Inc., 663 A.2d 1232, 1244 & n.9 (D.C. 1995).

84. Kennedy v. Baxter Healthcare Corp., 50 Cal. Rptr. 2d 736, 739–40, 744–45 (Ct. App. 1996).

85. Brenner v. Am. Cyanamid Co., 699 N.Y.S.2d 848, 853 (App. Div. 1999).

86. *See infra* Parts II.B, III.B.

87. *See* Kenneth S. Abraham, *Individual Action and Collective Responsibility: The Dilemma of Mass Tort Reform*, 73 VA. L. REV. 845, 863–64 (1987) (arguing that the strongest justification for imposing collective liability is that defendants engaged in some form of collective action, even "independent but consciously parallel" conduct).

chemical standards" for its production, and creation of "uniform labeling and product literature."[88]

In a similar vein, the fact that a product is fungible may indicate that imposing some form of collective liability will encourage coordinated industry action to reduce the product's risk. When various manufacturers produce essentially the same product, improving the product's safety may require concerted industry effort because the benefits of a safety innovation achieved by one manufacturer will be shared by all its competitors, and therefore no one industry member will have sufficient incentives to undertake research on its own.[89] Beneficial interaction and cooperation, or what Professor Robert Baruch Bush calls "community formation," can be promoted by imposing collective responsibility on such an industry.[90]

DES again provides an example. Naomi Sheiner suggested that the industry-wide production of a "generically similar" drug like DES demonstrated that the risk posed by the product was an industry-wide problem best resolved by an industry-wide solution, rather than by actions undertaken by each individual manufacturer.[91] Sheiner suggested that collective liability could give the industry incentives to institute safety measures requiring cooperation, such as improving reporting systems for adverse reactions to the drug.[92]

5. Proportional Share Liability

Fungibility thus can mean several different things, only one of which—uniformity of risk—is crucial for market share liability. That products of various manufacturers look the same or can be used interchangeably are just two among many reasons why a product may present inherent and unusually serious identification problems. Manufacturers can be extremely difficult or impossible to identify for many other reasons.[93] Uniformity of risk across all manufacturers' products is the only sense in which fungibility is a logical requirement for application of market share liability.

The notion that any kind of fungibility should be required erodes completely as soon as one opens the door to what this Article calls "propor-

88. Sheiner, *supra* note 28, at 976–77, 1004.

89. *See* Rose-Ackerman, *supra* note 76, at 745.

90. Robert A. Baruch Bush, *Between Two Worlds: The Shift From Individual to Group Responsibility in the Law of Causation of Injury*, 33 UCLA L. REV. 1473, 1554–57 (1986).

91. Sheiner, *supra* note 28, at 1004–06.

92. *Id.* at 1005.

93. For example, a product may cause injury under circumstances making it unlikely that evidence of the manufacturer's identity can be obtained. *See infra* Part II.C (discussing firearms); *infra* Part II.D (discussing outer space debris).

tional share liability," a concept that includes but extends beyond market share liability. Market share data is simply one among many conceivable ways in which shares of liability could be apportioned across a group of defendants. Uniformity of risk is not essential if the liability can be allocated in an alternative manner that adequately takes into account the varying levels of risk posed by each manufacturer's products. Courts and commentators alike have cursorily dismissed or ignored this concept and given life to the fungibility requirement by doing so.

The idea of imposing proportional share liability on manufacturers of products that do not pose uniform risks has been lurking in the shadows for years even as market share liability has had the spotlight. In the first few years after the *Sindell* decision, a flood of writing addressed apportionment of liability in general and market share liability in particular.[94] A small handful of these writers suggested that market share liability represented just one form of a broader approach that could be extended to nonfungible or nonidentical risks. For example, a case comment on *Sindell* recognized that courts should have "some mechanism for considering evidence reflecting disproportionate harm caused per unit," so that liability could be allocated properly where market share data alone did not adequately reflect the likelihood that each defendant caused the plaintiff's injury.[95] Soon after, Professor Glen Robinson raised the same idea in an essay about the larger notion of holding defendants liable in proportion to the amount of risk they create rather than the amount of harm they cause.[96] Robinson observed that, despite the excitement and controversy surrounding the DES cases, market share liability was likely to have little impact outside the DES context if it remained applicable only to defendants creating identical risks.[97] He suggested that there was "no logical compulsion for the principle to be so limited," if "workable measures of apportionment can be found."[98]

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94. *See infra* notes 95–98.

95. Robert A. Kors, Case Comment, *Refining Market Share Liability:* Sindell v. Abbott Laboratories, 33 STAN. L. REV. 937, 944–46 (1981).

96. Glen O. Robinson, *Multiple Causation in Tort Law: Reflections on the* DES *Cases*, 68 VA. L. REV. 713 (1982).

97. *Id.* at 749–50.

98. *Id.* at 750, 754; *see also* Rosenberg, *supra* note 23, at 867–68 (arguing that "[w]hen market share and risk contribution diverge, apportionment should accord with the firm's contribution to the risk"); Richard W. Wright, *Causation in Tort Law*, 73 CAL. L. REV. 1735, 1818–21, 1820 nn.353–54 (1985) (arguing that "[i]f there are risk-creating characteristics that vary among the products of different firms, they should be taken into account"); Craig A. Etter, Note, *The Causation Problem in Asbestos Litigation: Is There an Alternative Theory of Liability?*, 15 IND. L. REV. 679, 702–06 (1982) (proposing a scheme for allocating liability among manufacturers of asbestos products posing various degrees of risk). *But see* David A. Fischer, *Tort Law: Expanding the Scope of Recovery Without Loss of*

Among the several approaches to market share liability adopted for DES in different states, Wisconsin's scheme comes closest to providing a way to impose proportional share liability in cases involving nonfungible products.[99] Citing Professor Robinson's essay but somewhat cryptically indicating that it did not agree entirely with his reasoning, the Supreme Court of Wisconsin ruled that liability should be allocated among DES manufacturers under the state's comparative negligence statute, based on each defendant's overall share of the causal fault.[100] Unlike other states requiring apportionment to be based on market share data alone, the Wisconsin court made clear that market share data was just one among many factors to be considered.[101] That approach would seem to be flexible enough to accommodate situations where products pose varying degrees of risk, but the opinion did not clearly indicate whether the court intended to go that far, stating only that its approach could apply to other products "factually similar" to DES without explaining what that meant.[102]

Twenty years have passed since the original string of decisions adopting market share liability and the flurry of interest they attracted. Despite the early, scattered scholarly interest in a principle underlying market share liability that could be extended beyond fungible products, the idea went nowhere. While courts have split on whether to adopt market share liability, they essentially have reached a unanimous consensus that market share liability cannot apply unless defendants' conduct poses perfectly uniform risks.[103] Courts thus regard the fact that a product is "fungible and generic in

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Jury Control, 11 HOFSTRA L. REV. 937, 987–92 (1983) (presenting theoretical and practical objections to the extension of market share liability beyond fungible products); Jerry J. Phillips, *Asbestos Litigation: The Test of the Tort System*, 36 ARK. L. REV. 344, 353 (1983) (noting the possibility of factoring "degree-of-harm" considerations into the market share liability approach, but arguing that it would be too "complicate[d]" and "cumbersome"); Richard W. Kozlowski, Jr., Comment, *An Examination of Recurring Issues in Asbestos Litigation*, 46 ALB. L. REV. 1307, 1328 (1982) (noting the possibility of "integrating a causation factor based on the relative danger of each product into the market share analysis" but suggesting that it would create new practical problems).

99. *See* Collins v. Eli Lilly Co., 342 N.W.2d 37 (Wis. 1984); Christina Bohannan, Note, *Product Liability: A Public Policy Approach to Contaminated Factor VIII Blood Products*, 48 FLA. L. REV. 263, 293–94 (1996) (proposing to solve the problem of blood clotting products not posing uniform or fungible risk by applying the comparative negligence approach described in *Collins*).

100. *Collins*, 342 N.W.2d at 49 n.10, 52–53 (citing Robinson, *supra* note 96); *see* Andrew G. Celli, Jr., Note, *Toward a Risk Contribution Approach to Tortfeasor Identification and Multiple Causation Cases*, 65 N.Y.U. L. REV. 635, 663–66 (1990) (discussing inconsistency and confusion in the *Collins* opinion's treatment of Professor Robinson's "risk contribution" ideas).

101. *Collins*, 342 N.W.2d at 53.

102. *Id.* at 49.

103. Five states have clearly joined California in adopting some form of market share liability for fungible products. *See* Conley v. Boyle Drug Co., 570 So. 2d 275 (Fla. 1990); Smith v.

nature" to be an "absolute predicate" to any application of market share liability to its manufacturers.[104] Decisions declining to apply market share liability because a product is not fungible are legion.[105] Even Wisconsin's "risk contribution" version of market share liability has failed to extend its

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Cutter Biological, Inc., 823 P.2d 717 (Haw. 1991); Hymowitz v. Eli Lilly & Co., 539 N.E.2d 1069 (N.Y. 1989); Martin v. Abbott Labs., 689 P.2d 368 (Wash. 1984); *Collins*, 342 N.W.2d 37.

Decisions by lower state courts and federal courts have suggested that several other states would do the same. *See* McCormack v. Abbott Labs., 617 F. Supp. 1521 (D. Mass. 1985) (applying Massachusetts law); McElhaney v. Eli Lilly & Co., 564 F. Supp. 265 (D.S.D. 1983) (applying South Dakota law); Mahar v. Hanover House Indus., Inc., No. CA 880156, 1995 WL 1146188 (Mass. Super. Ct. Dec. 12, 1995); Russo v. Material Handling Specialties Co., No. 9101209, 1995 WL 1146853 (Mass. Super. Ct. Aug. 29, 1995); *cf.* Ferrigno v. Eli Lilly & Co., 420 A.2d 1305 (N.J. Super. Ct. Law Div. 1980) (ruling that DES makers could be held jointly liable under an alternative liability theory, with damages allocated by market share via contribution claims).

Courts in two other states have ruled that DES plaintiffs could recover under a concerted action or alternative liability theory, without the need for creation of a new theory like market share liability. *See* Abel v. Eli Lilly & Co., 343 N.W.2d 164 (Mich. 1984); Erlich v. Abbott Labs., 5 Phila. 249 (C.P. Ct. 1981).

The highest courts of five states have indicated they would not apply market share liability to any product, fungible or not. *See* Smith v. Eli Lilly & Co., 560 N.E.2d 324 (Ill. 1990); Mulcahy v. Eli Lilly & Co., 386 N.W.2d 67 (Iowa 1986); Zafft v. Eli Lilly & Co., 676 S.W.2d 241 (Mo. 1984); Sutowski v. Eli Lilly & Co., 696 N.E.2d 187 (Ohio 1998); Gorman v. Abbott Labs., 599 A.2d 1364 (R.I. 1991).

Federal court decisions have predicted that a number of other states would similarly reject market share liability. *See* Tidler v. Eli Lilly & Co., 851 F.2d 418 (D.C. Cir. 1988) (applying District of Columbia and Maryland law); Blackston v. Shook & Fletcher Insulation Co., 764 F.2d 1480 (11th Cir. 1985) (applying Georgia law); Thompson v. Johns-Manville Sales Corp., 714 F.2d 581 (5th Cir. 1983) (applying Louisiana law); *In re* Minn. Breast Implant Litig., 36 F. Supp. 2d 863, 876 (D. Minn. 1998) (applying Arizona law); Doe v. Cutter Biological, 852 F. Supp. 909 (D. Idaho 1994) (applying Idaho law), *appeal dismissed*, 89 F.3d 844 (9th Cir. 1996); Herlihy v. Ply-Gem Indus., Inc., 752 F. Supp. 1282 (D. Md. 1990) (applying Maryland law); Dawson v. Bristol Labs., 658 F. Supp. 1036 (W.D. Ky. 1987) (applying Kentucky law); Griffin v. Tenneco Resins, Inc., 648 F. Supp. 964 (W.D.N.C. 1986) (applying North Carolina law); Franklin County Sch. Bd. v. Lake Asbestos of Quebec, Ltd., No. 84-AR-5435-NW, 1986 WL 69060 (N.D. Ala. Feb. 13, 1986) (applying Alabama law); Gullotta v. Eli Lilly & Co., No. Civ. H-82-400, 1985 WL 502793 (D. Conn. May 9, 1985) (applying Connecticut law); Ryan v. Eli Lilly & Co., 514 F. Supp. 1004 (D.S.C. 1981) (applying South Carolina and North Carolina law).

In other states, courts have not clearly accepted or rejected market share liability but have indicated that, if they were to permit market share liability, they would do so only for fungible products. *See, e.g.*, Black v. Abex Corp., 603 N.W.2d 182 (N.D. 1999); Case v. Fibreboard Corp., 743 P.2d 1062 (Okla. 1987).

104. *In re* Dow Corning Corp., 250 B.R. 298, 362–63 (Bankr. E.D. Mich. 2000).

105. *See, e.g.*, Blackston v. Shook & Fletcher Insulation Co., 764 F.2d 1480, 1483 (11th Cir. 1985) (finding market share liability unfair where manufacturers' products "differ in degrees of harmfulness"); Starling v. Seaboard Coast Line R.R., 533 F. Supp. 183, 190–91 (S.D. Ga. 1982) (declining to apply market share liability to asbestos and declaring that companies' market shares cannot be adjusted to account for the relative harmfulness of their products); Skipworth v. Lead Indus. Ass'n, 690 A.2d 169, 173 (Pa. 1997) (rejecting market share liability because lead paint contains varying amounts of lead and different formulae that result in differing levels of bioavailability of lead).

grasp beyond fungible products, as no reported decisions apply market share liability under Wisconsin law to any products other than DES.

The idea that liability could be apportioned among manufacturers of nonfungible products has died in the legal literature as well. Scholars and students writing about market share liability occasionally mention the idea of allocating liability using more than just market share data and cursorily dismiss it,[106] but more often they simply accept the fungibility requirement without question or discussion.[107] For example, some have written detailed and persuasive analyses to show that a particular product is not fungible and that market share liability should therefore not apply to it, without even addressing the possibility that liability could be allocated in any way other than using just market share data.[108]

106. *See, e.g.*, Stephen A. Spitz, *From* Res Ipsa Loquitur *to Diethylstilbestrol: The Unidentifiable Tortfeasor in California*, 65 IND. L.J. 591, 631–32 (1990) (stating that the determination of "reasonable causation probabilities" for products that pose varying degrees of risk would be too difficult and speculative); Aaron D. Twerski, *With Liberty and Justice for All: An Essay on Agent Orange and Choice of Law*, 52 BROOK. L. REV. 341, 358–59 (1986) (noting that it might be possible to fashion an allocation formula accounting for varying amounts of dioxin in Agent Orange herbicides, but that it is questionable whether courts would or should be willing to add that new "complicating factor" to market share liability); Celli, *supra* note 100, at 667, 685–92 (arguing that a "risk contribution" approach could be applied to products that do not pose fungible or uniform risk, but concluding that the idea is impractical despite being "rife with theoretical promise"); L. Joel Chastain, Note, *Market Share Liability and Asbestos Litigation: No Causation, No Cause*, 37 MERCER L. REV. 1115, 1123–25, 1130, 1135, 1138 (1986) (arguing that market share liability should be limited to fungible products because of the practical difficulties of applying it to nonfungible products like asbestos); John F. Kostyack, Note, *Market Share Theory and the Asbestos Suits: Should the Industry Bite the Dust?*, 14 STETSON L. REV. 239, 256–57 (1984) (suggesting that available information is not sufficient to take the relative safety of different asbestos products into account in imposing market share liability); Simcha David Schonfeld, Note, *Establishing the Causal Link in Asbestos Litigation: An Alternative Approach*, 68 BROOK. L. REV. 379, 390 (2002) (arguing that an analysis taking into account the relative risk of nonfungible products "would be entirely inconsistent with the principles upon which market share liability was founded").

107. *See, e.g.*, Michelle Adams, *Causation and Responsibility in Tort and Affirmative Action*, 79 TEX. L. REV. 643, 676–84 (2001); Frank J. Giliberti, *Emerging Trends for Products Liability: Market Share Liability, Its History and Future*, 15 TOURO L. REV. 719 (1999); Klein, *supra* note 10; Jonathan J. Koehler, *When Do Courts Think Base Rate Statistics Are Relevant?*, 42 JURIMETRICS J. 373, 400 (2002); Kathy J. Owen & C. Vernon Hartline, Jr., *Industry-Wide Liability: Protecting Plaintiffs and Defendants*, 44 BAYLOR L. REV. 45 (1992); David M. Schultz, *Market Share Liability in DES Cases: The Unwarranted Erosion of Causation in Fact*, 40 DEPAUL L. REV. 771, 793–96 (1991); Robert F. Daley, Comment, *A Suggested Proposal to Apportion Liability in Lead Pigment Cases*, 36 DUQ. L. REV. 79 (1997); Shirley H. Fang, Comment, Santiago v. Sherwin-Williams Co.: *Rejection of Market Share Liability in Lead-Based Paint Litigation*, 43 BUFF. L. REV. 725 (1995); Mark P. Gagliardi, Comment, *Stirring up the Debate in Rhode Island: Should Lead Paint Manufacturers Be Held Liable for the Harm Caused by Lead Paint?*, 7 ROGER WILLIAMS U. L. REV. 341, 351 (2002); Dalmau Garcia, Note, *Revisiting* Payton v. Abbott Laboratories: *Is Market Share Liability a Viable Theory of Recovery in Massachusetts?*, 80 B.U. L. REV. 1127, 1131 (2000); Nace, *supra* note 2.

108. *See, e.g.*, Klein, *supra* note 10, at 922–23.

Recent drafts of the *Restatement (Third) of Torts*, still in tentative form, reflect the same disdainful attitude toward the concept. Calling it by the name "risk-adjusted market share liability," the draft comments acknowledge the theoretical possibility of proportional share liability for products that do not pose a uniform risk, but express severe skepticism about the idea.[109] The authors of the *Restatement* observe that market share liability is attractive from a compensatory and deterrence standpoint "when the product is fungible and therefore poses equivalent risks," but recognize that limiting the theory's application to those products gives it "an exceedingly limited reach" because most toxic substances and other hazardous products do not pose uniform risks.[110] The draft comments conclude that "[w]hile in theory a risk-adjusted market-share liability system might be attractive, the administrative costs imposed even by a pure market-share system augur against such efforts, and there is virtually no case support for a risk-adjusted market-share theory."[111]

The authors of those draft comments to the *Restatement* are correct that little existing judicial precedent exists for imposing proportional share liability on manufacturers of products that do not pose a uniform risk. At the same time, little precedent exists that thoughtfully examines the idea and rejects it. Instead, courts simply have treated market share liability as an isolated concept rather than recognizing it as being just one representation of a more general principle. They have insisted that claims fail if the product is not fungible, without analyzing whether there are other reasons why injuries generally cannot be attributed to particular manufacturers and whether there are means of fairly apportioning liability other than by market shares. The idea of applying proportional share liability merits more serious consideration in cases where it could be utilized.

II. APPLYING PROPORTIONAL SHARE LIABILITY TO NONFUNGIBLE PRODUCTS

In cases where a product poses uniquely severe identification problems for plaintiffs but does not pose a uniform degree of risk, a court could take

109. RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL HARM (BASIC PRINCIPLES) § 28 cmt. o (Tentative Draft No. 2, 2002).

110. *Id.*

111. *Id.* The latest Restatement of products liability law uses the term "proportional liability" to refer to a broader concept of which market share liability is only one example. RESTATEMENT (THIRD) OF TORTS: PROD. LIAB. § 15 cmt. c (1998). It takes no position on whether market share liability or any other form of proportional liability should be adopted. *Id.* § 26 cmt. n.

several different avenues toward imposing proportional share liability.[112] For example, suppose that several manufacturers produce a new type of drug that, unlike DES, is not chemically identical because each manufacturer has a unique, slightly different formula for producing the drug. The manufacturers negligently disregard indications that the drug will cause severe adverse reactions for some who take it. Some of those injured by the drug can identify the manufacturer of the dose they received, while others cannot do so.

If the degree of risk varies among the products, market share liability would not be appropriate, and courts would have to allocate liability in another manner. One possibility would be to take market share data as a starting point but to use product test data to adjust the percentages to take into account the relative risk posed by each product. For example, if each manufacturer performed field studies of its drug and had data on the odds of adverse reactions to the drug, that information could be used to adjust market share data to achieve an allocation of liability that reasonably reflects the likelihood of each manufacturer having caused a plaintiff's injury.

Where product test data does not exist, market share data could be adjusted based on expert witnesses' assessments of the relative risk of each product. For example, plaintiffs could offer expert evidence explaining how the differences in chemical formula affected each drug's odds of causing adverse reactions.

Still another approach would be to eschew market share data completely where an alternative set of data exists that takes into account the relative degree of danger presented by each manufacturer's product. For example, data about adverse reactions that can be traced to particular manufacturers' drugs could be used to allocate liability for cases in which the manufacturer cannot be identified. The cases described in this part illustrate these various approaches.

A. Vaccines: Using Product Test Data to Adjust Market Share Data

The case in which a court came closest to articulating a theory of proportional share liability for nonfungible products, *Shackil v. Lederle Laboratories*,[113] involved DPT vaccine. Unlike DES, a synthetic chemical produced accord-

112. This Article addresses only whether proportional share liability should apply when a plaintiff proves that multiple defendants engaged in tortious conduct but cannot prove which one caused plaintiff's injury. It therefore assumes without discussion that plaintiffs can prove tortious conduct by pharmaceutical companies, gun makers, brake pad manufacturers, and the other industries discussed. In every instance, of course, that is a debatable proposition.

113. Shackil v. Lederle Labs., 530 A.2d 1287 (N.J. Super. Ct. App. Div. 1987), *rev'd*, 561 A.2d 511 (N.J. 1989).

ing to a standardized formula, DPT vaccine is a biological product that each manufacturer produces via its own proprietary process.[114] Alleging that a DPT inoculation caused their infant daughter to suffer severe brain damage from encephalitis, a viral infection of the brain, the Shackils brought a lawsuit claiming that DPT vaccines contain toxins that manufacturers could eliminate with the use of proper technology.[115] The Shackils were unable to identify the manufacturer of the vaccine administered to their daughter and sued each of the several manufacturers that supplied vaccine to her pediatrician.[116]

The vaccine manufacturers argued that market share liability could not be imposed because their products were not "generic or truly fungible."[117] The trial judge dismissed the case on that basis, but the intermediate appellate court reversed and remanded for further development of the factual record.

In his opinion for the appellate court, Judge William Dreier first zeroed in on what type of "fungibility" is important to market share liability.[118] While the manufacturers emphasized that they use different processes to make the vaccines and that the biological characteristics of the vaccines vary as a result, Judge Dreier essentially recognized that physical indistinguishability and identical methods of production are not prerequisites for market share liability or for any other proportional share liability theory. If any of the vaccines could have caused the injury, "[i]t makes little difference to a consumer what the internal biological or chemical nature of a product may be . . . ."[119] The Shackils' inability to identify a manufacturer stemmed largely from the same factors that plagued DES plaintiffs: passage of time and destruction of the product as it was used. Almost thirteen years passed after their daughter's inoculation before the Shackils became aware of a connection between DPT vaccine

114. *See id.* at 1290–91.

115. *Id.* at 1291. Concern about the pertussis component of DPT vaccine causing brain injuries led several countries in the 1970s to exclude pertussis from their national immunization programs, although some later studies have suggested that existing data do not show a causal link between pertussis vaccination and permanent neurological damage. *See* World Health Org., *Pertussis Vaccines*, 18 WKLY. EPIDEMIOLOGICAL REC. 137, 139 (1999), *available at* http://www.who.int/vaccines-documents/PP-WER/wer7418.pdf.

116. *Shackil*, 530 A.2d at 1291.

117. *Id.* at 1292, 1293.

118. No other member of the court endorsed Judge Dreier's collective liability analysis. A second member of the appellate panel, Judge Edwin Stern, expressed deep reservations about Judge Dreier's theory, including the notion that collective liability could apply to a product that is not a "generic drug" like DES, but concurred in the decision because he thought reversal and remand was appropriate to permit development of an adequate factual record for review by New Jersey's Supreme Court. *Id.* at 1306, 1308 (Stern, J., concurring). The third member of the panel dissented, arguing that the unique new theory proposed by Judge Dreier "may serve to cripple our judicial system's ability to handle the weight of the litigation it will engender." *Id.* at 1309 (Shebell, J., dissenting).

119. *Id.* at 1293.

and brain damage and filed their suit.[120] Judge Dreier observed that differences in the composition of the manufacturers' vaccines "must be considered as irrelevant as the color of the label on the package" if they merely establish that the manufacturers' products were physically distinguishable.[121]

At the same time, Judge Dreier recognized that differences among the vaccines would be significant if they affected the likelihood of the vaccines' recipients suffering seriously harmful reactions to the vaccine.[122] Pure market share liability would not be a sound way to allocate liability if the vaccines did not pose a uniform risk. For example, defendant manufacturer Eli Lilly asserted that its DPT vaccine contained an "acellular" form of pertussis vaccine produced through a patented centrifugal process that eliminates unwanted cell debris and significantly reduces the chances of adverse reactions as compared to other manufacturers' "whole cell" forms of the vaccine.[123]

For most courts, that would have been the end of the story. The product was not fungible, and therefore market share liability could not apply. Judge Dreier looked beyond that to consider whether some form of liability could be imposed on a proportional basis even though the product did not pose a uniform risk. He seized on the crucial fact that data existed from which an allocation of liability could be made that would account for variation in the risk posed by the manufacturers' vaccines. Each manufacturer maintained records concerning the incidence of encephalitic injuries resulting from its vaccines.[124]

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120. *Id.* at 1291. It is highly questionable whether DPT vaccine posed an identification problem that was inherent in the nature of the product or injuries and that was severe enough to warrant application of a collective liability theory. Unlike DES, the injuries did not appear only after a long latent period. The Shackils alleged that their daughter's problems began almost immediately after she received a DPT vaccine booster shot. They simply did not associate those problems with the vaccination until twelve years later when Mrs. Shackil read a news article about side effects of DPT vaccines. *Id.* Had they linked the injuries to the vaccination sooner, it is likely that the manufacturer of the vaccine could have been identified because federal regulations required manufacturers to keep records about each lot of vaccine for five years and the Shackils' doctor and his drug distributor also retained their records for several years before destroying them. *Id.* at 1292. The manufacturers pointed out these facts, but to no avail. Treating this as an issue of whether the Shackils should be blamed for not asserting their claim more promptly, the New Jersey court decided that the claim was not too late. *Id.* at 1292–93. Had the court instead asked whether DPT vaccine is a product that will routinely cause injuries that cannot be attributed to a particular manufacturer, it may have reached a different result.

121. *Id.* at 1293.

122. *Id.* at 1293–94.

123. *Id.* at 1293–94 & n.5. *See generally* WORLD HEALTH ORG., THE IMMUNOLOGICAL BASIS FOR IMMUNIZATION SERIES, MODULE 4: PERTUSSIS 12–16 (1993) (describing differences between whole cell and acellular pertussis vaccines), *available at* http://www.who.int/vaccines-documents/DocsPDF-IBI-e/mod4_e.pdf.

124. *Shackil*, 530 A.2d at 1293–94.

Eli Lilly, for example, not only asserted that its vaccine was markedly safer than its competitors' products, but also that it could quantify this difference.[125]

Judge Dreier's opinion therefore directed the trial judge to employ a "risk-modified market share analysis," in which market share data would provide the starting point for the liability allocation but "proof by a defendant of the reduced incidence of encephalitis would result in a proportional lowering of the percentage responsibility for such defendant."[126] Rather than allowing the manufacturers to escape liability altogether simply because their products posed different levels of risk, the court concluded that there was no reason to refrain from imposing proportional share liability "if the differences can be suitably quantified."[127]

The New Jersey court aimed for a solution that would balance the need for fairness to the manufacturers with the opportunity for plaintiffs to recover if they could prove injuries caused by a defective product supplied by one of the manufacturers.[128] The court refused to be dissuaded by the inevitability of imperfections in its approach. Discussing details of the work that would be required to determine the manufacturers' proportions of the liability, Judge Dreier offered a reminder that "[t]he aim is not certainty but reasonable approximation."[129]

The case proceeded up to the Supreme Court of New Jersey. Reversing and ordering dismissal of the Shackils' claims, that court inexplicably failed to grapple with the proportional share liability theory actually proposed by the lower appellate court and instead analyzed the case as though pure and unadjusted market share liability were the only theory at issue.[130] The supreme court began by asking whether DPT vaccine "is a 'generic product' that is uniformly harmful and therefore amenable to a market-share analysis."[131]

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125. *Id.* at 1303.

126. *Id.* at 1294.

127. *Id.* at 1303.

128. The court emphasized that the collective liability approach it suggested would never even come into play unless the Shackils first proved that each manufacturer's vaccine was a defective product. *Id.* at 1296.

129. *Id.* at 1304.

130. Shackil v. Lederle Labs., 561 A.2d 511 (N.J. 1989). Several other decisions rejected collective liability claims against DPT vaccine makers before the Supreme Court of New Jersey's ruling in *Shackil*. *See* Chapman v. Am. Cyanamid Co., 861 F.2d 1515, 1520 (11th Cir. 1988) (concluding that Georgia does not recognize any collective liability theories but that the plaintiff had sufficient circumstantial evidence of the manufacturer's identity to survive summary judgment); Senn v. Merrell-Dow Pharms., Inc., 850 F.2d 611, 613 (9th Cir. 1988) (holding that Oregon does not recognize an alternative liability theory but that the plaintiff might have sufficient proof of the manufacturer's identity based on the fact that one defendant made 73 percent of vaccine used in the state's vaccination program).

131. *Shackil*, 561 A.2d at 521.

Answering in the negative, the court pointed to Eli Lilly's unique method of creating the vaccine and cited scientific literature suggesting that the method significantly lowered the risk of encephalitic reactions.[132] Finding that "[t]he products were clearly not identical" because Eli Lilly's vaccine posed a lower risk of harm, the supreme court complained that Judge Dreier's opinion for the lower court nevertheless "swept all producers into one market share" allocation.[133] The supreme court added that it was "wary" of Eli Lilly's vaccine being included in the allocation "inasmuch as the product may have represented the 'state of the art' in vaccine design at the time of the inoculation."[134]

In making these arguments, the Supreme Court of New Jersey did an astonishing job of missing the point. The fact that Eli Lilly's or any other manufacturer's product posed less risk than the other vaccines was exactly what Judge Dreier crafted his risk-adjusted approach to take into account.[135] The supreme court seemed unable to let go of an entrenched notion that market share liability is the only possibility when it comes to proportional share liability and that the products therefore must be "fungible" and present identical degrees of risk.

The supreme court's concern about Eli Lilly being liable for a share of the injury despite its vaccine being "state of the art" made even less sense. As that court noted, New Jersey law provides that "state of the art" status is an absolute defense in products liability actions.[136] The court acted as though liability was a foregone conclusion under Judge Dreier's theory and that the only thing left to decide would be each defendant's percentage of the damages, forgetting that the plaintiffs would not bring their claim into the realm of proportional share liability unless they first proved that Eli Lilly's conduct was negligent or its product was defective.[137] Indeed, even if the Shackils proved that every other DPT vaccine on the market was defective, a failure to prove a defect in Eli Lilly's product should have enabled *all* manufacturers to avoid liability, not just Eli Lilly, because courts generally hold that

132. *Id.* (citing Conrad C. Weihl, *Extracted Pertussis Antigen*, 106 AM. J. DISEASES CHILD. 210 (1963)); *cf.* World Health Org., *supra* note 115, at 141–42 (stating that studies have found acellular forms of pertussis vaccine to be significantly less likely to cause adverse reactions such as fever or seizures).

133. *Shackil*, 561 A.2d at 522.

134. *Id.*

135. *See supra* notes 124–127.

136. N.J. STAT. ANN. 2A:58C-3(a)(1) (West 2000), *cited in Shackil*, 561 A.2d at 522.

137. *See supra* note 128. The dissenting justice accused the court of letting its "intuitive feeling" that DPT vaccines are valuable fog its analysis of the collective liability issues. *Shackil*, 561 A.2d at 529–30 (O'Hern, J., dissenting). He rightly observed that none of the court's concerns about unduly impeding pharmaceutical research and development would be affected by a sudden discovery of information identifying the actual manufacturer of the DPT vaccine administered to the Shackils' daughter. *Id.* at 535.

principles such as market share liability and alternative liability cannot be imposed unless a plaintiff can prove tortious conduct by all members of the group of actors that could have caused the injury.[138]

Setting aside Eli Lilly and looking just at the other five manufacturers, who all used similar "whole-cell" processes to produce the vaccine, the supreme court thought market share liability might be a viable theory. It observed that the vaccines were fungible in the sense of being functionally interchangeable[139] and noted that studies found no significant differences in the rates of serious reactions to the vaccines of these five manufacturers, suggesting they were also fungible in the sense of posing a uniform risk.[140]

Even for the vaccines that might be regarded as fungible, however, the court ultimately concluded that no form of collective liability should be imposed on DPT vaccine makers because that sort of liability would frustrate "overarching public-policy and public-health considerations by threatening the continued availability of needed drugs and impairing the prospects of the development of safer vaccines" and because the goal of compensating injured people had already been accomplished by the creation of a federal statutory compensation scheme for vaccine injuries.[141] The court noted that the federal scheme essentially establishes a collective liability regime for vaccine injuries, because it provides compensation without requiring identification of a manufacturer.[142] The court emphasized that these policy concerns were unique to the context of vaccines and that its decision "should not be read as forecasting an inhospitable response to the theory of market-share liability in an appropriate context."[143]

The effectiveness and fairness of the federal compensation scheme for vaccine injuries have been the subjects of considerable debate.[144] For exam-

138. *See* Pennfield Corp. v. Meadow Valley Elec., Inc., 604 A.2d 1082, 1087 (Pa. Super. Ct. 1992); RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL HARM (BASIC PRINCIPLES) § 28 cmt. h (Tentative Draft No. 2, 2002). Of course, if Eli Lilly proved that its vaccine was so safe that it ruled itself out completely as a possible source of the vaccine received by the Shackils' daughter, proportional liability could be imposed on the other vaccine makers.

139. *Shackil*, 561 A.2d at 522 ("[T]here is sufficient evidence that pediatricians used the whole-cell products interchangeably.").

140. *Id.* (citing Larry J. Baraff et al., *DPT-Associated Reactions: An Analysis by Injection Site, Manufacturers, Prior Reactions and Dose*, 73 PEDIATRICS 31 (1984)).

141. *Id.* at 512, 522–29; *see also* National Childhood Vaccine Injury Act of 1986, 42 U.S.C. §§ 300aa-1 to -34 (2000).

142. *Shackil*, 561 A.2d at 526; *see also* 42 U.S.C. § 300aa-11.

143. *Shackil*, 561 A.2d at 529.

144. *See, e.g.*, Derry Ridgway, *No-Fault Vaccine Insurance: Lessons From the National Vaccine Injury Compensation Program*, 24 J. HEALTH POL. POL'Y & L. 59 (1999); Lisa J. Steel, Note, *National Childhood Vaccine Injury Compensation Program: Is This the Best We Can Do for Our Children?*, 63 GEO. WASH. L. REV. 144 (1994).

ple, the statute caps damages for vaccine-related deaths at $250,000,[145] and some believe the program "has failed to achieve its purpose of efficiently compensating the small, but significant, number of children who are injured by vaccines."[146] Litigation about DPT vaccine nevertheless waned after *Shackil*, with potential plaintiffs preferring to seek compensation under the federal statute rather than face the perils of trying to show that the vaccines posed identical risks or trying to persuade a court to apply a novel "risk adjusted" liability theory. Only one reported decision after *Shackil* raised the issue of manufacturers being held collectively liable for injuries from DPT vaccine; the plaintiff in that case apparently did not attempt to employ any proportional share liability theory and instead asserted that the vaccine was a "generic, fungible" product.[147]

The Supreme Court of New Jersey's decision in *Shackil* reflects a remarkable determination to frame the case in the familiar terms of fungibility and pure market share liability, disregarding what the Shackils sought and how the lower court had ruled. The liability theory advanced by the lower court was a sound response to the availability of data with which the varying degrees of risk posed by the manufacturers' products could be taken into account in making a reasonable allocation of liability. Reversed on grounds unique to the vaccine context, the lower appellate court's decision represents a tentative judicial recognition of the sensibility of proportional share liability recoveries not based strictly on market share.

B. Asbestos Brake Pads: Using Expert Assessment of Products' Relative Risks to Adjust Market Share Data

Litigation concerning asbestos brake products provides an example of how unnecessarily limiting proportional share liability to "fungible" products posing uniform risks forces plaintiffs and courts to stretch the meaning of fungibility beyond its natural limits. Asbestos has long been used as a component of friction brake pads and shoes because it can withstand the extreme heat generated by braking in even the largest vehicles.[148] Some individuals who install and repair brakes believe that they have contracted diseases from prolonged inhalation of asbestos particles from the brake prod-

145. 42 U.S.C. § 300aa-15(a)(2).

146. Steel, *supra* note 144, at 146.

147. *See* Miller v. Wyeth Labs., Inc., No. 94-6090, 1994 WL 708197 (10th Cir. Dec. 21, 1994) (unpublished opinion) (affirming dismissal of claims against DPT vaccine makers because Oklahoma has not recognized any collective liability theories).

148. *See* Chavers v. Gatke Corp., 131 Cal. Rptr. 2d 198, 199 (Ct. App. 2003).

ucts. In *Wheeler v. Raybestos-Manhattan*,[149] plaintiffs sued several manufacturers of asbestos brake products under a market share liability theory. They argued that people injured by these products inevitably face severe difficulties identifying manufacturers because of the nature of the products and their use. Most of the exposure to asbestos fibers from these products occurs during inspection or replacement of worn pads, when dust or residue from the old pads is blown out of the brake drums.[150] While the manufacturer of a new pad can be easily identified, the brand markings on an old pad have been obliterated by abrasion by the time a mechanic removes it and suffers exposure to the asbestos dust.[151]

The arguments made in *Wheeler* reflect the substantial confusion created by judicial precedents declaring that fungibility is required for market share liability without clearly explaining what that means. The defendants insisted that brake pads are not fungible because they come in many different shapes and sizes designed to fit different vehicles, while the plaintiffs offered to satisfy the fungibility requirement by proving that brake pads are "fungible to the extent that a pad of a given size, regardless of who made it, could be used on a variety of different vehicles."[152] The California Court of Appeal panel that decided *Wheeler* rightly saw through those superficial notions about fungibility and observed that it is irrelevant whether the pads come in various shapes and sizes unless that somehow affects the level of risk posed by each pad or affects whether an injured person generally will be able to identify the manufacturer of the products that caused the harm.[153]

Recognizing that this product presented severe identification problems for injured plaintiffs, the court focused on whether the product was fungible in the sense of posing a uniform degree of risk. The evidence showed that all pads contained a single type of asbestos fiber, chrysotile, but in varying amounts, with the asbestos making up as little as 40 percent or as much as 60 percent of the pad's weight.[154] Such evidence does not meet the standard of perfectly uniform risk required by most courts for market share liability. Nevertheless, the court in *Wheeler* decided that it was close enough, concluding that brake pads are sufficiently fungible "by virtue of containing roughly comparable quantities of the single asbestos fiber chrysotile."[155] Dis-

149. 11 Cal. Rptr. 2d 109 (Ct. App. 1992).
150. *Id.* at 111.
151. *Id.*
152. *Id.*
153. *Id.*
154. *Id.*
155. *Id.*

tinguishing a case in which the Supreme Court of Ohio found that duct tape is not fungible because its asbestos content varies from 15 to 100 percent, the *Wheeler* court observed that the asbestos content of the brake pads is "not identical" but varies only within a "restricted range" of 40 to 60 percent and that the risk of harm posed by each brake pad is therefore "more nearly equivalent."[156] The court realized and was willing to accept that subjecting brake pad manufacturers to market share liability would not result in each defendant's portion of the liability being based on the best estimate of how much harm its product actually caused.[157]

Wheeler successfully withstood a petition for review by the Supreme Court of California, but its validity remains in substantial doubt. In *Richie v. Bridgestone/Firestone, Inc.*,[158] a member of the California Court of Appeal who was not on the panel in *Wheeler* made a forceful attack on the notion that asbestos brake products are sufficiently fungible for market share liability to apply.[159] Justice Carl Anderson argued emphatically that *Wheeler* was wrongly decided because, unlike DES, brake pads with asbestos content ranging from 40 to 60 percent by weight do not pose identical risks.[160] In Justice Anderson's view, California law requires absolute uniformity of risk, and even a miniscule variance in the asbestos content of brake pads would be enough to prevent

156. *Id.* at 111–12 (citing Goldman v. Johns-Manville Sales Corp., 514 N.E.2d 691 (Ohio 1987)).

157. The court thought there was another factor that made brake pads an even stronger subject for application of market share liability than DES, suggesting that mechanics are more likely to be exposed to asbestos from brake pads from many or all major manufacturers, creating a "tighter" fit between shares of liability and actual harm caused, while DES plaintiffs were more likely to be exposed to just one or a few DES manufacturers' products. *Id.* at 112.

158. 27 Cal. Rptr. 2d 418 (Ct. App. 1994).

159. *Id.* at 421–25 (Anderson, J., concurring and dissenting).

160. *Id.* at 424. Justice Anderson's analysis contained a glaring mathematical flaw relating to the Ohio case about exposure to asbestos from duct tape. *See id.* The asbestos content of brake pads in *Wheeler* ranged from 40 percent to 60 percent. The asbestos content of duct tape in the Ohio case ranged from 15 to 100 percent. *Goldman*, 514 N.E.2d at 697. As the *Wheeler* court had noted, the 40 to 60 percent range for brake pads is obviously far narrower than the 15 to 100 percent range for duct tape. Justice Anderson disputed that. He calculated that the brake pads with the most asbestos (60 percent of weight) contained 50 percent more asbestos than the brake pads with the least asbestos (40 percent of weight), and then argued that this "variance of 50 percent" fit "well within the 15 to 100 percent variance" deemed too great for market share liability theory to apply in *Goldman*. Anderson's comparison uses the term "variance" in two very different ways. If the brake pads had a 50 percent variance, as Justice Anderson put it, then the duct tape had a 567 percent variance, as the tape with the most asbestos (100 percent of weight) had nearly six times as much asbestos as the tape with the least asbestos (15 percent of weight). Straightening out this confusion is unlikely to have changed Justice Anderson's mind, however, as he believed any amount of variance is too much. *See infra* note 161.

application of market share liability.[161] In addition, Justice Anderson pointed out that the variation in asbestos quantity is not the only thing that prevents brake pads from posing a uniform, fungible risk. For example, brake pads contain asbestos fibers obtained from different geographic sources, which can affect the degree of health hazard posed by the product.[162] Manufacturers of the brake pads also used different bonding agents, a factor that might affect the amount of asbestos released from the pads.[163]

The Supreme Court of California has yet to rule on these issues,[164] and *Wheeler* therefore continues to stand as a precedent, albeit disputed, for the notion that market share liability can be applied when the products pose risks that vary but are within a relatively limited range. Nevertheless, plaintiffs have not had success trying to recover based on *Wheeler*'s approach. Courts have come up with a variety of grounds on which to distinguish *Wheeler* and to decline to follow it.[165]

Wheeler was a flawed attempt to overcome a bad rule of law. The court rightly felt that there was something wrong with denying recovery merely because a product contains a harmful ingredient in varying amounts and therefore is not fungible in the sense of posing a perfectly uniform level of risk. But the *Wheeler* court proposed to solve that problem by simply disregarding the variations in risk among the products. Other courts have

161. *Richie*, 27 Cal. Rptr. 2d at 424–25 (arguing that *Sindell* requires "0 percent variance" and "brake pads are *not* fungible within the meaning of *Sindell*" (citing Sindell v. Abbott Labs., 607 P.2d 924 (Cal. 1980))).

162. *Id.* at 424.

163. *Id.*

164. The Supreme Court of California addressed market share liability briefly in *Rutherford v. Owens-Illinois, Inc.*, 941 P.2d 1203, 1217 n.10, 1218–19 (Cal. 1997), an asbestos case in which plaintiffs did not seek market share or any form of collective liability. Ruling on how a plaintiff can prove that exposure to asbestos caused disease, the court simply noted that it had never applied market share liability to any product except DES. *Id.* at 1217.

165. *See, e.g.*, Ferris v. Gatke Corp., 132 Cal. Rptr. 2d 819 (Ct. App. 2003) (ruling that market share liability could not apply because plaintiff's expert could not determine defendant's share of brake product market, plaintiff could identify at least two other manufacturers of asbestos products to which he was exposed, and circumstances were not compelling enough to justify deviation from conventional tort law principles); Chavers v. Gatke Corp., 131 Cal. Rptr. 2d 198, 204 n.4 (Ct. App. 2003) (rejecting conspiracy and concert of action theories in a suit against brake product manufacturers and noting that market share theory was either abandoned by the plaintiff or rejected by the trial court); Black v. Abex Corp., 603 N.W.2d 182, 189–91 (N.D. 1999) (ruling that market share liability could not apply to claims against manufacturers of brake and clutch products containing as little as 7 percent and as much as 75 percent asbestos because those products do not pose "a singular risk factor" or "equivalent risks of harm"); *see also* Campbell v. Maremont Corp., No. A099765, 2003 WL 22222205 (Cal. Ct. App. Sept. 26, 2003) (affirming the exclusion of an expert witness on the fungibility of asbestos brake products on the ground that the witness had expertise only about asbestos exposure in general and not about asbestos content and fungibility of brake pads in particular).

balked at that idea because the differences in *Wheeler* were not de minimis, the variation is even greater in many other cases, and ignoring variations in the risk created by each defendant undermines the logic of market share liability. To paraphrase one of the courts declining to follow *Wheeler*, it seems obvious that a product containing 60 percent asbestos would create a greater risk of harm than one containing only 40 percent.[166]

The solution to that obvious problem is to take the variations in risk into account rather than disregarding them. Contrary to *Wheeler*'s approach, a manufacturer that sells pads containing 60 percent asbestos should bear more of the liability than a manufacturer that has an equal market share but sells pads with only 40 percent asbestos content. At the same time, the mere fact that some pads contain more asbestos than others should not rule out the possibility of recovery any more than the fact that DES pills came in different dosages.[167] Expert evidence obviously will be necessary to quantify the difference in risk posed by brake products containing different amounts of asbestos. The risk created by each manufacturer may be a function of more than just market share and asbestos content if other differences among the products, such as geographic source of asbestos fibers or bonding agents,[168] prove to have a significant effect on the risk posed by the products.[169]

Is it feasible for courts to arrive at a liability allocation that fairly accounts for the variations in risk posed by different manufacturers' asbestos brake products? That question is impossible to answer with certainty at this point because plaintiffs have not even tried to assert such a theory or to present the evidence it would require. Instead, they continue trying to show that brake products are fungible enough that the differences among them should be ignored.[170] Plaintiffs are trying to squeeze a square peg into a round hole because that is the only opening available to them given courts' unduly narrow focus on market share liability to the exclusion of all other imaginable forms of proportional share liability.[171] Proposing a suitable form of proportional share

166. *Black*, 603 N.W.2d at 191.

167. *See supra* note 39.

168. *See supra* notes 162–163 and accompanying text.

169. *See* Etter, *supra* note 98, at 702–06 (outlining a formula for calculation of liability shares in asbestos cases based on the amount of asbestos in each product, the concentration of asbestos fibers, emission value reflecting the product's propensity to release asbestos fibers, the duration of the plaintiff's exposure to the product, and the defendants' average market shares during the exposure period).

170. *See, e.g.*, Appellant's Brief in Response to Brief of Amicus Curiae Thelen Reid & Priest LLP at 7, 9, *Ferris*, 132 Cal. Rptr. 2d 819 (No. A093413), *available at* 2003 WL 21957394.

171. Plaintiffs have attempted to do the same thing with other products, alleging they are fungible when they are clearly not. *See, e.g.*, Jackson v. Glidden Co., 647 N.E.2d 879, 884 (Ohio Ct.

liability would strengthen a plaintiff's position by making the liability correspond more closely to each defendant's contribution to the risk of injury. At the same time, such an argument would put the plaintiff in the difficult position of urging application of a liability theory to a court unaccustomed to thinking in any terms other than those of pure market share liability.

A massive amount of experimental work has been conducted on asbestos toxicity in recent decades.[172] Considering that depth of knowledge, it is plausible, to say the least, that an expert in that field could render a sound opinion about the relative danger of brake pads containing different amounts of asbestos. Plaintiffs should exploit the information available, while courts should signal their willingness to entertain claims seeking proportional share liability on bases other than simply market share data.

C. Guns: Using Data on Injuries Traced to Specific Manufacturers to Allocate Liability for Untraceable Injuries

Lawsuits against gun manufacturers provide another example of how proportional share liability could be imposed in a form other than market share liability.[173] Plaintiffs injured by criminals using guns have brought market share liability claims against gun manufacturers, but without success. Recognizing that market share liability is not the exclusive means of imposing proportional share liability would shift the focus in these cases from fungibility to whether liability can be allocated among gun manufacturers in a way that reasonably and fairly reflects each manufacturer's contribution to the risk at issue. For guns, a unique body of data exists that would accomplish that; indeed, it would enable courts to bypass market share data entirely. Every year, the Federal Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) traces hundreds of thousands of guns used in crimes.[174] The immense database generated by ATF tracing provides comprehensive information about the relative risks of criminal use of every type of gun and a sound means

App. 1995) (reversing dismissal of market share liability claims because plaintiffs alleged all lead paint is fungible), *overruled by* Sutowski v. Eli Lilly & Co., 696 N.E.2d 187 (Ohio 1998).

172. *See* Bice Fubini, The Physical and Chemical Properties of Asbestos Fibers Which Contribute to Biological Activity, Presentation at The Asbestos Health Effect Colloquium (May 24–25, 2001), *available at* http://www.epa.gov/swerrims/ahec/summary/presentations/fubini.pdf.

173. This assumes that plaintiffs can prove tortious conduct by gun manufacturers. *See supra* note 112. For an overview of tort theories asserted against gun manufacturers, see Brian J. Siebel, *City Lawsuits Against the Gun Industry: A Roadmap for Reforming Gun Industry Misconduct*, 18 ST. LOUIS U. PUB. L. REV. 247 (1999).

174. BUREAU OF ALCOHOL, TOBACCO & FIREARMS, DEP'T OF THE TREASURY, ATF PERFORMANCE AND ACCOUNTABILITY REPORT 12 (2002), *available at* http://www.atf.gov/pub/gen_pub/2002annrpt/index.htm.

of allocating liability among gun manufacturers when the particular brand of gun used in a crime cannot be identified. In short, data about traced guns provides a way to allocate liability for guns that cannot be traced.

1. Judicial Rejection of Market Share Liability for Guns

The notion of imposing collective liability on gun manufacturers first arose in *Hamilton v. Accu-Tek*,[175] a suit brought in the Eastern District of New York by victims of shootings involving illegally obtained handguns. Using a local rule providing for assignment of new cases to judges who previously handled "related" cases,[176] plaintiffs' counsel steered the case to Judge Jack Weinstein, who had significant experience with the concept of industry-wide liability. In addition to having developed a theory of "enterprise liability" in litigation against blasting cap manufacturers,[177] Weinstein later dealt with other collective liability theories while presiding over mass tort cases involving DES, Agent Orange, and asbestos.[178]

Judge Weinstein initially permitted the plaintiffs in *Hamilton* to take discovery limited to issues bearing on potential application of collective liability theories, rather than opening the door to full discovery on the merits of the claims.[179] Denying defense motions for summary judgment, Weinstein suggested that market share liability or other collective liability theories could apply to claims brought by gun violence victims because of the fact that many plaintiffs alleging negligent distribution of guns cannot identify the manufacturer of the particular gun used to inflict the injury. Weinstein recognized that guns, like DES, are a product posing inherent identification difficulties. For guns, the identification problems do not occur because guns are physically indistinguishable or functionally interchangeable. Instead, guns pose inherent identification problems because they are uniquely likely to be unavailable after injury has occurred.[180] People who commit crimes with guns have strong incentives not to permit themselves or their weapons to be found and identified. They flee the scenes of their crimes and they generally take their

175. 935 F. Supp. 1307 (E.D.N.Y. 1996).

176. *See* E.D.N.Y. & S.D.N.Y. R. FOR DIVISION OF BUSINESS AMONG DISTRICT JUDGES 50.3.

177. Hall v. E.I. DuPont De Nemours & Co., 345 F. Supp. 353 (E.D.N.Y. 1972).

178. *See, e.g.*, *In re* DES Cases, 789 F. Supp. 552 (E.D.N.Y. 1992); *In re* Joint E. & S. Dist. Asbestos Litig., 129 B.R. 710 (E.D.N.Y. 1991); *In re* "Agent Orange" Product Liab. Litig., 597 F. Supp. 740 (E.D.N.Y. 1984).

179. *Hamilton*, 935 F. Supp. at 1315.

180. *See* Philip J. Cook & Anthony A. Braga, *Comprehensive Firearms Tracing: Strategic and Investigative Uses of New Data on Firearms Markets*, 43 ARIZ. L. REV. 277, 289 (2001) (noting that police recover only a small fraction of guns used in criminal violence).

guns with them. In many instances, criminals destroy, discard, or otherwise dispose of guns so that the weapons can never be recovered and identified even if the criminal is apprehended. As Judge Weinstein put it, "[i]t is the nature of illegal handgun use that the shooter is likely to dispose of the gun so as to minimize the chances of being caught."[181] According to the plaintiffs' allegations, the manufacturers' tortious conduct creates and fosters the underground gun market, exacerbating the identification problems inherent in the nature of the product.

At the same time, Judge Weinstein suggested a second and more radical theory under which collective liability could be imposed on gun manufacturers. He suggested that even a plaintiff who *can* identify the manufacturer of the gun used to inflict plaintiff's injury could claim that liability for the harm should be imposed on the entire industry, not just one manufacturer.[182] Each manufacturer's negligence is a partial cause of the harm suffered by a plaintiff "[i]f the underlying cause of the injuries is the unchecked growth of the underground handgun market, and not an individual negligent sale of a particular gun by a particular defendant to a particular licensed dealer . . . ."[183] For example, a plaintiff could claim that she was shot with a Beretta pistol obtained from the underground gun market, but that Beretta's negligent supply of that market was only part of the problem. If only Beretta's distribution system was faulty, the underground market would wither. Instead, that market flourishes because Glock, Smith & Wesson, Sturm Ruger, and other manufacturers pour guns into it along with Beretta. Under that view, "only the collective action of the handgun industry makes the individual shootings giving rise to [suits] possible even when the manufacturer of the gun used in the shooting was known."[184]

In essence, Judge Weinstein proposed a way to make product identification problems disappear by redefining the thing that causes harm. This was a familiar move for Judge Weinstein, as it was the key to his theory of "enterprise liability" in the blasting cap cases.[185] Treating a blasting cap as the cause of the injury inevitably leads to the question of who made the blasting cap and reluctance to impose liability if no one knows the answer to that question. Treating faulty industry standards as the cause of the injury solves that problem and allows the issue of product identification to be brushed aside. Weinstein proposed that plaintiffs might adopt a similar tactic in gun

181. *Hamilton*, 935 F. Supp. at 1331.
182. *Id.*
183. *Id.*
184. *Id.* at 1330.
185. Similar reconceptualizations have been carried out in other areas of tort law. *See supra* note 21.

cases by claiming that the underground market was the cause of their injury, turning the identification issue into a question about who is responsible for the underground market rather than who produced the specific firearm used by plaintiff's assailant.[186]

The *Hamilton* case went to trial and generated a verdict in early 1999. The jury found that fifteen manufacturers acted negligently and that nine of those proximately caused injury to one or more plaintiffs. However, the jury awarded damages for only one of the shooting victims, Stephen Fox, who was severely wounded by a juvenile with a handgun illegally purchased from someone selling guns from the trunk of a car.[187] Police recovered a spent .25 caliber cartridge case from the scene. The bullet remained lodged permanently in Mr. Fox's brain, and police never recovered the gun used in the shooting.[188] The jury awarded $4 million in damages to Mr. Fox and his mother and assigned liability to three manufacturers found negligent in the case, allocating the damages based on their shares of the .25 caliber handgun market: 0.23 percent to American Arms, 6.03 percent to Beretta, and 6.8 percent to Taurus.[189]

Denying those three manufacturers' motions to throw out the verdict, Judge Weinstein ruled that the justifications for New York's adoption of market share liability in DES cases supported application of that theory to injuries resulting from unidentified handguns. Handgun plaintiffs face "intractable problems of proof" because a large portion of crime guns are not recovered or otherwise identified.[190] Weinstein concluded that guns are sufficiently fungible

186. Although Judge Weinstein used market share liability to deal with the manufacturer identification dilemmas in the *Hamilton* case, several writers have suggested that there was another serious causation problem lurking in the case for which Judge Weinstein should have invoked some form of proportional liability. These writers argue that the *Hamilton* plaintiffs could prove at most that the gun industry's negligence increased to some extent the risk of guns winding up in criminal hands, but could not prove by a preponderance that the industry's negligence caused any particular criminal use of a gun that would not otherwise have occurred. They therefore argue that the application of a proportional liability or proportional causation approach would have strengthened Judge Weinstein's conclusion that plaintiffs had adequately proven causation. *See* Daniel L. Feldman, *Not Quite High Noon for Gunmakers, But It's Coming: Why* Hamilton *Still Means Negligence Liability in Their Future*, 67 BROOK. L. REV. 293, 319–27 (2001); Aaron Twerski & Anthony J. Sebok, *Liability Without Cause? Further Ruminations on Cause-in-Fact as Applied to Handgun Liability*, 32 CONN. L. REV. 1379, 1395–1409 (2000).

187. Hamilton v. Accu-Tek, 62 F. Supp. 2d 802, 808–09 (E.D.N.Y. 1999), *questions certified sub nom.* Hamilton v. Beretta U.S.A. Corp., 222 F.3d 36 (2d Cir. 2000), *certified questions answered*, 750 N.E.2d 1055 (N.Y. 2001), *vacated by* 264 F.3d 21 (2d Cir. 2001).

188. *Id.* at 809.

189. *Id.* at 811.

190. *Id.* at 843.

to warrant imposition of market share liability, suggesting that all handguns are alike from the point of view of criminals as well as shooting victims.[191]

The case wound its way up to the Second Circuit and over to the Court of Appeals of New York. Answering certified questions, the state court unanimously rejected Judge Weinstein's application of market share liability to gun manufacturers.[192] The court first attacked the notion that guns are fungible in ways that create inherent identification difficulties. Rewriting history, the court asserted that DES was "an identical, generically marketed product" and that therefore "identification of the actual manufacturer that caused the injury to a particular plaintiff was impossible."[193] The court apparently had forgotten much about DES since deciding *Hymowitz v. Eli Lilly & Co.*,[194] the case in which it initially adopted market share liability. While all DES shared the same or a substantially similar chemical formula[195] and identifying a manufacturer was often impossible, DES pills were not physically identical or indistinguishable and many DES plaintiffs could identify the manufacturer of the product that caused their injury.[196] Comparing guns to its somewhat skewed recollection of DES, the court in *Hamilton* observed that guns are "not identical, fungible products" and that "it is often possible to identify the caliber and manufacturer of the handgun that caused injury to a particular plaintiff."[197] The court never addressed the idea that guns pose uniquely severe identification problems for reasons other than physical indistinguishability or generic marketing.[198]

The New York court stood on much more solid ground, however, when it pointed out that guns are not fungible in the sense that they do not pose a

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191. *Id.* at 837, 844. Judge Weinstein previously concluded that handguns should be treated as fungible products for purposes of establishing personal jurisdiction over manufacturers, because he found the proof could show that handguns are fungible from the point of view of criminals or those injured by them. Treating handguns as fungible for jurisdictional purposes meant that plaintiffs could establish personal jurisdiction based on the notion that sales anywhere in the national market would affect sales within the New York market. Hamilton v. Accu-Tek, 32 F. Supp. 2d 47, 50–52 (E.D.N.Y. 1998).

192. *Hamilton*, 750 N.E.2d at 1066–68. The New York Court of Appeals also concluded that the negligence claims against the manufacturers failed on other grounds. While it was therefore unnecessary for the court even to rule on the market share liability question, the court found it "prudent" to address the market share liability issue as well "because of its particularly significant role in this case . . . ." *Id.* at 1066.

193. *Id.* at 1066–67.

194. 539 N.E.2d 1069 (N.Y. 1989) (noting that identification of DES manufacturers was "generally" impossible).

195. *See supra* note 37.

196. *See supra* notes 38–47 and accompanying text.

197. *Hamilton*, 750 N.E.2d at 1067.

198. *See supra* notes 180–181 and accompanying text.

uniform risk. As the court recognized, the plaintiffs claimed that each manufacturer negligently distributed guns, but never suggested that every manufacturer's distribution methods were exactly the same. Instead, "[e]ach manufacturer engaged in different marketing activities that allegedly contributed to the illegal handgun market in different ways and to different extents."[199] Neither plaintiffs nor Judge Weinstein attempted to establish the "relative fault of each manufacturer" and "instead sought to hold them all liable based simply on market share" percentages.[200] Market share was a reasonable allocation method for DES, a product posing a uniform risk, because it was "an accurate reflection of the risk" created by each manufacturer's conduct.[201] In the New York court's view, market share could not result in a fair allocation of liability when applied to the "varied conduct" of gun manufacturers.[202]

2. Proportional Share Liability Based on Trace Data

Even if they can prove negligence by gun manufacturers, plaintiffs injured by guns that are not recovered and cannot be identified have no hope if courts think exclusively in terms of market share liability and accompanying notions about fungibility. Guns are easy to distinguish physically, because there are numerous models, with different calibers, ammunition capacities, and designs, and each gun is marked with the manufacturer's name and a unique serial number.[203] While certain distribution and marketing practices are common throughout the industry, no two manufacturers' distribution system and methods are exactly the same. Different kinds of guns, ranging from antique black powder muskets to modern high-capacity assault weapons, vary tremendously in the degree to which they are used by criminals and present a safety risk to the public. Market share data alone will not produce a reasonable allocation of liability among gun makers.

Rather than trying to squeeze guns into a theory that does not fit them, the better approach for plaintiffs in cases involving unidentifiable guns is to exploit the fact that an immense body of data provides a better way to allocate liability among gun makers. That data exists because ATF continually traces guns recovered by federal, state, and local law enforcement agencies throughout the United States. Police submit trace requests

199. *Hamilton*, 750 N.E.2d at 1067.
200. *Id.*
201. *Id.*
202. *Id.*
203. *See* Hamilton v. Accu-Tek, 32 F. Supp. 2d 47, 51 (E.D.N.Y. 1998) (citing Report and Recommendation of Magistrate Judge Cheryl Pollak).

to ATF's National Tracing Center, providing information about the gun to be traced, including the name of its manufacturer and its serial number.[204] Federal law provides that police can request traces only in connection with bona fide criminal investigations.[205] If police submit requests for informational purposes unrelated to a criminal investigation, ATF will not conduct the trace.[206] Every traced gun is therefore a "crime gun" according to ATF, defined as "any firearm that is illegally possessed, used in a crime, or suspected to have been used in a crime."[207]

The tracing process is cumbersome because firearm transaction records are not maintained in any centralized manner, reflecting fears about creation of anything resembling a national gun registry.[208] Instead, records are in the hands of manufacturers, distributors, and dealers dispersed throughout the country. ATF therefore generally begins a trace by contacting the manufacturer and providing it the serial number of the gun being traced.[209] The manufacturer looks in its records to determine the distributor or dealer to which it sold the gun and then gives ATF that name and the date of sale. ATF then contacts that distributor or dealer to find out what it did with the gun. By that process, ATF works its way down through the chain of distribution until it obtains information about the retail sale of the gun. ATF maintains a database of information generated about each gun traced, including the gun's manufacturer, model, and caliber. The database is available to the public in computerized form for a nominal fee.[210]

The number of traces recorded in the database grows every day, with ATF tracing over 230,000 guns in fiscal year 2001 and over 240,000 guns in

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204. BUREAU OF ALCOHOL, TOBACCO & FIREARMS, DEP'T OF THE TREASURY, CRIME GUN TRACE REPORTS (2000): NATIONAL REPORT 63 (2002) [hereinafter TRACE REPORTS (2000)], *available at* http://www.atf.gov/firearms/ycgii/2000/index.htm. A copy of the trace request form appears in an appendix to that report. *Id.* app. c, at C-3.

205. 18 U.S.C. § 923(g)(1)(B)(iii) (2000).

206. TRACE REPORTS (2000), *supra* note 204, at 68 (reporting that ATF rejected 3.4 percent of trace requests in 2000 on ground that request was "submitted for informational purposes only").

207. *Id.* app. a, at A-3.

208. *See* Anthony A. Braga et al., *The Illegal Supply of Firearms*, 29 CRIME & JUST. 319, 348 (2002).

209. TRACE REPORTS (2000), *supra* note 204, app. a, at A-4. In limited circumstances, ATF can conduct the trace without contacting the manufacturer, such as when the gun appears in ATF's collection of "out-of-business records" of defunct firearm dealers. *See id.* at 70.

210. ATF redacts certain information before releasing the database, such as dealer names and retail purchaser information, but the redacted information is not relevant to the use of the database for the purpose of allocating liability among manufacturers. In 2003, the Supreme Court granted certiorari to resolve a dispute between ATF and the city of Chicago over what information ATF should be redacting from the database, but then declined to hear the case after Congress passed an appropriations rider precluding disclosure of the information sought by Chicago. *See* City of Chicago v. United States Dep't of Treasury, 287 F.3d 628 (7th Cir. 2002), *cert. granted*, 537 U.S. 1018 (2002), *vacated by* 537 U.S. 1229 (2003).

fiscal year 2002.[211] Fifty major cities participate in a "comprehensive crime gun tracing" program under which their police departments request traces of all crime guns recovered in the jurisdiction.[212] Six states have implemented comprehensive tracing for all guns recovered from criminals statewide.[213] ATF has established a Crime Gun Analysis Branch specifically dedicated to studying the data generated by tracing and publishing reports intended to help law enforcement agencies develop strategies for investigations and to "inform federal licensed firearms dealers of crime gun patterns, allowing them to build sounder and safer businesses."[214] The reports contain lists of the guns most frequently traced, the guns that typically move most quickly from retail sale to use in a crime, and the guns most frequently recovered from criminal offenders in specific cities or age groups.[215] Researchers have utilized the database to study patterns in gun trafficking and their implications for public policy.[216]

The trace database thus provides reasonable estimates of the extent to which different types of guns are used in crimes. The representation of a particular model or type of gun in the trace database can be dramatically different from its market share measured by sales. For example, while long guns (rifles and shotguns) represent more than one half of all guns sold in

211. BUREAU OF ALCOHOL, TOBACCO & FIREARMS, *supra* note 174, at 12; TRACE REPORTS (2000), *supra* note 204, at 67 (reporting that ATF conducted 206,070 traces in 1999 and 206,115 traces in 2000).

212. TRACE REPORTS (2000), *supra* note 204, at 67.

213. *See* Braga et al., *supra* note 208, at 331 (reporting that California, Connecticut, Illinois, Maryland, New Jersey, and North Carolina have instituted comprehensive tracing).

214. TRACE REPORTS (2000), *supra* note 204, at 1, 69.

215. *See generally id.*; BUREAU OF ALCOHOL, TOBACCO & FIREARMS, DEP'T OF THE TREASURY, CRIME GUN TRACE REPORTS (1999): NATIONAL REPORT (2000) [hereinafter TRACE REPORTS (1999)], *available at* http://www.atf.gov/firearms/ycgii/1999/index.htm; BUREAU OF ALCOHOL, TOBACCO & FIREARMS, DEP'T OF THE TREASURY, GUN SHOWS: BRADY CHECKS AND CRIME GUN TRACES (1999), *available at* http://www.atf.gov/pub/treas_pub/gun_show.pdf.

216. *See, e.g.*, GLENN PIERCE ET AL., THE IDENTIFICATION OF PATTERNS IN FIREARMS TRAFFICKING: IMPLICATIONS FOR FOCUSED ENFORCEMENT STRATEGIES (1995); Braga et al., *supra* note 208; Cook & Braga, *supra* note 180; David M. Kennedy et al., *Youth Violence in Boston: Gun Markets, Serious Youth Offenders, and a Use-Reduction Strategy*, 59 LAW & CONTEMP. PROBS. 147, 171–77 (1996); Jeffrey A. Roth & Christopher S. Koper, *Impacts of the 1994 Assault Weapons Ban: 1994–96*, NAT'L INST. JUST. RES. IN BRIEF, Mar. 1999, at 1; Jon S. Vernick et al., *Effects of Maryland's Law Banning Saturday Night Special Handguns on Crime Guns*, 5 INJ. PREVENTION 259 (1999); Julius Wachtel, *Sources of Crime Guns in Los Angeles, California*, 21 POLICING 220 (1998); Douglas S. Weil & Rebecca C. Knox, *Effects of Limiting Handgun Purchases on Interstate Transfer of Firearms*, 275 J. AM. MED. ASS'N 1759 (1996); Garen J. Wintemute, *Relationship Between Illegal Use of Handguns and Handgun Sales Volume*, 284 J. AM. MED. ASS'N 566 (2000).

the United States every year,[217] they account for less than one quarter of traced guns.[218]

Several writers have severely criticized the idea of using ATF trace data to draw any conclusions about criminal use of guns.[219] One compared analyzing trace data to practicing phrenology or examining the entrails of sacrificial animals to forecast the future.[220] Notwithstanding that sort of hyperbole, their objections to analysis of trace data are not compelling, particularly when it comes to using trace data for the limited purpose of estimating the extent to which different types of guns are used in crimes.

These critics point out that the hundreds of thousands of guns traced by ATF every year represent only a small fraction of all guns used in crimes.[221] That is true, but it is not a reason to oppose the use of trace data for proportional share liability allocation. Indeed, the fact that not all guns are traced merely underscores the fact that guns used in crimes frequently are not recovered and cannot be identified, a factor weighing in favor of imposing collective liability.

Likewise, the critics of trace data note that most traced guns are not used to commit violent crimes.[222] For example, ATF traces large quantities of guns that police recover from people who possess them illegally, such as juveniles and convicted felons. This criticism assumes that the extent to which a

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217. For example, rifles and shotguns accounted for approximately 55 percent of guns manufactured in or imported into the United States, minus exports, from 1986 to 1999. The figure ranged from a low of 50 percent in 1994 to a high of nearly 67 percent in 1999. *See* BUREAU OF ALCOHOL, TOBACCO & FIREARMS, DEP'T OF THE TREASURY, FIREARMS COMMERCE IN THE UNITED STATES, at E-1 to E-3 (2001/2002), *available at* http://www.atf.gov/pub/fire-explo_pub/firearmscommerce/firearmscommerce.pdf.

218. TRACE REPORTS (2000), *supra* note 204, at x.

219. *See* Gary Kleck, *BATF Gun Trace Data and the Role of Organized Gun Trafficking in Supplying Guns to Criminals*, 18 ST. LOUIS U. PUB. L. REV. 23, 29–36 (1999); David B. Kopel, *Clueless: The Misuse of BATF Firearms Tracing Data*, 1999 L. REV. MICH. ST. U. DET. C.L. 171 (1999); David B. Kopel & Paul H. Blackman, *Research Note: Firearms Tracing Data From the Bureau of Alcohol, Tobacco and Firearms: An Occasionally Useful Law Enforcement Tool but a Poor Research Tool*, 11 CRIM. JUST. POL'Y REV. 44, 57 (2000); *cf.* Timothy D. Lytton, *Tort Claims Against Gun Manufacturers for Crime-Related Injuries: Defining a Suitable Role for the Tort System in Regulating the Firearms Industry*, 65 MO. L. REV. 1, 37–38 (2000) (questioning the use of trace statistics to prove the extent to which gun trafficking supplies guns used by criminals); Twerski & Sebok, *supra* note 186, at 1400–01 n.101 (questioning the use of trace statistics to prove causation in negligent gun distribution cases). At least one court has expressed skepticism about the idea that manufacturers should use trace data to identify dealers selling disproportionate numbers of guns used in crimes. *See* Hamilton v. Beretta U.S.A. Corp., 750 N.E.2d 1055, 1065 & n.7 (N.Y. 2001).

220. Kopel, *supra* note 219, at 171, 185.

221. *See, e.g.*, Kleck, *supra* note 219, at 29; Lytton, *supra* note 219, at 37, 40; Twerski & Sebok, *supra* note 186, at 1401 n.101.

222. *See* Kleck, *supra* note 219, at 33; Kopel, *supra* note 219, at 175–76; Lytton, *supra* note 219, at 37; Twerski & Sebok, *supra* note 186, at 1401 n.101.

particular kind of gun is illegally possessed will not be reasonably representative of the extent to which that kind of gun is illegally used to commit violent crimes, or at least that the degree of correlation between illegal possession and illegal use of particular types of guns is uncertain. Even if one accepts that assertion, this criticism still fails to stand up as an argument against using trace data to apportion liability among gun manufacturers.

First and most important, this criticism of trace data ignores the fact that one of the fields in the trace database contains a code representing the criminal offense associated with the gun. It is therefore possible to determine a particular manufacturer's or gun model's share of traced guns associated with violent crimes in general, or with a particular type of violent crime.[223] In other words, if the overall body of data on traced guns is not a fair measure of each manufacturer's contribution to violent criminal use of guns, the solution is to identify the appropriate subset of the data, not to insist that the data should be ignored.

Moreover, the entire trace database clearly would be the best set of data to use in certain cases, even though it includes many guns traced in connection with possession offenses rather than violent crimes. For example, lawsuits brought by cities and counties against the gun industry have sought to recover extra law enforcement and other government costs incurred because of widespread illegal use *and* possession of firearms.[224] These municipalities incur costs in attempting to remove illegally possessed guns from the streets before they are used to commit crimes, not just responding after a shooting or other violent crime occurs.

The critics also note that a large portion of attempted traces are unsuccessful, meaning that ATF is unable to track the gun all the way down to the point of identifying the retail dealer who sold the gun and the customer who purchased it.[225] While that would arguably be a matter of concern for some uses of trace data that depend on information about dealers and retail purchasers, it is not an issue to the extent the data is used to allocate liability

223. *See, e.g.*, Kennedy et al., *supra* note 216, at 170–71, 175–76 (describing how illegal possession charges accounted for the majority of guns recovered from juvenile suspects in Boston and analyzing data separately for "possession" guns and "substantive crime" guns).

224. *See, e.g.*, City of Cincinnati v. Beretta U.S.A. Corp., 768 N.E.2d 1136, 1141 (Ohio 2002); City of Chicago v. Beretta U.S.A. Corp., 785 N.E.2d 16, 21–25 (Ill. App. Ct. 2002), *appeal allowed*, 788 N.E.2d 727 (Ill. 2003); City of Boston v. Smith & Wesson Corp., No. 199902590, 2000 WL 1473568, at *6 n.29 (Mass. Super. Ct. July 13, 2000).

225. *See* Kopel, *supra* note 219, at 175; Lytton, *supra* note 219, at 37, 40; Twerski & Sebok, *supra* note 186, at 1401 n.101; *see also* TRACE REPORTS (2000), *supra* note 204, at 68 (reporting that, for cities participating in comprehensive tracing in 1999, ATF was able to identify the last retail dealer for 71 percent of traces and to identify the retail purchaser for 53 percent of traces).

among manufacturers. Even "unsuccessful" traces result in identification of the weapon's manufacturer.[226]

The critics' final assertion is that traced guns may be a biased or unrepresentative sample of the overall population of guns possessed and used by criminals.[227] For example, these writers contend that police are selective about what types of guns they trace and are much more likely to request traces of guns that are unusual in appearance or that are the subject of political controversy, such as the type of guns known as "assault weapons."[228] Likewise, they point out that ATF generally cannot successfully trace a gun manufactured before 1968, because there were no laws in effect prior to that year requiring dealers to keep records of their disposition of guns.[229]

While this bias or unrepresentativeness is by far the strongest criticism of analysis of trace data, it still does not seriously undermine the case for using trace data to apportion liability among gun manufacturers. It overlooks the significance of comprehensive tracing, a measure that ATF has already taken that greatly reduces the potential for sample bias. A large portion of the guns in the trace database comes from cities in which police are comprehensively requesting traces of all crime guns they recover, eliminating selectivity and bias that otherwise might occur.[230]

Nor does the difficulty of tracing guns manufactured before 1968 severely undermine the use of trace data. If an older gun cannot be successfully traced all the way to a retail purchaser, ATF still enters the information it has about the gun, including the manufacturer's identity and the criminal offense

226. *See* Cook & Braga, *supra* note 180, at 290 (noting that the trace database contains useful information, such as the make and model of a gun and the criminal offense connected to it, even for guns that ATF does not successfully trace to a retail purchaser).

227. *See* Kleck, *supra* note 219, at 29; Kopel, *supra* note 219, at 174–75; Twerski & Sebok, *supra* note 186, at 1400 n.101.

228. *See* GARY KLECK, POINT BLANK: GUNS AND VIOLENCE IN AMERICA 75 (1991); Kleck, *supra* note 219, at 30; Kopel, *supra* note 219, at 179–81; *see also* Lytton, *supra* note 219, at 37–38.

229. TRACE REPORTS (2000), *supra* note 204, at 68; *see also* Kleck, *supra* note 219, at 30–31. The critics of trace data also note that ATF at one time had a policy of not tracing guns manufactured before 1990, which would skew the trace database in favor of newer guns. Kleck, *supra* note 219, at 31; Kopel, *supra* note 219, at 183. That policy, instituted in 1995 for budgetary reasons, was eliminated in 1999. *See* TRACE REPORTS (1999), *supra* note 215, at 52; Cook & Braga, *supra* note 180, at 281 n.25.

230. *See supra* note 212 and accompanying text; *see also* Braga et al., *supra* note 208, at 331 (noting that jurisdictions with comprehensive tracing "can be confident that the resulting database of trace requests is representative of a well-defined 'population' of guns recovered by police during a particular period of time and a reasonable 'sample' of guns used in crime"); Cook & Braga, *supra* note 180, at 290 (noting that comprehensive tracing policies eliminate bias introduced by police decisions about which guns to submit for tracing).

associated with the gun, into the trace database.[231] As a result, the subset of guns that ATF can trace all the way to a retail purchaser may skew toward guns of more recent manufacture, while the larger set of data on all guns for which ATF receives a trace request does not. It is the latter data that is relevant to apportionment of liability among manufacturers.

The critics of ATF trace data essentially demand perfection. They are surely correct that the data is not a perfectly random and representative sample of all guns used in crime. As one put it, "it would simply be a lucky coincidence" if the subset of traced guns looked exactly "the same as the entire population of crime guns."[232] But that degree of perfection is not required in tort law, or in social sciences in which similar data is used.[233] For example, criminologists analyze arrest data as a way of discerning information about criminals, even though the subset of criminals arrested is not perfectly representative of the overall universe of criminals.[234] The arguments of those critical of trace data analysis do not undermine the fact that trace data could be used to achieve a reasonable—albeit imperfect—allocation of liability among manufacturers of guns used in crimes.

3. Judicial Resistance to Proportional Share Liability

The idea of imposing proportional share liability on gun manufacturers using trace data rather than market share information has been suggested by plaintiffs in a few recent cases, but so far without success. Rather than offering strong reasons to reject it, courts have either failed to comprehend the idea or have simply declared that it is an unrecognizable and unprecedented theory. The opinions reflect how deeply judges are accustomed to thinking of market share liability as the only possible form of proportional share liability.

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231. *See, e.g.*, Cook & Braga, *supra* note 180, at 290; Kennedy et al., *supra* note 216, at 193 (listing numbers of guns that ATF could not trace successfully for various reasons, but indicating that ATF nonetheless includes the information it has about the guns in the trace database).

232. Kleck, *supra* note 219, at 29–30.

233. *See* Beecher-Monas, *supra* note 16, at 1088 ("[R]equiring judicial decisions to be made only on the condition of perfect knowledge requires more certainty than is either possible or legally necessary."); Daniel J. Capra, *The Daubert Puzzle*, 32 GA. L. REV. 699, 705–06 (1998) (noting that the law does not demand perfection from scientific evidence); *see also* McKnight *ex rel.* Ludwig v. Johnson Controls, Inc., 36 F.3d 1396, 1401 (8th Cir. 1994) (recognizing that experimental test conditions need not be perfect for test results to be admissible); People v. Brown, 110 Cal. Rptr. 2d 750, 759 (Ct. App. 2001) (noting that an ideal database of DNA "would be composed of samples chosen entirely at random," but is not required in view of the difficulty, expense, and impracticality of obtaining such data).

234. *See* Cook & Braga, *supra* note 180, at 290–91.

The issue has been raised in the cases brought against the gun industry in recent years by cities and counties seeking to recoup costs incurred because of gun violence allegedly attributable to the manufacturers' negligent distribution of guns and defective product designs.[235] In one of these cases, brought by the city of Boston, a Massachusetts trial court issued a detailed decision rejecting the application of market share liability to gun manufacturers.[236] Largely repeating the same conclusions reached by the New York appellate court in *Hamilton*, the Massachusetts judge found that "it is essential for the plaintiff to prove that the product at issue is fungible or generic" and that guns are not "a single, fungible product presenting a singular risk."[237] The city of Boston tried to argue that guns are fungible or interchangeable products from the standpoint of criminals, as Judge Weinstein had suggested in *Hamilton*.[238] In response, the court pointed out that the varied risks posed by different types of guns are reflected in Massachusetts laws banning certain weapons, as well as in Boston's own complaint, which alleged that handguns posed a particular threat to safety within the city.[239] If different guns pose different amounts of risk, using market shares to allocate damages will not result in a reasonable correspondence between each manufacturer's responsibility for the harm and its liability.[240] The *Boston* court also suggested that the identification of gun manufacturers is not as difficult as the identification of DES manufacturers, despite the presence of evidence indicating that Boston police can identify a manufacturer for less than 5 percent of firearm-related incidents to which the city's police respond.[241]

While arguing that market share liability could apply to gun manufacturers, the city of Boston also advanced the idea of using trace data as an alternative means of apportioning liability. The city's brief emphasized to the court how this form of liability allocation would overcome the problem of gun manufacturers' conduct posing risks that are not uniform in degree, because "manufacturers' shares of liability would take into account the types

235. *See* Siebel, *supra* note 173, at 250–53 (describing public costs of gun violence).

236. City of Boston v. Smith & Wesson Corp., No. 99-02590 (Mass. Super. Ct. Jan. 30, 2002) (unpublished memorandum and order on the manufacturer defendants' motion for partial summary judgment on market share liability).

237. *Id.* at 7.

238. *Id.* at 11–12.

239. *Id.* at 8.

240. *Id.*

241. *Id.* at 16–19 & n.13.

of guns made by each manufacturer and the degree to which they were marketed and distributed in ways promoting criminal use."[242]

The court devoted only two short paragraphs in its twenty-five page opinion to rejecting the idea of allocating liability based on trace data. Failing even to acknowledge that the city of Boston proposed a form of relief *other than* market share liability, the court insisted on characterizing Boston as proposing that data about recovered and traced guns should be used "to define market share for purposes of market share liability."[243] The court noted that it could find no precedent "in which the definition of market share has been anything other than market share."[244] While precedent for proportional share liability in any form other than market share liability is indeed scarce, that alone is not a reason to reject the argument. If the law were that rigid, Boston would have brought suit under a writ for "trespass on the case" rather than under a claim of negligence. Indeed, there was no precedent for market share liability until just a few decades ago.

The court concluded its terse rejection of the city's argument by adding that the proposed method of allocation would result in "a truly perverse application of the market-share liability theory," as it would entail the manufacturer of a recovered and identified firearm being held liable under a theory based on the premise that the product cannot be identified.[245] Again, the court erred in insisting that the city's theory was a form of market share liability. Moreover, contrary to what the court suggested, the city did not illogically propose that manufacturers be held liable for selling *identified* firearms based on a theory developed for unidentifiable products. The theory of proportional share liability proposed by the city would be used only to impose liability for *unidentifiable* guns.[246] If anything is anomalous about using trace data to apportion liability for unidentifiable guns, it is merely that the existence of the data confirms that the manufacturer of a gun used in a crime often can be identified. That simply means, however, that some potential plaintiffs in gun cases can identify a manufacturer, while many others cannot. The same is true for DES and every other product to which market share liability can be applied.

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242. *Id.* at 19 (quoting plaintiff's opposition to manufacturer defendants' motion for partial summary judgment).

243. *Id.* at 19.

244. *Id.* at 19–20.

245. *Id.* at 20.

246. The court acknowledged, elsewhere in its opinion, that the issue before it was only the defendants' responsibility for harm that could not be attributed to any one defendant's product. *Id.* at 2 n.3.

A case brought by the District of Columbia and several individual victims of shootings provides an even more striking example of judicial reluctance to accept that market share liability is not the only possible form of proportional share liability.[247] The District's complaint included a count broadly phrased to allege "collective liability" and did not even mention the concept of market share liability.[248] In opposing dismissal of its claims, the District emphasized that this count encompassed any form of collective liability, from nonproportional theories like "alternative liability" to proportional allocations based on data about recovered guns.

Disregarding other collective liability theories or the distinctions among them, the trial judge insisted that all references in the District's complaint and briefs to different forms of collective liability were merely different ways of referring to just one thing: market share liability.[249] Having denied the existence of any means of imposing collective liability, the judge proceeded as though market share liability was the sole issue and ruled that it cannot be imposed on gun manufacturers. Largely parroting the reasoning of the New York appellate court in *Hamilton*, the judge concluded that it is "virtually impossible" to impose market share liability on manufacturers of "non-fungible or non-generic products."[250] That is doubtless why the District proposed another theory, only to have it ignored by the court with its single-minded focus on market share liability.

Guns are not a fungible product, because some guns are much more likely to be used by criminals than others. The virtue of using trace data to allocate liability for unidentified guns is that trace data accounts for the relative risk of criminal use of different types of guns. The trace data reflects the varying extent to which each type of gun is likely to be used in crime. The fact that a product is not fungible should not stand as an obstacle to imposing proportional share liability if the measure used to allocate liability takes into account the relative risk of the product in a way that market share data does not.[251]

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247. District of Columbia v. Beretta U.S.A. Corp., No. Civ. A. 0428-00, 2002 WL 31811717 (D.C. Super. Ct. Dec. 16, 2002), *aff'd in part & rev'd in part on other grounds*, 847 A.2d 1127 (D.C. 2004).

248. Complaint for Damages and Injunctive Relief at 28, District of Columbia v. Beretta U.S.A. Corp. (No. Civ. A. 0428-00), *available at* http://www.gunlawsuits.com/downloads/washdc.pdf.

249. *Beretta U.S.A. Corp.*, 2002 WL 31811717, at *54.

250. *Id.* at *56.

251. *See also* City of Gary v. Smith & Wesson Corp., 801 N.E.2d 1222, 1245 (Ind. 2003) (rejecting the city's reliance on a market share liability theory because its alleged harm involves "such a wide mix of lawful and unlawful conditions as well as many potentially intervening acts by non-parties").

D. Outer Space Debris: Proportional Share Liability Masquerading as Market Share Liability

The issue of potential liability for violence involving unidentifiable guns has a remarkable analogue in the problem of harm caused by unidentifiable debris in outer space. The orbital paths used most frequently by satellites and other spacecraft contain various types of human trash, from paint chips to rocket fragments, discarded hand tools, and abandoned nuclear reactors.[252] Operational spacecraft can be damaged or destroyed if they collide with such debris. While major collisions have been rare to date, the number of them is likely to increase as the amounts of debris and spacecraft traffic in these orbits grow.[253]

Space surveillance systems operated by the United States and Russia identify and track thousands of the largest pieces of debris, making it possible in some instances to identify the source of the debris involved in a collision.[254] An international treaty provides that a nation can be held liable for damage caused by debris if a claimant can identify that nation as the source of the debris and can prove fault.[255]

The majority of orbital debris is too small to be tracked by the American or Russian surveillance systems. As a result, that debris cannot be identified and attributed to the particular source that produced it, and the international treaty provides no means of recovering damages for harm that it causes.[256] Over the years, a number of those analyzing this problem have proposed that liability should be allocated among space-faring nations in situations where a spacecraft collides with unidentifiable orbital debris, with each nation paying for a portion of the harm equal to the percentage of the total debris population for which that nation is responsible.[257] In the most recent and

252. *See* WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW 37–39 (2d ed. 1994) (citing EDWARD R. TUFTE, ENVISIONING INFORMATION 48–49 (1990)); Mark J. Sundahl, Note, *Unidentified Orbital Debris: The Case for a Market-Share Liability Regime*, 24 HASTINGS INT'L & COMP. L. REV. 125, 128–29 (2000).

253. *See* Sundahl, *supra* note 252, at 129–32.

254. *See id.* at 132–33.

255. Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, art. 3, 24 U.S.T. 2389, 961 U.N.T.S. 187.

256. *See* Peter T. Limperis, Note, *Orbital Debris and the Spacefaring Nations: International Law Methods for Prevention and Reduction of Debris, and Liability Regimes for Damage Caused by Debris*, 15 ARIZ. J. INT'L & COMP. L. 319, 337–40 (1998); Sundahl, *supra* note 252, at 127, 136–37.

257. *See* GLENN H. REYNOLDS & ROBERT P. MERGES, OUTER SPACE: PROBLEMS OF LAW AND POLICY 189 (1997); Richard Berkley, *Space Law Versus Space Utilization: The Inhibition of Private Industry in Outer Space*, 15 WIS. INT'L L.J. 421, 440 (1997); James P. Lampertius, Note, *The Need for an Effective Liability Regime for Damage Caused by Debris in Outer Space*, 13 MICH. J. INT'L L. 447, 466 (1992); Limperis, *supra* note 256, at 339–41; Lawrence D. Roberts, *Addressing the*

complete elaboration of this idea, Mark Sundahl proposed that liability for damage done by unidentifiable debris should be allocated based on each nation's share of the pool of larger debris items that have been identified and tracked. For example, the United States produced 52.9 percent of the total population of identified debris fragments, as of the end of 1997, and would therefore be liable for 52.9 percent of the harm resulting from unidentifiable debris under Sundahl's proposed scheme.[258]

While Sundahl and others making similar proposals have consistently used the term "market share liability" to describe the liability regime they advocate, they are in truth proposing a form of proportional share liability based on something other than market share. Setting aside the semantic difficulties of treating debris as a product with a "market," the simple fact is that no one has information equivalent to market share data for unidentifiable orbital debris. In other words, no one actually knows what portion of the unidentifiable debris each nation produced. The closest data available is the information about each nation's share of the pool of larger debris fragments that have been identified and tracked. Sundahl therefore proposed using the data on larger, identified debris as a proxy for the information that is not available about the population of smaller, unidentifiable debris fragments, much as data about crime guns that police recover and trace could be used to apportion liability for crime guns that are not recovered and cannot be identified. Just as it is reasonable to think that a gun maker producing a large percentage of traced crime guns is responsible for a similarly large percentage of unidentifiable crime guns, Sundahl and others find it reasonable to believe that a nation producing "a large portion of the known body of large debris" is also "responsible for creating an equal portion of the unidentified debris fragments."[259] That belief gathers support from the fact that small debris is often created by collisions of larger debris, which suggests a strong correlation between the amount of each nation's responsibility for the larger debris and the smaller debris.[260] On the other hand, to the extent that smaller debris results from phenomena that do not produce larger debris, such as explosions,[261] it is possible that each nation's proportion of the larger debris does not fairly reflect the proportion of the smaller debris for which it should bear liability.

Problem of Orbital Space Debris: Combining International Regulatory and Liability Regimes, 15 B.C. INT'L & COMP. L. REV. 51, 70 (1992); Sundahl, *supra* note 252, at 138–52.

258. Sundahl, *supra* note 252, at 145–46.

259. *Id.* at 145. The parallel to guns would be even closer if liability for harm resulting from unidentifiable debris could be allocated using data about *collisions* involving tracked debris, not just the amount of tracked debris in orbit, but there are too few of those collisions to generate a useful set of data.

260. *Id.*

261. *Id.* at 133.

Sundahl and others making similar proposals also overlook several characteristics of orbital debris, such as velocity and orbital level, that make it a nonfungible commodity posing varying degrees of risk. For example, debris that is moving extremely fast through a highly trafficked orbital level is far more dangerous than debris moving slowly through an orbit seldom used by satellites or other spacecraft.[262] The data about large, identified debris that Sundahl and others propose to use to allocate liability for small, unidentified debris does not take into account these characteristics. For example, two nations with the same number of debris fragments tracked by the space surveillance systems, but with different distributions of the debris across orbital levels, may pose substantially different levels of risk to space traffic, and yet be held liable for the same share of harm when a spacecraft collides with unidentified debris.

Analysis may reveal that factors like the velocity and orbital level of debris do not introduce any significant variation in risk posed by each nation's debris, or it may show that there are significant variations that must be taken into account by adjusting nations' shares of the liability. Overlooking those considerations is an understandable error that occurs when one thinks exclusively in terms of market share liability, which involves simply taking a set of data and using it to allocate liability, without the need for adjustments to account for variations in risk posed by each defendant. Recognizing that market share liability is merely one variant of proportional share liability focuses attention on the need to account for ways in which the product at issue does not pose a uniform risk.

E. Cigarettes: Choosing From Among Several Alternative Means of Allocation

Tobacco presents a final example of a product for which proportional share liability could be imposed on a basis other than market share. A typical lawsuit against tobacco companies does not require any form of collective liability. Most smokers are well aware of the brands of cigarettes they used, and their manufacturers can be easily identified.

Despite the ease with which most smokers can identify manufacturers, several types of suits against tobacco companies could present occasions for imposing proportional share liability. A plaintiff alleging injury caused by secondhand smoke may need some form of collective liability if he is unable

262. *See* Limperis, *supra* note 256, at 322–23, 326–27. The damage resulting from a collision would also depend on the characteristics of the spacecraft struck by the debris. *See id.* at 327.

to prove exposure to smoke from cigarettes produced by specific manufacturers.[263] In addition, an entity such as a health insurer could assert a proportional share liability theory in an action seeking to recoup costs from tobacco companies, particularly a suit proceeding on an aggregate basis rather than via presentation of individualized proof about each insured smoker and his or her brand of cigarettes.[264]

Cigarettes are not "fungible" products posing a perfectly uniform degree of risk.[265] A recent opinion by the Court of Appeals for the Second Circuit suggested that cigarettes may fall somewhere in between DES and handguns in the extent to which they pose a uniform or fungible risk.[266] While all cigarettes produce nicotine, tar, carbon monoxide, and other hazardous substances, different types of cigarettes produce different amounts.[267] The variation in risk actually posed by different cigarettes is vastly reduced by the phenomenon of "compensation," meaning that smokers switching to "low tar" or "low nicotine" cigarettes change the way they smoke to obtain the level of nicotine to which they are addicted, usually without realizing that they are doing so. They smoke longer, puff more intensely, and even cover the ventilation holes in cigarette filters with their lips or fingers to enhance nicotine intake.[268] An extensive amount of data on the relative

263. *See* Robert L. Rabin, *Enabling Torts*, 49 DEPAUL L. REV. 435, 451–52 (1999); Mark C. Weber, *Thanks for Not Suing: The Prospects for State Court Class Action Litigation Over Tobacco Injuries*, 33 GA. L. REV. 979, 1019 (1999); Darren S. Rimer, Comment, *Secondhand Smoke Damages: Extending a Cause of Action for Battery Against a Tobacco Manufacturer*, 24 SW. U. L. REV. 1237, 1270–72 (1995).

264. *See, e.g.*, Blue Cross & Blue Shield of N.J., Inc. v. Philip Morris USA Inc., 344 F.3d 211, 225 (2d Cir. 2003) (noting that a health care insurer might be able to rely on market share liability in a suit against tobacco companies based on aggregate claims rather than individualized proof about each insured smoker). Florida enacted a statute, later repealed, that specifically authorized the state to rely on market share liability in asserting Medicaid cost recovery claims against the tobacco industry. The statute included a fungibility requirement, but demanded fungibility only in the sense of functional interchangeability rather than uniform degree of risk. FLA. STAT. § 409.910(9)(b) (1995) (allowing market share liability where "the products involved are substantially interchangeable among brands"), *repealed by* Medicaid Third Party Liability Act, 1998 Fla. Laws ch. 98-411, § 1.

265. *See* Note, *Market Share Liability: An Answer to the DES Causation Problem*, 94 HARV. L. REV. 668, 679 & n.58 (1981) (noting the difficulty of applying a market share liability theory to tobacco products because "'low tar' and filter cigarettes are considered less likely to cause disease than their 'regular' counterparts").

266. *Blue Cross & Blue Shield of N.J.*, 344 F.3d at 225 n.10.

267. NAT'L CANCER INST., U.S. DEP'T OF HEALTH & HUMAN SERVS., SMOKING AND TOBACCO CONTROL MONOGRAPH 13: RISKS ASSOCIATED WITH SMOKING CIGARETTES WITH LOW MACHINE-MEASURED YIELDS OF TAR AND NICOTINE 16 (2001), *available at* http://cancercontrol.cancer.gov/tcrb/monographs/13/; OFFICE ON SMOKING & HEALTH, U.S. DEP'T OF HEALTH & HUMAN SERVS., THE HEALTH CONSEQUENCES OF SMOKING: THE CHANGING CIGARETTE 194–237 (1981), *available at* http://www.cdc.gov/tobacco/sgr/sgr_1981/.

268. NAT'L CANCER INST., *supra* note 267, at 39–60.

danger of different kinds of cigarettes is available because the Federal Trade Commission has been using a standardized smoking machine test since 1968 to measure the tar, nicotine, and carbon monoxide yields of virtually all brands of cigarettes available in the United States.[269] Researchers have also generated a vast amount of data on the "compensation" phenomenon and on the relative disease risks of cigarettes with varying yields of nicotine and tar.[270]

Allocating liability among cigarette manufacturers therefore would require information other than just sales volume. Market share data could be used as a starting point, but could then be adjusted to account for the relative danger of different kinds of cigarettes, just as data about sales of brake products could be adjusted to account for differences in asbestos content.[271] In the alternative, an allocation could be made using information, other than market share data, that already takes into account the relative danger of different kinds of cigarettes. For example, data on disease rates among smokers who can identify the brand of cigarette smoked could be used to allocate liability in secondhand smoke cases,[272] just as data about guns recovered and traced could be used to allocate liability for guns that cannot be identified or data about tracked orbital debris could be used to allocate liability for untracked debris.[273] While a rigid application of the fungibility requirement would bar application of market share liability, the fact that tobacco products do not pose a uniform level of risk should not stand in the

269. *Id.* at 13, 165; OFFICE ON SMOKING & HEALTH, *supra* note 267, at 230. For example, results for cigarettes tested in a recent year ranged from highs of 27 milligrams of tar and 2.0 milligrams of nicotine per cigarette to lows of less than 0.5 milligrams of tar and less than 0.05 milligrams of nicotine per cigarette. *See* FED. TRADE COMM'N, "TAR," NICOTINE, AND CARBON MONOXIDE OF THE SMOKE OF 1294 VARIETIES OF DOMESTIC CIGARETTES FOR THE YEAR 1998 (2000), *available at* http://www.ftc.gov/reports/tobacco/1998tar&nicotinereport.pdf.

270. *See* NAT'L CANCER INST., *supra* note 267, at 65–158; OFFICE ON SMOKING & HEALTH, *supra* note 267.

271. *See supra* Part II.B.

272. Researchers surveying those with smoking-related diseases generally collect data on cigarette brands, although they rarely analyze and report it. *See* E-mail from Joshua E. Muscat, Senior Research Scientist, Institute for Cancer Prevention, to author (Dec. 9, 2003) (on file with author). *But cf.* John P. Pierce et al., *Sharing the Blame: Smoking Experimentation and Future Smoking-Attributable Mortality Due to Joe Camel and Marlboro Advertising and Promotions*, 8 TOBACCO CONTROL 37 (1999) (estimating, by brand, the number of deaths that will eventually result from cigarette advertising aimed at adolescents, based on data about adolescent brand preferences, adolescent experimentation with smoking, and smoking-related mortality).

273. *See supra* Parts II.C.2 and II.D.

way of allowing plaintiffs to recover on a proportional basis when a reasonable allocation based on reliable scientific evidence can be made.[274]

III. THE LIMITS OF PROPORTIONAL SHARE LIABILITY

Discarding the fungibility requirement and recognizing forms of proportional share liability other than market share liability would expand the range of situations in which injured plaintiffs can recover despite being unable to identify the precise source of injury. At the same time, a number of significant limitations would remain in place and bar recovery based on proportional share liability for certain types of products and situations.

A. Manufacturing Defects

Recognizing that liability can be allocated fairly in some cases involving nonfungible products would not alter the fundamental requirement that proportional share liability can be imposed only if the plaintiff proves that each defendant was negligent, sold a defective product, or otherwise engaged in tortious conduct.[275] For example, this requirement precludes application of proportional share liability to cases involving a manufacturing defect, unless plaintiff can prove the problem is a systemic flaw in the manufacturing process utilized by every manufacturer of the product rather than the result of an idiosyncratic error in manufacture committed by just one.

A pair of cases from California involving vaccines illustrates proportional share liability's limited application to manufacturing defect claims. In *Sheffield v. Eli Lilly & Co.*,[276] the California Court of Appeal declined to apply market share liability to manufacturers of polio vaccine.[277] Sheffield claimed that she contracted polio from vaccine that contained live virus.[278] While

274. Other products that have failed to satisfy the fungibility requirement and to which a form of proportional liability arguably could be applied include latex gloves and gasoline. *See supra* notes 83–84.

275. *See supra* note 138. Much of the criticism of theories allowing recovery against unidentifiable tortfeasors overlooks this crucial point, erroneously suggesting that market share liability, alternative liability, and other collective liability theories impose liability without proof of fault. *See, e.g.*, Klein, *supra* note 10, at 921 (suggesting that blood product supplier would remain liable under market share theory even if it produced a product far safer than competitors' products); Elizabeth C. Price, *Toward a Unified Theory of Products Liability: Reviving the Causative Concept of Legal Fault*, 61 TENN. L. REV. 1277, 1349–50 (1994) (suggesting that all manufacturers of products such as canned beans would be liable if one company produced one can containing toxin).

276. 192 Cal. Rptr. 870 (Ct. App. 1983).

277. *Id.* at 874.

278. *Id.* at 876.

the vaccine contains polio virus, the virus is supposed to be rendered incapable of causing infection. The court acknowledged that the vaccine, like DES, is a "generic pharmaceutical product" made "according to a uniform formula" using standard processes.[279] The formula was not the problem. Rather than claiming that all polio vaccine is dangerous and "generically defective," Sheffield asserted that one unidentifiable manufacturer produced a "deviant defective vaccine" by failing to carry out the manufacturing process properly.[280] Sheffield's claim was not amenable to any form of proportional share liability, even one crafted to take into account the varying risk posed by each manufacturer's product, because no theory provides "a key to unlock a treasure chest of a shared liability indiscriminately imposed on manufacturers of safe and defective products of the same nature."[281]

On the other hand, the plaintiff in *Morris v. Parke, Davis & Co.*[282] brought manufacturing defect claims against five DPT vaccine makers, but alleged that the manufacturing defect was present in DPT vaccines produced by every one of the defendants because they shared flawed manufacturing and testing processes.[283] In that situation, the court recognized that market share liability could apply.[284] Although the court in *Morris* felt that the fungibility requirement would compel the plaintiff to show that each manufacturer's products suffered from the manufacturing defect to exactly the same degree, that requirement would dissolve if the court accepted the possibility of applying proportional share liability in a form other than pure market share liability and if the plaintiff could obtain data about the portion of each manufacturer's output tainted by the defect that would allow a reasonable allocation of liability to be made.[285]

Market share liability and other forms of proportional share liability thus can be applied in manufacturing defect cases, but their reach is limited. They can apply when the defect is a systemic or industry-wide problem

279. *Id.*
280. *Id.* at 876, 883.
281. *Id.* at 878.
282. 667 F. Supp. 1332 (C.D. Cal. 1987). The court ruled that Morris could not proceed on design defect claims. *Id.* at 1334 n.1; Morris v. Parke-Davis & Co., No. CV 82-5296-RJK, 1985 WL 8049, at *2 (C.D. Cal. Sept. 19, 1985) (concluding that California "has not adopted 'design defect' theory of strict liability" for vaccine or prescription drug makers).
283. *Morris*, 667 F. Supp. at 1342.
284. *Id.* at 1342–43.
285. *See supra* Part II.A.

affecting all manufacturers,[286] but not to an idiosyncratic manufacturing defect attributable to just one or a few manufacturers.[287]

B. Diffuse Causes of Injury

Accepting the notion that proportional share liability can be applied to nonfungible products also will not overcome the severe practical difficulties of achieving a reasonable allocation of liability in cases in which injury results from exposure to an extremely diffuse and varied set of products. Asbestos litigation provides the clearest example. Asbestos is not a single product or even a single category of products, but a "generic designation possessing a rainbow-like diversity and a bewildering array of potential uses."[288] The Environmental Protection Agency estimated that there were two to three thousand different products containing asbestos.[289] Plaintiffs in some cases have alleged harm attributable to dozens of different asbestos products,[290] rather than a narrower category of products such as brake pads[291] or another specific category of products containing asbestos.[292]

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286. *See* Ray v. Cutter Labs., 754 F. Supp. 193, 195–96 (M.D. Fla. 1991) (applying market share liability to alleged HIV infection from blood products, even though only some batches contained the virus, because the defendants used virtually identical methods to manufacture all batches).

287. *See, e.g.*, Santarelli v. BP America, 913 F. Supp. 324, 329 (M.D. Pa. 1996) (rejecting the application of market share liability on the ground that alleged toxic contamination of salmon is essentially a manufacturing defect rather than a design defect); Edwards v. A.L. Lease & Co., 54 Cal. Rptr. 2d 259, 262 (Ct. App. 1996) (rejecting the application of market share liability to claims alleging a manufacturing defect in drain pipes); Campagno v. IPCO Corp., 524 N.Y.S.2d 138, 140 (Sup. Ct. 1987) (rejecting collective liability for an injury resulting from the shattering of an eyeglass lens, where the product was fungible but the plaintiff did not claim industry-wide deficiency in the production of such lenses).

288. Mullen v. Armstrong World Indus., Inc., 246 Cal. Rptr. 32, 26 (Ct. App. 1988).

289. Commercial and Industrial Use of Asbestos Fibers, 44 Fed. Reg. 60,061, 60,062 (proposed Oct. 17, 1979) (to be codified at 40 C.F.R. pt. 763).

290. *See, e.g.*, *Mullen*, 246 Cal. Rptr. at 35, 37 (rejecting market share liability where plaintiffs alleged harm from a variety of insulation, fireproofing, and other materials used in homes); Celotex Corp. v. Copeland, 471 So. 2d 533, 534 (Fla. 1985) (rejecting market share liability where the plaintiff alleged exposure to various asbestos products while employed in fifty to one-hundred different jobs during more than thirty years working as boilermaker); Case v. Fibreboard Corp., 743 P.2d 1062, 1063, 1067 (Okla. 1987) (rejecting market share liability where the plaintiff could not even identify the types of products that produced asbestos dust to which he was exposed during his career as sheet metal worker).

291. *See supra* Part II.B.

292. For example, a New York court suggested that market share liability would have been an "appropriate theory upon which to proceed" in a case brought by owners of buildings containing fireproofing material made with asbestos, had the plaintiffs' assertion of a market share liability theory not been barred by discovery sanctions. N.Y. Tel. Co. v. AAER Sprayed Insulations, Inc., 679 N.Y.S.2d 21, 27 (App. Div. 1998). Far from presenting a "shotgun" style claim, plaintiffs in that case had an expert who could testify that he examined asbestos fiber samples from each building under an electron microscope and could identify the two or three manufacturers that made asbestos

Courts have frequently invoked the fungibility requirement in ruling that market share liability cannot be applied to these "shotgun" style asbestos claims.[293] Discarding the fungibility requirement would not eliminate the practical difficulties of achieving a reasonable allocation of liability for such claims. Indeed, attempting to impose proportional share liability in a manner that takes account of the varying risks posed by different asbestos products would add another element of significant complexity to the "cosmic sweep of the factual data" that jurors must absorb in asbestos cases, even when no uncertainty exists about the manufacturers of the asbestos products to which the plaintiff was exposed.[294] The alleged sources of injury at some point become too numerous and the risk they pose varies too much for a reasonable allocation of liability to be achieved.[295]

C. Indeterminate Timing

Plaintiffs seeking to recover on a theory of proportional share liability also will continue to face significant and often insurmountable hurdles if they cannot determine the approximate time that the tortious conduct occurred. Although often overlooked, one of the characteristics that made DES a particularly appealing candidate for market share liability is that it was relatively easy to determine the approximate time of manufacture of the DES that caused each plaintiff's injuries. A plaintiff whose mother took DES during pregnancy in 1960, for example, knew that liability should be measured by defendants' market shares as of 1960.[296]

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fireproofing material consistent with each sample. N.Y. Tel. Co. v. AAER Sprayed Insulations, Inc., 661 N.Y.S.2d 701, 706 (Sup. Ct. 1997), *rev'd*, 679 N.Y.S.2d 21.

293. *See* Black v. Abex Corp., 603 N.W.2d 182, 186 (N.D. 1999) (describing a "shotgun" asbestos case as one in which the "plaintiff is alleging injury from exposure to many different types of asbestos products").

294. *Cf.* Malcolm v. Nat'l Gypsum Co., 995 F.2d 346, 349 (2d Cir. 1993); Celli, *supra* note 100, at 673–89 (arguing that asbestos dangers are too complex for courts to quantify in a reasonable way).

295. For examples of such cases that did not involve asbestos, see Sanderson v. Int'l Flavors & Fragrances, Inc., 950 F. Supp. 981 (C.D. Cal. 1996) (rejecting claims where the plaintiff alleged exposure on 16,000 occasions to different aldehydes in countless different fragrance products), and Setliff v. E.I. Du Pont de Nemours & Co., 38 Cal. Rptr. 2d 763 (Ct. App. 1995) (rejecting claims where the plaintiff alleged exposure to a wide assortment of "volatile organic compounds" in "paint[s], solvents, strippers[,] and glue products" while working in a paint store).

296. This ignores the fact that there will always have been some gap between the time of manufacture and time of consumption of the drug, a time lag that courts applying market share liability in DES cases have simply ignored, without explanation but presumably on the ground that it would not make a significant difference to the ultimate assignments of liability. *But see* Cynthia L. Chase, Note, *Market Share Liability: A Plea for Legislative Alternatives*, 1982 U. ILL. L. REV. 1003, 1008–09 (arguing that indeterminacy about the time frame for measuring market shares is a practical problem even in DES cases).

The timing of the tortious conduct is much more difficult to determine for some other products and, as a result, proportional share liability is much more difficult to apply. For example, the First Circuit rejected market share liability claims against the makers of lead paint pigments in *Santiago v. Sherwin Williams Co.*[297] on the ground that plaintiff could not identify the time of the tortious conduct with sufficient specificity to allow a reasonable allocation of liability to be made. While the plaintiff allegedly ingested lead paint from the walls of an apartment where her family lived from the time of her birth in 1972 until 1978, no one could determine the date of the lead paint's manufacture or its application to the apartment's walls. An expert witness for the plaintiff testified that the apartment contained two layers of lead paint and opined that the first layer probably was applied between 1933 and 1939 and the second layer was probably applied between 1955 and 1969, but the plaintiff could not pinpoint the timing any more precisely than that and proposed that liability should be apportioned based on averages of the defendants' market shares over time.[298] The First Circuit ruled that these time periods were too broad to ensure an adequate correlation between each defendant's allocated share of liability and the likelihood that it actually supplied the product that caused the plaintiff's injuries.[299] Courts in cases involving other products, such as asbestos and gasoline, have reached similar conclusions when the approximate time of the tortious conduct cannot be determined.[300]

Recognizing that proportional share liability can be applied to nonfungible products using information other than just market share data would not necessarily help plaintiffs unable to determine the timing of tortious conduct. For example, a willingness to adjust market share data upward and downward to account for variations in the lead content of different types of paint will not change the fact that a plaintiff does not know the time of the paint's manufacture and sale and therefore cannot identify the approximate year or even decade from which to draw the market share data in the first place.

At the same time, there may be means of allocating liability in some circumstances that solve the problem of indeterminate timing as well as the lack of fungibility. Allocating liability among gun manufacturers based on

297. 3 F.3d 546 (1st Cir. 1993).

298. *Id.* at 550–51 & nn.7–8.

299. *Id.* at 551. Other courts have reached the same conclusion in lead paint cases. *See, e.g.*, Jefferson v. Lead Indus. Ass'n, 930 F. Supp. 241, 247 (E.D. La. 1996), *aff'd*, 106 F.3d 1245 (5th Cir. 1997); Brenner v. Am. Cyanamid Co., 699 N.Y.S.2d 848, 852–53 (App. Div. 1999); Skipworth v. Lead Indus. Ass'n, 690 A.2d 169, 172–73 (Pa. 1997).

300. *See, e.g., In re* Related Asbestos Cases, 543 F. Supp. 1152, 1158 (N.D. Cal. 1982); Bly v. Tri-Continental Indus., Inc., 663 A.2d 1232, 1244–45 (D.C. 1995).

ATF trace data again provides an illustration. Even if all guns were perfectly fungible, a plaintiff seeking to impose market share liability on gun makers for an incident involving an unrecovered gun would still face a serious obstacle. The gun may have been anywhere from a few months to many decades old.[301] Using recent market share data would overstate the liability of new or growing manufacturers and understate the liability of others who have gone out of business or had significant declines in sales. On the other hand, using market share information stretching back many years would require either an unreasonable assumption that guns of all vintages are equally likely to be used in a crime or a complex weighting of the data so that market shares from recent years count more than market shares from the distant past.

Using data on traced crime guns to allocate liability alleviates the problem because trace data reflects the likelihood of criminal use of guns from different eras. If newer guns pose a significantly greater risk than older guns, that should be true both for guns that police recover and trace and guns that cannot be identified and on which a proportional share liability claim would be based.[302] The trace data thus accounts for the varying levels of risk posed by guns of different ages in a way that market share data does not. While inability to determine the timing of tortious conduct will remain an insurmountable obstacle to proportional share liability in some circumstances, data may exist that overcomes that problem in some cases.

D. Uncertainty About What Caused Plaintiff's Injury

Severe obstacles also will confront plaintiffs seeking to recover under a proportional share liability theory if there is uncertainty about *what* caused their injuries, not just uncertainty about *who* is responsible. One of the reasons that the DES cases presented an ideal setting for application of market share liability was that plaintiffs had compelling proof that they had suffered harm caused by DES. They suffered a "signature injury," vaginal adenocarcinoma

301. *See* City of Boston v. Smith & Wesson Corp., No. 99-02590, at 15–16 (Mass. Super. Ct. Jan. 30, 2002) (unpublished memorandum and order on the manufacturer defendants' motion for partial summary judgment on market share liability) (noting that market shares in a gun case would have to be calculated over "a term of years, making definition of each manufacturers' share of the gun market a highly speculative endeavor").

302. The strength of the correlation would be lower if, as some have argued, the trace data systematically undercounts older guns used in crimes, either because police do not request traces of them or ATF does not enter information about those guns into the database. *See supra* note 229 and accompanying text.

and adenosis, strongly linked to maternal consumption of DES.[303] While facing a severe problem of defendant indeterminacy, that uncertainty was not compounded by further layers of factual indeterminacy about the cause of the injuries.

In many other situations, plaintiffs suffer no signature injury. For example, several commentators have proposed schemes to impose variants of market share liability on industrial enterprises for contributing to the hazards of air pollution or acid rain.[304] These schemes would entail complex allocations taking into account the amount of pollution emitted by each defendant, the geographical distance from each defendant's plants to the plaintiff's location, and the climatological and topographical conditions affecting the spread of pollutants to that location.[305] These proposals overlook an additional layer of uncertainty for which any such allocation would have to account. While pollution exacerbates and increases the risks of various disorders and diseases, it would be difficult for any plaintiff to definitively attribute an illness to exposure to air pollution.[306] If a plaintiff is uncertain about what caused harm, as well as which defendant is responsible, the uncertainties multiply to the point that a fair allocation of liability may be unobtainable.

IV. DECIDING WHEN PROPORTIONAL SHARE LIABILITY SHOULD APPLY

Courts have used the fungibility requirement as an effective way to curtail the reach of market share liability. Since virtually no products are perfectly fungible in every sense, fungibility serves as a simple means by which to restrain the extension of the proportional share liability concept beyond the DES context.

Eliminating the fungibility requirement would open the door to serious consideration of forms of proportional share liability other than market share liability. At the same time, it would focus attention on the concerns that ought to drive decisionmaking about when, if ever, liability should be imposed despite a plaintiff's inability to identify the specific source of the

303. *See, e.g.*, *Brenner*, 699 N.Y.S.2d at 853; Nancy Lee Firak, *The Developing Policy Characteristics of Cause-in-Fact: Alternative Forms of Liability, Epidemiological Proof and Trans-Scientific Issues*, 63 TEMP. L. REV. 311, 334 (1990).

304. *See, e.g.*, Patrick J. Scully, Comment, *Proof of Causation in a Private Action for Acid Rain Damage*, 36 ME. L. REV. 117, 141–49 (1984); Ellen Friedland, Note, *Pollution Share Liability: A New Remedy for Plaintiffs Injured by Air Pollutants*, 9 COLUM. J. ENVTL. LAW 297, 314–19 (1984).

305. *See* Friedland, *supra* note 304, at 314–17.

306. *See, e.g.*, Troyen A. Brennan, *Environmental Torts*, 46 VAND. L. REV. 1, 15 (1993) (describing the difficulty of attributing deaths to air pollutants that do not cause a "signature" injury).

product that caused the plaintiff's harm. These decisions require careful consideration of the degree to which there is a compelling need to give plaintiffs a means of recovery in a particular category of cases and the degree to which that can be accomplished in a way that fairly allocates liability among defendants. In other words, how great is the need for a proportional share liability remedy, and how close a fit can be achieved between each defendant's assigned share of liability and the amount of risk it created and harm it presumably caused? Fundamentally, the decision about whether to impose some form of proportional share liability on suppliers of a particular product is a policy choice driven by judges' estimates of what justice and fairness demand.[307]

On the "need" side of the calculus, it is appropriate for courts to take into account the severity of the harm suffered by plaintiffs, the severity of fault by defendants, and the strength of the proof that defendants' product caused the harm.[308] Courts also should consider the extent to which there are others who can identify exactly who caused their injury and can hold defendants liable under traditional causation principles, or whether an entire class of tortious conduct and resulting injuries would pass without remedies because none of the injured can offer sufficient proof to identify a defendant and recover absent a proportional share liability remedy.[309] Stronger grounds for imposing proportional share liability exist where it is "the nature of the defendants' conduct and the resulting harm which caused the plaintiff's inability to identify,"[310] and weaker grounds exist where a plaintiff's inability to identify a defendant is a mere fortuity or even the plaintiff's own fault.[311] Courts frequently have woven these concerns into their decisions, even while ultimately couching their ruling in "fungibility" terms.[312]

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307. *See* Hamilton v. Accu-Tek, 935 F. Supp. 1307, 1329 (E.D.N.Y. 1996); Hamilton v. Accu-Tek, 62 F. Supp. 2d 802, 841–42 (E.D.N.Y. 1999) (discussing moral and pragmatic reasons for adopting collective liability theories), *questions certified sub nom.* Hamilton v. Beretta U.S.A. Corp., 222 F.3d 36 (2d Cir. 2000), *certified questions answered*, 750 N.E.2d 1055 (N.Y. 2001), *vacated by* 264 F.3d 21 (2d Cir. 2001).

308. *See, e.g.*, 210 E. 86th St. Corp. v. Combustion Eng'g, Inc., 821 F. Supp. 125, 129 (S.D.N.Y. 1993) (considering the severity of defendant's fault as a factor in deciding whether an innovative causation theory should be allowed).

309. *See* Note, *supra* note 265, at 679 ("When only a few people have been injured by a product or when it is not an extraordinary burden to require plaintiffs to identify a manufacturer, courts will not feel as motivated to undertake burdensome market share determinations.").

310. Sheiner, *supra* note 28, at 993.

311. For an example of a case in which the court arguably overlooked this consideration, see *supra* note 120.

312. *See, e.g.*, *In re* Related Asbestos Cases, 543 F. Supp. 1152, 1158 (N.D. Cal. 1982) (noting that asbestos plaintiffs were not completely unable to identify manufacturers of products to which they were exposed); Prelick v. Johns-Manville Corp., 531 F. Supp. 96, 98 (W.D. Pa. 1982) (ruling

When a sufficiently compelling need for a remedy exists, courts must assess whether it is possible to fulfill that need in a way that achieves a fair allocation of responsibility. The measure of liability must be reasonable but need not be perfect. Knowledge about the relative hazards of products inevitably will be imperfect and incomplete. Making reasonable inferences to fill those gaps is a normal part of scientific analysis, and often several different kinds of studies or data must be brought together to reach a conclusion.[313] In many circumstances, uncertainty will be aggravated by defendants' failure to test a product adequately or to gather information on injuries caused by the product, making it particularly important not to allow the absence of perfect information to preclude liability.[314] While causation requirements are "far more than a technicalism," they are "not an end of the legal system, but rather the means by which the legal system achieves its purposes."[315] The best should not become the enemy of the good,[316] and courts should strive to do justice even if it must be done in rough form.

All evidence is probabilistic,[317] and all causal determinations require inferential reasoning.[318] Nevertheless, judges frequently have insisted that no deviation between a defendant's share of liability and its probable share of actual culpability can be tolerated.[319] They recoil at the notion that there

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that market share liability should not apply where a plaintiff can identify at least one manufacturer or supplier whose product caused the plaintiff's injury); Rutherford v. Owens-Illinois, Inc., 941 P.2d 1203, 1220 (Cal. 1997) (finding no compelling need for alternative liability theory in asbestos cases because plaintiffs generally will not face insurmountable difficulties in proving exposure to specific manufacturers' products); Celotex Corp. v. Copeland, 471 So. 2d 533, 537 (Fla. 1985) (stating that market share liability is inappropriate where a product does not pose an inherent identification dilemma and a worker can identify the majority of manufacturers supplying asbestos to which he was exposed); *In re* N.Y. State Silicone Breast Implant Litig., 631 N.Y.S.2d 491, 494 (Sup. Ct. 1995) (finding that manufacturers of breast implants generally can be identified), *aff'd*, 650 N.Y.S.2d 558 (App. Div. 1996).

313. *See* Beecher-Monas, *supra* note 17, at 1591–97; Beecher-Monas, *supra* note 16, at 1088–89; *see also id.* at 1097 (noting that "judges have trouble accepting the uncertainties of probabilistic thinking").

314. *See* Beecher-Monas, *supra* note 16, at 1089–91; Geistfeld, *supra* note 14, at 1015; *cf.* Wendy E. Wagner, *Choosing Ignorance in the Manufacture of Toxic Products*, 82 CORNELL L. REV. 773, 833–34 (1997) (arguing that causation should be presumed where the defendant did not sufficiently test a product).

315. Shackil v. Lederle Labs., 561 A.2d 511, 534 (N.J. 1989) (O'Hern, J., dissenting).

316. *Cf.* JOHN BARTLETT, FAMILIAR QUOTATIONS 306 (Justin Kaplan ed., 16th ed. 1992) (quoting VOLTAIRE, DICTIONNAIRE PHILOSOPHIQUE (1764)).

317. *See* DePass v. United States, 721 F.2d 203, 207 (7th Cir. 1983) (Posner, J., dissenting); Richard A. Posner, *An Economic Approach to the Law of Evidence*, 51 STAN. L. REV. 1477, 1508 (1999).

318. *See* RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL HARM (BASIC PRINCIPLES) § 28 cmt. b (Tentative Draft No. 2, 2002).

319. *See, e.g.*, Santiago v. Sherwin Williams Co., 3 F.3d 546, 551 n.8 (1st Cir. 1993); Richie v. Bridgestone/Firestone, Inc., 27 Cal. Rptr. 2d 418, 424–25 (Ct. App. 1994) (Anderson, J., concurring and dissenting).

will be "errors" if liability cannot be allocated in a way that perfectly reflects each defendant's contribution to the risk of harm. In doing so, they fail to recognize the errors that result from denying recovery to plaintiffs able to prove injuries caused by tortious conduct by one of the defendants but unable to prove which defendant caused the harm. That result guarantees a 100 percent error rate, with every error working to the detriment of injury victims and in favor of tortfeasors.[320]

In making these determinations about whether to apply proportional share liability, courts should be careful to exclude considerations that really go to the issue of whether the industry should be held liable at all, not to the issue of what to do in situations where a particular manufacturer cannot be identified. For example, judges opposed to market share liability in DES cases frequently argued that it is bad public policy to hold drug makers liable for failing to discover adverse consequences of a medication that do not manifest themselves until many years after consumption of the drug.[321] Likewise, some have argued that market share liability should not be imposed on blood clotting product suppliers because the lives of people with hemophilia depend on continuation of an affordable supply of those products.[322] If those assertions are true, they are reasons to refrain from imposing liability in every DES or blood product case, regardless of whether the provider of the product can be identified, and they should be factored into the standard of care and other rules that determine liability for all cases.[323]

Critics of market share liability and other forms of proportional share liability should keep in mind that these theories do not generate liability without fault and, if properly applied, do not saddle any industry with more liability than it would bear if we simply knew which tortfeasors caused harm to which victims.[324] Cries of hardship ring hollow when they essentially amount to saying that industry members found to have engaged in tortious

320. *See* David Kaye, *The Limits of the Preponderance of the Evidence Standard: Justifiably Naked Statistical Evidence and Multiple Causation*, 1982 AM. B. FOUND. RES. J. 487, 509; *see also* Geistfeld, *supra* note 14, at 1017 (recognizing that "errors are inevitable in a world of limited information" and that ordinary evidentiary standards "allow[] for the possibility that some non-culpable defendants will incur liability" and "that some deserving plaintiffs will not be compensated").

321. *See, e.g.*, Sindell v. Abbott Labs., 607 P.2d 924, 942 (Cal. 1980) (Richardson, J., dissenting).

322. *See* Klein, *supra* note 10, at 919–22.

323. *See* Note, *supra* note 265, at 674–75 (suggesting that social policy concerns about drug industry liability and innovation can be more precisely calibrated and balanced through an analysis of the standard of care than through decisions based on causation grounds).

324. *See* Saul Levmore, *Probabilistic Recoveries, Restitution, and Recurring Wrongs*, 19 J. LEGAL STUD. 691, 698 (1990) ("It is no longer controversial, I think, to argue that there is no moral or practical reason to insist that victims be denied recovery or that some wrongdoers escape liability simply because we are unable to match wrongdoers with their victims.").

conduct causing harm should not lose the fortuitous escape from responsibility afforded by circumstances that routinely prevent plaintiffs from identifying the culpable party.

Determining whether proportional share liability should be imposed to permit recovery for harm caused by a nonfungible product does not require courts to engage in any radical or unique form of reasoning. Courts continually must strike balances, in tort law and throughout the law in general, between a desire for predictable rules that make cases easy to adjudicate and a desire to achieve substantively just results based on the facts of particular cases. Courts simply must decide how badly the circumstances call for a fair remedy and how well they can achieve one.[325]

CONCLUSION

The first person to write about market share liability in a law review declared that "[t]he DES cases are only the tip of an iceberg."[326] Citing that line, a judge dissenting from the first judicial decision to embrace market share liability warned that "[a]lthough the pharmaceutical drug industry may be the first target of this new sanction, the majority's reasoning has equally threatening application to many other areas of business and commercial activities."[327]

Twenty-five years have passed, and the iceberg remains almost completely submerged. While some courts adopted market share liability for DES cases and a few scattered decisions have applied the theory to other products, the fungibility requirement has blocked courts from even giving serious consideration to applying suitable forms of proportional share liability to products that are not fungible and instead vary in the degree of danger they pose. Courts should recognize that market share liability is just one of the many potential forms in which proportional share liability could be imposed and that fungibility is not essential if liability can be allocated in a way that reasonably accounts for the differing levels of risk created by each defendant. In many circumstances, courts may decide that no reasonable measure of relative responsibility can be achieved, but they should undertake that inquiry rather than simply invoking a fungibility requirement that is not logically sound and that effectively turns market share liability into a special rule for DES cases only.

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325. *See* Jack M. Balkin, *The Crystalline Structure of Legal Thought*, 39 RUTGERS L. REV. 1, 43–53 (1986) (describing the tension between "formal realizability" and "substantive realizability" interests that recurs throughout legal argumentation).

326. Sheiner, *supra* note 28, at 1007.

327. Sindell v. Abbott Labs., 607 P.2d 924, 943 (Cal. 1980) (Richardson, J., dissenting).

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