ACCOUNTING FOR RISK DISPARITY: AN ALTERNATIVE TO MARKET SHARE LIABILITY

Daniel J. Grimm*

I. INTRODUCTION

Market share liability emerged as a response to the problematic diethylstilbesterol (DES) litigation of the 1980s,[1]

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* J.D. Candidate 2007, Columbia University School of Law; B.A. International Relations 2004, Michigan State University. The author offers special thanks to Professor William Ohlemeyer for his guidance throughout the process of writing this Note, Professor Catherine Sharkey for her valuable assistance and suggestions, Alexander Pulte for his insight and advice, and the staff of the *Columbia Business Law Review* for their editing assistance.

[1] This Note examines DES in the context of its use as a miscarriage prevention drug. There are, however, other uses for DES. *See* David M. Schultz, *Market Share Liability Theory in DES Cases: The Unwarranted Erosion of Causation in Fact*, 40 DEPAUL L. REV. 771, 775 (1991) (explaining that while DES is no longer used to prevent miscarriage, it is still prescribed as an estrogen replacement for hormone deficiencies, for

during which plaintiff daughters were unable to identify the specific defendants responsible for their injuries.[2] DES is a synthetic estrogen compound that was produced by over 200 firms and administered to pregnant women for the purpose of preventing miscarriage.[3] Years after its approval by the FDA, DES was found to be a cancer-causing toxin that failed to prevent miscarriages while producing birth defects and heightened cancer rates in daughters born to women who had used the drug.[4] The extended latency period between the mothers' exposures and the daughters' injuries, coupled with the fungible nature of DES, prevented the victims from identifying the specific firms responsible for producing the drug(s) that their mothers had ingested.[5]

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the treatment of menopausal problems, and in response to certain breast and prostate cancers).

[2] *See generally* Sindell v. Abbott Labs., 607 P.2d 924 (Cal. 1980); *see also* Cynthia L. Chase, *Market Share Liability: A Plea for Legislative Alternatives*, 1982 U. ILL. L. REV. 1003, 1005 (1982); Mary Jane Sheffet, *Market Share Liability: A New Doctrine of Causation in Product Liability*, 47 J. OF MARKETING 35, 35 (1983).

[3] *Sindell*, 607 P.2d at 940. *Cf.* Schultz, *supra* note 1, at 775 (asserting that the actual number of firms that manufactured DES was as high as 300); *see also* N. Kathleen Strickland & John P. Katerndahl, *Toxic Tort Case Essentials: Strategies, Experts, Motions, and ADR*, 446 PLI/Lit 277, 282-83 (1992).

[4] *See Sindell*, 607 P.2d at 925; *see also* John T. Nockleby & Shannon Curreri, *100 Years of Conflict: The Past and Future of Tort Retrenchment*, 38 LOY. L.A. L. REV. 1021, 1047-48 (2005).

[5] "[The plaintiff] could not trace the DES which injured her to any particular manufacturer. Physicians prescribed DES generically at the time her mother used the drug, and any records implicating a particular manufacturer had been destroyed." Chase, *supra* note 2, at 1005; *see also* Harvey Teff, *"Market Share" Liability: A Novel Approach to Causation*, 31 INT'L & COMP. L.Q. 840, 840 (1982):

> DES was never patented and over the years as many as three hundred pharmaceutical companies may have manufactured it for use in pregnancy, employing an identical, mutually agreed formula. Doctors' prescriptions and records normally referred to the drug only by the generic name "DES" and pharmacists made up prescriptions from whatever brand they had [on] hand. Furthermore, adenocarcinoma manifests itself only after a

California was the first state to devise a market share liability system for apportioning damages among DES producers.[6] Adopting a variation of the underlying policy of *Summers v. Tice*,[7] the Supreme Court of California in *Sindell v. Abbott Laboratories* held that, as between a negligent defendant and an innocent plaintiff, the former should bear the costs of injury notwithstanding lingering tortfeasor identification issues.[8] Damages were apportioned among each defendant in proportion to its share of the national DES market, provided that joined defendants collectively occupied a "substantial share" of the national market.[9] The court

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> minimum latency period of some ten or twelve years, and often not for twenty years or more. In the circumstances, the vast majority of plaintiffs have been unable to identify the specific company which manufactured the pills taken by their mothers, and several courts have held that they failed to establish causation.

[6] *See generally Sindell*, 607 P.2d 924.

[7] In *Summers v. Tice*, two defendants fired rifles in the direction of the plaintiff, injuring the plaintiff's eye and face. The plaintiff could not show which of the defendants was responsible for causing the injury. The court shifted the burden to the defendants to prove how damages should be apportioned because of "the practical unfairness of denying the injured person redress simply because he cannot prove how much damage each did, when it is certain that between them they did all; let them be the ones to apportion it amongst themselves." 199 P.2d 1, 3-4 (Cal. 1948).

[8] Sindell v. Abbott Labs., 607 P.2d 924, 936 (Cal. 1980) ("The most persuasive reason for finding plaintiff states a cause of action is that advanced in *Summers*: as between an innocent plaintiff and negligent defendants, the latter should bear the cost of the injury.").

[9] *Id.* at 937 ("If plaintiff joins in the action the manufacturers of a substantial share of the DES which her mother might have taken, the injustice of shifting the burden of proof to defendants to demonstrate that they could not have made the substance which injured plaintiff is significantly diminished."). *See also* Gregory N. Woods & Ann V. Thornton, *Deadly Blood: Litigation of Transfusion-Associated AIDS Cases in Texas*, 21 TEX. TECH. L. REV. 667, 731 (1990) (emphasizing that the *Sindell* approach does not require the joinder of all parties but only a "substantial percentage" of the market); *see also* Chase, *supra* note 2, at 1006 (noting that the *Sindell* court required that the joined defendants collectively occupy a substantial share of the market, but that "substantial share" is impliedly less than 75%). The 75% figure was originally

found market share liability appropriate because DES injuries arose from a fungible product created by an identical formula that obscured specific causation among defendants.[10]

Several state courts have adopted components of the *Sindell* framework. Of particular interest is the Court of Appeals of New York case, *Hymowitz v. Eli Lilly & Co.*, which established an expansive form of market share liability that precluded individual DES manufacturers from exculpating themselves from liability even if they could prove that their products did not cause injury.[11] In so

proposed by Naomi Sheiner, author of the student comment that informed the *Sindell* decision. *See* Naomi Sheiner, Comment, *DES and a Proposed Theory of Enterprise Liability*, 46 FORDHAM L. REV. 963, 996 (1977). *See also* G. Marc Whitehead & George J. Socha, Jr., *Alternative Theories of Liability: Is Market Share Alive or Dead*, 361 PLI/Lit 335, 340-41 (1988) (explaining that the "substantial share" requirement produced a strong likelihood that the defendants actually responsible for causing the injury would be before the court).

[10] *See* Chase, *supra* note 2, at 1005; *see also* Sindell v. Abbott Labs., 607 P.2d 924, 935 (Cal. 1980); *see also* Robert F. Daley, Comment, *A Suggested Proposal to Apportion Liability in Lead Pigment Cases*, 36 DUQ. L. REV. 79, 87 (1997).

[11] Hymowitz v. Eli Lilly & Co., 539 N.E.2d 1069, 1078 (N.Y. 1989). *See also* Joseph J. Ortego, *Market Share Liability Theory of Product Liability Litigation*, SB16 ALI-ABA 155, 158-59 (1996) (stating that "[u]nder [*Hymowitz*], once the plaintiff establishes that it is a member of the market that sold DES for pregnancy use, defendants cannot exculpate themselves. Defendants will be held liable for plaintiff's injuries even if they can prove that their product could not have caused the plaintiff's injury"); *see also* Christopher J. McGuire, Note, *Market-Share Liability After* Hymowitz *and* Conley*: Exploring the Limits of Judicial Power*, 24 U. MICH. J. L. REFORM 759, 770 (1991) ("The stunning aspect of [*Hymowitz*] is that it denies a defendant the opportunity to exculpate itself . . . . A defendant's share of the national DES market of DES for use during pregnancy determines, not as a rebuttable presumption, but absolutely, its proportion of the damages owed to the plaintiff."); *see also* Symposium, *The Problem of the Indeterminate Defendant: Market Share and Non-Market Share Liability*, 55 BROOK. L. REV. 863, 868 (1989) (under *Hymowitz*, "even if a defendant DES manufacturer was able to prove, beyond a shadow of a doubt, that a plaintiff's mother had never used its brand of DES pills, the DES manufacturer would still be liable for a percentage of the plaintiff's injury equal to the manufacturer's share of the national DES market").

holding, the court rejected traditional causation principles and imposed liability on the basis of net risk contribution divorced from cause in fact.[12] If a defendant was found to have produced DES at any point during the period of injury, this was deemed sufficient contribution to a net social risk by virtue of that production, even if the company in question could not possibly have injured a particular plaintiff.[13] The *Hymowitz* court also rejected the joint and several liability theory underlying *Summers* and held that liability would be several only, despite acknowledging that this could prevent plaintiffs from receiving a full recovery of their damages.[14]

Plaintiffs advancing market share liability theories beyond the DES context have largely failed.[15] Market share liability has been rejected in litigation involving asbestos, cigarettes, breast implants, benzene, and toxic chemicals.[16] Courts have typically held that substances of diverse variety, such as asbestos, fail the *Sindell* fungibility requirement, while finished products like cigarettes are easily identified

[12] *Hymowitz*, 539 N.E.2d at 1078.

[13] *Id.*

[14] *Id.* ("[W]e hold that the liability of DES producers is several only, and should not be inflated when all participants of the market are not before the court in a particular case. We understand that, as a practical matter, this will prevent some plaintiffs from recovering 100% of their damages."). As a result of this holding, a plaintiff suing multiple defendants under market share liability theory will not receive all of the judgment unless the entire market is joined.

[15] Courts have been reluctant to extend market share liability beyond DES. With limited exceptions, it has been rejected in litigation involving vaccines, pharmaceuticals, breast implants, blood products, and asbestos. Courts have adhered to traditional legal principles, declining to recognize any market share theory. *See* Shirley H. Fang, Santiago v. Sherwin-Williams Co.: *Rejection of Market Share Liability in Lead-Based Paint Litigation*, 43 BUFF. L. REV. 725, 738-39 (1995). *See also* J. Scott Kirkwood, *The Status of Product Liability Law in the USA*, *in* STRUCTURAL FAILURE: TECHNICAL, LEGAL AND INSURANCE ASPECTS 33 (H.P. Rossmanith ed., 1996).

[16] Douglas A. Henderson & Mary K. McLemore, *MTBE: A Tale of Air, Water and Civil Procedure*, 19-SPG NAT. RESOURCES & ENV'T 20, 25 (2005).

by brand and do not create the tortfeasor identification problem posed by the DES market.[17]

A significant exception to this trend is the limited application of market share liability to Factor VIII blood products. Factor VIII is a protein that occurs naturally in human blood and regulates clotting and coagulation.[18] Commercial Factor VIII was formerly acquired from private blood donors and then fractionalized to remove plasma.[19] It was then processed and supplied to hemophiliacs[20] to prevent uncontrollable bleeding.[21] During the 1980s, numerous

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[17] Robert A. Levy, *Tobacco Medicaid Litigation: Snuffing Out the Rule of Law*, 22 S. ILL. U. L.J. 601, 631 (1998) (remarking that even those courts that have applied market share liability to DES "have not been willing to expand its coverage to nongeneric products, like cigarettes"). *See also* Simcha David Schonfeld, Note, *Establishing the Causal Link in Asbestos Litigation: An Alternative Approach*, 68 BROOK. L. REV. 379, 394 (2002) (observing that "the vast majority of courts have refused to apply the theory of market share liability in asbestos litigation" because asbestos lacks the fungibility element of DES).

[18] Andrew R. Klein, *A Legislative Alternative to "No Cause" Liability in Blood Products Litigation*, 12 YALE J. ON REG. 107, 108-09 (1995) [hereinafter Klein, *Legislative Alternative*]. For further information on the nature of Factor VIII, see Andrew R. Klein, *Beyond DES: Rejecting the Application of Market Share Liability in Blood Products Litigation*, 68 TUL. L. REV. 883, 907-08 (1994) [hereinafter Klein, *Beyond DES*]; *see also* Smith v. Cutter Biological, Inc., 823 P.2d 717, 721 (Haw. 1991); Christina Bohannan, Note, *Product Liability: A Public Policy Approach to Contaminated Factor VIII Blood*, 48 FLA. L. REV. 263, 264 (1996).

[19] Woods & Thornton, *supra* note 9, at 671-72; *see also* Smith v. Cutter Biological, Inc., 823 P.2d 717, 722 (Haw. 1991) (discussing the process of plasmapheresis, which allows the clotting factors making up Factor VIII to be extracted from cryoprecipate and then freeze-dried). More information about processing is provided by Deborah R. Hensler et al., *"Blood Clotting Products for Hemophiliacs:* In re Factor VIII or IX Concentrate Blood Products," *in* CLASS ACTION DILEMMAS: PURSUING PUBLIC GOALS FOR PRIVATE GAIN 293, 294 (2000).

[20] Hemophilia is a disease that affects males and causes uncontrollable bleeding. It can cause death and injury through external bleeding and through internal bleeding that damages organs and joints. Hensler et al., *supra* note 19, at 293.

[21] Eric A. Feldman, *Blood Justice: Courts, Conflict, and Compensation in Japan, France, and the United States*, 34 LAW & SOC'Y REV. 651, 664 (2000).

Factor VIII products became contaminated by the human immunodeficiency virus (HIV).[22] Similar to the DES cases, plaintiffs suffering injury through contaminated Factor VIII are often unable to identify the specific manufacturer(s) responsible for their harm.[23] Extended latency periods between exposure and knowledge of injury are also common. Additionally, like DES, HIV contamination is often detected long after a Factor VIII user has contracted the virus.[24]

Much of the Factor VIII supply available today is of the recombinant variety, which is derived from DNA to bypass the need for directly extracting proteins from the pooled blood of donors. Recombinant Factor VIII is favored because it substantially reduces the risk of contamination by HIV and other infectious diseases, although some lingering risks and practicality concerns remain.[25] This Note focuses on non-recombinant Factor VIII because this variety triggered the relevant litigation and provides an effective platform for examining market share liability.

Two courts have imposed market share liability on producers of non-recombinant Factor VIII. The Supreme

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[22] Klein, *Legislative Alternative*, *supra* note 18, at 108-09.

[23] *Id.* at 109.

[24] HIV can remain undetected for up to six months and infected individuals can remain asymptomatic for several years. Eric J. Knapp, *Tort Law—Turning Blood into Whine: "Fear of AIDS" as a Cognizable Cause of Action in New Mexico*—Madrid v. Lincoln County Medical Center, 28 N.M. L. REV. 165, 169 (1998); *see also* Jones v. Methodist Healthcare, 83 S.W.3d 739, 743 (Tenn. Ct. App. 2001) (rejecting plaintiff's argument that the statute of limitations should not apply to blood products litigation because of the extended latency period between contamination and HIV development); Madrid v. Lincoln County Med. Ctr., 923 P.2d 1154, 1155 (N.M. 1996) (noting the "current medical impossibility" of ruling out HIV infection for six months to a year after possible exposure); Jessamine R. Talavera, Quintana v. United Blood Services: *Examining Industry Practice in Transfusion-Related AIDS Cases*, 2 CORNELL J.L. & PUB. POL'Y 475, 476 n.11 (1993).

[25] Weekly to bi-weekly use of recombinant Factor VIII can cost up to $500,000 per year and may have limited effectiveness if a patient develops antibodies to the protein. *Gene Therapy Advance Treats Blood Disorder in Mouse Models*, BIOTECH WEEK, Sept. 14, 2005, at 1166, *available at* 2005 WLNR 14159523.

Court of Hawaii in *Smith v. Cutter Laboratories* applied the *Hymowitz* non-exculpation rule while dispensing with the usual fungibility requirement of *Sindell*.[26] In *Ray v. Cutter Laboratories*, a federal court in Florida imposed market share liability on Factor VIII producers, provided that the plaintiff could show a "genuine attempt" to locate and identify the specific defendants responsible for the injury.[27] While market share liability may be appropriate in the context of DES and other uniformly defective products, its application to fungible goods[28] such as Factor VIII, which nonetheless produce variant risk levels through differentiated production processes, is inconsistent with notions of economic efficiency and fairness.

This Note advocates an alternative to market share liability for fungible products that produce disparate consumer risks by using the Factor VIII litigation as a starting point. Part II highlights the distinctions between DES as a uniformly toxic substance producing a net reduction in social utility and products such as Factor VIII, which create positive or negative utility based on the care exercised by particular defendants during the production process. Part III examines the market-based inefficiencies that are likely to result from applying market share liability to products like Factor VIII.

Part IV proposes an alternative model for apportioning liability among a class of defendants responsible for producing functionally interchangeable goods that generate

[26] The *Smith* court rejected exculpation, except in the very narrow instance of defendants that did not have Factor VIII on the market at the time of injury. Smith v. Cutter Biological, Inc., 823 P.2d 717, 729 (Haw. 1991).

[27] Ray v. Cutter Labs., 754 F. Supp. 193, 196 (M.D. Fla. 1991).

[28] This Note will apply the definition of fungibility used by the Uniform Commercial Code, which holds that a good is fungible when "any unit, by nature or usage of trade, is the equivalent of any other like unit." U.C.C. § 1-201(18) (2003). Different batches of Factor VIII will inevitably produce different levels of contamination risk, but this Note will take the position that fungibility should track the tortfeasor identification problem rather than identical risk contribution among a given class of products. *See infra*, Part III.

dissimilar levels of consumer risk. The model advanced herein seeks to ensure full victim compensation while creating incentives for firms to reduce product risks. This will be achieved by a three-phase system for assigning damages. Phase 1 will permit defendants to exculpate themselves from the lawsuit by disproving causation. Phase 2 will replace the national market used by market share liability regimes with a sub-market representing the relative culpability of the non-exculpated defendants. Phase 3 will modify the sub-market liability apportionment by awarding damage discounts to those defendants that have effectively reduced product risks without qualifying for full exculpation.[29]

If fungible products are troublesome because they frustrate attempts to prove specific causation, and if this problem can only be resolved through collective liability, then it might be questioned why the model advanced in this Note provides for exculpation and discounting. The justification for what might be considered a hybrid liability regime is that neither individualized causation nor market share liability is wholly effective for litigation involving products subject to both the tortfeasor identification problem and the role of negligence as the genesis of harm. In such cases, pure collective liability applies too broadly to protect incentives for safe production, while pure individualized causation is too narrow to give relief to injured plaintiffs. The model strikes a compromise between competing liability theories to provide incentives for reducing consumer risk in products resulting from negligent production that are nonetheless subject to the tortfeasor identification problem affecting fungible markets.

[29] This system will be explained *infra*, Part IV.

II. INHERENT DANGER VERSUS NEGLIGENT PRODUCTION

A. The Role of DES

The DES litigation is significant not only for its novel approach to causation and market-based redress, but also because of the unique context within which it arose. DES, when used to prevent miscarriage, was a uniformly toxic chemical that was manufactured in identical form by all firms across the market.[30] The concept of a "safe" version of DES for miscarriage prevention is self-contradictory, as all DES products used for this purpose invariably posed a substantial degree of risk to those using them.[31] Joseph A. Page argues that DES is a "generic" risk product because every consumer using it is exposed to inherent harm.[32]

[30] "DES was . . . produced in 'generic' form which did not contain any clearly identifiable shape, color, or markings. DES was a fungible drug produced with a chemically identical formula." Collins v. Eli Lilly Co., 342 N.W.2d 37, 44 (Wis. 1984). *See also* Sindell v. Abbott Labs., 607 P.2d 924, 933 (Cal. 1980) ("The formula for DES is a scientific constant.").

[31] *See* Page, *infra* note 32, at 8; *see also Sindell*, 607 P.2d at 925-26 ("During the period defendants marketed DES, they knew or should have known that it was a carcinogenic substance, that there was a grave danger after varying periods of latency it would cause cancerous and precancerous growths in the daughters of the mother who took it, and that it was ineffective to prevent miscarriage. Nevertheless, defendants continued to advertise and market the drug as a miscarriage preventative.").

[32] Page distinguishes generic from nongeneric product risks as follows:

> Risks attributable to flaws or impurities caused by the manufacturing process usually are present only in a small percentage of the units of a particular product and do not endanger every consumer of the product. Such product risks are nongeneric in nature. The presence of a foreign substance in a jar of mayonnaise and a malfunction in a television set due to poor workmanship exemplify this category of hazards. In contrast, DES and asbestos share a common characteristic: the capacity to create risks that endanger, but do not necessarily harm, *every user or consumer of the product*. Such product risks are generic in nature.

Inherent harm refers to consumer risks inextricably linked to the nature of a product, as compared to a relatively safe product that is rendered harmful through the intervention of outside forces. Page's criticism of DES was echoed by the FDA in 1971, when it ordered producers to stop marketing the drug for miscarriage prevention.[33] The FDA found that DES was largely ineffective in preventing miscarriage, but that it did create new health risks in pregnant women and their unborn children.[34] If net social utility[35] for a product is

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Joseph A. Page, *Generic Product Risks: The Case Against Comment k and for Strict Tort Liability*, 58 N.Y.U. L. REV. 853, 857 (1983) (emphasis added).

[33] *See generally Sindell*, 607 P.2d 924.

[34] Tracey I. Batt, Note, *DES Third-Generation Liability: A Proximate Cause*, 18 CARDOZO L. REV. 1217, 1218 n.13 (1996) (citing multiple articles and studies claiming that DES was not only ineffective for miscarriage prevention but actually increased its risk). *See* Karen Fassuliotis, Note, *The Science of Endocrine Disruption—Will It Change the Scope of Products Liability Claims?*, 17 PACE ENVTL. L. REV. 351, 375 (2000) ("In 1971, the FDA determined that DES was both ineffective and dangerous for use by pregnant women and withdrew approval for its use."); *see also* Lucinda M. Finley, *Female Trouble: The Implications of Tort Reform for Women*, 64 TENN. L. REV. 847, 870 (1997) (DES "was ineffective for [preventing miscarriage], elevated the risk of breast cancer among the exposed mothers by forty percent, and has caused cancer, reproductive tract abnormalities, and infertility in the exposed daughters and sons of the pregnant women who took it."); Sue McGrath, *Only a Matter of Time: Lessons Unlearned at the Food and Drug Administration Keep Americans at Risk*, 60 FOOD & DRUG L.J. 603, 605-06 (2005) ("Research conducted in 1953 . . . established that not only was DES ineffective for preventing miscarriages, but also actually could increase the risk."); Henry A. Waxman, *A History of Adverse Drug Experiences: Congress Had Ample Evidence to Support Restrictions on the Promotion of Prescription Drugs*, 58 FOOD & DRUG L.J. 299, 306 (2003) ("Perhaps the greatest tragedy of DES is that years after it was first marketed, an independent study showed that it was completely ineffective for preventing miscarriages.").

[35] George P. Fletcher defines the "paradigm of reasonableness" in tort law as examining an activity (here, the production of DES) based on whether the risk was reasonable, which requires a "straightforward balancing of costs and benefits." *Fairness and Utility in Tort Theory*, 85 HARV. L. REV. 537, 542 (1972). The victim is entitled to recovery only where the risk produces a "net social disutility." *Id.* Fletcher explains

understood as the sum of P*V for all possible use outcomes, where P is the probability of occurrence and V is social value, then it is expected that DES will, on average, yield a negative utility outcome because the probability of generating its purported benefit is approximately zero,[36] leaving little to counterbalance negative V outcomes such as cancer and birth defects.[37]

In addition, because DES was chemically fungible across the market, the net social value of any given product is likely to be a negative number, regardless of whether the probability or severity of the expected harm is reduced in those products containing smaller dosages.[38] This uniformity of harm meant that every DES manufacturer contributed to an aggregate social ill by producing a toxic end product.[39] Net risk contribution by adding harm to the market with every output is the basis for the *Hymowitz* court's apportionment of liability based on relative shares of the national market, which the court believed accurately

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that utility considerations find burden distributions to be fair when they optimize the interests of the community. *Id.* at 569.

[36] One way to calculate social utility (U) is to assign values and probabilities to different outcomes such that $U = (x_1 + x_2 \ldots x_n)$ where $x = (P)(V)$. P represents the probability of outcome and V the utility of outcome in a chosen standardized unit. A product is socially beneficial where $U > 0$. A net social harm exists when $U < 0$ and a perfectly neutral outcome is represented by $U = 0$. Assume that the risk of contracting cancer (x_1) from DES is 30% and that cancer generates a social value of -5. Assume the probability of preventing miscarriage (x_2) with DES is, as the FDA eventually determined, equal to 0 (the actual number was probably slightly higher, but for purposes of the example it makes sense to use 0). Let V equal any number. The net social utility for DES is $x_1 = (.30)(-5) = -.15$; $x_2 = (0.0)(V) = 0$; $U = -.15 + 0 = -.15$. DES can therefore be expected to consistently produce negative social utility outcomes because its purported benefit of miscarriage prevention is illusory. Different outcomes are possible for Factor VIII blood products, which can yield positive or negative utility depending on the care undertaken during production.

[37] I use the terms "approximately" and "little" because sweeping statements about a product producing "zero" social utility are too broad, despite the fact that numerous studies performed after the 1970s repudiate the ability of DES to perform its stated function.

[38] *See* Ray v. Cutter Labs., 754 F. Supp. 193, 196 (M.D. Fla. 1991).

[39] *Id.*

reflected the relative social risk produced by each defendant.[40] This rationale was appropriate for DES because the result of any given production process was almost invariably harmful, making liability based on production volume reflective of a given manufacturer's relative contribution to the aggregate risk pool.[41] Market share liability is further appropriate for DES because the drug's chemical structure is inherently harmful, such that each unit of output correlates to some level of risk, regardless of the care undertaken during production. DES can be analogized to the types of substances appropriate for strict liability regimes, as the harm produced is not caused by deviations from standards of care, but rather, is inevitable given the product's inherent characteristics.

Moreover, DES produces signature diseases, such as clear cell adenocarcinoma, which has been traced to DES alone.[42]

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[40] [O]ur market share theory cannot be founded upon the belief that, over the run of cases, liability will approximate causation . . . . Instead, we choose to apportion liability so as to correspond to the over-all culpability of each defendant, measured by the amount of risk of injury each defendant created to the public-at-large. Use of a national market is a fair method . . . of apportioning defendants' liabilities according to their total culpability . . . .

Hymowitz v. Eli Lilly & Co., 539 N.E.2d 1069, 1078 (N.Y. 1989).

[41] *See* U.C.C. § 1-201(b)(18) (1991); *see also* Richard A. Epstein, *Implications for Legal Reform*, *in* REGULATION THROUGH LITIGATION 320 (W. Kip Viscusi ed., 2002) (Market share liability in the DES cases "presupposed not only the fungibility of all DES tablets but also that each tablet from first to last bore its proportionate share of responsibility.").

[42] Michael D. Green, *Products Liability: Pharmaceutical and Medical Device Issues*, SL038 ALI-ABA 139, 166 (2005) ("Examples of signature diseases are vaginal adenocarcinoma in the daughters of mothers exposed to DES and asbestosis in those exposed to asbestos. Once a signature disease is identified, there is no need for proof of either general causation or specific causation, as the existence of the disease is tied to exposure to the signature agent."). *See also* Troyen A. Brennan, *Environmental Torts*, 46 VAND. L. REV. 1, 15-16 (1993); Keith Cunningham-Parmeter, *A Poisoned Field: Farmworkers, Pesticide Exposure, and Tort Recovery in an Era of Regulatory Failure*, 28 N.Y.U. REV. L. & SOC. CHANGE 431, 491 (2004); Noah Sachs, *Blocked Pathways: Potential Legal Responses to Endocrine Disrupting Chemicals*, 24 COLUM. J. ENVTL. L. 289, 335-36 (1999).

Although the generic nature of DES rendered difficult the identification of particular defendants, identifying the chemical DES as the cause of injury was less complicated. Market share was an attractive means of distributing liability because DES inherently generated risk and could be linked to easily-identifiable signature diseases. The DES litigation is unique in that the plaintiffs' injuries were not caused by atypical defects in an otherwise socially beneficial product. Their injuries were the result of a product that was inherently harmful regardless of how it was produced.

B. Factor VIII and Differential Risk

In contrast to DES, Factor VIII blood products pose a "nongeneric" risk of harm to consumers.[43] As Klein explains,

> [T]he equivalent risk of harm that formed the basis for market share liability in the DES setting is absent in the factor concentrate setting. Underlying this conclusion is the fact that factor concentrate, unlike DES, is not inherently dangerous. Exposure to factor concentrate is dangerous only if a manufacturer processed the product from infected blood. The degree of risk depends on a myriad of factors, ranging from the manufacturer's plasma collection location to the quality of the manufacturer's processing operations. In contrast, *every* in utero exposure to DES was consistently harmful because of the product's chemical formation.[44]

A Florida court agreed in *King v. Cutter Laboratories*, finding that Factor VIII products "do not share a uniform composition" in part because "[e]ach manufacturer uses a different proprietary method to prepare its concentrate."[45] In

[43] *See* Page, *supra* note 32, for a discussion of "generic" and "nongeneric" product risks.

[44] Klein, *Beyond DES, supra* note 18, at 922-23.

[45] King v. Cutter Labs., 685 So. 2d 1358, 1360 (Fla. Dist. Ct. App. 1996). *See also* Smith v. Cutter Biological, Inc., 823 P.2d 717, 724 (Haw. 1991) (making a distinction between DES as a product based on an "identical formula" and Factor VIII, which lacks the "constant quality" of

rejecting the application of market share liability to Factor VIII, the court in *King* explained, "[b]ecause there is no indication that every unit of Factor VIII concentrate was uniformly infectious, it cannot be said that every unit created a uniform risk of harm."[46] Unlike DES, the risk of harm posed by Factor VIII is not inextricably linked to the inherent properties of the product but instead turns on the care exerted during processing.

The risk posed by non-recombinant Factor VIII prior to *Smith* and *Ray* depended on three significant variables built into the production process.[47] First, firms extract blood products from groups of private donors, rendering it virtually impossible to apply a consistent baseline risk to all manufacturers at the outset of the production process.[48] Factor VIII is a biological product drawn from the unique blood compositions of a constantly changing pool of individuals, thus causing different samples to contain varying degrees of risk based on the health of donors.[49]

DES because plasma donors are different for each company in the market).

[46] *King*, 685 So. 2d at 1360.

[47] Rather than relying on identical production methods, Factor VIII manufacturers used highly differentiated techniques. As Woods and Thornton explain, "Factor VIII is not a uniform product and each manufacturer uses a slightly different process to fractionated blood plasma." Woods & Thornton, *supra* note 9, at 731.

[48] William R Buckley and Cathy J. Okrent dispute the inherent harmfulness of Factor VIII as follows:

> [O]ne of the bases for the *Sindell* court applying the market share theory of liability was that *each* DES pill was inherently dangerous and potentially harmful, whereas, in this case, it cannot be said that the Factor VIII concentrates at issue were inherently harmful. Rather, such concentrates would only have been harmful if particular plasma donors had been infected with the HIV virus.

TORTS AND PERSONAL INJURY LAW 503 (2003).

[49] Factor VIII concentrate is frequently derived from pools of 1000 to 5000 donors. Users require between 40,000 to 65,000 product units per year, underscoring the possibility of exposure to thousands of donors. *See* INSTITUTE OF MEDICINE, HIV AND THE BLOOD SUPPLY: AN ANALYSIS OF

Second, while DES is made from the same chemical formula every time, the Factor VIII production process and content can vary significantly.[50] Producers have a wide array of available techniques that can reduce the risks of the final product. Finally, human negligence occupies a greater role in the production of Factor VIII than with DES. Batch processing that pools the blood of multiple donors into a common sample magnifies the danger of error, as negligently screening even a single HIV positive donor risks contaminating the entire output.[51]

These variables create disparate social utility outcomes in the outputs of a group of Factor VIII producers. Rather than inevitably producing a generic harm in every product unit, Factor VIII provides immense potential to yield positive social utility outcomes when risk-laden variables are controlled during production.[52] Potential social benefits from Factor VIII include allowing hemophiliacs to lead more satisfying lives by participating in physical activity without

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CRISIS DECISIONMAKING 267 (1995). Other experts have determined that Factor VIII is produced from vats of blood drawn from up to 20,000 donors. This intermingling process means one infected donor can potentially infect the entire vat. Hensler et al., *supra* note 19, at 294.

[50] Klein, *Beyond DES, supra* note 18, at 907.

[51] Even one error in the screening process can be deadly. Prior to the *Smith* and *Ray* litigation, Factor VIII producers pooled the blood plasma of numerous donors prior to manufacturing. Pooling risked contaminating the entire batch if there was even one HIV positive donor. The result was that the risk of HIV contamination was significantly higher from the use of blood products than from whole blood. Feldman, *supra* note 21, at 665.

[52] "Unlike factor concentrate, DES does not provide life-enhancing qualities to a small group of individuals . . . . In contrast, hemophiliacs, the primary consumers of factor concentrate, depend on an affordable supply of [Factor VII] concentrate to maintain the quality, or existence, of their lives." Klein, *Beyond DES, supra* note 18, at 919-20. Robert L. Rabin has argued that the social utility of a product includes a distinction between luxury and necessity. A product is necessary or essential if it "fills a critical need." *The Renaissance of Accident Law Plans Revisited*, 64 MD. L. REV. 699, 732 (2005) (citing O'Brien v. Muskin Corp., 463 A.2d 298, 306 (N.J. 1983)). See also John W. Wade, *On the Nature of Strict Tort Liability for Products*, 44 MISS. L.J. 825, 837-38 (1973), for examples of factors that can be used to determine the social utility of a product.

fearing severe injury, reducing administrative and medical expenses incurred from otherwise frequent hospital visits,[53] and the prevention of death by hemorrhaging.

Giving effect to this potential requires enhancing the production process to minimize the probability of viral contamination. The absence of generic risk in Factor VIII products allows consumer risk to be adjusted by the manufacturer.[54] Efficient screening of blood donors prior to extracting proteins, testing blood samples for HIV, and using heat treatment procedures that neutralize the presence of viruses are effective means of safeguarding consumers. Infusing the production process with these strategies has proven very effective in reducing the risk of HIV contamination. As one commentator notes, by 1986 some Factor VIII producers responded to the contamination problem by rejecting high-risk donors, screening remaining donors, and heat-treating blood.[55] These changes in the production process "almost completely eradicated [HIV] from the concentrates."[56]

The ability of manufacturers to implement risk-reducing production techniques exposes the failure of market share liability as a response to nongeneric product risks. While the magnitude of harm generated by impure Factor VIII is severe,[57] the producer can exert control over the probability of occurrence to manipulate the product's net social utility

[53] Hemophiliacs can administer Factor VIII at home, which maximizes their independence while reducing the frequency of hospital visits. *See* Bohannan, *supra* note 18, at 264; *see also* Hensler et al., *supra* note 19, at 294 (finding that factor concentrate "revolutionized" hemophilia care because it could be self-administered at home).

[54] Factor VIII is not inherently harmful. *See* Klein, *Beyond DES, supra* note 18, at 922.

[55] Bohannan, *supra* note 18, at 265.

[56] *Id.*

[57] Injuries incurred from contaminated Factor VIII are likely to remain severe because HIV and AIDS are life-threatening. *See, e.g.*, Christopher-Paul Milne, *Racing the Globalization of Infectious Diseases: Lesson from the Tortoise and the Hare*, 11 NEW ENG. J. INT'L & COMP. L. 1, 2-5 (2004).

outcome.[58] The presence of HIV in Factor VIII represents defective processing within a socially valuable output area whereas DES is inherently harmful regardless of production inputs. Under a market share liability regime, a Factor VIII manufacturer that screens donors and uses heat treatment to create positive social utility by reducing the risk of harm will nonetheless be penalized in the same capacity as a negligent manufacturer that takes no precautions.

The ability to modify production processes to reduce the risk of harm renders dubious the *Smith* and *Ray* opinions. The *Smith* court's application of market share liability to Factor VIII was an unreasonable extension of *Sindell* and *Hymowitz*, as those cases dealt with a generic harm produced by every defendant in the market. In the case of Factor VIII, it makes little sense to deny manufacturers the ability to exculpate themselves from liability by demonstrating that they did not contribute to the injury, as this would likely create a backwards incentive against investing in risk reduction. It is similarly ineffective to strictly align liability with relative market share, as a firm controlling 20% of the national market may be responsible for 1% or 100% of the risk. The likelihood of disparity between production volume and a firm's contribution to the aggregate consumer risk is magnified when the uniform risk assumption of market share liability is applied to nongeneric harms. The problem is rendered more complex in the case of Factor VIII because HIV has several causes apart from contaminated blood products and is not a signature disease tied to a particular product.[59]

[58] *See* Ray v. Cutter Labs., 754 F. Supp. 193, 196 (M.D. Fla. 1991).

[59] *See, e.g.*, Steven R. Salbu, *Needle Exchange, HIV Transmission, and Illegal Drug Use: Informing Law and Public Policy with Science and Rational Discourse*, 33 HARV. J. ON LEGIS. 105, 182 n.2 (1996).

III. THE ECONOMIC EFFECTS OF APPLYING MARKET SHARE LIABILITY TO NONGENERIC PRODUCT RISKS

DES creates an ideal environment for market share liability because apportioning liability based on output replicates marginal harm where output and harm are proportional.[60] In such a system, a defendant can reduce its contribution to the aggregate harm only by reducing its output.[61] Factor VIII creates a far different scenario because it can yield a positive social utility when safety concerns inform the production process. DES was a ripe opportunity to experiment with market share liability because the courts were certain that every producer shared common elements of culpability through net risk contribution. In contrast, the Factor VIII cases misapplied market share liability to an industry containing different levels of culpability among the defendants. The central problem with market share liability for industries containing nongeneric product risks is that the certainty of damages removes incentives to invest in safe production strategies.

A primary inefficiency that market share liability creates is the "free rider" problem, where a firm in an interchangeable product market decides to cut safety expenses to obtain a cost advantage in the production process. This producer is able to maximize its profits relative to competitors while taking advantage of the industry-wide liability shield provided by market share liability.[62] If the producer's defective products cause injury,

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[60] Devra L. Golbe & Lawrence J. White, *Market Share Liability and its Alternatives* 11 (N.Y.U. Ctr. for Law & Bus., Working Paper No. CLB-99-014, 1999), *available at* http://papers.ssrn.com/paper.taf?abstract_id=209809.

[61] *Id.*

[62] Market share liability reduces incentives to invest in safe products on two fronts. First, would-be safe producers have no incentive to reduce consumer risks if liability turns on the negligence of other producers in the market. Second, negligent producers have no incentive to reprioritize consumer safety so long as larger producers absorb the costs of injury. *See* Schultz, *supra* note 1, at 812.

its relative market share caps its liability.[63] For example, if Company A cuts production costs to the detriment of safety and causes 95% of the plaintiffs' injuries, it will only be liable for 10% of the judgment if 10% represents its relative share of the national market. Likewise, a producer occupying 90% of the national market but bearing only 10% of the fault will pay 90% of the plaintiffs' injuries in the event of judgment.

The essence of the free rider problem is that safety-conscious firms end up subsidizing negligent competitors.[64] This occurs because market share liability equates damage payments with relative market share, rather than individual risk contribution, thus constructing a de facto cooperative action problem where the decisions of one producer can implicate the liability of another.[65] This arrangement reduces incentives to produce safe products, as the benefit of safe production expenditures are spread across the entire market, thereby watering down the liability protection afforded to the investing company.[66] Moreover, free riding competitors that fail to modify their own production

[63] *See* Woods & Thornton, *supra* note 9, at 731 ("Under the *Sindell* analysis, a particular defendant's market-share determines its percentage of liability.").

[64] Jonathan B. Newcomb, *Market Share Liability for Defective Products: An Ill-Advised Remedy for the Problem of Identification*, 76 NW. U. L. REV. 300, 317 (1981).

[65] This is true because the negligence of one firm can bring multiple firms to trial and force them to pay damages in proportion to market share. *See, e.g.*, Hymowitz v. Eli Lilly & Co., 539 N.E.2d 1069, 1078 (N.Y. 1989) (explaining that liability is unlikely to approximate actual causation). The implication is that some defendants are likely to pay damages for harms caused by others.

[66] The manufacturing of a safer product by any market player distributes lower accident costs across the market, which prevents the investing producer from realizing the full benefit of the investment. Newcomb, *supra* note 64. *See also* John C. Coates IV, *"Fair Value" as an Avoidable Rule of Corporate Law: Minority Discounts in Conflict Transactions*, 147 U. PA. L. REV. 1251, 1304 (1999) ("Innovation externalities are a type of positive externality that provides benefits to third parties by permitting them to free-ride on the efforts of an innovating firm, and thus preventing an innovating firm from capturing the full benefits of its efforts.").

strategies siphon off a percentage of the risk-reduction benefits from a given company's safety expenditures.[67] The result is that the investing company will not receive a proper return on its investment because negligent free riders may still trigger a lawsuit, requiring damage payments by each market participant in proportion to its relative market share.[68] The investing firm is also likely to face reduced profits through higher production costs that cannot be defrayed by reduced damage payments, as liability is fixed to relative output.[69]

Judge Learned Hand's famous liability formula demonstrates the problems with applying market share liability to Factor VIII defendants. Judge Hand reasoned that a duty of care arises when the burden (B) of a given precaution is less than the cost of injury (L) multiplied by the probability (P) of occurrence.[70] In the production context, the formula suggests that a firm should invest in a given risk-reducing production technique when the probable cost outcome (PL) of failing to do so is higher than the cost of

[67] Newcomb, *supra* note 64, at 317.

[68] This is true except in those situations where courts have permitted exculpation from liability and an investing firm has reduced risk substantially enough to qualify.

[69] This assumes profit is defined as income minus costs, as consumer safety modifications are likely to increase the expense of production.

[70] United States v. Carroll Towing Co., 159 F.2d 169, 173 (2d Cir. 1947); *see also* Eimann v. Soldier of Fortune Magazine, Inc., 880 F.2d 830, 835 (5th Cir. 1989):

> [L]iability turns on whether the burden of adequate precautions, B, is less than the probability of harm, P, multiplied by the gravity of the resulting injury, L. In other words, an actor falls below the standard of conduct and liability attaches when B is less than PL. Conversely, the actor satisfies the obligation to protect against unreasonable risks when the burden of adequate precautions—examined in light of the challenged action's value—outweighs the probability and gravity of the threatened harm.

implementation (B).[71] A rational, risk-averse firm will naturally attempt to reduce its costs by choosing the most efficient production strategy,[72] which can include risk reduction efforts depending on the extent of liability that can be predictably avoided.

Market share liability intervenes to distort this natural choice[73] by raising the cost of B for investing firms. If a firm invests $10 million in risk reduction under a market share liability regime, the system will spread any reductions in P and L across the industry, thus preventing the investor from enjoying the full value of its expenditure.[74] The investment is devalued because market free riders prevent the investor

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[71] B is the cost of accident prevention, which can include "the cost of installing safety equipment or otherwise making the activity safer." Richard A. Posner, *A Theory of Negligence*, 1 J. LEGAL STUD. 29, 32 (1972). Landes and Posner discuss how the formula operates in terms of the costs of identifying potential consumer risks. In regard to the famous *Palsgraf v. Long Island R.R. Co.* case, 162 N.E. 99 (N.Y. 1928), they explain that "[m]aking the railroad liable for injuries to nonpassengers . . . would have no appreciable effect on the railroad's level of care, because the costs of identifying such a state of the world would have exceeded the benefits to the railroad from taking precautions against its occurrence." William M. Landes & Richard A. Posner, *Causation in Tort Law: An Economic Approach*, 12 J. LEGAL STUD. 109, 128 (1983).

[72] Arguing that profit maximization is the driving force behind firms, Jack Rabin et al. argue that "[e]fficiency is the sole criterion for determining which firms survive and which do not." HANDBOOK OF STRATEGIC MANAGEMENT 35 (2000). Reducing production costs is one way to increase efficiency.

[73] "Proper application of the Hand Formula will lead to efficient risk-taking. Precautions against injury are only required where the marginal benefit of taking precautions outweighs the marginal costs. This creates the appropriate incentives for all economic actors." Jonathan R. Macey, *The Pervasive Influence of Economic Analysis on Legal Decisionmaking*, 17 HARV. J.L. & PUB. POL'Y 107, 109 (1994). *See also* JEFFREY L. HARRISON, LAW AND ECONOMICS 163-64 (3d ed. 2003) ("Inherent in the Hand formula is a 'pricing' effect that creates certain incentives. In theory, any actor has a choice of taking steps to avoid an accident or not. The Hand formula informs the actors of the price of each of these choices. When the prices are compared, presumably the rational actor will select the lower-priced option.").

[74] *See* Newcomb, *supra* note 64.

from purchasing the level of liability protection it would otherwise receive. Any savings in future liability less than $10 million renders the investment disadvantageous from a marginal cost perspective.[75] This disincentive to invest in product safety causes risk-generating products to continue to reach consumers.

Reductions in the probability of accidents within a given market are passed along to all firms in the market as positive externalities. Positive externalities function like public goods in that the investing firm cannot control their full value, thereby creating an incentive among market competitors to dodge costs by free riding on the investor's efforts.[76] Distortion of the Hand formula is especially likely in a market share liability regime because the full costs of B remain concentrated in the investor, while the benefits of lower PL values are shared among all the market participants. Market free riders spend nothing, but still enjoy a portion of the value of consumer safety investments.[77]

This disruption between the value of investments and liability protection can reverse the B < PL formula by making the costs of safer production greater than the expected damage payments they avoid.[78] When the burden of investing in a safe production technique is more expensive than its liability reduction advantage, a rational firm will choose to take its chances with the tort system.[79] Rational firms will only undertake a given production strategy when the marginal costs of doing so are equal to the marginal

[75] Michael Faure & Ton Hartlief, *Remedies for Expanding Liability*, 18 OXFORD J. OF L. STUDIES 681, 682-83 (1998).

[76] *See* Christopher S. Yoo, *Vertical Integration and Media Regulations in the New Economy*, 19 YALE J. ON REG. 171, 195 (2002).

[77] See Newcomb, *supra* note 64, at 319 (explaining that "[t]he 'safe' producers will still pay for accidents caused by the rest of industry, while the 'unsafe' free riders will benefit from the reduced number of accidents" under a market share liability system).

[78] *See* Macey, *supra* note 73.

[79] "When the cost of accidents is less than the cost of prevention, a rational profit-maximizing enterprise will pay tort judgments to the accident victims rather than incur the large cost avoiding liability." Posner, *supra* note 71, at 33.

benefits of accident reduction.[80] Market share liability removes incentives to provide this optimal level of care by dispersing the benefit of a given risk-reducing investment across the market while leaving all costs with the investor.[81] Free riding can turn risk avoidance into an endeavor more costly than simply paying damages to injured consumers.

Moreover, producers will be even less likely to engage in safe production techniques following the non-exculpation component in *Hymowitz* and *Smith*.[82] A Factor VIII producer that can prove that it significantly reduced the risk of injury is unable to escape liability under *Smith*, despite shouldering the entire cost of B.[83] This outcome lends support to the criticism that market share liability is little more than "a judicially created form of industry-wide insurance" that divorces liability from specific causation.[84] Fixing liability to

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[80] Macey, *supra* note 73; Faure & Hartlief, *supra* note 75.

[81] The optimal level of care for accident prevention occurs where the marginal costs of taking precautions are equal to the marginal costs of accident reduction. *Id.* *See also* CARLO C. JAEGER ET AL., RISK, UNCERTAINTY AND RATIONAL ACTION 116 (2001) ("When there are several investment possibilities with positive returns, priorities are set by first investing in the one with the highest rate of return. The guiding principle is to reduce risk at the rate of marginal increase of safety for each unit of money spent for this purpose.").

[82] *See* Hymowitz v. Eli Lilly & Co., 539 N.E.2d 1069, 1078 (N.Y. 1989); *see also* Smith v. Cutter Biological, Inc., 823 P.2d 717, 729 (Haw. 1991).

[83] *Smith* permits exculpation only when a producer did not have the product on the market at the time of injury. *Smith* does not speak to partial reductions in consumer risk. *Smith*, 823 P.2d at 729.

[84] Sutowski v. Eli Lilly & Co., 696 N.E.2d 187, 190 (Ohio, 1998). *See also* Rebecca J. Greenberg, *The Indeterminate Defendant in Products Liability Litigation and a Suggested Approach for Ohio*, 39 CLEV. ST. L. REV. 207, 224 (1991) (arguing that "[n]ational market share liability operates as a judicially administered insurance system. A manufacturer who creates greater risks makes larger payments on a regular basis."); Arthur J. Jacobson, *Taking Responsibility: Law's Relation to Justice and D'Amato's Deconstructive Practice*, 90 NW. U.L. REV. 1755, 1780 n.52 (1996) (market share liability "resembles legally imposed insurance"); Andrew Nace, Note, *Market Share Liability: A Current Assessment of a Decade-Old Doctrine*, 44 VAND. L. REV. 395, 436 (1991) (arguing that "market share liability is a judicial insurance plan that strives to redistribute the cost of claims in rough accordance with a manufacturer's

relative output produces disincentives to invest in consumer safety, as the costs of doing so may not translate into reduced liability when damages are apportioned.

A second problem with applying market share liability beyond the generic risk context is the possibility of over-deterrence. Market share liability disproportionately allocates burdens to firms possessing relatively large market shares regardless of actual harm contribution, risking a curtailment of consumer access to beneficial products. Uprooting the DES market by linking liability to output would have likely produced a positive utility outcome[85] because the DES market failed to provide a social benefit to counterbalance the risk it created. DES was largely an anomaly, however, as most products contain at least some potential to yield positive social utility outcomes.

The *Smith* and *Ray* courts should have exercised greater caution in apportioning liability to ensure that socially beneficial firms would remain profitable. The runaway liability problem is likely for the Factor VIII producer occupying 90% of the market but contributing only 2% of the harm. This is especially troubling because such a firm is highly efficient from a social utility standpoint, as controlling 90% of national output while contributing only 2% of risk indicates that the firm produces a significant amount of social value with relatively little harm. Imposing liability by tightly correlating output to damage payments risks producing what may be called the "blackout effect,"[86] or

share of the risk"); Schultz, *supra* note 1, at 809 ("[M]anufacturers contend that adoption of market share liability dramatically increases insurance costs to such an extent that some companies either can no longer obtain insurance or cannot pass the costs on to consumers, while other companies can no longer survive.").

[85] This outcome would occur if the costs of judicial action would be less than the costs of allowing the DES market to survive.

[86] Dirk Barrett, an attorney for Pfizer in New York, describes what he calls the "blackout effect":

> [F]rom the perspective of our industry, the health care industry, I think you can look at a number of experiences arising out of product liability litigation that have had what I call a "blackout effect" on research and development

liability-driven disincentives to develop new products or even remain in the market.[87] A firm may assess the probability of judgment based on the net risk value of the market as a whole and determine that a future judgment would be crippling given its relatively large market share.[88] The

> in certain areas . . . . You had the example of Dalcon [sic] Shield, a very serious litigation, followed by the Copper Seven litigation. Together they, as well as litigation affecting oral contraceptives, have been in large part responsible for what has been reported to be a reduction of companies doing research on contraceptives in the United States, from thirteen to one in recent years.
>
> Similarly, you have the example of the Vanvechten case where you had a drug that was used to treat morning sickness. It was at that time the only available drug for morning sickness, and was widely held by medical opinion to be safe for that purpose. But, it was the subject of a number of liability lawsuits against Merrill, its manufacturer, most of which were won. Nevertheless, because of the costs of those suits, Merrill withdrew the product from the market, and to my knowledge there are no morning sickness drugs available and there is probably little research in that area.
>
> There has been a similar experience in the vaccine area, and I think it is safe to say that the breast implant business has been very effectively shut down or substantially reduced.

Introduction: Product Liability Aspects of Innovation, 21 CAN.-U.S. L.J. 305, 305-06 (1995).

[87] *See* James M. Wood, *Product Liability Issues*, BLI GLASS-CLE 237, 265 (2002) (arguing that fears of product liability claims coupled with rising insurance rates have reduced innovation in the medical industry). Liability fears and litigation have deterred biomedical corporations such as DuPont and Dow Corning from supplying biomaterials, risking shortages of medical devices. RAND, Science and Technology Policy Institute, *Biomaterials Availability: Potential Effects on Medical Innovation and Health Care*, Jan. 2000, *available at* http://www.rand.org/pubs/issue_papers/IP194/IP194.pdf.

[88] The over-deterrence problem may cause producers to completely forego development of risky products. Vaccine companies in particular "have chosen to exit the market rather than face incalculable possible liability." McGuire, *supra* note 11, at 779.

threat of staggering liability may induce firms to voluntarily exit the market, depriving consumers of necessary products. Producers that choose not to exit the market may be driven into post-judgment insolvency if they remain, or they may simply withdraw certain products. As Klein explains in the context of strict liability:

> [T]he primary justification for the rejection of strict liability in actions against blood processors is the desire to ensure an adequate supply of blood products for those who need them. Courts and legislatures have expressed concern that an expansive liability theory will increase the price of blood products beyond the means of many hemophiliacs or, worse, discourage manufacturers from remaining in the blood products market (internal citations omitted).[89]

Market share liability can produce these consequences by mismatching causation and liability, such that relatively cautious firms that meet applicable standards of care must nevertheless subsidize the harm generated by negligent competitors. Damages paid by firms that meet the standard of care represent deadweight loss in the deterrence context, as liability payments by innocent defendants fail to deter the negligent producers from using risky production techniques. Likewise, there is no benefit from extracting payments from firms that already use safe production methods, as they are not engaging in risky behavior requiring correction. Detaching liability from fault leaves little incentive for negligent producers possessing smaller relative market shares to alter their production strategies, as larger competitors will heavily subsidize their liability in the event of judgment.

Insurance costs produce an additional inefficiency. Market share liability is likely to cause the price of insurance to rise exponentially, as near industry-wide liability makes judgment more likely based upon both the number of producers in the market and the variant levels of

[89] Klein, *Beyond DES*, *supra* note 18, at 919.

care undertaken by each.[90] The insurance rates for a firm in an interchangeable product market may rise regardless of whether the firm enacts safe production strategies, as liability is determined by market composition rather than the conduct of particular firms. Rather than assigning rates based on a given manufacturer's specific production strategies, insurance companies are likely to examine the market holistically and increase costs for "risky markets" instead of "risky producers." Insurance costs as well as the risk of judgment will force companies to adjust prices to offset the cost increases. Other companies may decide to simply stop producing a product that is likely to trigger market-based liability. Cost and supply changes will intertwine, with firms raising prices to offset higher insurance premiums while reductions in the number of producing firms risks forcing supply below demand. In the end, consumers will end up paying higher costs for increasingly scarce products.[91]

IV. A NEW MODEL OF APPORTIONMENT

A. Fungibility

Disparate risk contribution among a group of Factor VIII products immediately challenges traditional understandings of fungibility.[92] The *Smith* court deals with this issue by applying market share liability in spite of its finding that

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[90] *See* UGO MATTEI, COMPARATIVE LAW AND ECONOMICS 250 (1997). Mattei argues that market share liability systems make insurance premiums uniform, which creates "no incentive for the single participant to use more efficient precautions with the consequent failure of the deterrence potentiality of the system." *See also* Sheffet, *supra* note 2, at 42 (hypothesizing that market share liability will cause insurance premiums to rise); KENNETH S. ABRAHAM, DISTRIBUTING RISK: INSURANCE, LEGAL THEORY, AND PUBLIC POLICY 49 (1986) (explaining that market share liability may distort insurance pricing).

[91] *See* Klein, *Beyond DES*, *supra* note 18, at 917-18.

[92] Fungibility in the context of uniform risk has sometimes been required for market share liability. RESTATEMENT (THIRD) OF TORTS: APPORTIONMENT LIAB. § 26 cmt. n (2000) (stating that some jurisdictions have applied market share liability to "fungible-risk products").

variant risk levels among products prevented Factor VIII from being a fungible good in the traditional sense.[93] The implication that risk fungibility should not be a prerequisite for market share liability is discussed by Allen Rostron, who argues that courts should distribute damages based on the defendant's proportional share of the harm, which includes market share as one factor among many.[94] Rostron's argument acknowledges that market share liability and a strict linking of volume and damages is appropriate only where product risks are uniform.[95] This Note rejects the notion that the concept of fungibility requires risk uniformity and instead adopts the plain language of the Uniform Commercial Code, which defines goods as fungible when "any unit, by nature or usage of trade, is the equivalent of any other like unit."[96]

The U.C.C. definition is ideal because the "usage of trade" provision accounts for interchangeable functions while excluding products with particular brand identities that

[93] Smith v. Cutter Biological, Inc., 823 P.2d 717, 723-24 (Haw. 1991).

[94] *See generally* Allen Rostron, *Beyond Market Share Liability: A Theory of Proportional Share Liability for Nonfungible Products*, 52 UCLA L. REV. 151 (2004).

[95] "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." *Id.* at 154. Rostron further explains that the "[u]niformity of risk across all manufacturers' products is the only sense in which fungibility is a logical requirement for application of market share liability." *Id.* at 168.

[96] U.C.C. § 1-201(18) (2003); *see also supra* note 28. Aside from the U.C.C. definition of fungibility, at least one scholar has argued that "DES and certain other pharmaceutical products (such as, perhaps, blood-clotting factor) present natural opportunities for the imposition of market-share liability because the products of different manufacturers are fungible." GERALD J. POSTEMA, PHILOSOPHY AND THE LAW OF TORTS 239 (2001). It should be noted, however, that Postema defines fungibility as posing an equal risk of causing injury. *Id.* In contrast, Richard S. Miller and Geoffrey K.S. Komeya claim that the *Smith* court rejected the fungibility of Factor VIII because it is derived from the blood of multiple donors. *Tort and Insurance "Reform" in a Common Law Court*, 14 U. HAW. L. REV. 55, 111 (1992).

would remove the indeterminate defendant problem.[97] Risk levels among Factor VIII products vary, but the *purpose* of every batch remains constant.[98] The U.C.C. definition is appropriate because fungibility should reflect the tortfeasor identification problem that troubles plaintiffs attempting to recover damages from relatively anonymous defendants.[99] Cigarette manufacturers, for example, are poor candidates for collective liability systems[100] because smokers can typically identify the particular brand they used, which violates the product equivalence requirement.[101] In contrast,

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[97] *See* Conley v. Boyle Drug Co., 570 So. 2d 275, 286 (Fla. 1990) (limiting the imposition of market share liability in DES litigation to instances where the plaintiff could establish "a genuine attempt to locate and to identify the manufacturer responsible for her injury")

[98] Even the DES cases demonstrate the problem with defining fungibility as inclusive of equal risk across the market. DES inevitably yields a negative social utility outcome, while also producing distinct social risk levels per product due to different dosage levels. The DES market is accurately viewed as uniformly above the zero risk baseline, but the height each product rises above that level depends on dosage, which market share liability ignores by linking liability strictly to output (income or units sold) without examining pill size or dosage. *See* Rostron, *supra* note 94, at 166, explaining that "[w]hile each milligram of DES presented the same amount of risk, each DES pill did not, because the pills came in different dosages."

[99] Woods and Thornton describe the tortfeasor identification problem caused by Factor VIII in terms strikingly similar to descriptions of DES. They argue that hemophiliacs often require numerous transfusions and constant use of blood products over timeframes spanning many years. Factor VIII is produced by several companies and is administered by hospitals based on what brand is then available. A given plaintiff "may have had products from any one of a number of manufacturers," making the burden of identification exceedingly difficult. Woods & Thornton, *supra* note 9, at 725. *See also* Chase, *supra* note 2 (accounts of defendant identification problems created by DES).

[100] I use the term "collective liability systems" to refer to liability regimes based on tortfeasor identification problems. Market share liability is one example, as is the system that will be proposed *infra* Part IV.B.

[101] In advocating proportional share liability for tobacco products, Rostron explains that "[m]ost smokers are well aware of the brands of cigarettes they used, and their manufacturers can be easily identified." Rostron, *supra* note 94, at 202. *See also* Frank J. Giliberti, *Emerging*

firearms manufacturers are ideal candidates for collective liability because different brands of equivalent firearms are functionally interchangeable to both their users and their victims.[102] To the extent that it is required for collective liability systems, fungibility should reflect the plaintiff's inability to identify a particular defendant instead of requiring the presence of identical risk among a group of products.[103] The *Smith* court applies a similar rationale

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Trends for Products Liability: Market Share Liability, its History and Future, 15 TOURO L. REV. 719, 732 (1999) ("No market share liability would appear appropriate or necessary in tobacco cases, since most persons are aware of the brand of cigarette that they have smoked."); Robert A. Levy, *Tobacco Medicaid Litigation: Snuffing Out the Rule of Law*, 22 S. ILL. U. L.J. 601, 631-32 (1998) (arguing that cigarette brands are distinguishable).

[102] Although acknowledging that firearms use different calibers and imprint unique markings on bullets that can distinguish one gun from another, District Judge Jack Weinstein nonetheless determined that handguns are fungible for market share liability purposes. Hamilton v. Accu-Tek, 62 F. Supp. 2d 802, 845-46 (E.D.N.Y. 1999), *vacated*, 264 F.3d 21 (2d Cir. 2001). He explained:

> Handguns, already found to be fungible for jurisdictional purposes . . . may also be deemed fungible for substantive law purposes. From the point of view of the criminals using them, there are no relevant differences between handguns. As a criminal co-defendant in one of the shootings put the matter in deposition testimony read into the record at trial:
>
> > "[W]here I'm from you don't really care who manufactures them. You just get your hands on them and, you know, that's how that goes . . . . I never really take the time to look at who makes it, whose name is on it, or, you know, it's not important to me."
>
> The fungibility of handguns, and, thus, their amenability to market share analysis is even clearer when viewed from the vantage point of shooting victims.

Id. at 844.

[103] Courts applying market share liability to Factor VIII products have done so "when there is an inherent inability to identify the manufacturer of a defective product." Howard L. Dorfman, *Living in a Complex World: Prospects for Non-Identification Liability*, 150-JAN N.J. LAW. 25, 28 (1993). *See also* RESTATEMENT (THIRD) OF TORTS: APPORTIONMENT LIAB. §

despite arriving at a misguided outcome, explaining, "although [Factor VIII] is fungible insofar as it can be used interchangeably, it does not have the constant quality of DES."[104]

B. Format

The model proposed in this Note provides an alternative liability system for functionally interchangeable products that create disparate consumer risks. The role of the courts in responding to what may be conceived as the "Factor VIII problem" is not to impose penalties on industries as a whole, but rather to isolate the liable defendants as accurately as possible. A judicial process is necessary to separate those defendants that failed to exercise due care in the production process from those that did. This approach will ensure that firms providing positive social utility are not forced out of the market by free riding.[105] Replacing market share liability with an alternative means of apportioning damages among producers of fungible products reduces the likelihood that innocent firms will be caught up in the liability dragnet imposed by current market share regimes. This outcome requires a retargeting of liability from high-volume producers to those firms most likely to have caused a plaintiff's injuries.[106]

This Note advances a three-phase apportionment system intended to draw a closer link between damage payments and injury causation for fungible products posing disparate

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26 cmt. n (2000) (explaining that market share liability has been applied when numerous defendants are engaged in "manufacturing and selling the same *or similar* products, but the plaintiff cannot identify which defendant provided the product that caused injury").

[104] Smith v. Cutter Biological, Inc., 823 P.2d 717, 724 (Haw. 1991). *See also* Bohannan, *supra* note 18, at 267 (arguing that there is an "interchangeability of the products" within the Factor VIII market that compounds defendant identification issues).

[105] *See, e.g.*, *supra* note 77.

[106] *See* Sindell v. Abbott Labs., 607 P.2d 924, 937 (Cal. 1980) (acknowledging that market share may not accurately reflect a defendant's liability).

consumer risks. Phase 1 will allow defendants to exculpate themselves from the market as permitted in *Sindell*.[107] This procedure dispenses with the *Hymowitz* and *Smith* system, which bars exculpation based on the assumption that relative output was roughly equivalent to a given defendant's contribution to the aggregate risk.[108] *Hymowitz* is rooted in the concept of uniform harm among products and is inappropriate where output volume and risk are incongruent.[109] To account for the typical disparity between output and risk contribution, the model recommended by this Note permits defendants to exculpate themselves from liability at the outset of the lawsuit.

Permitting exculpation is the first step in providing firms with incentives to invest in risk-reducing production strategies.[110] *Sindell* permits exculpation of those producers who did not sell the given product during the timeframe when the plaintiff could have been injured.[111] Exculpation should be expanded to account not only for lack of production during the relevant timeframe, but also for negligible risk creation within a given defendant's output. For example, risk-reducing production strategies can bring the likelihood of HIV contamination from Factor VIII products to nearly zero.[112] Other products may have higher lowest-risk

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[107] *Id.*

[108] *See* Hymowitz v. Eli Lilly & Co., 539 N.E.2d 1069, 1078 (N.Y. 1989); *see also Smith*, 823 P.2d at 729.

[109] *Hymowitz*, 539 N.E.2d at 1078.

[110] Allowing companies to exculpate themselves from liability creates an incentive to take precautions. Richard Goldberg, *The Role of Scientific Evidence in the Assessment of Causation in Medicinal Product Liability Litigation*, *in* LAW AND SCIENCE: CURRENT LEGAL ISSUES 76-77 (Helen Reece ed., 1998). *See also* Newcomb, *supra* note 64.

[111] Sindell v. Abbott Labs., 607 P.2d 924, 937 (Cal. 1980).

[112] In examining the state of current production, one commentator argues that blood-screening and the development of recombinant Factor VIII means "the risk of contracting HIV through factor VIII infusions is virtually zero." DAVID M. GOLAN, PRINCIPLES OF PHARMACOLOGY 344 (2004). *See also* Hollis W. Merrick III, Mary R. Smith & Bruce V. MacFayden, Jr., *Surgical Bleeding and Blood Replacement*, *in* ESSENTIALS OF GENERAL SURGERY 101 (Peter F. Lawrence ed., 2005) (arguing that

thresholds that will need to be determined. The producers who can prove that they undertook all necessary precautions to reach a predefined floor of lowest possible risk will be dismissed.

Exculpation under *Sindell* is necessarily narrow because all DES producers added a significant risk of harm to the market.[113] The lowest possible risk created by DES was still substantial, particularly because DES was largely incapable of providing positive social utility to counterbalance the harms it created.[114] In this respect, DES differs from most products that typically provide positive social utility outcomes marred by occasional injurious defects.[115] Excluding from the lawsuit those manufacturers whose products reach a predefined lowest-risk baseline provides an incentive for firms to prioritize consumer safety.

Phase 2 involves the creation of a sub-market composed of the sum of outputs[116] of those defendants who have failed to exculpate themselves in Phase 1. The sub-market represents the total number of potentially dangerous product units and will replace the national market figure as the new denominator in calculating each defendant's relative share.[117]

careful screening of blood donors and blood prior to Factor VIII transfusions has reduced transmission of infectious diseases to "very low levels"). *See also* RODNEY J.Y. HO & MILO GIBALDI, BIOTECHNOLOGY AND BIOPHARMACEUTICALS 135 (2003) (screening, safety testing, virucidal techniques, and other measures have led to an "extremely low risk of viral transmission" from Factor VIII).

[113] *See* Page, *supra* note 32.

[114] *See supra* note 34.

[115] *See* Page, *supra* note 32, at 857.

[116] It is also possible to calculate market share by using relative income instead of relative output. This Note advocates the use of relative output because it more accurately reflects each defendant's contribution to the net harm. Income can fluctuate based on price such that an income of X may not reflect an equivalent risk-contribution figure.

[117] Market share is calculated by dividing a given firm's output units or income by the total number of output units of income in the entire market. Market share for pharmaceutical products can be determined by the formula A/B * 100, where A is the number of prescriptions written for a drug under its primary diagnosis and B is the number of prescriptions for the entire class of drugs to which A belongs. This formula is the

The calculation of relative sub-market shares will be a non-exculpated defendant's total output in product units divided by the sum of output units of all non-exculpated defendants. This is distinct from a national market denominator because the sub-market excludes the outputs of exculpated defendants.

Adjusting the denominator, instead of using the traditional market share calculation, ensures that plaintiffs receive full recovery. Under many market share systems, a plaintiff's recovery is diminished by a percentage equivalent to the size of the national market controlled by missing or absent defendants, as this quantity remains in the denominator.[118] Full plaintiff recovery requires adjusting the denominator by subtracting the sum of outputs of exculpated defendants. Figure 1, *infra*, demonstrates this process.

Phase 3 awards damage discounts to liable defendants who fall short of full exculpation, but who nevertheless reduce consumer risk in some appreciable capacity. This Phase rewards firms for investing in effective risk-reduction strategies, even though they failed to reach the lowest-risk baseline or otherwise qualify for exculpation. Damage discounts are awarded by the jury based on an assessment of the effectiveness of a given risk reduction strategy. The jury will rely on expert testimony, industry data, probability calculations, and other necessary factors to determine the efficacy of a defendant's risk reduction strategy.

Convenience requires that the jury focus on the average risk per product when awarding damage discounts. Assessing individual unit risks among products and then

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equivalent of a market share calculation based on output rather than income. MICKEY C. SMITH, PHARMACEUTICAL MARKETING: STRATEGY & CASES 195 (1991).

[118] *See, e.g.*, Hymowitz v. Eli Lilly & Co., 539 N.E.2d 1069, 1078 (N.Y. 1989) ("[W]e hold that the liability of DES producers is several only, and should not be inflated when all participants in the market are not before the court in a particular case. We understand that, as a practical matter, this will prevent some plaintiffs from recovering 100% of their damages."). Several liability makes each defendant responsible only for its share of the damages. As a result, a plaintiff's damage award will be reduced by the percentage of market share controlled by missing defendants.

calculating the total risk of each producer's net output would be unnecessarily complex and time consuming for a jury.[119] Instead, the jury should determine the average risk reduction per product unit caused by a given risk reduction strategy. For example, a jury could find that a production strategy reduces the risk of harm per product by 50%. Converted to the aggregate, this translates into 50% of Defendant 1's products generating one unit of risk[120] while 50% are risk-neutral.[121] Converting the risk reduction per product into a discrete number of risk-neutral products separates a general pool of output units into two smaller pools, with one pool containing a quantity of units bearing a risk of harm one, and the other containing units with a risk of harm zero.[122]

The first group of products is assumed to have a risk of harm one, which is indistinguishable from the theory underlying *Smith* and *Hymowitz*, where each unit of output represents an equivalent amount of risk. The distinction between the model advanced herein and the model of *Smith* and *Hymowitz* is that the latter applied the "one unit, one

[119] For example, it would be unreasonable to require the jury to look at every unit of output individually to determine that a given production technique would reduce the risk of contamination in unit 1 by 10%, in unit 2 by 20%, in unit 3 by 30%, and so on.

[120] One unit of risk is equivalent to a 100% risk of contamination. This does not mean that each product in this category is certain to cause contamination. Rather, converting to the aggregate represents the equivalent units of output that *could have* caused the harm following the jury's discount.

[121] Assume a producer makes ten products, each posing a 20% risk of harm. Multiplying the risk of harm per product (.2) by the number of products (ten) yields a value of two. Manageability requires assessing an average risk per product rather than attempting to calculate the individual risks for each product unit. This is especially true in large markets.

[122] This division is largely a legal fiction that gives effect to the jury's risk determination. It does not matter that not all of the products in the risk pool *will certainly* cause harm or that not all of the units in the risk-neutral pool *will never* cause harm. Instead, this division provides a means of converting the jury's risk per product assessment into the quantity of products most likely to create harm.

risk" correlation to the entire market without excluding output units likely to be risk-neutral.[123] The model in this Note subtracts the number of risk-neutral units of output from the total sub-market prior to calculating each defendant's relative share.

A significant flaw in market share theory is that it artificially inflates the risk per unit of output ratio by failing to exclude risk-neutral products.[124] Including risk-neutral products in the liability calculation disproportionately punishes companies with larger outputs. Consider the result of failing to adjust the market denominator for a finding that 50% of a defendant's products are risk-neutral. Under a market share system, this defendant will pay damages based on 100% of its output, even though only 50% of its products could have caused the plaintiff's injuries. This defendant has little incentive to pay higher costs for risk reduction, as it will still pay damages in equal proportion to its market share.[125] Figure 1 demonstrates how the model resolves this problem.

Figure 1

*Numbers are rounded to the nearest hundredth

Initial Exculpation Hearing	Defendant 1: Liable	Defendant 2: Liable	Defendant 3: Not Liable	Defendant 4: Not Liable
National Market Share	2500/5000 = .5	1000/5000 = .2	1000/5000 = .2	500/5000 = .1
Sub-market Share	2500/3500 = .71	1000/3500 = .29	—	—
Discount	80% = -2000	0	—	—
Adjusted Sub-market Share	500/1500 = .33	1000/1500 = .66	—	—

[123] This is likely because there were no risk-neutral units of DES. Page, *supra* note 32, at 857.

[124] For example, the court in *Conley v. Boyle Drug Co.* permitted exculpation but included a rebuttable presumption that all remaining defendants controlled equal shares of the national market. This risks the artificial inflation of some shares and the devaluation of others. Conley v. Boyle Drug Co., 570 So. 2d 275, 286 (Fla. 1990).

[125] I use the phrase "little incentive" because the probability of paying any damages is reduced when any producer decreases product risks. Newcomb, *supra* note 64, at 317.

Assume Defendants 1 and 2 are liable while Defendants 3 and 4 are not. Under a market share system, liability is fixed to output, causing Defendants 3 and 4 to pay for 30% of the plaintiff's damages despite contributing 0% of the risk of harm.[126] This forces Defendants 3 and 4 to subsidize the negligence of Defendants 1 and 2. The model corrects this problem by allowing Defendants 3 and 4 to exculpate themselves at the outset of the lawsuit by disproving liability.

Defendants 1 and 2 remain after the exculpation phase. As such, the sum of their outputs has been found responsible for 100% of the plaintiff's injuries. Adding the outputs of Defendants 1 and 2 yields a total sub-market of 3500 product units. Dividing the individual outputs of Defendant 1 and 2 by this figure yields the relative sub-market share of each. Defendant 1 controls 71% of the sub-market while Defendant 2 controls 29%. The sub-market excludes Defendants 3 and 4, which increases Defendant 1's liability from 50% under a market share system to 71% under the model. Likewise, Defendant 2's liability increases from 20% to 29%.

This change reflects two events. First, liability becomes more highly concentrated on those defendants most likely to have caused the plaintiff's injuries. Second, the outputs of Defendants 1 and 2 represent 100% of the sub-market, which ensures that the plaintiff will receive full compensation when liability is apportioned. A market share system that allows exculpation without adjusting the market denominator would permit the plaintiff to collect only 70% of the judgment, as excusing Defendants 3 and 4 removes 30% of the market and renders an equal percentage of the plaintiff's judgment unrecoverable.[127]

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[126] Sindell v. Abbott Labs., 607 P.2d 924, 937 (Cal. 1980); Smith v. Cutter Biological, Inc., 823 P.2d 717, 721 (Haw. 1991).

[127] For example, *Martin v. Abbott Labs.* uses an apportionment scheme such that "[i]f the resulting market shares total less than 100% of plaintiffs' damages, the plaintiff should bear the cost of the difference." Kenneth R. Lepage, *Lead-Based Paint Litigation and the Problem of Causation: Toward a Unified Theory of Market Share Liability*, 37 B.C. L. REV. 155, 180 (1995). *See also* Woods & Thornton, *supra* note 9, at 731-32

Damage discounts can now be assigned under Phase 3. Replacing the national market figure with a sub-market based on likely causation improves the alignment of fault with damages but remains incomplete because some of the products that *could* have caused the harm probably did not. Damage discounting refines the process by offering partial liability reductions to those firms that reduce product risks, even if they do not qualify for full exculpation.

Figure 1 demonstrates how damage discounting functions. Assume the jury finds that Defendant 1, a Factor VIII producer, invested in an effective heat treatment system that reduced the risk of HIV contamination by 80%. Defendant 1's adjusted risk-creating output after the discount is 500 units, as the 80% discount excludes 2500 units as risk-neutral. The total sub-market income is also reduced by 2500 units, which transfers liability from Defendant 1 to Defendant 2. Only 20% of Defendant 1's products could have caused plaintiff's injuries, demonstrating that the remainder of the risk was caused by Defendant 2. The adjusted sub-market liability of Defendants 1 and 2 reveals that Defendant 1's liability has declined from 71% to 33%, while Defendant 2's liability has more than doubled, from 29% to 66%. Notice that Defendant 2's damage payment will be twice as large as Defendant 1's, even though Defendant 2 controls a share of the national

(arguing that a plaintiff might recover less than the full value of the damages under the Martin formula if all possible defendants are not before the court). *See also* Hymowitz v. Eli Lilly & Co., 539 N.E.2d 1069, 1078 (N.Y. 1989) (acknowledging that plaintiffs will not recover the totality of damages if defendants are absent from the market). The court's argument for this was that joint liability would "increase a defendant's liability beyond its fair share of responsibility." *Id.* Given the context of a volume-based market share system this argument is valid only if output is tightly correlated with causation, an arrangement that limits the usefulness of *Hymowitz* to risk-uniform products like DES. The *Hymowitz* system can create less than full compensation because the national market denominator remains constant after a defendant is dismissed from the suit. In contrast, the model adjusts the sub-market to account for exculpated (non-liable) defendants by subtracting their output units from the total pool.

market that is less than half of Defendant 1's share. Unlike a market share regime, Defendant 1's investment has produced a cognizable reduction in its liability. The result is that Defendant 1 has a greater incentive to continue investing in risk-reducing production strategies than it would otherwise have.[128]

Shifting liability from Defendant 1 to Defendant 2 corrects the free rider problem created by market share liability regimes. Following the discount shown in Figure 1, Defendant 2 is essentially subsidizing Defendant 1's safer production process by paying a higher rate of the judgment than if it had also invested in safe production. Discounting can reverse the free rider problem of market share liability by pinpointing culpable parties and forcing them to pay the costs of the harms they create, which "internaliz[es] externalities" and sparks incentives to exert care during the production process.[129]

In contrast, using a national market share denominator provides a liability shield to small firms seeking cost advantages by externalizing the consumer risk created by negligent production. The model corrects this problem by forcing negligent producers to pay higher damages when other firms reduce product risks. In short, the model prevents firms controlling relatively large shares of the national market from acting as de facto insurance policies for smaller, negligent producers.[130]

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[128] In explaining that exculpation under a market share liability system provides "a small mechanism for combating the free rider problem," Newcomb stresses that this alone will be insufficient in most cases. Newcomb, *supra* note 64, at 318-19. The reason for this is that most product modifications will never make a given product "absolutely safe," meaning the producer will still be liable for its percentage of the national market because it cannot show conclusively that it did not cause the harm. Discounting under the model permits limited liability reductions for those production techniques that reduce risk without fully extinguishing it. Discounting can therefore be conceptualized as partial exculpation.

[129] Tom H. Tietenberg, *Indivisible Toxic Torts: The Economics of Joint and Several Liability*, 65 LAND ECON. 305, 305 (1989).

[130] *See supra* note 84.

The model advanced in this Note rests on assumptions similar to those of the Supreme Court of Wisconsin in *Collins v. Eli Lilly Co.*, which allowed the jury to determine the relative risk contributions of each non-exculpated DES defendant.[131] In *Collins*, the jury assigned a percentage of liability to each defendant based on a variety of factors, including market share, ventures to reduce injury to the public, and efforts to acquire FDA approval.[132]

While tracing a stronger link than its predecessors between fault and liability, the *Collins* system remains incomplete. The court permitted the jury to allocate damage percentages without a consistent mathematical foundation. The *Collins* opinion also implies that a defendant could pay lower damages for factors that may not have reduced a firm's actual contribution to the harm. For example, a firm that followed other defendants into the market rather than taking the lead itself seems to qualify for lower damage payments under *Collins*.[133] Factors such as this are problematic because they may not correlate to actual reductions in consumer risk.[134]

Rather than rejecting *Collins*, the model refines its underlying principle of aligning liability with relative risk

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[131] Collins v. Eli Lilly Co., 342 N.W.2d 37, 52-53 (Wis. 1984). *See also* Bohannan, *supra* note 18, at 293-94. Bohannan argues that market share liability should be replaced with a "modified market share approach" based on comparative fault. Her argument is that liability should be apportioned based on two factors—market share and "the relative degree of negligence of each manufacturer," which includes the safety precautions undertaken "by each manufacturer with respect to the others." *Id.* This proposal is consistent with the model advanced in this Note as well as the model in the *Collins* decision. The primary distinction is that the model advanced in this Note grounds liability in an initial baseline by creating a sub-market of risk-generating products.

[132] *Collins*, 342 N.W.2d at 53.

[133] *Id.*

[134] Following another company into the market should not reduce the second company's liability because the sequence of market entry has no bearing on relative risk contributions. The second corporation to produce a harmful product has still contributed to the injury in proportion to its relative output minus any discounts. Factors such as this may indicate state-of-mind, but remain ineffective measures of actual risk reduction.

contribution, where risk and output are incongruent. Instead of allowing the jury to allocate damages based on a potentially endless array of factors,[135] the model provides an initial division of relative risk by creating a sub-market composed of risk-generating output units.[136] Damage discounts can then be awarded based on *effective* risk-reduction techniques that remove output units from this foundational risk allocation. This constructs a more exacting liability regime by conforming discount percentages to equivalent quantities of risk-generating output units. The model controls damage discounts by anchoring them to an initial pool of risk-generating output units rather than permitting the jury to allocate damages based on potentially limitless factors that may or may not have yielded quantifiable reductions in product risk.[137] While market share liability often draws overly rigidified correlations between fault and volume, *Collins* is unique in that it may veer too far in the opposite direction by failing to provide a standardized means of apportioning liability.

C. Problems and Complications

Two situations complicate the discounting process in Phase 3. Figure 2 is an example of the first. In Figure 2, Defendant 2 has received a 40% discount while Defendant 1's 80% discount remains.

Figure 2

*Numbers are rounded to the nearest hundredth

Initial Exculpation Hearing	Defendant 1: Liable	Defendant 2: Liable	Defendant 3: Not Liable	Defendant 4: Not Liable
National Market Share	2500/5000 = .5	1000/5000 = .2	1000/5000 = .2	500/5000 = .1
Sub-market Share	2500/3500 = .71	1000/3500 = .29	—	—
Discount	80% = -2000	40% = -400	—	—
Adjusted Sub-market Share	500/1100 = .45	600/1100 = .55	—	—

[135] *Collins*, 342 N.W.2d at 53.

[136] *See supra* fig. 1.

[137] *Collins*, 342 N.W.2d at 53.

Had Defendant 2 failed to receive a discount, Defendant 1 would owe 33% of the plaintiff's damages instead of 45%.[138] Had Defendant 1 failed to receive a discount, Defendant 2 would owe 19% of the damages instead of 55%.[139] As these figures indicate, discounting places defendants in competition to reduce product risks relative to market competitors. The relevant question is if the potential for multiple discounts creates a disincentive to invest in consumer safety by reducing the value of each defendant's discount.

A similar problem occurs if the defendants are awarded equal discounts. Consider Figure 3, in which each defendant has been awarded a discount of 80%:

Figure 3

*Numbers are rounded to the nearest hundredth

Initial Exculpation Hearing	Defendant 1: Liable	Defendant 2: Liable	Defendant 3: Not Liable	Defendant 4: Not Liable
National Market Share	2500/5000 = .5	1000/5000 = .2	1000/5000 = .2	500/5000 = .1
Sub-market Share	2500/3500 = .71	1000/3500 = .29	—	—
Discount	80% = -2000	80% = -800	—	—
Adjusted Sub-market Share	500/700 = .71	200/700 = .29	—	—

Notice that the liability apportionment after discounting is equal to the apportionment based on relative sub-market share alone. The equality of discounts has nullified their utility for the defendants, as each ends up paying the same damage percentages had they done nothing to reduce product risks.

While not entirely satisfactory, an immediate solution to the equal discounting problem in Figure 3 is for courts to simply prohibit the jury from awarding equal discounts.

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[138] *See supra* fig. 1.

[139] Without Defendant 1's discount, the total sub-market would be 3100 product units (2500 units for Defendant 1; 600 product units for Defendant 2 after a 40% discount). Hence, Defendant 2's liability would be 600/3100, or 19% of the judgment.

Another way to dispense with the problem is to accept it as an equitable outcome. If each defendant receives equal damage discounts, the risk per product is uniform among the defendants. This outcome triggers an appropriate use of traditional market share liability, which apportions damages based on the market share of contributing defendants.[140] The model advanced in this Note is only necessary when fungible products create disparate risks.[141] Market share liability is wholly appropriate where each firm has contributed an equal risk per unit.[142]

The most troubling implication of Figures 2 and 3 is that they may prevent damage discounts from creating incentives for minimizing consumer risk. This criticism is valid in theoretical terms but is functionally less persuasive, if only because the incentive to reduce liability is forward-looking, while possible devaluations of a discount occur after liability has been established. The attenuated sequence of events leading from production to injury obstructs perfect information and renders accurate cost predictions difficult.[143] Each firm will still be motivated to reduce its liability unless it can accurately anticipate the probability and magnitude of future discount devaluations.

This knowledge is unlikely to be available because an accurate cost decision would have to predict numerous unknowns, including the value of the future discount, the likelihood of receiving a discount, and the value of discounts awarded to other firms. Moreover, predicting devaluations only becomes relevant if the defendant believes it will fail to exculpate itself from the lawsuit.[144] Exculpation alone is a strong incentive for enhancing consumer safety because it permits a defendant to exit the lawsuit and avoid the costs of

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[140] *See* Sindell v. Abbott Labs., 607 P.2d 924, 937 (Cal. 1980).

[141] *See supra* Part IV.A.

[142] *See* Golbe & White, *supra* note 60, at 11-12.

[143] *See* Larry T. Garvin, *Adequate Assurance of Performance: Of Risk, Duress, and Cognition*, 69 U. COLO. L. REV. 71, 141 (1998) (arguing that imperfect information is inevitable).

[144] Exculpation can combat free riding by providing an incentive to develop safer products. *See* Newcomb, *supra* note 64, at 317.

paying damages, as well as engaging in the remainder of the litigation.

In addition, assumptions about the consumer safety strategies of competitors are likely to push firms toward risk reduction rather than away from it. In Figure 2, each defendant is likely to increase and refine its risk-reduction strategies if it thinks the other will acquire a discount. Both defendants will be motivated to protect themselves by reducing risk substantially enough to gain exculpation from the class of defendants or, in the alternative, to simply reduce risk to a greater degree than the other. If one firm invests in product safety, it will drive up incentives for competitors to do the same by raising the costs of failing to act. In optimal form, the risk of multiple discounts co-opting each other will motivate firms to strive harder for full exculpation.

The famed prisoner's dilemma explains how firms are likely to react.[145] In the prisoner's dilemma, two co-defendants are arrested and offered the chance to go free if they "rat" on the other. The optimal strategy is for each to say nothing, causing both to be released for lack of evidence. Instead, each defendant will implicate the other for fear of what the other defendant is disclosing. A similar situation develops under the model because imperfect information and the chance that competitors are limiting their liability will motivate a risk-averse firm to do the same. This result is supported by Landes and Posner's explanation of the joint liability theory underlying *Summers* as creating a system whereby "[i]f one party uses due care, the entire liability is

[145] *See* ROBIN PAUL MALLOY & DENIS J. BRION, LAW IN A MARKET CONTEXT: AN INTRODUCTION TO MARKET CONCEPTS IN LEGAL REASONING 130 (2004); *see also* DANIEL M. HAUSMAN, ECONOMIC ANALYSIS AND MORAL PHILOSOPHY 183-84 (1996). For a discussion of the application of the prisoner's dilemma to tort law, see generally Michael I. Krauss, *Product Liability and Game Theory: One More Trip to the Choice-of-Law Well*, 2002 B.Y.U. L. REV. 759 (2002) (explaining why current choice-of-law constraints in American product liability law result in pro-plaintiff adjudication and advocating the use of a federal choice-of-law rule).

thrown onto the other injurer. Knowing this, the other injurer will have an incentive to take due care."[146]

The prisoner's dilemma is frequently used to explain how rational self-interest can yield suboptimal outcomes, as both defendants are eventually convicted despite acting in what they perceive to be their self-interest.[147] The model proposed by this Note provides a slight twist on the inevitability of a suboptimal outcome because the most efficient result for firms in a fungible market may very well be to reduce the costs of eventual liability by investing in preliminary risk reduction.

The optimality of up-front investments in risk reduction is revealed when these investments are compared with the costs of failing to take precautions. Consider Defendant 1 in Figures 1 and 2. Figure 1 shows that Defendant 1 will owe 33% of the damages if it is the sole risk-reducer. Figure 2 demonstrates that Defendant 1's liability is increased to 45% when Defendant 2 receives a 40% discount. While not the choice outcome for Defendant 1, Defendant 1 is still in a better position than it would have been had it done nothing to reduce product risks. If Defendant 2 receives a 40% discount and Defendant 1 does nothing, Defendant 1 will owe 80% of the plaintiff's damages, causing Defendant 1 to pay 35% more of the damages if it fails to reduce consumer risk.[148] In choosing between the two outcomes, Defendant 1 will invest in product safety so long as the costs of doing so are less than 35% of the anticipated damages.[149]

Consider the same situation under Figure 3. If Defendant 1 chooses to do nothing while Defendant 2

[146] Landes & Posner, *supra* note 71, at 124. *See also* HAL VARIAN, SYSTEM RELIABILITY AND FREE RIDING, ECONOMICS OF INFORMATION SECURITY 15 (L. Jean Camp & Stephen Lewis eds., 2004) (discussing the effects of imperfect information on agent relationships and arguing that uncertainty about what other agents are doing can reduce free riding).

[147] *See* HAUSMAN, *supra* note 145, at 183-84.

[148] Looking at Figure 2, if Defendant 1 does nothing and Defendant 2 receives a 40% discount, then Defendant 1's liability is equal to 2500/3100, or 0.80.

[149] As seen in Figure 2, this is the outcome Defendant 1 would choose if perfect information existed.

receives an 80% discount, Defendant 1's liability will increase from 71% to 93%. As a consequence, each defendant has an incentive not to take precautions only when the costs of investing in risk reduction are greater than the legal fees and damage payments this decision is likely to produce.[150] The problem is that the risk-reduction capabilities of other firms may be unknown to a given defendant, making an accurate cost assessment difficult. Defendant 1 can only make a reasonable decision to invest or not to invest in product safety if it has an idea of what its competitors are doing. This provides incentives for risk reduction because the cost of non-action is both unknown and partially contingent on the acts of competitors. Thus, the costs of abstaining from risk reduction are difficult to calculate and potentially enormous.

Lower insurance costs provide an additional incentive for risk reduction.[151] Market share liability regimes increase insurance premiums for every firm in the market because injuries caused by any producer can place the entire market on trial.[152] Companies with relatively large outputs are especially disadvantaged, as the rigid assignment of liability with output means insurance rates are likely to increase with output. The model makes lockstep insurance rates less likely by removing strict alignment between output and liability and instead attaching liability to specific production processes. This permits firms to implement risk-reduction strategies for the purpose of acquiring lower insurance premiums. Moreover, this incentive operates independently of damage discounts, which occur only after a lawsuit has proceeded through trial.

In effect, the model recalibrates the value of taking care. Market share liability systems disrupt the Hand formula through benefit dispersion, such that liability reductions are

[150] *See supra* note 79.

[151] *See supra* text accompanying notes 90-91 for a discussion of how market share liability regimes can distort and increase insurance costs.

[152] *Id.*

often less than the costs incurred in securing them.[153] Shifting the costs of liability onto those defendants who failed to take precautions reduces this problem by enhancing the value of actively seeking consumer safety.[154] Furthermore, the costs of doing nothing increase because liability, no longer fixed to market share, will fall on those firms that have failed to reduce product risks.[155]

D. Application

This Note has focused on Factor VIII because it provides a clear example of dissimilar risk within a fungible market. However, the model provided is intended to have general application to any scenario where interchangeable products create disparate consumer risks. A broader application offers an alternative for those difficult situations where neither specific causation nor market share liability is appropriate.

One potential application of the model is the litigation surrounding injury from lead paint. A common justification for rejecting market share liability in the lead paint context has been that lead paint, unlike DES, is not fungible in the traditional sense.[156] Lead paint is problematic because paint manufacturers used different chemical formulations respon-

[153] *See* Newcomb, *supra* note 64, at 317, noting that market share liability permits free riders to divert a portion of the risk-reduction benefit of another firm's consumer safety investment. Diversion can render the value of a consumer safety investment to the investor less than the costs of creation.

[154] *See supra* fig.1.

[155] *See supra* fig.1.

[156] *See* Skipworth v. Lead Indus. Ass'n, 690 A.2d 169, 173 (Pa. 1997) (defining as fungible those products that are indistinguishable both in use and in risk level). In addition to the fungibility problem, the *Skipworth* court rejected a market share liability approach because of the lengthy timeframe between application of the paint to buildings and the injury. *Id.* The court worried that the extended timeframe would cause defendants to "be held liable even though they could not have possibly committed the harm." Daley, *supra* note 10, at 99. Fortunately, the model alleviates this concern by allowing initial exculpation.

sible for varying levels of toxicity.[157] The model advanced in this Note resolves this issue by permitting discounts for firms that used relatively safer compounds or lower levels of lead pigment. Despite being interchangeable in the eyes of an injured plaintiff,[158] lead paint is unlikely to pose a uniform risk of harm given disparate toxicity levels among products.[159] While considered fatal to the application of market share liability, a product market of dissimilar toxicities provides an ideal situation for use of the model.

Litigation involving the negligent marketing of handguns provides an additional example of a situation where the model would resolve issues that rendered market share liability inadequate.[160] In opposition to the conclusion reached by the District Court for the Eastern District of New York, which held that handguns were functionally fungible to both shooters and gunshot victims,[161] the Court of Appeals of New York explained,

> Unlike DES, guns are not identical, fungible products. Significantly, it is often possible to identify the caliber and manufacturer of the handgun that caused injury to a particular plaintiff . . . . Each [handgun] manufacturer engaged in different marketing activities that allegedly contributed to the illegal handgun market in different ways and to different extents. Plaintiffs made no attempt to establish the relative fault of each manufacturer, but

[157] *Skipworth*, 690 A.2d at 173.

[158] This satisfies the fungibility requirement of this model. *See supra* text accompanying notes 101-05.

[159] *Skipworth*, 690 A.2d at 173.

[160] Daley, *supra* note 10, at 97-98 (citing Santiago v. Sherwin-Williams Co., 782 F. Supp. 186, 192 (D. Mass. 1992), in which the court noted that while market share liability was appropriate for DES cases, it was inappropriate for residential lead-based paint exposure cases, in which heredity and other environmental factors also contributed to rates of lead-based paint poisoning).

[161] Hamilton v. Accu-Tek, 62 F. Supp. 2d 802, 844 (E.D.N.Y. 1999).

> instead sought to hold them all liable based simply on market share.[162]

The opinion noted, "a manufacturer's share of the national handgun market [and hence, market share liability] does not necessarily correspond to the amount of risk created by [the manufacturer's] alleged tortious conduct."[163] The model advanced in this Note would respond to the risk disparity in handgun negligent marketing cases. Those manufacturers that took steps to reduce the likelihood that their handguns entered illegal markets would be rewarded with lower damage payments, either through initial exculpation or by discounting. As a result, handgun manufacturers would have incentives to take precautions, as liability would reflect the "relative fault"[164] that the Court of Appeals of New York refers to, rather than simple market participation.

The model would also prove useful for asbestos litigation, an area in which market share liability has been frequently rejected.[165] Asbestos has been identified as a poor candidate for market share liability for several reasons, one of which is that, unlike DES, asbestos is not a fungible product. There are several asbestos varieties, creating dissimilar risks of harm.[166] As some argue,

> Because some asbestos products are more harmful than others, it is virtually impossible to determine a close correlation between the total volume of asbestos produced and the injuries caused. Market share liability does not provide a means for adjusting a manufacturer's proportion of liability under these circumstances.[167]

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[162] Hamilton v. Beretta U.S.A. Corp., 750 N.E.2d 1055, 1067 (N.Y. 2001).

[163] *Id.*

[164] *Id.*

[165] *See, e.g.*, Goldman v. Johns-Manville Sales Corp., 514 N.E.2d 691 (Ohio 1987).

[166] *Id.* at 700-01.

[167] Kathy J. Owen & C. Vernon Hartline, Jr., *Industry-Wide Liability: Protecting Plaintiffs and Defendants*, 44 BAYLOR L. REV. 45, 65 (1992).

The model would account for disparate risk generation among different types of asbestos, and therefore would present an opportunity to provide relief to asbestos plaintiffs who would otherwise have no recourse under either market share liability or traditional causation principles.

E. Incentives for Research & Development

A lingering question involves the application of damage discounts for well-intentioned research and development in the area of consumer safety. Consider the example of a defendant that makes a substantial investment in Research and Development (R&D), with the intent of reducing product risks. Unfortunately, the firm's risk reduction strategy fails and injured victims file a lawsuit. Should the defendant be awarded a damage discount for its ultimately ineffective efforts to reduce harm?

The answer is no. Creating incentives for socially beneficial behavior is tangential to the underlying policy of holding a defendant liable for that portion—and only that portion—of the harm that it caused. It is entirely possible that a large percentage of a defendant's production costs would have been invested in a product safety mechanism that reduced consumer risks by a low percentage or by nothing at all. In such a case, the jury would be in error to award a damage discount.

The institutional role of the courts provides an additional, structural restriction on awarding damage discounts for well-intentioned, but ineffective, R&D. The judicial system is not institutionally situated to award discounts for prospective risk reductions that have not been implicated by the facts of a lawsuit brought before the court. Providing a damages discount today for what might reduce product risks in the future is beyond the purview of the court system, as Congress retains the spending power and is institutionally situated to decide whether funds should be allocated to R&D.[168] A prospective discount for R&D awarded by the court system is tantamount to a judicial subsidy that

[168] U.S. CONST. art. I, § 8.

intrudes into the legislative sphere, in violation of the separation of powers doctrine.[169] Courts are responsible for apportioning liability after the fact and cannot award discounts for prospective risk reduction.

Moreover, rewarding firms for R&D that fails to reduce consumer risk may create inefficiency by encouraging wasteful expenditures motivated by a desire to hedge against liability. Granting discounts for ostensibly well-intentioned but ineffective R&D would create incentives to invest in areas that will reduce a firm's damage payments regardless of any appreciable effect on actual risk. Rather than maximizing social utility through lower risk production, firms will invest in those areas most likely to satisfy judicial requirements for damage discounts, even where doing so fails to provide optimal risk reduction or would not be cost-effective under normal circumstances. If a firm invests in ineffective but judicially acceptable R&D for the purpose of reducing its liability, the resource base that could have been invested in effective risk reduction will be depleted. Utility maximization is incompatible with judicial incentives to allocate limited investment funds to areas where they will be underutilized.

V. CONCLUSION

Market share liability and its variations have always been vexatious, largely because they respond to issues that the tort system is ill-equipped to resolve. Fungible products, disparate risk levels, and tortfeasor identification problems converge to form problem scenarios that require innovative judicial solutions. None of the liability systems devised in response to these issues has been perfect. The model advanced in this Note, while similarly imperfect, aims to

[169] For a discussion of the separation of powers principle, see Benjamin V. Madison, *Judicial Activism, and the Roots of Separation of Powers*, 43 BRANDEIS L.J. 29, 71 (2004). According to Madison, the framers of the U.S. Constitution viewed judicial intervention into legislative territory as the most dangerous violation of separation of powers.

shift emphasis toward functionally interchangeable products that create disparate consumer risks. The product liability cases of the future will resemble the Factor VIII scenario, as the level of care exercised during production can create disparate risk levels among products, despite their interchangeability. This will be especially true as the biomedical industry continues to advance. Likewise, collective liability problems involving substances like asbestos and products like firearms will continue to pose difficult questions of causation and fault. This Note seeks to advance the discussion of how the judicial system can respond.