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For decades, advocates of tort reform have argued that expansive products liability stifles economic activity by imposing excessive and unpredictable liability costs on businesses. Although politicians aspiring to create jobs, attract businesses, and improve the economy have relied on this argument to enact hundreds of reforms, it has largely gone empirically untested. No longer. Using the most comprehensive dataset to date on products liability reforms and economic activity, I find that many reforms that restrict the scope of products liability improve economic conditions. Specifically, these reforms increase the number of businesses, employment, and production in the industries that face most of the products liability claims: the manufacturing, retail, distribution, wholesale, and insurance industries. However, several other popular reforms have either a weak effect or no effect on economic activity. My results have important implications for recently enacted reforms and proposed legislation: while many of these reforms will improve economic conditions as lawmakers hope, others will have no effect. In the current economy, as business groups intensify their demands for tort reform, my findings provide critical evidence for courts and legislatures that are reassessing the appropriate scope of products liability.

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Products Liability and Economic Activity: An Empirical Analysis of Tort Reform's Impact on Businesses, Employment, and Production

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INTRODUCTION

The optimal scope of products liability law has incited vehement political debate for at least half a century. Proponents of expanding products liability argue that consumers are not sufficiently protected from dangerous products and that victims are not adequately compensated for injuries from products.[1] In contrast, supporters of reforms that reduce the scope of products liability contend that excessive litigation has driven countless American companies out of business and prevented innumerable socially valuable products from coming to market.[2] In the states, the reformers have won numerous victories as legislatures continue to enact reforms

1. *See, e.g.*, *Dangerous and Defective Products*, AM. ASS'N FOR JUST. (Sept. 15, 2012, 3:02 PM), http://www.justice.org/cps/rde/xchg/justice/hs.xsl/9493.htm.

2. *See, e.g.*, *Product Liability Reform*, AM. TORT REFORM ASS'N (Sept., 15, 2012, 3:14 PM), http://www.atra.org/node/56.

that reduce the scope of products liability. Although they have been less successful in persuading the U.S. Congress to enact comprehensive products liability reforms, the reformers have prevailed in pushing through various federal reforms that limit products liability in specific industries.[3]

The primary argument among the proponents of reform is that expansive products liability stifles economic activity by imposing excessive and unpredictable liability costs on businesses. Although politicians aspiring to create jobs, attract businesses, and improve the economy have relied on this argument to enact hundreds of reforms, it has largely gone empirically untested. Specifically, we know surprisingly little about whether products liability law suppresses economic activity, and which, if any, reforms might improve economic conditions.[4]

This Article provides empirical evidence that addresses this argument. This issue is particularly salient because economic conditions are worse than they have been in decades, yet the cost of the products liability system continues to grow. Consequently, probusiness groups have intensified their demands for tort reform, maintaining that reforms are essential to improving the economy. Hence, it is imperative for lawmakers to know which reforms can help mend current economic conditions. Moreover, the tort system costs American businesses over $150 billion annually.[5] If reforms can reduce this burden and ignite economic activity, they may help replace some of the 8.8 million jobs lost in the current recession.[6]

Part I describes how the scope of products liability law has tended to ebb and flow over time. Prior to the mid-twentieth-century, products liability cases were rarely brought and plaintiffs rarely won the cases that were brought. However, sensing that the law was not

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3. For example, the General Aviation Revitalization Act of 1994, Pub. L. No. 103-298, § 2, 108 Stat. 1552, 1553 (codified as amended at 49 U.S.C. § 40101 (2006)), created an eighteen-year statute of repose for manufacturers of general aviation aircraft and their component parts. Similarly, the Biomaterials Access Assurance Act of 1998, 21 U.S.C. §§ 1601–06 (2006), limits the products liability of biomaterials suppliers of raw materials and medical implant component parts. Likewise, the Homeland Security Act of 2002, Pub. L. No. 107-296, §§ 304, 863, 116 Stat. 2135, 2165, 2239 (codified at 6 U.S.C. § 443 (2006) and 42 U.S.C. § 233 (2006)), limits the liability of both manufacturers and administrators of the smallpox vaccine and sellers of antiterrorism technology.

4. AM. TORT REFORM ASS'N, *supra* note 2.

5. TOWERS WATSON, 2010 UPDATE ON U.S. TORT COST TRENDS 7 (2010), *available at* http://www.towerswatson.com/united-states/research/3424.

6. Paul Wiseman, *U.S. Economic Recovery Is Weakest Since World War II*, HUFFINGTON POST (Aug. 15, 2012), http://www.huffingtonpost.com/2012/08/15/us-economic-recovery-weak_n_1783065.html.

achieving fair compensation and adequate deterrence, courts and legislatures adopted strict products liability in the 1960s and further expanded the law in the 1970s with the development of new proplaintiff theories. Soon after, the business community declared a "crisis," citing an explosion of lawsuits, excessive awards, and skyrocketing insurance premiums. The community's activism was extensive, ranging from nationwide advertising campaigns to testimony before both Congress and state legislatures. It demanded, and often achieved, the passage of countless state laws in the 1980s and 1990s that were designed to curb the products liability crisis by limiting liability and damages. This probusiness trend has continued into the twenty-first century with states continuing to adopt new reforms and Congress enacting legislation that dramatically reduces the scope of products liability in specific industries.[7]

The impetus for most major expansions and contractions in the scope of products liability law has been shifting assessments of the law's costs and benefits. In Part II, I outline the primary benefits and costs of the products liability system. The benefits of the system are well accepted: compensation of victims, improvements in product safety, and reduction in the purchases of risky products. However, over the last few decades, increases in insurance coverage, consumers' access to product information, and the reach of governmental safety regulations have severely undermined these benefits. At the same time, the costs of the products liability system—disproportionate transaction costs, price distortions that deter socially beneficial purchases, and reductions in economic activity—have been exacerbated by increasing litigation expenses. Consequently, contemporary reformers argue that, for many products, the costs of the products liability system outweigh the benefits, necessitating a change in the law.[8]

Central to the reformers' demands for legal change is their assertion that expansive products liability stifles economic activity.[9] Although this claim has been at the forefront of policy debates for decades, there is a dearth of empirical evidence exploring this relationship. My empirical analysis in Part III fills that void. Using the most accurate, comprehensive dataset available on state-level products liability tort reforms and measures of economic activity, I

7. *See generally* DAVID G. OWEN, PRODUCTS LIABILITY LAW §§ 1.2–1.3 (2005) (examining products liability law in the United States).

8. *See, e.g.*, A. Mitchell Polinsky & Steven Shavell, *The Uneasy Case for Product Liability*, 123 HARV. L. REV. 1437, 1472–76 (2010).

9. AM. TORT REFORM ASS'N, *supra* note 2.

analyze the relationship between the scope of products liability law and several measures of economic activity: the number of small businesses, employment, and gross state product (the state-level counterpart of GDP). The state tort reforms included in my analysis restrict the scope of products liability by limiting damage awards or making future liability more predictable. The substantial differences among states' choices of reforms and timing of enactment provide fifty distinct "laboratories" that offer the ideal empirical setting both to test the relationship between products liability law and economic activity and to draw conclusions about the likely impact of federal tort reform. Moreover, expansions in products liability law would be expected to have the opposite effect on economic activity as the tort reforms included in my analysis do.

Until recently, data limitations and conventional econometric techniques prevented a precise analysis of the relationship between products liability law and economic activity. There has never been a comprehensive dataset of state-level tort reforms. However, the Congressional Research Service has recently compiled a unique dataset of products liability reforms that was subsequently made available to researchers.[10] This is the first study to employ this dataset in an empirical analysis.

Moreover, conventional econometric techniques hindered precise measurement of the relationship between products liability and economic activity. A traditional difference-in-differences analysis would have difficulty ruling out the possibility that products liability reforms are endogenous to—that is, caused by—other factors that influence business activity in a particular state, such as a powerful probusiness lobby. However, I employ a sophisticated triple-differences methodology that uses businesses in low-risk industries as a control group to mitigate the endogeneity concerns.[11]

My empirical results indicate that several reforms that restrict the scope of products liability have a significant impact on economic activity. Statutes of repose that limit the time period for which manufacturers are liable for product defects, comparative negligence reforms that reduce damage awards when plaintiffs engage in negligent activity, and reforms that eliminate strict liability for nonmanufacturer product sellers are all associated with statistically

10. HENRY COHEN, CONG. RESEARCH SERV., RL32560, SELECTED PRODUCTS LIABILITY ISSUES: A FIFTY-STATE SURVEY 8–23 (2005), *available at* http://stuff.mit.edu/afs/sipb.mit.edu/contrib/wikileaks-crs/wikileaks-crs-reports/RL32560.pdf.

11. The triple-differences methodology was introduced by Jonathan Gruber. Jonathan Gruber, *The Incidence of Mandated Maternity Benefits*, 84 AM. ECON. REV. 622, 627 (1994).

significant increases in economic activity. Specifically, my results suggest that these reforms increase the number of businesses, employment, and production in the industries that bear most of the products liability claims: the manufacturing, retail, distribution, wholesale, and insurance industries.

In contrast, other reforms have a weak effect on economic activity. My results suggest that caps on noneconomic damages and reforms to the traditional collateral source rule are only weakly associated with increases in economic activity. Meanwhile, caps on punitive damages and reforms eliminating joint and several liability are weakly associated with decreases in certain measures of economic activity.

My results have important implications for recently enacted reforms and proposed legislation. In recent years, several states have enacted reforms that reduce the scope of products liability law. My results suggest that, while many of these reforms will improve economic conditions, others will have no effect. Likewise, recently proposed federal legislation contains some reforms that should increase economic activity, whereas other proposed reforms will do little or nothing to improve economic conditions.

As courts and legislatures reassess the appropriate scope of products liability law, they will no longer have to blindly accept reformers' assertions that reforms categorically improve economic conditions. Instead, the results of my study indicate that, while some products liability reforms can be important tools to improve economic conditions, others will have no effect on economic activity.

I. THE EVOLUTION OF PRODUCTS LIABILITY LAW

Products liability law as we know it began in the 1960s. Prior to that period, products liability cases were rarely brought and plaintiffs rarely won the cases that were brought.[12] However, the widespread adoption of strict liability in the 1960s and the development of new proplaintiff theories in the 1970s expanded products liability law and increased plaintiffs' recoveries. The tide turned again in the early 1980s with the enactment of state-level legislation that limited the scope of products liability law. This prodefendant trend continued into the twenty-first century with several industry-specific reforms adopted at the federal level. In this

12. *See generally* OWEN, *supra* note 7, § 1.3 (describing modern American products liability law).

Part, I briefly describe the ebb and flow of U.S. products liability law from its roots in English common law to the present.

A. Early American Law

The early development of products liability law was greatly impeded by two powerful doctrines borrowed from England: *caveat emptor* and privity of contract.[13] *Caveat emptor* translates to "let the buyer beware." Under this doctrine, sellers were not responsible for product defects and buyers bore the risk for product-related injuries. Hence, plaintiffs had no recourse under the law for injuries they sustained from either obvious or hidden defects. Reflecting the nation's commitment toward free enterprise and protecting infant industries during the Industrial Revolution,[14] all states but South Carolina strictly adhered to the *caveat emptor* doctrine until the turn of the nineteenth century.[15] *Caveat emptor* persisted in the majority of jurisdictions until the Uniform Sales Act of 1906 obligated an implied warranty of quality that made sellers responsible for many product defects.[16]

Despite legislatures imposing implied warranties of quality after 1906, manufacturers often were still able to avoid liability with privity defenses. The doctrine of privity required manufacturers and consumers to be in a contractual relationship for a valid products liability claim to lie. Thus, it comported with the realities of the

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13. On the early history of products liability law in England and America, see Francis H. Bohlen, *The Basis of Affirmative Obligations in the Law of Tort*, 53 AM. L. REG. 273, 337 (1905); Walton H. Hamilton, *The Ancient Maxim Caveat Emptor*, 40 YALE L.J. 1133 (1931); Karl N. Llewellyn, *On Warranty of Quality, and Society*, 36 COLUM. L. REV. 699 (1936); Karl N. Llewellyn, *On Warranty of Quality, and Society*, 37 COLUM. L. REV. 341 (1937); Cornelius F. Murphy, Jr., *Medieval Theory and Products Liability*, 3 B.C. INDUS. & COM. L. REV. 29 (1961); William L. Prosser, *The Implied Warranty of Merchantable Quality*, 27 MINN. L. REV. 117 (1943); John W. Wade, *Strict Tort Liability for Products: Past, Present and Future*, 13 CAP. U. L. REV. 335 (1984).

14. As explained by the Supreme Court of Pennsylvania, if a manufacturer of a boiler, machine, or steam-ship "owes a duty to the whole world" that its products contain no hidden defects, "it is difficult to measure the extent of his responsibility, and no prudent man would engage in such occupations upon such conditions. It is safer and wiser to confine such liabilities to the parties immediately concerned." Curtin v. Somerset, 21 A. 244, 245 (Pa. 1891).

15. David G. Owen, *The Evolution of Products Liability Law*, 26 REV. LITIG. 955, 961 (2007).

16. Promulgated in 1906, the Uniform Sales Act (predecessor to Article 2 of the Uniform Commercial Code) provided for an implied warranty of merchantability in sales by description: Where the goods are bought by description from a seller who deals in goods of that description (whether he be the grower or manufacturer or not), there is an implied warranty that the goods shall be of merchantable quality. UNIF. SALES ACT § 15(2), 1 U.L.A. 7 (1950), *superseded by* U.C.C. § 2-314 (1962).

preindustrialization economy when products were typically sold directly by the manufacturer to the consumer.[17] However, as industrialization and mass production expanded, goods were increasingly sold through intermediate retailers. As a result, manufacturers no longer entered into contractual relationships with consumers, and they could use the ready-made defense of no privity of contract to avoid liability in products liability cases.[18]

As manufacturers became increasingly remote from consumers in the expanding economy, the harshness of the privity doctrine became obvious. The privity requirement began disappearing from products liability claims in 1916, when the New York Court of Appeals decided *MacPherson v. Buick Motors*.[19] Explaining the liberation of tort law from contracts, Judge Cardozo proclaimed:

> We have put aside the notion that the duty to safeguard life and limb, when the consequences of negligence may be foreseen, grows out of contract and nothing else. We have put the source of the obligation where it ought to be. We have put its source in the law.[20]

Although most states quickly followed New York's lead in eliminating the privity requirement, it remained in a few states well into the second half of the twentieth century.[21]

As the majority of states eliminated the doctrines of *caveat emptor* and privity of contract in the early 1900s, products liability claims began to increase across the nation.[22] However, plaintiffs still had to overcome significant hurdles to prevail in these cases. Because negligence was the basis for products liability claims, the injured party had to prove that the manufacturer was negligent in producing the product and that the negligence caused the subsequent injuries. Plaintiffs rarely prevailed in these cases because they were usually unable to produce evidence of manufacturers' negligence, which often occurred years before the product caused an injury.[23]

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17. Frances E. Zollers, Sandra N. Hurd & Peter Shears, *Looking Backward, Looking Forward: Reflections on Twenty Years of Products Liability Reform*, 50 SYRACUSE L. REV. 1019, 1021 (2000).

18. *Id.*

19. 111 N.E. 1050, 1055 (N.Y. 1916).

20. *Id.* at 1053.

21. Owen, *supra* note 15, at 966.

22. *Id.*

23. Zollers, Hurd & Shears, *supra* note 17, at 1022.

B. Modern American Law

The tide began to turn in favor of plaintiffs in the early 1940s. In the first, 1941 edition of the most influential treatise ever published on tort law, Dean William Prosser argued for strict liability for manufacturers of defective products.[24] Three years later, in *Escola v. Coca Cola Bottling Co. of Fresno*, the Supreme Court of California upheld a *res ipsa loquitur* verdict against Coca Cola for an exploding bottle, eliminating the need for plaintiffs to provide evidence of manufacturers' negligence in situations where accidents would not normally occur without negligence.[25] Moreover, in his concurrence, Justice Roger Traynor argued for strict products liability using many of Prosser's arguments: "[I]t should now be recognized that a manufacturer incurs an absolute liability when an article that he has placed on the market, knowing that it is to be used without inspection, proves to have a defect that causes injury to human beings."[26]

However, it was not until 1963 that strict products liability was adopted by the Supreme Court of California. In *Greenman v. Yuba Power Products, Inc.*, the court upheld a judgment for a plaintiff that had been injured by a defective power tool.[27] Although Justice Traynor had alone argued for strict liability in his concurrence in *Escola* nineteen years earlier, he authored the majority opinion for a unanimous court in *Greenman*: "A manufacturer is strictly liable in tort when an article he places on the market, knowing that it is to be used without inspection for defects, proves to have a defect that causes injury to a human being."[28]

Just two years later, in 1965, the Restatement (Second) of Torts helped propagate strict products liability to virtually every jurisdiction.[29] The American Law Institute ("ALI") had started revisions on the Restatement of Torts chapter that applied negligence to the liability of sellers in the 1950s.[30] Fortuitously, Dean Prosser was chosen as the Reporter for the Second Restatement. Consequently, a year after *Greenman* was decided in his home state of California, Prosser presented the ALI with a revised draft that incorporated the principles of strict products liability found in both

24. WILLIAM L. PROSSER, HANDBOOK OF THE LAW OF TORTS 688–93 (1941).
25. 150 P.2d 436 (Cal. 1944).
26. *Id.* at 440 (Traynor, J., concurring).
27. 377 P.2d 897, 901–02 (Cal. 1963).
28. *Id.* at 900.
29. RESTATEMENT (SECOND) OF TORTS § 402A (1965).
30. Owen, *supra* note 7, § 5.3.

Greenman and his own torts treatise. The American Law Institute adopted the revision in 1965 as section 402A of the Restatement.[31] Section 402A made products liability "strict" because sellers could be liable even if they had exercised "all possible care" and thus were not negligent.[32]

From 1965 to the early 1980s, court after court, along with several state legislatures, adopted strict liability for manufacturers and sellers of defective products. The development of new theories, such as enterprise[33] and market-share liability,[34] further facilitated suits by consumer-plaintiffs. The end result was a body of products liability law in 1980 that was significantly more plaintiff friendly than it had been in the days when negligence was the basis for liability and *caveat emptor* and privity of contract were valid defenses.

C. The Liability "Crisis"

Largely as a result of the proliferation of strict products liability, products liability trials and awards increased significantly beginning in the 1970s. Although only data on federal cases are available during this period, the data reveal that products liability cases increased by an average of forty percent per year during this period.[35] Whereas only 2,393 products liability cases commenced in federal court in 1975, the number of these cases had increased to

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31. This section reads:

> Section 402A. Special Liability of Seller of Product for Physical Harm to User or Consumer
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> (1) One who sells any product in a defective condition unreasonably dangerous to the user or consumer or to his property is subject to liability for physical harm thereby caused to the ultimate user or consumer, or to his property, if
>
> (a) the seller is engaged in the business of selling such a product, and
>
> (b) it is expected to and does reach the user or consumer without substantial change in the condition in which it is sold.
>
> (2) The rule stated in Subsection (1) applies although
>
> (a) the seller has exercised all possible care in the preparation and sale of his product, and
>
> (b) the user or consumer has not bought the product from or entered into any contractual relation with the seller.

RESTATEMENT (SECOND) OF TORTS, *supra* note 29.

32. *Id.* § 402A cmt. m. This point is made in black letter: "The rule stated in Subsection (1) applies although (a) the seller has exercised all possible care in the preparation and sale of his product . . . ." *Id.* § 402A(2).

33. Hall v. E.I. DuPont de Nemours & Co., 345 F. Supp. 353, 368 (E.D.N.Y. 1972).

34. *See* Sindell v. Abbott Labs., 607 P.2d 924, 937–38 (Cal. 1980).

35. W. Kip Viscusi, *The Dimensions of the Product Liability Crisis*, 20 J. LEGAL STUD. 147, 150 (1991).

14,145 by 1987.[36] Moreover, this number drastically underestimates the true number of products liability claims because many tort claims are brought in state courts[37] and the vast majority are settled before trial.[38]

Furthermore, although litigation in general increased during this time, products liability litigation increased at a significantly higher rate. In 1975, products liability cases represented 2.04 percent of all civil cases. However, by 1987, that share had almost tripled, rising to 5.92 percent.[39]

Awards in products liability cases increased as well. The average verdict of $563,438 in 1980 more than doubled by 1987, to $1,325,443.[40] Similarly, the median verdict, which may be more informative because it is not influenced by a few unusually large awards, increased from $225,000 in 1980 to $430,000 in 1987.[41]

Increases in both the number of products liability cases and the awards in those cases increased the expected liability for manufacturers, distributors, and product sellers. As a result, insurance companies increased the premiums for liability coverage for these industries. When section 402A was published in 1965, total liability premiums in the United States were $881 million.[42] By 1987, this figure had increased by over two thousand percent, to $20.9 billion. The average annual growth rate during this period was over sixteen percent, and in some years, premiums grew by over seventy percent.[43]

D. A Period of Reform

Although the causes of the explosion in premiums are debatable,[44] there is little doubt that the more consumer-friendly

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36. *Id.*

37. CAROL J. DEFRANCES ET AL., BUREAU OF JUSTICE STATISTICS, CIVIL JURY CASES AND VERDICTS IN LARGE COUNTIES: CIVIL JUSTICE SURVEY OF STATE COURTS, 1992, at 2 (1995).

38. Viscusi, *supra* note 35, at 150.

39. *Id.*

40. *Id.* at 152.

41. *Id.*

42. MICHAEL J. MOORE & W. KIP VISCUSI, PRODUCT LIABILITY ENTERING THE TWENTY-FIRST CENTURY: THE U.S. PERSPECTIVE 11–12 (2001).

43. *Id.*

44. Explanations involve the role of the underwriting cycle, conspiracy among insurance companies, increased liability actions, and uncertainty. For an assessment of alternate explanations of the crisis, see, for example, Kenneth S. Abraham, *Making Sense of the Liability Insurance Crisis*, 48 OHIO ST. L.J. 399 (1987); George Priest, *The Current Insurance Crisis and Modern Tort Law*, 96 YALE L.J. 1521 (1987); Michael J. Trebilcock, *The Social Insurance-*

products liability law was at least partly to blame.[45] As a result, manufacturers, insurers, and other businesses declared the situation a "crisis" and pushed for legislation, either at the state or federal level, to protect the interests of manufacturers and businesses.[46] Their activism was extensive, ranging from industry papers[47] to nationwide advertising campaigns[48] to testimony before both Congress and state legislatures.[49]

The proponents of immediate reform argued that proconsumer products liability doctrines resulted in unfair harassment of businesses by opportunistic consumers and plaintiffs' lawyers.[50] They claimed that burdensome liability costs and insurance rates had dramatically increased the cost of doing business and were forcing many manufacturers and sellers out of business.[51] Moreover, they argued that state-by-state variation in products liability laws resulted in a competitive disadvantage for businesses operating in high-liability states.[52] Thus, the arguments were generally cast in terms of restoring balance to an area of law that had become lopsided in favor of plaintiffs.[53]

The outcry in the business community won over some courts. Although courts did not commonly overturn prior decisions, they

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Deterrence Dilemma of Modern North American Tort Law: A Canadian Perspective on the Liability Insurance Crisis, 24 SAN DIEGO L. REV. 929 (1987); Ralph A. Winter, *The Liability Crisis and the Dynamics of Competitive Insurance Markets*, 5 YALE J. ON REG. 455 (1988).

45. Viscusi, *supra* note 35, at 154.

46. William P. Bivins, Jr., *The Products Liability Crisis: Modest Proposals for Legislative Reform*, 11 AKRON L. REV. 595, 595 (1977).

47. *See, e.g.*, MACH. & ALLIED PRODS. INST., PRODUCTS LIABILITY: A MAPI SURVEY (1976), *reprinted in Product Liability Insurance: Hearings Before the Subcomm. for Consumers of the Comm. on Commerce, Sci., and Transp.*, 95th Cong. 146–68 (1977); NAT'L FED'N OF INDEP. BUS., NFIB SURVEY REPORT ON PRODUCTS LIABILITY (1977); John J. Kircher, *Products Liability – The Defense Position*, 44 INS. COUNS. J. 276, 276 (1977) (discussing a tort reform position paper, called the "Products Liability Position Paper," co-sponsored by The Defense Research Institute).

48. *See* Anita Johnson, *Products Liability "Reform": A Hazard to Consumers*, 56 N.C. L. REV. 677, 678 nn.5 & 7 (1978) (referencing advertisements by manufacturers found in various newspapers and magazines, such as THE WALL STREET JOURNAL, NEWSWEEK, TIME MAGAZINE, U.S. NEWS AND WORLD REPORT, and THE WASHINGTON POST).

49. *See Swine Flu Immunization Program: Supplemental Hearings Before the Subcomm. on Health and the Env't of the H. Comm. on Interstate and Foreign Commerce*, 94th Cong. 84–85 (1976) [hereinafter *Swine Flu Immunization Program*] (statement of Leslie Cheek, Vice President, American Insurance Association).

50. Johnson, *supra* note 48, at 678.

51. *See Swine Flu Immunization Program*, *supra* note 49, at 85 ("Men have lost their jobs and their businesses because of the passion of the judicial system to compensate an injured person by attaching liability, however remote the justification.").

52. Zollers, Hurd & Shears, *supra* note 17, at 1023.

53. *Id.* at 1024.

regularly rejected arguments to further expand products liability boundaries.[54] Moreover, many courts began to question whether strict liability was the appropriate standard for evaluating a product's warnings and design.[55] The Restatement (Third) of Torts, published in 1998,[56] eventually validated this doubt and grounded liability for design and warning defects in the principles of negligence.[57]

However, a more significant attack on products liability law came during the 1980s from state legislative bodies enacting tort reform. The state legislatures were persuaded that products liability reforms would solve the liability and insurance crisis and fix an imbalanced system.[58] Moreover, they believed that reforming the system would improve their local state economies: a more business-friendly legal environment would bring business to their states, creating jobs and strengthening the state economy.[59] State after state enacted legislation designed to curb the crisis by limiting the scope of liability and damages. Next, I discuss the most significant reforms that the states adopted to limit the scope of products liability.

1. Statutes of Repose

One of the most frequent reform measures passed by the states limits the period during which suits can be brought.[60] All civil suits are subject to a statute of limitations. However, the statute of

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54. James A. Henderson, Jr. & Aaron D. Twerski, *Closing the American Products Liability Frontier: The Rejection of Liability Without Defect*, 66 N.Y.U. L. REV. 1263, 1272 (1991).

55. *See* Anderson v. Owens-Corning Fiberglas Corp., 810 P.2d 549, 550, 552–60 (Cal. 1991) (discussing a case involving asbestos); Feldman v. Lederle Labs., 479 A.2d 374, 376, 380–90 (N.J. 1984). *But see* Carlin v. Superior Court, 920 P.2d 1347, 1351 (Cal. 1996) (holding that "strict liability" defective warning claims are still viable in that state, even if controlled by the principle that manufacturers need warn only of "foreseeable risks").

56. The RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY, often referred to as the Products Liability Restatement, was approved by the ALI's membership in 1997 and published the following year.

57. Owen, *supra* note 15, at 988–89.

58. Zollers, Hurd & Shears, *supra* note 17, at 1032–40.

59. For example, Governor George W. Bush of Texas claimed that one of the most important things government can do to improve the economy and create jobs in Texas was to reform the civil justice system. *Encouraging Entrepreneurship and Economic Growth*, GEORGE W. BUSH OFF. OF THE GOVERNOR (2000), http://web.archive.org/web/20000531132207/http://www.governor.state.tx.us/Business/tort.html. Similarly, Texas Representative Rob Junell (D-San Angelo) said of products liability reform: "This brings us back into the mainstream of the American civil justice system, and makes Texas a preferable place to do business . . . ." Ross Ramsey, *The 74th Legislature: "This Is It," Lawsuit Reform on Way; Final Touches Are Being Put on Bills*, HOUS. CHRON., May 7, 1995, at 1.

60. Terry Morehead Dworkin, *Federal Reform of Product Liability Law*, 57 TUL. L. REV. 602, 608 (1983).

limitations for most torts is only one or two years.[61] Because the act for which defendant manufacturers are traditionally liable is manufacturing defective products, a two-year statute of limitations poses a problem for plaintiffs injured by products purchased several years earlier. Thus, rather than leave plaintiffs without a remedy when they were injured by products purchased years earlier, many courts adopted a "discovery" rule.[62] Under a discovery rule, the statute of limitations begins to run when the plaintiff actually discovers the injury, instead of when the defective product was purchased.[63]

However, under the discovery rule, manufacturers' exposure to liability can last for the life of the product. Consequently, some manufacturers are subject to liability for injuries caused by products that are twenty and thirty years old.[64] To counteract this open-ended liability, many states have adopted so-called statutes of repose that specify the number of years after a product is first sold within which suit must be filed.[65] Instead of beginning to run when the injury is discovered, the repose period begins to run when the product is first marketed. Thus, a statute of repose may expire, precluding a lawsuit, even before an injury occurs and a statute of limitations begins to run. Most repose periods are set at ten years;[66] thus, suits for injuries caused by products purchased over ten years earlier are barred under statutes of repose. Twenty-seven states have adopted these reforms that significantly reduce manufacturers' exposure to liability.[67]

2. Reforms to Product-Seller Liability

Another popular reform adopted by the states involves the liability of nonmanufacturer product sellers such as wholesalers, distributors, and retailers. Under traditional products liability laws, nonmanufacturer product sellers can be held strictly liable like product manufacturers for injuries caused by product defects.

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61. WILLIAM PROSSER, HANDBOOK OF THE LAW OF TORTS § 30, at 143–45 (4th ed. 1971).

62. *See, e.g.*, Urie v. Thompson, 337 U.S. 163, 169 (1949); Williams v. Borden, Inc., 637 F.2d 731, 734–35 (10th Cir. 1980); Louisville Trust Co. v. Johns-Manville Prods. Corp., 580 S.W.2d 497, 498, 500–02 (Ky. 1979).

63. COHEN, *supra* note 10, at 16.

64. *See, e.g.*, Gates v. Ford Motor Co., 494 F.2d 458, 459–60 (10th Cir. 1974) (discussing liability for injuries caused by a 24-year-old tractor); Kaczmarek v. Mesta Mach. Co., 463 F.2d 675, 676–79 (3d Cir. 1972) (discussing liability for injuries caused by a 30-year-old pickling machine).

65. Dworkin, *supra* note 60, at 609.

66. *Id.* at 610.

67. COHEN, *supra* note 10, at 20–23.

Although innocent sellers can subsequently recover from manufacturers under traditional law, this creates significant transaction and litigation costs.[68] Thus, several states have enacted reforms that eliminate strict liability for wholesalers, distributors, and retailers that do not manufacture products. Under these reforms, nonmanufacturer sellers may be held liable only for their own negligence or breach of warranty.[69] Thus, these reforms relieve nonmanufacturer sellers from the significant costs associated with defending products liability claims.[70] Twenty-two states have enacted reforms that eliminate strict liability for product sellers.[71]

3. Reforms to Joint and Several Liability

Several states have also reformed joint and several liability rules in products liability cases. Under traditional joint and several liability, a plaintiff can recover the full cost of her injury from any party who is partially responsible for the injury, no matter how small the party's responsibility.[72] The rule ensures that plaintiffs are fully compensated, but ignores whether each codefendant pays his or her portion of the damages.[73] As recently as 1973, joint and several liability was universally applied in every state.[74]

Unfortunately, traditional joint and several liability rules encourage plaintiffs to seek out a "deep-pocket" defendant, even if that defendant contributed only modestly to causing the damages.[75] Although the deep-pocket defendant can seek contribution from the other tortfeasors for their share of the damages, such cross claims are often fruitless when the other tortfeasors lack resources. Reformers argue that the traditional rule unfairly requires a single defendant to pay the entire damage award, even when that defendant is only remotely responsible for the harm.[76] As a result, thirty-one states have

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68. Dworkin, *supra* note 60, at 616.

69. Zollers, Hurd & Shears, *supra* note 17, at 1033.

70. Victor E. Schwartz & Mark A. Behrens, *Federal Product Liability Reform in 1997: History and Public Policy Support Its Enactment Now*, 64 TENN. L. REV. 595, 608 (1997).

71. COHEN, *supra* note 10, at 1.

72. W. PAGE KEETON ET AL., PROSSER AND KEETON ON TORTS § 47, at 327 (5th ed. 1984).

73. *Id.*

74. Paul Bargren, Comment, *Joint and Several Liability: Protection for Plaintiffs*, 1994 WIS. L. REV. 453, 471.

75. *Id.* at 456.

76. *See, e.g.*, Aaron D. Twerski, *The Joint Tortfeasor Legislative Revolt: A Rational Response to the Critics*, 22 U.C. DAVIS L. REV. 1125, 1133 (1989) (complaining that shifting losses to a joint tortfeasor treats the tortfeasor as a "whipping boy").

eliminated joint and several liability in products liability cases so that each responsible defendant is liable only in proportion to its relative share of responsibility.[77]

4. Reforms to the Collateral Source Rule

Other states have modified the traditional collateral source rule. The traditional rule prevents the admission of evidence at trial that shows that a plaintiff's losses have been compensated by other sources, such as insurance or workers' compensation. The rationale for the traditional rule is that a defendant should not benefit from something paid for in advance by the plaintiff.[78]

Although the rule promotes efficient deterrence by requiring a tortfeasor to pay damages even when a victim has received payments from a source other than the tortfeasor, it allows plaintiffs to potentially recover twice for the same injury.[79] Moreover, even if providers of the collateral benefit have a contractual or statutory right to subrogation—allowing them to recover the value of the benefit from successful tort claimants—subrogation involves significant transaction costs to determine the providers' rights.[80]

Thus, several states have adopted reforms that include allowing evidence of collateral source payments or completely offsetting awards by the amount of collateral source payments.[81] Thirty-six states have adopted such reforms that modify the traditional collateral source rule in products liability cases.

5. Noneconomic Damage Caps

Limitations on damages have been passed by many states as an additional way to treat the products liability crisis. Most reforms are aimed at either noneconomic damages or punitive damages. Noneconomic damages are damages for nonpecuniary losses such as

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77. COHEN, *supra* note 10, at 13.

78. *See* O'Bryan v. Hedgespeth, 892 S.W.2d 571, 576 (Ky. 1995); RESTATEMENT (SECOND) OF TORTS § 920A cmt. b (1979); Michael Flynn, *Private Medical Insurance and the Collateral Source Rule: A Good Bet?*, 22 U. TOL. L. REV. 39, 43 (1990).

79. Victor E. Schwartz, *The Remoteness Doctrine: A Rational Limit on Tort Law*, 8 CORNELL J.L. & PUB. POL'Y 421, 427 (1999).

80. The amount of payment is subject to negotiation. *See* Helfend v. S. Cal. Rapid Transit Dist., 465 P.2d 65, 67–68 (Cal. 1980).

81. *See generally* Ronen Avraham, *Database of State Tort Law Reforms (DSTLR 4th)*, (Univ. of Tex. Sch. of Law, Law & Econ. Research Paper No. 184, Sept. 2011), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=902711.

pain and suffering, loss of consortium, emotional distress, and other intangible losses. Thus, unlike punitive damages, noneconomic damages are compensatory, even though they are frequently difficult to compute. Moreover, noneconomic damages serve an important deterrent function because they make potential tortfeasors internalize the nonpecuniary harms they impose on others.[82]

However, critics claim that these damages are often excessive and unpredictable, increasing both the level and variation of expected liability costs. For example, one study suggests that the severity of harm explains only about forty percent of the variation in noneconomic damage awards in personal injury cases. This leaves enormous award variation that is random and unexplained. For example, awards for the most serious permanent injuries range in value from approximately $147,000 to $18.1 million.[83] This unpredictability produces several harms. It makes settlement more difficult because accurate prediction of jury awards is impossible.[84] It increases insurance premiums as insurers charge potential tortfeasors "ambiguity premiums" to cover the increased risk.[85] Moreover, the risk of significant noneconomic damage payments may result in manufacturers curbing innovation or production to reduce their exposure to catastrophic judgments.[86]

In addition, critics claim that, because prices reflect expected liability costs, a tort system that provides noneconomic damages effectively requires everyone in society to pay for insurance to cover

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82. *See* Kwasny v. United States, 823 F.2d 194, 197 (7th Cir. 1987) ("If [pain and suffering] were not recoverable in damages, the cost of negligence would be less to the tortfeasors and there would be more negligence, more accidents, more pain and suffering, and hence higher social costs.").

83. Randall R. Bovbjerg et al., *Valuing Life and Limb in Tort: Scheduling "Pain and Suffering,"* 83 NW. U. L. REV. 908, 922–23 (1989); *see also* Mark Geistfeld, *Placing a Price on Pain and Suffering: A Method for Helping Juries Determine Tort Damages for Nonmonetary Injuries*, 83 CALIF. L. REV. 773, 777 (1995) (asserting that there is substantial variability in jury awards for pain and suffering for injuries of equal severity); David W. Leebron, *Final Moments: Damages for Pain and Suffering Prior to Death*, 64 N.Y.U. L. REV. 256, 288–325 (1989) (analyzing pain-and-suffering awards in 256 wrongful death cases and concluding that there is a lack of horizontal equity in awards).

84. *See* ROBERT COOTER & THOMAS ULEN, LAW & ECONOMICS 406–08 (Denise Clinton ed., 4th ed. 2004).

85. Howard Kunreuther & Robin M. Hogarth, *How Does Ambiguity Affect Insurance Decisions?*, *in* CONTRIBUTIONS TO INSURANCE ECONOMICS 307, 321 (Georges Dionne ed., 1992) ("A principal conclusion emerging from surveys of actuaries and underwriters is that they will add an ambiguity premium in pricing a given risk whenever there is uncertainty regarding either the probability or losses.").

86. *See* Daniel L. Rubinfeld, *On Determining the Optimal Magnitude and Length of Liability in Torts*, 13 J. LEGAL STUD. 551, 554 n.7 (1984).

such losses. Critics argue that most people do not want this mandatory insurance for nonpecuniary losses because they do not purchase insurance coverage for other nonpecuniary harms.[87]

State legislatures have listened to the critics, and twenty-four states have adopted caps on noneconomic damages in products liability cases. However, the reforms vary tremendously.[88] Not only do the amounts of the cap differ by state, but some reforms impose a fixed dollar cap while others are indexed to inflation. Some reforms impose different caps for different types of defendants or different severities of injury. The reforms also vary in what kinds of cases are covered or excluded from the cap.

6. Punitive Damage Caps

Punitive damages are meant to deter willful, wanton, and malicious conduct. Although they are not awarded to compensate victims, punitive damages may be necessary to achieve adequate deterrence of either especially egregious behaviors or behaviors where the probability of detecting negligence is low.[89] When victims only discover their harms and/or file claims in a fraction of suits, damages in the few suits that are filed must exceed the compensatory level to achieve adequate deterrence.

However, critics argue that increasing punitive damage awards have led to excessive litigation and windfall gains for plaintiffs.[90] They insist that the grounds for punitive damage awards are

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87. For example, most people do not buy life insurance for the loss of a child to compensate them for one of the most significant nonpecuniary harms imaginable. John E. Calfee & Paul H. Rubin, *Some Implications of Damage Payments for Nonpecuniary Losses*, 21 J. LEGAL STUD. 371, 378 (1992); Robert Cooter, *Towards a Market in Unmatured Tort Claims*, 75 VA. L. REV. 383, 392 (1989) ("[A] rational person would insure only against that pain and suffering that curtailed earnings."); George L. Priest, *A Theory of the Consumer Product Warranty*, 90 YALE L.J. 1297, 1346–47, 1352 (1981); Alan Schwartz, *Proposals for Products Liability Reform: A Theoretical Synthesis*, 97 YALE L.J. 353, 362–67 (1988).

88. *See* Avraham, *supra* note 81.

89. *See* COOTER & ULEN, *supra* note 84, at 371–76.

90. The American Tort Reform Association offered this analysis:

> The difficulty of predicting whether punitive damages will be awarded by a jury in any particular case, and the marked trend toward astronomically large amounts when they are awarded, have seriously distorted settlement and litigation processes and have led to wildly inconsistent outcomes in similar cases. . . . While punitive damages awards are infrequent, their frequency and size have grown greatly in recent years. More importantly, they are routinely asked for today in civil lawsuits.

Punitive Damages Reform, AM. TORT REFORM ASS'N, http://www.atra.org/issues/punitive-damages-reform (last visited Oct. 23, 2012). *But see* Michael L. Rustad, *Nationalizing Tort Law: The Republican Attack on Women, Blue Collar Workers and Consumers*, 48 RUTGERS L. REV. 673, 758–59 (1996) (concluding that punitive damages are not out of control).

inappropriately expanding in many areas.[91] Moreover, probusiness groups argue that excessive and arbitrary punitive damage awards have increased the cost and reduced the availability of insurance.[92] Many blame punitive damages for producing unjustifiably large awards and forcing otherwise viable industries out of business.[93] Many state legislatures have been persuaded that business competitiveness depends on reasonable and predictable liability costs.[94] As a result, twenty-three states have adopted caps on punitive damages in products liability cases.[95]

7. Comparative Negligence

Other states have reformed laws regarding comparative fault. Historically, in an action claiming negligence on the part of the defendant, contributory negligence disallowed any recovery by a plaintiff whose own negligence contributed, even minimally, to causing the damages.[96] In contrast, contributory negligence was not recognized as a defense to strict liability.[97]

Critics argue that contributory negligence is overly harsh to negligent plaintiffs in negligence actions. As a result, forty-six states have adopted comparative negligence that reduces the plaintiff's recovery in proportion to his percentage of responsibility.[98]

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91. For a discussion of the expansion of punitive damage awards, see Dworkin, *supra* note 60, at 614–15.

92. *See, e.g.*, TORT POLICY WORKING GRP., REPORT OF THE TORT POLICY WORKING GROUP ON THE CAUSES, EXTENT AND POLICY IMPLICATIONS OF THE CURRENT CRISIS IN INSURANCE AVAILABILITY AND AFFORDABILITY 16, 35–42, 66–69 (1986) (detailing how the "[e]xplosive [g]rowth in [tort] [d]amage [a]wards" likely contributed to a shortage of low-cost insurance; recommending instituting a $100,000 cap on non-economic damages).

93. *See, e.g.*, Dickinson R. Debevoise, Senior Judge of the U.S. Dist. Court for the Dist. of N.J., Arthur T. Vanderbilt Lecture at Harvard Law School: A Trial Judge's View of Tort Reform, *in* 25 SETON HALL L. REV. 853, 857–58 (1994) (noting anecdotal evidence that health maintenance organizations (HMOs) suffer large punitive damage awards).

94. Sandra N. Hurd & Frances E. Zollers, *State Punitive Damages Statutes: A Proposed Alternative*, 20 J. LEGIS. 191, 195–96 (1994).

95. COHEN, *supra* note 10, at 8–13.

96. *See, e.g.*, FRANK J. VANDALL, A HISTORY OF CIVIL LITIGATION: POLITICAL AND ECONOMIC PERSPECTIVES 38 (2011) ("A layman might assume incorrectly that once the product is determined to be defective, the case is over. Before 1978, the rule was that if plaintiffs were negligent to any degree, they could not recover.").

97. *Id.* at 38–39.

98. COHEN, *supra* note 10, at 5–8. Only Alabama, Maryland, North Carolina, and Virginia retain contributory negligence. *Id.* During my sample period, Ohio and Indiana also still used contributory negligence. IND. CODE §§ 34-51-2-5 to -6 (West 2012) (enacted in 1998); COHEN, *supra* note 10, at 5–8 (stating the Ohio contributory negligence statute was repealed in April 2003).

Although these comparative negligence reforms were intended to increase recovery for negligent plaintiffs, they have accomplished the exact opposite in strict liability actions. Whereas contributory negligence was not a defense to strict liability, comparative negligence is recognized as a defense in these actions.[99] Hence, in products liability cases under contributory negligence, defendants' damages are never reduced to reflect plaintiffs' negligence, but under comparative negligence, defendants' damages are routinely reduced to account for plaintiffs' negligence.

8. Other State-Level Reforms

States have experimented with other reforms to varying degrees. Although the specific reforms vary by state, they all serve to limit manufacturers' liability. For example, "The patent danger rule relieves a manufacturer from liability for failure to warn or to redesign if the dangerous aspect of the product is obvious to the reasonable person."[100] Although adopted by a few states,[101] many have rejected the rule as a complete defense and, instead, consider an obvious danger as one factor to consider when determining liability.[102]

Another reform adopted by some states relates to the "state of the art," or the feasibility of safety measures when a product was developed. These reforms have taken various forms, though most allow the introduction of evidence about the state of the art at the time the product was developed.[103]

9. Federal Reforms

In response to the perceived liability crisis of the 1970s and 1980s, numerous federal tort reform bills were also introduced in

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99. *See, e.g.*, VANDALL, *supra* note 96, at 38–39 ("Historically, contributory negligence was not recognized as a defense to strict liability . . . . The Uniform Comparative Fault Act was drafted in 1977, and contemporaneously several state supreme courts have applied comparative fault in strict liability actions.").

100. Dworkin, *supra* note 60, at 611.

101. *See id.* at 611–12 (noting that eighteen of thirty-five states to consider the patent danger rule have refused to apply it as a complete defense).

102. *See, e.g.*, Micallef v. Miehle Co., Div. of Miehle-Goss Dexter, Inc., 39 N.Y.2d 376, 387 (1976) (applying a "reasonable care" standard where the "openness and obviousness" of danger is a factor defense can raise against plaintiff but is not dispositive); Palmer v. Massey-Ferguson, Inc., 476 P.2d 713, 719 (Wash. Ct. App. 1970) (explaining that a product's obvious danger is a factor in determining a plaintiff's contributory negligence).

103. *Cf.* Micallef, 39 N.Y.2d at 386–87 (explaining that reasonable care is partially determined by whether a manufacturer "kept abreast of recent scientific developments").

Congress.[104] The vast majority of these bills stalled in committee, faced filibusters, or passed in one chamber but not the other.[105] As a result, for years states were the primary source of legislative efforts to reduce the scope of products liability.[106]

However, in the 1990s, Congress successfully enacted a series of products liability reforms that shielded manufacturers and product sellers in specific industries. For example, the General Aviation Revitalization Act of 1994 created an eighteen-year statute of repose for manufacturers of general aviation aircraft and their component parts.[107] Similarly, the Biomaterials Access Assurance Act of 1998 limits the products liability of biomaterials suppliers of raw materials and medical-implant component parts.[108] Likewise, the Y2K Act provides liability relief and limits on punitive damages for defendants in legal actions arising from year-2000 computer failures.[109] The Homeland Security Act of 2002 limits the liability of both manufacturers and administrators of the smallpox vaccine and sellers of antiterrorism technology.[110] Similarly, the Protection of Lawful Commerce in Arms Act shields manufacturers, distributors, dealers, and importers of firearms or ammunition from liability resulting from the misuse of their products by others.[111]

Despite reformers' success at enacting various industry-specific reforms, efforts to adopt comprehensive federal tort reform have failed. Although numerous bills that reduce the scope of products

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104. *See* Zollers, Hurd & Shears, *supra* note 17, at 1023–24 (explaining that Congress responded to "perceived chaos" in tort law by enacting "bill after bill" to limit plaintiffs' recovery).

105. *Id.* at 1024–25.

106. Congress did enact legislation that protected defendants in certain industries while providing substitute remedies for injured parties. For example, under the Swine Flu Act of 1976, the Federal Government assumed liability for any injury in connection with the swine flu vaccine, thereby shielding manufacturers and distributors of the vaccine from such liability. National Swine Flu Immunization Program of 1976, Pub. L. No. 94-380, 90 Stat. 1113 (amended 1978). Similarly, the National Childhood Vaccine Injury Act of 1986 substituted liability against vaccine manufacturers with a federal no-fault compensation program funded by a tax on each dose of vaccine. *See* 42 U.S.C. §§ 300aa-1 to -34 (2006) (establishing "the National Vaccine Injury Compensation Program . . . under which compensation may be paid for a vaccine-related injury or death").

107. *See* Pub. L. No. 103-298, 108 Stat. 152 (setting time limits on civil actions against aircraft and aircraft component manufacturers).

108. 21 U.S.C. §§ 1601–06 (2006).

109. 15 U.S.C. §§ 6601–17 (2006).

110. *See* Homeland Security Act of 2002, Pub. L. No. 107-296, §§ 304, 863, 116 Stat. 2135, 2165, 2239 (codified at 6 U.S.C. § 443 (2006) and 42 U.S.C. § 233 (2006)) (making a civil action against the United States the exclusive remedy for smallpox-vaccine-related-injuries; providing the government contractor defense to antiterrorism technology vendors).

111. 15 U.S.C. §§ 7902–03.

liability across all industries have been proposed in Congress, they have yet to be enacted. The bills are often successful in one chamber but fail in the other. One bill was even passed by both chambers, but Congress subsequently failed to override President Clinton's veto of the bill.[112] Proponents of federal tort reform argue that, despite state tort reforms, many judgments are still excessive. In addition, they argue that national uniformity in products liability law is necessary to prevent distortions in the cost of doing business across states.[113] Comprehensive federal tort reforms continue to be proposed every few years, and several powerful business interest groups continue to campaign for them.[114]

II. BENEFITS AND COSTS OF PRODUCTS LIABILITY LAW

The historical ebb and flow in the scope of products liability law has been caused by shifting assessments of the law's costs and benefits. Early expansions were the result of courts and policymakers sensing that the law was not achieving fair compensation and adequate deterrence. Later contractions ensued when courts and legislatures feared that products liability law had gone too far and was stifling economic activity.

In this Section, I outline the primary benefits and costs of the U.S. products liability system. I also explain how recent developments have dramatically changed the relevance of various benefits and costs. Increases in the availability of insurance, consumers' access to product information, governmental safety regulations, and litigation costs have altered the relative magnitudes of products liability law's benefits and costs.[115]

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112. For an account of President Clinton's veto of the Common Sense Product Liability and Legal Reform Act of 1995, H.R. 956, 104th Cong. (1995), see Neil A. Lewis, *President Vetoes Limits on Liability*, N.Y. TIMES, May 3, 1996, at A1 (quoting the President saying that the bill "tilts the playing field against consumers" and "inappropriately intrudes on state authority").

113. *See* Zollers, Hurd & Shears, *supra* note 17, at 1023 ("Businesses . . . argued that the lack of uniformity that resulted from the state-by-state development of the common law [of strict products liability] created an unfair burden, requiring them to manufacture to the most costly state requirements at the expense of competitiveness.").

114. Gary Wilson et al., *The Future of Products Liability in America*, 27 WM. MITCHELL L. REV. 85, 93–94 (2000).

115. For a more thorough discussion of the costs and benefits of the products liability system, see Polinsky & Shavell, *supra* note 8, at 1437. For a different perspective, see John C.P. Goldberg & Benjamin C. Zipursky, *The Easy Case for Products Liability Law: A Response to Professors Polinsky and Shavell*, 123 HARV. L. REV. 1919, 1919 (2010).

A. Benefits of Products Liability Law

Assertions about the benefits of the products liability system, and the tort system in general, have been the impetus for most historical expansions in tort law. Next, I describe the three primary benefits of the products liability system: compensation of victims, improvements in product safety, and reduction in purchases of risky products.

1. Compensation of Victims

One of the primary functions of tort law is compensation. Similarly, products liability law is designed to compensate consumers for harm resulting from defective products and to restore them to their preinjury conditions.[116] Because manufacturers and product sellers can spread the cost of compensation over an array of products, they are in a better position to bear the compensatory burden than consumers.

The products liability system played an essential role in reimbursing tort victims during much of the twentieth century. However, widespread insurance coverage, subrogation provisions, and increasing litigation expenses and delays combine to undermine the compensatory function of modern-day products liability law.[117]

During much of the twentieth century, the products liability system was essential for reimbursing tort victims' injury-related costs because there were few other sources for victims to look to for compensation. However, as more and more Americans obtain insurance that covers many injury-related costs, the products liability system is no longer the principal source of compensation.[118] In the

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116. *See, e.g.*, DAN B. DOBBS, THE LAW OF TORTS § 13, at 26–27 (2d ed. 2011) ("Compensation of injured persons is one of the generally accepted aims of tort law. Payment of compensation to injured persons is desirable. If a person has been wronged by a defendant, it is just that the defendant make compensation. Compensation is also socially desirable, for otherwise the uncompensated injured persons will represent further costs and problems for society."); Daniel W. Shuman, *The Psychology of Compensation in Tort Law*, 43 U. KAN. L. REV. 39, 45 (1994) ("The commonly understood goal of tort compensation is to restore the injured to their preaccident condition, to make them whole."); Steven D. Smith, *The Critics and the "Crisis": A Reassessment of Current Conceptions of Tort Law*, 72 CORNELL L. REV. 765, 769 (1987) ("[I]njured plaintiffs should receive an amount necessary to make them 'whole,' that is, to restore them to the position they would have occupied but for the defendant's tortious conduct.").

117. Polinsky & Shavell, *supra* note 8, at 1464–65. *But see* Goldberg & Zipursky, *supra* note 115, at 1934–40 (arguing that compensatory damages still improve tort victim's welfare despite high legal costs and subrogation).

118. *See* Polinsky & Shavell, *supra* note 8, at 1462–63 ("[T]he influence of product liability on compensation is incremental, only beyond that furnished by insurance.").

United States, approximately ninety-seven percent of homeowners have property insurance,[119] eighty-five percent of the population has health insurance,[120] about seventy-eight percent of families own life insurance,[121] and at least thirty-three percent of the workforce has disability coverage.[122] These various forms of insurance reimburse tort victims for all or many injury-related costs, often negating the need for the products liability system to compensate victims. Indeed, many tort victims with adequate insurance coverage never even file tort claims,[123] suggesting that compensation from litigation would often be redundant and unnecessary.

Moreover, increases in the frequency of subrogation provisions in insurance contracts reduce the compensation that tort victims receive from the products liability system.[124] Subrogation provisions give insurers the right to "stand in the shoes" of the insured victim and assert a claim against the defendant for any expenses that the insurance company paid to the victim.[125] Because these provisions reimburse the insurer for its payment to the insured out of any judgment or settlement, consumer victims often retain only a portion of the settlements and judgments from products liability claims.[126]

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119. *Homeowners and Renters Insurance: Expenditures for Homeowners and Renters Insurance*, INS. INFO. INST., http://www.iii.org/media/facts/statsbyissue/homeowners (last visited Sept. 17, 2012) (citing 2011 survey).

120. *See* CARMEN DENAVAS-WALT ET AL., U.S. CENSUS BUREAU, INCOME, POVERTY, AND HEALTH INSURANCE COVERAGE IN THE UNITED STATES: 2007, at 21 fig.7 (2008), *available at* http://www.census.gov/prod/2008pubs/p60-235.pdf (showing that 15.3% of the population has no health insurance).

121. AM. COUNCIL OF LIFE INSURERS, LIFE INSURERS FACT BOOK 2008, at 61 (2008), *available at* http://www.acli.com/Tools/Industry%20Facts/Life%20Insurers%20Fact%20Book/Documents/e4f672e3748844ce8a434412bd801c2dFactBook2009.pdf (citing 2004 data).

122. *See* BUREAU OF LABOR STATISTICS, U.S. DEP'T OF LABOR, BULL. NO. 2715, NATIONAL COMPENSATION SURVEY: EMPLOYEE BENEFITS IN THE UNITED STATES, MARCH 2008 tbl.12 (2008), *available at* http://www.bls.gov/ncs/ebs/benefits/2008/ebbl0041.pdf (finding thirty-five percent of workers participate in short-term disability insurance and thirty-one percent participate in long-term disability insurance).

123. *See, e.g.*, HARVARD MED. PRACTICE STUDY, PATIENTS, DOCTORS AND LAWYERS: MEDICAL INJURY, MALPRACTICE LITIGATION AND PATIENT COMPENSATION IN NEW YORK 41 (1990); *see also* PAUL C. WEILER ET AL., A MEASURE OF MALPRACTICE: MEDICAL INJURY, MALPRACTICE LITIGATION, AND PATIENT COMPENSATION 61–76 (1993) (relaying survey results showing that a significant number of medical malpractice victims never file tort claims).

124. *See* Polinsky & Shavell, *supra* note 8, at 1463–64 (using a hypothetical to explain how subrogation policies allow insurers to retain a portion of tort victims' damage awards).

125. *Id.* at 1464.

126. *See* KENNETH S. ABRAHAM, INSURANCE LAW AND REGULATION 405–07 (4th ed. 2005) (outlining legal and policy questions arising from insurers' ability to recoup costs from insured parties' tort settlements and judgments through equitable and contractual subrogation); Alan O. Sykes, *Subrogation and Insolvency*, 30 J. LEGAL STUD. 383, 383–85 (2001) (noting how insurers

Finally, increasing litigation costs and delays undermine the compensatory function of the products liability system.[127] Several studies have found that, because of rising legal fees, tort victims generally retain only forty-six cents of every dollar paid by defendants in tort litigation.[128] Moreover, increasing litigation delays effectively reduce compensation as inflationary pressures reduce the value of damage awards.[129] As a result, the products liability system has become increasingly ineffective at compensating tort victims for product-related injuries.

2. Improvements in Product Safety

Another primary function of tort law is to incentivize potential tortfeasors to take precautions and avoid risky behavior.[130] Because products liability law makes product sellers pay for harm caused by defective products, it gives them a financial incentive to reduce or

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may often recover portions of tort judgments regardless of whether the tortfeasor's assets sufficiently cover the cost of the victim's injuries).

127. Polinsky & Shavell, *supra* note 8, at 1464–65.

128. *See e.g.*, JAMES S. KAKALIK & NICHOLAS M. PACE, RAND INST. FOR CIVIL JUSTICE, COSTS AND COMPENSATION PAID IN TORT LITIGATION, at ix tbl.S.3, x (1986), *available at* http://www.rand.org/pubs/reports/2006/R3391.pdf ("[After litigation costs], the injured plaintiff receives approximately 56 percent in net compensation. . . . If we add the value of time spent by the litigants to the costs, the injured parties' net compensation sinks to 46 percent of the total expenditures."); TILLINGHAST-TOWERS PERRIN, U.S. TORT COSTS: 2003 UPDATE 17 (2003), *available at* https://www.towersperrin.com/tillinghast/publications/reports/2003_Tort_Costs_Update/Tort_Costs_Trends_2003_Update.pdf (showing that victims receive twenty-two cents for economic losses and twenty-four cents for noneconomic losses). Subsequent reports do not state the amount obtained by plaintiffs per dollar spent by defendants. *See, e.g.*, TOWERS PERRIN, 2008 UPDATE ON U.S. TORT COST TRENDS 1–19 (2008), *available at* http://www.towersperrin.com/tp/getwebcachedoc?webc=USA/2008/200811/2008_tort_costs_trends.pdf (no per plaintiff award numbers).

129. *See* Polinsky & Shavell, *supra* note 8, at 1465 ("[I]f victims do not receive interest on their judgment or settlement from the time of the accident until receipt of their payment, then they will be shortchanged.").

130. *See, e.g.*, KENNETH S. ABRAHAM, THE FORMS AND FUNCTIONS OF TORT LAW 18 (4d ed. 2012) ("The imposition of tort liability . . . helps to prevent future tortious actions, by threatening potential wrongdoers with liability if they cause actionable harm."); PETER CANE, ATIYAH'S ACCIDENTS, COMPENSATION AND THE LAW 424 (7th ed. 2006) ("One of the most important of the suggested functions of personal injuries compensation law is deterrence of potentially injury-causing conduct . . . ."); Richard L. Abel, *A Critique of Torts*, 37 UCLA L. REV. 785, 808 (1990) ("At least since Learned Hand offered his famous formula . . . judges, lawyers, and legal scholars have argued that fear of liability will compel potential tortfeasors to engage in a cost-benefit analysis, taking just those safety precautions that cost less than the accidents they prevent."); Daniel W. Shuman, *The Psychology of Deterrence in Tort Law*, 42 U. KAN. L. REV. 115, 131 (1993) ("[Deterrence] remains an important goal of tort law in the eyes of those judges and lawyers who maintain that the threat of tort liability acts as an incentive for persons engaged in various activities to take steps to reduce the risk of injuries." (internal quotation marks omitted)).

eliminate product risks. As a result, product sellers should take more care in the design, manufacture, and marketing of products.

However, the contribution of products liability law to improving product safety has declined over time with increases in consumers' access to product information and expansions in governmental safety regulations. Market forces provide a significant incentive for many manufacturers to improve product safety.[131] There are numerous examples of consumers abandoning their purchases of products once the products are found to be unsafe.[132] Similarly, consumer demand often increases in response to favorable safety information.[133] However, the market's ability to punish and reward product sellers depends on consumers obtaining information about product safety. For much of the twentieth century, consumers had limited access to product-safety information. In contrast, recent technological advances have broadened the reach of the media, enabled extensive product research, and opened communication channels that allow consumers to exchange product information. As a result, product-safety information is more accessible than ever before, increasing the ability of the market to discipline product sellers. In turn, the role of the products liability system in improving product safety has declined. Indeed, empirical results suggest that products liability law has a smaller impact on product safety when consumers are well informed about product risks. For example, one study of the relationship between products liability law and accidental fatalities in

131. For a thorough discussion of the role of market forces on product safety, see Polinsky & Shavell, *supra* note 8, at 1443–50.

132. *See, e.g.*, RICHARD N.L. ANDREWS, MANAGING THE ENVIRONMENT, MANAGING OURSELVES 213–14 (2d ed. 2006) (discussing that cranberry purchases declined after consumers became aware that a potentially toxic pesticide was used on some cranberries); GARY DAVIES ET AL., CORPORATE REPUTATION AND COMPETITIVENESS 110–11 (2003) (discussing that sales of Perrier dropped after consumers became aware of benzene contamination); RONALD D. MICHMAN & EDWARD M. MAZZE, THE FOOD INDUSTRY WARS 140–41 (1998) (discussing that sales of Gerber declined after glass was found in some containers of Gerber peaches); Tamar Lewin, *Tylenol Posts an Apparent Recovery*, N.Y. TIMES, Dec. 25, 1982, at 30 (noting that Tylenol lost eighty-seven percent of its market share when several people ingested Tylenol capsules contaminated with cyanide); Bradley A. Stertz, *U.S. Study Blames Drivers for Sudden Acceleration*, WALL ST. J., Feb. 2, 1989 (discussing that Audi purchases dropped due to consumer fears that the cars were prone to sudden acceleration).

133. *See, e.g.*, William Boulding & Devavrat Purohit, *The Price of Safety*, 23 J. CONSUMER RES. 12, 24 tbl.B1 (1996) (concluding that Volvo is able to charge a premium for its cars due to their safety reputation); Austin Weber, *Cirrus Soars with Composites*, ASSEMBLY, Aug. 29, 2008, at 26, *available at* http://www.assemblymag.com/articles/85800-cirrus-soars-with-composites (noting that the Cirrus SR22 is the "world's best-selling aircraft," largely because of its safety reputation).

the home concludes that products liability law increases care levels only when consumers are poorly informed about risk.[134]

In addition, the expansion of governmental safety regulations has reduced products liability law's contribution to improving product safety.[135] Whereas the government had little to say about product safety during the early twentieth century, government agencies now regulate the safety of countless products. Automobiles, pharmaceuticals, aircraft, and numerous consumer products are subject to extensive safety regulations.[136] Evidence confirms that many of these government regulations have drastically improved product safety.[137] Moreover, because government regulations of some products, such as drug labels[138] and medical devices,[139] may preempt products liability claims, products liability law has no way of providing incentives to improve product safety. Hence, for many products, products liability law may not improve safety beyond the level already required by government regulations.

Thus, significant increases in consumers' access to information and expanding governmental safety regulations both reduce the role of the products liability system in improving product safety.[140] Empirical studies attempting to measure this role have produced mixed results.

Most interviews with manufacturers and corporate executives suggest that products liability law strongly influences decisions about product design,[141] research and development devoted to product

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134. *See* Richard S. Higgins, *Producers' Liability and Product-Related Accidents*, 7 J. LEGAL STUD. 299, 318 (1978) ("[T]he evidence consistently shows that producer liability at best has a negative impact on the home accident rate when the education attainment level is low.").

135. For a thorough discussion of the role of regulation on product safety, see Polinsky & Shavell, *supra* note 8, at 1450–53.

136. *Id.*

137. *See e.g.*, Lloyd D. Orr, *The Effectiveness of Automobile Safety Regulation: Evidence from the FARS Data*, 74 AM. J. PUB. HEALTH 1384, 1387 (1984) (calculating that as many as 9,200 lives were saved by automobile safety regulations); *Success Stories Index*, U.S. CONSUMER PRODUCTS SAFETY COMMISSION, http://www.cpsc.gov/cpscpub/pubs/success/index.html (revised May 5, 1996) (highlighting examples of the impact on product safety of regulations on cigarette lighters, cribs, hair dryers, and bicycles).

138. Colacicco v. Apotex, Inc., 432 F. Supp. 2d 514 (E.D. Pa. 2006) (summary judgment granted on FDA's implied preemption of plaintiff's warning claims regarding anti-depressant Paxil and risk of suicide).

139. Riegel v. Medtronic, Inc., 552 U.S. 312 (2008).

140. *But see* Goldberg & Zipursky, *supra* note 115, at 1928–33.

141. GEORGE EADS & PETER REUTER, INST. FOR CIVIL JUSTICE, DESIGNING SAFER PRODUCTS: CORPORATE REPONSES TO PRODUCT LIABILITY LAW AND REGULATION viii (1983).

safety,[142] and other safety improvements.[143] In contrast, a considerable body of empirical work suggests that the liability system does not have a significant effect on product safety. For example, several studies explore the relationship between products liability law and aggregate accident rates. One finds that an increase in products liability litigation has no effect on either aggregate death rates or the rate of product-related injuries requiring emergency room treatment.[144] My own previous study of accidental-death rates finds that general tort reforms that reduce manufacturers' incentives to improve product safety do not result in an increase in accidental-death rates.[145]

Other studies investigate the influence of products liability law in specific industries. For example, an early study analyzing motor vehicle safety finds that the scope of products liability law had no impact on passenger car–death rates between 1950 and 1988.[146] Other studies explore the influence of products liability law on the safety of general aviation aircraft. The studies all report that the expansion of liability for aircraft manufacturers during the 1970s and 1980s had no impact on the rate of fatal aviation accidents.[147] Another study exploring the safety of vaccines finds that increases in the liability risk faced by vaccine manufacturers in the 1970s and 1980s had no influence on vaccine safety.[148]

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142. Egon Zehnder Int'l, *The Litigious Society: Is it Hampering Creativity, Innovation, and Our Ability to Compete?*, 2 CORP. ISSUES MONITOR 1, 2 (1987), *available at* http://legacy.library.ucsf.edu/tid/sff22d00/pdf.

143. E. PATRICK MCGUIRE, THE IMPACT OF PRODUCT LIABILITY 20 tbl.32 (1988); NATHAN WEBER, THE CONFERENCE BD., REPORT NO. 8732, PRODUCT LIABILITY: THE CORPORATE RESPONSE 15 chart 3 (1987).

144. George L. Priest, *Products Liability Law and the Accident Rate*, *in* LIABILITY: PERSPECTIVES AND POLICY 184, 193–94 (Robert E. Litan & Clifford Winston eds., 1988) (showing that despite "an enormous expansion of products liability," product safety studies "provide no evidence that the expansion of litigation has affected the injury or death rate").

145. Paul H. Rubin & Joanna M. Shepherd, *Tort Reform and Accidental Deaths*, 50 J.L. & ECON. 221, 235 (2007).

146. *See* John D. Graham, *Product Liability and Motor Vehicle Safety*, *in* THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION 120, 180–83 (Peter W. Huber & Robert E. Litan eds., 1991).

147. Andrew Craig, *Product Liability and Safety in General Aviation*, *in* THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION, *supra* note 146, at 456, 476; Robert Martin, *General Aviation Manufacturing: An Industry Under Siege*, *in* THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION, *supra* note 146, at 478, 492–93.

148. Richard L. Manning, *Changing Rules in Tort Law and the Market for Childhood Vaccines*, 37 J.L. & ECON. 247, 248 (1994).

3. Reduction in Purchases of Risky Products

Products liability may also benefit consumers by reducing socially undesirable purchases of risky products that result when misinformed consumers underestimate product risks.[149] When consumers underestimate product risks they, in turn, undervalue the true costs of products and may make socially undesirable purchases by purchasing products with costs that exceed the value to consumers.

As products liability law increases the expected litigation costs of selling risky products, manufacturers, in turn, pass on much of the expected costs to consumers in the form of higher prices.[150] As the prices of risky products increase, these products are disadvantaged in the market. Consumers that are unaware of product risks will, nevertheless, demand fewer products as the prices increase. As a result, the price-signaling function of products liability will lead to less informed consumers purchasing fewer products.[151]

However, the degree to which higher prices reduce socially undesirable purchases of risky products depends on how misinformed consumers are about product safety. If well-informed consumers already incorporate product risks into their estimates of the true costs of products, price increases will do less to correct the miscalculations of products' true costs that result in socially undesirable purchases. Thus, the price-signaling benefit of products liability law has declined as modern-day consumers grow better informed about product safety.[152]

Moreover, as I discuss in the next Section, when prices increase to incorporate not only expected liability costs but also significant expected litigation costs, then excessive price increases will deter socially beneficial purchases.[153]

B. Costs of Products Liability Law

Legal scholars and policymakers also recognize that the products liability system produces significant costs. Next, I describe the three primary costs of the system: excessive transaction costs,

149. Polinsky & Shavell, *supra* note 8, at 1461–62.

150. Guido Calabresi refers to this as the "general deterrence" or "market method" objective. GUIDO CALABRESI, THE COSTS OF ACCIDENTS 27 (1970).

151. Products liability can also correct consumers' overestimation of product risks. Ultimately, when prices reflect product risks, products liability will lead to more efficient purchases of risky products. Polinsky & Shavell, *supra* note 8, at 1459–62.

152. *See, e.g., id.* at 1460.

153. *See infra* notes 159–61 and accompanying text.

price distortions that deter socially beneficial purchases, and reductions in economic activity.

1. Excessive Transaction Costs

The U.S. tort system has become an increasingly inefficient way to transfer money from injurers to victims. The transaction costs of the tort system—measured as the sum of legal, administrative, and third-party expenses, but excluding damage awards to victims—totaled $248.1 billion in 2009, or $808 per citizen.[154] In contrast, the transaction costs of the system in 1960 totaled only $5.4 billion, or, when adjusted for inflation, $218 per citizen.[155] This nearly fourfold increase in the transaction costs of the tort system is the direct result of the increasing costs of legal representation[156] and litigation delays.[157]

As the transaction costs of the tort system increase, the portion of the defendants' payments retained by plaintiffs decreases. Several studies have found that tort victims generally receive only forty-six cents of every dollar paid by defendants in tort litigation.[158] Other studies that examine products liability cases report that victims in these cases receive between thirty-seven and fifty cents of every dollar spent by defendants, depending on the product.[159] Hence, for every dollar defendants pay to compensate victims, an additional dollar and change is spent on legal and administrative expenses. Moreover, as

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154. TOWERS WATSON, *supra* note 5, at 6.

155. *Id.*

156. *See* Lester Brickman, *Effective Hourly Rates of Contingency-Fee Lawyers: Competing Data and Non-Competitive Fees*, 81 WASH. U. L.Q. 653, 655 n.5 (2003) (noting that during the 1960–2001 period, inflation-adjusted hourly rates of tort plaintiffs' lawyers have increased as much as 1400%).

157. *See e.g.*, George L. Priest, *Private Litigants and the Court Congestion Problem*, 69 B.U. L. REV. 527, 532 (1989) (showing that civil court suit-to-trial delays average 4.71 years).

158. *See e.g.*, KAKALIK & PACE, *supra* note 128, at x; TILLINGHAST-TOWERS PERRIN, *supra* note 128, at 17 (showing that victims receive twenty-two cents for economic losses and twenty-four cents for noneconomic losses). Subsequent reports do not state the amount obtained by plaintiffs per dollar spent by defendants. *See e.g.*, TOWERS PERRIN, *supra* note 128.

159. STEPHEN J. CARROLL ET AL., RAND INST. FOR CIVIL JUSTICE, ASBESTOS LITIGATION 104 (2005) (concluding that plaintiffs receive forty-two cents of every dollar paid by defendants in asbestos cases); PETER W. HUBER, LIABILITY: THE LEGAL REVOLUTION AND ITS CONSEQUENCES 151 (1988) (concluding that plaintiffs receive forty cents of every dollar paid by defendants in medical practice cases and forty cents of every dollar paid by defendants in products liability cases); Patricia M. Danzon, *Liability for Medical Malpractice*, *in* 1B HANDBOOK OF HEALTH ECONOMICS 1339, 1369 (Anthony J. Culyer & Joseph P. Newhouse eds., 2000) (concluding that plaintiffs receive forty cents of every dollar paid by defendants in medical practice cases).

legal fees and litigation delays continue to increase, this inefficiency will only worsen.

2. Deterrence of Socially Beneficial Purchases

High litigation costs may also deter socially beneficial purchases. As manufacturers incorporate expected liability costs into product prices, the prices will reflect more than just the compensation paid to victims. As less than half of the money paid by defendants goes to the compensation of victims, similarly, less than half of the price increases will reflect compensation. High litigation and administrative costs constitute the majority of the price increases. As a result, increasing litigation costs will continue to increase prices, deterring potentially socially beneficial transactions.[160]

Although price increases of unsafe products may benefit society by reducing the consumption and use of such products, the products liability system will cause price increases among socially valuable products as well. For example, empirical studies show that there is a strong relationship between expected liability costs and the prices of both vaccines and prescription drugs.[161] Price increases among medicines, vaccines, safety features on cars, and other risk-reducing products will lead to fewer purchases of socially valuable products. Ultimately, reductions in such worthwhile purchases will likely lead to negative social consequences. Indeed, in my recent empirical study of the relationship between tort reform and death rates, I found evidence supporting the notion that higher liability costs among risk-reducing products result in an increase in accidental deaths.[162]

3. Reduction in Economic Activity

Expansions in the scope of liability reduce potential tortfeasors' incentives to engage in activities that could potentially result in a tort.[163] This is especially true in strict liability regimes where tortfeasors are liable regardless of the level of care they exercise. Hence, strict products liability reduces the incentives for product

160. Polinsky & Shavell, *supra* note 8, at 1470–72.

161. Manning, *supra* note 148, at 273; Richard L. Manning, *Products Liability and Prescription Drug Prices in Canada and the United States*, 40 J.L. & ECON. 203, 234 (1997).

162. *See* Rubin & Shepherd, *supra* note 145, at 235.

163. For a discussion of the tort system's influence on activity levels, see COOTER & ULEN, *supra* note 84, at 332–33.

sellers to design, manufacture, and sell products.[164] As a result, expanding the scope of products liability should decrease economic activity such as production, employment, innovation, and business openings.

Several consequences of the products liability system may deter economic activity. First, products liability directly influences business decisions by increasing the expected liability costs associated with the design, manufacturing, and marketing of products. In 2009, the cost of torts alleged against businesses was $152.7 billion.[165] Although some of these costs are passed on to consumers in the form of higher prices, the unpredictable and arbitrary nature of product injuries and products liability cases means that ex ante price increases cannot incorporate all liability costs that many manufacturers will subsequently pay. Consequently, significant and unpredictable liability costs will affect many important business decisions including whether to open or close businesses, relocate to lower-liability areas, and increase or decrease production.

In addition, products liability litigation leads to declines in stock value that may deter business activity. Several empirical studies have shown that litigation adversely affects the stock price of businesses as the market incorporates the expected cost of future litigation. For example, one recent study finds that media reports of products liability litigation significantly decrease firms' stock values.[166] Another study reports that litigation events significantly reduce the value of firms in the automobile and pharmaceutical industries.[167] Oftentimes, the reduced stock value costs the firm more than the associated liability costs. As a result, fears of stock value declines that result from litigation will likely influence owners' important business decisions.

The products liability system also deters economic activity by increasing the cost that product sellers must pay for general liability insurance. Several empirical studies find that insurers charge higher premiums to product sellers when expansions in products liability law

164. For a discussion of the activity-level effects of medical malpractice liability, see Joanna Shepherd, *Tort Reforms' Winners and Losers: The Competing Effects of Care and Activity Levels*, 55 UCLA L. REV. 905, 924–29 (2008).

165. TOWERS WATSON, *supra* note 5, at 6.

166. W. Kip Viscusi & Joni Hersch, *The Market Response to Product Safety Litigation*, 2 J. REG. ECON. 215, 228 (1990).

167. David W. Prince & Paul H. Rubin, *The Effects of Product Liability Litigation on the Value of Firms*, 4 AM. L. & ECON. REV. 44 (2002).

increase either expected liability or legal uncertainty.[168] Increases in expected liability increase insurers' exposure, and greater legal uncertainty increases the variance in the insurers' exposure, thereby increasing the insurers' risk. As a result, insurers add an additional cost, or "ambiguity premium," above the expected value of liability when there is uncertainty in either the likelihood or magnitude of liability. [169] Indeed, empirical studies have shown that greater legal uncertainty is associated with higher premium rates.[170] Higher premium rates, in turn, increase the costs of doing business for manufacturers and product sellers, deterring economic activity.

Thus, by increasing expected liability, reducing stock value, and increasing insurance premiums, the products liability system deters economic activity. These factors influence the incentives for new businesses to open, existing businesses to close, businesses to relocate, and businesses to expand or contract the production and marketing of products.

Empirical studies confirm the influence of the products liability system on certain types of business decisions. For example, several studies have explored the influence of products liability law on innovation. One study reports that interviews with senior-level corporate executives reveal that litigation concerns deter many companies from introducing new products.[171] Other studies report that interviews with risk managers and CEOs confirm that liability fears lead many major corporations to discontinue existing product lines.[172]

Econometric studies also confirm the relationship between products liability and innovation. The studies generally find that at low levels of expected liability, businesses invest resources in safety

168. Patricia H. Born & W. Kip Viscusi, *The Distribution of the Insurance Market Effects of Tort Liability Reforms*, *in* 1998 BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 55, 55 (Clifford Winston et al. eds., 1999); W. Kip Viscusi, *The Performance of Liability Insurance in States with Different Products-Liability Statutes*, 19 J. LEGAL STUD. 809, 834 (1990); W. Kip Viscusi et al., *The Effect of 1980s Tort Reform Legislation on General Liability and Medical Malpractice Insurance*, 6 J. RISK & UNCERTAINTY 165, 166 (1993).

169. *See* Kunreuther & Hogarth, *supra* note 85, at 307, 321 ("A principal conclusion emerging from surveys of actuaries and underwriters is that they will add an ambiguity premium in pricing a given risk whenever there is uncertainty regarding either the probability or losses."); George L. Priest, *The Modern Expansion of Tort Liability: Its Sources, Its Effects, and Its Reform*, 5 J. ECON. PERSP. 31 (1991).

170. W. Kip Viscusi, *The Risky Business of Insurance Pricing*, 7 J. RISK & UNCERTAINTY 117, 136 (1993).

171. Egon Zehnder Int'l, *supra* note 142, at 2.

172. MCGUIRE, *supra* note 143, at 2, 6 tbl.4; WEBER, *supra* note 143, at 15 chart 3.

improvements.[173] However, as expected liability increases, businesses reduce new product introductions and spending on innovation. In contrast, products liability reforms that reduce expected liability would be expected to increase the introduction of new products.

Another study has explored the relationship between state tort reforms and state productivity.[174] Although it focused on general tort reforms instead of products liability reforms, the study found that cost-reducing reforms enacted between 1970 and 1990 were associated with significant increases in productivity.[175]

Thus, several empirical studies confirm that products liability law affects certain business decisions, such as the decision to innovate. In the next Part, I test whether products liability law affects business decisions relating to important measures of economic activity: the number of business establishments, employment, and production. My findings provide critical evidence for courts and legislatures reassessing the appropriate scope of products liability.

III. EMPIRICAL ANALYSIS OF THE RELATIONSHIP BETWEEN PRODUCTS LIABILITY AND ECONOMIC ACTIVITY

To explore the relationship between products liability law and economic activity, I empirically investigate the impact of the most important state-level products liability reforms on states' economic activity. These reforms all restrict the scope of products liability by limiting damage awards or making future liability more predictable. The substantial differences among states' choices of reforms and timing of enactment provide fifty distinct "laboratories" that offer the ideal empirical setting both to test the relationship between products liability law and economic activity and to draw conclusions about the likely impact of federal tort reform. Moreover, the results demonstrate that expansions in products liability law would influence economic activity in the opposite direction.

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173. W. Kip Viscusi & Michael J. Moore, *Rationalizing the Relationship Between Product Liability and Innovation*, *in* TORT LAW AND THE PUBLIC INTEREST: COMPETITION, INNOVATION, AND CONSUMER WELFARE 105, 123 (Peter H. Schuck ed., 1991); W. Kip Viscusi & Michael J. Moore, *An Industrial Profile of the Links Between Products Liability and Innovation*, *in* THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION, *supra* note 146, at 81, 114; W. Kip Viscusi & Michael J. Moore, *Product Liability, Research and Development, and Innovation*, 101 J. POL. ECON. 161, 182 (1993).

174. Thomas J. Campbell et al., *The Link Between Liability Reforms and Productivity: Some Empirical Evidence*, *in* 1998 BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS, *supra* note 168, at 107, 108–09.

175. *Id.* at 109.

Although claims about the impact of products liability law on economic activity have been at the forefront of all policy debates, there is a dearth of empirical evidence exploring this relationship. Until now, two challenges prevented a precise analysis of this relationship.

First, data limitations made the measurement of both products liability law and economic activity extremely difficult. There has never been a comprehensive dataset of state-level tort reforms available to researchers. A comprehensive dataset of medical malpractice tort reforms was finally created in 2006 thanks to an "army of research assistants," an NSF grant of over $72,000, and years of work by a tireless legal scholar.[176] Fortunately, the Congressional Research Service has recently compiled a unique dataset of state products liability reforms that was subsequently made available to researchers.[177] In addition, the U.S. Census Bureau has significantly expanded its collection and reporting of measures of economic activity in recent years. This is the first study to employ these combined datasets in an empirical analysis.

Second, conventional econometric techniques made precise analysis of the relationship difficult. A traditional difference-in-differences analysis would have difficulty ruling out the possibility that products liability reforms are endogenous, that is, caused by other factors that influence business activity in a particular state, such as a powerful probusiness lobby. However, I employ a sophisticated triple-differences methodology that uses businesses in low-risk industries as a control group to mitigate the endogeneity concerns.[178]

First, I discuss the measurements of products liability law and economic activity that I use in my analysis. Then I discuss the methodology and empirical results.

A. Measures of Products Liability

My analysis will test the effects of many of the most common tort reforms: reforms eliminating strict liability for nonmanufacturer product sellers, reforms adopting comparative negligence, caps on punitive damages, caps on noneconomic damages, reforms limiting joint and several liability, reforms modifying the collateral source rule, and reforms adopting statutes of repose. These reforms all limit the

176. Avraham, *supra* note 81.

177. COHEN, *supra* note 10, at 1.

178. The triple-differences methodology was introduced by Jonathan Gruber. Gruber, *supra* note 11, at 627.

scope of products liability law and reduce the liability costs of doing business. Caps on punitive damages and caps on noneconomic damages directly limit specific damage awards. Reforms eliminating joint and several liability, reforms adopting comparative negligence, and reforms modifying the collateral source rule reduce the damage award imposed on a specific defendant by allocating responsibility or compensation among different parties. Reforms eliminating strict liability for nonmanufacturer product sellers reduce the liability of sellers as they are held liable only for their own negligence or breach of warranty. Finally, statutes of repose limit the period for which manufacturers and product sellers are liable for product defects.

My analysis covers the period from 1977 to 1997. This period encompasses the most significant state-level contraction of products liability law in history. In 1977, after several federal reform measures failed in Congress, reform advocates began to view the statehouses as the only possible source of relief.[179] Over the next twenty years, states passed a multitude of reforms designed to limit businesses' liability. Differences in the timing and selection of reforms among the fifty states during this period provide ideal variation for an empirical analysis. Moreover, my sample period ends in 1997, when the enactment of the Restatement (Third) of Torts and subsequent reforms at the federal level reduced some of the variation among the states.[180] Hence the period from 1977 to 1997 allows me to exploit state-level variation to empirically isolate the influence of products liability law on economic activity.[181] Table 1 reports the number of states with each tort reform during these years.

179. Zollers, Hurd & Shears, *supra* note 17, at 1023–33.

180. *See supra* notes 104–14 and accompanying text (discussing federal reforms).

181. In addition, census data on business patterns changed in 1998, affecting the comparability with later years.

Table 1:
Number of States with Products Liability Tort Reform[182]

	Year																			
Reform	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
Product Seller Reforms	4	7	9	10	12	12	12	12	12	12	12	14	14	15	17	18	19	19	20	20	20
Comparative Negligence	17	17	21	21	24	24	24	26	28	32	36	38	38	39	40	42	43	43	43	44	44
Punitive Damage Caps	4	4	5	5	5	5	5	5	6	9	13	14	15	15	15	15	16	16	21	21	20
Joint and Several Reform	9	11	12	12	12	12	12	13	14	21	23	24	25	25	25	27	27	27	28	28	28
Statutes of Repose	9	16	18	19	21	21	20	19	17	18	18	18	18	18	18	18	18	18	19	19	19
Noneconomic Damage Caps	3	3	3	3	4	4	4	4	4	11	12	12	11	10	10	10	10	10	11	11	10
Collateral Source Reforms	1	0	1	1	1	1	1	1	2	8	14	16	16	17	16	16	15	15	14	14	14

B. Measures of Economic Activity

I examine the influence of products liability law on various measures of state-level economic activity: the number of small business establishments in high-risk industries, employment in these establishments, and gross state product (the state-level equivalent of GDP) in high-risk industries. I provide more detail on each measure below.

182. Data on these reforms are from the Congressional Research Service, COHEN, *supra* note 10, *The Database on State Tort Law Reforms*, Avraham, *supra* note 81, and my research assistants' searches of state codes and case law.

1. Number of Small Business Establishments

My first measure of economic activity is the number of small business establishments per one hundred thousand state residents in high-risk industries. The number of business establishments is an important measure of economic activity, reliably reflecting both the economic conditions in an area and the economic changes over time.[183] Exploring the influence of products liability law on establishments will determine how products liability law affects the cost of doing business by measuring net changes in business openings and closings. Moreover, it will determine whether tort reform advocates and policymakers are correct in their assertions that state-level tort reforms attract businesses to their states.[184]

a. Small Businesses

I measure the economic activity of small business establishments, or establishments with fewer than one hundred employees. Businesses of this size are more likely to be affected by state-level products liability laws than larger businesses for several reasons. First, small businesses are less likely to sell to a national market than larger businesses.[185] Large manufacturers and retailers that distribute their products nationwide could be subject to the laws in any state in which a consumer lives, and thus state-specific products liability laws will have less impact on business decisions. In contrast, small businesses selling locally are more likely to be subject to the laws of the state in which they are located. Typically, the law applied to any tort is the substantive law of the jurisdiction in which the suit is brought; in most cases in which a product's acquisition, the victim's domicile, and the victim's injury are in the same state, courts apply the laws of that state.[186] Thus, state-specific products liability

183. *County Business Patterns*, U.S. CENSUS BUREAU, http://www.census.gov/econ/cbp/index.html (last visited Oct. 23, 2012).

184. For example, Texas Representative Rob Junell (D-San Angelo) said of products liability reform: "This brings us back into the mainstream of the American civil justice system, and makes Texas a preferable place to do business . . . ." Ramsey, *supra* note 59.

185. Viscusi, *supra* note 168, at 813.

186. Symeon Symeonides, *Choice of Law for Products Liability: The 1990s and Beyond*, 78 TUL. L. REV. 1247, 1248 (2004) ("[I]n 79% of the cases in which the product's acquisition and the victim's domicile and injury were in the same state, the courts applied that state's law, regardless of whether it favored the plaintiff or the defendant and regardless of whether that state was also the forum.").

laws should have a greater influence on small businesses that sell locally than large businesses with national markets.

Second, small businesses are less likely to be part of a multi-establishment company, such as chain retailers. Businesses with fewer than one hundred employees are much more likely to be single-establishment companies. In 1998, at least ninety-five percent of businesses with fewer than one hundred employees were single-establishment businesses. In contrast, as few as eight percent of businesses with more than one hundred employees were single-establishment businesses.[187] Whereas company-wide decisions and policies of multi-establishment businesses will be influenced by the laws of many states, the decisions of a single-establishment business are more likely to be influenced by the law of the state in which it is located.[188] That is, state-level products liability laws are more likely to influence the business decisions for a small local hardware store than for a Home Depot.

Third, examining the economic activity of small, single-establishment businesses mitigates endogeneity concerns. Endogeneity bias can result if a third, confounding variable is driving changes in both products liability law and economic activity. For example, perhaps the political clout of a dominant business in the state is responsible for both the adoption of products liability reforms (through lobbying efforts) and increases in economic activity (through other probusiness efforts). However, small businesses are less likely to be involved in the lobbying efforts that could make products liability reforms endogenous to the forces that correlate with economic activity. Whereas a large business, such as a General Motors manufacturing plant, will have substantial political clout in a state and spend significant resources lobbying for products liability reforms, small,

187. *Statistics of U.S. Business: 1998*, U.S. CENSUS BUREAU, http://www.census.gov/epcd/susb/1998/us/US--.HTM (last modified July 13, 2011).

188. Nevertheless, confining my analysis to small businesses will not eliminate all of the multi-establishment businesses or businesses selling to the national market. However, inadvertently including these businesses will bias my results toward finding no impact of tort reform on economic activity. That is, assuming that the products liability laws governing a business are the laws in which the business is located, when in fact the business sells nationally, will bias my results toward zero. This type of random measurement error will imply that the actual effects of products liability reforms on economic activity are greater than those found in my analysis.

single-establishment businesses are less likely to have the same influence on state lawmakers.[189]

Finally, analyzing businesses at the individual establishment level, rather than the firm level, will more accurately capture the influence of state-level products liability laws on expected liability and insurance premiums.[190] In the majority of products liability cases involving businesses that sell locally, the substantive law applied in the case is the law of the jurisdiction where the establishment is located.[191] As a result, insurance companies charge different premiums based on the substantive law in the jurisdictions in which the establishment is located, not the substantive law of the insured firm's corporate headquarters.[192] Thus, whereas state corporate law may influence decisions about where to base corporate headquarters, state products liability law will influence decisions about where to locate individual establishments.

b. High-Risk Industries

I measure the relationship between products liability reforms and the economic activity of high-risk industries, or industries bearing the majority of products liability claims.[193] As businesses in these industries face the most exposure to products liability litigation, changes in products liability law will likely have the largest impact on their business decisions.

I employ two different measures of high-risk industries. My first measure includes only manufacturing industries. Products liability law is designed to deter manufacturers from producing defective products. Hence, changes in products liability law should

189. *See* Alberto Chong & Mark Gradstein, *Firm-Level Determinants of Political Influence*, 22 ECON. & POL. 233 (2010) (showing empirically that larger firms have more political influence on government policies).

190. Firms are an aggregation of all establishments owned by a parent company. In single-establishment businesses, the firm and the establishment are the same. *Statistics of U.S. Businesses: Definitions*, U.S. CENSUS BUREAU, http://www.census.gov/econ/susb/definitions.html# (last visited Aug. 25, 2012).

191. *See* Symeonides, *supra* note 186, at 1247.

192. *See* Viscusi, *supra* note 168, at 835 (describing the powerful effect that individual state products liability law has on insurance premium levels).

193. I collected the data from the Census Bureau's County Business Patterns collection for the years 1977–1997. These data include information on the number of business establishments in each state and year, the industry of each establishment, and the employment size of each the establishment. Data is arranged by the Standard Industrial Classification system, and is aggregated at the Major Group (two digit SIC) level. Data was previously available from the University of Virginia Geospatial & Statistical Data Center http://fisher.lib.virginia.edu/collections/stats/cbp, and is now on file with author.

alter manufacturers' cost of doing business and, in turn, influence decisions about opening, closing, and relocating businesses.

My second measure of high-risk industries includes both manufacturing industries and other industries whose businesses regularly serve as defendants in products liability claims: the retail, distribution, wholesale, and insurance industries. Under the common law in most states, all sellers in the chain of distribution are strictly liable for product defects.[194] This includes wholesalers, distributors, and retailers that had no role in the manufacture or design of a product. Similarly, insurers are often involved in products liability litigation. As businesses in these industries are subject to products liability claims, changes in the scope of products liability should influence their important business decisions.

Appendix 1 reports the industry groups defined as high-risk industries in this analysis.

2. Employment

My second measure of economic activity is employment in small business establishments per one hundred thousand state residents in high-risk industries.[195] Although the number of business establishments is an important measure of economic health, most citizens and policymakers are more concerned about employment. Exploring the impact of products liability law on employment will determine the reach of the law's influence on economic activity. That is, this measure will allow me to determine whether products liability law's influence has trickled down from the business decisions of the boardroom to the everyday lives of citizens. Moreover, it will determine whether tort reformers are correct in their assertions that restricting products liability creates jobs.[196] In my analysis of employment, I define small businesses and high-risk industries as I did in my analysis of establishments.

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194. Robert A. Sachs, *Product Liability Reform and Seller Liability: A Proposal for Change*, 55 BAYLOR L. REV. 1031, 1032–33 (2003).

195. The employment data come from the Census Bureau's County Business Patterns collection for the years 1977–1997. Data is arranged by the Standard Industrial Classification system, and is aggregated at the Major Group (two digit SIC) level. Univ. of Va. Geospatial and Statistical Data Ctr., *supra* note 193.

196. For example, Governor George W. Bush of Texas claimed that one of the most important things government can do to improve the economy and create jobs in Texas was to reform the civil justice system. GEORGE W. BUSH OFF. OF THE GOVERNOR, *supra* note 59.

3. Gross State Product

My third measure of economic activity is real per capita production, or gross state product, by high-risk industries in each state.[197] Gross state product is the state-level counterpart to gross domestic product, or GDP, which economists use to identify economic recessions and expansions. Similarly, gross state product measures the economic output of a state, and determines the health of a state's economy. Hence, exploring the relationship between products liability law and this measure will determine whether changes in businesses' exposure to liability have altered the most common indicator of economic health. In addition, this measure will determine the validity of pro-reform claims that constricting products liability is good for the economy.[198] My definitions of small businesses and high-risk industries remain the same as in my analysis of establishments and employment.

C. Econometric Methodology

To test the relationship between the scope of products liability law and economic activity I employ a sophisticated triple-differences methodology. This methodology allows me to avoid many of the pitfalls of a more traditional analysis that can result in misleading findings.

A traditional difference-in-differences analysis would examine the influence of reforms on economic activity by measuring differences in economic activity across states and years (two differences). However, this methodology would have difficulty ruling out the possibility that products liability reforms are endogenous to—that is, caused by—other factors that influence economic activity in a particular state. For example, it may be the case that a third variable, called a confounding variable, such as a powerful probusiness lobby, is responsible both for differences in economic activity across states or years and for the enactment of products liability reform. An influential probusiness lobby should be able to both push through products liability reforms and generate other changes that improve the state's economic activity. As a result, a traditional difference-in-differences analysis could produce results suggesting that reforms increase economic activity when, in fact, there is no causation. Instead, the

197. Data on real gross state product by industry were obtained from *Regional Economic Accounts*, BUREAU OF ECON. ANALYSIS, http://www.bea.gov/regional/ (last modified Sept. 25, 2012).

198. Ramsey, *supra* note 59 and accompanying quote.

results are picking up the influence of a probusiness lobby on both reforms and economic activity.

To avoid these misleading results, I employ a triple-differences methodology. Although still relatively new in the empirical literature, this methodology has been successfully employed to mitigate endogeniety bias in the presence of an important confounding variable that could be driving the results in a difference-in-differences estimation.[199] Specifically, a triple-differences estimation exploits three differences to reliably isolate relationships between variables. Whereas a difference-in-differences methodology measures differences across states and years, a triple-difference methodology also measures a third difference, in this case, differences across industries that are at high risk and low risk for products liability claims.

Nearly all confounding variables that would create endogeneity bias in a difference-in-differences estimation affect economic activity among both high-risk and low-risk businesses. For example, potential confounding variables such as a powerful probusiness lobby, favorable corporate law, tax incentives for businesses, an abundant supply of skilled labor, and many others, should influence economic activity across all industries. There is no reason why these variables would only affect economic activity in industries that face significant products liability exposure. Consequently, measuring differences in economic activity between high- and low-risk industries allows me to net out, or control for all other factors that influence industries regardless of risk. As a result, the triple-differences methodology allows me to isolate the influence of products liability law from thousands of other variables that might also influence economic activity.

I define the low-risk industries as industries relatively immune from products liability claims: water transportation, pipelines, mining, communications, utilities, personal services, business services, automobile-repair services, miscellaneous-repair services, motion pictures, educational services, social services, museums, and membership organizations. These low-risk industries serve as control groups for the high-risk industries previously discussed: the manufacturing, retail, distribution, wholesale, and insurance industries. Appendix 2 discusses further empirical tests that confirm the validity of my categorization of high-risk and low-risk industries.

My triple-differences model takes the following form:

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199. The triple-differences methodology was first introduced in 1994. Gruber, *supra* note 11, at 627.

$$\text{Economic Activity}_{ist} = \alpha + \beta_1 \cdot \text{industry}_i + \beta_2 \cdot \text{state}_s + \beta_3 \cdot \text{year}_t + \beta_4 \cdot (\text{industry}_i \times \text{state}_s) + \beta_5 \cdot (\text{industry}_i \times \text{year}_t) + \beta_6 \cdot (\text{state}_s \times \text{year}_t) + \beta_7 \cdot (\text{high-risk industry}_i \times \text{state}_s \times \text{year}_t) + \varepsilon_{ist}$$

where i indexes industry, s indexes state, and t indexes year.[200] The coefficient β_1 measures the systematic differences among each industry's economic activity across all states and years. With β_2, I measure persistent differences among states' levels of economic activity. The coefficient β_3 measures annual changes that affect the economic activity across all states, such as economic recessions and expansions. With β_4, I measure the systematic differences among each state/industry combination across all years. That is, β_4 captures influences on each industry within a state that do not change over time, such as the existence of certain natural resources or proximity to important transportation sources. The coefficient β_5 measures systematic differences among each year/industry combination across all states. That is, this coefficient controls for changes over time that affect an industry regardless of state, such as technological changes or federal regulations affecting specific industries. With β_6, I control for time-varying effects within each state that influence the economic activity in all industries, such as a business-friendly environment, favorable corporate law, wage levels, or tax incentives for business owners.

The coefficient β_7 isolates products liability law's influence on economic activity. The indicator variable *(high-risk* $\text{industry}_i \times \text{state}_s \times \text{year}_t$*)* takes the value of one only to indicate a high-risk industry in a state and year with a specific products liability reform. It is zero otherwise. Thus, the coefficient β_7 captures variation in economic activity specific to high-risk industries (relative to low-risk industries), in the reform states (relative to nonreform states), in the years after products liability reforms have been enacted (relative to before the reforms). All results tables report only the coefficient β_7 for each estimation; the other variables are included in the analysis, but not reported for brevity.

Moreover, all regressions are estimated with the appropriate state population weights, and I present both robust standard errors and standard errors clustered by state to mitigate concerns about serial correlation.[201] In addition, I present a specification that adds

200. The natural log is used to remove the scale effects in the data due to differences in the amount of establishments, employees, and output across the different industries.

201. Marianne Bertrand, Esther Duflo & Sendhil Mullainathan, *How Much Should We Trust Differences-in-Differences Estimates?*, 119 Q.J. ECONOMICS 249 (2004) (raising concerns about serial correlation in difference-in-differences studies, and suggesting potential remedies).

separate linear trends for each state and industry combination as a robustness check.

D. Empirical Results

Tables 2 through 7 report results from the triple-differences analyses of the relationship between products liability law and economic activity. In each results table, the top number in each cell is the regression coefficient, which indicates the magnitude and direction of the relationship between each products liability reform and economic activity. A negative coefficient indicates that products liability reform is associated with decreases in economic activity. In contrast, a positive coefficient indicates that products liability reform is associated with increases in economic activity.

In addition, the tables report robust standard errors in parentheses and standard errors clustered by state in square brackets.[202] In the table, * and + indicate significance at the five percent and ten percent levels, respectively.[203]

1. Business Establishments

Table 2 reports the results for the triple-differences analysis of the relationship between products liability law and the number of small business establishments in manufacturing industries. The other control variables in the Model are included in the analysis, but are not reported in the interest of brevity.

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202. The standard error is a measure of the precision with which the regression coefficient is measured. The size of the standard error relative to the coefficient indicates whether the result is statistically significant. Specifically, the regression coefficient divided by the standard error equals the *t*-statistic of the coefficient. Coefficients with *t*-statistics equal to or greater than 1.645 are considered statistically significant at the ten percent level, meaning that there is ninety percent certainty that the coefficient is different from zero. Similarly, *t*-statistics equal to or greater than 1.96 indicate statistical significance at the more certain five percent level. Empiricists typically require *t*-statistics of at least 1.645 to conclude that one variable affects another in the direction indicated by the coefficient.

203. Each results table also reports R-squared statistics, which measure the regression's overall goodness of fit. That is, the R-squared measures how much of the overall variation in the dependent variable—here, the relevant economic activity—is explained by the explanatory variables. Thus, the R-squared of a regression will vary between zero and one. An R-squared of zero means that the explanatory variables explain none of the dependent variable's variation. An R-squared of one means that the explanatory variables explain all of the variation. The closer the R-squared is to one, the better the regression explains the data. *See* WILLIAM H. GREENE, ECONOMETRIC ANALYSIS 33–34 (5th ed. 2003) (describing the use of R^2 as a measure of goodness of fit of a given regression line).

TABLE 2: PRODUCTS LIABILITY REFORMS AND SMALL BUSINESS ESTABLISHMENTS IN MANUFACTURING INDUSTRIES[204]

	Without State*Industry Trends	With State*Industry Trends
Product-Seller Liability	0.006 (0.008) [0.026]	-0.019 (0.005)* [0.015]
Comparative Negligence	0.038 (0.009)* [0.020]+	0.03 (0.006)* [0.012]*
Punitive Damage Caps	0.035 (0.009)* [0.029]	-0.002 (0.007) [0.018]
Joint and Several	-0.045 (0.010)* [0.022]*	-0.004 (0.009) [0.013]
Statute of Repose	0.018 (0.009)* [0.010]+	0.014 (0.006)* [0.08]+
Noneconomic Damage Caps	-0.004 (0.010) [0.026]	0.025 (0.006)* [0.015]+
Collateral Source Reform	-0.014 (0.009) [0.031]	0.022 (0.007)* [0.012]+
Observations	38513	38513
R-squared	0.9941	0.9951

204. The dependent variable is the natural log of the number of business establishments in each industry per one hundred thousand state residents. High-risk industries are defined as manufacturing industries. Below the coefficients, robust standard errors are in parentheses and standard errors clustered by state are in square brackets; * and + indicate significance at the five percent and ten percent levels, respectively. All regressions are estimated with state population weights and include industry*state, industry*year, and state*year effects.

The results for manufacturing industries show that reforms imposing comparative negligence and statutes of repose have a consistent positive relationship with the number of small manufacturing business establishments. These effects are statistically significant with both robust standard errors, with standard errors clustered by state, and when trends are added for each state and industry combination.

The magnitudes of the coefficients imply that,[205] holding other things constant,[206] reforms imposing comparative negligence are associated with approximately a 3.05–3.87 percent increase in the number of small manufacturing businesses. Similarly, statutes of repose are associated with approximately a 1.41–1.82 percent increase in the number of small manufacturing business

Results for other reforms are weaker. Both caps on noneconomic damages and reforms to the collateral source rule have a statistically significant positive relationship with the number of small manufacturing businesses in two of the estimations, suggesting that these reforms may also increase economic activity. Reforms to joint and several liability have a statistically significant negative relationship with the number of small businesses in two of the estimations, implying that this reform may be associated with decreases in economic activity.

Table 3 reports the results for the number of small business establishments in industries that are regular defendants in products liability cases: the manufacturing, retail, wholesale, distribution, and insurance industries. Once again, the other control variables in the Model are included in the analysis, but are not reported in the interest of brevity.

205. In my semi-log estimation, the interpretation of the marginal effect of the coefficient is $[exp(\beta_7) - 1]$, so the percentage impact is $100[exp(\beta_7) - 1]$.

206. "Holding other things constant," or "*ceteris paribus*," means that if no other changes except comparative negligence reforms had occurred during this period, there would have been a 3.0–3.8 percent increase in the number of small manufacturing business establishments.

TABLE 3:
PRODUCTS LIABILITY REFORMS AND SMALL BUSINESS ESTABLISHMENTS IN INDUSTRIES BEARING MOST OF THE PRODUCTS LIABILITY CLAIMS[207]

	Without State*Industry Trends	With State*Industry Trends
Product-Seller Liability	0.017 (0.008)* [0.01]+	0.021 (0.004)* [0.01]+
Comparative Negligence	0.012 (0.008) [0.011]	-0.002 (0.004) [0.01]
Punitive Damage Caps	0.026 (0.007)* [0.02]	-0.011 (0.014) [0.02]
Joint and Several	-0.022 (0.009)* [0.002]+	0.015 (0.010) [0.011]
Statute of Repose	0.021 (0.008)* [0.01]*	0.015 (0.004)* [0.009]
Noneconomic Damage Caps	-0.004 (0.009) [0.017]	0.024 (0.004)* [0.01]+
Collateral Source Reform	-0.022 (0.014) [0.017]	0.026 (0.004)* [0.01]*
Observations	51365	51365
R-squared	0.9958	0.9965

207. The dependent variable is the natural log of the number of business establishments in each industry per one hundred thousand state residents. High-risk industries are defined as manufacturing, retail, wholesale, distribution, and insurance industries. Below the coefficients, robust standard errors are in parentheses and standard errors clustered by state are in square brackets; * and + indicate significance at the five percent and ten percent levels, respectively. All regressions are estimated with state population weights and include industry*state, industry*year, and state*year effects.

The results show that only reforms eliminating strict liability for product sellers and statutes of repose have a consistent positive relationship with the number of small businesses in industries bearing most of the products liability claims. The magnitudes of the coefficients indicate that, holding other things constant, reforms eliminating strict liability for product sellers are associated with approximately a 1.71–2.12 percent increase in the number of small businesses in industries bearing most of the products liability claims during my twenty-year sample period. Similarly, statutes of repose are associated with approximately a 1.51–2.12 percent increase in the number of small business establishments in these industries.

The results for other reforms are weaker. Both caps on noneconomic damages and reforms to the collateral source rule have a statistically significant positive relationship with the number of small businesses in these industries in two of the estimations, suggesting that these reforms may also increase economic activity. Reforms to joint and several liability have a statistically significant negative relationship with the number of small businesses in two of the estimations, implying that this reform may be associated with decreases in economic activity.

2. Employment

Tables 4 and 5 reveal the influence of products liability law on small business employment in high-risk industries. Table 4 reports the results for manufacturing industries. The other control variables in the Model are included in the analysis, but are not reported in the interest of brevity.

TABLE 4:
PRODUCTS LIABILITY REFORMS AND EMPLOYMENT IN MANUFACTURING INDUSTRIES[208]

	Without State*Industry Trends	With State*Industry Trends
Product-Seller Liability	-0.093 (0.048)+ [0.096]	0.066 (0.047) [0.075]
Comparative Negligence	-0.074 (0.047) [0.070]	0.021 (0.046) [0.048]
Punitive Damage Caps	-0.118 (0.049)* [0.139]	-0.124 (0.057)* [0.102]
Joint and Several	-0.043 (0.051) [0.068]	-0.047 (0.070) [0.068]
Statute of Repose	0.228 (0.055)* [0.088]*	0.19 (0.060)* [0.070]*
Noneconomic Damage Caps	-0.080 (0.059) [0.107]	-0.088 (0.056) [0.125]
Collateral Source Reform	0.030 (0.046) [0.067]	-0.048 (0.041) [0.072]
Observations	38513	38513
R-squared	0.9001	0.9084

208. The dependent variable is the natural log of the number of employees in each industry per one hundred thousand state residents. High-risk industries are defined as manufacturing industries. Below the coefficients, robust standard errors are in parentheses and standard errors clustered by state are in square brackets; * and + indicate significance at the five percent and ten percent levels, respectively. All regressions are estimated with state population weights and include industry*state, industry*year, and state*year effects.

The Table reports that only statutes of repose have a consistently significant relationship with manufacturing employment. The results indicate that, holding other things constant, statutes of repose are associated with approximately a 20.92–25.61 percent increase in employment in manufacturing industries during the sample period.

Caps on punitive damages have a weak negative relationship with manufacturing employment in small businesses. The negative relationship indicates that this reform is associated with decreases in employment. However, the results are only statistically significant in two of the four estimations.

Table 5 reports the results for employment in small businesses in industries bearing most of the products liability claims. The other control variables in the Model are not reported in the interest of brevity.

TABLE 5:
PRODUCTS LIABILITY REFORMS AND EMPLOYMENT IN INDUSTRIES BEARING MOST OF THE PRODUCTS LIABILITY CLAIMS[209]

	Without State*Industry Trends	With State*Industry Trends
Product-Seller Liability	0.091 (0.039)* [0.045]*	0.033 (0.014)* [0.02]+
Comparative Negligence	0.093 (0.040)* [0.066]	-0.004 (0.030) [0.036]
Punitive Damage Caps	-0.096 (0.040)* [0.098]	-0.087 (0.037)* [0.063]
Joint and Several	0.059 (0.042) [0.063]	-0.012 (0.044) [0.050]
Statute of Repose	0.203 (0.044)* [0.073]*	-0.025 (0.039) [0.051]
Noneconomic Damage Caps	-0.042 (0.049) [0.088]	-0.055 (0.035) [0.082]
Collateral Source Reform	0.009 (0.038) [0.059]	-0.066 (0.026) [0.050]
Observations	51365	51365
R-squared	0.9086	0.9162

209. The dependent variable is the natural log of the number of employees in each industry per one hundred thousand state residents. High-risk industries are defined as manufacturing, retail, wholesale, distribution, and insurance industries. Below the coefficients, robust standard errors are in parentheses and standard errors clustered by state are in square brackets; * and + indicate significance at the five percent and ten percent levels, respectively. All regressions are estimated with state population weights and include industry*state, industry*year, and state*year effects.

The Table reports that only reforms eliminating strict liability for product sellers have a statistically significant positive relationship with employment across all specifications. The coefficients suggest that this reform is associated with a 3.36–9.53 percent increase in employment in small business establishments during the twenty-year sample period, holding other things constant.

The results also suggest that statutes of repose have a positive effect on employment in two of the four specifications, suggesting that this reform may also increase this measure of economic activity. In contrast, punitive damage caps are associated with decreases in employment in two of the four specifications, indicating a negative relationship between this reform and employment in industries bearing most of the products liability claims.

3. Gross State Product

Table 6 reveals the results for the triple-differences analysis of the relationship between products liability law and gross state product in manufacturing industries. The other control variables in the Model are included in the analysis, but are not reported in the interest of brevity.

TABLE 6:
PRODUCTS LIABILITY REFORMS AND GROSS STATE PRODUCT IN MANUFACTURING INDUSTRIES[210]

	Without State*Industry Trends	With State*Industry Trends
Product-Seller Liability	0.015 (0.016) [0.051]	-0.041 (0.011)* [0.037]
Comparative Negligence	0.031 (0.015)* [0.011]*	0.030 (0.011)* [0.017]+
Punitive Damage Caps	0.022 (0.016) [0.041]	0.027 (0.011)* [0.034]
Joint and Several	-0.055 (0.016)* [0.031]+	0.022 (0.014) [0.024]
Statute of Repose	0.017 (0.017) [0.037]	0.02 (0.010)* [0.039]
Noneconomic Damage Caps	-0.023 (0.022) [0.085]	0.018 (0.017) [0.027]
Collateral Source Reform	0.014 (0.015) [0.049]	0.074 (0.009)* [0.016]*
Observations	35959	35959
R-squared	0.9809	0.9898

210. The dependent variable is the natural log of the real gross state product per capita in each industry. High-risk industries are defined as manufacturing industries. Below the coefficients, robust standard errors are in parentheses and standard errors clustered by state are in square brackets; * and + indicate significance at the five percent and ten percent levels, respectively. All regressions are estimated with state population weights and include industry*state, industry*year, and state*year effects.

The results show that only reforms adopting comparative negligence have a consistently significant positive relationship with manufacturing production. The magnitudes of the coefficients suggest that these reforms are associated with a 3.05–3.15 percent increase in gross state product in manufacturing industries, holding other factors constant. Reforms modifying the collateral source rule have a positive effect in some specifications, though the inconsistency suggests the effects are weak. Similarly, reforms to joint and several liability have a weakly negative relationship with gross state product in manufacturing industries.

Table 7 reports the results for gross state product in small businesses in industries bearing most of the products liability claims.

TABLE 7:
PRODUCTS LIABILITY REFORMS AND GROSS STATE PRODUCT IN INDUSTRIES BEARING MOST OF THE PRODUCTS LIABILITY CLAIMS[211]

	Without State*Industry Trends	With State*Industry Trends
Product-Seller Liability	0.018 (0.005)* [0.01]+	0.041 (0.01)* [0.035]
Comparative Negligence	0.029 (0.01)* [0.03]	0.029 (0.01)* [0.027]
Punitive Damage Caps	0.022 (0.02) [0.04]	0.028 (0.01)* [0.032]
Joint and Several	-0.053 (0.02)* [0.03]+	0.026 (0.022) [0.027]
Statute of Repose	0.020 (0.016) [0.03]	0.022 (0.009)* [0.036]
Noneconomic Damage Caps	-0.020 (0.02) [0.08]	0.016 (0.013) [0.025]
Collateral Source Reform	0.012 (0.01) [0.04]	0.066 (0.008)* [0.017]*
Observations	40159	40159
R-squared	0.9835	0.9910

211. The dependent variable is the natural log of the real gross state product per capita in each industry. High-risk industries are defined as the manufacturing, retail, distribution, wholesale, and insurance industries. Below the coefficients, robust standard errors are in parentheses and standard errors clustered by state are in square brackets; * and + indicate significance at the five percent and ten percent levels, respectively. All regressions are estimated with state population weights and include industry*state, industry*year, and state*year effects.

The results reveal that reforms eliminating strict liability for product sellers are positively associated with gross state product in the industries bearing most of the products liability claims in three of the four specifications. The magnitudes of the coefficients suggest that this reform is associated with a 1.82–4.19 percent increase in gross state product in the high-risk industries during my sample period.

Reforms adopting comparative negligence and reforms to the collateral source rule are also positively associated with production in many of the specifications, whereas elimination of joint and several liability is negatively associated with production in many of the specifications.

4. Summary of Results

My empirical results indicate that several reforms that restrict the scope of products liability have a significant impact on economic activity. Statutes of repose that limit the period for which manufacturers and product sellers are liable for product defects are associated with statistically significant increases in both the number of small businesses and the amount of employment in manufacturing industries. They are also weakly associated with the number of businesses and employment in the industries that bear most of the products liability claims: the manufacturing, retail, distribution, wholesale, and insurance industries.

Similarly, comparative negligence reforms that reduce damage awards when plaintiffs engage in negligent activity affect economic activity. These reforms are associated with statistically significant increases in the number of small manufacturing businesses and manufacturing production. Moreover, they are weakly associated with increases in production in industries bearing most of the products liability claims.

As expected, reforms that eliminate strict liability for nonmanufacturer product sellers increase the economic activity for only the broader category of industries that includes nonmanufacturer product sellers. Whereas these reforms have no relationship with economic activity in manufacturing industries, they are associated with increases in businesses, employment, and production in the aggregate category of industries that includes retailers, distributors, and wholesalers.

Other reforms have a weaker and less consistent relationship with economic activity. Reforms to the collateral source rule are associated with increases in the number of businesses and level of production in both manufacturing industries and the larger category

of high-risk industries that includes the retail, distribution, wholesale, and insurance industries. Noneconomic damage caps are positively associated with the number of small businesses in both definitions of high-risk industries.

In contrast, reforms to joint and several liability are associated with *decreases* in the number of businesses and level of production in both manufacturing industries and the larger category of high-risk industries that includes the retail, distribution, wholesale, and insurance industries. Similarly, punitive damage caps are associated with *decreases* in the amount of employment in both definitions of high-risk industries. However, the results are not statistically significant across all specifications, casting doubt on the reliability of the findings.

E. Implications for Recent Reforms

My empirical results have important implications for recently enacted reforms and proposed legislation. They indicate that some products liability reforms will improve economic conditions as lawmakers hope, but others will have no discernible effect on economic activity.

My evidence suggests that statutes of repose, reforms that eliminate strict liability for product sellers, and reforms adopting comparative fault significantly increase many measures of economic activity. Noneconomic damage caps and reforms to the collateral source rule weakly improve economic conditions. In contrast, punitive damage caps and reforms eliminating joint and several liability have a negative impact on certain measures of economic activity.

Thus, the results of my empirical analysis suggest that several recently enacted reforms should improve economic conditions. For example, Alabama's Small Business Protection Act of 2011 that eliminates strict liability for nonmanufacturer product sellers should increase economic activity among retailers, distributors, and wholesalers in the state.[212] Similarly, Tennessee should experience increases in economic activity after enacting reforms in 2011 that prohibit products liability claims against retailers that were not involved in the manufacturing, design, or packaging of a product.[213]

212. *See* S.B. 184, 2011 Leg., Reg. Sess. (Ala. 2011) (codified at ALA. CODE §§ 6-5-501, -521 (2012)).

213. 2011 Tenn. Pub. Acts ch. 510, § 11 (codified at TENN. CODE ANN. § 29-28-104 (West 2012).

Also in 2011, Oklahoma[214] and Tennessee[215] enacted new caps on noneconomic damages. My results suggest that these reforms may lead to slight increases in certain measures of economic activity.

In contrast, other recent reforms are unlikely to improve economic conditions, and may even worsen certain measures of economic activity. For example, South Carolina,[216] Tennessee,[217] and Wisconsin[218] adopted punitive damage caps in 2011, while Florida,[219] Oklahoma,[220] and Pennsylvania[221] eliminated joint and several liability in the recovery of all damages.

Although no state has enacted a new statute of repose since Ohio in 2004,[222] twenty-seven states currently have these reforms. Moreover, recently proposed federal legislation calls for a federal statute of repose. The Workplace Goods Job Growth and Competitiveness Act of 2006 proposed a federal twelve-year statute of repose for all durable goods.[223] If enacted, the Act would have prevented recovery in all cases where an injury occurred more than twelve years after the good was first marketed in the United States. My empirical results suggest that the proponents' assertions that the bill would promote "job growth and competitiveness" were accurate; a federal statute of repose would likely increase jobs and improve economic conditions.

Another recently proposed federal tort reform bill called for reform of products liability claims against small businesses. The bill proposed caps on punitive damages, the elimination of joint and several liability rules, and the rejection of strict liability for

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214. OKLA. STAT. ANN. tit. 23, § 61.2 (West 2011) (limiting bodily injury noneconomic loss compensation to three hundred fifty thousand dollars ($350,000) where the jury does not find defendant's conduct was grossly negligent, with reckless disregard for others, fraudulent, or intentional).

215. TENN. CODE ANN. § 29-39-102(a)(2) (2011) (limiting noneconomic damages to seven hundred fifty thousand dollars ($750,000) for all injuries or occurrences asserted).

216. S.C. CODE ANN. § 15-32-530 (2011) (limiting punitive damages to the greater of three times the compensatory damages award or five hundred thousand dollars ($500,000)).

217. TENN. CODE ANN. § 29-39-104 (capping punitive damages at five hundred thousand dollars ($500,000) with certain exceptions).

218. WIS. STAT. ANN. § 895.043 (West 2011) (limiting punitive damages to twice the amount of compensatory damages or two hundred thousand dollars ($200,000), whichever is greater).

219. FLA. STAT. ANN. § 768.81 (West 2012).

220. OKLA. STAT. ANN. tit. 23, § 15 (West 2011).

221. 42 PA. CONS. STAT. ANN. § 7102 (West 2011).

222. OHIO REV. CODE ANN. § 2305.10 (LexisNexis 2004) (imposing two-year statute of limitations on products liability claims).

223. H.R. 3509, 109th Cong. (2d. Sess. 2006).

nonmanufacturer product sellers.[224] The sponsors of the bill argued that the current products liability system "impedes competitiveness in the marketplace for goods, services, business, and employees" whereas the proposed reforms would "promote the free flow of goods and services [and] lessen burdens on interstate commerce."[225] My empirical results support their claims about the elimination of strict liability for product sellers; these reforms should increase economic activity. However, my results indicate that punitive damage caps and reforms to joint and several liability and are unlikely to improve economic conditions.

CONCLUSION

Developments over the last few decades, such as increases in the availability of insurance, consumers' access to product information, governmental safety regulations, and litigation costs, have altered the relative magnitudes of products liability law's costs and benefits, forcing courts and legislatures to reassess the appropriate scope of products liability law. Although claims about the impact of products liability law on economic activity have been at the forefront of this policy debate, these claims have largely gone empirically untested. This study fills that void by providing the first empirical evidence of the impact of products liability reforms on important measures of economic activity: businesses, employment, and production.

My results indicate that many reforms do ignite economic activity as the reformers suggest. However, many other reforms have no discernible effect on economic conditions. Statutes of repose that limit the time period for which manufacturers are liable for product defects, comparative negligence reforms that reduce damage awards when plaintiffs engage in negligent activity, and reforms that eliminate strict liability for nonmanufacturer product sellers are all associated with statistically significant increases in economic activity. Specifically, my results suggest that these reforms increase the number of businesses, employment, and production in the industries that bear most of the products liability claims: the manufacturing, retail, distribution, wholesale, and insurance industries.

In contrast, other reforms have a weak effect on economic activity. My results suggest that caps on noneconomic damages and

224. Small Business Liability Reform Act, H.R. 2813, 108th Cong. (2003).

225. *Id.*

reforms to the traditional collateral source rule are only weakly associated with increases in economic activity. Meanwhile, caps on punitive damages and reforms eliminating joint and several liability are weakly associated with decreases in certain measures of economic activity.

In the current economy, lawmakers are increasingly looking to legislation to ignite business activity and improve economic conditions. The results of this study indicate that some products liability reforms will improve economic conditions as lawmakers hope, whereas others will have no discernible effect on economic activity. Understanding the likely impacts will help to ensure that reforms are shaped less by myth and power politics, and more by information about their true impacts.

APPENDIX 1

Table A1 reports the industry groups defined as high-risk industries in this analysis.

TABLE A1: DEFINITIONS OF HIGH-RISK INDUSTRIES

Manufacturing Industries (SIC code)	Industries Bearing Most of the Products Liability Claims (SIC code)
Food and kindred products (2000)	Manufacturing industries (2000–3900)
Tobacco manufacturers (2100)	Wholesale trade-durable goods (5000)
Textile mill products (2200)	Wholesale trade-nondurable goods (5100)
Apparel and other textile products (2300)	Building materials, hardware, garden supply (5200)
Lumber and wood products (2400)	General merchandise stores (5300)
Furniture and fixtures (2500)	Food stores (5400)
Paper and allied products (2600)	Automotive dealers and gasoline stations (5500)
Printing and publishing (2700)	Apparel and accessory stores (5600)
Chemicals and allied products (2800)	Furniture & home equipment stores (5700)
Petroleum and coal products (2900)	Eating and drinking places (5800)
Rubber and plastic products (3000)	Miscellaneous retail (5900)
Leather products (3100)	Insurance carriers (6300)
Stone, glass, and concrete products (3200)	Insurance agents, brokers, and service (6400)
Primary metal industries (3300)	
Fabricated metal products (3400)	
Industrial machinery and equipment (3500)	
Electrical and electronic equipment (3600)	
Transportation equipment (3700)	
Instruments and related products (3800)	
Miscellaneous manufacturing industries (3900)	

APPENDIX 2

Table A2 reports the industry groups defined as low-risk industries in this analysis.

TABLE A2: DEFINITIONS OF LOW-RISK INDUSTRIES

Low-Risk Control Industries (SIC code)
Fishing, hunting, trapping (900)
Metal mining (1000)
Coal mining (1200)
Nonmetallic minerals, except fuels (1400)
Water transportation (4400)
Pipelines, except natural gas (4600)
Communications (4800)
Electric, gas, and sanitary services (4900)
Personal services (7200)
Business services (7300)
Automotive repair, services, and parking (7500)
Motion pictures (7800)
Educational services (8200)
Social services (8300)
Museums, galleries, botanical & zoological gardens (8400)
Membership organizations (8600)

In order for the low-risk industries to serve as adequate controls, the measures of economic activity in the low-risk industries must be mostly unaffected by products liability reforms. This assumption would be violated if, for example, insurers pool liability risk across different industries or if the low-risk industries frequently face liability for the types of claims covered by products liability reforms. However, both of these possibilities are extremely unlikely. Moreover, if this assumption is violated, the estimates of the impact of the products liability reforms on economic activity in the high-risk industries will be biased toward zero. Thus, my results would only understate the true impact of products liability law on economic activity.

In addition, to mitigate endogeneity concerns, economic activity in low-risk industries must be highly correlated with economic activity in high-risk industries. This condition would hold if state-specific factors such as a powerful probusiness lobby, tax incentives, low wages, and a large supply of skilled workers are important to the economic activity of businesses in both low-risk and high-risk industries. In Table A3, I provide evidence that the economic activity measures of businesses in low-risk industries are a good predictor of the economic activity measures of businesses in high-risk industries. The number of small business establishments in low-risk industries is positively related to the number of small business establishments in high-risk industries. The table also shows that employment and gross state product in low-risk industries are positive predictors of those same measures in high-risk industries. In each case, with robust or state-clustered standard errors, the effects are highly statistically significant. Moreover, the R^2s in each specification are large, indicating that the low-risk measures explain a large portion of the variation in the high-risk measures.

TABLE A3:
RELATIONSHIP BETWEEN LOW-RISK CONTROL INDUSTRIES AND HIGH-RISK INDUSTRIES[226]

	Manufacturing Industry			Industries Bearing Most of the Products Liability Claims		
	ln(small business establishments per 100,000)	ln(employment in small business establishments per 100,000)	ln(real per capita gross state product	ln(small business establishments per 100,000)	ln(employment in small business establishments per 100,000)	ln(real per capita gross state product
ln(relevant low-risk control)	0.307 (0.064)* [0.111]*	0.148 (0.045)* [0.062]*	0.023 (0.011)* [0.009]*	0.499 (0.077)* [0.151]*	0.295 (0.056)* [0.065]*	0.040 (0.02)* [0.015]*
Adjusted R^2	0.8968	0.9208	0.9863	0.9096	0.9091	0.9917

226. The dependent variable is designated in the second row. It is one of three activity-level measures: the natural log of the number of small business establishments in the high-risk industries per one hundred thousand state residents, the natural log of the number of employees in small business establishments in the high-risk industries per one hundred thousand state residents, or the natural log of the real per capita gross state product in the high-risk industries. The definition of high-risk industries is designated in the first row; it is either the manufacturing industry or industries bearing most of the products liability claims: manufacturing, retail, distribution, wholesale, and insurance. The following industries served as low-risk controls: mining, water transportation, pipelines, communications, utilities, personal services, business services, auto repair services, miscellaneous repair services, motion pictures, educational services, social services, museums, and membership organizations. Below the coefficients, robust standard errors are in parentheses and standard errors clustered by state are in square brackets. All regressions are estimated with state population weights and include state and year dummies. All estimations have 1071 observations.

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