PRODUCT LIABILITY REFORM AND BUSINESSES IN HIGH-RISK INDUSTRIES: ESTABLISHMENTS, EMPLOYMENT, AND ECONOMIC ACTIVITY

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ABSTRACT

Businesses and pro-business interest groups have often claimed that the litigation environment in the states influences their decisions about where and how to do business. However, very little empirical evidence exists to suggest that these claims are anything more than anecdotal. This study attempts to fill that void. I employ a triple-differences identification strategy in which businesses in high-liability industries in states that pass product liability reform serve as the treatment group and businesses in low-liability industries in those same states serve as the contemporaneous control group. Whereas, a traditional difference-in-difference analysis would have difficulty ruling out the possibility that product liability reforms are endogenous to other factors that influence business activity in a particular state, a triple-differences identification strategy that uses businesses in low-risk industries as a control group can mitigate many of the endogeneity concerns. My results suggest that four product liability reforms—reforms eliminating strict liability for product sellers, reforms adopting comparative negligence, reforms enacting statutes of repose, and reforms to the traditional collateral source rule—have significant effects on business supply decisions in high-risk industries. These reforms are associated with increases in the number of small business establishments, employment in small business establishments, and real gross state product in high-risk industries. Thus, the results from my analysis shed some light on the inherent tradeoffs in the product liability system.

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I.   INTRODUCTION

The state of product liability law has great significance in the United States. Tens of thousands of product liability cases are filed annually and many class action cases involve hundreds of thousands or even millions of individuals as plaintiffs.[2]

Traditional economic models provide theoretical predictions about the impact of product liability law and reforms on both care-level and activity-level effects. Product liability reforms that restrain liability should, in theory, reduce incentives to take care and lead to more accidents. However, these same reforms should increase the willingness of businesses to engage in the design, manufacturing, and marketing of products. Indeed, businesses and pro-business interest groups have often claimed that the litigation environment in the states influences their decisions about where and how to do business.[3] However, very little empirical evidence exists to suggest that these claims are anything more than anecdotal. This study attempts to fill that void.

I employ a triple-differences identification strategy in which businesses in high-liability industries in states that pass product liability reform serve as the treatment group and businesses in low-liability industries in those same states serve as the contemporaneous control group.   Because only the subset of businesses operating in high-risk industries are likely to be affected by product liability laws and reforms, businesses in low-risk industries represent a contemporaneous within-state comparison group. By exploiting this control group, I can net out unobservable effects that correlate with product liability reforms but that are not adequately captured by either state fixed effects or year effects.   Whereas, a traditional difference-in-difference analysis would have difficulty ruling out the possibility that product liability reforms are endogenous to other factors that influence business activity in a particular state, my triple-differences identification strategy that uses businesses in low-risk industries as a control group can mitigate many of the endogeneity concerns.

My results suggest that four product liability reforms—reforms eliminating strict liability for product sellers, reforms adopting comparative negligence, reforms enacting statutes of repose, and reforms to the traditional collateral source rule—have significant effects on business supply decisions in high-risk industries. These reforms are associated with increases in the number of small business establishments, employment in small business establishments, and real gross state product in high-risk industries.

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[2] A. Mitchell Polinsky & Steven Shavell, *The Uneasy Case for Product Liability*, 123 HARV. L. REV. 1437, 1437 (2010).

[3] THE INSTITUTE FOR LEGAL REFORM OF THE U.S. CHAMBER OF COMMERCE, RANKING THE STATES LAWSUIT CLIMATE 2010, 8 (2010), *available at:* http://www.instituteforlegalreform.com/images/stories/documents/pdf/lawsuitclimate2010/2010LawsuitClimateReport.pdf. ("Two-thirds [of general counsel and senior litigators report that the litigation environment in a state is likely to impact important business decisions at their companies, for instance, where to locate or do business").

.   Thus, the results from my analysis shed some light on the inherent tradeoffs in the product liability system. Although reforms may reduce compensation to some deserving victims and reduce the care levels of some manufacturers and related businesses, the increase in activity levels can produce large economic benefits in the U.S. states.

In the next section, I briefly discuss the history of the product liability crisis and the reform solutions passed by many state legislatures. In section III, I discuss the predicted care-level and activity-level effects of product liability reforms, and the existing empirical evidence supporting the theories. In section IV, I employ a triple-differences identification strategy to test the relationship between the supply of small business establishments in high-risk industries and several of the most common product liability tort reforms. In section V, I use a similar empirical strategy to test the impact of the reforms on employment in small business establishments and gross state product in high-risk industries. I conclude in section VI.

II.   HISTORY OF PRODUCT LIABILITY TORT REFORM

Since the 1960s, the liability of manufacturers has been on the rise. Strict product liability was first adopted in California in 1962,[4] and soon after, the Restatement (Second) of Torts helped to spread strict product liability to virtually every jurisdiction.[5]   The development of new theories, such as enterprise[6] and market share liability,[7] further facilitated consumer plaintiffs' suits. As a result, both product liability trials and awards increased significantly from the early 1960s to the late 1970s.

However the increase in product liability activity in the 1970s paled in comparison to the escalation of activity in the 1980s. The number of product liability cases brought in federal court increased by an average of 33 percent *per year* over the period from 1975 to 1989. At the same time, insurance premiums for product liability coverage escalated rapidly. Premium growth between 1975 and 1989 averaged 17.6 percent annually, and in some years, premiums grew by over 70 percent.[8] Although the cause of the significant increase in premiums is debatable, manufacturers, insurers, and other related businesses declared the situation a "crisis" and turned to state legislatures for reform solutions.[9]

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[4] Greenman v. Yuba Power Prods., Inc., 59 Cal. 2d 57, 377 P.2d 897, 27 Cal. Rptr. 697 (1962).
[5] Restatement (Second) of Torts § 402A (1965).
[6] Hall v. E.I. DuPont de Nemours & Co., 345 F. Supp. 353 (E.D.N.Y. 1972).
[7] Sindell v. Abbott Laboratories, 26 Cal. 3d 588, 607 P.2d 924, 163 Cal. Rptr. 132, *cert. denied sub nom.* E.R. Squibb & Sons, Inc. v. Sindell, 449 U.S. 912 (1980).
[8] MICHAEL J. MOORE & W. KIP VISCUSI, PRODUCT LIABILITY ENTERING THE TWENTY-FIRST CENTURY, THE U.S. PERSPECTIVE 11-12 (2001).
[9] Some have claimed that some of the increase in insurance premiums was due to bad investment decisions on the part of insurance companies, instead of increases in expected liability. UNITED STATES DEP'T OF COMMERCE, INTERAGENCY TASK FORCE ON PRODUCT

Efforts at state legislative reform have resulted in numerous reforms to state product liability laws. One of the most frequent reform measures passed by the states is a limitation on the period during which suit can be brought. All civil suits are subject to a statute of limitations. However, the statute of limitations for most torts is only one or two years. Because the act for which defendant manufacturers were traditionally liable under product liability was manufacturing defective products, a two-year statute of limitation posed a problem for plaintiffs injured by products purchased several years earlier. Rather than leave plaintiffs without a remedy when they were injured by products purchased years earlier, many courts adopted a "discovery" rule under which the statute of limitations starts to run when the plaintiff actually discovers the injury, instead of when the defective product was purchased.[10]

However, under the discovery rule, manufacturers could be subject to liability for the life of the product. To counteract this open-ended liability, many states have adopted statutes of repose that specify the number of years after a product is first sold within which suit must be filed.[11] Thus, a statute of repose may expire, precluding a lawsuit, even before an injury occurs and a statute of limitations begins to run. Twenty-seven states have adopted statutes of repose.[12]

Another popular reform adopted by the states involves the liability of product sellers such as wholesalers, distributors, and retailers. Under traditional product liability laws, product sellers could be held strict liability like product manufacturers for injuries caused by product defects. Although innocent sellers could subsequently recover from manufacturers under traditional law, this created significant transaction costs.[13] Thus, several states have enacted reforms that eliminate strict liability for product sellers. Under these reforms, sellers may be held liable only for their own negligence or breach of warranty. Twenty-two states have enacted reforms that eliminate strict liability for product sellers.[14]

Several states have also reformed joint-and-several-liability rules. Under traditional joint-and-several liability rules, a plaintiff can recover the full cost of

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LIABILITY, FINAL REPORT 1-22 (1977); Johnson, *Product liability "Reform": A Hazard to Consumers,* 56 N.C.L. REV. 677, 679 (1978); MICHAEL J. MOORE & W. KIP VISCUSI, PRODUCT LIABILITY ENTERING THE TWENTY-FIRST CENTURY, THE U.S. PERSPECTIVE 10-13 (2001).

[10] Henry Cohen, SELECTED PRODUCT LIABILITY ISSUES: A FIFTY STATE SURVEY, CONGRESSIONAL RESEARCH SERVICE, REPORT RL32560 16 (2005), *available at:* http://stuff.mit.edu/afs/sipb.mit.edu/contrib/wikileaks-crs/wikileaks-crs-reports/RL32560.pdf

[11] Terry Morehead Dworkin, *Federal Reform of Product Liability Law,* 57 TUL L. REV 602, 608-610 (1983).

[12] Henry Cohen, SELECTED PRODUCT LIABILITY ISSUES: A FIFTY STATE SURVEY, CONGRESSIONAL RESEARCH SERVICE, REPORT RL32560 20 (2005), *available at:* http://stuff.mit.edu/afs/sipb.mit.edu/contrib/wikileaks-crs/wikileaks-crs-reports/RL32560.pdf

[13] Terry Morehead Dworkin, *Federal Reform of Product Liability Law,* 57 TUL L. REV 602, 615-616 (1983).

[14] Henry Cohen, SELECTED PRODUCT LIABILITY ISSUES: A FIFTY STATE SURVEY, CONGRESSIONAL RESEARCH SERVICE, REPORT RL32560 1 (2005), *available at:* http://stuff.mit.edu/afs/sipb.mit.edu/contrib/wikileaks-crs/wikileaks-crs-reports/RL32560.pdf

her injury from any party who is partially responsible for the injury, no matter how small the party's responsibility. This allows plaintiffs to collect all of their damages from a "deep-pocket" defendant, even if that defendant contributed only modestly to causing the damages. The deep-pocket defendant can sue the other tortfeasors for contribution to seek reimbursement of the other tortfeasors' share of the damages, but such cross-claims are often fruitless because the other tortfeasors often lack resources. As a result, several states have reformed their rules regarding multiple defendants so that each responsible defendant is liable only in proportion to its share of responsibility. Thirty-one states have reformed their joint-and-several-liability rules in product liability cases.[15]

Other states have modified the traditional collateral source rule. The traditional collateral source 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 is that a defendant should not benefit merely because the plaintiff has had the foresight to purchase insurance. 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, a plaintiff's award may exceed the value of the harm he suffered. 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. Thirty-six states have adopted reforms that modify the traditional collateral source rule.

Limitations on damages have been passed by many states as an additional way to treat the product liability crisis. Most reforms are aimed at either noneconomic damages or punitive damages. Noneconomic damages are damages for nonpecuniary losses such as pain and suffering, loss of consortium, emotional distress, and other intangible losses. Critics claim that these damages are often excessive and unpredictable, increasing both the level and variation of expected liability costs. In addition, critics claim that a tort system that provides noneconomic damages is, in effect, requiring everyone in society to pay for insurance to cover such losses. Sellers who become liable for noneconomic damages will pass their costs on to all consumers through higher prices, so that everyone will end up paying for them. Critics argue that most people do not want this mandatory insurance for nonpecuniary losses: they do not purchase insurance coverage for other nonpecuniary harms, such as life insurance for the loss of a child.[16] Twenty-four states have adopted caps on noneconomic damages.

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[15] Henry Cohen, SELECTED PRODUCT LIABILITY ISSUES: A FIFTY STATE SURVEY, CONGRESSIONAL RESEARCH SERVICE, REPORT RL32560 13 (2005), *available at:* http://stuff.mit.edu/afs/sipb.mit.edu/contrib/wikileaks-crs/wikileaks-crs-reports/RL32560.pdf

[16] John E. Calfee & Paul H. Rubin, *Some Implications of Damages Payments for Nonpecuniary Losses*, 21 J. LEGAL STUD. 371 (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,

Punitive damages are meant to deter willful, wanton, and malicious conduct. Opponents also argue that these awards are often excessive and arbitrary, which increases expected liability costs and insurance premiums.[17] Critics of punitive damage awards point to the recent U.S. Supreme Court decision in State Farm v. Campbell. The decision found that a punitive damage award of $145 million was excessive and violated the Due Process Clause of the 14th Amendment because compensatory damages were only $1 million.[18] Twenty-three states have adopted caps on punitive damages.[19]

Other states have reformed laws regarding comparative fault. Traditionally, contributory negligence rules disallowed any recovery by a plaintiff whose negligence contributed, even minimally, to causing the damages. Critics argued that contributory negligence was overly harsh to negligent plaintiffs. As a result, forty-six states have adopted comparative negligence that reduces the plaintiff's recovery in proportion to his percentage of responsibility.[20]

Although comparative negligence reforms were originally intended to increase recovery for negligent plaintiffs, some scholars have asserted that they have the opposite impact.[21] One experimental study found that mock juries are less likely to find plaintiffs negligent under contributory negligence than under comparative negligence. Believing it unfair to preclude at-fault plaintiffs from receiving any compensation from negligent defendants under contributory

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Proposals for Product Liability Reform: A Theoretical Synthesis, 97 YALE L.J. 353, 362-67 (1988).

[17] *See, e.g.,* American Tort Reform Association, *Issues: Punitive Damage Reform*, *at* http://www.atra.org/issues/index.php?issue=7343 (last visited July 20, 2010) ("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").

[18] State Farm Mutual Auto Ins. Co. v. Campbell, 538 U.S. 408, 429 (2003) ("The punitive award of $145 million, therefore, was neither reasonable nor proportionate to the wrong committed, and it was an irrational and arbitrary deprivation of the property of the defendant."); Pacific Mut. Life Ins. Co. v. Haslip, 499 U.S. 1, 42 (1991) (O'Connor, J., dissenting) ("Punitive damages are a powerful weapon. Imposed wisely and with restraint, they have the potential to advance legitimate state interests. Imposed indiscriminately, however, they have a devastating potential for harm. Regrettably, common-law procedures for awarding punitive damages fall into the latter category").

[19] Henry Cohen, SELECTED PRODUCT LIABILITY ISSUES: A FIFTY STATE SURVEY, CONGRESSIONAL RESEARCH SERVICE, REPORT RL32560 8 (2005), *available at:* http://stuff.mit.edu/afs/sipb.mit.edu/contrib/wikileaks-crs/wikileaks-crs-reports/RL32560.pdf

[20] Only Alabama, Maryland, North Carolina, and Virginia retain contributory negligence. Henry Cohen, SELECTED PRODUCT LIABILITY ISSUES: A FIFTY STATE SURVEY, CONGRESSIONAL RESEARCH SERVICE, REPORT RL32560 5 (2005), *available at:* http://stuff.mit.edu/afs/sipb.mit.edu/contrib/wikileaks-crs/wikileaks-crs-reports/RL32560.pdf

[21] Shari S. Diamond et al., *Blindfolding the Jury,* 52 LAW & CONTEMP. PROBS 252, 252-54 (1989).

negligence, the jurors refused to find at-fault plaintiffs negligent at all.[22] The magnitude of the effect was significant; under the comparative negligence rule, which the mock jurors viewed as fair, none of the mock juries reported that the plaintiff was blameless.[23] In contrast, under the contributory negligence rule, rather than strictly applying the rule and ruling that the plaintiffs' negligence precluded any compensation, 45 percent of the mock juries nullified the rule by judging the blameworthy plaintiff to be blameless.[24]

If the experimental evidence holds true in actual product liability cases, then comparative negligence reforms could have two potentially offsetting effects on expected liability costs. On the one hand, because recovery is no longer barred for negligent plaintiffs, comparative negligence reforms may result in more cases where defendants pay some damage award. On the other hand, the damage awards in many cases may decrease because more plaintiffs will be found negligent under a regime that does not entirely preclude negligent plaintiffs' recovery. My empirical analysis will help to determine which of the competing influences dominates activity-level effects.

III.   PREDICTED EFFECTS OF PRODUCT LIABILITY REFORMS

The literature on the law and economics of tort law focuses on two types of behavior that may be affected by liability: care-level behaviors and activity-level behaviors. Care-level behaviors include any precautions a potential tortfeasor might take to reduce the risk of accidents in a given amount of activity. Activity-level behaviors refer to how much the potential tortfeasor engages in the activity. In this section, I discuss product liability tort reform's predicted effects on care-level behaviors and activity-level behaviors.

1. Care-Level Effects

According to law-and-economics theory, increases in expected liability costs increase potential tortfeasors' incentives to take care. Similarly, tort reforms that reduce expected liability costs reduce the incentives to take care. Thus, because product liability tort reforms lower liability costs, they reduce the incentives for manufacturers and other businesses to take care in the design, manufacture, and marketing of products.

Despite the theoretical predictions that tort reform should decrease care, studies examining the relationship between product liability and care levels have produced mixed results. For example, in an early empirical study, Higgins found that producer liability reduces the frequency of accidental fatalities in the home in states with low levels of education attainment and increases it in states with high

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[22] K. Sommer et al., *When Juries Fail to Comply with the Law: Biased Evidence Processing in Individual and Group Decision Making*, 27 PERSONALITY AND SOC. PSYCHOL. BULL. 309, 317 (2001).
[23] *Id.* at 320.
[24] *Id.*

levels of educational attainment.[25] Asserting that educational attainment proxies for whether consumers are imperfectly informed, he argues that his results suggest that producer liability increases care levels when consumers are poorly informed about risk.

In contrast, several other studies find no relationship between product liability and care levels. In an often-cited study, Priest finds that expansion of product liability litigation has no effect of either aggregate death rates or the rate of product-related injuries requiring emergency room treatment.[26] Similarly, Graham finds that an index measuring the extent of product liability has no impact on passenger-car death rates.[27] In separate studies, Craig and Martin find that the expansion of product liability on aircraft manufacturers during the 1970s and 1980s had no impact on the rate of fatal aviation accidents.[28] Similarly, Manning finds that increases in the liability risk faced by vaccine manufacturers has no influence on the safety of vaccines.[29]

2. Activity-Level Effects

Law-and-economics theory also predicts that increases in liability reduce potential tortfeasors' incentives to engage in activities that could potentially result in a tort. This is especially true in strict-liability regimes where tortfeasors are liable regardless of the level of care they exercise. In contrast, tort reforms reduce the incentive to refrain from activities that could potentially result in a tort. Thus, product liability reform should increase the activity levels of manufacturers, product sellers, and other at-risk businesses, resulting in an increased supply of these businesses.

Product liability reforms could affect the supply of businesses directly by reducing the expected liability costs associated with the design, manufacturing, and marketing of products. U.S. businesses face significant expected liability costs. In 2009, the cost of torts alleged against businesses was $152.7 billion.[30] Thus, reforms that restrain liability have the potential to significantly reduce businesses' expected costs.

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[25] Richard S. Higgins, *Producers Liability and Product Related Accidents*, 7 J. OF LEGAL STUD.299 (1978)

[26] George L. Priest, *A Theory of the Consumer Product Warranty*, 90 YALE L. J. 1297 (1981)

[27] John D. Graham ,*Product Liability and Motor Vehicle Safety, in* THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION 20 (Peter W. Huber and Robert E. Litan, eds., 1991).

[28] Andrew Craig, *Product Liability and Safety in General Aviation*, *in* THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION 456 (Peter W. Huber and Robert E. Litan, eds., 1991); Robert Martin, *General Aviation Manufacturing: An Industry Under Siege*, *in* THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION 478 (Peter W. Huber and Robert E. Litan, eds., 1991).

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

[30] TILLINGHAST-TOWERS PERRIN, 2010 UPDATE ON U.S. TORT COST TRENDS 6 (2010)

In addition to lowering expected liability claims, the reforms reduce the likelihood that businesses will experience declines in stock value as a result of litigation. 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, Viscusi and Hersch find media reports of product liability litigation significantly decrease firms' stock values.[31] Similarly, Prince and Rubin find that litigation events significantly reduce the value of firms in the automobile and pharmaceutical industries.[32] Oftentimes, the reduced stock value costs the firm more than the associated liability costs.

Product liability reforms could also affect the supply of businesses by reducing the cost of general liability insurance in the states with tort reforms. Reforms are generally aimed to both restrain liability and to reduce legal uncertainty. Legal uncertainty increases the variance in both the likelihood and the magnitude of insurers' covered losses, thereby increasing the insurers' risk. Insurers add an additional cost, or "ambiguity premium," above the expected value of loss when there is uncertainty in either the likelihood or magnitude of insured losses.[33] Empirical studies have shown that greater legal uncertainty is associated with higher premium rates.[34] Product liability reforms will reduce this legal uncertainty and restrain liability. Indeed, several studies have shown that product liability reforms reduce premiums paid by firms for liability insurance.[35]

Thus, lower expected liability costs, lower expected stock price reductions, and lower insurance premiums in states with product liability reforms should have significant activity-level effects on business supply. Holding other factors constant, these changes give disparate incentives across states with and without reforms for new businesses to open, existing businesses to close, businesses to relocate across state borders, and businesses to expand or contract the production and marketing of products.

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[31] W. Kip Viscusi & Joni Hersch, *The Market Response to Product Safety Litigation*, 2 J. OF REGULATORY ECON. 215 (1990).

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

[33] *See* George L. Priest, *The Modern Expansion of Tort Liability: Its Sources, Its Effects, and Its Reform*, 5 J. ECON. PERSP. 31 (1991); 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.").

[34] W. Kip Viscusi, *The Risky Business of Insurance Pricing*, 7 J. OF RISK AND UNCERTAINTY 117 (1993)

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

Although no other study has explored the relationship between product liability reforms and the supply of business establishments, some studies have tested for other activity-level effects. For example, several studies have explored the influence of product liability on innovations.[36] The studies generally find that at low levels of expected liability, businesses invest resources in safety improvements. However, as expected liability increases, businesses reduce new product introductions and spending on innovation. In contrast, product liability reforms that reduce expected liability would be expected to increase the introduction of new products.

Another study has explored the relationship between state product liability reforms and state productivity.[37] This study found that cost-reducing reforms are associated with significant increases in productivity.

In this study, I explore the relationship between product liability reforms and various activity-level effects: the supply of small business establishments in high-risk industries, employment in small business establishments in high-risk industries, and gross state product in high-risk industries. In the next sections, I discuss my empirical methodology and findings. I find that several product liability reforms have the predicted activity-level effects.

IV.   EMPIRICAL ANALYSIS OF TORT REFORM'S EFFECT ON THE SUPPLY OF SMALL BUSINESS ESTABLISHMENTS

In this section, I explore the relationship between the supply of small business establishments and several of the most common product liability tort reforms. After discussing the variables and methodology used in the analysis, I present the results.

A. *Variables*

My analysis will test the effects of many of the most common tort reforms: reforms eliminating strict liability for 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.[38] My analysis

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[36] 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 (Peter H. Schuck ed., 1991); W. Kip Viscusi & Michael J. Moore, *An Industrial Profile of the Links between Product Liability and Innovation*, in THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION 81 (Peter W. Huber and Robert E. Litan, eds., 1991); W. Kip Viscusi & Michael J. Moore, *Product Liability, Research and Development, and Innovation*, 101 J. OF POL. ECON. 161 (1993)

[37] Thomas J. Campbell, et al., *The Link between Liability Reforms and Productivity: Some Evidence*, BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 107 (1998).

[38] Data on these reforms are from the Congressional Research Service, The Database on State Tort Law Reforms, and my research assistants' searches of state codes and case law. Henry

covers the period from 1977-1997, years when most of the existing product liability tort reforms were adopted.

I examine the influence of these reforms on the number of small business establishments per 100,000 state residents in high-risk industries, or industries bearing the majority of product liability claims.[39] I employ two different measures of high-risk industries. First, I designate the manufacturing industry as the high-risk industry. Product liability law is generally meant to deter manufacturers from marketing defective products, and in turn, many product liability tort reforms either directly or indirectly reduce liability risk for this industry.

My second measure of high-risk industries includes the industries bearing most of the commercial liability claims. The most common sources of commercial insurance claims (other than medical malpractice) are generally auto accidents, unsafe premises, defective products, and operations of contractors, construction, and design firms.[40] The industry bearing most of the auto accident claims is the auto transportation industry. The industries bearing the majority of unsafe premises claims are the retail trade, hotel, and amusement industries. Manufacturers and wholesalers likely bear most of the defective product claims. Finally, liability for the operations of contractors, construction, and design firms falls on the construction industry. Consistent with the claims data, previous studies have found that product liability reforms have the largest impact on these industries.[41]

Because these high-risk industries bear most of the product liability claims, tort reforms that restrain liability and reduce uncertainty will disproportionately lower the expected liability costs of businesses in high-risk industries. Product liability reforms will also disproportionately reduce the likelihood that businesses in high-risk industries will suffer stock price declines as a result of litigation. Finally, businesses in high-risk industries should experience

Cohen, SELECTED PRODUCT LIABILITY ISSUES: A FIFTY STATE SURVEY, CONGRESSIONAL RESEARCH SERVICE, REPORT RL32560 8 (2005), *available at:* http://stuff.mit.edu/afs/sipb.mit.edu/contrib/wikileaks-crs/wikileaks-crs-reports/RL32560.pdf Ronen Avraham, *Database of State Tort Law Reforms (DSTLR 3rd)* (Northwestern Law & Econ Research Paper No. 06-08; U of Texas Law, Law and Econ Research Paper No. 184m 2010) *available at* SSRN: http://ssrn.com/abstract=902711.

[39] 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 (2 digit SIC) level. COUNTY BUSINESS PATTERNS. retrieved [December 1, 2010], from the University of Virginia, Geospatial and Statistical Data Center: http://fisher.lib.virginia.edu/collections/stats/cbp/.

[40] Thomas J. Campbell, et al., *The Link between Liability Reforms and Productivity: Some Evidence*, BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 107, 127-129 (1998).

[41] Thomas J. Campbell, et al., *The Link between Liability Reforms and Productivity: Some Evidence*, BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 107, 127-129 (1998).

a disproportionate decrease in insurance premiums after tort reform. Indeed, empirical studies confirm that industries with higher expected liability costs tend to pay higher premiums for product liability insurance.[42] Thus, the activity levels of businesses in these high-risk industries are more likely to be affected by tort reforms than activity levels in other industries. Table 1 reports the industry groups defined as high-risk treatment industries and low-risk control industries in this analysis.

I define small business establishments to be establishments with fewer than 100 employees. Establishments of this size are more likely to be affected by state product liability reforms than larger establishments for several reasons. First, small establishments are less likely to sell to a national market than larger business establishments.[43] Large manufacturers that distribute their products nationwide could be subject to the laws in any state in which a consumer lives, and thus state-specific reforms will have less impact on expected liability. In contrast, small businesses selling locally are more likely to be subject to the laws of that 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.[44] Thus, in contrast to large businesses with national markets, small businesses that sell locally will have a larger decrease in expected liability costs after state-specific product liability reform.

Moreover, small business establishments are less likely to be part of a multi-establishment company, such as chain retailers. Establishments with fewer than 100 employees are much more likely to be single-establishment companies. In 1998, at least 93 percent of businesses with fewer than 100 employees were single-establishment businesses. In contrast, as few as 7 percent of businesses with more than 100 employees were single-establishment businesses.[45] 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 is more likely to be influenced by the law of the state in which it is located.

Certainly confining my analysis to small business establishments will not eliminate all of the multi-establishment businesses or businesses selling to the

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[42] W. Kip Viscusi & Michael J. Moore, *An Industrial Profile of the Links between Product Liability and Innovation, in* THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION 81 (Peter W. Huber and Robert E. Litan, eds., 1991);

[43] W. Kip Viscusi, *The Performance of Liability Insurance in States with Different Products-Liability Statutes,* 19 J. LEGAL STUD. 809, 813 (1990);

[44] Symeon Symeonides, *Choice of Law for Product liability: The 1990s and Beyond*, 78 TULANE L. REV. 1247 (2004) ("In 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.")

[45] U.S. CENSUS BUREAU, STATISTICS OF U.S. BUSINESS, 1998, *available at:* http://www.census.gov/epcd/susb/1998/us/US--.HTM.

national market. However, inadvertently including these businesses will bias my results towards a finding of no activity-levels effects after tort reform. That is, assuming that the product liability law governing an establishment is the law in which the establishment is located, when in fact the establishment sells nationally, will bias my results towards zero. This type of random measurement error will imply that the actual activity-level effects of product liability reforms are greater than those found in my analysis.

In addition, small, single-establishment businesses are less likely to be involved in the lobbying efforts that could make product liability reforms endogenous to the forces that correlate with business supply. Whereas a large business, such as a GM manufacturing plant, will have substantial political clout in a state and spend significant resources lobbying for product liability reforms, small, single-establishment businesses are less likely to have the same influence on state lawmakers.

Finally, analyzing business supply at the individual establishment level, rather than the firm level will more accurately capture the influence of state-level product liability reforms on expected liability and insurance premiums. In the majority of product liability cases involving establishments that sell locally, the substantive law applied in the case is the law of the jurisdiction where the establishment is located. [46] Thus, 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 business's corporate headquarters.[47] Whereas business headquarters may be located in specific states because of corporate law advantages, establishments will be located in states because of state product liability laws, supply of skilled workers, natural resources, tax advantages, and other state-specific factors. Table 2 presents summary statistics on the product liability reforms and all dependent variables used in the analysis.

B. Methodology

I employ a triple-differences identification strategy in which businesses in high-liability industries in states that pass product liability reform serve as the treatment group and businesses in low-liability industries in those same states serve as the contemporaneous control group. Because only the subset of businesses operating in high-risk industries is likely to be affected by a product liability crisis, businesses in low-risk industries represent a contemporaneous within-state comparison group. By exploiting this control group, I can net out

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[46] Symeon Symeonides, *Choice of Law for Product liability: The 1990s and Beyond*, 78 TULANE L. REV. 1247 (2004) ("In 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.")

[47] W. Kip Viscusi, *The Performance of Liability Insurance in States with Different Products-Liability Statutes*, 19 J. LEGAL STUD. 809, 813 (1990);

unobservable effects that correlate with product liability reforms but that are not adequately captured by either state fixed effects or year effects. A traditional difference-in-difference analysis would have difficulty ruling out the possibility that product liability reforms are endogenous to other factors that influence business activity in a particular state, such as a general business-friendly environment in the state, tax incentives, or the supply of skilled workers. In contrast, a triple-differences identification strategy that uses businesses in low-risk industries as a control group will mitigate the endogeneity concerns.

I utilize the industry-specific data to create the treatment and control groups for my analysis. I define the low-risk industries to be 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. These low-risk industries serve as control groups for high-risk treatment groups previously discussed: the manufacturing industry and the industries bearing the majority of commercial liability claims.

In order for the low-risk industries to serve as adequate controls, the measures of business activity in the low-risk industries must be mostly unaffected by product 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 product liability reforms. However, if this assumption is violated, the estimates of the impact of the product liability reforms on business activity in the high-risk industries will be biased toward zero.

In addition, for businesses in low-risk industries to mitigate the endogeneity concerns, the activity-level decisions in low-risk industries must be highly correlated with the activity-level decisions of the high-risk industries. This condition would hold if state-specific factors such as a business-friendly environment, tax incentives, low wages, a large supply of skilled workers, and other factors are important to the activity-level decisions of businesses in both low-risk and high-risk industries. In Table 3, I provide evidence that the activity levels of businesses in low-risk industries are a good predictor of the activity levels 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 (the activity-level measures tested in the next section) 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.

For the triple-differences analysis, I examine the natural log of the number of business establishments per 100,000 state residents in each state and industry group for both the high- and low-risk industries. I use the natural log to remove

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the scale effects in the data because of differences in the number of establishments in each industry.

The regression model takes the following form:

$$ln(establishments_{ist}) = \beta \ x \ REFORM_{ist} + \tau_{it} + \theta_{is} + \gamma_{st},$$

where i is specialty, s is state, and t is year. The model includes separate year indicators for each industry group (τ) to control for time-varying effects within each industry such as technological changes or federal regulations affecting specific industries. The model includes separate state fixed effects for each industry (θ) to control for state-specific effects within each industry, such as the existence of certain natural resources in a state or a large supply of skilled workers. The model also includes separate year indicators for each state (γ) to control for time-varying effects within each state such as wage levels or tax incentives for business owners. In the triple-differences specifications, the REFORM vector only matches the product liability reforms with the observations for the high-risk industries in states and years when the reforms were in place. 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.[48]

C. Results

Table 4 presents results from the triple-differences model. Reforms imposing comparative negligence and statutes of repose have a statistically significant positive effect on the number of small business establishments in both the manufacturing industry and the industries bearing most of the commercial liability claims. These effects are statistically significant with both robust standard errors and standard errors clustered by state.

Reforms eliminating strict liability for product sellers and reforms modifying the traditional collateral source rule have a consistent positive effect on the number of small business establishments in only the industries bearing most of the commercial liability claims. The effects are statistically insignificant for the manufacturing industry alone.

Interestingly, whereas reforms to joint and several liability have a statistically significant negative effect on the number of small business establishments in the manufacturing industry, they have a weak positive effect in the industries bearing most of the commercial liability claims (the statistical significance disappears when standard errors are clustered at the state level).

Noneconomic damage caps have no statistically significant effect in either definition of high-risk industries. Punitive damage caps have a statistically significant positive effect on the number of manufacturing establishments, but the

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[48] Bertrand, Duflo, and Mullainathan raised concerns about serial correlation in difference-in-difference studies, and suggest the remedies that I implement. Marianne Bertrand, Esther Duflo, & Sendhil Mullainathan, *How Much Should We Trust Differences-in-Differences Estimates*, 119 Q. J. OF ECON. 249 (2004).

significance disappears when standard errors are clustered by state. Punitive damage caps have no effect on the number of small business establishments for the industries bearing most of the commercial liability claims.

Thus, several reforms do appear to affect the activity-level decisions in high-risk industries. Regardless of the definition of high-risk industries, reforms imposing comparative negligence and statutes of repose increase the number of small business establishments. Statutes of repose are associated with a 1.7 percent increase in the number of small manufacturing business establishments and a 16.8 percent increase in the number of small business establishments in industries bearing most of the commercial liability claims. As these reforms replace potential liability for the life of a product with a ten-year period of potential liability, they significantly reduce both the level and uncertainty of expected liability costs. My results suggest that these reforms have significant influences on the activity-level decisions of small businesses in high-risk industries.

According to the estimation, reforms imposing comparative negligence are associated with a 3.3 percent increase in the number of small manufacturing businesses and a 31 percent increase in the number of small business establishments in industries bearing most of the commercial liability claims. These results are consistent with the experimental evidence: because more plaintiffs are found negligent under comparative negligence laws that do not entirely preclude at-fault plaintiffs' recovery, average damage awards decrease. Although comparative negligence reforms were intended to benefit plaintiffs, both the experimental evidence and my results suggest that defendants gain the most under these reforms.

Other reforms do not have a significant effect on the manufacturing industry, but do affect the number of small business establishments in the industries bearing most of the commercial liability claims: auto transportation, retail trade, hotel, amusement, manufacturers, wholesalers, and construction. Reforms eliminating strict liability for product sellers are associated with a 21.7 percent increase in the number of small business establishments in these industries. Similarly, reforms to the collateral source rule are associated with a 33.7 percent increase in the number of small business establishments in these high-risk industries.

Unfortunately, given current data limitations, I am unable to isolate the specific activity-level decisions that are driving the effects. That is, I cannot determine whether the effects are due to new businesses entering reform states, existing businesses leaving non-reform states, businesses relocating from non-reform to reform states, or other decisions. The Census Bureau reports that an upcoming edition of the County Business Patterns Data will include data on new business entries and business exits by state, year, and industry that will allow a more nuanced analysis.

V. EMPIRICAL ANALYSIS OF TORT REFORM'S EFFECT ON EMPLOYMENT AND
PRODUCTION

The preceding results suggest that several product liability reforms are effective in increasing the supply of small business establishments in high-risk industries. In this section, I test whether the increase in establishments improves other measures of economic activity in the states.

Some studies have found that product liability laws affect the structure of business organizations. If a firms suspects that one of its products is likely to have high liability costs in the future, the firm has the incentive to insulate itself from the future liability by divesting production of that product.[49] Indeed, empirical studies have found that expansions in product liability increase the number of small corporations as firms divest production to avoid liability.[50]

If firms divest production to avoid liability, reforms that limit liability should result in a decrease in the number of establishments, not an increase as my results suggest. Nevertheless, to ensure that changes in product liability laws are not only affecting the structure of business organizations, in this section I test whether product liability reforms impact real measures of economic activity: employment and gross state product.

The triple-differences methodology, definitions of high-risk and low-risk industries, and variable definitions remain the same as in the preceding analysis. However, I test the impact of product liability reforms on two different dependent variables. First, I test the impact on the natural log of the number of employees per 100,000 residents in small business establishments in high-risk industries.[51] Then, I test the reforms' impacts on the real per capita production, or gross state product, by high-risk industries in each state.[52]

Table 5 presents results from the triple-differences model for employment and Table 6 presents the triple-differences results for gross state product. Table 5 shows that only reforms adopting statutes of repose have a consistently significant effect on employment in the manufacturing industry. According to the results, statutes of repose are associated with a 23 percent increase in employment in manufacturing industries.

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[49] R.D. MacMinn & P.L. Brockett, *Corporate Spin-Off s as a Value Enhancing Technique when Faced with Legal Liability*, 16 INSURANCE: MATHEMATICS AND ECONOMICS 63 (1995).

[50] Al H. Ringleb & Steven N. Wiggins, *Liability and Large-Scale, Long-term Hazards*, 98 J. OF POL. ECON. 574 (1990); Todd A. Merolla, *The Effect of Latent Hazards on Firm Exit in Manufacturing Industries*, 18 INT. REV. OF L. AND ECON. 13 (1998); Richard R.W. Brooks, *Liability and Organizational Choice*, 45 J. L. & ECON. 91 (2002)

[51] 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 (2 digit SIC) level. COUNTY BUSINESS PATTERNS. retrieved [December 1, 2010], from the University of Virginia, Geospatial and Statistical Data Center: http://fisher.lib.virginia.edu/collections/stats/cbp/.

[52] Data on real gross state product by industry come from the BUREAU OF ECONOMIC ANALYSIS, REGIONAL ECONOMIC ACCOUNTS, *available at:* http://www.bea.gov/regional/gsp/.

Several reforms have consistently significant relationships with employment in the industries bearing most of the commercial liability claims. Reforms eliminating strict liability for product sellers, reforms adopting comparative negligence, reforms enacting statutes of repose, and reforms to the traditional collateral source rule all have significant positive effects on employment in these high risk industries. These effects are statistically significant with both robust standard errors and standard errors clustered by state. Moreover, the magnitudes of the effects are large. Each of these four reforms is associated with between 27 and 36 percent increases in employment in small business establishments.

Table 6 shows that both reforms adopting comparative negligence and statutes of repose have consistently significant positive effects on gross state product in the manufacturing industry. These positive relationships are statistically significant with both robust standard errors and standard errors clustered by state. According to the results, both comparative negligence reforms and statutes of repose are associated with a 31 percent increase in manufacturing production.

For the industries bearing most of the commercial liability claims, several reforms have consistently significant effects on gross state product. Reforms eliminating strict liability for product sellers, reforms adopting comparative negligence, reforms enacting statutes of repose, and reforms to the traditional collateral source rule all have positive effects on gross state product in these industries. The magnitudes of the effects are large; all four of these reforms are associated with between 21 and 25 percent increases in gross state product in high-risk industries.

Thus, the results for employment and gross state product indicate that product liability reforms are not only affecting the structure of business organizations. Instead, these reforms are associated with real increases in several important measures of states' economic activity.

VI.   CONCLUSION

Businesses and pro-business interest groups have often claimed that the litigation environment in the states influences their decisions about where and how to do business.[53] However, very little empirical evidence exists to suggest that these claims are anything more than anecdotal. This study attempts to fill that void.

My analysis exploits the fact that only businesses in certain high-risk industries are likely to be affected by product liability laws and reforms. I

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[53] THE INSTITUTE FOR LEGAL REFORM OF THE U.S. CHAMBER OF COMMERCE, RANKING THE STATES LAWSUIT CLIMATE 2010, 8 (2010), *available at:* http://www.instituteforlegalreform.com/images/stories/documents/pdf/lawsuitclimate2010/2010LawsuitClimateReport.pdf.

estimate a triple-differences model, using businesses in low-risk industries as a contemporaneous, within-state control group, to net out unobservable effects that correlate with product liability reforms but that are not adequately captured by either state fixed effects or year effects. Whereas, a traditional difference-in-difference analysis would have difficulty ruling out the possibility that product liability reforms are endogenous to other factors that influence business activity in a particular state, a triple-differences identification strategy that uses businesses in low-risk industries as a control group can mitigate many of the endogeneity concerns.

My results suggest that four product liability reforms—reforms eliminating strict liability for product sellers, reforms adopting comparative negligence, reforms enacting statutes of repose, and reforms to the traditional collateral source rule—have significant effects on business supply decisions in high-risk industries. These reforms are associated with increases in the number of small business establishments, employment in small business establishments, and real gross state product in high-risk industries. Other reforms, such as caps on punitive damages, caps on noneconomic damages, and reform of joint-and-several-liability rules, have no consistent effect on business supply decisions. Future drafts of this paper will add additional reforms to the analysis, such as state-of-the-art defenses and patent danger rules.

Thus, the results from my analysis shed some light on the tradeoffs inherent in the product liability system. Product liability reforms that restrain liability should, in theory, reduce incentives to take care and lead to more accidents. However, these same reforms should increase the willingness of businesses to engage in the design, manufacturing, and marketing of products. As confirmed by my empirical results, this increase in activity levels can produce large economic benefits in the U.S. states.

Table 1:
Industry Definitions

Manufacturing Industries (SIC)	Industries Bearing Most of the Commercial Liability Claims (SIC)	Low-Risk Control Industries (SIC)
Food and kindred products (2000) Tobacco manufacturers (2100) Textile mill products (2200) Apparel and other textile products (2300) Lumber and wood products (2400) Furniture and fixtures (2500) Paper and allied products (2600) Printing and publishing (2700) Chemicals and allied products (2800) Petroleum and coal products (2900) Rubber and plastic products (3000) Leather products (3100) Stone, glass, and concrete products (3200) 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)	Manufacturing Industries (2000 – 3900) + General Building Contractors (1500) Heavy Construction Contractors (1600) Special Trade Contractors (1700) Local & Interurban Passenger Transit (4100) Motor Freight Transportation and Warehousing (4200) Transportation by Air (4500) Wholesale Trade-Durable Goods (5000) Wholesale Trade-Nondurable Goods (5100) Building Materials, hardware, garden supply (5200) General Merchandise Stores (5300) Food Stores (5400) Automotive Dealers and Gasoline Stations (5500) Furniture & home equipment stores (5700) Miscellaneous retail (5900) Insurance carriers (6300) Insurance Agents, Brokers, and Service (6400) Real Estate (6500) Hotels and other lodging places (7000) Amusement and Recreational Services (7900)	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)

	Mean (S.D.) in Manufacturing Industry	Mean (S.D.) in Industries bearing most of the Commercial Liability Claims	Mean (S.D.) in Low-Risk Control Industries
Small business establishments per 100,000 state residents	6.32 (8.1)	35.3 (45.5)	25.9 (36.3)
Employees in small business establishments per 100,000 state residents	91.0 (110.5)	299.9 (418.9)	191.6 (274.9)
Real Per Capita Gross State Product	123.2 (196.7)	247.6 (457.9)	137.5 (228.1)
Product Seller Liability	0.271 (.444)	0.271 (.444)	0.271 (.444)
Comparative Negligence	0.638 (0.480)	0.638 (0.480)	0.638 (0.480)
Punitive Damage Caps	0.218 (0.414)	0.218 (0.414)	0.218 (0.414)
Joint and Several Reforms	0.387 (0.487)	0.387 (0.487)	0.387 (0.487)
Statute of Repose	0.355 (0.478)	0.355 (0.478)	0.355 (0.478)
Noneconomic Damage Caps	0.211 (0.407)	0.211 (0.407)	0.211 (0.407)
Collateral Source Reforms	0.475 (0.499)	0.475 (0.499)	0.475 (0.499)

Table 2:
Summary Statistics

Table 3:
Relationship between Low-Risk Control Industries and High-Risk Treatment Industries

	Manufacturing Industry			Industries bearing most of the Commercial 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

Notes: 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 100,000 state residents, the natural log of the number of employees in small business establishments in the high-risk industries per 100,000 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 commercial liability claims (auto transportation, retail trade, hotel, amusement, manufacturers, wholesalers, and construction). 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.

Table 4:
Triple-Differences Estimation: Product Liability Reforms and Supply of Small
Business Establishments in High-Risk Industries

	Manufacturing Industry	Industries bearing most of Commercial Liability Claims
Product Seller Liability	0.004 (0.008) [0.026]	0.217 (0.052)* [0.073]*
Comparative Negligence	0.033 (0.009)* [0.020]+	0.316 (0.057)* [0.119]*
Punitive Damage Caps	0.035 (0.009)* [0.028]	-0.028 (0.061) [0.086]
Joint and Several	-0.045 (0.010)* [0.022]*	0.121 (0.067)+ [0.128]
Statute of Repose	0.017 (0.008)* [0.010]+	0.168 (0.059)* [0.086]*
Noneconomic Damage Caps	-0.006 (0.007) [0.018]	0.044 (0.057) [0.065]
Collateral Source Reform	-0.020 (0.018) [0.027]	0.337 (0.050)* [0.070]*
Observations	38513	64679
Adjusted R^2	0.9941	0.8389

Notes: The dependent variable is the natural log of the number of business establishments in a given industry per 100,000 state residents. Below the coefficients, robust standard errors are in parentheses and standard errors clustered by state are in square brackets. Regressions for the Industries bearing most of the Commercial Liability Claims examine the number of business establishments for the following industries: auto transportation, retail trade, hotel, amusement, manufacturers, wholesalers, and construction. The following industries served as low-risk, within-state 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. All regressions are estimated with state population weights and include industry*state, industry*year, and state*year effects.

Table 5:
Triple-Differences Estimation: Product Liability Reforms and Employment in
Small Business Establishments in High-Risk Industries

	Manufacturing Industry	Industries bearing most of Commercial Liability Claims
Product Seller Liability	-0.088 (0.047)+ [0.089]	0.276 (0.069)* [0.096]*
Comparative Negligence	0.094 (0.048)* [0.073]	0.352 (0.072)* [0.137]*
Punitive Damage Caps	-0.131 (0.048)* [0.136]	-0.111 (0.079) [0.111]
Joint and Several	0.048 (0.051) [0.071]	0.131 (0.083) [0.159]
Statute of Repose	0.236 (0.054)* [0.098]*	0.357 (0.075)* [0.130]*
Noneconomic Damage Caps	0.032 (0.041) [0.081]	0.064 (0.071) [0.089]
Collateral Source Reform	-0.074 (0.041)+ [0.068]	0.354 (0.063)* [0.096]*
Observations	38513	64679
Adjusted R^2	0.9001	0.8080

Notes: The dependent variable is the natural log of the number of employees in small business establishments in a given industry per 100,000 state residents. Below the coefficients, robust standard errors are in parentheses and standard errors clustered by state are in square brackets. Regressions for the Industries bearing most of the Commercial Liability Claims examine the number of business establishments for the following industries: auto transportation, retail trade, hotel, amusement, manufacturers, wholesalers, and construction. The following industries served as low-risk, within-state 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. All regressions are estimated with state population weights and include industry*state, industry*year, and state*year effects.

Table 6:
Triple-Differences Estimation: Product Liability Reforms and Gross State Product
in High-Risk Industries

	Manufacturing Industry	Industries bearing most of Commercial Liability Claims
Product Seller Liability	0.128 (0.045)* [0.157]	0.243 (0.048)* [0.099]*
Comparative Negligence	0.312 (0.043)* [0.152]*	0.254 (0.048)* [0.099]*
Punitive Damage Caps	0.007 (0.047) [0.139]	0.086 (0.053) [0.070]
Joint and Several	0.050 (0.049) [0.117]	0.117 (0.056)* [0.117]
Statute of Repose	0.311 (0.043)* [0.117]*	0.239 (0.048)* [0.113]*
Noneconomic Damage Caps	-0.121 (0.086) [0.136]	0.062 (0.058) [0.075]
Collateral Source Reform	0.064 (0.048) [0.132]	0.214 (0.083)* [0.102]*
Observations	31269	57124
Adjusted R^2	0.8123	0.4622

Notes: The dependent variable is the natural log of the real gross state product per capita in each industry. Below the coefficients, robust standard errors are in parentheses and standard errors clustered by state are in square brackets. Regressions for the Industries bearing most of the Commercial Liability Claims examine the number of business establishments for the following industries: auto transportation, retail trade, hotel, amusement, manufacturers, wholesalers, and construction. The following industries served as low-risk, within-state 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. All regressions are estimated with state population weights and include industry*state, industry*year, and state*year effects.