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THE NATIONAL IMPLICATIONS OF LIABILITY REFORMS FOR GENERAL LIABILITY AND MEDICAL MALPRACTICE INSURANCE

W. Kip Viscusi*
Patricia Born**

I. INTRODUCTION

The mid-1980s marked the emergence of the liability crisis. By most any standard, there was a rapid jump in the role of the tort liability system concentrated in a narrow time band from 1984-86. The number of personal injury products liability cases commenced in the federal courts was 6876 in 1980, and had risen slightly to 7677 by 1984.¹ By 1985, however, this number jumped to 12,507, and it continued to rise to a peak of 16,166 in 1988. Measured as a percentage of all federal civil cases, the role of liability also grew, rising from under three percent of all cases in 1984 to five percent in 1985.² Thus, the increasing role of liability was not simply due to the increasing litigiousness of society, but rather, it also reflected a changing mix in the nature of the lawsuits. While much of the surge in liability was due to the rising role of asbestos cases, other liability suits also increased during the mid-1980s.³ Once the influence of asbestos cases is excluded, however, the liability suit trend is much more stable.

The tally of liability suits in the federal courts is but one measure of the shifting liability burden. Case counts do not track which parties prevail in these suits or the amount of the awards. More importantly, they also neglect the role of out-of-court settlements, the dominant source of compensation for accident victims. A more comprehensive measure of the role of tort liability is the shifting level of premiums firms pay for liability insurance coverage. In the case of general liability insurance, these premiums rose

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¹ These data are based on information from W. KIP VISCUSI, REFORMING PRODUCTS LIABILITY 17 (1991). See also W. Kip Viscusi, *The Performance of Liability Insurance in States with Different Products-Liability Statutes*, 19 J. LEGAL STUD. 809 (1990).

² See VISCUSI, *supra* note 1, at 18.

³ *Id.* at 21-24.

from \$6.5 billion in 1984, to \$11.5 billion in 1985, and then to \$19.4 billion in 1986, tripling the premium level in a two-year period.⁴ A similar pattern was evidenced in the case of medical malpractice insurance, where premiums doubled in the same two-year period, from \$2.4 billion in 1984, to \$3.5 billion in 1985, and then to \$4.5 billion in 1986.⁵ This surge in premium levels was not necessarily profitable for insurance firms. Indeed, there is substantial evidence discussed below indicating that writing insurance became a losing proposition during that period, accounting for the effort by insurance companies to raise premium amounts to cover their losses. In addition, there was evidence of insurance market distortions as some firms were denied insurance coverage. For instance, the Coney Island Cyclone ride was closed temporarily; municipal parks closed playgrounds; motels removed diving boards from their swimming pools; the private aircraft industry in the United States virtually shut down altogether; almost all firms abandoned the production of vaccines; and U.S. contraceptive research grounded to a halt.⁶

Many of the changes in the role of tort liability can be attributed to changes in the structure of tort liability law over the past three decades. The emergence of strict liability, the rising role of design defect cases and, perhaps most importantly, the emergence of mass toxic tort cases, greatly expanded the scope of liability. Moreover, there became the widespread perception that juries were awarding plaintiffs excessive amounts that were not justified by the character of the injury.

The main market manifestation of the liability crisis was its influence on liability insurance markets. Liability insurance is the market context where one would expect the shifting role of tort liability to be most apparent because it is in this market that firms obtain coverage for their liability insurance costs.⁷ Indeed, much of the impetus for the tort liability reform efforts came from a perception that the insurance markets were in a state of crisis during this period.

⁴ *Id.* at 27.

⁵ These data were calculated from the National Association of Insurance Commissioners (NAIC) annual data tapes.

⁶ For a review of these events, see VISCUSI, *supra* note 1, chs. 1-2.

⁷ Another market context in which the shifting role of tort liability is apparent is medical services. The frequency of medical malpractice claims rose at a rate of 10% per year from 1975 to 1986, threatening to disrupt the provision of medical services. See Patricia M. Danzon, *Malpractice Liability: Is the Grass on the Other Side Greener?*, in TORT LAW AND THE PUBLIC INTEREST 176 (Peter H. Schuck ed., 1991) [hereinafter TORT LAW].

In this Article, we will examine the changing performance of insurance markets for both general liability insurance and medical malpractice insurance throughout the 1984-91 period. These are the two lines of insurance primarily affected by the liability crisis. Conventional insurance coverage for homeowners' insurance, automobile insurance, and other lines performed in a much more stable manner throughout that period⁸ and were not as subject to the changing role of tort liability in American society. Examining the performance of insurance markets, as opposed to changing litigation patterns, is also instructive because it enables us to capture the full effect of the changing liability burden. Insurance costs will reflect not only federal court cases and their associated verdicts, but state court cases as well. Moreover, out-of-court settlements, which are over fifty times more likely than court verdicts for plaintiffs, will also be captured by examining the shifting insurance burden.⁹ The data set we analyze will include all firms writing insurance coverage in the United States, utilizing the information that insurance companies are required to provide to the states as part of the insurance regulation process.

To assess the shifting performance of the liability insurance market, we will examine the changing profitability of insurance. The principal measure examined will be the ratio of insurance losses to insurance premiums, which provides an index of the relative profitability of the underwriting activities in a particular line of insurance. This measure is the focal point of the literature on insurance regulation.¹⁰

In the course of this assessment, we will investigate which states enacted reforms from 1985 to 1987, and how these reforms related to insurance market characteristics. Did the character of insurance market operations contribute to the adoption of tort lia-

⁸ Auto insurance premiums rose 30% from 1984 to 1986, while homeowners insurance premiums rose just 13% in the same period. These figures are based on data from the NAIC annual data tapes.

⁹ The relative ratio of out-of-court settlements to court verdicts won by plaintiffs is based on the data in VISCUSI, *supra* note 1, at 46.

¹⁰ See, e.g., Glenn Blackmon & Richard Zeckhauser, *State Tort Reform Legislation: Assessing Our Control of Risks*, in TORT LAW, *supra* note 7, at 272; David J. Cummins & Scott E. Harrington, *The Impact of Rate Regulation in U.S. Property-Liability Insurance Markets: A Cross-Sectional Analysis of Individual Firm Loss Ratios*, 12 GENEVA PAPERS ON RISK & INS. 42, 50-62 (1987); Henry Grabowski et al., *Price Availability Tradeoffs of Automobile Insurance Regulation*, 56 J. RISK & INS. 275 (1989); Scott E. Harrington, *The Impact of Rate Regulation on Prices and Underwriting Results in the Property-Liability Insurance Industry*, 51 J. RISK & INS. 577 (1984); Patricia Born & W. Kip Viscusi, *Insurance Market Responses to the 1980s Liability Reforms: An Analysis of Firm-Level Data*, 61 J. RISK & INS. (forthcoming June 1994).

bility reforms and the timing of this adoption? The greatest economic pressures for tort liability reform should come from the states that have been hardest hit by these liability crises. Did these states react faster than those with a more stable liability environment, or was the adoption of liability reforms simply attributable to political factors independent of interstate differences in insurance market operations?

Perhaps most importantly, what effect did the liability reforms have? The first yardstick used to assess this impact will be the extent that these reforms influence insurance market trends. In the course of this assessment, we will investigate a variety of different measures of insurance market profitability pertaining to the mean profitability, the median profitability, and the profitability at the seventy-fifth percentile of the profitability distribution. This assessment will not only make it possible to assess whether liability reforms affected the trend, but also how firms at different levels of profitability were affected differently by the liability reforms. To the extent that the state liability reform efforts were targeted at the excesses of the tort liability system, one should expect the firms experiencing catastrophic losses to benefit most from the liability reforms, resulting in an unequal distribution of the influence of tort liability on the insurance market.

A second basis of comparison used to assess the influence of liability reforms will be to contrast the insurance market patterns in the states adopting liability reforms with those states not implementing reforms during that period. One might view the no-reform states as providing an index of how insurance markets might have recovered from the liability insurance crisis even in the absence of tort liability reform. Did the states adopting reforms stabilize the insurance profitability more rapidly than the states not adopting the reforms, as one would expect if these reforms were effective?

We will also examine the effect of these reforms over a long period of time extending through 1991. Liability reforms should be expected to increase the profitability of firms operating in the states adopting these reforms. If these reforms make writing insurance more profitable in the reform state than in the no-reform state, however, firms should shift their operations to engage in price competition in the profitable reform states and possibly decrease their operations in the less profitable no-reform states.¹¹

¹¹ See Paul Joskow, *Cartels, Competition and Regulation in the Property-Liability Insurance Industry*, 4 BELL J. ECON. & MGMT. SCI. 375 (1973); Mark Pauly et al., *Regulation and*

The long run effect should be that rates of profitability should be equalized across the reform and no-reform states if insurance markets are truly competitive, ultimately passing gains from tort liability reform on to consumers. To what extent was there such an equalization in profitability through the 1991 period?

The final class of concerns will pertain to the nature of the scope of our investigation. By considering both medical malpractice and general liability coverage, it will be possible to compare the role of the liability reforms in these two different contexts. Were medical malpractice reforms more prevalent than general liability reforms? To what extent was there an overlap between the states adopting the two kinds of reforms? Did these reforms have comparable effects, or was one class of reforms much more effective? Examining the insurance market profitability statistics for each of these two markets will illuminate comparative questions such as these, as well as help determine whether the reforms themselves were influential.

II. LIABILITY TRENDS

The insurance data sample we use for our analysis of the effect of the liability reforms on insurance profitability will be the data from the National Association of Insurance Commissioners (NAIC). Each state regulates insurance, and one requirement of this regulation is that all firms writing coverage in the different lines must submit the pertinent financial information to the state regulators. This information is available on a firm-specific basis by state, and by line of coverage, making it possible to analyze the overall trends in the insurance market as well as state differences in these trends.¹²

To track the performance in a typical market, one would like to know three things. First, what is the price at which the good is being sold? Second, how much of the good is being sold? Third, what is the resulting profitability of the firms producing the good? In the case of liability insurance data, firms do not report the price and quantity of insurance sold. Information is available on premium levels, but it is not possible to distinguish whether any shift in premiums is due to a change in the price of insurance or a

Quality Competition in the U.S. Insurance Industry, in *THE ECONOMICS OF INSURANCE REGULATION* 107 (Jörg Finsinger & Mark Pauly eds., 1986).

¹² More specifically, the data set that we used was culled from 56 computer tapes provided to us by the National Association of Insurance Commissioners. Data drawn from these tapes were then used in the accompanying empirical analysis.

change in the amount of insurance being bought. As a result, the insurance literature focuses on an index of the profitability of insurance as the principal barometer of how insurance markets are performing.

This profitability measure, known as the "loss ratio," is the ratio of losses firms incur for the policies they have written in a particular year to the value of premiums on these policies.¹³ If the losses equal premiums, then the firm has broken even from an underwriting standpoint. If losses exceed premiums, resulting in a loss ratio greater than 1.0, firms are losing money on their underwriting activities. Finally, if losses are below premiums, then the firms are making an underwriting profit. Because premiums can be invested, writing insurance may still be profitable even in situations in which the loss ratio falls below 1.0.¹⁴ Consequently, one should be cautious in making inferences that the insurance industry is losing money when the loss ratio rises above 1.0.¹⁵ However, the profitability of its underwriting activities does decrease as loss ratios increase. As a consequence, researchers have focused on the loss ratio as the dominant measure of insurance market performance.

Figure 1 sketches the loss ratio trends for the time period analyzed, where these loss ratios are weighted by the level of insurer activities. In particular, the loss ratios of firms writing a larger volume of premiums are given a greater weight proportional to their premium level. This adjustment avoids the distorting effect that would otherwise occur if small and unprofitable firms were given equal weight.

The role of insurance market conditions in providing an impetus for the liability reform movement is apparent from these figures. Loss ratios exceeded 1.0 in 1984, as they were 1.08 for general liability coverage. A similar pattern is shown in Figure 2 for medical malpractice insurance, where the loss ratio was 1.12 in 1984. In 1985, which is the principal year of the liability reforms, loss ratios hit an all-time high at 1.17 for general liability coverage in 1985 and 1.20 for medical malpractice coverage in 1985.

Two implications follow from this trend, which will be bol-

¹³ See Charles L. McClenahan, *Ratemaking*, in FOUNDATIONS OF CASUALTY ACTUARIAL SCIENCE 25 (Casualty Actuarial Society 1990).

¹⁴ William B. Fairley, *Investment Income and Profit Margins in Property-Liability Insurance: Theory and Empirical Results*, 10 BELL J. ECON. & MGMT. SCI. 192 (1979).

¹⁵ In fact, the property and casualty insurance industry as a whole has been operating at an underwriting loss for the entire period of 1984 to 1991. Underwriting losses were calculated from the NAIC annual data tapes.

Figure 1
General Liability Loss Ratios, 1984-1991

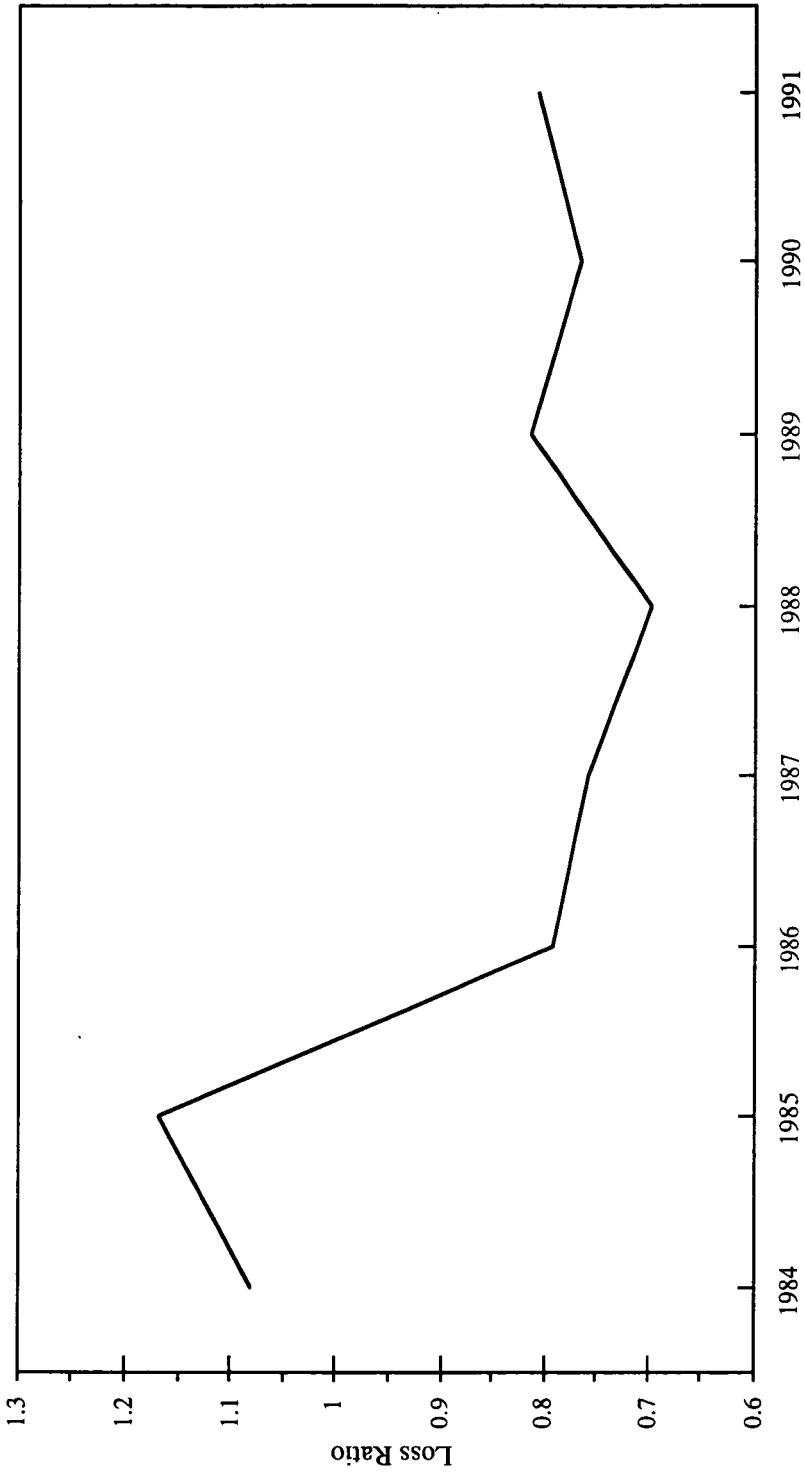
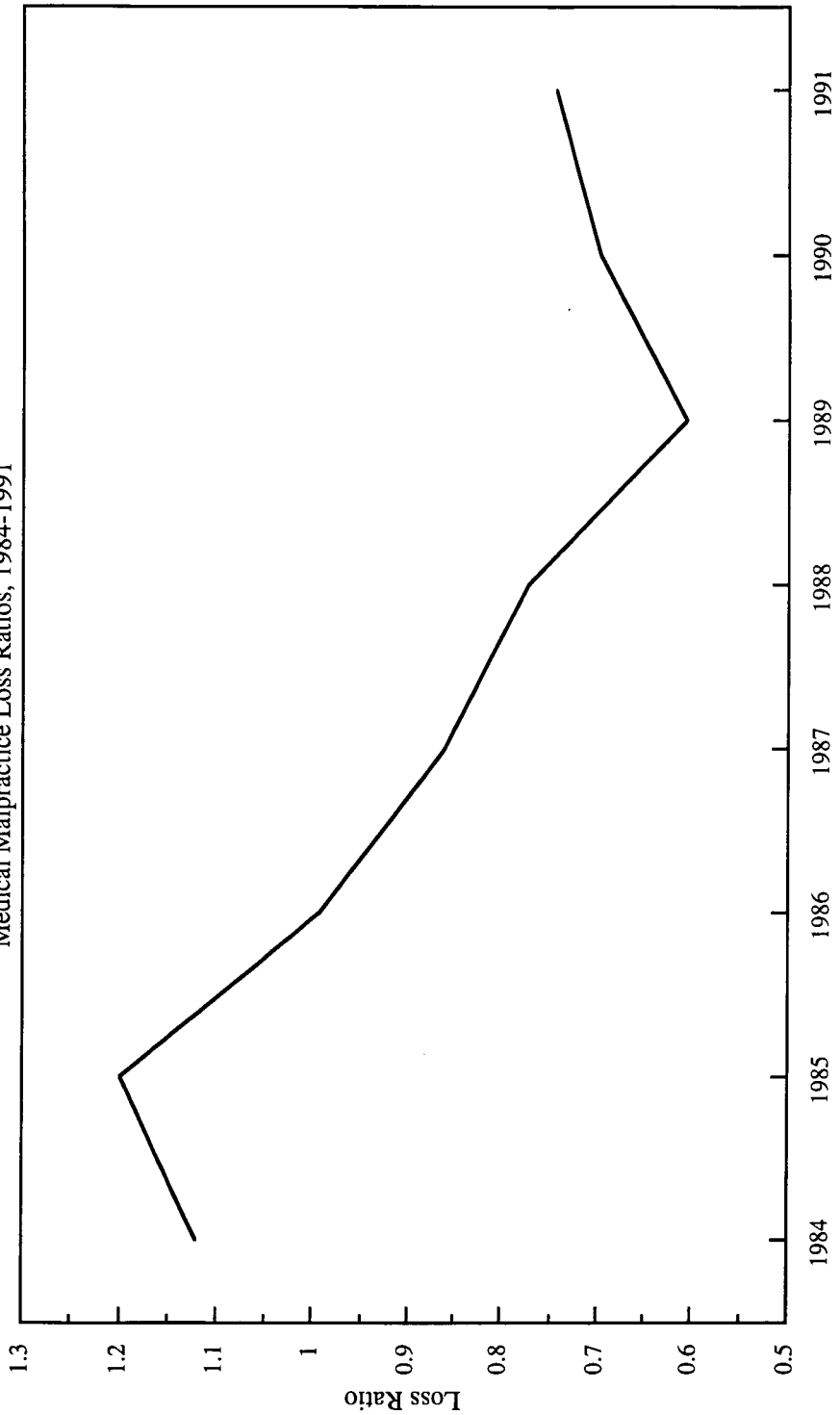


Figure 2
Medical Malpractice Loss Ratios, 1984-1991



stered by the more detailed analysis below. First, the loss ratio increase and the associated drop in insurance profitability were principal factors leading to the adoption of the tort liability reforms. Indeed, "tort liability reforms" has become almost synonymous with "cost containment." As a general rule, recent legislative changes designated as liability reforms do not increase the probability that the plaintiff will prevail or increase the size of the damages that the plaintiff will receive. The second implication of these loss ratio trends is that the precipitous drop in the loss ratios following 1985 is suggestive of a possible influence of the tort liability reforms on insurer profitability. If the objective of the liability reforms was to enhance insurance profitability, then at least judging from the overall market performance, this objective seems to have been fulfilled.

There may of course have been other contributing factors.¹⁶ The more detailed analysis below will examine states adopting reforms and states that did not, and assess the character of the shifts that took place in these different states. However, it also may be the case that there was a general shift in the tort liability climate beginning in the mid-1980s. The widespread publicity given to supposed excesses of the tort liability system may have shifted the liability climate even in the states not adopting explicit legislative reforms. Consequently, judges and juries may have become more pro-defendant in their rulings. While exploring these possibilities, using data on insurance market behavior is not possible, but nevertheless, one should not rule out the potential role of factors other than specific legislative reforms.

The improvement in insurance underwriting profitability came quickly after the mid-1980s and was maintained until 1991. General liability loss ratios dropped to 0.79 in 1986, and were only slightly higher at 0.81 in 1991. Similarly, medical malpractice loss ratios dropped to 0.99 in 1986, continued to fall through 1989, and eventually rose to 0.74 in 1991. In the case of each line of insurance, there has been a dramatic shift in the profitability of insurance in the post-liability reform era. In the sections below, we will examine the behavior in the different states that undertook these liability reforms in order to assess the degree to which these trends are consistent with the reform effect.

¹⁶ See Cummins & Harrington, *supra* note 10 (discussing a number of factors that can be expected to influence individual insurer loss ratios, including ownership form, distribution method, investment yield, and market concentration).

III. GENERAL LIABILITY REFORMS

General liability insurance coverage includes product liability for coverage of consumer products, such as the highly litigated pharmaceutical products, automobiles, asbestos, and related products that have been the target of liability suits. In addition, accidents occurring on the premises of establishments, such as injuries at amusement parks and at motel swimming pools, are also included within general liability coverage. The anecdotal evidence at the time of the tort liability crisis of the mid-1980s flagged general liability coverage as a line of insurance that was being particularly hard hit.

Partly in response to these pressures, states enacted a wide variety of reform efforts designed principally to limit liability costs.¹⁷ These measures were quite diverse, including restrictions on joint and several liability, limits on punitive damages, abolition of collateral source rules, provision for payment of court costs for frivolous suits, limits on non-economic damages, limits on liability, limits on attorney fees, and similar measures. Unfortunately, many of these actions were typically undertaken as part of a larger package of reforms. Thus, states did not enact restrictions on pain and suffering in 1985, dram shop liability rules in 1986, and punitive damage restrictions in 1987. If they had, an examination of the shifting trends in the performance of liability insurance and the incremental effect of the reforms would be possible as each of these successive experiments with liability reforms was undertaken. Instead, our task is to assess the influence of entire packages of reforms, where a possible implication of this legislative reform goes beyond the specifics of the reform action and may reflect a change in the liability climate within the state.

Table 1 lists the different reform efforts undertaken for general liability over the 1985-87 period in which reforms were enacted.¹⁸ All but four states enacted reforms during this time period. The initial wave of reform in 1985 included twelve states;

¹⁷ See KENNETH J. MEIER, *THE POLITICAL ECONOMY OF REGULATION: THE CASE OF INSURANCE* (1988) (discussing the reform coalitions and their proposals). In most states, coalitions of insurance companies, physicians, municipalities, day-care centers, small businesses, and truckers faced opposition from the American Trial Lawyers Association and consumer groups that occasionally contained labor unions. In some states, adoption of liability reforms was accompanied by requirements that insurers reduce premiums (Florida) or set prices in accordance with specified zones (New York).

¹⁸ Reform efforts targeted at the general liability insurers were obtained from the Alliance of American Insurers, Civil Justice Enactments, 1985-1987.

twenty-two states followed suit in 1986, and a final group of twelve states adopted reforms in 1987. The adoption of the reforms was not an entirely random process. Although political factors, such as the composition of the state legislature, are no doubt instrumental, the differing tort liability climate in these states will also be shown to be consequential.

Table 1
Summary of Reform Efforts, 1985-1987
General Liability

Reformed in 1985	Reformed in 1986	Reformed in 1987	No Reforms
Colorado	Alabama	Idaho	Arkansas
Illinois	Alaska	Mississippi	Kentucky
Louisiana	Arizona	Nebraska	North Carolina
Maine	California	Nevada	Pennsylvania
Massachusetts	Connecticut	North Dakota	
Missouri	Delaware	Ohio	
Montana	Florida	Oregon	
New Jersey	Georgia	Rhode Island	
New Mexico	Hawaii	South Carolina	
South Dakota	Indiana	Texas	
Wisconsin	Iowa	Vermont	
Wyoming	Kansas	Virginia	
	Maryland		
	Michigan		
	Minnesota		
	New Hampshire		
	New York		
	Oklahoma		
	Tennessee		
	Utah		
	Washington		
	West Virginia		

Table 2 presents the trends in the mean loss ratios for general liability insurance for each of the four groups of states listed, where states are grouped by the year their reform was enacted, if at all. In 1984, which was the year preceding the reform effort, the loss ratios were above 1.0 in every case. It is noteworthy that the highest 1984 loss ratio in this table is for the states enacting reforms in 1985. This pattern is consistent with the hypothesis that the unprofitability of insurance in 1984 provided the impetus for the states adopting reforms in 1985.

Table 2
Mean Loss Ratios in General Liability Insurance, 1984-1991
(standard errors in parentheses)

	1984	1985	1986	1987	1988	1989	1990	1991
No Reform Effort	1.022 (0.082)	1.115 (0.126)	0.735 (0.047)	0.653 (0.173)	0.650 (0.097)	0.671 (0.035)	0.640 (0.084)	0.695 (0.081)
Reformed in 1985	1.173 (0.065)	1.106 (0.340)	0.753 (0.110)	0.713 (0.185)	0.682 (0.142)	0.814 (0.221)	0.736 (0.992)	0.867 (0.087)
Reformed in 1986	1.070 (0.049)	1.216 (0.066)	0.817 (0.082)	0.784 (0.136)	0.711 (0.200)	0.805 (0.063)	0.783 (0.180)	0.794 (0.040)
Reformed in 1987	1.016 (0.247)	1.137 (0.089)	0.801 (0.424)	0.773 (0.407)	0.701 (0.247)	0.922 (0.083)	0.804 (0.123)	0.817 (0.081)

Somewhat strikingly, we observe the same pattern in the next year as well. The highest loss ratio in the 1985 column is for the states adopting reforms in 1986. Once again, the very high degree of unprofitability of insurance in some states in 1985 seems to have provided an impetus for reforms in those states in the following year.

The lowest loss ratio in 1985 was for the states undertaking reforms in that year, so that within a single-year period the states reforming in 1985 went from having the highest loss ratio average in 1984 to the lowest loss ratio average in 1985. Moreover, whereas the loss ratios for every other state group in Table 2 rose in 1985, the loss ratio declined for the states enacting reforms in 1985. As a result, there seems to have been a distinct shift in the trend of insurance profitability resulting from the enactment of the 1985 reforms in that group of states.

Lower loss ratios occurred in 1986, in addition to increasing profitability for all of the groups listed in Table 2. Unlike the results for the 1985 and 1986 reforms, for the year preceding the 1987 reforms, the states undertaking the reforms did not have the highest loss ratios. However, their loss ratio average of 0.80 in 1986 is the second highest of all the groups in 1986, and is only barely exceeded (by 0.02) by the loss ratio average for the states reforming in 1986. Perhaps another reason for the absence of such a stark pre-reform discrepancy is that, by 1986, the insurance markets had begun to stabilize more generally, so that the excesses apparent in 1984 and 1985 were not evident.

The overall trend in liability market performance over the 1984-91 period was one of substantial improvements in the mean profitability of all the lines of insurance. States not adopting reforms experienced a loss ratio decline of 1.12 to 0.70. States adopt-

ing reforms in 1985 experienced a loss ratio decline of 1.17 to 0.87. States adopting reforms in 1986 experienced a loss ratio decline of 1.07 in 1984 to 0.79 in 1991, and states adopting reforms in 1987 experienced a loss ratio drop of 1.02 in 1984 to 0.82 in 1991. These comparisons are not as refined as some of the comparisons undertaken below because the year immediately preceding the reform was not always 1984, and the starting point from which the reforms had to take effect differed. State reform efforts should be given credit for the overall shift in the profitability of liability insurance beginning with the year just before the reform, and not the entire change since 1984. Even with these caveats, however, it is clear that the profitability of all lines of insurance seems to have improved. The main effect of the liability reforms appears to have been an acceleration of the pace of improved profitability in the states adopting reforms, as opposed to making these states more profitable for insurance companies in the post-reform era.

Results such as this would not be a great surprise to those believing the insurance market is competitive. If tort liability reforms improve the profitability of writing insurance in a particular state, other firms should enter those states to drive the profitability down, equalizing the profitability of writing additional coverage in different states. Put somewhat differently, the decreased costs to insurance companies resulting from tort liability reforms ultimately should be passed on to insurance purchasers so that one would not expect there to be a higher level of profitability of firms in states adopting the liability reforms in the long run.

Although the average loss ratio statistics are instructive, they may be potentially distorted by the influence of outliers. Firms with particularly bad loss experiences, which, for example, might be the case for firms that were insurers in mass toxic tort lawsuits, would be expected to be particularly hard hit.¹⁹ The role of these outliers could potentially distort the mean of the trends in the profitability of insurance.

Table 3 presents information on the median loss ratios for the different insurer groups, as well as information on the seventy-fifth percentile of the loss ratio distribution. Firms at the seventy-fifth percentile will have a loss ratio higher than seventy-five percent of the remaining firms in the group. One would expect these outliers to be most affected by limits on liability and reforms such as damages caps. The liability reform efforts were intended to curb the

¹⁹ In 1985, asbestos-related claims were being filed at a rate of 500 per month and court judgments had exceeded one billion dollars. See MEIER, *supra* note 17, at 94.

purported excesses of the liability system, rather than simply decrease the expected awards to all plaintiffs, irrespective of the merits of the case.²⁰ To the extent that reforms are targeted in this manner, it is the seventy-fifth percentile that should manifest the greatest influence.

Table 3
State Loss Ratios at the Median and 75th Percentile, 1984-1991
General Liability

States with no Reform Efforts

	1984	1985	1986	1987	1988	1989	1990	1991
Median	0.595	0.566	0.481	0.499	0.468	0.457	0.441	0.460
75th Percentile	1.194	1.270	0.916	0.925	0.956	0.977	0.880	0.998

States that Reformed in 1985

	1984	1985	1986	1987	1988	1989	1990	1991
Median	0.678	0.656	0.518	0.546	0.503	0.520	0.495	0.536
75th Percentile	1.504	1.500	1.035	1.032	1.026	1.090	1.043	1.135

States that Reformed in 1986

	1984	1985	1986	1987	1988	1989	1990	1991
Median	0.689	0.644	0.520	0.514	0.505	0.497	0.475	0.527
75th Percentile	1.490	1.369	1.032	0.997	1.013	1.060	0.990	1.163

States that Reformed in 1987

	1984	1985	1986	1987	1988	1989	1990	1991
Median	0.618	0.601	0.485	0.501	0.500	0.508	0.470	0.526
75th Percentile	1.334	1.312	0.953	0.985	0.989	1.028	1.015	1.135

The trend in the median loss ratios follows a pattern very similar to that displayed by the means. States adopting reforms in 1985 experienced improved profitability both in that year and in 1986. States adopting reforms in 1986 experienced improved profitability beginning in that year. The principal exception is the median loss

²⁰ Penalties for frivolous suits, liability limits, the establishment of immunities, and alternative dispute mechanisms were measures aimed at reducing the number of cases brought to trial.

ratio pattern for states adopting reforms in 1987, which exhibited a loss ratio rise in that year.

The most striking patterns in Table 3 pertain to the outliers. The shifting trends in the seventy-fifth percentile of the loss ratio distribution presumably should more accurately reflect the influence of the tort liability reforms. The seventy-fifth percentile for the no-reform states was comparatively stable over the 1984 to 1991 period, declining from 1.19 to 1.00. By contrast, the seventy-fifth percentile for states adopting reforms in 1985 dropped from 1.50 in 1984 to 1.14 in 1991; states adopting reforms in 1986 experienced a loss ratio decline over that period of 1.49 to 1.16; states adopting reforms in 1987 experienced a loss ratio drop of 1.33 to 1.14. Only the 1987 reform states experienced a loss ratio improvement comparable to the no-reform states. In the case of the 1985 and 1986 reforms, there was a much more substantial effect. One would have expected this to be the case because states with the most pressing liability problems should have enacted tort liability reforms first. Indeed, this was evidenced in the high mean loss ratio values found above in the years preceding the adoption of the liability reforms in the different states. The shifting trends in the performance of the seventy-fifth percentiles of these distributions reflect the greater impact of the initial liability reform efforts as compared with those undertaken in the late-1980s.

A final set of instructive comparisons is the calculation of the loss ratio differences between the performance of the insurance market in a particular year relative to the year immediately preceding reform.²¹ In the case of states adopting reforms in 1985, the issue is how much the loss ratio shifted in 1985 and thereafter as compared with 1984. The results for the median and seventy-fifth percentile of the loss ratio distribution presented in Table 4 indicate that there was a very modest effect in 1985, but a considerable one in 1986 and thereafter. Moreover, it is particularly striking that the effect relative to 1984 is much greater for the seventy-fifth

²¹ This "natural experiment" approach uses loss ratio differences to net out line-specific trends in general liability insurance. The comparison of differences across states that reformed and states that did not reform is a "differences-in-differences" analysis of the effects of reforms. For more examples of natural experiments, see CHENG HSIAO, *ANALYSIS OF PANEL DATA* (1986); BRUCE D. MEYER ET AL., *WORKERS' COMPENSATION AND INJURY DURATION: EVIDENCE FROM A NATURAL EXPERIMENT* (National Bureau of Economic Research Working Paper No. 3494, 1990); T.W. Anderson & Cheng Hsiao, *Formulation and Estimation of Dynamic Models Using Panel Data*, 18 J. ECONOMETRICS 47 (1982); Joshua D. Angrist & Alan B. Krueger, *Does Compulsory School Attendance Affect Schooling and Earnings?*, 106 QUARTERLY J. ECON. 979 (1991).

percentile of the distribution, as compared with the effects for the median.

Table 4
Loss Ratio Differences: General Liability
Reformed in 1985 vs. No Reform Efforts

Reformed in 1985

Quantile	1985-1984	1986-1984	1987-1984	1988-1984	1989-1984	1990-1984	1991-1984
Median	-0.022	-0.160	-0.132	-0.175	-0.158	-0.183	-0.142
75th Percentile	-0.004	-0.468	-0.471	-0.478	-0.414	-0.461	-0.368

No Reform Efforts

Quantile	1985-1984	1986-1984	1987-1984	1988-1984	1989-1984	1990-1984	1991-1984
Median	-0.029	-0.111	-0.096	-0.127	-0.138	-0.154	-0.135
75th Percentile	0.076	-0.278	-0.269	-0.238	-0.217	-0.314	-0.196

Reformed in 1986 vs. No Reform Efforts

Reformed in 1986

Quantile	1986-1985	1987-1985	1988-1985	1989-1985	1990-1985	1991-1985
Median	-0.125	-0.130	-0.139	-0.147	-0.169	-0.117
75th Percentile	-0.343	-0.358	-0.363	-0.319	-0.392	-0.209

No Reform Efforts

Quantile	1986-1985	1987-1985	1988-1985	1989-1985	1990-1985	1991-1985
Median	-0.085	-0.066	-0.098	-0.108	-0.124	-0.106
75th Percentile	-0.354	-0.345	-0.314	-0.293	-0.390	-0.271

Reformed in 1987 vs. No Reform Efforts

Reformed in 1987

Quantile	1987-1986	1988-1986	1989-1986	1990-1986	1991-1986
Median	0.016	0.015	0.023	-0.015	0.041
75th Percentile	0.032	0.036	0.075	0.061	0.182

No Reform Efforts

Quantile	1987-1986	1988-1986	1989-1986	1990-1986	1991-1986
Median	0.018	-0.013	-0.024	-0.040	-0.021
75th Percentile	0.009	0.040	0.061	-0.036	0.082

Even if one uses the no-reform states as a reference point, which may understate the effect of liability reforms to the extent that the reforms undertaken in the reform states had a spillover effect in altering the liability climate in the no-reform states, one nevertheless finds that, relative to these states, the 1985 reform efforts were influential. Although the median loss ratio trends are fairly similar in the two groups of states, the shift from 1984 for the seventy-fifth percentile is much greater for the reform states than the no-reform states. By this measure as well, the 1985 reforms appear to have been particularly influential.

Results in Table 4 for the 1986 reforms suggest a more limited effect of the 1986 reforms as compared with the 1985 reforms. The 1986 liability reforms' impact upon the median of the loss ratio distribution is consistently greater than in the no-reform states, as are the seventy-fifth percentile results beginning in 1987. Nevertheless, these influences are not as great as those exemplified by the 1985 reform efforts, which seem to have the greatest impact on insurance market performance. This overall pattern of a diminishing effect of subsequent reforms is borne out as well by the pattern displayed by the 1987 reforms in Table 4, as the median and seventy-fifth percentile for this group changed only modestly from the pre-reform period, where the magnitudes of these changes did not differ from the no-reform states. Given the diminishing impact of the general liability reforms, it is not surprising that the wave of the tort liability reform efforts during our sample period came to an end in 1987.

IV. MEDICAL MALPRACTICE REFORMS

Medical malpractice reforms in the 1985-87 period were as prevalent as the reforms of general liability. Moreover, the timing of the reforms of medical malpractice was somewhat earlier than that of general liability. As the state reform summary in Table 5 indicates, seventeen states adopted medical malpractice reforms in 1985, compared with twelve states adopting general liability reforms.²² An additional twenty-one states filed suit with liability reforms in 1986, where this figure is comparable to the twenty-two state total for general liability. An additional eight states adopted medical malpractice reforms in 1987, which is below the twelve

²² Reform efforts specifically targeted toward medical malpractice insurance were obtained from the Alliance of American Insurers. The set of measures is not identical to the general liability measures because some reforms were specifically aimed at medical malpractice.

state figure of states adopting general liability reforms at the end of this reform era. As in the case of general liability reforms, four states did not adopt liability reforms.

There is a remarkable similarity in the reform patterns and a substantial overlap in the states adopting general liability reforms in a particular year and the states adopting medical malpractice reforms. In the case of the four states not adopting reforms, for example, Arkansas and Kentucky are represented in each case.

Table 5
Summary of Reform Efforts, 1985-1987
Medical Malpractice

Reformed in 1985	Reformed in 1986	Reformed in 1987	No Reforms
Arizona	Alabama	Idaho	Arkansas
Colorado	Alaska	Nebraska	Kentucky
Connecticut	California	North Carolina	Mississippi
Florida	Delaware	North Dakota	Vermont
Illinois	Georgia	Ohio	
Kansas	Hawaii	Oregon	
Louisiana	Indiana	South Carolina	
Montana	Iowa	Virginia	
Nevada	Maine		
New Jersey	Maryland		
New Mexico	Massachusetts		
New York	Michigan		
Pennsylvania	Minnesota		
South Dakota	Missouri		
Texas	New Hampshire		
Utah	Oklahoma		
West Virginia	Rhode Island		
	Tennessee		
	Washington		
	Wisconsin		
	Wyoming		

Mississippi and Vermont, the two other no-reform medical malpractice states, were among the last states adopting general liability reforms, doing so in 1987. North Carolina and Pennsylvania were no-reform states for general liability, where North Carolina adopted medical malpractice reforms in 1987, and Pennsylvania did so in 1985.

The substantive content of the medical malpractice liability reforms was similar to that of general liability. In each case, the reform efforts included provisions pertaining to joint and several liability, punitive damages, collateral sources, frivolous suits, noneconomic damages, limits on liability, attorney fees, and statutes of limitations. The distinctive difference is that medical malpractice reforms also included specific medical malpractice liability limits, and general liability reforms included dram shop provisions.

The pattern of the mean loss ratios for medical malpractice insurance in the different states, which is summarized in Table 6, is consistent with the timing of the reform efforts. The patterns in 1984 are particularly striking. The highest loss ratio average is for the states that undertook reforms in 1985, where this level is followed by the mean value for the states that undertook reforms in 1986, and states that reformed in 1987. The lowest mean loss ratio, which is 0.47 below that for the states that undertook reforms in 1985, is for the no-reform states. The loss ratio value in 1984 is consequently a very good predictor of whether the state would undertake a medical malpractice reform, as well as the timing of the reform effort.

Table 6
Mean Loss Ratios in Medical Malpractice Insurance
(standard errors in parentheses)

	1984	1985	1986	1987	1988	1989	1990	1991
No Reform Effort	0.796 (0.080)	0.963 (0.263)	0.988 (5.393)	0.613 (0.123)	0.654 (0.090)	0.546 (0.066)	0.536 (6.090)	0.602 (0.107)
Reformed in 1985	1.267 (0.303)	1.346 (0.247)	1.166 (0.604)	1.037 (0.159)	0.969 (0.177)	0.647 (0.504)	0.785 (0.178)	0.873 (0.581)
Reformed in 1986	1.031 (0.112)	1.065 (0.333)	0.836 (1.389)	0.681 (0.455)	0.568 (0.061)	0.559 (0.284)	0.619 (0.152)	0.584 (0.468)
Reformed in 1987	0.868 (0.155)	1.056 (0.347)	0.811 (0.574)	0.764 (1.821)	0.633 (0.182)	0.623 (0.102)	0.553 (0.099)	0.615 (0.032)

For the states that undertook medical malpractice reforms in 1985, loss ratios continued to increase slightly in 1985, after which they abated. Over the 1984-91 period, the loss ratio average for these states declined from 1.27 to 0.87. There was also a 1985 rise in the mean loss ratios for the states that undertook reforms in 1986 and 1987, eventually leading to a dramatic drop in the loss ratios for those states.

Similar patterns are evidenced in the median and seventy-fifth percentile results summarized in Table 7. What is particularly striking is that over the 1984-86 period, there is a frequent pattern of loss ratios in excess of 2.0, or underwriting losses were more than double the value of the premiums written. Even with high rates of interest earned on investments, it is not possible to maintain a profitable insurance underwriting effort given these high loss ratios that are pertinent at the seventy-fifth percentile of the distribution. For at least one-fourth of the firms that were the most unprofitable, medical malpractice insurance was very much a losing proposition.

In all states there is considerable improvement in the perform-

ance of medical malpractice insurance after 1987. The starkest improvements are evidenced for the low profitability firms at the seventy-fifth percentile rather than for the mean. Between 1984 and 1991, the seventy-fifth percentile of the distribution essentially experienced a doubling of the profitability of insurance, as loss ratios declined to a level so that losses and premiums were brought into line.

Table 7
State Loss Ratios at the Median and 75th Percentile, 1984-1991
Medical Malpractice

States with no Reform Efforts

	1984	1985	1986	1987	1988	1989	1990	1991
Median	0.853	0.930	0.819	0.705	0.655	0.523	0.639	0.576
75th Percentile	2.153	1.676	2.272	1.224	1.364	0.923	1.435	1.045

States that Reformed in 1985

	1984	1985	1986	1987	1988	1989	1990	1991
Median	0.823	1.022	0.802	0.780	0.641	0.614	0.592	0.589
75th Percentile	2.284	2.402	2.107	1.369	1.407	1.158	1.065	1.192

States that Reformed in 1986

	1984	1985	1986	1987	1988	1989	1990	1991
Median	0.770	0.938	0.804	0.700	0.600	0.597	0.562	0.560
75th Percentile	2.167	2.163	1.706	1.265	0.987	1.166	1.021	0.986

States that Reformed in 1987

	1984	1985	1986	1987	1988	1989	1990	1991
Median	0.689	0.887	0.717	0.680	0.559	0.617	0.555	0.595
75th Percentile	1.899	2.217	1.677	1.151	0.850	1.143	0.915	1.024

The relationship of these improvements to the adoption of medical malpractice insurance reforms is more apparent in the comparisons undertaken in Table 8. Consider first the performance of the states that undertook reforms in 1985, as compared with the 1984 baseline insurance performance. Although there are no improvements evident in 1985, perhaps due in part to the continuing surge in

Table 8
Loss Ratio Differences: Medical Malpractice
Reformed in 1985 vs. No Reform Efforts

Reformed in 1985

Quantile	1985-1984	1986-1984	1987-1984	1988-1984	1989-1984	1990-1984	1991-1984
Median	0.199	-0.021	-0.043	-0.182	-0.209	-0.231	-0.234
75th Percentile	0.117	-0.178	-0.915	-0.877	-1.127	-1.219	-1.093

No Reform Efforts

Quantile	1985-1984	1986-1984	1987-1984	1988-1984	1989-1984	1990-1984	1991-1984
Median	0.077	-0.034	-0.148	-0.198	-0.330	-0.214	-0.277
75th Percentile	-0.478	0.119	-0.929	-0.790	-1.231	-0.718	-1.109

Reformed in 1986 vs. No Reform Efforts

Reformed in 1986

Quantile	1986-1985	1987-1985	1988-1985	1989-1985	1990-1985	1991-1985
Median	-0.134	-0.238	-0.338	-0.341	-0.376	-0.378
75th Percentile	-0.456	-0.898	-1.176	-0.996	-1.142	-1.176

No Reform Efforts

Quantile	1986-1985	1987-1985	1988-1985	1989-1985	1990-1985	1991-1985
Median	-1.154	-0.225	-0.275	-0.408	-0.292	-0.355
75th Percentile	0.596	-0.452	-0.312	-0.753	-0.241	-0.631

Reformed in 1987 vs. No Reform Efforts

Reformed in 1987

Quantile	1987-1986	1988-1986	1989-1986	1990-1986	1991-1986
Median	-0.037	-0.158	-0.100	-0.162	-0.122
75th Percentile	-0.526	-0.827	-0.534	-0.762	-0.653

No Reform Efforts

Quantile	1987-1986	1988-1986	1989-1986	1990-1986	1991-1986
Median	-0.114	-0.164	-0.297	-0.181	-0.244
75th Percentile	-1.048	-0.909	-1.350	-0.837	-1.227

the liability insurance market beginning in 1986 and thereafter, there is a marked decline in the loss ratios. Overall, the median loss ratio declined by 0.23 between 1984 and 1991, and there was a decline of 1.093 for the seventy-fifth percentile. These declines are comparable in magnitude to those that were experienced by the no-reform states. What differed, however, is that in the no-reform states there is greater stability and, in the case of the seventy-fifth percentile, more improvement in 1985 than in the reform states. If the reforms in 1985 were not undertaken at the start of the year, then a more appropriate baseline starting point would have been 1986. In 1986 and thereafter, there is a somewhat greater decline in the loss ratios for the reform states.

In the case of the 1986 reform efforts summarized in Table 8, the median loss ratio improved by 0.38 for reform states, whereas the seventy-fifth percentile improved by 1.18. Although the median improvement is comparable for the reform and the no-reform states, the seventy-fifth percentile improvement for the reform states is almost twice as great as for the no-reform states. As in the case of many of the general liability results, it is the outliers that appear to be most affected. Similarly, as in the case of the general liability results, the 1987 reforms appear to have been least consequential. Indeed, based on the median and seventy-fifth percentile results in Table 8, the no-reform states seem to have performed somewhat better than the 1987 reform states. This pattern may be due in part to a dip in loss ratio values in the 1987 reform states in 1986, thus establishing a very low baseline for making any judgements with respect to improvement. If one looks at the longer term average of, for example, the mean loss ratios in Table 6, there does appear to be some evidence of improved profitability in the 1987 reform states, although it is not as pronounced as for the earlier reform efforts.

V. CONCLUSION

The tort liability reforms for general liability and medical malpractice were enacted at the peak of the liability crisis in the mid-1980s. Very few states failed to enact some kind of reform during this crisis period. The states' decisions to implement a reform effort, as well as the timing of the reforms, were not due solely to interstate political differences and random political factors. There was a clear-cut relationship between the state's liability insurance performance and the adoption of liability reform. States in which losses greatly exceeded premiums, so that liability insurance was particularly unprofitable, adopted reforms earlier than states

whose firms had a better record of profitability. The early reform states also differ quite markedly from the latter reform states and from the no-reform states in terms of their post-reform profitability.

To the extent that the objective of the liability reforms was to enhance insurance profitability, they appear to have succeeded. Insurance in the reform states became much more profitable in the post-reform era. Although these effects influence the performance throughout the market in each state, the high loss firms that were the most unprofitable seem to have been the most greatly affected. This incidence of the impact of the liability reforms is quite consistent with their character, as the various damages cap provisions should serve to restrict the prevalence of the major loss outliers that are the source of an unprofitable record of performance.

Immediately after the reforms were enacted, there is evidence of substantial improvements in the profitability of both general liability and medical malpractice insurance. Over a period of time, however, there appears to have been greater equalization of the profitability of the insurance written in the different states. This pattern is not unexpected because in the long run firms should adjust their underwriting activities to equalize the profitability of the incremental insurance policy written in different states. Competitive market factors would lead to such a result. From the standpoint of consumers, this phenomenon suggests that ultimately many of the gains of the liability reforms will be passed on to consumers in terms of lower prices. Stabilizing the profitability of insurance consequently benefits not only the companies that would suffer losses because of erratic insurance market performance, but ultimately may be to the benefit of the purchasers of insurance who profit from a more stable market.

There is, however, an additional class of parties involved in these various transactions—those injured by accidents. The stabilization of the insurance market may lead to lower prices for products and for medical care, but will also generally lead to lower values of tort awards as well. If the social objective was simply to reduce losses, then that objective could be achieved by abolishing tort liability altogether. Our societal concerns are clearly much broader. In the absence of a more detailed assessment of the desirability of the reforms and their effect on injured parties, it would be premature to conclude that reform efforts that were successful in enhancing insurance market profitability should be judged a

success from the standpoint of advancing social welfare. Instead, any pronouncements of success must be more limited to whether these efforts accomplished the avowed objectives of the tort reform efforts.