

# The Impact of Tort Reform on Private Health Insurance Coverage, February 2010

---

Ronen Avraham, *University of Texas School of Law*, and  
Max Schanzenbach, *Northwestern University School of Law*

Send correspondence to: Ronen Avraham, University of Texas School of Law, 727 E. Dean Keeton St., Austin, TX 78705, USA; Tel: 512-232-1357; Fax: 512-471-6988; E-mail: ravraham@law.utexas.edu; and Max Schanzenbach, Northwestern University School of Law, 357 East Chicago Avenue, Chicago, IL 60657, USA; Tel: 312-503-4425; Fax: 312-503-5950; E-mail: m-schanzenbach@law.northwestern.edu.

This study evaluates tort reform's impact on private health insurance coverage. Tort reform may reduce costly damage awards and defensive medicine. On the other hand, tort reform may increase health care costs by reducing doctors' care-taking or increasing questionable treatments. Reducing health care costs should increase health insurance coverage rates, while cost increases should decrease coverage rates. We find that between 1981 and 2007 damage caps, collateral source reform, and joint-and-several liability reform increased health insurance coverage among price-sensitive groups between one-half and one percentage points each. We conclude that tort reform reduces health care costs, at least for price-sensitive groups. (*JEL* I11, I18, K10, K13, K23)

For two decades, tort reform has been among the foremost legal items on state legislative agendas, with interest groups regularly spending hundreds of millions of dollars pursuing or fighting against reform. The debate over tort reform has increasingly turned to a debate over physician liability and its effect on America's uniquely costly health care system. Several bills to federalize aspects of medical malpractice law have

---

The authors wish to thank Amitabh Chandra, Austan Goolsbee, Christine Jolls, Louis Kaplow, Jonathan Klick, Anup Malani, Kathryn Spier, Abraham Wickelgren, Kathy Zeiler, and participants at the American Bar Foundation seminar series for helpful comments.

American Law and Economics Review  
doi: 10.1093/aler/ahq003

© The Author 2010. Published by Oxford University Press on behalf of the American Law and Economics Association. All rights reserved. For permissions, please e-mail: journals.permissions@oxfordjournals.org.

been debated in Congress since 1994, the most recent in 2006. Policy makers have begun to link medical malpractice costs to the problems of health care costs and underinsurance. Both President Bush (2004) and President Obama (2009) have suggested limiting medical malpractice liability as a way to increase insurance coverage rates—in the case of President Obama as part of a broader health care reform package. The [Department of Health and Human Services \(2002\)](#) asserted that “limiting unreasonable awards for non-economic damages could reduce health care costs by 5%–9%....These savings would...permit an additional 2.4–4.3 million Americans to obtain insurance.” More recently, various interest groups have begun to connect tort reform with health insurance coverage. [America’s Health Insurance Plans \(AHIP\) \(2006\)](#), a national association of health insurance providers, actively promotes tort reform, arguing that defensive medicine and litigation costs increase health insurance premiums by nearly 9%.<sup>1</sup> Lastly, various legislative proposals put forward in Congress as part of health care reform included malpractice liability reform, although the legislation ultimately enacted did not include these measures.<sup>2</sup>

Despite these assertions, the effect of tort reform on health care costs is theoretically ambiguous; limiting liability could either increase or decrease insurance coverage. Proponents of tort reform have argued that reform will reduce medical malpractice insurance costs, damage awards, and costs associated with defensive medicine. If proponents are correct, medical cost reductions should translate into greater private health insurance coverage by lowering the price of health care. On the other hand, if prior tort law was functioning as intended by deterring negligent behavior, reform may increase medical costs by reducing doctors’ caretaking or

---

1. On AHIP’s website, the group asserts that “the current litigation system for compensating patients injured by medical negligence is expensive, slow, and does little to benefit the injured patients.” Available at <http://www.ahip.org/content/default.aspx?bc=39|341|320>.

2. For example, on March 2009, Congressman Michael Burgess (R-TX) reintroduced the Medical Justice Act (HR 1468) arguing that “medical liability reform must be part of national health care debate.” In February 2009, Senator Ron Wyden (D-OR) introduced the Healthy Americans Act, S.391, 111th Cong. (2009) which deals with access to health care insurance as well as with physician liability.

increasing the number of unnecessary and aggressive procedures. In this case, tort reform may actually decrease private insurance coverage by raising health care costs.

We estimate the effect of reform on private health insurance coverage using the [Current Population Survey's \(CPS\) March Demographic Files](#) and a new database of state tort law reforms. This paper is the first to directly analyze the impact of tort reform on health insurance coverage.<sup>3</sup> Our results suggest that some tort reforms modestly increase health insurance coverage for the most price-sensitive working adults (the unmarried young and the self-employed) relative to older, married, non-self-employed workers. When all eight common tort reforms are considered together, an additional reform increases coverage rates for the treatment groups between 0.3 and 0.5 percentage points each. When we consider major reforms only (caps on damages and reforms to the collateral source and joint-and-several liability rules), the effect of reform is larger. The effects further increase when we remove reforms that were weak because they were quickly struck down after passage or contained major loopholes. An effective, major reform is associated with a nearly one percentage point increase in coverage rates for both the self-employed and the single young. The joint tests of reform–treatment group interactions are generally strong ( $p$ -value $<0.0001$ ), and some inferences can be drawn about which reforms have the greatest impact. Accordingly, we conclude that some tort reforms are associated with higher insurance coverage rates for price-sensitive groups. However, the overall impact of reform on coverage rates will be very small. Most of the population is not price sensitive to coverage, and among the price-sensitive groups, we can detect only a few percentage point increase in coverage.

The rest of this paper is organized as follows. Section 1 discusses the theoretical framework, Section 2 the data, and Section 3 the methodology; Section 4 presents the results, and Section 5 concludes.

---

3. [Baicker and Chandra \(2006\)](#) used malpractice payments by state as an instrument for health insurance premiums and find that the two are significantly correlated in the expected direction. The instruments seem to work well in the estimation of health insurance demand.

## 1. Tort Reform and Health Care

The effect of tort reform on health care costs is theoretically ambiguous. To resolve this ambiguity, previous empirical work on the effect of tort reform has largely studied specific procedures in narrow patient populations. This work has the advantage of carefully tracing patient outcomes, but practice areas face widely different liability pressures as well as differing opportunities for defensive medicine or induced demand. Therefore, it is difficult to generalize from this work. Moreover, these studies have found conflicting effects of tort reform.

This paper takes a broader perspective than prior work by focusing on the impact of tort reform on private health insurance coverage as an indirect measure of health care costs. Private health insurance coverage is a normal good: as price increases, coverage rates decrease in part because no coverage or government coverage is available as a substitute (see [Chernew et al. 2005](#)). As such, private insurance coverage is a proxy for health care costs. We now examine the literature on tort reform and health care costs before turning to a discussion of tort reform and private health insurance coverage.

### 1.1. Direct Evidence on Tort Reform and Health Care Costs

There is an emerging consensus that both liability costs and doctor activity levels are affected by tort reform. Liability costs are comprised of malpractice damage awards and the associated litigation costs.<sup>4</sup> Recent work has confirmed that tort reform was effective in reducing doctors' liability exposure.<sup>5</sup> In his survey of the literature, [Holtz-Eakin \(2004\)](#) concludes that caps on damages are fairly consistently found to reduce the number of lawsuits, awards, and the loss ratio. Most recently, [Avraham \(2007\)](#) examined medical malpractice settlements applying the comprehensive tort reform database used in this paper, paying special

---

4. The administrative costs of the courts are largely socialized, and plaintiffs bear a portion of the litigation costs as well. We ignore these costs in our analysis.

5. Early studies on tort reform focused mainly on the impact of tort reform on direct medical liability costs such as average award size, frequency of lawsuits, or the price of malpractice insurance. Other studies have explored the effect of tort reform on medical malpractice insurance variables such as premiums, loss ratio, and losses incurred. These studies often found mixed results and were plagued with selection issues (for reviews of previous literature see [Zuckerman et al. 1986](#); [Holtz-Eakin 2004](#)).

attention to the retroactive applicability of some reforms. He found that some tort reforms decreased the number of claims and average payouts.<sup>6</sup>

Another strand of this literature has examined the effects of tort reform on physician location decisions and medical malpractice insurance prices. The literature on the impact of tort reform on physician supply suggests that tort reform may increase the supply of physicians in rural areas but has found otherwise mixed results.<sup>7</sup> Studies of the incidence of malpractice insurance find that costs of malpractice insurance are largely passed on by doctors to consumers in the form of higher prices and switches to higher quantity of services or more profitable procedures (Danzon et al. 1990; Thurston 2001; Pauly et al. 2006). This may explain some of the conflicting findings on whether or not tort reform increases the number of practicing doctors. More importantly for our study, the finding that malpractice costs are passed on to consumers suggests that tort reform could have an impact on health insurance coverage rates.

Of course, these studies do not address the extent to which tort reform affects doctors' behavior but rather its effectiveness in reducing physician and hospitals' liability costs. Liability costs are generally thought to comprise a small share of total health care costs, at most 2% (Congressional Budget Office 2004). Therefore, tort reform cannot

---

6. Specifically, Avraham and Bustos (2007) found that caps on noneconomic damages and limitation of the doctrine of joint and several liability reduced the number of annual payments and that caps on noneconomic damages and periodic payment reform reduced average awards. Additionally, caps on noneconomic damages were found to reduce total awards, although the statistical significance of this was weak. The other reforms had no statistically significant effect on the total annual payments. In their working paper, Currie and MacLeod (2006) also found that reforms reduced malpractice payouts.

7. For example, Baiker and Chandra (2005) found that malpractice premiums do not affect the overall size of the physician workforce, although they may deter marginal entry, increase marginal exit, and reduce the rural physician workforce. On the other hand, Kessler et al. (2005) found that the adoption of "direct" malpractice reforms led to 3.3% growth in the overall supply of physicians. Direct reforms had a larger effect on supply through retirements and entries than through the propensity of physicians to move between states. In a recent working paper, David Matsa (2007) used county-level, specialty-specific annual counts of physicians from 1970 to 2000 to estimate the effect of damage caps on physician supply. He found that caps do not affect physician supply for the average resident of states adopting reforms. On the other hand, caps appear to increase the supply of rural specialist physicians by 10–12%. For a survey of older studies, see U.S. Government Accountability Office (2003).

much reduce health care costs directly by limiting the cost of liability. For example, if a cap on noneconomic damages lops off one-quarter of medical malpractice litigation costs, this translates into at most a 0.5% reduction in health care expenditures from administrative savings. Therefore, if tort reform is to have a measurable effect on health care costs, it must affect doctor care and activity levels, which implies that doctors must be sensitive to liability pressures.

While the prevalence of defensive medicine has been established primarily by surveys of doctors, only a few studies attempted to measure its scope in a systematic manner.<sup>8</sup> The most cited studies are by Kessler and McClellan. Using data on all elderly Medicare beneficiaries treated for serious heart disease, Kessler and McClellan (1996) found that “direct” reforms (such as limitations on damages) reduce medical costs by 5–9% within 3 to 5 years of adoption without substantially affecting mortality or medical complications.<sup>9</sup> In their 2002 study on the same population, Kessler and McClellan (2002) controlled for HMO penetration and found that “direct” tort reforms reduce medical costs for heart patients by 4%. “Indirect” reforms, such as periodic payments or limits on joint-and-several liability, had little impact.

Recently, Sloan and Shadle (2009) reassess Kessler and McClellan’s papers using a dataset containing more years of data and a broader measure of costs. They fail to find significant effects of tort reform on cost or outcomes. Both studies rely on older patients who have Medicare coverage and consequently may not be the most likely group to be affected by tort reform given the lower damages associated with injuries (lower lost wages, shorter pain and suffering horizon, etc.). In addition, both studies rely on a broad definition of reform instead of examining specific reforms as we do.

---

8. By 1994, there were forty-seven studies which explored defensive medicine by way of surveys and only two studies from the mid-1980s which did it based on statistical tools using existing datasets (see U.S. Congress 1994). The most recent study based on surveys of physicians is Studdert et al. (2005).

9. Kessler and McClellan (1996, pp. 371–2). By “direct” reforms, the authors include: caps on pain and suffering damages, caps on punitive damages, and abolition of the collateral source rule and mandatory prejudgment interest. By “indirect” reforms, the authors include: contingency fee reforms, periodic payments, joint and several liability, and patient compensation fund. See Id. at 371–2.

The extent to which tort liability influences a doctor's choice of delivery method has also received significant attention. [Currie and MacLeod \(2008\)](#) found that joint-and-several liability reform reduces the use of Cesarean sections and reduces complications of labor and delivery. In contrast, they found that caps on damages increases unnecessary C-sections and the chance of complications in labor and delivery. They conclude that doctors may perform unnecessary Cesarean sections when liability is reduced, increasing complication rates.

However, other studies have considered Cesarean sections and found them positively correlated with medical malpractice pressure. [Dubay and Kaestner \(1999\)](#) found that greater malpractice pressure leads to a higher probability of Cesarean delivery but no significant improvement in Apgar scores. Later, [Dubay et al. \(2001\)](#) found that liability pressure reduced utilization of prenatal care in some low-income cases. [Sloan et al. \(1995\)](#), using mortality of the child and Apgar scores as indicators of health outcomes, found no systematic improvement in birth outcomes due to increased threat of medical malpractice litigation.

## 1.2. Tort Reform and Private Health Insurance Coverage

The rate of private insurance coverage has fluctuated over time but has generally declined in the United States since roughly 1987 (for detailed summary statistics, see [DeNavas-Walt et al. 2005](#)). In 1987, the CPS reported that 76% of the U.S. population was covered by private health insurance. By 2004, the percentage with private insurance had declined to roughly 68%. In addition, there is substantial variation between states over time in health insurance coverage (see *id.*). The bulk of the decline in coverage has been attributed to the rising cost of health insurance and the increasing availability of government insurance (see [Chernew et al. 2005](#)). For working adults, most of whom receive insurance through their employers, the price elasticity of health insurance coverage is fairly low. Most recently, [Chernew et al. \(2005\)](#) estimated a  $-0.08$  elasticity of coverage among the entire population. However, well-defined subgroups have significantly higher estimated elasticities of coverage. For example, those without access to group plans have an elasticity on the order of  $-0.3$  to  $-0.5$ , and this is much higher for the young, single, and self-employed (for a survey of the research, see [Marquis et al. 2004](#)). Using a tax code change, [Gruber and Poterba \(1994\)](#) estimate an elasticity of coverage for the self-

employed of around  $-0.5$ , but this was  $-1.8$  for the single self-employed. Thus, the self-employed, young, and single are proper treatment groups, and the remaining population has an almost inelastic demand around small price fluctuations, presenting a legitimate control group.

In theory, tort reform could decrease or increase private insurance coverage. Tort reform could decrease insurance coverage through a combination of two mechanisms. First, if doctors reduce their care level below the optimal level, resulting increases in medical errors will require more medical expenditures to repair damage. For example, the procedure may have to be performed again or the injured patient may need a longer hospital stay. Depending on the magnitude of the effect, increased medical error could more than offset any savings reductions from reduced defensive medicine and malpractice payouts, decreasing private insurance coverage rates. Second, as Currie and MacLeod suggest, tort reform could increase unnecessary procedures by reducing liability for performing them. Indeed, the example of Cesarean sections is quite telling. Compared to vaginal delivery, Cesarean sections are nearly twice as expensive (see Currie and MacLeod 2008, p. 806 for a discussion). If tort reform enables more aggressive treatments, then expenditures will rise after tort reform. Therefore, a decrease in insurance coverage rates after tort reform, reflecting higher health care costs, would unambiguously suggest a decrease in social welfare.

On the other hand, tort reform could increase coverage rates by reducing direct liability costs and doctor's excessive caretaking. Lower direct liability costs will be reflected in medical malpractice insurance rates and, presumably, passed on to some extent to consumers. Less exposure to litigation may also affect doctor's decisions about treatment. Defensive medicine, by definition, is unjustified caretaking. Doctors may practice defensive medicine for a number of reasons. First, although doctors are insured against medical malpractice liability, the doctors may be sensitive to malpractice claims because of time and reputation costs as well as the psychic costs of liability. Second, doctors may bear little of the cost of defensive medicine, which is paid for by third-party insurers or borne by the hospital and others. Thus, even a weak incentive to practice defensive medicine may lead to significant amounts of defensive medicine.

However, our analysis recoups only the explicit medical costs of reduced caretaking. Therefore, reducing justifiable precautions may also

increase coverage. In this case, patients may bear pain and suffering and lost wages which will not be reflected in private health insurance premiums and insurance coverage rates. It is therefore important to recall throughout the remaining discussion that higher coverage rates do not necessarily reflect higher social welfare.<sup>10</sup>

Despite the important missing component of pain and suffering damages, an analysis of insurance coverage rates can yield some important conclusions. First, our methodology tests for whether the cost savings of tort reform are offset by increased medical complications or increases in treatment intensity. Higher coverage rates would rule out the possibility that tort reform on balance increases unnecessary procedures. Second, increases in insurance coverage and cost savings in medicine are important goals of tort reform, and testing tort reform's effectiveness in reducing them is important.

## 2. The Data

Since 1982, the [Current Population March Demographic Survey](#) has collected data on health insurance coverage in the prior year. We examine coverage rates for the years 1981 through 2007. Thus, we have twenty-four survey years during a period of substantial reform. In addition, in some specifications, we employ the limited panel nature of the CPS by controlling for prior insurance status, which accounts for a great deal of heterogeneity in insurance coverage.

The CPS's March insurance questions are vague and not terribly detailed but are consistent enough over time to allow for comparable state-level estimates of private health insurance coverage since 1981. The extent of health coverage and health status cannot be ascertained. Prior to 1994, we cannot determine which individuals purchased health insurance directly or through an employer. One widely noted aspect of the survey is that it likely overstates the number of uninsured. The survey is conducted in March, but the health insurance coverage question asks for last year's coverage. Therefore, it is unclear how people would report coverage if they had spells of private coverage combined with other sorts of coverage or periods of no coverage at all. Comparisons to

---

10. For a discussion of how the CPS may overstate the number of uninsured and its other drawbacks, see [Congressional Budget Office \(2003\)](#).

smaller but more precise surveys, such as the Survey of Income and Program Participation, indicate that the CPS appears to describe how many individuals have or are lacking coverage at a given moment but significantly overstates the number uninsured for the whole year.<sup>11</sup> Therefore, the CPS cannot be used to determine who is chronically uninsured, and many people are uninsured for short spells, for example when in-between jobs or after graduating from college. Fortunately, these problems should not distort our analysis because the response to tort reform should come from those who are marginally uninsured, and the CPS probably does a good job of capturing them.

We limit the sample to adults between the ages of 18 and 64 who reported some employment in the previous year (the year for which health coverage information was collected). We wish to compare the response of the self-employed to those who work for others, so we limit the sample to adults with some labor force connection. Those 65 and older, of course, have access to Medicare coverage and would generally only have private coverage as a supplement (e.g., Medigap coverage) and are therefore excluded from the analysis.<sup>12</sup>

On average, 82% of the sample is covered by private health insurance, and as of 2008, nearly 78% of the sample had private coverage. Employed adults are highly unlikely to have access to government coverage such as Medicaid and Medicare. In our sample, only 3.2% report coverage from these two programs, suggesting that the options for those attached to the labor force are private coverage or no coverage. Children are excluded for two reasons. First, the determinants of health insurance coverage for children are different than that of adults mainly because, under Medicaid rules and various state programs, children have greater access to government coverage and subsidies. Medicaid programs targeting children

---

11. Although we acknowledge the theoretical possibility that tort reform may generate demand side effects for private health insurance, we believe that these effects will be small. First, a shift in demand would require that consumers accurately perceive the quality of health care before and after tort reform. Though possible, this scenario seems unlikely. Indeed, one reason doctors may be able to prescribe unnecessary procedures is because consumers do not know whether or not various procedures are in their interest. Second, the decision to purchase health insurance may primarily be a decision over whether or not to insure assets against the possibility of catastrophic health costs and therefore may be largely invariant to the quality of care.

12. In addition, because older individuals face lower damage awards, doctors would have less incentive to undertake defensive medicine to avoid liability.

were expanded during the later part of the study period. Second, in 1988, the CPS began asking detailed questions about whether household members may have insurance coverage from those outside the household. This largely affected children.<sup>13</sup>

### 3. Methodology

The basic specification takes the following form, which is estimated using a linear probability regression:<sup>14</sup>

$$\begin{aligned} \text{Private Insurance}_{ijt} = & \alpha \text{Constant} + \lambda \text{Year}_t + \Psi \text{State}_j + \tau \text{Demographic}_{ijt} \\ & + \mu \text{Treatment}_{ijt} + \sigma \text{Tort Reform}_{jt} + \delta \text{Tort Reform}_{jt} \\ & \times \text{Treatment}_{ijt} + E_{jt} \end{aligned}$$

The dependent variable, *Private Insurance*, equals one if private insurance coverage is reported in the previous year, zero otherwise. *Tort Reform* is either a simple indicator for the presence of a “major” tort reform, a count variable for the number of tort reforms (described below), or a matrix of dummy variables for individual reforms. The variable of interest is  $\delta$ , which measures the percentage point increase in private insurance coverage after the adoption of tort reform for the treatment group (self-employed, young, or single) relative to the control group. *Year* is a matrix of year dummies, *State* is a matrix of state fixed effects. Demographic controls are dummies for high school completion, college (or higher) completion, sex, marital status, and previous year’s employment status (self-employment or government employment; private employment is the excluded category), Black, and Hispanic.<sup>15</sup> Continuous variables control for age, age squared, and family income. All regressions include demographic controls, state and year fixed effects, and treatment group main effects. The standard errors reflect clustering by state.

13. The regression results reported below were run with children, taking the self-employment status, age, and marital status of the head of household as the treatment variable. None of the joint tests were significant, and the coefficients were substantially smaller than those reported for adults.

14. The marginal effects estimated in probit models were similar to those of the linear probability models.

15. Government-provided health insurance is not mutually exclusive to private insurance. Spells of Medicaid coverage and a spell of private insurance coverage could both occur in the reference year, or private insurance could be maintained as a supplement.

We take as treatment groups the self-employed and the single young. Combined, these groups have been found to have elasticity of coverage up to ten times higher than that of married or older non-self-employed individuals. We define “young” as 35 years of age or younger although we explore more flexible definitions of age in [Table 1](#) (including linear and quadratic specifications). Those aged 35 and younger are far less likely to have health insurance than the rest of the adult population, but rates of coverage vary little in the sample after the age of 35.<sup>16</sup> In addition, the effect of reform is entirely concentrated in unmarried young, with the married young being relatively unresponsive.

Figure 1 traces the coverage rates over time for our control group (older, married, non-self-employed workers) and the average of our three treatment groups (single, young, and self-employed), labeled “treatment.” We posit that our control group displays little response (at least in the short run) to the change in insurance prices. Our specifications rely on the “control” group removing the effect of changes other than price, such as changes in industry composition, macroeconomic shocks that cause spells of unemployment and consequent insurance coverage loss, and state-level policy changes that could also affect insurance coverage rates. A potential concern is that the control group is unresponsive in general and uncorrelated with the treatment groups’ coverage rates. However, as Figure 1 clearly demonstrates, fluctuations in insurance coverage among the control are highly correlated with fluctuations among the treatment (the year-to-year correlation coefficient between the two is 0.84). In sum, the control and treatment groups appear to be valid.

### 3.1. Tort Reform Definitions and Dating

We date tort reforms using the third edition of Database of State Tort Law Reforms (DSTLR 3<sup>rd</sup>) compiled by Avraham and discussed at length in [Avraham \(2006\)](#).<sup>17</sup> The database was assembled by reviewing the laws and court cases of the fifty states (and Washington DC) from

16. The private insurance coverage rate in the sample rises from 66% at age 19 to 80% by age 35, at which point it remains fairly constant until the early 60s, where it declines somewhat.

17. The dataset is available for free download at: [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=902711](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=902711).

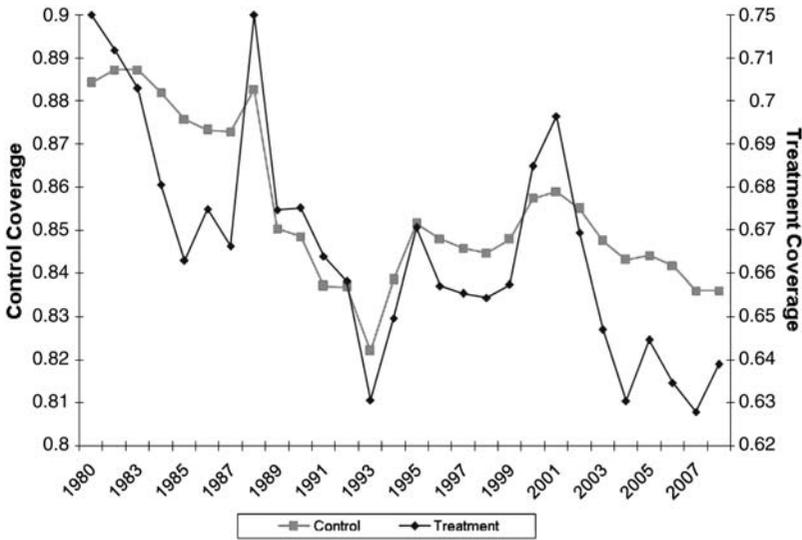


Figure 1. Control and Treatment Average Private Health Insurance Coverage Rates.

1980 to 2005 and comparing them to existing tort law compilations.<sup>18</sup> The process discovered that commonly used dating schemes suffer from missed reforms, missing or erroneously coded effective dates of reforms, and missing or incorrectly coded state supreme court decisions striking down or upholding reforms. We believe the DSTLR to be the most comprehensive and accurate legal dataset on tort reform to date.

There are ten common tort reforms, which include a variety of damage caps, damage payment reforms, and reforms of joint-and-several liability. However, we have sufficient variation in the years of our study to analyze only eight of them.<sup>19</sup> For a detailed compilation of the number of state

18. The compilations include: The American Tort Reform Association’s (2007) compilation; a compilation by the National Conference of State Legislators (2007); American Medical Liability Association’s Comparison of State Medical Liability Laws; Westlaw’s (2006) 50 State Survey; Congressional Research Service (2005).

19. A few states have compensation funds from which patients can collect their recoveries. The patient compensation fund is a state fund which usually pays the medical malpractice victims monies if the damages awarded are above some threshold, such as \$400,000. The rationale given for such arrangement is that it lowers physician’s premiums and spreads the risk of risky medical specialties across the entire population of doctors and taxpayers. In the mid-1980s, a few states changed their policies regarding contingency fees, capping plaintiffs’ lawyers’ share in the recovery.

adoptions and invalidations of all major reforms, see Appendix Table 2. As can be seen, there is a substantial amount of variation in tort law over the time period studied, ranging from six state law changes for caps on total damages to forty-four state law changes for caps on noneconomic damages.

Figure 2 presents the number of tort reforms the average state has over time. Although most of the changes occurred from the mid-1980s to the mid-1990s, states were still changing tort law even after 2000. Post-1990, and in particular in the late 1990s, reforms were often medical malpractice specific, or medical malpractice concerns were more salient in the enactment of reforms (see Appendix Table 2 for details). These reforms are more likely to be a response to health insurance costs or coverage rates. But a large number of states changed in the late 1980s when the perceived “tort crisis,” largely driven by products liability litigation, prompted many states to enact reforms. These reforms are more likely exogenous to health insurance costs or coverage rates. Because of the potential for later reforms to be endogenous, we run separate regressions on the pre-1990 and post-1990 periods; however, we do not find qualitatively different results.

*3.1.1. Reform of joint-and-several liability.* The most common reform passed in state legislatures in recent decades is the limitation of joint-and-several liability for malpractice defendants (variable name “*Joint and Several*”). Forty-two states had some variant of this reform by 2004. The common law doctrine of joint-and-several liability allows the plaintiff to collect full damages from any of the defendants (which usually include both the hospital and the doctor) irrespective of the defendant’s proportional fault. This means that plaintiff can go after “deep-pocket” defendants, like hospitals, and collect all their damages even if the doctor is the main party at fault. The reforms adopted by states limit this possibility by either imposing liability based on fault or by allowing for joint-and-several liability only if the defendant is responsible for a significant proportion of the harm, usually at least 50%.

*3.1.2. Collateral source.* Discretionary or mandatory consideration of collateral sources of payment for medical costs is another common reform (established in thirty-five states by 2004). The collateral source rule was developed by common law courts in the 19th century when insurance became more common. The common law “collateral source

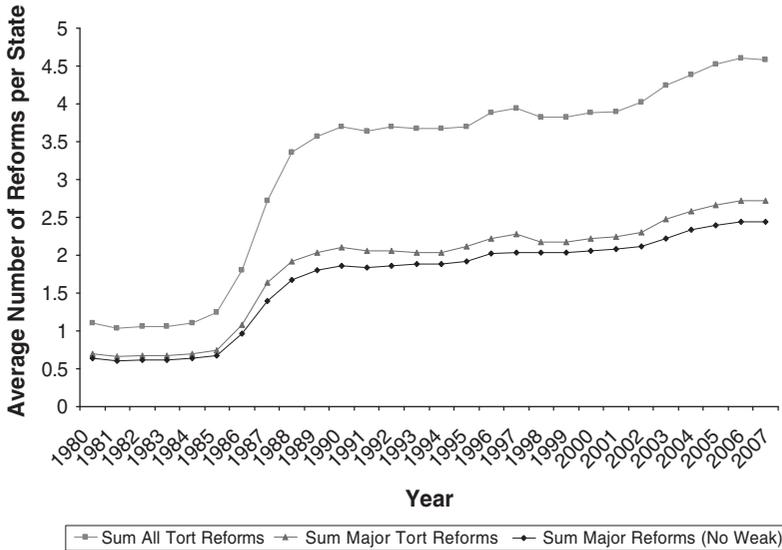


Figure 2. Reform Trends by State.

rule” generally holds that the plaintiff’s personal insurance coverage *cannot* be used to offset the defendant’s share of damages. The result is that an insured plaintiff gets more than his full harm in case of an accident. States coded as having reformed the collateral source rule have abrogated the common law and either require or allow courts to reduce the plaintiff’s recovery by the amount of private or public insurance benefits he receives (taking into account the accumulated paid premium).

**3.1.3. Damage caps.** Some of the more controversial reforms involve ceiling caps on damage awards. These caps most commonly apply to noneconomic damages (“*Cap Noneconomic*”, in twenty-three states) or punitive damages (“*Cap Punitive*”, in twenty-six states) but can also apply to total damages (“*Cap Total*”, in seven states). Caps come in many flavors. Some impose a cap of fixed dollar amount, while others use a multiplier of the economic damages. Some are inflation indexed, some are not.

**3.1.4. Minor reforms.** A number of less-relevant reforms were enacted in a number of states: periodic payment, punitive evidence, and split recoveries. We consider these reforms to some extent in the tort reform

index specifications but in general conclude that they have little impact. Periodic payment of large future damage awards is now allowed or required in thirty-one states (“*Periodic Payment*”). The reform allows or requires courts to award future damages that are above some threshold, usually \$200,000, in periodic installments. Many states also implemented heightened pleading, evidentiary, or other procedural standards for punitive damages (“*Punitive Evidence*” in thirty-two states). For example, some states now require punitive damages to be proven with “clear and convincing evidence” rather than merely the traditional “preponderance of the evidence.” Other states require proof that defendant acted with “deliberate disregard” or “willful indifference” towards plaintiff’s potential injury. As of 2007, six states required the plaintiff to share with the state a portion of the punitive damages (“*Split Recovery*”). The rationale usually provided for such reforms is that plaintiff was already made whole with the compensatory damages, so the punitive damages are a windfall which should therefore be shared with the state.

### 3.2. Robustness Checks

*3.2.1. Strength of reforms.* Reforms vary in strength and effectiveness. Some reforms, such as heightened punitive evidence requirements, split recoveries, or periodic payments seem unlikely to have strong impacts on tort recoveries for medical malpractice. The previous literature has found effects on tort awards and physician behavior primarily for damage caps, collateral source, and joint-and-several liability reform (see Mello 2006 for a survey). Including such weak reforms in our count index of tort reforms will bias the coefficient toward zero. We therefore report specifications excluding these minor reforms from the count index, and we expect the magnitude of the coefficient to increase as a result.

Even among the major reforms, such as damage caps and alterations to joint-and-several liability rule, the effectiveness and strength of the reform vary. For example, some damage caps do not apply to “severe” injuries. Of course, a damage cap would likely only be binding in cases of severe injuries with high damages. Some damage caps are implausibly high and unlikely to be effective, such as West Virginia which capped noneconomic damages at \$1 million. In addition, reforms are sometimes struck down a short time after adoption, particularly caps on noneconomic damages. Such reforms have little chance to take effect, and there is some evidence in our

data that the effect of reform increases over time as consumers and insurance companies respond to health care cost changes. In addition, if a strike down of a reform is largely anticipated, then there should be little response to reform, especially since a constitutional ruling applies retroactively. Thus, including in the estimation reforms that are quickly struck down will push the estimated effect of reform to zero. In some specifications, we exclude weak reforms, defined as reforms with substantial loopholes or reforms that were struck down within 3 years of passage. Figure 2 traces out the average number of major reforms and the average number of major reforms excluding “weak” major reforms. For additional clarity concerning which reforms were designated as weak, please refer to Appendix Table 2.

In sum, there are strong reasons *ex ante* to think that reforms with high damage caps, reforms with severity restrictions, and reforms that are quickly struck down are weak reforms. We report specifications excluding weak reforms, again expecting the magnitude of the coefficient to increase.

*3.2.2. Exogeneity of reforms.* A concern with a difference-in-differences methodology is the exogeneity of the reforms studied. In our case, the results could be biased if high medical costs or low insurance coverage helped create the necessary political environment for tort reform. Although a possibility, there are several reasons why endogeneity is probably not an important factor here.

First, our results generally suggest an increase in insurance coverage following tort reform. It is unlikely that better coverage and lower medical costs motivated legislatures to adopt medical malpractice reforms. More likely, lower coverage or rising costs would prompt a legislative response, in which case coverage rates would be trending down around the adoption of a reform. Thus, the bias works against our general finding. Second, given the long time frame of the sample, we are less concerned about spikes or dips in prereform coverage rates, followed by a reversion to the mean, biasing our results. Third, the majority of the reforms enacted in the period of the study are not specific to medical malpractice but were instead broad tort reform, applying to accidents and products liability as well. This is particularly true of reforms prior to the 1990s, for which we present separate results. (See Appendix Table 2 for

which reforms are medical malpractice specific.) Thus, even if medical malpractice reforms were enacted in reaction to high levels of uninsured Americans, broad tort reforms were most probably not.

We will formally test for pretrends by entering leads of the Tort Reform count index and interacting them with our treatment groups. We find no evidence of a pretrend. In addition, graphical evidence (Figures 3 and 4) suggests that insurance coverage exhibited no noticeable trend in the years prior to tort reform.

*3.2.3. Previous insurance status.* Because households are sampled for 4 months, followed by an 8-month break, and then sampled for another 4 months, two-period panels can be constructed for each March household (except for the 1986 and 1996 surveys).<sup>20</sup> Thus, we can control for an individual's prior insurance status. This undoubtedly will remove a great deal of individual heterogeneity that simple demographic controls do not. For example, if one has health insurance in the prior year, there is a 91% chance that private health insurance is reported in the subsequent year (see Appendix Table 1). For those who report that they were uninsured, only 46% will report private insurance the next year.

However, controlling for prior insurance coverage reduces the sample size by almost two-thirds. In addition, if insurance status is persistent, controlling for prior status will tend to bias the estimated coefficients toward zero. In other words, if reforms affect insurance coverage and such coverage is persistent, then by conditioning on prior insurance we bias our estimates of the impact of tort reform on health insurance coverage rates toward zero. Therefore, we include prior insurance status only to check the robustness of the results.

## 4. Results

We define the *Tort Reform* variable in three different ways. First, we employ a simple dummy variable for the adoption of any major reform. This

---

20. We follow the approach of Madrian and Lefgren (1999) in matching the samples. We included all plausibly matched units. Eliminating observations that failed certain validity tests (e.g., age increased by more than 2 years over the sample period) did not change the results appreciably. The year 1981 cannot be matched because the CPS did not collect full insurance data for 1980. In addition, the survey years 1986 and 1996 cannot be matched to their prior years because household identifiers were changed.

specification will present the easiest interpretation, but it will underestimate the total impact of reform because many states have adopted multiple reforms and nearly half the states had a major reform in 1980, when the data begin, and nearly all had a major reform by the early 2000s.

Next, we employ a count index of the number of reforms. The reform index varies between zero and eight when all reforms are included and between zero and five when we consider only major reforms. This specification has the benefit of capturing more reforms, thus enabling us to account for the intensity of the tort reform legislation in a given state and year. It also allows us to easily perform robustness checks on the effect of including or excluding weak reforms and testing for pretrends in the data. However, the count index weights all reforms equally, and there is reason to expect that some reforms may have larger impacts than others. In addition, reforms could have offsetting effects. For example, caps on damages could increase aggressive treatments while joint-and-several liability reform could align incentives to take optimal care (Currie and MacLeod 2008).

Next, we assess the impact of individual reforms by entering major reforms individually. The estimation of the effect of individual reforms is important, even if difficult to present. Given our large dataset and time frame, we can identify independent impacts of individual reforms and make some inference about which reforms seem to have the greatest impact and whether there is evidence that some reforms work in opposite directions. Before turning to the regressions, however, we start with a basic graphical analysis of the effect of reform.

#### 4.1. Trends in Coverage Rates Prereform and Postreform

Figures 3 and 4 trace out the difference in average state coverage rates between the control and treatment groups for states adopting the reform. We include four major reforms: caps on noneconomic and punitive damages and reforms to collateral source and joint-and-several liability rules. We do not trace out trends for caps on total damages because it was adopted in only six states (and quickly struck down in two).

A couple important points are evident from the figures. First, the relative differences between the control and treatment groups are basically flat in the years prior to the adoption of a reform. There is no evidence of a pretrend or Ashenfelter dip that could be distorting results. In addition,

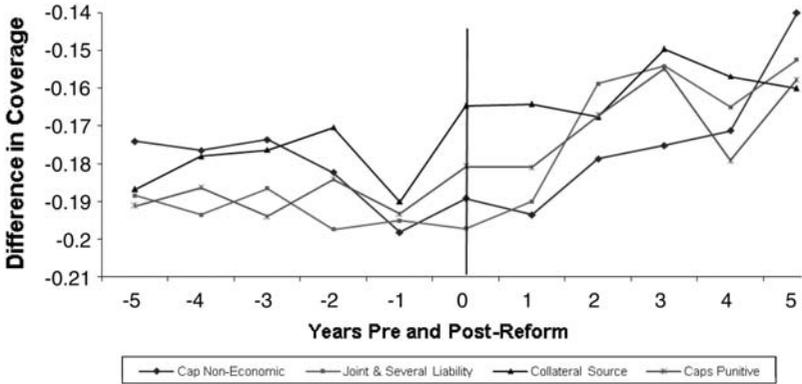


Figure 3. Control Minus Self-Employed Coverage Rates.

the effect of reform increases over time and tends to be evident beginning 2 years after reform. As discussed previously, if the CPS respondents tend to report insurance status as of the end of the prior year or as of March of the survey year, then the response to reform is more delayed than suggested by the figures.

#### 4.2. Any Major Reform

Table 1 presents results in which the tort reform variable equals one after a state adopts a major reform (*Any Major Reform*). Major reforms are defined to be damage caps, collateral source reform, and reform of

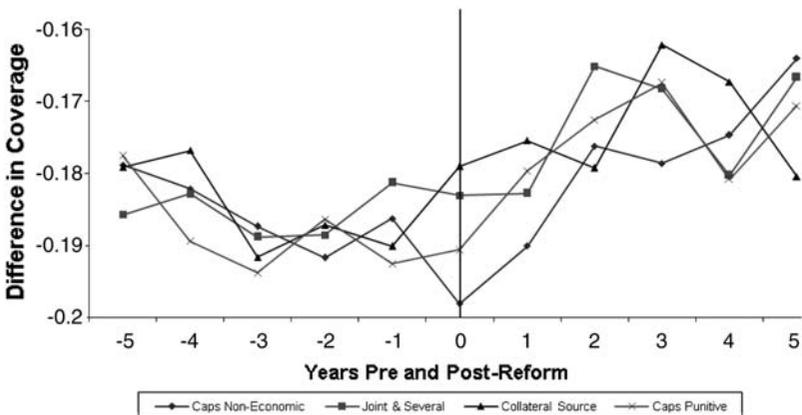


Figure 4. Control Minus Young & Single Coverage Rates.

**Table 1.** Age and Reform Interactions

	(1)	(2)	(3)	(4) Single	(5) Married
Age	0.87** (0.062)	0.75** (0.066)	1.24** (.015)	1.00** (0.015)	1.54** (0.015)
Age Squared	-0.007** (0.001)	-0.005** (0.001)	-0.011** (0.002)	-0.006** (0.002)	-0.015** (0.002)
Self-Employed	-22.1** (0.86)	-22.1** (0.86)	-22.1** (0.86)	-34.1** (1.63)	-18.1** (0.66)
Young (age<35)	-1.12** (0.41)				
Any Major Reform	0.024 (0.38)	1.87** (0.61)	12.3** (2.79)	18.0** (3.12)	-6.2+ (3.12)
Any Major Reform* Self-Emp.	0.45 (0.53)	0.45 (0.53)	0.45 (0.53)	0.26 (0.25)	1.05+ (0.53)
Any Major Reform* Young	0.63** (0.23)				
Any Major Reform* Age		-0.038** (0.009)	-0.62** (0.15)	-0.80** (0.16)	0.23 (0.16)
Any Major Reform* AgeSq			0.007** (0.002)	0.009** (0.002)	-0.002 (0.002)
Joint test Major Reform, Age Interactions		0.0001	0.0000	0.0000	0.0134
Population	2,136,959	2,136,959	2,136,959	815,918	1,321,041

\*\*sig at <0.01 level; \*sig at <0.05 level; +sig at <0.10 level. Standard errors in parentheses a Huber-White heteroskedasticity robust with clustering by state. Sample is aged 18 through 65 who report some work in previous year. Major reforms are caps on total, noneconomic, or punitive damages, joint-and-several liability reform, and collateral source reform. All regressions include state dummies, state linear time trends, year dummies, and demographic controls for age, age squared, employment sector (private, government, self-employed), state HMO penetration, race, sex, and educational attainment (high school, college, more than college).

the joint-and-several liability rule. The interactions between *Any Major Reform* and the *Self-Employed* dummy are never significant at <5% level. However, the interactions with *Young* (age ≤ 35) and *Age* or *Age Squared* are statistically significant and indicate that the adoption of a major tort reform is associated with an increase in insurance coverage among younger workers.

Column 1 interacts *Any Major Reform* with *Young*, a dummy that equals one if age is <35. The main effect (*Major Reform*) is negligible, implying that adopting a major reform has no measureable effect on older workers. The interaction between *Young* and *Any Major Reform*, however, has a coefficient of 0.63. This implies that after adoption of a major reform, the rate of private insurance coverage among the young increases by 0.63 percentage points.

Column 2 replaces the *Young* dummy with actual age. In this case, tort reform has statistically significant positive coefficient, but the age term is negative, indicating that the effect of tort reform diminishes as age increases. Taking the coefficients as given, the effect of reform declines in age and reaches zero when individuals are in their early 50s. In Column 3, the quadratic term complicates the interpretation a bit but yields similar results. Here, the effect of reform reaches its minimum when individuals are in the mid-40s and then increases a bit thereafter. Columns 4 and 5 take the quadratic approach and divide the sample into married and unmarried individuals. Column 4 shows that the effect of reform is clearly concentrated among the single and young and also declines in age until individuals are in their mid-40s. The effect of reform among those who are married is basically flat in age. Henceforth, we focus on only two treatment groups: the *Young and Single* and the *Self-Employed*.

The use of *Any Major Reform* allows for a fairly straightforward interpretation of the results, but it has several important drawbacks. First, the specification does not permit the adoption of a second or third major reform to have an added effect. Second, by 2001, nearly all states had adopted at least one major reform, so there is little variation in much of the sample period. Finally, there is no effect for the self-employed, perhaps because smaller sample size among them reduces the power of the test and hence we need a better measure of reform. We now turn to other measures of tort reform, which provides more variation and some ability to parse out the effectiveness of specific reforms.

#### 4.3. Count Index of Tort Reform Results

Table 2 presents the count index results. The main effect, *Tort Reform (Count)*, is statistically insignificant for all specifications with small coefficients, again implying that there is no detectable effect of tort reform among the control group. Column 1 includes all eight reforms in the count index. The coefficient on the *Self-Employed* and *Young and Single* interactions are 0.34 and 0.50, respectively, and each is statistically significant. This implies that for each tort reform adopted, private insurance coverage among the self-employed increases by 0.34 percentage points and among the young and single private insurance coverage increases by 0.50 percentage points. Moving from no reforms

**Table 2.** Effect of Count of Tort Reforms on Private Insurance Coverage Rate

	(1)	(2)	(3)	(4)	(5) Pre-1990	(6) Post-1991	(7)	(8)
Self-Employed	-22.1** (0.86)	-22.1** (0.86)	-22.6** (0.86)	-22.1** (0.92)	-20.0** (0.73)	-18.0** (0.76)	-14.0** (1.30)	N/A
Single and Young	-5.72** (0.66)	-5.24** (0.62)	-4.94** (0.402)	-5.02** (0.47)	-8.87** (0.49)	-3.15** (0.54)	-4.50** (1.80)	N/A
Tort Reform (Count)	0.087 (0.12)	-0.016 (0.016)	-0.06 (0.14)	-0.01 (0.02)	-0.47+ (0.28)	0.36 (0.28)	-0.15 (0.18)	-0.23 (0.16)
Self-Employed* Tort Reform	0.34* (0.16)	0.58** (0.27)	0.57** (0.29)	0.85** (0.30)	0.70 (0.48)	0.97* (0.39)	0.36 (0.25)	0.17 (0.34)
Single and Young* Tort Reform	0.50** (0.14)	0.89** (0.15)	0.74** (0.11)	1.05** (0.15)	0.91** (0.22)	0.46** (0.17)	0.61** (0.15)	0.50** (0.17)
Joint test reform interactions (p-value)	0.0000	0.0000	0.0000	0.0000	0.0006	0.0023	0.0030	0.0125
Major Reforms Only		X		X	X	X	X	X
No Weak Reforms			X	X	X	X	X	X
Lagged Insurance Controls							X	
Full Interaction Terms								X
Observations	2,136,959	2,136,959	2,136,959	2,136,959	749,271	1,387,688	596,154	2,136,959

\*\*sig at <0.01 level

\*sig at <0.05 level; +sig at <0.10 level. Standard errors in parentheses a Huber-White heteroskedasticity robust with clustering by state. Sample is aged 18 through 65 who report some work in previous year. Major reforms are caps on total, noneconomic, or punitive damages, joint-and-several liability reform, and collateral source reform. *Single and Young* are those under the age of 35 and unmarried. All regressions include state dummies, state linear time trends, year dummies, and demographic controls for age, age squared, employment sector (private, government, self-employed), state HMO penetration, race, sex, and educational attainment (high school, college, more than college). In Column 7, lagged insurance controls are *Private Insurance*<sub>t-1</sub> and *Government Insurance*<sub>t-1</sub> dummies based on previous CPS March survey reporting of private insurance and government insurance (uninsured is the excluded category). Full interaction terms in Column 8 are state\*year, state\*treatment, treatment\*year interactions.

to the sample median of three tort reforms would increase coverage among the self-employed by roughly one percentage point and coverage among the single and young by 1.5 percentage points. Columns 2 and 3 remove minor reforms and weak reforms, respectively. In each case, this limitation results in a roughly 50–70% increase in the estimated coefficients on the *Self-Employed* and *Young and Single* interactions from Column 1.

Column 4 removes both weak and minor reforms, yielding a coefficient estimate of 0.85 and 1.05 for *Self-Employed* and *Young and Single* interactions, respectively, more than double the estimates of Column 1. These coefficients imply that adopting a major and effective tort reform can increase private insurance coverage by as much as one percentage point among price-sensitive groups. Adopting the sample median of two major tort reforms would increase coverage among the self-employed and single young by 1.7 and 2.1 percentage points respectively. Adopting four major reforms could increase coverage by as much as 3.5 to 4 percentage points among the self-employed and single young, respectively, but <5% of the sample is covered by four major reforms and hence this prediction is much more tentative.<sup>21</sup>

The *Tort Reform Count* results must be interpreted with some caution. Most of the variation in the “major reform” count index is between zero and three major reforms. Very few states have more than three major reforms, and caps on total damages are not common and are not usually adopted in conjunction with caps on other types of damages. Therefore, answering what would happen if all major reforms are adopted requires an out-of-sample prediction.

Columns 5 and 6 divide the sample into the years 1990 and before and the years after 1990, respectively. We do this for two reasons. First, much of the variation in tort reform occurred in the 1980s, and we want to test the robustness of the results exclusive of those years. Second, much of the focus of tort reform after 1990 related to medical malpractice coverage and those tort reforms are more likely to be adopted in response to a trend in coverage rates or insurance costs. Third, the 1986 Tax Reform Act lowered the after-tax cost of insurance for the self-employed raising

---

21. There are five major reforms in all, but because caps on total damages is enacted rarely and not in conjunction with other reforms, it is improper to make a prediction here.

concerns about the estimates around this time period. The results in each case are qualitatively similar.

The next two columns attempt to reduce the unobserved heterogeneity in the data. Column 7 adds a lagged insurance status control. As discussed, if insurance status is persistent, controlling for prior insurance status would tend to push the estimated coefficients to zero. However, prior insurance status controls for consumer tastes and unobserved availability of insurance. Controlling for prior insurance status reduces both interaction coefficients by roughly half relative to Column 4.<sup>22</sup> The *Young and Single* interaction is still statistically significant, while the *Self-Employed* interaction coefficient is no longer statistically significant. However, the two treatment interaction coefficients remain jointly significant ( $p$ -value = 0.0030).

Column 8 adds a full set of interaction terms: *Treatment\*Year*, *State\*Year*, and *State\*Treatment*. In this case, reform is identified solely by changes within a state, as between-state variation is dummied out. As in Column 7, the effect of reform on the *Young and Single* remains statistically significant, while the coefficient on the *Self-Employed* interaction is reduced and no longer statistically significant. Again, the two reform–treatment interaction coefficients test jointly significant.

In sum, the *Tort Reform Count* results suggest that tort reform increases insurance coverage rates among the self-employed and single young. These results become stronger when minor and weak reforms are eliminated from the *Tort Reform Count* variable and are robust to the inclusion of a full set of interaction terms and lagged insurance controls. The effect of reform on young and single remains even when prior insurance status or a full set of treatment/state/year interactions are included in the regressions, although this weakens the estimate of the effect of reform on the self-employed.

#### 4.4. Leads and Lags of Tort Reform

Table 3 presents results including leads and lags of the *Tort Reform Count* variable. We chose a 3-year lead and lag on the grounds that this

---

22. The coefficients on the lagged insurance terms were highly significant ( $p$ -value < .0001) and matched well to the averages reported in the summary statistics in Appendix Table 1: if the individual was previously insured, there was a 90% chance that they would be insured in the current period; if previously uninsured, there was about a 50% chance they would be insured in the present period.

**Table 3.** Sum of Reforms Leads and Lags—Major Reforms

	(1) Leads	(2) Lags	(3) Leads and Lags
Self-Employed* Tort Reform (lead one to three years)	−0.63 (0.45)		−0.61 (0.42)
Self-Employed* Tort Reform	1.23** (0.33)	0.64+	1.42** (0.48)
Self-Employed* Tort Reform (lag three years and more)		−0.039 (0.22)	−0.09 (0.22)
Single and Young* Tort Reform (lead one to three years)	−0.31 (0.21)		−0.31 (0.31)
Single and Young* Tort Reform	1.15** (0.30)	0.42* (0.17)	0.75** (0.25)
Single and Young* Tort Reform (lag three years and more.)		0.57** (0.15)	0.55** (0.17)
Observations	1,840,605	2,136,094	1,840,605

\*\*sig at <0.01 level; \*sig at <0.05 level; +sig at <0.10 level. Standard errors in parentheses a Huber–White heteroskedasticity robust with clustering by state. Sample is aged 18 through 65 who report some work in previous year. Major reforms are caps on total, noneconomic, or punitive damages, joint-and-several liability reform, and collateral source reform. *Single and Young* are those under the age of 35 and unmarried. All regressions include state dummies, state linear time trends, year dummies, and demographic controls for age, age squared, employment sector (private, government, self-employed), state HMO penetration, race, sex, and educational attainment (high school, college, more than college).

would provide us with sufficient power to test for trends around the timing of reform.<sup>23</sup> *Tort Reform Count (lead 1–3 years)* moves back the *Tort Reform Count* variable for each state by 3 years and *Tort Reform Count (lag 3 years and more)* moves the *Tort Reform Count* variable forward 3 years. Recall that *Tort Reform Count* is a count variable, so if state A moves from two to three major tort reforms in 1993, *Tort Reform Count (lead 1–3 years)* will record state A as having a lead of three reforms beginning in 1990.

The interactions between the leads of *Tort Reform Count* and the treatment groups are not statistically significant. Therefore, there are no treatment-group-specific trends in coverage rates prior to the introduction of tort reform that could bias estimation. There is some evidence that the effect of reform for the young and single may increase over time, although this effect is not present for the self-employed. Taken together, these results are largely consistent with the Figures 3 and 4.

23. Using a 4-year lead resulted in similar estimates.

#### 4.5. Individual Impact of Reforms

We now turn estimates of the individual impact of reforms. We consider only major reforms, excluding weak reforms (reforms quickly struck down, with high caps, or severity exceptions). Table 4, Column 1 estimates the effect of all reforms entered jointly; Column 2 reports estimates of reforms entered separately. Therefore, Column 2 reports results from five separate regressions.

The coefficients on all reform–treatment group interactions are positive in both columns, again suggesting that tort reforms increase insurance coverage. When estimated jointly in Column 1, reform–treatment interaction coefficients are bordering on significance for the *Young and Single* group in the case of collateral source reform and caps on punitive damages and are significant for joint-and-several liability reform. For the self-employed, the reform interaction coefficients are significant only in the case of punitive damage caps. However, the reforms jointly test strongly significant for each treatment group ( $p$ -value $<0.02$  for *Self-Employed*;  $p$ -value $<0.0001$  for *Young and Single*). We include caps on total damages because it is a potentially important reform, but because only six states adopted an effective total cap, we cannot be confident in its identification (see Conley and Taber 2005 for a discussion). We therefore report some joint tests exclusive of caps on total damages. The joint tests without the caps on total damages interactions are stronger, verifying that caps on total damages are not strongly influencing the results.

When reforms are entered separately in Column 2, the effect of reform on coverage rates increases slightly relative to the joint estimations of Column 1. For the *Young and Single*, all reform–treatment interactions are statistically significant except that of caps on total damages. With the exception of caps on punitive damages, the *Self-Employed*–reform interactions are not statistically significant but are all positive and jointly significant with the *Young and Single* interaction.

In sum, when reforms are considered individually (whether jointly or separately) all interaction coefficients are positive. Therefore, there is no evidence that reforms have offsetting effects. In addition, each major reform (the three damage caps, joint-and-several liability reform, and collateral source reform) appears to have similar impacts within each treatment group, although the imprecise estimates of individual reform

**Table 4.** Major Reforms Individual Estimates

	(1) Estimated Jointly	(2) Estimated Separately
Caps Total	1.45*	1.94**
	(0.47)	(0.60)
Caps Total * Self-Employed	0.34	0.76
	(1.22)	(1.45)
Caps Total * Young and Single	0.81	0.66
	(1.02)	(1.00)
<i>Joint Test Reform Interactions</i>		0.7907
Cap Noneconomic	0.25	0.85
	(0.51)	(0.61)
Cap Noneconomic * Self-Employed	0.25	0.50
	(1.18)	(1.15)
Cap Noneconomic * Young and Single	0.83	1.25**
	(0.61)	(0.51)
<i>Joint Test Reform Interactions</i>		0.0156
Cap Punitive	-0.62	-0.53
	(0.61)	(0.65)
Cap Punitive * Self-Employed	2.22*	2.33*
	(1.00)	(0.89)
Cap Punitive * Young and Single	1.19+	1.32*
	(0.64)	(0.60)
<i>Joint Test Reform Interactions</i>		0.0175
Collateral Source	0.74	0.46
	(0.52)	(0.61)
Collateral Source * Self-Employed	0.90	1.22
	(1.05)	(0.98)
Collateral Source * Young and Single	0.80+	1.36**
	(0.46)	(0.44)
<i>Joint Test Reform Interactions</i>		.0101
Joint and Several	-1.13	-1.08**
	(0.57)	(0.48)
Joint and Several * Self-Employed	0.63	0.93
	(1.05)	(0.77)
Joint and Several * Young and Single	1.41**	1.77**
	(0.55)	(0.48)
<i>Joint Test Reform Interactions</i>		0.0025
Joint tests		
<i>Main Effects (All) [No Cap Total]</i>	(0.0006) [0.2726]	
<i>Self-Employed (All) [No Cap Total]</i>	(0.0236) [0.0137]	
<i>Young and Single (All) [No Cap Total]</i>	(0.0000) [0.0000]	

\*\*sig at <0.01 level; \*sig at <0.05 level; +sig at <0.10 level. Standard errors in parentheses a Huber–White heteroskedasticity robust with clustering by state. Sample is aged 18 through 65 who report some work in previous year. *Single and Young* are those under the age of 35 and unmarried. All regressions include state dummies, state linear time trends, year dummies, and demographic controls for age, age squared, employment sector (private, government, self-employed), state HMO penetration, race, sex, and educational attainment (high school, college, more than college).

effects prevents a strong inference. With respect to young and single treatment group, the results are not only positive but generally statistically significant.

#### 4.6. Plausibility of Estimates

Our results so far suggest that tort reforms jointly increased private health insurance coverage among the most price-sensitive groups. We pause here to note the magnitude and plausibility of some of the coefficients. The most important thing to note is that the effect of tort reform on insurance coverage is likely to be modest. Our treatment groups comprise roughly 25% of the sample, and even a four percentage point increase in coverage rates (which is our very top estimate) would only increase insurance coverage rates among all employed adults by one percentage point.

We now consider the elasticity between coverage and cost simply to verify that the magnitudes of the estimated effects are not implausibly high. Most estimates suggest a one percentage point increase in coverage after adoption of a major reform. Given an elasticity of coverage of  $-0.5$  to  $-1.0$ , this suggests that a major tort reform reduces health insurance costs for employed adults by 1–2%. This back-of-the-envelope cost estimate is not implausibly high but suggests a modest reduction in costs. We do not claim that this back-of-the-envelope calculus is a reliable estimate of the total health care cost savings of tort reform. First, it assumes that a generalization in costs can be made between the treatment and control groups, whose health care needs may be quite different as the treatment group is younger. Second, the insurance market may not be perfectly competitive and could pass through less than any costs savings.<sup>24</sup> Third, because the control group's coverage is not expected to change much in response to price, we have not established that there was any effect for these workers. More direct work is needed on the effect of tort reform on health care costs to verify true cost savings. Finally, because we measure private health insurance coverage rates, our estimates relate only to private health insurance costs, not social costs or the costs of medical care in government programs. If injured patients wind up on

---

24. Dafny (2010) finds that insurance prices paid by firms are sensitive to profitability in concentrated markets, indicating that some rents are earned by insurers.

government care more often after tort reforms reduce recovery, these costs would be missed in our analysis.

## 5. Conclusion

We conclude that tort reform has limited potential to increase insurance coverage rates. The magnitude of the increase for the general population appears to be negligible, but for major reforms the coverage rates among the self-employed and the single young increased by about one percentage point.

Because insurance coverage rates reflect only part of the costs and benefits associated with tort reform, our results do not reflect the full social welfare picture. Potential increases in pain and suffering and loss of life are not recouped by the insurance coverage analysis. However, tort reform risks increasing health care costs by increasing injuries and aggressive treatments. We show that tort reform increases insurance coverage rates, implying that tort reform reduces private health insurance costs overall and therefore does not increase overall treatment intensity.

**Appendix Table 1: Summary Statistics**

	Proportion or Average
Percent Sample Covered by:	
Cap Total	0.10
Cap Noneconomic	0.29
Cap Punitive	0.36
Punitive Evidence	0.48
Split Recovery	0.08
Joint and Several	0.55
Period Payment	0.53
Collateral Source	0.60
Insurance	
Private Insurance	0.79
Medicare	0.005
Medicaid	0.027
Military	0.031
Uninsured	0.15
Private Insurance cond'l Privately Ins. Last Period	0.91
Private Insurance cond'l Uninsured Last Period	0.46
Demographics	
Privately Employed	0.75
Gov't Employed	0.16
Self-Employed	0.080
College	0.52
High School	0.35
Age	39.8
Young	0.36
Unmarried	0.34
Young and Unmarried	0.19
Black	0.080
Hispanic	0.074
Family Income	53,990

Appendix Table 2: Tort Reform Enactments and Strike Downs

	1981	1982	1983	1984	1985	1986	1987
<b>Major Reforms</b>							
<b>Cap Total</b>	Enactment					SD <sup>d</sup>	KS <sup>bd</sup>
	<i>Strike Down</i>						
<b>Cap Noneconomic</b>	Enactment					AK <sup>a</sup> , MN, MO <sup>d</sup> , WA <sup>b</sup> , WV <sup>a,d</sup> , WI <sup>d</sup>	AL, CO, FL <sup>b</sup> , HI, KS, MD, MA <sup>ad</sup> , MI <sup>ad</sup> , NH <sup>d</sup>
	<i>Strike Down</i>					SD	
<b>Caps Punitive</b>	Enactment				IL <sup>d</sup>	WI <sup>d</sup>	AL, CO, FL <sup>c</sup> , NH
	<i>Strike Down</i>						
<b>Collateral Source</b>	Enactment				NY <sup>d</sup>	KS <sup>bd</sup> , MN <sup>d</sup>	AL, CO <sup>d</sup> , HI, IN, MA <sup>d</sup> , MI, UT <sup>d</sup>
	<i>Strike Down</i>	NH			KS		
<b>Joint and Several</b>	Enactment	LA	NM	IA		AL, CA, MO, TX UT, WA, WV <sup>d</sup> , WY	CO, CT, FL, HI, MI, NY, SD
	<i>Strike Down</i>						
<b>Minor Reforms</b>							
<b>Periodic Payment</b>	Enactment				IN <sup>d</sup> , LA <sup>d</sup>	IL <sup>d</sup> , MI, MO <sup>d</sup> , NY <sup>d</sup> , WA	FL, ME, MD, MT, UT <sup>d</sup>
	<i>Strike Down</i>	NH					
<b>Split Recovery</b>	Enactment					CT	CO, FL, IA
<b>Punitive Evidence</b>	Enactment			IN	MN, MT	AK, MO	AL, AR, IA, ND
	<i>Strike Down</i>						

Text in *italics* represents striking down.

<sup>a</sup>Alaska, Idaho, Massachusetts, Michigan, Ohio, and West Virginia all enacted ineffective caps on noneconomic damages, either because the caps are set too high or because they exempt severe injuries. Therefore, these reforms were excluded from the regression.

<sup>b</sup>Reforms in Florida, Georgia, Illinois, Kansas, New York, Ohio, and Washington were not in place long enough to have an impact and were therefore excluded from the analysis.

<sup>c</sup>Alabama, Arkansas, Florida, Mississippi, Montana, and Texas enacted punitive damages caps that are ineffective and therefore excluded from the analysis.

<sup>d</sup>These reforms were specific to medical malpractice. (For Colorado's collateral source rule beginning in 1989.)

		1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
<b>Major Reforms</b>												
<b>Cap Total</b>	Enactment		CO <sup>d</sup>									
	Strike Down	KS, TX								SD		
<b>Cap Noneconomic</b>	Enactment	ID <sup>a</sup> , OR, UT <sup>d</sup>							IL <sup>b</sup>	MT <sup>d</sup> , ND <sup>d</sup> , SD <sup>d</sup>	OH <sup>abd</sup>	
	Strike Down	FL	WA	MN	NH	AL, OH						IL, OH
<b>Caps Punitive</b>	Enactment	GA, KS, OR <sup>d</sup> , TX <sup>c</sup>	NV, VA				ND		IN	NJ, NC, OK	OH <sup>b</sup> , PA <sup>d</sup>	AK <sup>c</sup>
	Strike Down						AL					OH
<b>Collateral Source</b>	Enactment	GA <sup>b</sup> , MT, NJ, ND, OR,	KS <sup>b</sup> , KY	ID, ME <sup>d</sup>					WI <sup>d</sup>			
	Strike Down	KS			GA		KS		KY		AL	OH
<b>Joint and Several</b>	Enactment	AZ, GA, ID, MT NJ, ND	KY, MN	MS, NH		NE, TX			IL <sup>b</sup> , WI		OH	
	Strike Down											IL, OH
<b>Minor Reforms</b>												
<b>Periodic Payment</b>	Enactment	CT, ID, OH, RI SD	AZ <sup>d</sup> , CO <sup>d</sup> , MN <sup>d</sup>							MT <sup>d</sup>		
	Strike Down								AZ, OH			
<b>Split Recovery</b>	Enactment	GA, IA		UT		NY <sup>b</sup>				IN		AK, OR
	Strike Down				CO			NY				FL
<b>Punitive Evidence</b>	Enactment	CA, GA, ID, KS OH,	KY, NV	UT		MD, TN		MS	WI	NJ, NC		
	Strike Down	OR, SC, TX										KY

**Appendix Table 2** (continued)

		1999	2000	2001	2002	2003	2004	2005	2006	2007	Total Flips
<b>Major Reforms</b>											
<b>Cap Total</b>	Enactment										6
	<i>Strike Down</i>										
<b>Cap Noneconomic</b>	Enactment		ME			FL <sup>d</sup> , OH <sup>d</sup> , MS	OK <sup>d</sup> , TS <sup>d</sup>	GA <sup>d</sup> , NV <sup>d</sup> , TN <sup>d</sup>	IL <sup>d</sup> SC <sup>d</sup>		44
	<i>Strike Down</i>		OR								
<b>Caps Punitive</b>	Enactment		AL, ME			AR, MS <sup>c</sup>	ID, MT <sup>c</sup>	OH	MO <sup>d</sup>		30
	<i>Strike Down</i>										
<b>Collateral Source</b>	Enactment			AL	OH <sup>d</sup> , PA <sup>d</sup>	WV <sup>d</sup>	OK <sup>d</sup>				32
	<i>Strike Down</i>										
<b>Joint and Several</b>	Enactment				PA	AR <sup>d</sup> , OH, NV <sup>d</sup>			SC		40
	<i>Strike Down</i>										
<b>Minor Reforms</b>											
<b>Periodic Payment</b>	Enactment				PA <sup>d</sup>	OH <sup>d</sup>	TX <sup>d</sup>	GA <sup>d</sup>			28
	<i>Strike Down</i>							AL			
<b>Split Recovery</b>	Enactment				PA <sup>d</sup>			CA, MT	MO		19
	<i>Strike Down</i>									CA	
<b>Punitive Evidence</b>	Enactment		FL <sup>d</sup>			AR					29
	<i>Strike Down</i>										

## References

- American Tort Reform Association. 2007. *State and Federal Reforms*. Available at: <http://www.atra.org/reforms/>.
- America's Health Insurance Plans (AHIP). 2006. *Health Insurance Premium Growth Slows Despite Increased Utilization, Higher Costs*. Available at: <http://www.ahip.org/content/pressrelease.aspx?docid=14702>.
- Avraham, Ronen. 2006. Database of State Tort Law Reforms. Working Paper No. 06-08, Northwestern Law and Econ Research Paper. Available at: <http://ssrn.com/abstract=902711>.
- . 2007. "An Empirical Study of the Impact of Tort Reforms on Medical Malpractice Settlement Payments," 36 *Journal of Legal Studies* 183–229.
- Baicker, Katherine, and Amitabh Chandra. 2005. "The Effect of Malpractice Liability on the Delivery of Health Care," 8 *Forum for Health Economics & Policy* Art.4.
- . 2006. "The Labor Market Effects of Rising Health Insurance Premiums," 24(3) *Journal of Labor Economics* 3609–43.
- Chernew, Michael, David Cutler, and Patricia Keenan. 2005. "Increasing Health Insurance Costs and the Decline in Insurance Coverage," 40(4) *Health Services Research* 4 1021–39.
- Congressional Budget Office. 2003. *How Many People Lack Health Insurance and for How Long?* Washington, D.C.: Congressional Budget Office.
- . 2004. *Limiting Tort Liability for Medical Malpractice*. Washington, D.C.: Congressional Budget Office. Available at: <http://www.cbo.gov/ftpdocs/49xx/doc4968/01-08-MedicalMalpractice.pdf>.
- Congressional Research Service. 2005. *Medical Malpractice Liability Reform: Legal Issues and Fifty-State Survey of Caps on Punitive Damages and Noneconomic Damages*. Washington, D.C.: Library of Congress. Available at: <http://shelby.senate.gov/legislation/MedicalMalpractice.pdf>.
- Conley, Timothy, and Christopher Taber. 2005. *Inference with "Difference in Differences" with a Small Number of Policy Changes*. NBER Technical Working Paper No. 312. Cambridge, MA: National Bureau of Economic Research.
- Current Population Survey. 1981–2004. *March Annual Demographic Files*. Washington, D.C.: Bureau of the Census.
- Currie, Janet, and W. Bentley MacLeod. 2006. *Tort Reform and Birth Outcomes*. Working Paper No. 12478. Cambridge, MA: National Bureau of Economic Research.
- . 2008. "Tort Reform and Birth Outcomes," 123(2) *Quarterly Journal of Economics* 2795–830.
- Danzon, Patricia M., Mark V. Pauley, and Raynard S. Kington. 1990. "The Effects of Malpractice Litigation on Physicians' Fees and Income," 80(2) *American Economic Review* 2122–27.
- Dafny, Leemore. 2010. "Are Health Insurance Markets Competitive?" *American Economic Review* forthcoming.

- DeNavas-Walt, Carmen, Bernadette D. Proctor, and Cheryl Hill Lee. 2005. *Income, Poverty, and Health Insurance Coverage in the United States*. Washington, D.C.: U.S. Census Bureau Current Population Reports.
- Dubay, Lisa, and Robert Kaestner. 1999. “The Impact of Malpractice Fears on Caesarian Section Rates,” 18(4) *Journal of Health and Economics* 4491–522.
- Dubay, Lisa, Robert Kaestner, and Timothy Waidmann. 2001. “Medical Malpractice Liability and its Effect on Prenatal Care Utilization and Infant Health,” 20 *Journal of Health Economics* 591–611.
- Gruber, Jonathan, and James Poterba. 1994. “Tax Incentives and the Decision to Purchase Health Insurance: Evidence from the Self-Employed,” 109 *Quarterly Journal of Economics* 701–33.
- Holtz-Eakin, Douglas. 2004. *The Effects of Torts Reform: Evidence from the States*. Washington, D.C.: Congressional Budget Office.
- Kessler, Daniel, and Mark McClellan. 1996. “Do Doctor’s Practice Defensive Medicine?” 111 *Quarterly Journal of Economics* 353–90.
- . 2002. “Malpractice Law and Health Care Reform: Optimal Liability Policy in an Era of Managed Care,” 84(2) *Journal of Public Economics* 2175–97.
- Kessler, Daniel P., William M. Sage, and David J. Becker. 2005. “Impact of Malpractice Reforms on the Supply of Physician Services,” 293 *Journal of the American Medical Association* 2618–25.
- Madrian, Brigitte C., and Lars John Lefgren. 1999. *A Note on Longitudinally Matching Current Population Survey (CPS) Respondents*. Working Paper No. 247. Cambridge, MA: National Bureau of Economic Research.
- Marquis, M. Susan, Melinda Beeuwkes Buntin, Jose J. Escarce, Kanika Kapur, and Jill M. Yegian. 2004. “Subsidies and the Demand for Health Insurance in California,” 39 *Health Services Research* 1547–70.
- Matsa, David. 2007. “Does Liability Keep the Doctor Away? Evidence from Tort Reform Damage Caps,” 36 *Journal of Legal Studies* S143–82.
- Michelle, Mello. 2006. *Medical malpractice: impact of the crisis and effect of state tort reforms. Research Synthesis Report No. 10*. Princeton, NJ: The RWJF.
- National Conference of State Legislators. 2007. *Medical Malpractice Tort Reform*. Available at: <http://www.ncsl.org/standcomm/sclaw/medmaloverview.htm>.
- Pauly, Mark, Christy Thompson, Thomas Abbott, James Margolis, and William Sage. 2006. “Who Pays? The Incidence of Malpractice Premiums,” 9 *Forum for Health and Economic Policy* Art.2.
- Sloan, Frank, and John H. Shadle. 2009. “Is There Empirical Evidence for “Defensive Medicine?” A Reassessment,” 28 *Journal of Health Economics* 481–91.
- Sloan, Frank A., Kathryn Whetten-Goldstein, Penny B. Githens, and Stephen S. Entman. 1995. “Effects of the Threat of Medical Malpractice Litigation and Other Factors on Birth Outcomes,” 33 *Medical Care* 700–14.
- Studdert, David M., Michelle M. Mello, William M. Sage, Catherine M. Des-Roches, Jordon Peugh, Kinga Zapert, and Troyen A. Brennan. 2005. “Defensive

- Medicine Among High-Risk Specialist Physicians in a Volatile Malpractice Environment,” 293 *The Journal of the American Medical Association* 2609–17.
- Thurston, Norman K. 2001. “Physician Market Power—Evidence from the Allocation of Malpractice Premiums,” 39(3) *Economic Inquiry* 3487–98.
- U.S. Congress. Office of the Technology Assessment. *Defensive Medicine and Medical Malpractice, OTA-H-602*. Washington, D.C.: U.S. Government Printing Office.
- U.S. Department of Health and Human Services. 2002. “Confronting the New Health Care Crisis: Improving Health Care Quality and Lowering Costs by Fixing Our Medical Liability System.” Available at: <http://aspe.hhs.gov/daltcp/reports/litrefm.pdf>.
- U.S. Government Accountability Office. 2003. “Medical Malpractice Implications of Rising Premiums on Access to Health Care,” *Pub. No. GAO-03-836*. Washington, D.C: United States General Accounting Office.
- Westlaw. 2006. *50 State Statutory Surveys: Health Care Medical Malpractice*.
- Zuckerman, Stephen, Christopher F. Koller, and Randall R. Bovbjerg. 1986. “Information on Malpractice: A Review of Empirical Research on Major Policy Issues,” 49 *Law and Contemporary Problems* 101–3.