

LITIGATION PATTERNS IN AUTOMOBILE BODILY INJURY CLAIMS 1977–1997: EFFECTS OF TIME AND TORT REFORMS

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ABSTRACT

This study uses data from the Insurance Research Council to investigate changes in the use of attorneys and in the filing of legal claims to resolve automobile third-party bodily injury claims between 1977 and 1997. We find results consistent with the general public perception that the use of attorneys and the filing of legal claims have increased over the study period. In addition, we find evidence that tort reforms enacted by the states have slowed the rates of increase in the use of attorneys and in the filing of legal claims to resolve automobile insurance claim disputes.

INTRODUCTION

Indisputably, U.S. society is viewed throughout the world as excessively litigious. This reputation goes back at least to the 1960s and early 1970s, when rapidly rising automobile and medical professional (malpractice) insurance premiums in the United States provided initial concern about litigation patterns. Concern was high enough that legislators in numerous states passed a variety of “tort reforms,” including automobile no-fault laws as well as limitations on medical malpractice litigation. In the intervening years, new liability “crises” have encouraged policymakers to limit other areas of litigation, including through general placement of caps on damages, restrictions on joint and several liability, and a narrowing of situations when punitive damages are available.

Despite these policy efforts, insurance affordability, and availability, difficulties have continued, as have debates about the actual influence of litigation patterns on those difficulties (see Baker, 2005, who argues that insurance “crises” are caused by insurer underwriting decisions rather than by changes in underlying claiming patterns). With a rich data set of automobile liability claims from 1977 to 1997, we can offer input to the debate by observing actual liability claiming patterns, as well as influences of tort

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reforms on those patterns, over time. Specifically, we test whether or not automobile liability claimants were more or less likely to employ attorneys and to file legal claims in 1997 than they were in 1977. We also test the effects of various tort reforms on those patterns. Our findings indicate that reforms are significant in reducing both the use of attorneys and the filing of legal claims. When using state identifiers instead, we find generally opposite results. One possibility is that the high correlation between passage of reforms and time has muddled the effect of either. To disentangle these two issues, we ran a third analysis, including both state identifiers and interaction effects between reforms and data years. In this third analysis, we find the reforms generally effective in dampening the use of attorneys and filing legal claims, both of which increased over time.

One might argue that automobile liability is not the venue where most of the debate about litigiousness occurs. Yet, automobile liability accounts for more than half of all property-liability insurance premiums sold in the United States. Furthermore, the topic is of sufficient concern that state legislators continue to pass laws modifying rules for compensating individuals injured in automobile accidents. Colorado, for instance, reverted to a tort liability system in 2003 after many years as a no-fault state. Minnesota is considering a similar change.

To place this research in context, we provide a brief discussion of existing literature on litigation patterns in the second section. In the section on "General Economic Models of Litigation Behavior" we present general models of litigation behavior, which lead to our empirical investigation. The data used to test our hypotheses and the empirical methodology employed are presented in the following section, with results presented in the next section. In the final section we present implications of our findings and suggestions for future research.

LITERATURE ON LITIGATION PATTERNS

Over the past three decades, a great deal of research has been reported on various aspects of U.S. litigation patterns. Some of it has dealt with changes in numbers of legal claims filed in various courts and jurisdictions (see, e.g., various reports by the Bureau of Justice Statistics, a subsidiary of the U.S. Department of Justice, <http://www.ojp.usdoj.gov/bjs/>). These studies, however, have been hampered by a variety of underlying problems, such as lack of good sorting techniques. For instance, civil claims encompass all cases involving bankruptcy filings, prison discrimination suits, as well as product liability and automobile injury claims, among others, limiting an ability to quantify changes in willingness to sue for specific areas of tort law. Lack of data on the underlying safety of various activities is a further limitation. For instance, if we observe rising rates of claims in product or automobile liability, we cannot distinguish the cause between rising accident rates or rising willingness to sue. Setting aside the question about causation, commonly accepted notions of U.S. litigation patterns indicate that rates rose dramatically during the 1980s and have steadied or declined recently (see Reimann, 2003).

A second branch of research on litigation patterns investigates the effects of various legislative modifications to the civil litigation system, commonly known as "tort reforms." This latter area has benefited somewhat from availability of specific insurer data in some instances (e.g., Viscusi, 1991) and more generally the Insurance Research

Council (IRC) data sets employed here, which provide information on thousands of automobile claims closed within a specified time period every 5 to 10 years. The studies on effects of tort reforms by and large demonstrate that caps on damages reduce, both the size of awards and the frequency of claiming (Danzon, 1984; Viscusi and Born, 2005). Mixed results have been found on a variety of other reforms, including passage of no-fault legislation, limiting the availability of joint and several liability, and modifying collateral source rules (Schmit, Browne, and Lee, 1997; Hillman and Allen, 2003).

We intend to add to this literature by combining the two fields. We use the automobile closed claim surveys conducted by the IRC to investigate changes in claiming patterns over the period 1977 to 1997. Specifically, we test for changes in a claimant's use of an attorney as well as, the claimant's decision to file a legal suit. Simultaneously, we test for effects of various tort reforms and claimant characteristics on these patterns. We know of no other study to consider these issues in tandem.

GENERAL ECONOMIC MODELS OF LITIGATION BEHAVIOR

As with empirical investigations of the tort system, numerous studies offer economic models of litigation behavior, including Bebchuk (1984), Shavell (various articles summarized in his book, 2004), and those presented in Cooter and Rubinfeld (1989). These models typically follow a sequential process for both parties in litigation, beginning with their respective decisions to expend resources on safety and proceeding through the various steps once an accident has occurred and harm resulted: making a complaint, hiring a lawyer, filing a formal legal claim, entering settlement discussions, and ultimately going to court where settlement or judgment occurs. Before proceeding to the next stage, the parties evaluate the expected benefits and costs of proceeding, and are assumed to do so only when the risk-adjusted expected benefits of further effort exceed the expected costs. The data employed in this study are of claims made with payment. As a result, we begin at the third stage of the process, hiring a lawyer, and then to the fourth, filing a legal claim.

Both theoretical and empirical evidence demonstrate that a number of factors affect the claimant's decisions, including risk attitudes, asymmetry of information, and expected returns from litigation (see Shavell, 2004). The greater the risk aversion of a claimant, for example, the less likely the individual is to proceed with litigation. The sure bet of a settlement offer will look better to the risk-averse individual than to one who is more risk taking.

Similarly, as information asymmetry decreases, we are less likely to observe extensive litigation. That is, for claims in which the information available to assess claim value is shared by both parties, the parties are expected to come to agreement sooner than when their information differs. As a result, lower levels of litigation are anticipated with more transparent situations. If the automobile compensation system has become more routine in nature, as some researchers have suggested (see Hensler et al., 1987; Viscusi, 1991), we would anticipate less asymmetric information, and less need to expend resources in litigation.

Size of harm, generally referred to as "damages," as well as the likelihood of success, also will affect claiming patterns by altering expected payouts. Changes in the

value of damages (for the same injury, and in real terms) over time are expected to affect incentives to litigate. Increasing damages, for instance, produce higher expected benefits of litigation and therefore lead to greater claimant willingness to hire lawyers, and pursue legal claims. Decreasing damages would have the opposite effect, as observed by Viscusi (1986) in product liability litigation. This becomes particularly relevant in observing patterns over time if society values noneconomic damages differently from one period to another.

In the current study we are interested in observing changes over time in two distinct decisions: the decision to hire an attorney and the decision to file a legal claim. Our data set involves paid liability insurance claims. The parties have selected and implemented safety levels, an accident has occurred resulting in injury, and at least one of the parties has requested compensation from the other. Having sought compensation from the insured driver, the injured party decides whether or not to hire an attorney. Some claimants hire attorneys; others do not. The second decision, to file a legal claim with the court, is also ultimately made by the injured party. Nonetheless, it is reasonable to assume that for those individuals who hire an attorney, the attorney heavily influences this decision. A 1991 Rand survey of individuals who have been injured indicates that the decision to hire an attorney often is made within days of requesting compensation from another party (Hensler et al., 1991). The decision to file a legal claim generally takes more time.

EMPIRICAL ANALYSES: DATA AND METHODOLOGY

Data Description

The data used in this study come from the IRC, a division of the American Institute for Chartered Property Casualty Underwriters and the Insurance Institute of America. Three different data sets are used in the analyses. Each data set consists of third-party automobile bodily injury liability claims that were closed in the study year: 1977, 1987, 1997. The insurers providing information on closed claims account for a significant portion (in excess of 60 percent) of the U.S. automobile insurance market and include both State Farm and Allstate, the two largest writers of automobile bodily injury liability coverage, although the set of insurers providing information is not the same in each of the different data years. The data do not indicate which insurer provided coverage for the particular claims that are reported.¹

An important consideration in evaluating these data is that the survey asks for information only about those claims *closed with payment*. The distribution of claims could look quite different if those closed without payment were included. We anticipate, for instance, that claims in the data set tested are more likely to involve attorneys than the full set of all claims. We also expect an overrepresentation of nuisance claims (i.e., of small value) that insurers find less costly just to pay than fight, and large uncertain claims that plaintiffs find worthwhile to pursue even when the probability of success is low.

¹ Insurers may differ to some extent in their claims settlement practices. Regulation, market reputation, competition, and bad faith laws, however, likely proscribe the extent to which claims settlement practices differ from company to company. The analyses that are reported here are based on the implicit assumption that claims settlement practices are similar across companies.

Methodology

As discussed in the previous section, we are primarily interested in determining whether two stages of litigation in the resolution of third-party automobile insurance claims have changed in frequency since 1977: the hiring of attorneys and the filing of legal claims. To undertake this test, we estimate a two-stage logistical regression model in which the estimated likelihood of hiring an attorney from the first equation is used as an explanatory variable in the second equation. This system takes the form:

$$\begin{aligned}
 P(\text{Hiring Lawyer}) = & f(\text{Attorneys per Capita} + \text{Claimant Characteristics} \\
 & + \text{Accident Characteristics} + \text{State Legal Characteristic} \\
 & + \text{Data Year}), \tag{1}
 \end{aligned}$$

and

$$\begin{aligned}
 P(\text{Filing Legal Claim}) = & f(\text{Estimated Probability of Hiring an Attorney} \\
 & + \text{Claimant Characteristics} + \text{Accident Characteristics} \\
 & + \text{State Legal Characteristics} + \text{Data Year}). \tag{2}
 \end{aligned}$$

Hiring Lawyer is a dichotomous variable that takes the value one if the third-party claimant hired an attorney to help resolve the dispute, and zero otherwise. *Filing Legal Claim* also is a dichotomous variable, taking the value one if the third-party claimant filed a legal claim, and zero otherwise.

In the first equation, where the likelihood a claimant hires an attorney is modeled, a variable representing the number of *Lawyers per Capita* in the state is included. The American Bar Association (ABA) publishes data on the number of lawyers in each state yet has not done so for every year of our study. For years in which the data were not reported, the values were extrapolated.² We anticipate a higher probability of engaging a lawyer for claimants located in states with higher numbers of lawyers per capita. In the second equation of the system (modeling the probability of filing a legal claim), we include the resulting *Estimated Probability of Attorney Representation* as an explanatory variable.

A number of additional factors are likely to affect both the decision to hire an attorney and to file a legal claim. These include: claimant characteristics, accident characteristics, state legal rules where the accident occurred, and the primary variable of interest with the passage of time. We use the same measurements in each equation and discuss them below.

The data set year (or time) variables are those of greatest interest here in testing for changes in use of the legal system over time. We use a vector of categorical variables, *Data Year 1977 (1987, 1997)*, to represent the different survey years for which we have

² We have a total of 12 years of reported data. To incorporate estimates for the other years, we used those 12 data points in a regression model $\#lawyers/population = a + b(\text{year}) + \varepsilon$.

closed claims files from the IRC. The IRC data were created from a survey of automobile claims adjusters who completed survey forms on all auto claims closed within a specified 2-week period for each of those survey years. The data were collected at three points in time: 1977, 1987, and 1997. Coefficients on the data year variables indicate whether or not differences in the hiring of attorneys, and the filing of legal claims have occurred over time. Our base data year is 1997.

Finding that the data year variables are significantly different from zero would provide evidence that the likelihood of hiring an attorney or bringing legal action for the sample that we study has changed. Negative coefficients, especially if they rise (i.e., are less negative) from 1977 to 1987, would suggest that the likelihood of using an attorney and bringing legal action has increased over the study period. The opposite would hold for coefficients that are positive, and which decline from 1977 to 1987. A mixed result is of course also possible, providing evidence of other conditions in the relationship between hiring an attorney and filing a legal claim. To test for any changes in these claiming patterns, other control variables that could affect litigation decisions are included. Specifically, we include controls for claimant, accident, and state characteristics.

Claimant Characteristics is a vector of variables representing demographic traits of the claimant, which may affect decisions to hire an attorney and/or file a legal claim. First note that the claimant is never the policyholder, given that these are third-party claims. It is very likely that the insurer provides legal defense to the insured as part of the liability coverage under the policy and has rights to control the litigation and settlement process. The insured, therefore, is less likely to be making overt decisions, while the claimant at least must make the initial decision to hire an attorney or not and then will be involved in making the decision (either with or without an attorney) to settle or proceed with a legal filing.

Gender, marital status, and employment status may reflect a greater availability of resources, which in turn is likely to encourage greater levels of litigation. Men generally have higher incomes and married people have available a second source of activity (which may be available for income production, child care, or other needed activities). Employed claimants also are more likely to have additional resources for claiming.

Similarly, various demographic characteristics have been associated with differences in risk attitudes and negotiating preferences. Halek and Eisenhauer (2001) reported evidence in life insurance purchase decisions of risk aversion differences across gender, age, and marital status. Doerpinghaus, Schmit, and Yeh (2003, 2004) found gender and age effects in both claim payment and fault assignment in automobile liability claims. Viscusi (1988) identified gender and marital status effects in pursuing product liability claims. In our study, *male* equals one if the claimant is male, *married* equals one if the claimant is married, and *employed* equals one if the claimant is employed.

Along with the effects of claimant demographics, we anticipate differences across claims associated with the accidents themselves. *Accident Characteristics* is a vector of variables defining accident traits. These include the severity of the injury suffered by the third-party claimant, type of injury, accident location, number of vehicles involved in the incident, and degree of fault of the claimant. Each of these characteristics can be considered elements of case complexity, with more complex cases more likely to

involve litigation through attorney involvement and filing of claims. In much of the literature, complexity is associated with asymmetric information, and asymmetric information generally is expected to lead to greater levels of litigation (see Cooter and Rubinfeld, 1989; Shavell, 2004).

The claimant's injury severity is expected to be positively related to hiring an attorney in part because the larger the claim value, the more important is the outcome to the claimant. We also anticipate that higher-valued claims will proceed further through the litigation process to the point of filing a legal claim because the benefits of continuing are seen by both parties as outweighing the costs. Higher-valued (i.e., more severe) injuries often represent situations with greater complexity, hence the presence of asymmetric information, and therefore they are expected to generate fewer settlements.

We use two injury severity measures. The first is represented by a vector of four dummy variables related to different degrees of disability. These categories are reported by the claims adjuster in describing the third-party claimant's injuries from the accident, and listed in order of severity: *a temporary disability*, *a permanent partial disability*, *a permanent total disability*, and (the holdout) *no disability*. Other things equal, more severe disabilities are expected to result in greater damages. Greater damages are likely to lead to greater benefit from hiring an attorney. Attorneys are also expected to be hired more often as cases become increasingly complex. As stated above, injury severity likely represents one aspect of complexity. With regard to disability, another aspect of complexity is the need to determine degree of disability for partial disabilities; therefore, a partial disability could be more complex than a total disability or fatality and result in greater attorney usage.

We include a second measure of injury severity associated with the claimant's relative medical expenses, measured as the dollar value of the claimant's medical expenses divided by the average medical expenses (*medical expenses/average medical exp*) of all claimants whose claim closed in the same year. The higher the relative value of medical expenses, the more likely the claimant is to hire an attorney and to file a legal claim.

In addition to severity, injury *type* has been shown to affect claim patterns (see Derrig, Weisberg, and Chen, 1994). In particular, soft-tissue injuries (i.e., sprains and strains) appear more open to fraud and/or differences of opinion between the parties. Insurers in these cases are more likely to litigate further (holding other factors constant) in an effort to minimize fraudulent claims. Valid claims, therefore, are more likely to depend on hiring an attorney for successful outcomes and are more likely to proceed through the filing of a legal claim.

Other factors are also likely related to case costs, and complexity. Accident location, for example, is considered a reflection of the availability (and therefore costs) of legal resources, the extent of public interactions, attitudes toward litigation, and other qualities that could affect the likelihood of attorney usage and claim filing. Others (e.g., Danzon, 1984) have incorporated an urbanization variable to consider these factors, generally finding it a significant influence on litigation patterns. Here we are able to pinpoint whether the accident occurred in a *large city*, *suburban area*, *medium city*, *small town*, or (the holdout) *rural area*. We anticipate greater degrees of litigation moving from the rural areas to the large city.

The *number of vehicles* involved in the accident is also expected to influence case complexity, with higher numbers indicating more complex situations. Determining relative fault among the multiple drivers can be expected to be more difficult as the number of cars involved rises. Relative benefits of hiring an attorney, therefore, are anticipated to be greater as the number of vehicles involved in the accident increase. Whether or not claim filing is affected is unknown *a priori*.

As Ross (1980) discusses, relative certainty about fault makes case disposition easier. Where the claimant is considered not at all at fault (0 percent) or totally at fault (100 percent), we would anticipate little if any disagreement about liability. The disagreement would rest solely on the size of damages. As relative fault becomes more evenly distributed, however (nearing 50 percent), the dispute incorporates both issues of liability itself as well as size of damages. Benefits of attorneys become greater with increasing uncertainty. And as Shavell (2004) indicates, claiming rates may also rise as disputants disagree about financial responsibility. We utilize two variables, *claimant fault* and *claimant fault squared*, to test for these relationships. The measures of fault are estimates provided by the claims adjusters for the insurers who complete the IRC surveys. The adjusters are employed by the insured defendant's insurance company. In talking with adjusters who have completed the survey, we believe that this estimate of fault is assigned relatively early in the claim process, but could be modified as claim disposition becomes known.

State Legal Characteristics is a vector of variables representing the state legal environment. Browne and Puelz (1999) and Schmit, Browne, and Lee (1997), as well as others, provide evidence that tort reforms influence the disposition of legal claims. We control for whether or not a particular state in a given year has in effect a variety of laws affecting automobile liability. We consider laws that limit the circumstances when *joint and several liability* or *punitive damages* can be used. Because the availability of punitive damages can be limited in a variety of ways, our variable can take on a value greater than one. We also consider laws that place *caps* on awards for noneconomic or punitive damages. In addition, we control for whether or not the *punitive damages are insurable* in the state. Controls for state *no fault* and *compulsory insurance* laws are also included in the analysis.

As noted below, a second set of analyses was conducted in which the state reform variables were omitted and instead state identifiers were employed. The intention of the second set of analyses is to break the potential time effect of the reform variables while still allowing the state legal characteristics to be accounted for in the analysis. This second analysis, however, presumes fixed effects over the time period, which may well be incorrect because of the passage of reforms. A third analysis was conducted, therefore, in which both state identifiers and interaction terms between reforms, and the data set year variables are included.

Descriptive Statistics

Table 1 lists descriptive statistics for each variable used in the analysis and for each data set as well as for the overall sample. The variation in sample size over time merely reflects insurer response to the request for information. It is not a representation of claim frequency.

TABLE 1

Descriptive Statistics Mean (Standard Deviation) All Data Years Combined and by Data Year Mean (Standard Deviation) for Each Variable for the Following Groups: Total Sample

Variable	Full Sample (N = 23,430)	1977 (N = 5,651)	1987 (N = 7,567)	1997 (N = 10,212)
Lawyer	0.524 (0.499)	0.434 (0.496)	0.552 (0.497)	0.553 (0.497)
Lawyers per capita	2.842 (3.134)	2.159 (1.876)	2.775 (2.278)	3.270 (4.037)
Male	0.462 (0.499)	0.470 (0.499)	0.452 (0.498)	0.465 (0.499)
Married	0.496 (0.500)	0.568 (0.495)	0.493 (0.500)	0.458 (0.498)
Employed	0.842 (0.365)	0.964 (0.186)	0.710 (0.454)	0.873 (0.333)
Temporary disability	0.409 (0.492)	0.484 (0.500)	0.490 (0.500)	0.307 (0.461)
Permanent partial disability	0.092 (0.289)	0.089 (0.285)	0.100 (0.300)	0.087 (0.282)
Permanent total disability	0.011 (0.103)	0.025 (0.155)	0.006 (0.078)	0.006 (0.078)
No disability	0.480 (0.500)	0.378 (0.485)	0.398 (0.489)	0.598 (0.490)
Medical expense/avg medical expense	0.985 (4.358)	0.997 (7.667)	1.005 (2.726)	0.964 (2.355)
Fatality	0.008 (0.091)	0.024 (0.153)	0.006 (0.076)	0.001 (0.038)
Fracture	0.083 (0.275)	0.109 (0.312)	0.092 (0.289)	0.061 (0.240)
Neck strain	0.582 (0.493)	0.248 (0.432)	0.623 (0.485)	0.736 (0.441)
Back strain	0.477 (0.499)	0.180 (0.384)	0.505 (0.500)	0.620 (0.485)
Concussion	0.043 (0.204)	0.023 (0.149)	0.068 (0.251)	0.037 (0.188)
Other strain	0.125 (0.330)	0.168 (0.374)	0.126 (0.332)	0.100 (0.300)
Bruise	0.191 (0.393)	0.168 (0.457)	0.212 (0.409)	0.117 (0.321)
Cosmetic	0.045 (0.206)	0.103 (0.304)	0.035 (0.183)	0.019 (0.138)
Other injury	0.166 (0.372)	0.073 (0.259)	0.151 (0.358)	0.230 (0.421)
Large city	0.336 (0.472)	0.338 (0.473)	0.352 (0.478)	0.324 (0.468)
Suburban area	0.199 (0.399)	0.170 (0.376)	0.201 (0.401)	0.213 (0.409)
Medium city	0.284 (0.451)	0.229 (0.420)	0.279 (0.449)	0.319 (0.466)
Small town	0.109 (0.311)	0.155 (0.362)	0.093 (0.290)	0.094 (0.293)
City	0.336 (0.472)	0.338 (0.473)	0.357 (0.478)	0.323 (0.468)
Number of vehicles	1.940 (1.015)	1.195 (0.636)	1.182 (1.276)	2.172 (0.728)
Claimant fault	6.612 (17.700)	6.224 (16.621)	9.851 (21.696)	4.427 (14.302)
Joint & several liability	0.409 (0.492)	0.001 (0.074)	0.280 (0.449)	0.727 (0.446)
Punitive damages (PD)	0.482 (0.500)	0.009 (0.093)	0.322 (0.467)	0.862 (0.345)
Non-economic damages caps	0.088 (0.284)	0 (0)	0.054 (0.227)	0.163 (0.369)
Punitive damages insurable	0.450 (0.498)	0.230 (0.421)	0.549 (0.498)	0.499 (0.500)
PD * Punitive damages insurable	0.265 (0.441)	0.005 (0.069)	0.197 (0.398)	0.459 (0.498)
No-fault	0.202 (0.402)	0.176 (0.381)	0.208 (0.406)	0.213 (0.409)
Compulsory insurance	0.690 (0.463)	0.416 (0.493)	0.701 (0.458)	0.832 (0.373)

Several interesting patterns are observable. One quite important pattern is to notice the change in tort reform variables over the three data sets. As shown in Table 1, the values are near 0 for each variable except the no-fault variable in 1977 and exceed 0.70 for joint and several as well as punitive damages reform in 1997, with substantial increases in the others. Because the reform variables may be picking up a time effect, we undertook three analyses: one using tort reforms as control variables, a second with state identifiers as control variables, and a third with state identifiers, as well as interaction terms between reforms and the data set years.

Claimant Characteristics. The proportion of claimants who are married as well as those who are employed declined from 1977 to 1997. About 57 percent of claimants were married in 1977 and 96 percent were employed. In 1997 just under 46 percent were married and just over 87 percent employed. If demographic characteristics are linked to propensities to sue and/or utilize the legal system, we would expect to observe these changes affecting the outcomes of our analysis.

Accident Characteristics. A number of interesting patterns are also observable in factors associated with the accident. Note that the proportion of claims in which no disability is reported increased from 38 percent in 1977 to 60 percent in 1997. The shift seems to have come primarily from the temporary disability category, which was reported for 48 percent of claimants in 1977 but only 31 percent in 1997. We also observe the results of efforts to curb motor vehicle fatalities, with the number dropping from 2.4 percent in 1977 to less than one-tenth of that in 1997.

The accident location has also changed. Specifically, a shift appears to have occurred to suburban, and medium-sized cities from the large cities, small towns, and rural areas. Where 40 percent of the claims involved accidents in suburban and medium-sized cities in 1977, they accounted for 53 percent in 1997. We assume this shift is also representative of changes in driving patterns, with increasing traffic volume in the suburban and medium-sized cities relative to the other locations.

We further observe that the average number of vehicles involved in an accident has risen from 1.2 in 1977 to 2.2 in 1997. If increasing numbers of vehicles represents increasing case complexity, we would anticipate greater use of attorneys, and filings of legal claims.

Claimant fault over this duration fell, from 6.2 percent in 1977 to 4.4 percent in 1997. Note, however, that the value in 1987 was 9.8 percent. Determining if a trend exists, therefore, is not possible with these data. In fact, a review of these descriptive statistics suggests a hyperbolic pattern might have existed, with patterns in 1987 different from 1997 and 1977 while the beginning and ending points of our analysis may be more similar to one another.

RESULTS

Results of the two-stage logistic regressions using state tort reform variables as controls are reported in Table 2. Logistic regressions using state identifiers as controls are reported in Table 3. Logistic regressions using state identifiers as well as interaction terms between the reforms and data set years are reported in Table 4. Using tort reforms, we find that coefficients for both the reforms and the data set year variables for both equations are statistically significant. Further, the coefficient signs indicate increasing use of attorneys and increasing claim filings, with tort reforms dampening these effects generally in the expected ways. An exception is the no-fault reform variable, which tends to be positive. We would consider this result contrary to expectations except that prior research indicates that state no-fault legislation often results in counterintuitive patterns because of the complex incentive systems for claim build-up and litigation (Schmit and Yeh, 2003).

Importantly, when using state identifiers as control variables instead of the tort reform variables, the data set year variables show quite different patterns. As indicated in

TABLE 2

Two-Stage Logistic Regression Analysis: Likelihood of Hiring an Attorney and Likelihood of Filing a Legal Claim—Tort Reform Controls

Variable	Probability of Hiring Attorney		Probability of Filing Legal Claim	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Intercept	-0.8649	<0.0001	-4.9559	<0.0001
Lawyers per capita	0.00920	0.1102		
Estimated P(lawyer representation)			4.0793	<0.0001
Data year 1977	-1.0141	<0.0001	-0.4239	<0.0001
Data year 1987	-0.8507	<0.0001	-0.8154	<0.0001
Joint & several liability	-0.4339	<0.0001	-0.5129	<0.0001
Punitive damages limitations	-0.6472	<0.0001	-0.8657	<0.0001
Noneconomic damages caps	-0.2153	0.0001	-0.5175	<0.0001
Punitive damages insurable	0.4437	<0.0001	0.4795	<0.0001
Punitive damages * Punitive damages insurable	-0.5110	<0.0001	0.0158	0.8573
No-fault	0.8261	<0.0001	0.2713	<0.0001
Compulsory insurance	-0.1583	<0.0001	-0.0602	0.2179
Male	0.1177	0.0001	-0.1339	0.0009
Married	-0.1775	<0.0001	0.3000	<0.0001
Employed	-0.2634	<0.0001	0.1170	0.0371
Permanent disfigurement	0.5078	<0.0001	-0.0041	0.6896
Temporary disability	0.6472	<0.0001	0.2587	<0.0001
Permanent partial disability	1.7689	<0.0001	0.4531	<0.0001
Permanent total disability	0.8800	<0.0001	0.6156	0.0003
Medical expenses/average medical expense	0.2412	<0.0001	0.0167	0.0005
Fatality	2.4665	<0.0001	0.8575	<0.0001
Fracture	0.4524	<0.0001	0.4426	<0.0001
Neck strain	0.6151	<0.0001	0.1135	0.0230
Back strain	0.8996	<0.0001	0.0611	0.1904
Concussion	0.3418	0.0001	0.3626	<0.0001
Other strain	0.5233	<0.0001	0.0734	0.2106
Bruise	-0.0338	0.4231	-0.1723	0.0021
Cosmetic	0.1854	0.0301	0.0590	0.5488
Other injury	0.4844	<0.0001	0.4692	<0.0001
Large city	0.7606	<0.0001	-0.0315	0.7183
Suburban area	0.5755	<0.0001	0.1226	0.1797
Medium city	0.1737	0.0078	0.0739	0.4052
Small town	0.0670	0.3684	-0.1136	0.2672
Number of vehicles	0.0153	0.3547	0.0260	0.2281
Claimant fault	0.0347	<0.0001	0.0337	<0.0001
Claimant fault squared	-0.00033	<0.0001	-0.00025	<0.0001
Maximum rescaled adjusted <i>R</i> ²	0.2936		0.3701	

Table 3, lawyer use between the 1977 and 1997 data set years shows no statistical difference, while 1987 is statistically lower than 1997. For claim filing, however, the coefficients suggest that 1977 involved statistically greater levels of claim filing than 1997, and no difference between 1987 and 1997.

TABLE 3

Two-Stage Logistic Regression Analysis: Likelihood of Hiring an Attorney and Likelihood of Filing a Legal Claim—State Identifier Controls

Variable	Probability of Hiring Attorney		Probability of Filing Legal Claim	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Intercept	-0.5994	0.1392	-4.6603	<0.0001
Lawyers per capita	-0.0460	0.0048		
Estimated P(lawyer representation)			4.1684	<0.0001
Data year 1977	-0.0531	0.3231	0.4965	<0.0001
Data year 1987	-0.2246	<0.0001	-0.0868	0.0931
Male	0.0932	0.0025	-0.1635	<0.0001
Married	-0.1748	<0.0001	0.2919	<0.0001
Employed	-0.2675	<0.0001	0.1417	0.0138
Permanent disfigurement	0.4992	<0.0001	-0.1342	0.2440
Temporary disability	0.6610	<0.0001	0.2847	<0.0001
Permanent partial disability	1.8194	<0.0001	0.8123	<0.0001
Permanent total disability	0.8406	<0.0001	0.8297	<0.0001
Medical expenses/average medical expense	0.2769	<0.0001	0.0139	0.0033
Fatality	2.4842	<0.0001	0.8468	<0.0001
Fracture	0.4139	<0.0001	0.2647	0.0003
Neck strain	0.6063	<0.0001	0.1042	0.0438
Back strain	0.8852	<0.0001	0.0150	0.7544
Concussion	0.3374	0.0001	0.2831	0.0012
Other strain	0.4886	<0.0001	-0.00595	0.9216
Bruise	-0.0259	0.5417	-0.1590	0.0059
Cosmetic	0.1718	0.0467	-0.00562	0.9562
Other injury	0.4690	<0.0001	0.4101	<0.0001
Large city	0.7161	<0.0001	-0.1261	0.1658
Suburban area	0.4003	<0.0001	-0.0143	0.8802
Medium city	0.1171	0.0777	0.0670	0.4682
Small town	0.0243	0.7477	-0.0991	0.3516
Number of vehicles	0.0146	0.3758	0.0321	0.1496
Claimant fault	0.0335	<0.0001	0.0331	<0.0001
Claimant fault squared	-0.00032	<0.0001	-0.00025	<0.0001
State identifiers (not shown)				
Maximum rescaled adjusted R^2	0.2958		0.3914	

We view these results as indicating that the tort reform variables may be picking up a time effect and therefore influencing the results in unintended ways. In fact, correlation analysis indicates high associations between the tort reforms and the data set years. The correlations between data set years and tort reforms moves from 0.0001 significance negative in 1977 to 0.0001 significance positive in 1997. The year 1987 is mixed.

Furthermore, the state identifiers ought to permit greater opportunity to account for variations across states, with more allowances for distinctions across states, and over

time than can be measured by limited categories of reform controls. Further, we note that the rescaled maximum R^2 (see Schmit and Yeh, 2003, for a discussion of this measure) is slightly higher for the analyses with state identifiers than tort reforms, which indicates a slightly better fit. Furthermore, the intercept is significantly negative in the model with tort reforms and not significantly different from zero in the model with state identifiers.

We refer to other data to indicate similar results as demonstrated here, with increases in litigiousness during the 1980s and decreases in the 1990s. Tillinghast-Towers/Perrin

TABLE 4

Two-Stage Logisitic Regression Analysis: Likelihood of Hiring an Attorney and Likelihood of Filing a Legal Claim—State Identifier With Interaction Controls Between Data Year and Tort Reforms

Variable	Probability of Hiring Attorney		Probability of Filing Legal Claim	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Intercept	1.1739	0.0092	−1.3639	0.0005
Lawyers per capita	−0.0511	0.0016		
Estimated P(lawyer representation)			4.0631	<0.0001
Data year 1977	−1.4626	<0.0001	−1.8088	<0.0001
Data year 1987	−0.8536	<0.0001	−1.8078	<0.0001
Joint & several liability ₇₇	−0.2859	0.5450	−1.1374	0.0858
Punitive Damages ₇₇	−2.3575	0.0001	−1.5890	0.0127
Punitive Damages Insurable ₇₇	0.1487	0.2021	−0.6460	<0.0001
Punitive Damages ₇₇ * Punitive Damages Ins ₇₇	1.0871	0.1638	0.6495	0.4587
Compulsory ₇₇	−0.2440	0.0107	−0.4320	0.0026
No Fault ₇₇	−0.1504	0.3311	−0.5750	0.0042
Joint & Several ₈₇	−0.4857	<0.0001	−1.4066	<0.0001
Noneconomic Damages ₈₇	−1.0686	<0.0001	−1.4704	<0.0001
Punitive Damages ₈₇	−1.0831	<0.0001	−0.7568	0.0018
Punitive Damages Insurable ₈₇	0.3725	0.0012	−0.2655	0.0526
Punitive Damages ₈₇ * Punitive Damages Ins ₈₇	−0.6637	<0.0001	−0.4127	0.1509
Compulsory ₈₇	−0.5004	<0.0001	−0.5212	<0.0001
No Fault ₈₇	0.1644	0.2466	−0.7950	<0.0001
Joint & Several ₉₇	−0.4955	<0.0001	−1.1364	<0.0001
Noneconomic Damages ₉₇	−0.6997	<0.0001	−0.5835	<0.0001
Punitive Damages ₉₇	−0.5022	<0.0001	−0.7663	<0.0001
Punitive Damages Insurable ₉₇	0.8025	0.0004	0.6104	0.0084
Punitive Damages ₉₇ * Punitive Damages Ins ₉₇	−0.8472	0.0001	−0.6397	0.0050
Compulsory ₉₇	−0.6464	<0.0001	−1.2901	<0.0001
No Fault ₉₇	−0.3064	0.0334	−1.3478	<0.0001
Male	0.1102	0.0005	−0.1515	0.0004
Married	−0.1844	<0.0001	0.2543	<0.0001
Employed	−0.2432	<0.0001	0.1586	0.0078
Permanent disfigurement	0.4445	0.0002	−0.1483	0.2134
Temporary disability	0.6189	<0.0001	0.2369	<0.0001
Permanent partial disability	1.7885	<0.0001	0.7235	<0.0001

(continued)

TABLE 4
(Continued)

Variable	Probability of Hiring Attorney		Probability of Filing Legal Claim	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Permanent total disability	0.9043	<0.0001	0.8181	<0.0001
Medical expenses/average medical expense	0.2180	<0.0001	0.0129	0.0090
Fatality	2.5577	<0.0001	0.9072	<0.0001
Fracture	0.4396	<0.0001	0.3326	<0.0001
Neck strain	0.6104	<0.0001	0.1047	0.0493
Back strain	0.8684	<0.0001	0.0139	0.7777
Concussion	0.3415	0.0002	0.2747	0.0026
Other strain	0.4957	<0.0001	-0.00550	0.9300
Bruise	-0.0196	0.6525	-0.1670	0.0051
Cosmetic	0.2097	0.0164	0.00555	0.9580
Other injury	0.4667	<0.0001	0.4333	<0.0001
Large city	0.7423	<0.0001	-0.0442	0.6362
Suburban area	0.4261	<0.0001	0.0736	0.4521
Medium city	0.1206	0.0744	0.1142	0.2282
Small town	0.0414	0.5897	-0.0800	0.4637
Number of vehicles	0.0154	0.3639	0.0368	0.1082
Claimant fault	0.0323	<0.0001	0.0332	<0.0001
Claimant fault squared	-0.00032	<0.0001	-0.00026	<0.0001
State identifiers (not shown)				
Maximum rescaled adjusted R^2	0.3268		0.4199	

report an increase in tort costs over the 1980s of 11.8 percent but just 3.2 percent during the 1990s (Tillinghast, 2005).

To provide both the power of the state identifiers while measuring the marginal effects of the reform variables separate from time, we conducted a third analysis. In this third analysis, we used the state identifiers with interaction terms between the reforms and data set years. As mentioned above, the results are reported in Table 4. In these results, we observe an increasing use of attorneys from 1977 to 1987 to 1997. We also observe approximately the same rate of filing legal cases in 1977 and 1987, with both years below 1997. Most reforms show no marginal significance in 1977, likely due to the limited use of those reforms at that time. Reforms, however, are generally significant for both 1987 and 1997 in the expected direction. Insurability of punitive damages generally is associated with greater use of an attorney and mixed results in filing a legal claim (we would anticipate positive results), while other reforms are generally negative. No-fault legislation has some mixed results, which is also explicable given the variety of laws and generally mixed results in other literature.

Using the final analysis for discussion, we observe that most of the coefficients of the other explanatory variables are significant in the hypothesized directions and the same

for both sets of analyses. In the group of variables related to claimant characteristics, we see that employed, married, and female claimants all are less likely to hire an attorney than employed, nonmarried, or male claimants. Employed, married, and female claimants, however, are more likely to file a legal claim, having controlled for the likelihood of employing a lawyer. These results are consistent with married and employed claimants possessing additional resources that allow them to pursue litigation rather than take an early settlement.

A number of variables were included in the analysis to compare across types of accidents. In this group, we observe that more severe injuries lead to greater use of attorneys, as anticipated. A fatal accident nearly always leads to hiring an attorney, while any claimant with a disability is more likely to hire an attorney than is a claimant without a disability. Fatal injuries as well as those resulting in disabilities also lead to greater likelihood of filing a legal claim. Partial disabilities appear to yield greater use of an attorney than the other disability categories, which may reflect the need to prove both the existence of liability and the degree of disability. The various strain categories show mixed results, likely reflecting the concern about fraudulent claims in these categories. The last of the severity measures, relative costs of medical expenses, also demonstrates a positive relationship with attorney use and likelihood of filing a legal claim.

As anticipated, we also see increasing use of an attorney as the accident location moves from a rural area to a metropolitan city, although the significance level drops as the categories move into smaller locales. Other studies have suggested that this outcome relates to ease of access to legal counsel, lower personal connections across parties in the accident, and similar types of variations across locales. We do not, however, see that these location differences affect the decision to file a legal claim. Again, a possible explanation is the initial decision to hire an attorney negates the effect.

SUMMARY, IMPLICATIONS, AND FUTURE RESEARCH

Conventional wisdom around the globe is that American citizens are increasingly litigious, with litigiousness the primary cause for insurance availability and affordability problems in a number of liability insurance lines. Over the past 30 years, state legislators have responded with passage of various legal reforms designed to dampen litigation. Yet insurance “crises” have continued, calling into question some of the conventional wisdom. We use a series of data sets generated from surveys of insurance claims adjusters to test whether or not claimants in automobile liability situations have demonstrated greater litigiousness over the period 1977 to 1997. We test specifically whether or not claimants are more likely to employ an attorney and/or more likely to file a legal claim.

When undertaking the analyses using state tort reform variables as controls, we find increasing use of attorneys and filing of legal claims, consistent with conventional wisdom. We also observe dampening effects of most tort reforms. Those reforms, however, are highly correlated with the data set year variables, leading to difficulty in interpreting the results as either effects of reforms or effects of time.

To address the collinearity issue, we conduct the analyses with state identifiers rather than the tort reform variables. Results differ substantially, with filings declining over

time and attorney use statistically unchanged between 1977 and 1997. The models with state identifiers demonstrate greater explanatory power than the models with tort reform variables used as controls.

Yet, using only state identifiers is limited in being able to test for the effects of tort reforms. A third analysis was conducted, therefore, in which state identifiers as well as interaction terms between the tort reforms, and the data set years were included. By adding the interaction terms, we can measure the marginal effects of the reforms by data set. These last results suggest that the conventional wisdom is generally correct that attorney use and claim filing have risen over time. They also suggest that tort reforms generally have been successful in achieving their stated goals of dampening litigation. The influence of tort reforms is important to current public policy debates focused on liability insurance availability and affordability questions.

As with any social science research, additional work is warranted. For instance, without data on all claims, not just those that are closed with payment, we cannot feel certain that our results are true representations of the litigation environment. For instance, it could be that many claims that would have been made in the past are not being made now, or vice versa. We also encourage additional research into the underlying reasons for changes in litigation patterns. Much speculation has been made about these reasons, but little empirical work to support any given theory. Furthermore, we note the influential Supreme Court case, *Bates v. State Bar of Arizona*, in 1977 which permits advertising by lawyers, previously prohibited in the United States. We anticipate that the availability of advertising opportunities has influenced litigation patterns tremendously. If it has, the availability of advertising may be one of the reasons why the U.S. litigation rates appear to differ substantially from those throughout the rest of the world.

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