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State Decisions to Limit Tort Liability: An Empirical Analysis of No-Fault Automobile Insurance Laws

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ABSTRACT

This article considers the decision by state legislatures to enact auto insurance no-fault laws during the 1970s. The possible influences of levels and growth rates in insurance costs and the effects of no-fault on low-income households, medical care providers, insurers, and attorneys are analyzed. A probit model of decisions to adopt no-fault auto insurance from 1971 through 1976 is developed and estimated using cross-state data from 1970. Separate equations are estimated for restrictions on tort liability and the enactment of compulsory personal injury protection coverage. Holding other variables constant, the estimation results suggest: (1) the probability of adopting no-fault was higher in states with more rapid growth in auto liability insurance costs; (2) states with greater numbers of physicians per capita, a measure of the strength of the medical care community, were more likely to adopt no-fault; and (3) states with greater numbers of attorneys per capita were less likely to adopt no-fault laws with restrictions on tort liability.

Introduction

Sixteen states enacted auto insurance no-fault laws from 1971 through 1976 that generally contained two key features: (1) the purchase of first-party coverage for medical expenses and loss of income for drivers and passengers, known as personal injury protection (PIP), was made compulsory; and (2) tort liability of negligent drivers was limited.[1] The purchase of liability insurance for actions not affected by tort limitations also was made compulsory. Three other states enacted laws during this period that made PIP and liability coverage compulsory without limiting tort liability.[2] No state has adopted no-fault since 1976. The District of Columbia adopted a no-fault law in 1983, but it

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[1] Kentucky's no-fault law allowed consumers to reject PIP coverage and tort limitations.

[2] Several states required insurers to offer PIP coverage, but its purchase was not mandated and tort liability was not restricted. A few of these states made the purchase of liability insurance compulsory.

was repealed in 1986. Nevada repealed its no-fault law in 1979. Pennsylvania repealed its limitation on tort liability in 1984 but maintained compulsory PIP coverage. A subsequent change in Pennsylvania law allowed consumers to choose tort limitations in exchange for a premium discount on liability coverage. New Jersey also modified its original mandatory tort restrictions to allow consumer choice.

Despite the failure of no-fault auto insurance to spread to additional states since 1976, the subject remains of considerable interest, especially the concept of allowing consumers to choose no-fault. No-fault is often viewed as a means of reducing the cost of auto insurance. The policy debate parallels discussion in the early 1970s, when no-fault was commonly advertised as a desirable means of reducing costs. Several states included mandatory premium cuts in their no-fault laws. In addition to reducing costs and helping to make coverage more affordable, proponents of no-fault argue that the substitution of first-party medical coverage for third-party liability coverage is advantageous because it reduces dispute resolution costs and payments for general damages (pain and suffering). No-fault also leads to faster payment for losses. Opponents of no-fault argue that limitations on tort liability lead to more accidents and unfairly benefit negligent drivers. They also question whether no-fault is capable of significantly reducing premiums.

The literature on no-fault is massive and goes back at least 60 years. The modern economic literature generally has focused on two issues: whether tort limitations have affected the frequency and severity of accidents and/or claims (e.g., Landes, 1982; Zador and Lund, 1986; and Cummins and Weiss, 1989, 1992) and whether no-fault laws have led to significantly lower premiums (e.g., Smith, 1989; Cummins and Weiss, 1991; Johnson, Flanigan, and Winkler, 1992; also see Carroll et al., 1991).[3] Analyses of the former issue provide only weak evidence that limitations on tort liability have affected accident frequency and severity. Analyses of the effect of no-fault on premiums provide mixed results. Consistent with intuition, the overall results suggest that no-fault laws with weak tort limitations combined with large PIP coverage limits increase costs, but that strong tort limitations can reduce total costs, especially if PIP coverage limits are modest. Thus, no-fault laws have the potential to help control auto insurance costs if strong tort limitations are politically feasible (e.g., Cummins and Tennyson, 1992; Harrington, 1991).

This article focuses on a different issue: the decision by state legislatures to enact no-fault laws. The article considers the possible influences of levels and growth rates in insurance costs and the effects of no-fault laws on low-income households, medical care providers, insurers, and attorneys. A probit model of the decision to adopt no-fault from 1971 through 1976 is developed and estimated using cross-state data from 1970.[4] Separate equations are estimated for

[3] Cummins and Weiss (1993) use an expected utility framework to explore the effects of no-fault on driver welfare.

[4] Cummins and Weiss (1989, 1992) treated the decision to adopt no-fault as endogenous. Estimates of the probability that a state had no-fault (obtained using panel data from the latter

restrictions on tort liability and the enactment of compulsory PIP coverage. Holding other variables constant, the estimation results suggest: (1) the probability of adopting no-fault was higher in states with more rapid growth in auto liability insurance costs; (2) states with greater numbers of physicians per capita, a measure of the strength of the medical care community, were more likely to adopt no-fault; and (3) states with greater numbers of attorneys per capita were less likely to adopt no-fault laws with restrictions on tort liability.

The article first discusses sources of political pressure for and against the adoption of no-fault within the framework of the public choice literature and the economic theory of regulation. The econometric model, data, and estimation method are then described. The next section presents the empirical results. A brief summary and discussion of the findings and implications concludes.

Political Pressure For and Against No-Fault

Theoretical Framework

The traditional view of economic regulation is that the public interest is served by promoting efficiency (e.g., Breyer, 1982). According to this view, state legislators would adopt no-fault if it would improve efficiency, and the laws would be designed to maximize efficiency gains. The literature on the economic theory of regulation (see Stigler, 1971; Peltzman, 1976; and Becker, 1983) argues instead that policy-makers maximize political support or, equivalently, minimize opposition, and that the policies pursued often will be inefficient. The theory emphasizes the relative costs to different interest groups of exerting political pressure and that many people who do not belong to organized groups will not become informed about the details or consequences of regulation. A major prediction is that subsidies from regulation commonly will accrue to small, organized groups with the costs spread broadly among other parties. According to this literature, regulation is primarily redistributive rather than efficiency oriented, but efficiency losses from regulation limit the extent of redistribution (see especially Becker, 1983).

Unorganized groups. Most people affected by no-fault legislation do not belong to organized interest groups. While the economic theory of regulation has focused on organized groups, Becker (1983) emphasizes the critical importance of relative costs of group organization as opposed to absolute costs. If costs make organized pressure very difficult or even infeasible for different groups of consumers, politicians may nonetheless be able to obtain substantial support by pursuing policies that appeal to a majority of the population (see Lindbeck, 1985). Direct public interest and pressure are especially likely for legislation and regulation dealing with products—such as auto insurance—that are already heavily regulated and that represent a significant proportion of household expenditures (see Wenders, 1986).

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half of the 1970s and 1980s) were used as instrumental variables to estimate the effects of no-fault on claim frequency and severity.

Efficiency. The primary emphasis in the economic theory of regulation on redistribution of income through the political process suggests that decisions to adopt no-fault will largely reflect political pressure related to redistributive effects rather than efficiency. In addition, the complexity and inherent ambiguity concerning the efficiency of no-fault legislation preclude firm hypotheses about cross-state differences in efficiency that could affect the demand for no-fault legislation. Much of the efficiency debate has focused on whether restrictions on tort liability will increase the frequency and severity of accidents. As noted, empirical work provides only weak evidence of these effects. Moreover, since dispute resolution is costly and payment for pain and suffering through the tort system may provide suboptimal compensation (e.g, Shavell, 1987; also see Rea, 1987; and Cummins and Weiss, 1993), limits on tort recovery could be efficient even if they increased accident rates. Experience rating of compulsory PIP coverage that is primary over group medical coverage could encourage greater care and reduce the accident rate (Danzon, 1993). Compulsory PIP coverage and compulsory liability laws that accompanied no-fault also might enhance efficiency by reducing spill-over costs from uninsured driving (e.g., Keeton and Kwerel, 1984).[5]

Consumer Pressure

Demand for lower premiums. Historical concern with the "auto insurance affordability problem" and prior research on this issue (e.g., Baumol, 1991; Cummins and Tennyson, 1992) suggest that high and rapidly growing premiums generate significant consumer pressure for actions to reduce premiums. Regardless of whether no-fault legislation has reduced premiums in practice, one of the main advantages claimed for no-fault is that it can reduce total premiums for bodily injury-related coverages. As noted, the possible effects of no-fault on premiums played a central role in the debate in the early 1970s, and possible cost savings have been emphasized in recent no-fault proposals. The possibility that no-fault legislation could reduce premiums suggests that the adoption of no-fault in the early 1970s would be more likely in states with relatively high and more rapidly growing premium costs, where the demand by consumers for premium reductions would be greatest.

Effects on low-income drivers. The effects of no-fault legislation differ significantly across consumers. Even if no-fault is desired by people who would be covered by medical expense insurance and who would buy liability coverage without no-fault, it could have significant adverse effects on low-income (wealth) drivers. Theory suggests that it is often rational for low-income drivers to forego buying first-party medical and third-party liability coverage, given that much of their medical costs and the cost of injuries that they cause other drivers are borne by other parties (see Keeton and Kwerel, 1984). When combined with compulsory liability, no-fault laws require previously uninsured

[5] On the other hand, compulsory coverage might lead to fewer precautions to prevent accidents by drivers who buy coverage in response to the law (Shavell, 1986).

drivers to pay relatively large premiums in order to comply with the law. Much of these expenditures would reduce costs previously borne by other parties (e.g., hospital bad debts and other costs of free care, expenditures for medicaid, premiums for uninsured motorist coverage). Thus, low-income drivers that would not buy coverage without compulsion could rationally oppose no-fault legislation favored by higher-income insured drivers, especially if the legislation were to make liability insurance compulsory (also see Rea, 1987). The magnitude of opposition might depend on anticipated enforcement of compulsory coverage requirements. If weak enforcement were anticipated, opposition to no-fault by low-income drivers would be expected to diminish.[6]

Special Interests

Medical care providers. The provision of medical care to people injured in auto accidents who do not have private medical insurance, coverage through medicaid or medicare, or a valid and collectible tort claim increases hospital and physician bad debts. Compulsory PIP coverage increases the proportion of drivers with some medical expense insurance and thus reduces uncollectible bills for medical care. Some drivers who would otherwise drive without coverage buy coverage in response to the law; some people may forego driving. Without no-fault, much of the expected cost of bad debts might be shifted to others who pay for health care services. Nonetheless, fluctuations in bad debts, an unequal incidence of bad debts across providers, and competition among providers to control costs by reducing bad debts give medical care providers significant incentive to support compulsory PIP coverage. Medical care providers also would be inclined to favor tort restrictions if they made the adoption of compulsory PIP more likely by offsetting some of the cost of PIP coverage with premium reductions for bodily injury liability coverage.

Insurers and agents. The impact of no-fault on auto insurance premiums depends on the magnitude of PIP benefits and tort limitations. If no-fault reduced premiums, returns on insurer equity need not be affected given the competitive structure of the industry. No-fault could shift revenues across insurers. The substitution of auto PIP premiums for group health insurance premiums would increase revenues for insurers that write relatively more auto insurance and decrease revenues for those that write more health insurance. No-fault laws that significantly reduce premiums would be likely to reduce agent commissions, at least in the short run.

Although some segments of the industry expressed support for no-fault laws with modest PIP coverage limits and substantial tort limitations, a firm consensus did not exist during the early 1970s.[7] Auto insurers appear to have been concerned that large PIP coverage limits with minor tort restrictions could

[6] Anecdotal evidence is generally consistent with relatively weak enforcement of compulsory coverage requirements. Harrington (1993) discusses the adverse effects of compulsory insurance on low-income people and possible consequences for enforcement of the laws and rate regulation.

[7] See, for example, statements by major property-liability insurer trade associations in the hearings on a proposed federal no-fault law (U.S. Congress, 1971).

drive up premiums and increase pressure for rate regulation to reduce premiums relative to costs. Conversely, a well-designed no-fault law that reduced premiums might have reduced pressure on regulators.[8]

Attorneys. Restrictions on tort action tend to reduce attorney income. Tort restrictions also might reduce the number of attorneys involved in tort litigation.[9] Both plaintiff and defense attorneys are affected. No-fault laws with compulsory PIP coverage that allow insurers subrogation rights for PIP benefits without otherwise limiting tort action have the least effect on attorney income. No-fault laws that limit tort rights for losses covered by PIP and include a strong threshold for suits claiming general damage tend to have the greatest negative effect on attorney income.

Any tendency for compulsory PIP coverage to facilitate larger tort recoveries would mitigate the impact of no-fault on attorney income.[10] Attorneys also are involved in a significant fraction of first-party PIP claims in some states, and the enactment of compulsory liability insurance in conjunction with no-fault will mitigate any reduction in attorney income if it reduces the number of judgment-proof drivers. These mitigating influences imply that no-fault laws with compulsory liability, modest PIP benefits, and low thresholds for general damage suits could have very little effect on (or conceivably could increase) attorney income. Nonetheless, attorneys involved in auto accident litigation have substantial incentives to oppose tort restrictions in no-fault legislation and to minimize the adverse consequences of any restrictions that are adopted.

Econometric Model and Estimation Methods

Dichotomous Choice Models

Dichotomous choice models of the decision to adopt no-fault from 1971 through 1976 are estimated using measures of state characteristics (with the exception of one variable) as of 1970. The basic model can be expressed as

$$y_{j,t}^{*} = \beta x_{j,0} + \varepsilon_{j,t},$$

[8] The apparent spread of restrictive rate regulation in recent years in conjunction with increasing auto insurance costs has probably increased auto insurer support for no-fault. The connection between cost growth and pressure for price controls is emphasized by Baumol (1991). Also see Harrington and Doerpinghaus (1993). The possibility of rate freezes, rollbacks, etc. in response to high premiums could help align the legislative interests of auto insurers and insured drivers, assuming that insured drivers favor no-fault.

[9] During the 1970s, some pundits argued that the enactment of auto insurance no-fault laws increased litigation in other areas, such as medical malpractice, as attorneys sought alternative means to capture contingency fees. Danzon (1984) included a no-fault dummy variable to control for this possibility in her cross-state analysis of the impact of tort reforms in medical malpractice. The estimates for this variable were not significant.

[10] One possibility is that tort thresholds become targets that drive up PIP costs in order to penetrate the threshold. See Hammitt and Rolph (1985) for discussion and empirical evidence inconsistent with a targeting effect. For a contrary view, see Weisberg and Derrig (1991).

where $y_{j,t}^*$ = the unobservable sentiment (i.e., latent propensity) for state j to adopt no-fault from 1971 through 1976,
$x_{j,0}$ = a vector of characteristics for state j during 1970,
$\varepsilon_{j,t}$ = a mean-zero disturbance with constant variance that is uncorrelated with $x_{j,0}$, and
β = a parameter vector.

The observable variable $y_{j,t}$ equals 1 if state j adopts no-fault from 1971 through 1976 and 0 otherwise. Without loss of generality, the assumption that $y_{j,t} = 1$ (the state adopts no-fault) if $y_{j,t}^* > 0$ implies that $\varepsilon_{j,t} > -\beta x_{j,0}$. Thus, the probability that state j adopts no-fault equals $1 - F(-\beta x_{j,0})$, where $F(\ )$ is the cumulative distribution function of ε. The assumption that ε is a standard normal variate gives the probit model, which is estimated with maximum likelihood.[11] Two dependent variables are used. In the tort restriction model, $y_{j,t}$ equals 1 for the 16 states that restricted tort liability for general damages and 0 otherwise. In the compulsory PIP model, $y_{j,t}$ equals 1 for the 19 states that adopted compulsory PIP coverage and 0 otherwise.[12] The 16 states with tort restrictions all had compulsory PIP so that there is substantial overlap between the groups. The sample includes all 50 states.[13]

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[11] The probit method gives estimates of β/σ where σ is the standard deviation of ε. As noted by Maddala (1981), one might as well assume that $\sigma = 1$. Alternatively, unobservable sentiment can be viewed as being scaled so that $\sigma = 1$. Results using the logit method had the same implications. The logit t-values (ratios of estimated coefficients to standard errors) were generally slightly lower than those for probit.

[12] Three-category ordered probit models of tort restrictions and compulsory PIP coverage levels also were estimated. For the tort restriction models, the basic categories were (1) no restriction, (2) monetary threshold for general damage suits less than or equal to $1,000, and (3) monetary threshold greater than $1,000 or verbal threshold. (Category (2) versus (3) cutoffs of less than $1,000 and less than or equal to $750 also were tried.) For the compulsory PIP models, the categories were (1) no compulsory PIP, (2) compulsory PIP with medical expense limits less than or equal to $15,000, and (3) compulsory PIP with medical expense limits greater than $15,000 (including unlimited coverage). Coefficient estimates for these models generally had the same signs as those reported for the dichotomous choice models, but the t-values declined and the models had little ability to correctly classify states in categories (2) and (3). The weak performance of these methods probably reflects the small number of observations (e.g., 6-10 states) in categories (2) and (3). Tobit models of tort restrictions and PIP coverage levels and ordered probit models to reflect differences in the year of adoption also were estimated with similarly weak results.

[13] The 16 states that restricted suits for general damages were Colorado, Connecticut, Florida, Georgia, Hawaii, Kansas, Kentucky, Massachusetts, Michigan, Minnesota, Nevada, New Jersey, New York, North Dakota, Pennsylvania, and Utah. (As noted earlier, Kentucky allows consumers to reject no-fault.) The three states that enacted compulsory PIP without limiting tort action were Delaware, Maryland, and Oregon. The District of Columbia was excluded from the sample because it had extreme values for a number of the variables. In addition, early work considered the possible influence of the political ideology of the state's electorate using Americans for Democratic Action ratings of the state's congressional delegation as a measure of voter ideology. This variable, which was not available for the District of Columbia, was insignificant, and its exclusion had little effect on the reported results.

Explanatory Variables

Table 1 presents the definitions, sources, means, and standard deviations of the variables used in the analysis. It also shows the predicted sign for each explanatory variable.

Premium growth. Data were available on total (private passenger and commercial) auto liability insurance premiums by state in 1970, but data were not available on the number of insured vehicles. The proportionate growth in auto liability premiums per capita between 1966 and 1970 is included as a measure of premium growth. Growth rates in premiums per capita are affected by changes in the number of insured vehicles and coverage limits, but these factors generally do not change rapidly over time. Thus, per capita premium growth rates should be highly correlated with growth in the underlying cost of coverage across states and thus with pressure for no-fault by consumers concerned with coverage affordability. If increases in the cost of coverage increase demand for no-fault, the coefficient for premium growth will be positive.

Population density. Population density per road mile is used as a proxy for the underlying level of auto insurance costs in a state. Population density has a major influence on accident frequency and severity, with densely populated areas having high costs.[14] Since auto liability premiums per capita vary across states due to differences in factors such as the number of insured vehicles and coverage limits, population density could be a better proxy for the underlying cost of bodily injury liability coverage than premiums per capita. Estimation of models using premiums per capita rather than population density generally yielded the same signs, but the t-values, log-likelihood values, and ability of the model to correctly classify no-fault states were lower (see below).

Population density is included in both linear and squared form to allow for a non-monotonic (U-shaped) relationship between sentiment for no-fault and the level of costs. While consumer concern with coverage affordability suggests that pressure for no-fault is likely to be high in states with high costs, several states that adopted no-fault have very low population density and low insurance costs (e.g., Kansas and North Dakota). The fact that relatively fewer accidents involve lawsuits in low density states (e.g., due to relatively more single-car accidents) could alter the political dynamics of no-fault in ways that might not be reflected by the remaining explanatory variables. For example, the proportion of a typical attorney's income from auto accident litigation could be lower in low density states, or the benefits of compulsory PIP to health care providers or the insured population could be relatively greater. Including population density in both linear and squared form may help reduce

[14] The models also were estimated using estimated vehicle miles driven per road mile. The correlation between population density per road mile and vehicle miles per road mile was 0.98. The probit results using vehicle miles per road mile were quite similar and had the same implications as those reported. Classification accuracy, pseudo-R^2s (see below), and t-values for the density variables were higher using population per road mile. The absolute t-values for the coefficients for the attorney variables were slightly lower using vehicle miles per road mile.

Table 1
Variable Definitions and Sources, Means, Standard Deviations, and Predicted Signs

Variable	Mean	Standard Deviation	Predicted Sign
Tort Restriction: 1 if no-fault law restricting tort recovery for economic loss and general damages as of 1976; 0 otherwise (State Farm Company, n.d.).	0.32	0.47	
Compulsory PIP: 1 if PIP coverage is compulsory as of 1976; 0 otherwise (State Farm Company, n.d.).	0.38	0.49	
Premium Growth: auto liability insurance premiums per capita in 1970 ÷ auto liability insurance premiums per capita in 1966 - 1.0 (Insurance Information Institute, 1967, 1971, and U.S. Department of Commerce, 1983)	0.58	0.18	+
Population Density: population per road mile in 1970 (÷100) (U.S. Department of Commerce, 1983, and U.S. Federal Highway Administration, 1970).	6.42	5.73	-
Density Squared: Population Density^2 ÷ 10.	7.34	12.38	+
Per Capita Income in 1970 (in thousands of dollars) (U.S. Department of Commerce, 1983).	3.73	0.58	?
Physicians per Capita in 1970 (thousands) (U.S. Department of Commerce, 1983).	1.34	0.36	+
Direct Writer Share of private passenger auto liability insurance premiums in 1972 (A. M. Best, 1973).	0.51	0.12	?
Attorneys per Capita in 1970 (thousands) (American Bar Association, 1970, and U.S. Department of Commerce, 1983)	1.42	0.39	-
ABA Share: American Bar Association members ÷ total attorneys in 1970 (American Bar Association, 1970).	0.52	0.10	-
ABA Attorneys per Capita in 1970 (thousands) (American Bar Association, 1970, and U.S. Department of Commerce, 1983).	0.72	0.16	-

the possibility of omitted variable bias, even if specific reasons that low density states were more likely to adopt no-fault (holding other variables constant) are not known. If the relation between population density and sentiment for no-

fault is U-shaped, the coefficient on the linear term will be less than zero, and the coefficient on the squared term will be greater than zero.[15]

Per capita income. Per capita income will be lower in states with a larger proportion of low-income drivers who would be harmed by compulsory PIP and liability coverage. Thus, sentiment to adopt no-fault could be positively related to per capita income if the presence of relatively fewer low-income drivers reduced opposition to no-fault. On the other hand, lower per capita income and relatively more low-income drivers without medical expense or liability coverage could increase the demand for no-fault by the median voter, who is likely to bear some of the costs of uninsured driving by low-income people. In addition, increases in income, holding the underlying cost of coverage fixed, could reduce consumer concern with affordability of coverage and thus diminish political support for no-fault. The sign of the coefficient on per capita income will depend on the net effect of these influences.[16]

Physicians per capita. The number of physicians per capita is included as a measure of the influence of medical care providers.[17] Since medical care providers favor no-fault because compulsory PIP coverage reduces the number of injured drivers without means to pay for treatment, the predicted sign of the coefficient for this variable is positive.

Direct writer share. The share of private passenger auto liability premiums written by direct writers (insurers that market with exclusive agents or other tied sales personnel) in 1972 also is included. This variable was not available until 1972, but it changes slowly over time. Moreover, there is no reason to believe that any changes in direct writer share in states that adopted no-fault in 1971 or 1972 would be closely related to the adoption of no-fault. The largest auto insurers are direct writers. Direct writers generally specialize in personal

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[15] The results obtained when density squared was omitted are described briefly below. Models also were estimated that included, in addition to the density terms, the proportion of the state's population living in Standard Metropolitan Statistical Areas in 1970, a measure of the degree of urbanization. Some studies of changes in tort laws (e.g., Danzon, 1984) provide evidence that the likelihood of a state making a change (or the speed of making the change) is positively related to the degree of urbanization. Inclusion of this variable, which is highly correlated with density and physicians per capita, generally produced similar results, although the significance level of the estimate for physicians per capita declined to 0.10. Since including the urbanization variable increases possible problems from multicollinearity, results are reported without this variable.

[16] As noted, opposition to no-fault by low-income drivers could depend on the anticipated level of enforcement of compulsory coverage requirements. Results with similar implications to those reported were obtained when the proportion of the state's population living in households below the federal poverty level was used instead of per capita income. As expected, the signs of the estimates for the poverty variable were opposite those of per capita income. The absolute t-values for the poverty variable were smaller than those for per capita income; log-likelihoods and classification accuracy also were lower. Versions of the model also were estimated including proxies for the magnitude of the state's population without private medical coverage (e.g., the proportion of employees working for small employers and the proportion of young drivers). The results indicated that these variables were superfluous.

[17] In some versions of the model the proportion of physicians that belonged to the state's medical society also was included as a measure of homogeneity of interest and/or organizational strength (see Danzon, 1984). This variable was superfluous.

lines coverage and wrote 52 percent of all private passenger auto liability coverage in 1972. Since auto insurance represents a large proportion of direct writer premium volume, the adoption of no-fault would have relatively greater effects on direct writers than on insurers that use independent agents and brokers. However, since the intensity and scope of support for or opposition to no-fault by direct writers in 1970 is uncertain, a firm prediction cannot be made for the sign of the coefficient for direct writer share. A significantly positive (negative) estimate would suggest direct writer support (opposition) to no-fault.

Attorney influence. Measures of trial attorney membership by state, the number of attorneys in state legislatures, and the presence of trial attorneys on key state legislative committees dealing with no-fault in 1970 were not available.[18] Three specifications of the model are estimated to shed light on the role of attorneys. The first version includes the number of attorneys per capita. The second includes the number of attorneys per capita and the proportion of attorneys in a state that were members of the American Bar Association (ABA).[19] The latter variable is included as a measure of organizational strength and/or homogeneity of interest in the legal profession. In general, ABA members are more likely to be actively involved in private practice than non-ABA members. Thus, the ABA share variable should help control for differences in attorneys per capita across states that may bear little relation to opposition to no-fault.[20] The third specification is a restricted version of the second; it includes the number of ABA member attorneys per capita. Given attorney opposition to no-fault, the predicted signs for these variables are negative, especially for the tort restriction equations.[21]

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[18] Data on the proportions of state legislators that were attorneys in 1976 and 1986 were available. The models were estimated including attorneys as a proportion of the state's legislature in 1976. The estimates for this variable were close to zero and typically positive with very low t-values. Given that the data are for the end of the period in which no-fault laws were adopted, it would be inappropriate to conclude that attorney representation in state legislatures was irrelevant in influencing no-fault legislation. The variable could contain substantial noise due to changes in attorney representation over time. (The data indicated large changes in the proportions between 1976 and 1986 in some states.) Attorney representation also might possibly increase following the adoption of no-fault if the legal profession provided greater support for attorney legislators to fend off additional restrictions on tort liability.

[19] The ABA actively opposed no-fault, although it supported compulsory liability (American Bar Association, 1969).

[20] Only three states (Nebraska, New York, and Oklahoma) had values of attorneys per capita (x1000) greater than two (2.52, 2.59, and 2.47, respectively). ABA shares for these states were among the lowest in the sample. (The sample correlation between attorneys per capita and ABA share was -0.52.) Large numbers of non-ABA attorneys in rural states like Nebraska and Oklahoma could reflect idiosyncracies that are unrelated to pressure against no-fault.

[21] Note that, if the number of attorneys is positively correlated with the level of auto insurance costs holding density and the other explanatory variables constant, the resultant bias in the estimate for the number of attorneys would be positive, making a negative estimate less likely.

Empirical Results

Means and standard deviations of the explanatory variables for states with and without no-fault are presented in Table 2. No-fault states have higher average population density, premium growth, physicians per capita, and attorneys per capita (both ABA and total) than non-no-fault states. For both the tort restriction and compulsory PIP comparisons, a Wilcoxon test (several of the variables exhibit skewness) leads to rejection of the null hypothesis of equal means at the 0.05 level for per capita income and physicians per capita. The univariate comparisons for the number of attorneys provide no evidence that states with no-fault had fewer attorneys. Higher mean premium growth for no-fault states is largely due to Hawaii, a no-fault state with a much higher growth rate (152 percent) than any other state. Much of Hawaii's auto liability premium growth during the late 1960s might have reflected growth in the number of insured vehicles rather than underlying costs. However, the probit estimates and standard errors reported below were invariant to the inclusion of Hawaii in the sample.[22]

The bivariate correlations between population density and per capita income, population density and physicians per capita, and per capita income and physicians per capita range from 0.56 to 0.64. Thus, states with high population density also tended to have relatively large numbers of physicians and relatively high per capita income. Of course, population density and density squared are highly correlated ($\rho = 0.96$).

Probit estimation results are presented in Table 3.[23] The estimates for premium growth are positive and significant in each equation. Thus, states with high premium growth were more likely to adopt no-fault. The estimated coefficients for the population density variables imply a U-shaped relationship between the sentiment to adopt no-fault and population density for both the tort restriction and compulsory PIP equations, and each estimate is significantly different from zero at the 0.05 level. However, only a few states had population density values that exceed the value needed in each equation for the estimated marginal effect of increased population density to become positive. In the tort restriction model, the estimates for per capita income are uniformly positive and significant in equations (2) and (3) at the 0.05 and 0.10 level (for two-tailed tests), respectively. These results provide weak evidence that higher income increased the likelihood of tort restrictions, which could reflect relatively fewer low-income drivers that opposed no-fault. The estimates for direct writer share are positive, but not significant at the 0.10 level for a two-tailed test.

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[22] The estimated probability of adopting no-fault for Hawaii was 1.0. When the estimated probability is at the upper bound, deletion of an observation need not affect the probit estimates.

[23] The pseudo-R^2 is defined as 1 - $\log L_M/\log L_0$, where $\log L_M$ is the value of the log-likelihood maximized with respect to all of the parameters, and $\log L_0$ is the maximum value when the slopes are restricted to zero. The pseudo-R^2 provides an intuitive measure of differences in fit across equations for each model. Model chi-square statistics were highly significant for each equation.

Table 2
Variable Means and Standard Deviations (in parentheses)
for States With and Without No-Fault Auto Insurance Laws

	Tort Restriction		*Compulsory PIP*	
Variable	*Yes*	*No*	*Yes*	*No*
Premium Growth	0.64	0.55	0.61	0.55
	(0.29)	(0.10)	(0.27)	(0.10)
Population Density	8.99	5.21	9.06	4.80
	(7.86)	(3.99)	(7.50)	(3.57)
Per Capita Income (in thousands of dollars)	4.01	3.60	4.04	3.55
	(0.61)	(0.53)	(0.58)	(0.51)
Physicians per Capita (thousands)	1.53	1.26	1.54	1.22
	(0.40)	(0.31)	(0.37)	(0.30)
Direct Writer Share	0.51	0.50	0.52	0.50
	(0.13)	(0.11)	(0.12)	(0.12)
Attorneys per Capita (thousands)	1.47	1.40	1.46	1.40
	(0.40)	(0.38)	(0.37)	(0.40)
ABA Share	0.52	0.52	0.54	0.50
	(0.12)	(0.10)	(0.12)	(0.09)
ABA Attorneys per Capita (thousands)	0.74	0.70	0.77	0.68
	(0.16)	(0.16)	(0.17)	(0.14)
Number of States	16	34	19	31

Note: Detailed variable definitions and sources are provided in Table 1.

The estimates for the attorney variables are negative for each equation and model. In the tort restriction model, the estimate for attorneys per capita is significantly less than zero in equation (2), which controls for the proportion of attorneys that are members of the ABA. Thus, holding ABA share fixed, the results imply that increases in attorneys per capita were negatively related to the probability of adopting no-fault. The estimate for ABA share also is significantly negative, which is consistent with greater organizational strength and/or homogeneity of interest for ABA members. The estimate for the number of ABA attorneys in equation (3) also is significantly negative.[24]

The estimate for attorneys per capita is not significant in equation (1) of the tort restriction model, which does not control for ABA share. The pseudo-R^2 also is much lower in equation (1), although the classification accuracy is comparable to equations (2) and (3). The lack of significance of the estimate for attorneys per capita and lower pseudo-R^2 (and thus log-likelihood) could indicate that total attorneys per capita is a weak measure of attorney influence due to heterogeneity in attorney interests within states. Overall, the results for the attorney variables in the tort restriction model are consistent with the hypothesis that increases in attorney pressure reduced the likelihood of adopting no-fault.

[24] Equation (3) imposes a nonlinear restriction on equation (2) (ABA attorneys = attorneys x ABA share). Using a likelihood ratio test, this restriction would not be rejected at the 0.10 level.

Table 3
Probit Estimation Results for Models of Decision to Adopt No-Fault Auto Insurance Laws

	Tort Restriction			*Compulsory PIP*		
Variable	*(1)*	*(2)*	*(3)*	*(1)*	*(2)*	*(3)*
Constant	-8.65	-6.44	-12.33	-8.70	-7.75	-9.24
	(2.87)	(1.83)	(3.19)	(3.16)	(2.63)	(3.27)
Premium Growth	7.65	11.14	10.71	6.01	6.39	5.90
	(2.57)	(2.89)	(2.87)	(2.33)	(2.41)	(2.32)
Population Density	-0.48	-0.93	-0.81	-0.39	-0.48	-0.41
	(2.30)	(3.05)	(2.91)	(1.96)	(2.04)	(1.86)
Density Squared	0.27	0.47	0.41	0.23	0.27	0.23
	(2.38)	(3.02)	(2.89)	(2.15)	(2.21)	(2.03)
Per Capita Income	0.40	1.75	1.54	0.57	0.88	0.70
	(0.66)	(1.98)	(1.82)	(0.95)	(1.21)	(1.00)
Physicians per Capita	2.76	4.42	4.16	2.64	2.90	2.66
	(2.50)	(2.93)	(2.94)	(2.55)	(2.62)	(2.46)
Direct Writer Share	1.78	2.89	2.96	2.96	3.17	3.30
	(0.89)	(1.23)	(1.37)	(1.47)	(1.55)	(1.61)
Attorneys per Capita	-0.88	-3.81		-0.98	-1.65	
	(0.99)	(2.34)		(1.11)	(1.31)	
ABA Share		-12.74			-2.96	
		(2.59)			(0.82)	
ABA Attorneys per Capita			-7.00			-1.87
			(2.46)			(0.85)
Pseudo-R^2	0.38	0.53	0.48	0.38	0.39	0.37
Classification Accuracy						
No-Fault States	11/16	12/16	12/16	14/19	14/19	13/19
Non-No-Fault States	32/34	31/34	32/34	29/31	29/31	29/31

Note: Absolute t-values are in parentheses. Detailed variable definitions are provided in Table 1. Classification accuracy gives the number of no-fault (non-no-fault) states with predicted probabilities > 0.5 (< 0.5) relative to the number of no-fault (non-no-fault) states.

Interestingly, the estimates for the attorney variables are all insignificant in the compulsory PIP equations. Since attorney opposition to no-fault laws with tort restrictions should be greater than opposition to compulsory PIP laws without tort restrictions, the difference in results between the tort restriction and compulsory PIP equations makes it less likely that the significant negative estimates for the attorney variables in the tort restriction equations are spurious. Because only three of the 19 states with compulsory PIP did not restrict tort liability, the results on the attorney variables might have been expected to be similar for both models. However, the three compulsory PIP states without tort restrictions had the second, twelfth, and thirteenth highest values of ABA attorneys per capita in the 50-state sample. These results suggest that, while overall pressure for no-fault was sufficient to generate compulsory PIP coverage in these states, opposition by attorneys was strong enough to prevent tort restrictions.

As noted, models also were estimated that excluded population density squared and substituted auto liability premiums per capita and squared premiums per capita for the population density variables. In general, pseudo-R^2s and

classification accuracy were substantively lower than for the equations shown in Table 3. The estimates for premium growth and physicians per capita remained positive and significant. The estimates for the attorney variables in the tort restriction equation, while negative, were generally no longer significant in equations (2) and (3), or only significant at the 0.10 level for a one-tailed test.[25]

Conclusion

The probit estimation results indicate that growth in auto liability premiums per capita from 1966 through 1970 was positively and significantly related to the probability of adopting no-fault legislation during the subsequent six years. This finding is consistent with the hypothesis that rapid premium growth increased pressure for no-fault as a possible means of reducing premiums. The results also provide evidence that states with very high population density per road mile, a proxy for the underlying level of auto insurance costs, were more likely to adopt no-fault. However, the estimated effect of population density is nonlinear, suggesting that low-density states also were more likely to adopt no-fault. The reasons that some states with very low population density adopted no-fault are not clear.

The results also suggest that increases in the number of physicians per capita increased the probability of adopting no-fault. This finding is consistent with the hypothesis that the likelihood of adopting no-fault was positively related to pressure from health care providers. Finally, the results suggest that increases in the number of attorneys per capita (controlling for membership in the American Bar Association) decreased the probability of adopting no-fault. This finding is consistent with conventional wisdom: pressure from attorneys discouraged the enactment of no-fault laws. To be sure, the small number of observations, relatively crude measures of political pressure, and correlations among several of the explanatory variables suggest the need for a certain degree of caution in interpreting these findings.

This study has not addressed the efficiency of no-fault. If no-fault is efficient, the results suggest that increases in auto liability insurance premium growth and pressure from health care providers served to promote efficiency, while income preserving or enhancing behavior by attorneys discouraged the adoption of efficient legislation. If no-fault is inefficient, the results suggest the opposite.

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[25] For example, for equation (2) of the tort restriction model with density squared omitted, the pseudo-R^2 was 0.30 and only eight of 16 no-fault states were correctly classified. The estimate for density was negative but close to zero and insignificant (t-value = -0.31). The estimates for attorneys per capita and ABA share were negative but the t-values were low (-1.19 and -1.61, respectively). When the premiums per capita variables were used instead of the density variables in equation (2) of the tort restriction model, the results suggested a U-shaped relation between sentiment for no-fault and average premiums. The pseudo-R^2 was 0.36 and eight no-fault states were correctly classified. The t-values of the estimates for attorneys per capita and ABA share were -1.32 and -1.84, respectively.

The implications of these findings for the future are not clear. On the one hand, they might imply that (1) rapid growth in auto liability insurance costs could lead additional states to enact no-fault, and (2) less rapid but chronic real increases in auto liability insurance costs ultimately will cause more states to adopt no-fault. On the other hand, rapid premium growth in many states in the 1980s did not produce another wave of no-fault laws. The fact that some existing no-fault laws have done little to reduce premiums may have weakened the historical relationship between premium growth and public pressure for no-fault. If so, the strategy by no-fault opponents of fighting for weak tort limitations in states that adopted no-fault may have discouraged its enactment in other states.

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