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The Impact of Liability on the Physician Labor Market

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Abstract:

1. Introduction

Medical malpractice reform is a contentious issue. Despite the fact that states have implemented a variety of reforms over the past three decades, the implications of these reforms are still in dispute. For example, Born and Viscusi (1998) find that reductions in liability exposure reduce malpractice premiums. But recent work by Baicker and Chandra (2004) and Black et al. (2005) using different data find only a tenuous link between liability awards and malpractice premiums.

The impact of malpractice reforms on physician behavior is also unclear. Some researchers have found evidence of a large physician response. Perhaps the best known empirical papers are by Kessler and McClellan (1996, 2002) who examine how health expenditures for Medicare recipients vary with changes in state liability reforms. They find that up to nine percent of expenditures on treatment for heart disease and heart attacks can be attributed to excessive care due to physicians practicing 'defensive' medicine, defined as care that would not be done in the absence of a liability risk. However, other researchers tend to find smaller effects. For example, Dubay et al (1999, 2001) examine data on cesarean section procedures and find relatively small effects attributable to liability reform. Other work by Sloan et al. (1995) and the Congressional Budget Office (2003) also find little effect of liability reform on expenditures.

The work on expenditures is generally done using dummy variables to measure malpractice reform. For example, Kessler and McClellan use a dummy variable to indicate a state has instituted a cap on liability awards. Using that same methodology, a few papers have examined aspects of physician behavior. Danzon et al (1990) examine the effect of law changes on physician incomes. Klick and Stratman (200X) examine reforms implications for the number of physicians practicing in a given state.

A key difficulty in most of the work to date lies in the measurement of the effect of liability reform. The most common method, using dummy variables, is quite blunt: it masks the considerable variation in statutory differences across states. For example, Table 1 lists the levels and types of state-level caps on damages. On one extreme, Nebraska instituted a cap of $1.25 million on total damages, economic and non-economic. On the other tail, neighboring state Kansas instituted a cap of $250,000 on non-economic awards only. The dummy variable approach treats both states the same which seems likely to miss important differences in outcomes.

Our study reexamines the issue of liability reform and its implications for physician behavior using a new measure of liability, and nationally representative, micro-level data on physician behavior. We first develop a theoretic model in which physicians are unable to fully insure against liability risk, opening the possibility for 'defensive' medicine. We then use data on physician behavior from the Physician Practice Costs and Income Survey (PPCIS, 1983 and 1988). This data includes physician work hours, insurance level, patient mix, treatment practices, practice structure, among other variables, and we match this data with information on state-level changes in liability law. We investigate changes in physician behavior that correspond to changes in the legal climate. These surveys bracket a period of substantial state-level reform which provides the major source of variation in our empirical strategy.

We also develop a new measure of liability which allows us to exploit variation in responses across states and physician specialties. The measure is based on a combination of the Florida 'closed claim' file for 1980-1985 which contains all malpractice awards in the state of Florida, by thirty-one physician specialty categories, and the AM Best data on malpractice claims for all states from 1980 to 1988. Using this liability measure, we estimate the impact of liability reform on hours worked per year, the hours spent working in emergency rooms, and income. We find that an increase in liability tends to decrease the number of hours worked for physicians nearing retirement (age 55 and over), but there is no discernable effect for other physicians. We find no effect on the percentage of hours worked in the emergency room, and only a modest effect on physician income. We also examine the link between our 'pure' liability measure and malpractice premiums. We find that an increase in \$1 of expected liability is matched by approximately \$1 increase in malpractice premiums.

The outline of the paper is as follows: Section 2 presents the theoretic model and its implications; Section 3 describes the data and the creation of the liability measure; Section 4 presents and discusses the empirical results and Section 5 concludes.

2. Labor Supply and Liability Exposure

We model a physician as choosing an optimal number of patients subject to an uncertain loss from malpractice liability, $L(Q,\alpha)$.[1] The loss depends upon both the number of patients treated, Q, and an exogenous scaling parameter, α. For expositional purposes, we assume that the support of the random variable L does not depend on Q or

[1] For an alternative perspective focusing just on malpractice premiums, see the model in Thornton (1997).

α.[2] L is assumed to be strictly increasing in Q and α--$L_Q>0$, $L_\alpha>0$—and that $L_{Q\alpha}>0$ which implies that the marginal loss with respect to Q is increasing in α. The physician is risk-averse, has some market power, and chooses Q to maximize expected utility of profits where $U_\pi>0$ and $U_{\pi\pi}<0$. The physician has a cost function c(Q), $c_Q>0$ and $c_{QQ}>0$, and faces an inverse demand curve, P(Q), $P_Q<0$. We assume the physician purchases malpractice insurance at price *p*, but it does not cover all costs. L(Q,α) then is to be interpreted as net liability costs, after insurance payment. The maximization problem, along with first and second order conditions, is given by:

$$\underset{Q}{Max}\, E\left\{U(\pi)\right\} = E\left\{U\left(P(Q)Q - c(Q) - L(Q,\alpha) - p\right)\right\}$$

$$FOC:$$

$$\partial E\left\{U(Q)\right\} / \partial Q = E\left\{U_\pi(\pi)(P_Q Q + P - c_Q - L_Q)\right\} = 0$$

$$SOC:$$

$$\partial^2 E\left\{U(Q)\right\} / \partial Q^2 = E\left\{U_{\pi\pi}(\pi)(P_Q Q + P - c_Q - L_Q)^2 + U_\pi(\pi)(P_{QQ}Q + 2P_Q - c_{QQ} - L_{QQ})\right\} < 0$$

We would like to know how optimal Q changes as the liability risk changes, $\frac{\partial Q^*}{\partial \alpha}$. The comparative statics using the first order condition are

$$\frac{\partial Q^*}{\partial \alpha} = -\frac{\dfrac{\partial EU_Q}{\partial \alpha}}{\dfrac{\partial EU_Q}{\partial Q}}$$

[2] For example, L(Q,α)=Q$\ell(\alpha)$ where ℓ is a lognormal random variable with mean α.

Where EU_Q represents the first order condition. The denominator is the second order condition and is hence negative which implies that the sign of the derivative will be the sign of the numerator. The equation for the numerator is given by

$$\frac{\partial EU_Q}{\partial \alpha} = E\left\{U_{\pi\pi}(P_Q Q + P - c_Q - L_Q)(-L_\alpha) + U_\pi(-L_{Q\alpha})\right\}$$

Perhaps surprisingly, the sign is ambiguous. The second term will be negative, implying that an exogenous increase in the expected liability would decrease the number of patients. However, the sign on the first term will depend on the sign of marginal profits which can be either positive or negative depending on the weighting of marginal utility of profits in the first order condition.

Upon reflection, the intuition of this ambiguous result is straightforward: the risk of liability has two effects. First it increases the marginal cost of treating a patient, thereby reducing the incentive to take on additional patients. This is the effect measured by the 2nd, negative term. Second, it imposes a negative shock to income, reducing income and thereby making the treatment of an additional patient more valuable in expected utility terms. Which effect dominates is theoretically uncertain.

Although the model is cast in terms of number of patients treated, this theoretical uncertainty is likely to afflict other specifications of liabilities affect on physician behavior. This model also contrasts sharply with the view that malpractice premiums fully insure all potential losses from malpractice litigation. In this model, physicians have an incentive to avoid actions that will increase potential liability costs even when paying malpractice premiums.

3. Data Description

We use three primary data sources, two of which are combined to construct our liability measure. We describe each in turn, and then turn to the creation of the liability measure.

3.1: Data on Physician Behavior—The Physician Practice Costs and Income Surveys

We use two cross-sectional surveys: the 1983 and 1988 Physicians Practice Costs and Income Survey (1983 and 1988 PPCIS). The 1983 PPCIS is a cross-sectional survey of physicians conducted by NORC under contract to the Health Care Financing Administration. The survey includes responses from 4,729 physicians (out of 6,847 eligible) drawn from a stratified random sample of physicians from the American Medical Association's 1984 Physician Master File. The physicians were asked numerous detailed questions regarding practice costs, pricing policies and work schedules. The data set also contains a set of variables concerning the physicians' personal characteristics (age, sex, specialty, etc.) obtained from the AMA Physician Masterfile. The survey took place over a period of 9 months running from October 1984 to June 1985. The 1988 PPCIS is a similar cross-sectional study with 3,505 participating physicians (61 percent response rate) conducted between July 1989 and March 1990.

The PPCIS cross-sections have two primary strengths for our research purposes: first, the timing of the surveys is very useful because they bracket many of the important state-level medical liability reform measures made by states during the 1980s. Second, the data contain a rich set of behavioral and practice characteristics. For example, the data on physician behavior and characteristics are exceptionally detailed. We have information on both income and work hours, as well as information on case mix and practice costs.

3.2: The Florida Closed Claim File

Florida has maintained a database of all medical malpractice claims from 1975 to the present. Data on physician specialty was added beginning in 1980 when a more comprehensive form was required of insurance companies reporting the data to the Florida Department of Insurance.[3] These data are unique in providing specialty-specific distribution of medical malpractice claims over an extended period of time. As outlined below, we use the 1980 to 1985 data as a baseline for the distribution of state-level malpractice claims.

3.3: The AM Best Data on State Malpractice Claims

To account for variation across states in the level of malpractice claims, we use the AM Best's compilation of the National Association of Insurance Commissioners data. NAIC collects information on malpractice claims by insurer in each state, by year. This data does not include specialty information so it does not provide the level of detail of the Florida closed claim file. But it does allow us to scale the Florida data to account for differences in it litigation costs across states. The data include both incurred losses for the year, and actual losses paid. We use incurred losses to construct the liability measure.[4]

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[3] See Helland et al (2005) for a more detailed discussion of this data.
[4] See Born and Viscusi (1998) for a more extensive discussion of this data.

3.4: Description of Liability Index

A key aspect of our analysis is the construction and use of a measure of liability. Ideally, we would like to have a measure of all liability awards by specialty, state, and year; then we could directly measure the change in liability risk as various state-level regulations are modified. But such data are not available and so, as an alternative, we outline a methodology that allows us to create an index across all states and specialties, using the Florida closed claim data and the AM Best data.

3.4.1: Theoretical Justification

Our key assumption is that the unrestricted distribution of claims within a given specialty is similar across all states, up to a factor of proportionality, γ^S. Specifically, let f(x|c) be the PDF of liability awards, x, conditional on specialty, c, in a given state where γ^S is normalized to 1. Assuming a continuous distribution, the conditional mean for specialty c is represented by

$$E[x \mid c] = \int_0^{\infty} xf(x \mid c)dx$$

Suppose that liability awards by specialty are proportional across states. Let y be the claims in state S. Using the change-of-variables technique we have the following:

$$\begin{aligned}
&y = \gamma^S x, \gamma^S > 0 \\
&so \\
&x = (1/\gamma^S)y \\
&dx = (1/\gamma^S)dy \\
&f(y) = f_x(y/\gamma^S)(1/\gamma^S) \\
&so \\
&E[y \mid c] = \int_0^{\infty} yf(y \mid c)dy = \int_0^{\infty} \gamma^S x f_x(x \mid c)dx = \gamma^S E[x \mid c]
\end{aligned}$$

Therefore the expected liability for specialty c in state S is proportional to the mean in the reference state. For our analysis, we want to examine how liability changes with a cap on liability awards. To compute the mean with a cap in state S we have

$$E[y \mid c, cap = \bar{Y}] = \int_0^{\bar{Y}} y f(y \mid c) dy + \bar{Y} \int_{\bar{Y}}^{\infty} f(y \mid c) dy$$
$$= \int_0^{\bar{Y}/\gamma^S} \gamma^S x f(x \mid c) dx + \bar{Y} \int_{\bar{Y}/\gamma^S}^{\infty} f(x \mid c) dx$$

If we had a measure of γ^S we could estimate this mean with data from the reference state, as well as the mean without the cap.

3.4.2: Estimation of γ^S

AM Best gathers data on all claims paid by insurance in each state. Let $y_{s,i,t}$ be the average claim per doctor, and $p_{s,i,t}$ be the number of physicians in specialty s, state i, and year t. Then total claims in state i and year t can be written as:

$$c_{i,t} = \sum_s p_{s,i,t} y_{s,i,t}$$

In the AM Best data, we only observe $c_{i,t}$, not the individual components. But suppose claims are proportional to claims in Florida, our reference state: $y_{s,i,t} = \gamma^S y_{s,FL,t}$. Then we would have

$$c_{i,t} = \gamma^S \sum_s p_{s,i,t} y_{s,FL,t}$$

γ^S could then be estimated as

$$\gamma^S = \frac{c_{i,t}}{\sum_s p_{s,i,t} y_{s,FL,t}}$$

where the numerator is the AM Best state estimate for liability claims in state i and year t, and the denominator is the weighted average of the Florida specialty claims where the weighting is the state and year specific measure of doctors in each specialty. We estimate

γ for each state using all years from 1980 to 1985 where a state does not have a cap in place. Table 2 gives estimates of γ where Florida has been normalized to 1.[5]

3.4.3: Estimation of liability measure

Full details of our estimation are given in the appendix: here we give a brief overview. We assume that the distribution of awards in Florida is stable over the relevant time period, 1980-1985, implying that each year is drawn from the same underlying distribution. This allows us to reduce the noise from year to year variation in malpractice claims. The choice of 1980 to 1985 is driven by two factors: 1) 1980 was the first year that specialty designations were included with each claim; and 2) Florida began instituting malpractice reforms in 1986, including a cap on malpractice awards in 1988.[6] Thus we take the distribution of claims in the intervening period to be representative of an unrestricted claim environment.

We first adjust all awards to be measured in 1980 dollars. Then we compute an average award by specialty where the specialty designations are set by the Florida Department of Insurance (Table 3). To compute the estimated liability for specialty s in state i when there is no cap, we multiply the state-specific γ by the average award by specialty. For example, the estimated γ for Ohio is 1.11 and the estimated average annual

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[5] The unnormalized measure of γ for Florida is 1.06. This implies that the AM Best measure of claims is slightly larger than the Florida closed claim file. Given that the collection mechanisms and purposes of the two surveys are different, we view this as a small discrepancy.

[6] In 1986, Florida abolished the collateral sources rule, and joint and several liability, and it restricted contingent fees. In 1988, Florida imposed a cap of $350,000 on non-economic damages.(see Klick and Stratman (2005) and Helland and Tabarrok (200x). From 1980 until 1985 Florida did have the English Rule (the "loser pays" provision). See XXX for the details of this liability change. Although the effects of this rule are potentially significant, it unclear why this would systematically bias the results. Although the English Rule does appear to have moderately improved "case quality" this would seem to affect all specialties equally.

liability of a general surgeon in Florida is $3,066. Therefore we estimate the liability of an Ohio general surgeon to be $3,403.26.

To compute the effect of a cap, we truncate actual awards observed in Florida to the CPI adjusted award level in the particular state and then compute the sample mean implied by equation XX, adjusting for the state γ. For example, Virginia instituted a $1 million cap in 1983. We put this cap in 1980 dollars, multiply all observed Florida awards by Virginia's γ (0.902), truncate observed awards that exceed the cap, then compute the average award per doctor.

One issue in computing relative liability exposure is how to calculate caps on non-economic damages. As can be seen from Table 1 states often cap only non-economic damages. The Florida closed claim data does contain information on non-economic damages for some cases. One solution is to apply the relevant state cap to these damages. This is problematic because the breakdown is often not reported for settlements constituting 9X percent of closed claims. Our solution is to take the average breakdown across all cases and reduce awards only in those cases in which the fraction of the award that typically is non-economic damages exceeds the cap. During the period 1980-1985, 58 percent of awards in Florida are for economic damages (lost wages, medical expenses, etc.) and 42 percent non-economic damages. We therefore apply this average rate to all awards in computing the effect of caps on non-economic claims.

4. Estimation Results

We examine the role of liability in the physician labor market by estimating the impact of liability exposure on four variables: hours worked per year, hours worked per week, annual net income, and the proportion of hours worked in the emergency room. We use two measures of hours worked because of data considerations. The surveys ask for the number of hours worked in the previous week, and for the number of vacation weeks taken in the prior year. We combine these two to construct the annual hours measure. We expect this measure to be relatively noisy, but it is probably more informative than simply using the vacation weeks to capture a measure of annual labor supply. For income, the surveys report most physician's income within ranges. We use the midpoint of the range. The survey also asks what proportion of the previous week's labor hours were spent in the emergency room. We use this variable because we suspect physician's have some flexibility in avoiding ER hours and that those hours might pose a higher liability risk than other situations where physician's might have more ability to screen patients.

Our estimation strategy is to treat the PPCIS as a stacked cross-section for 1983 and 1988. Thus observation *i* is a physician, *k* is physician specialty, i is state, and t is year (1983 or 1988). The basic regression model is

$$\ln(y_i) = \beta_0 + \gamma liability_{s,k,t} + \lambda_t + \alpha_k + \delta_s + \beta x_i + \nu_i$$

where y_i is either hours worked or net income, λ_t is a dummy for 1988, α_k is a set of dummies for physician specialty, δ_s is a set of state dummies, $liability_{s,k,t}$ is the liability index and x_i are the control variables.

4.1 Impact of Changes in Liability on Hours Worked

The first empirical results are outlined in Table 5. Column 1 gives the results of the regression of log of annual hours worked on the liability measure and a set of controls. Specialty, state, and year dummies are included, but are not reported due to space considerations. Standard errors are computed robust to general forms of heteroskedasticity.

The coefficient of interest is the liability measure. It is estimated to be -0.154, implying that a 10 percent increase in the malpractice premium is associated with a 1.54 percent decrease in hours worked, but this variable is statistically insignificant. There are no surprises with the control variables, and R-squared is 0.15 with 6,823 observations. This regression hints at an effect of liability on hours worked, but the evidence is not strong.

Column 2 reports on a similar regression which uses weekly hours rather than annual hours. In this specification the coefficient is indeed larger (in absolute value) at -0.271 than when using annual hours, but it only marginally significant with a t-statistic of 1.88.

Column 3 modifies the Column 2 regression to add in an interaction term with liability and age. The motivation is as follows: anecdotal evidence suggests that harsh liability climates often induce exit from high risk specialties. While our data do not allow us to measure entry or exit decisions directly, it allows us to test for an indirect effect. Rather than a dichotomous choice to simply work or not work in response to a change in liability risk, it is possible that liability risk accelerates the standard retirement pattern of working fewer hours near the end of the life cycle; if physicians face higher risk they will exit the profession gradually rather than simply stopping work abruptly.

To test this, we interact the liability measure with a counter variable that takes a value of 0 for ages less than 55, 1 at age 55, 2 at age 56, 3 at age 57, and so on. The estimated coefficient for the interaction term is -0.00156 and is highly statistically significant with an estimated standard error of 0.00041. The coefficient on liability is similar to the weekly hours regression at -0.266, and it is also marginally significant. These results imply that liability does seem to have an increasing effect as physicians get older.

To examine this age effect more directly, we restrict the sample to physicians age 55 or older and rerun the regression. The results are reported in Column 4. In this specification, the liability measure is large relative to previous estimates, -0.878 and a t-statistic of 2.37. This estimate implies that a 10 percent increase in the malpractice premium is associated with a nearly 9 percent decrease in hours worked. This result is consistent with the specification using the full sample, implying that older physicians do seem to respond strongly to liability risk.

Column 5 uses log income as the dependent variable. There are fewer observations in this specification, 6,137 versus 6823, due to a lower response rate for the income questions. The liability effect is again negative and significant at the 10 percent level with a t-statistic of 1.91. The interaction term is positive and statistically significant with a t-statistic of 2.27. Oddly, the interaction term is positive in this regression, but the joint effect of the two variables is negative over the observed range of ages. The F-statistic testing joint significance is highly significant with a p-value of 0.01.

The last specification in this table examines the percent of hours spent in the emergency room. The idea underlying this specification is that physician might be less willing to treat patients in an ER setting because they have less ability to screen possibly litigious patients. The dependent variable is the log of the odds ration--percent hours/(1-percent hours)—to account for the bounded nature of the variable. Observations at 0 and

100 are truncated to 1 and 99, respectively. ER specialist physicians are excluded. The coefficient on liability is negative, but not significant. However the interaction term is again significant and negative suggesting that higher liability risk leads to fewer hours in the emergency room.

4.X Liability Measure And Malpractice Premiums

We next test the link between our liability measure and self-reported malpractice premiums. Our liability measure is admittedly imperfect, but if it is capturing anything of interest it ought to be correlated with observed malpractice premiums. The PPCIS asked physicians for the dollar amount of their malpractice premiums. This measure is also quite noisy: a given physician's malpractice premium can be complicated by joint arrangements in multi-physician practices, and by arrangements through other parties such as hospitals. In Table 6 we report the results of regressing the self-reported measure of malpractice premiums on our liability measure. Column 1 uses only a constant and the liability measure. In this regression the coefficient on liability is 1.134 with a t-statistic of 26. Given the measurement problems with both variables, this result is surprisingly strong. It is also heartening that the number implies that a $1 increase in liability is associated with a nearly equal increase in the observed malpractice premium.

Column 2 adds in some physician-specific control variables. The estimated coefficient decreases to 1.11, but it is still highly statistically significant. Column 3 adds in state, specialty, and year controls. These additional variables decrease the estimated coefficient substantially to 0.419, but it is still highly statistically significant.

V. Conclusion

The literature on the impact of liability changes on physician behavior varies considerably in its findings. Several studies find that physicians alter treatment in response to liability while others find no effect. One difficulty is that previous studies have used rather blunt measures of liability changes to estimate the impact of reform on physician behavior. In general previous studies have used either indicator variables for the imposition of damage caps or medical malpractice premiums as a measure of liability exposure.

In this paper we utilize an alternative measure of physician liability exposure that exploits the considerable variation across specialties and states created by limitations on damage awards. We use this measure to test a model of physician behavior in which demonstrates that the impact of additional liability labor hours, income, and time spent in treating ER patients.

We find that increases in liability decrease physician hours worked. The effect is strongest for physicians age 55 or older and the effect increases with age. The evidence on the effect of liability on income is weaker. It appears to decrease income for older physicians, but the effect diminishes with age. We do not have a good explanation for this result. We find weak evidence that older physicians spend less time in the ER, consistent with an explanation of avoiding risk.

We also find that our liability measure is highly correlated with a self-reported measure of malpractice premiums. As discussed in Baicker and Chandra (2004), malpractice premiums are influenced by several mechanisms including multiple years worth of liability exposure, investment returns, and the competitive climate. Despite these concerns, our liability measure does suggest a strong effect on malpractice premiums.

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Table 1: Malpractice Reforms before 1989

State	Non-Economic Damages Cap	Total Damages Cap	Collateral Sources Rule Abolished	Joint and Several Liability Abolished
AK			1976	1988
AL	$400,000 (1987)	$1,000,000 (1987)	1987	
AZ			1984	1987
CA	$250,000 (1975)		1975	1986
CO			1986	1986
CT			1985	
DE			1976	
FL	$350,000 (1988)		1986	1986
GA			1987	
HI	$375,000 (1986)		1986	
IA			1975	
ID				1987
IL			1985	
IN			1975	
KS	$250,000 (1988)			
KY			1988	1988
LA		$500,000 (1975)		
MA	$500,000 (1986)		1986	
MD	$350,000 (1986)			
MI			1986	1986
MN			1986	
MO	$500,000 (1988)		1987	
ND	$500,000 (1987)		1987	1987
NE		$1,250,000 (1986)		
NH	$250,000 (1986)			
NJ			1987	
NY			1986	
NM		$600,000 (1976)		1987
NV				1987
OH				1987
OK			1975	
OR			1987	1987
SD				1987
TN			1980	
TX				1987
UT				1986
VA		$1,000,000 (1983)		
VT				1985
WA	Formula (1988)			1986
WV	$1,000,000 (1986)			
WY				1986

Table 2 -- Estimated Factors of Proportionality

State	gamma	State	gamma
AK	1.32	MS	0.63
AL	0.92	MT	1.36
AR	0.51	NC	0.61
AZ	1.64	ND	1.81
CA	1.11	NE	0.46
CO	1.34	NH	0.83
CT	2.23	NJ	1.83
DC	1.57	NM	0.36
DE	2.42	NV	1.51
FL	1.00	NY	3.37
GA	1.02	OH	1.11
HI	0.70	OK	0.98
IA	1.48	OR	1.29
ID	1.33	PA	1.22
IL	2.41	RI	0.46
IN	0.65	SC	0.16
KS	0.84	SD	0.81
KY	1.01	TN	2.13
LA	0.76	TX	0.62
MA	0.26	UT	0.98
MD	1.43	VA	0.90
ME	1.18	VT	1.10
MI	2.35	WA	1.75
MN	0.95	WI	0.52
MO	1.52	WV	2.20
		WY	1.49

Table 3 -- Specialty Types in Florida Data

Specialty	Average Annual Liability Award Per Physician
Allergy	332
Anesthesiology	4,907
Cardiovascular Diseases	2,032
Dermatology	840
Emergency Room	4,139
Endocrinology	2,525
Gastroenterology	2,077
General Practice	1,417
General Surgery	3,066
Hematology	149
Internal Medicine	2,287
Nephrology	619
Neurology	4,711
No Designated Group	4,071
Obstetrics/Gynecology	8,190
Oncology	20
Opthalmology	995
Orthopedics	7,380
Pathology	1,548
Pediatrics	3,208
Physical Medicine	386
Plastic Surgery	2,962
Psychiatry	101
Public Health	136
Radiology	2,910
Rheumatology	119
Thoracic Surgery	4,940
Urology	1,505

Florida closed claim data, 1980-1985. 1980 $s.

Table 4 -- Descriptive Statistics

	Full Sample		1983 Only		1988 Only	
Observations	**7,095**		**3,883**		**3,212**	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Annual Hours	2,767	745	2,710	746	2,834	737
Weekly Hours	58	16	57	15	59	16
Annual Income	125,912	102,138	107,876	68,765	145,524	126,091
Proportion of Hours in ER	0.06	0.12	0.06	0.12	0.07	0.11
Medical Malpractice Premium	12,067	13,114	7,405	7,746	16,848	15,547
Liability Measure	4,765	4,969	4,691	4,890	4,855	5,062
Age	47.0	10.4	47.7	10.6	46.2	10.0
Male	0.92	0.27	0.92	0.28	0.93	0.26
Solo-Practice	0.34	0.47	0.23	0.42	0.46	0.50
Board Certified	0.72	0.45	0.69	0.46	0.77	0.42
Foreign Medical School	0.23	0.42	0.24	0.43	0.21	0.41
Hispanic	0.03	0.16	0.02	0.16	0.03	0.16
Asian	0.11	0.32	0.12	0.32	0.11	0.31
Black	0.02	0.15	0.02	0.14	0.02	0.15

Note: Some variables have missing values. The statistics are computed on the available data in those cases.

Table 5 -- Regression Results of Various Physician Behavioral Variables on the Liability Measure

	(1) Ln(Annual Hours)	(2) Ln(Weekly Hours)	(3) Ln(Weekly Hours)	(4) Ln(Weekly Hours) Age 55 or Older	(5) Ln(Annual Income)	(6) Percent Hour in Emergency Room
Ln(Liability)	-0.154	-0.271*	-0.266*	-0.878**	-0.501*	-0.571
	(0.148)	(0.144)	(0.144)	(0.370)	(0.262)	(0.815)
Ln(Liability)*(Age-54)			-0.00156***		0.00159**	-0.00349**
			(0.00041)		(0.00070)	(0.00174)
Age	0.018***	0.014***	-0.007762	-0.012403	0.082697***	-0.055919*
	(0.003)	(0.003)	(0.006265)	(0.035547)	(0.010976)	(0.028800)
Age Squared	-0.000***	-0.000***	0.0000609	-0.0000060	-0.0008747***	0.0005245
	(0.000)	(0.000)	(0.0000722)	(0.0002834)	(0.0001259)	(0.0003261)
Male	0.104***	0.099***	0.100***	0.119**	0.183***	0.077
	(0.014)	(0.013)	(0.013)	(0.049)	(0.021)	(0.067)
Solo-Practice	0.016**	0.003	0.004	-0.000	-0.123***	-0.027
	(0.008)	(0.007)	(0.007)	(0.016)	(0.014)	(0.034)
Board Certified	0.022***	0.018**	0.020**	0.040**	0.078***	-0.023
	(0.008)	(0.008)	(0.008)	(0.018)	(0.014)	(0.038)
Foreign Medical School	-0.005	-0.014	-0.013	-0.017	-0.062***	0.180***
Graduate	(0.011)	(0.011)	(0.011)	(0.024)	(0.018)	(0.053)
Race of Physician						
Asian	-0.021	-0.032**	-0.031**	0.068*	-0.033	-0.034
	(0.013)	(0.013)	(0.013)	(0.035)	(0.023)	(0.068)
Black	0.024	0.033	0.034	0.030	-0.181***	0.079
	(0.023)	(0.021)	(0.022)	(0.040)	(0.045)	(0.113)
Hispanic	0.003	0.009	0.007	0.001	-0.031	-0.054
	(0.022)	(0.022)	(0.022)	(0.058)	(0.035)	(0.100)
Observations	6823	6988	6988	1726	6137	5520
R-squared	0.15	0.15	0.16	0.15	0.30	0.10
F test:					4.51	2.27
Prob > F					0.01	0.10

Notes: Robust standard errors in parentheses. All regressions contain a constant and dummy variables for physician specialty and state. F-tests in Column (5) and (6) tests joint significance of liability and the interaction term. The interaction term, "Ln(Liability)*(Age-54)," takes a value of 0 for physicians under age 55. ER physicians are excluded from column (6).
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6--Regression of Self-Reported Medical Malpractice Premium on Liability Measure

	(1)	(2)	(3)
Liability	1.134***	1.110***	0.419***
	(0.043)	(0.039)	(0.087)
Age		685.332***	391.885***
		(116.322)	(106.066)
Age Squared		-6.625***	-3.879***
		(1.166)	(1.062)
Male		1420.966**	-190.998
		(591.848)	(543.551)
Solo-Practice		-880.038***	-753.097***
		(307.824)	(274.721)
Board Certified		1648.332***	1167.065***
		(297.237)	(272.507)
Foreign Medical School Graduate		392.649	617.187
		(449.294)	(405.759)
Race of Physician			
Asian		-1126.786**	-1177.453**
		(547.990)	(478.730)
Black		1095.218	-116.964
		(1080.101)	(874.884)
Hispanic		1066.985	-625.146
		(1008.317)	(951.194)
State, Year & Specialty Controls	No	No	Yes
Observations	6212	6205	6205
R-squared	0.18	0.32	0.32

Notes: Robust standard errors in parentheses. All regressions contain a constant
* significant at 10%; ** significant at 5%; *** significant at 1%