The Effects of Malpractice on Medical Specialties

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I. Introduction

"Tort law refers to the set of legal rules and practices that govern wrongful injuries to persons or property" (Culyer & Newhouse, 2000). In today's high-tech, fast-paced world, the use of the law as a resource for blame and compensation is highly utilized. One of the best demonstrations of this mentality is the reaction of the American people to the terrorist attacks of September 11, 2001. For instance, in Florida, two men filed a $1.1 trillion lawsuit against Osama bin Laden, claiming that his terrorist acts have threatened them with personal injury and forced them to re-fortify their bomb shelters. Additionally, they accuse bin Laden of causing them to suffer from high blood pressure and stomach disorders, though they acknowledge that it is highly unlikely that he will actually show up in court ("Bin Laden Lawsuit", 2001). Moreover, the wife of a man who perished in the September 11 attack on the World Trade Center is suing bin Laden and the Taliban for at least $5 million in a wrongful death lawsuit (McKay, 2001). Perhaps more than the bomb raids and other acts of retaliation by the US military, bin Laden should fear the onslaught of lawsuits - or perhaps not.

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Regardless, the increased volume and severity of tort litigation is a topic of concern for economists because it means that vast amounts of wealth are being tied up in transfer activity. In a study by Lab and and Sophocleus (1992) on resource investment in transfer activity in the US for 1985, it was found that transfer seeking constitutes a significant fraction, at least 11%, of all economic activity conducted in the US. Therefore, they suspect that in the absence of such investment, the rate of economic growth experienced in the late 1980s would have been substantially higher. For instance, the cost of tort litigation in 1985 was $17,350,000,000. In other words, roughly $17 billion could have been employed in productive ventures or in leisure but was instead removed from the production possibilities of the economy. Moreover, that figure is quite dated and is therefore not nearly representative of the total expenditure on tort law today.

Looking at a specific field of tort litigation, the frequency and severity of malpractice claims have risen dramatically since the late 1960s, leading to what some refer to as the malpractice insurance "crisis". For instance, from 1975 to 1984, claims per physician rose an average of 10% annually, and between 1982 and 1986, claim frequency per 100 physicians rose from 13.5 to 17.2 a year (Danzon, Pauly, & Kington, 1990). Additionally, awards for medical malpractice cases have risen, nearly doubling between 1985 and 1995, from $211,711 to $398,426 ("Medical Malpractice Awards…", 1997). This trend in the increased frequency of claims and higher awards is reflected in higher insurance premiums for doctors.

Therefore, I am concentrating my project on the effects of the growth of medical malpractice suits. One of the main goals of the medical malpractice system is to provide incentives for physicians to take appropriate precautions in medical treatment. However, I would like to explore whether increased malpractice activity has adversely affected the medical

labor market, particularly in regards to the specialties that doctors are choosing to enter. How reactive are doctors to the fear of litigation and financial pressure of rising insurance premiums? Are doctors in certain specialties more reactive to these stimuli than other doctors?

Thus, the main goal of this paper is to examine the effects of malpractice on certain medical specialties to determine if it is acting as a supply shock in the medical labor market. Accordingly, Section II evaluates the existing literature relating to medical malpractice, while Section III introduces the theoretical framework behind medical malpractice and liability in general. Section IV then presents the empirical model, followed by Section V which discusses the results of the model. Finally, Section VI draws conclusions from the results in Section V and proposes future ideas for research.

II. Literature Review

This section looks at three studies. First, Kessler and McClellan (1997) examine the relationship between liability reforms, malpractice pressure, and physician perceptions of medical care. They find that physicians, especially those that have been recently or frequently sued, most definitely change their practices. In the context of their study, a change in practice means the use of "defensive medicine," or performing extensive, unnecessary testing as protection against malpractice claims. Thus, the important finding of this study is the proof that malpractice has altered physician behavior. Therefore, it opens the possibility that malpractice could also alter physicians' choice of specialty, as I hypothesize.

In another study, Kletke (2000) projects the size and demographic composition of the US physician workforce until the year 2020. He finds that an aggregate increase in the physician supply from 1998 to 2020 is likely but with a decreasing annual net increase. Furthermore, the percent of physicians choosing to go into primary care specialties, which have lower malpractice insurance premiums, will rise, while other specialties will decline. Perhaps malpractice is a key player in this projected change in workforce composition. There are other possible explanations for this increase in primary physicians, such as the increase in the number of HMOs. However, as of 1998, only 2.1 percent of doctors were general practitioners, and of that 2.1 percent only a small percent participated in HMOs (Pasko, Seidman, & Birkhead, 2000). Thus, HMOs will not likely have a significant impact on this area.

Finally, Danzon, Pauly, and Kington (1990) study the effects of medical malpractice on rising healthcare costs. Their study finds evidence from 1976-1983 suggesting that increased medical malpractice costs reflected in greater insurance costs were being passed on rapidly to patients through higher fees, with little impact on physician net incomes. However, they also emphasize that their conclusions stemmed from data that predated the sharp increase in malpractice premiums in the mid-1980s. They suggest that the pass-through of cost increases in later years might very well be less rapid due to a more competitive market for physician services and more aggressive cost-control practices of third-party payers, such as Medicare and HMOs. Therefore, after the mid-1980s, medical malpractice has a greater chance of having an effect on physician behavior. Thus, I plan to explore more recent trends in physician behavior to see if their hypothesis is correct.

III. Theory

First, it is important to understand the theory behind liability. In general, the primary purpose of liability is to reduce the rate of inappropriate accidents during otherwise beneficial activities. Basically, liability is supposed to minimize risks to consumers. However, this reduction in accidents comes at a cost (Culyer & Newhouse, 2000). Since safety can be viewed as a good, efficient investment in safety requires producing both the efficient level of safety and using the lowest cost mix of inputs. Thus, to effectively minimize the total social cost of accidents, both the cost of accidents and the cost of injuries must be taken into account. In a cost-benefit sense then, liability can only be justified as an efficient institution for dealing with risk if its deterrence benefits outweigh its added costs (Culyer & Newhouse, 2000).

When specifically dealing with the malpractice liability, a crucial component of any cost-benefit evaluation of the malpractice system must take into account the effects of liability on physicians' behavior (Culyer & Newhouse, 2000). A supply shock to the medical labor market, might be an added cost of liability. Generally, a shock will shift the entire labor supply curve to the left, thus reducing the number of workers at each wage. In effect, by testing the effects of medical malpractice liability, I am also contributing to the cost-benefit analysis of the theory be-

hind liability.

Next, one must consider the decision criteria an individual uses to choose an occupation. It is assumed that the rational individual will choose the occupation that best maximizes his or her utility through net benefits. Given multiple choices of occupations, Choices = occ1, occ2, occ3,…, occx, the following equation results:

$$PV_i = \frac{\text{Sum (Net Benefits)}}{(1 + r)}$$

where PV_i is the present value of net benefits in occupation i.

The question, then, is what quantifies the net benefits for a physician? Specifically, the decision to specialize can be determined by analyzing the economic returns to specialty training. These returns can be summarized as follows: "If a doctor goes immediately into private practice instead of specializing, a certain expected path of income is achievable. If the doctor specialized, some added years of training take place, at reduced incomes (during the period of residency), and then the doctor can earn higher incomes. What discount rate makes these two choices equivalent?" (Phelps, 1992) In other words, the main determinant in the decision to specialize is income, or compensation. Therefore, the main positive component of any net benefit equation for physicians is compensation, which is composed of salary and fringes, such as conferences, free samples, and other perks of being a physician. Conversely, training costs negatively impact net benefits. Furthermore, I propose that malpractice is a new cost to physicians. Hence, an equation for net benefits for physicians could resemble the following:

Net Benefits = Salary + Fringes – (Training costs + Insurance costs/monetary equivalent of the risk of a malpractice suit, etc.)

IV. Research Design

To test my research hypothesis, I will look at the five main categories of medical specialty - General/Family Practice, Internal Medicine, General Surgery, Pediatrics, and Obstetrics/Gynecology- over the period 1982 to1998. More specifically, I will examine how malpractice affects employment in these specialties, while controlling for salary. However, before delving into an econometric model, I will first examine descriptive statistics to see if patterns can be visually perceived in the data.

Accordingly, Table 1 shows the percent change in employment from 1997 to 1998 in each specialty. Additionally, it lists the average malpractice insurance premium paid per physician as well as the average salary received per physician for each specialty. The malpractice and salary data are from 1995 in an effort to capture the lag in the time between when a medical student decides on a specialty and when they actually enter into the workforce after training in that specialty. At first glance, it would appear that perhaps compensating wage differentials are at work in the medical field since the specialties with the highest premiums, Surgery and Obstetrics/Gynecology, also have the highest salaries. However, it is also worth noting that those two specialties have the lowest employment growth rates, with the exception of Internal Medicine which also has a negative growth rate for that year. Thus, this implies that the salaries may still not be high enough to compensate for the risk.

Examining the relationship between employment, malpractice premiums, and salaries further leads to Table 2, which depicts the growth in all three areas from 1983 to 1998 for each specialty. Malpractice premiums have risen at a greater rate than salaries for all specialties, though the largest increase was in the Obstetrics/Gynecology field where malpractice premiums grew by 225.9% while salary only grew by 105.7%. Surgery and Obstetrics/Gynecology, with the highest average malpractice premiums, still have two of the three lowest employment growth rates.

The interesting aspect is that while surgery does appear almost to have achieved a compensating wage differential with a 119.2% increase in insurance premiums countered by a 114% salary increase, it has by far the lowest employment growth of 11%. On the other hand, malpractice premiums in Pediatrics grew almost twice as fast as salaries, 186.2% compared to 99.4%, and yet experienced 73.8% employment growth.

Combining the specialties into high and low-risk categories with respect to malpractice, as determined by the level of malpractice premiums, creates a high-risk specialty group of Surgery and Obstetrics/Gynecology and a low-risk specialty group of General/Family Practice, Internal Medicine and Pediatrics. Table 3 depicts employment, malpractice premium

TABLE 1
Descriptive Statistics for Five Main Specialty Groups

Specialty	Percent Change in Employment (1998)	Average Malpractice Premium (1995)	Average Salary (1995)
General/Family Practice	2.26%	$9,000	$131,200
Internal Medicine	-.67%	$9,400	$185,700
Surgery	-1.19%	$23,300	$269,400
Pediatrics	2.90%	$7,900	$140,500
Obstetrics/Gynecology	.65%	$38,600	$244,300

and salary growth with the specialties divided into the two categories of low-risk and high-risk. Now it becomes clearer that the high-risk specialties have had greater increases in both malpractice premiums and salaries but have experienced half of the employment growth that low-risk specialties have experienced.

Generating an empirical model from this descriptive data, then, would entail running two separate OLS regressions, one on high-risk specialties and one on low-risk specialties, to compare the effects malpractice has on them. My hypothesis is that malpractice should have a greater impact on employment in high-risk specialties.

The dependent variable chosen was **SPECIALTY**, which I measured through the number of actively employed physicians in each specialty. In that way, the number of physicians is representative of the demand for each specialty per year. Since fringes and training costs are more abstract concepts to measure, and do not really pertain to my research problem regarding malpractice, I have omitted them from my model. Instead, my two independent variables consist of **MALPRAC** and **SALARY.**

I chose to measure the effects of malpractice on physicians through the price of insurance premiums due to the fact that premiums should take into account not only an increase in the volume of lawsuits filed but also the increased severity of claims awarded. I hypothesize that **MALPRAC** will have a negative impact on **SPECIALTY** due to the fact that it represents an added cost to the physician. Hence, **MALPRAC** should produce a negative coefficient in the regression.

Furthermore, my other independent variable, **SALARY**, which is represented with the average annual income per physician in each specialty, should have a positive impact on **SPECIALTY** since it represents a benefit, in this case a profit, to the physician. In general, the higher the compensation a physician receives for his services, the more likely he is to perform such services. Thus, I predict that the **SALARY** variable will produce a positive coefficient in the regression. Finally, both **SALARY** and **MALPRAC** will be lagged in order to take into account the fact that medical students choose the specialty into which they will enter years before they actually become employed in that specialty. The lag will be for two years since that is what seemed to work the best. A summary of all variables is shown below in Table 4.

Ultimately, the empirical model for this cross-sectional time series study on the five main medical specialties from 1982 to 1998 thus resembles the fol-

TABLE 2
Employment, Malpractice, and Salary Growth Rates per Specialty

Specialty	Employment Growth, 1983-1998	Growth in Malpractice Premiums, 1982-1998	Growth in Salaries, 1982-1998
General/Family Practice	29.8%	104%	94.8%
Internal Medicine	54.7%	140.5%	113.7%
Surgery	11.3%	119.2%	114%
Pediatrics	73.8%	186.2%	99.4%
Obstetrics/Gynecology	34.8%	225.9%	105.7%

TABLE 3
Employment, Malpractice, and Salary Growth in Low and High Risk Specialties

Specialty	Employment Growth, 1983-1998	Growth in Malpractice Premiums, 1982-1998	Growth in Salaries, 1982-1998
Low Risk	49.2%	153.5%	103.4%
High Risk	21.8%	174.9%	110.1%

lowing:

SPECIALTY = a1 + a2 SALARY + a3 MALPRAC

Data for **SPECIALTY** comes from editions 1990 to 2001 of *Physician Characteristics and Distribution in the US*, a publication of the American Medical Association (AMA). All data on physicians in these editions were compiled from the AMA's Physician Masterfile, a comprehensive database of physician and medical student information maintained by the Division of Survey and Data. The Masterfile is widely considered the most complete and extensive source of physician-related information in the United States. It contains records of all individuals entering medical school, with information updated by the Physicians' Practice Arrangements questionnaire, which has evolved into a rotating census which surveys approximately one-third of all physicians yearly. Additionally, I acquired information for both **SALARY** and **MALPRAC** from an AMA publication as well, *Socioeconomic Characteristics of Medical Practice*, editions 1988, 1995, and 1997/1998. Information in this book comes from the Socioeconomic Monitoring System, with statistics derived from annual surveys of physicians across the country collected by the Center for Health Policy Research, a division of the AMA.

V. Results

Three regressions were run on the data. The first consists of the high-risk specialties of Surgery and Obstetrics/Gynecology; the second on the low-risk specialties of General/Family Practice, Internal Medicine, and Pediatrics. I did this in an attempt to see whether malpractice affects specialties differently. In addition to the aforementioned regressions on high-risk and low-risk specialties, a third regression was run on all five specialties to see how they react to changes in compensation and malpractice as a whole.

As displayed in Table 5, the results of the first regression were fairly good. The adjusted R-squared was .504, meaning that my model explains slightly over 50% of the variation in **SPECIALTY**. Additionally, both **MALPRAC** and **SALARY** have the predicted signs, negative and positive respectively. However, while **SALARY** proved to be extremely significant, **MALPRAC** is highly insignificant. Thus, this regression shows that high-risk specialties are affected by **SALARY** at a much greater level than **MALPRAC**, suggesting that compensating wage differentials may indeed be in place.

Table 6 shows the results for Regression 2, which had an even better adjusted R-squared of **.**572. Though both variables display the predicted signs, I

TABLE 4
Empirical Model Variables

	Variable	Definition	Predicted Sign
Dependent	SPECIALTY	number of physicians actively employed per specialty	
Independent	SALARY	average yearly income per physician by specialty	+
	MALPRAC	average yearly insurance premium paid per physician by specialty	-

TABLE 5
Regression #1 Results

Variable	Coefficient	Significance
SALARY	.04526	.000
MALPRAC	-.0516	.324
R^2	Adjusted R^2	Degrees of Freedom
.556	.504	17

find that **SALARY** is highly significant while **MALPRAC** is insiginicant for the low-risk specialties. However, **MALPRAC** was even more insignificant in this regression than in the first regression, so my hypothesis that **MALPRAC** would affect high-risk specialties more than low-risk specialties does appear to be correct. Additionally, these findings again support a case for compensating wage differentials.

Finally, I ran the third regression out of curiosity to see how malpractice affected the specialties if not split into the two categories. It presents some quite interesting results, as displayed in Table 7. Both **SALARY** and **MALPRAC** have the predicted signs once again, though the equation produced an adjusted R-squared of only **.**349 this time. However, in a dramatic turn of events, **MALPRAC** is extremely significant, while **SALARY** is only significant at the **.**10 level. This suggests that the five specialties as a whole react strongly to changes in malpractice costs but are not as affected by changes in compensation.

Overall, then, the results of the regressions seem to raise a few discrepancies. While **MALPRAC** is highly insignificant for the first two regressions where the specialties are split into high-risk and low-risk malpractice categories, quite a different story unfolds when the third regression is run using all five specialties. In

TABLE 6
Regression #2 Results

Variable	Coefficient	Significance
SALARY	.707	.000
MALPRAC	-2.167	.469
R^2	Adjusted R^2	Degrees of Freedom
.560	.527	27

TABLE 7
Regression #3 Results

Variable	Coefficient	Significance
SALARY	.165	.066
MALPRAC	-2.183	.000
R^2	Adjusted R^2	Degrees of Freedom
.375	.349	47

that case, **MALPRAC** is extremely significant, while **SALARY** is less significant. The results of the first two equations could be due to the fact that the **SALARY** in both high-risk and low-risk specialties is high enough to offset any possible negatives that might accompany **MALPRAC**, suggesting possible compensating wage differentials. As for the lessened significance of **SALARY** in the third equation, while salaries may help students in their specialty decision-making process, the average physician makes far more than the average employee regardless of specialty, and therefore, slight fluctuations in compensation have little effect on the labor market as a whole. Moreover, the significance of **MALPRAC** to the medical labor market as a whole may be reflective of the fact that once in the medical labor market salary determines specialty, but prior to that, malpractice may scare potential medical students from ever entering into the medical labor market to begin with.

VI. Conclusions

The main goal of this paper was to show that malpractice has an adverse effect on high-risk medical specialties. The one concrete conclusion that can be drawn from this study is that however significant, malpractice has a negative effect on employment in the medical field, while salary has a positive effect. Furthermore, this study demonstrates that when split into the categories of high and low-risk specialties, malpractice does not seem to greatly impact specialty employment, suggesting that perhaps compensating wage differentials are in place. However, when medical employment was looked at as a whole, as represented by the five specialties examined, malpractice was found to be an extremely significant determinant of employment. Hence, its effects on individual specialties are not so easily discernible.

In part, this may be due to the fact that physician income and malpractice premiums vary widely

across the country, depending on the legislation in place in each area. For example, in Pennsylvania, where there are no limits on jury awards in malpractice cases, malpractice premiums in many specialties doubled earlier this spring. At the Frankford Hospital in Philadelphia, malpractice insurance spending rose from $6 million to $12 million. Even worse, when orthopedic surgeons' medical malpractice premiums doubled in January, hitting $90,000 annually, they refused to work, forcing the emergency department to close for a few days. "They had to make a statement that they couldn't afford to stay in business," said Roy Powell, chief executive officer of the hospital. Though the surgeons were eventually coaxed back to work, there is fear that doctors will soon leave the area permanently due to the high insurance rates (Thrall, 2001). Additionally, concentrations of physicians by specialty also vary across different areas of the country. Thus, examining the country as a whole could be a little misleading. Perhaps future research could examine the effects of malpractice in different areas of the country.

Moreover, influential variables may have been left out of the study. For example, the percent change in employment growth for the entire medical labor market no doubt affects the specialty labor markets. While the cost of medical school and perhaps even the state of the economy do not directly affect the choice of medical specialty, they do directly affect how many students choose to enter medical school, which in turn effects medical labor market, and consequently, specialty growth. Thus, these are all areas which may need to be examined in future research.

Tort litigation in general is of economic concern due to the vast amounts of wealth it accrues in transfer activity. However, the economic implications go even farther when specifically examining the growing trend in medical malpractice suits, which may be acting as a supply shock to the medical labor market. Only time and future research will tell whether this is the case or whether compensating wage differentials are indeed in place.

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