Variance of Obstetrician/Gynecologist Liability Insurance Premium Rates

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Nationwide, there are reports of physicians' offices closing and turning down new patients due to rising costs of medical malpractice insurance. However, the costs of premiums vary greatly among states. Examples citing discrepancies abound. The ninth of August 2002 edition of the *Arkansas Time*, in an article titled "Ob-gyn Malpractice Costs Balloon," reported that premium rates for obstetricians and gynecologists in Mississippi rose 400% between the years 2001 and 2002, whereas Arkansas saw no significant rate increases. The seventh of May 2002 edition of the *Las Vegas Review-Journal* reported that almost all ninety three doctors who deliver babies in Clark County began turning new patients away as a result of increased premium rates. Obstetrician Darran Housel left Las Vegas when his premium reached $100,000 per year and fled to Utah where he now pays $36,000 per year (Schmitt, 2003, 24). It is clear that some states are experiencing a medical malpractice premium crisis. This paper will address why the average medical malpractice premium rate for obstetricians and gynecologists is higher in some states than others.

Background on the Medical Liability System

The medical liability system is dependent on the actions of four key parties: patients, physicians, insurance companies, and attorneys. Patients injured while receiving health care may sue health care providers under the governing state tort law. Nearly all health care providers buy medical malpractice insurance to protect themselves from potential liability suits that could cause financial harm. Insurers agree to investigate claims and accept financial responsibility for payment up to a certain amount in exchange for a premium. Attorneys must decide whether a case has the merits of negligence to bring it to trial.

High medical liability premiums are not a new phenomenon. This country has experienced emergency situations in both the mid-1970's and the mid-1980's. Beginning in the late 1960's, the size of awards and the number of claims began to increase at unprecedented rates culminating in a medical malpractice crisis in the mid-1970's (Danzon, 1986). At the time, many states adopted various tort reform measures in an effort to curtail the upward trend. By 1976, the malpractice problem stabilized to a great extent (Adams, 1984, 475). Average payment per claim paid and claim frequency climbed slowly until a sharp increase in the mid-1980's. Premium rates for all types of liability insurance were affected during this crisis. However, malpractice premium rates began to decline by the late 1980's, effectively ending the crisis. Rates remained relatively constant during the 1990's until hikes occurred at the turn of the century bringing about the current crisis situation. Ultimately, changes in both the tort system and the insurance underwriting system have caused changes in premium rates.

The Insurance Market

The insurance market has changed significantly over the past decades. The underwriting cycle, the type of insurer, and market competition have all altered the dynamics of the market. Medical liability insurers' profits are derived from two key sources: the premiums physicians pay and investment returns. The insurance system is commonly acknowledged to have an underwriting cycle because profits depend in part on the economic market. In setting the premium price, companies consider many factors on the larger economic cycle. An underwriting cycle occurs when companies miscalculate their perceived losses and then must adjust premium rates the following years (Kipp, Cokeson, and Mattie, 2003). Hunter and Doroshow (1999) explain the cycle, "During years of high interest rates and/or excellent insurer profits, insurance companies engage in fierce competition for premium dollars to invest for maximum return. Insurers lower prices and insure very poor risks just to get the premium dollars." On the flip side, when interest rates are low and companies have experienced low investment returns, they will raise premiums and limit coverage to insure a profit. Thus an underwriting cycle is perpetuated.

Malpractice insurance coverage is provided by two broad categories of companies: conventional and alternative. Once conventional providers dominated the market; now alternative providers provide twice the amount of coverage traditional providers do (Joint Economic Committee Study). Conventional providers consist of large insurance companies such as the A.I.G., C.N.A. and others. Alternative providers consist of joint underwriting associations, self-insurers (where a firm or group of firms assume all or much of their own risk exposure), captive insurers (which are owned subsidiaries of

the firms they insure), and risk retention groups (a group of firms or individuals that come together to form a limited purpose insurer). Alternative forms are created to provide coverage that can be controlled by the professionals they serve; they focus on providing stable coverage over maximizing profits. Alternative providers have grown because the profits for traditional companies have deteriorated. In fact, the largest commercial insurer, St. Paul, ceased writing or renewing policies for malpractice in 2002. The type of insurer a physician uses affects the premium as well as the competition in the market.

The Tort System

The tort system has two main objectives: to provide compensation for negligently injured patients and to penalize physicians who perform negligent acts. However, the system fails to meet either objective completely since the system does not provide victims with compensation equitably or rapidly nor does it deter negligent behavior. Typically, it takes four to five years to resolve a malpractice claim. In addition, according to Kessler and McClellan, while one in fifteen patients who suffer injury due to medical negligence receive compensation, only one-sixth of the cases that receive compensation have positive evidence of negligent medical injury (1997, 81). Awards are usually based on the significance of the injury or emotional factors versus the degree of negligence. For example, Samuel Desiderio, who at the age of four suffered brain damage following surgery at a New York City Hospital, was awarded $140 million for expenses and for pain and suffering. However, Joan Butsko, a retiree near death after a doctor missed a malignant tumor in her breast, was awarded only $250,000 (Shmitt, 2004, 24). Between 1994 and 2001, the typical medical malpractice award increased

176% to one million dollars (Joint Economic Committee Study, 2003). As for deterring physician negligence, there are record numbers of medical errors occurring and a greater proportion going unreported. Ultimately, the tort system suffers from high claim frequency and increasing payments per claim. The fact that the two are linked is demonstrated by the many fraudulent claims made in the hope of hitting the jackpot. The general assumption is often made that these factors are costly to the insurance companies and they pass on this cost by increasing malpractice premiums.

States all have their own medical liability system and they vary greatly. Almost all states have enacted some type of tort reform. Most of the reforms began during the crises in the mid-1970's and 1980's. Reforms are aimed at reducing the frequency of claims by making it more difficult to file a suit, reducing the statute of limitations or using alternative forms of adjudication. Other reforms, such as limits on payments, attempt to reduce the severity of awards. Currently, twenty-four states have a law that limits payments, whether it limits non-economic damages only or limits economic and punitive damages as well.

Other states directly intervened in the insurance market by forming joint underwriting associations or a collection of insurance companies sponsored by the state to provide insurance where it is not available. Other states provided subsides to companies that would provide coverage. Finally, other states established their own insurance fund or adopted compensation funds to pay a portion of the judgment if a provider contributes to the fund. The options states have to deal with the crises, as well as the extent to which each state has implemented reforms, vary greatly.

The Effects of High Malpractice Premiums

Although the reasons for the current premium increases are debatable, it is clear that a problem exists. The American Medical Association has identified nineteen states as being in crisis, twenty-five states as being in a state of pending crisis, and classified only six states with no significant problems (www.ama.com). Examining why some states have higher malpractice premiums is important because of the situations they perpetuate. Increased premiums can cause numerous problems including increased costs of care, decreased access of care, and decreased quality of care. The costs of care can be divided into direct and indirect costs. Directs costs include the cost of administrating the malpractice system and the costs of compensation. Direct costs account for less than one percent of national health care expenditures (Office of Technology Assessment, 1993). The logic follows a slippery slope argument and indicates that premium increases will have a multitude of effects. As physicians face increased premiums, they will pass the cost along to the consumer in the form of higher prices, which will cause insurance companies to raise the premiums for consumers, which will cause more people to become uninsured. In addition, the price of malpractice insurance is calculated into the rebates physicians receive from the government for Medicare and Medicaid patients. Thus a higher premium means a greater expense to the already pressured governmental programs. Indirect costs come from the practice of defensive medicine. Defensive medicine is defined as the excessive practices preformed by physician and hospitals out of fear of litigation. Direct surveys and clinical scenarios both demonstrate a substantial change in behavior due to malpractice concerns.

Another problem generated by increased premiums is a lack of access to specialty care. When physicians find that the price of their malpractice insurance makes business unprofitable, they will relocate to a state with lower premiums or stop practicing which causes access limitations. High premiums are especially prominent among high-risk specialties. Access becomes even more of an issue because specialists typically are limited in number and serve greater areas. The AMA recently reported that 64.8% of high-risk specialists have made changes to their practice, including no longer providing certain services, referring complex cases, or closing practices (Health & Medicine Week, April 28, 2003).

The high-risk specialty of obstetrics and gynecology is historically known for high premium rates and has seen dramatic rate hikes since the late-1990's. Ob-gyns are sued an average of 2.5 times over their career, and one fourth will be sued during their residency (Health & Medicine Week, Aug 4, 2003). Claims against ob-gyns occur two to three times more often than the average for all other physicians. In addition, in some states they must carry special coverage for 21 years after the delivery of their last baby to cover injuries that are discovered later in life. This specialty is at greater claim risk due to the many complications of birth and the dramatic nature of the loss or handicap of a child (Institute of Medicine, 1989, 4).

Currently, the federal government is considering passing legislation that would place caps on the amount of non-economic damages that could be awarded and change other aspects of the tort system. The bill H.R. 5 has been passed in the house but the senate version, S. 11, did not pass. Efforts are being made to propose a new bill into the senate. In addition, there are reports that the Republican leadership will present a bill

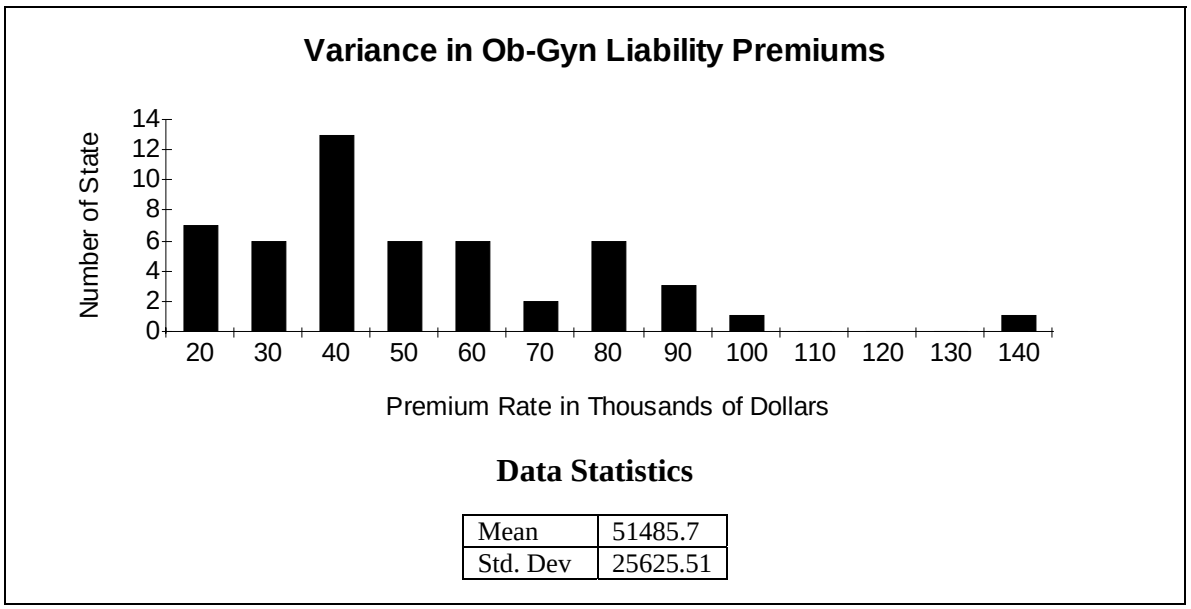
limiting caps to the ob-gyn specialty only in September of 2003. This has not been accomplished as to date. The idea behind placing a cap on non-economic damages is that this will effectively eliminate outrageous verdicts and therefore limit the direct costs of the liability system. This will lower the losses of the insurance companies who will pass the savings on to physician in the form of lower premiums. To see if this logic is correct, the federal government would be wise to review the reasons certain states have been effective at retaining lower premium rates. This shows the policy implications of my research; if we can find why some states have been effective their methods can be adopted on a broader scale.

Variation of Ob-Gyn Premium Rates

It is clear some states are facing outrageous ob-gyn premium rates. The controversy surfaces in determining the causes of high medical liability premium rates and how best to solve the problem. Please refer to Figure 1 to see the distribution of premium rates amongst states. Florida has the highest premium rate at $144,712. Oklahoma has the lowest premium rate at $17,272. The average premium rate is $51, 485.70. The distribution is a slightly skewed normal curve. The outliers of $140,000 and $100,000 serve to raise the mean. The distribution clearly shows some states are able to maintain a reasonable premium whereas others have outrageous premium prices.

Figure 1:

The Distribution by State of Ob-Gyn Malpractice Premiums for the Year 2002



Literature Review: General Observations

Research on premium rates lies within the larger theoretical context of policy development. Longest (2002) identifies various phases in the policy formulation cycle. First the agenda is set; policy is then formulated, adapted, implemented, evaluated, and modified. My research will help in evaluating the effectiveness of existing state policies and researching the formulation of federal policy as well as providing recommendations for policy modification. My research stems from the broader legal work concerning negligence and the tort system and specific work on the medical tort system. Some studies have tried to determine if high premium rates actually cause the problems of limited access and increased practice of defensive medicine (Hellinger and Encinosa, 2003). Others simply looked at why some physicians are more likely to be sued than others (Adams and Zuckerman, 1984). However, I'm interested only in what explains

why premium rates are higher in some states than others, not the effect of high premium rates themselves.

Most of the research examining premium increases uses poor methodology and reaches conflicting conclusions. This is because of the inherent restrictions in conducting research on the medical liability system. There are few direct variables that effect premium rates that are measurable. There is no set variable to measure the impact of tort reforms on the effectiveness of the liability system nor is there a systematic or comprehensive way of categorizing various reform measures. Likewise data on the insurance market is limited.

Most of the past research has focused specifically on the effectiveness of various state reforms and has neglected to control for other variables. (The details of these studies will be discussed later; please refer to the literature review specific projects section.) Four basic malpractice cost indicators have been used: mean losses of the insurance company, claim frequency, payment per paid claim, and insurance premiums. Insurance premiums are the preferred indicator as they are the end result of the tort system felt by the physician and theoretically cause the ensuing problems of limited access and defensive medicine. Mean losses of insurance companies are useful but other factors affect how an insurance company sets the premium. In addition, it is hard to apply it to a state level unit of analysis since insurance companies provide coverage to doctors in many states. High mean losses incurred from one state may or may not pass higher premiums on to doctors in that state. For example, in Nevada there may have been a 140 million dollar settlement, but if a New York firm incurs the loss from that settlemen it may raise premiums for all physicians regardless of geographical area. A company may

have a market share of only 15% in a state that caused them to incur high tort system costs, but decide to make up for the costs by increasing premiums in a less competitive state where they have a market share of 50%. Claim frequency and payment per claim paid have been examined in the past to see if tort reforms had the desired effect on the tort system; however, the usage of the tort system is only one variable that affects insurance premiums. Ultimately, using insurance premiums as the dependent variable is the most logical.

Other variables that affect premium rates are hard to measure. It is difficult to categorize or group state tort reforms, as they differ so widely in scope and application. For example, it would be naive to simply make a category for states that place caps on non-economic damages because the extents of the caps vary significantly. Market forces or underwriting cycle data is difficult to apply at a state level and control for statistically. These and other limitations cause the body of literature to be fragmented and vary in format. Reviewing how others have approached the issue and their conclusions is helpful. Conclusions vary as to whether tort reforms affect premium rates at all and, if it is accepted that reforms do have an effect, conclusions vary as to which reforms lower premiums, claim severity, and claim frequency.

Literature Review: Specific Research Projects

Many research studies used indicators of the tort system versus insurance premium rates. However, we can conclude that reforms that have no effect on indicators of usage of the tort system will have no effect on insurance premiums, as the reform must affect the tort system before savings can be passed on to the insurance company, who set the premium rates. Danzon (1986) found that reforms consisting of shortening the

statutes of limitation, mandating the offset of collateral benefits, and placing caps on awards, all significantly reduced claim severity and claim frequency. Danzon identified degree of urbanization and the business cycle as other variables that may affect the tort system. He identified that the two variables, the percentage of elderly and the number of lawyers, had no significant impact on claim frequency or severity. Sloan, Mergenhagen, and Bovbjerg (1989) examined how tort reforms affect the probability that a claim will be paid, the amount of payment, and the speed with which the claim is resolved. They found that reducing the basic statute of limitations, pre-trial screening, arbitration, offsetting collateral benefits, setting requirements for expert witnesses, and enacting caps, all had effects on at least one of the variables (Sloan, Mergenhagen, and Bovbjerg, 1989). Kessler and McClellan (1997) measured how reforms impact both claim rates and the price of insurance premiums. It was determined that direct reforms such as collateral source rule reform, caps on damage awards, and the abolition of punitive damages had a significant impact on both independent variables, while other more indirect reforms did not have an impact. However, their work on premium rates was limited because they did not control for other independent variables not dealing with reforms and their grouping of direct and indirect reforms is very broad (Kessler and McClellan, 1997). Thus, further analysis is needed on the following reforms: shortening the statute of limitations, offsetting collateral benefits, enacting caps, pre-trial screenings, arbitration, establishing requirements for expert witnesses, and abolishing punitive damages.

Other studies tried to determine how tort reforms affected insurance companies' gains and losses. Baker (1992) examined the effects of reforms on the state's mean loss ratio over a ten-year period. He concluded that the only procedural reform that had a

significant impact was codifying the standard of care. He also found that caps had a significant impact on the mean loss ratio, whereas modification of the collateral source rule, arbitration, and establishing patient compensation funds did not. Baker differs from many of the studies using indicators of the tort system. However, these reforms should still be examined because other researchers have indicated their significance. The General Accounting Office report (2003) is useful in determining how the factors that contribute to malpractice premium costs are related. It indicated that losses on medical malpractice claims are the primary long term driving force for insurance companies to set the premium rate. In addition, changes in investment income returns and the competitive environment are identified as contributing short-term factors of how rates are set (GAO Report 03-702).

Four additional studies used the dependent variable of tort reforms: Zuckerman, Bovbjerg, and Sloan; Blackman and Zeckhauser; Hunter and Doroshow; and the GAO Report 03-836. Blackman and Zeckhauser (1991) found that adopting a broad range of tort reforms lowered premiums. However, their explanation of data and methodology is limited. It appears that the average insurance premium per physician was used. This reduces the quality of their conclusion because insurance premiums differ greatly among different specialties. Hunter and Doroshow (1999) were the only research team to conclude that tort reforms did not lower premiums. The broad way they categorized tort reforms may explain their results. States were given a one, two, or three depending on the number of reforms they had enacted. Data for insurance premiums was based on letters from the Insurance Services Office that required data manipulation to obtain the real premium rate and only average insurance premium per physician was used. In

addition, the research may be biased as it was conducted by the interest group Citizens for Corporate Accountability and Individual Rights. The GAO Report 03-836 (2003) investigated whether state reforms affected malpractice premiums and claim payments. It concluded that growth in malpractice premiums and claims payments has been slower in states that have certain caps on non-economic damages (GAO Report 03-836, 2003). The study was limited in that analysis of all reforms other than caps were lumped together and entitled 'limited reforms'. Many factors, such as non-cap reforms, and other variables, such as the number and type of liability insurance companies, the competition of companies, the average number of physicians per capita, the percent urbanization, and the business cycle, were ignored. Zuckerman, Bovbjerg, and Sloan (1990) have conducted the most comprehensive research. They examined other variables that affect premium rates directly or indirectly. They found that reforms that significantly lower premiums are those that impose a cap or reduce the time a plaintiff has to initiate a claim. They determined other significant variables, which include the likelihood of exposure to malpractice, income per capita, the percentage of the population over 65, prior approval of premium levels by the state, insurance companies' returns on investments, the type of insurer, and the degree of competition among insurers. The study differed from Danzon (1986) in that it found the percentage of urbanization to be insignificant. The study also used claim frequency and severity as independent variables and failed to find a strong link between which variables affected both claim frequency and severity and premium rates. Data was limited because they, too, used the average premium rate per physician and the research was conducted for the years 1974 to 1986, which may not appropriately allow enough time to determine the effects of reforms in the mid-1980's. As to date, no

all-inclusive study that has examined other variables besides tort reform and been limited to using insurance premiums for a particular type of physician has been performed.

Hypothesis

I hypothesize that the average medical malpractice premium rate for obstetricians and gynecologists will be lower in states that have a greater share of population living in cities, greater competition among insurers, a higher percentage of alternative insurance providers, limits on the amount of award able to be received, and a more extensive tort reform system.

There is a great deal of complexity in how the variables work together in the real world to ultimately affect premium rates. Conversely, it is difficult to reduce the real world to a testable model. In the real world, the amount of use of the tort system (measured by the number of claims brought to suit and the severity of awards given) differs in each state. Each state has enacted different tort laws in an attempt to lower the usage of the tort system and each state has different factors that affect the tort system besides tort reforms. The usage of the tort system, itself, will affect the anticipated losses of insurance companies, which will affect the premium rate. How the insurance company sets the premium rate is also dependent upon the return on their investments, the type of company (traditional or alternative), and the competition level in a geographical area. All the real world relationships discussed above are shown in Figure 2. This representation provides an accurate and encompassing picture of the broad relationships. However, the world is not ideal and this model is untestable as data is not available or suited to a state level analysis. Losses due to the overuse of the tort system in one state do not directly correlate to increased premiums for physicians in that state as companies have different

market shares in each state and may find it more beneficial to make physicians in another state pay more. In addition, insurance companies do not make their investment losses available to the public and one could not create a state average investment loss, as companies are multi-state entities. What can be tested is how state factors, tort reforms, and insurance factors minus loss of investment income directly affect premium rates. The testable model is displayed in Figure 3. It is important to recognize intervening variables exist, but research cannot always depict the real world precisely. The testable model created depicts the actual relationships to the best possible ability. The relationships shown are still important to test as they determine whether the independent variables directly affect premium rates.

Figure 2:
Real World Relationships Between the Dependent and Independent Variables

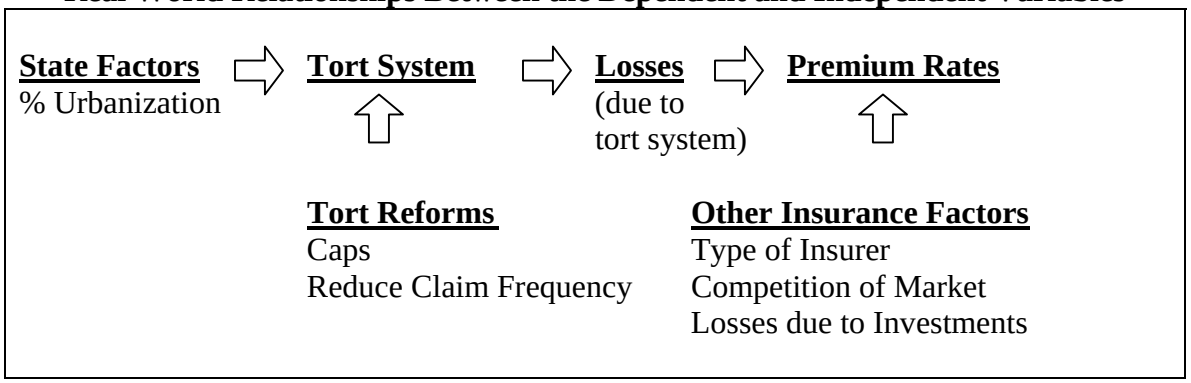
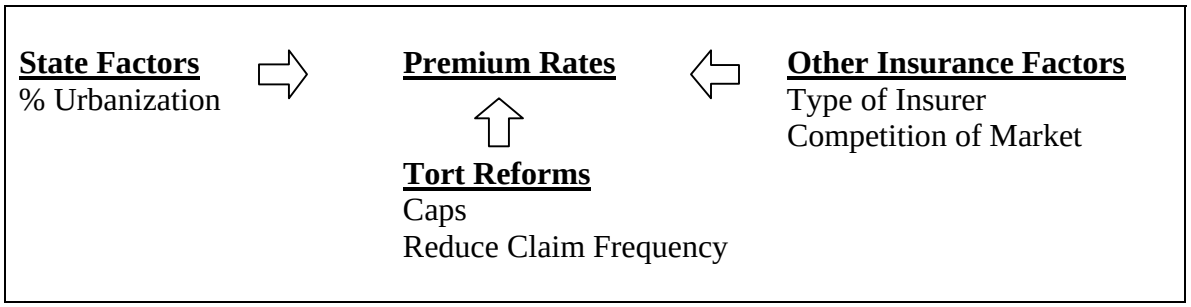


Figure 3:
Testable Relationships Between the Dependent and Independent Variables



I will explain how each variable is relevant and why a direct effect on premium rates is predicted. Many state factors could be identified to explain why some states have a higher premium rate than others; however, I have limited the state factors considered to just the percent urbanization. Since I am simply examining why some states have a higher premium rate than others, it is imperative that state factors are controlled for sufficiently so that, for example, California can be statistically compared to Nebraska. Malpractice premiums are statistically higher in city areas as doctors face a greater and more complicated workload. In addition, many doctors prefer these areas so companies can get by with charging higher premiums. Thus, it is predicted that states with a higher proportion of their population living in city areas will have a higher average malpractice premium rate. Therefore, the best way to control for differences in state population size is to examine how much of the population lives in cities. The literature has mixed results on the significance of the percent urbanization. Danzon (1986) found it to be an important state factor while Zuckerman, Bovbjerg, and Sloan (1990) found it to be irrelevant. Since past results vary, it is important to re-examine the variable. I excluded other state factors because past research showed many were insignificant. Zuckerman, Bovbjerg, and Sloan (1990) concluded the litigious nature of the state had no effect. The percentage of elderly population was also eliminated since Danzon found it to be insignificant. Income per capita was removed because there is no reasonable explanation that links it to the usage of the tort system.

Predicting an accurate picture of the insurance market factors that affect premium rates is extremely important because the hypothesis excludes insurance company mean loss data. Mean loss data is not directly included in the hypothesis because data was

unavailable; it is hard to prove direct correlation between a company's loss and a higher average premium rate for a state. However, other factors concerning the insurance market play a direct role in determining premium rates. Both the competition of the market in each state and the number of alternative providers affect premium rates. If there is a high level of competition or number of providers, physicians can be more selective in their choice of insurance carrier. Therefore, companies must compete which causes prices to decrease. The number of alternative providers also affects the average premium rate. Statistically, risk retention insurers, self-insurers and captive insurers charge lower premiums because they are companies run by doctors themselves. These companies are in the insurance business simply to provide coverage to themselves or colleagues and not to earn a profit; therefore, they charge a lower premium. It follows that the average state premium will be lower in states that have a higher percent of alternative providers. In addition, Zuckerman, Bovbjerg, and Sloan (1990) and the GAO Report 03-702 (2003) found these factors to be significant. For a further discussion of alternative and conventional providers please refer to the section beginning on page two.

Various tort reforms each state enacts can affect the average premium rate. To change premium rates, tort reforms must lower the usage of the tort system thereby lowering the costs of litigation for insurance companies who, therefore, can charge a lower premium. However, it is still justifiable to examine how the tort system directly affects premiums as many of the proposed solutions assume tort system reforms directly lower premiums. The existence of caps on damage recovery was identified as a single variable because research shows this reform to be the most effective and current

legislation is considering placing a nationwide cap. It is believed caps on awards significantly reduce the costs of the medical liability system and therefore premiums.

Other tort reforms were lumped together as a single variable because the purpose of my research is not to determine which tort reforms are more effective, but to determine why some states have lower medical liability insurance premiums than others. Only the tort reforms that were found to be significant in past studies were included with the addition of the existence of a patient compensation fund. The patient compensation fund was included because this is a relatively recent type of reform that has had limited research. With the multitude and variance of reforms, limits had to be set to determine what constitutes a state that has an extensive tort reform system. The reforms considered are eliminating the collateral source rule, requiring prior approval of premium rates, having a patient compensation fund, and having reforms that limit claim frequency. The collateral source rule allows double payment to parties who win suits. For example, both the physician and the hospital could pay the damages separately. Abolishing the collateral source rule prevents double payment, which would likely lower the overall cost of litigation. Some states require prior approval of premium rates, meaning they can reject rates they consider too high. States that have this more direct reform have more control over rates, which one could predict to result in a lower average rate. The existence of patient compensation funds reduces the cost of litigation for insurers because the state pays the majority of settlements and rewards. Finally, reforms that lower claim frequency such as pre-trial screening tests and the option of arbitration would produce a lower cost of litigation for insurance companies because fewer cases should go to trial, which would ultimately lower insurance premiums. Thus, states that have many of these

reforms would likely have lower costs generated by the tort system which insurance companies would pass on to physicians with lower premium rates.

Even though the testable relationship between the dependent variable and the independent variables is not an exact picture of reality, it still provides for causality and co-variation. We can ensure time order by confirming that the tort reforms have been in place before we measure the premium rate. Despite the simplifications that were needed to form a testable hypothesis, this research is imperative to advancing our knowledge of why some states have higher premiums than others.

Methodology

My hypothesis was tested by performing a multivariate regression with the state as the unit of analysis. The dependent variable was average ob-gyn premiums and the independent variables were percent urbanization rank, percent alternative providers, number of insurers, cap ranking, and tort system ranking.

The proportion of the population living in cities was measured by ranking each state on their total percent of urban population. Data was obtained for the year 2000 from the Wendell Cox Consultancy.[1] The variable is ordinal with fifty-one rankings (one ranking for each state plus the District of Columbia) because an increase in the ranking by one does not mean an increase of the percent urbanization by one.

The number of insurers per state was used to represent the competition of the market in each state. The variable is an interval variable as an increase of one does denote an increase of one insurance company. Data came from the National Association of Insurance Commissioners (NAIC) medical malpractice insurance database for the year

[1] Data is available at www.demographia.com

2001.[2] The NAIC explains that the data should be used with caution as the numbers include all insurers that write medical liability insurance, which includes coverage for physicians, doctors, nursing homes, etc. In addition, the data is derived from the NAIC's financial database, which does not include all insurance entities providing medical liability insurance, as some insurers are not required to file financial information with the NAIC or their state department. The biggest problem is in Texas where the NAIC believes it is missing data for 30-40% of the market share.

To calculate the proportion of alternative to conventional providers, data also came from the NAIC financial database with all the same observations about the quality as before. The NAIC had the type of insurers broken down into the categories of percent stock, mutual, surplus, reciprocal, risk retention groups, and residual market mechanism. The majority of conventional providers are stock companies but a significant proportion are also mutual companies. Therefore, the variable used to represent the percent of alternative insurers is the percent of surplus lines combined with the percent reciprocal, risk retention groups, and the residual market mechanism. Data is from the year 2002 and the variable is interval-ratio as it has rank order and the difference between categories is the same.

The variable of whether a state limited caps on medical liability awards was made into an interval variable since states vary in the size of the cap placed. Those states not enacting a cap were assigned three, states with a cap ranging from $750,000 and up were assigned as two, and states with a cap of $250,000 to $749,999 were assigned as one. I set a three to mean no cap so that I would have a positive relationship because I hypothesized that the higher insurance premiums would follow no caps. I set a two to

[2] Data is available at www.naic.org

equal the states that placed a cap, but set a very high cap because it is likely to have less of an effect in lowering premiums because awards can still be very high. I set one as the most limiting caps because they are the most likely to limit costs of litigation. Data came from the American Tort Reform Association (ATRA).[3]

To represent the extensiveness of tort reforms, a tort reform ranking system was created based on whether or not a state requires prior approval, abolished or limited the collateral source rule, has reforms to lower claim frequency, and the existence of a patient compensation fund. Variables were created for all these factors and then added together to form the overall tort reform rating. In assigning values for each variable, I chose a method that would assign the higher number to the outcome that is predicted to raise insurance premiums rates.

States not requiring prior approval were assigned a one and states that required prior approval were assigned as zero. States that still have the collateral source rule in existence (ie-still allow double payment) were given a one and states limiting the collateral source rule were given a zero. Claim frequency reforms considered were the existence of arbitration and pre-trial screening panels. States that had neither were given a two, states that had one or the other were given a one, and states that had both were given a zero. If a patient compensation fund was not in existence states were assigned as one, and states with a patient compensation funds were assigned zero. Then I added these variables using a compute statement to obtain the overall ranking in regard to the amount of tort reforms.

This is an ordinal variable as it has rank order but there is not an equal distance between categories. States with a higher ranking (or overall number) are predicted to

[3] Data is available online at www.atra.org

have higher premium rates because higher values were assigned to each reform effect associated with higher premium rates. Information as to the current state laws came from the ATRA. No reform or revocation occurred after 1993 so there has been ample time for the predicted results to occur.

The dependent variable is the average medical malpractice premium rate for ob-gyns in each state. Raw data was from the 2002 rate survey conducted by the *Medical Liability Monitor*. Data was presented by a state break down with further divisions for several companies per state. Thus the average premium rate charged by each company for a state was presented versus the overall state premium rate average. To calculate the overall state average I took the average of all the premium rates presented for each state. This is an interval variable as it has both rank order and the difference between each category is the same. Note that this data is limited because it does not take into account the number of physicians each company represents; so it is a rough average versus a percent of the market share weighted average. In addition, for states containing patient compensation funds or other governmental programs, physicians are normally charged a rate by insurance companies plus a fee to join the state program. When possible, rates represent the fee plus the actual premium. States that include only the premium rate without the additional fee include Indiana, Nebraska, New Mexico, and Wisconsin.

The data has its limitations and it is important to keep these limitations in mind in analyzing the data. I am aware the data for the number of insurance companies is from 2001 and not 2002 and that the data for the rank of percent urbanization is from 2000, but I feel these differences are justifiable because of the low likelihood of change in both numbers from year to year.

Analysis

I expected to find that the average medical malpractice premium rate for obstetricians and gynecologists would be lower in states that have a greater share of population living in cities, greater competition among insurers, a higher percentage of alternative insurance providers, limits on the amount of award able to be received, and a more extensive tort reform system. The results of the multi-variable regression are contained in Table 1. The equation of the line that can be used to determine the average ob-gyn liability premium rate for a given state based on the regression analysis is shown in Figure 4.

Graph 1: Regression Analysis Predicting Ob-Gyn Malpractice Premium Rates Across States, 2002.

	Slope	Standardized Coefficients	t-value	Significance
# of Insurers	499.371	.352	2.549*	.014
% Alternative Providers	445.425	.263	2.052*	.046
Cap Ranking	6798.540	.240	1.793	.080
%Urbanization Rank	-273.663	-.163	-1.226	.227
Tort System Ranking	- 2066.930	- .081	-.601	.551

Multiple R = .558
Adjusted R Square = .235
***** The hypothesized relationship predicted a negative T-value

Figure 4-The Equation to Determine the Average Medical Liability Premium.

Average Medical Liability Premium = -273.663 (The rank of % urbanization) + 445.425 (% of alternative providers) + 499.371(the number of insurance companies) + 6798.540 (the cap ranking) + -2066.930 (the tort system ranking) – 3435.446

My overall hypothesis is not supported. The results confirm the hypothesized relationship in respect to the independent variables of percent of the urbanization rank and the cap rank; however, neither is statistically significant. My results show the following variables had the opposite of the predicted effect on medical malpractice premium rates: the tort system rank, the percent of alternative providers, and the number of insurers. Significance was found for both the percent alternative providers and the number of insurers. I will now discuss each independent variable in detail.

The number of insurers had the opposite of the hypothesized effect on premium rates. The slope indicates that as the number of insurers increases (or the greater the competition among insurers) so does the medical liability premium. In fact, as the number of insurers increases by one, the average premium rate increases by $499.371 holding all other variables constant. What is even more troubling is that the t-value and significance level tell us this is a statistically significant variable. The t-value determines where a slope of this magnitude would be in the distribution of sample slopes if the null hypothesis (that the number of insurers has no effect on premium rates) were true. The null hypothesis can be rejected because the t-value (2.549) falls outside the set two standard deviation marks indicating that there is a 1.4% chance of getting a slope of this magnitude if the null hypothesis were true, which is virtually never. An explanation for

this unpredicted result is that the number of insurers was tested versus the number of insurers per ob-gyn physician. This means that large states would naturally have more insurers because they have more doctors and that large states are more likely to have a higher proportion living in the cities. It is difficult to accept that the price of malpractice insurance increases as competition decreases. I believe this data may show some other effect that state size has on insurance premiums.

The percent of alternative providers had the reverse of the predicted effect on insurance premiums. The regression analysis tells us that as the percent of alternative buyers increases by one, the average medical liability premium increases by $445.425 holding all other variables constant. What is even more detrimental to my hypothesis is that the t-vale is 2.549 and the significance level is .014 indicating that this relationship is statistically significant to the 95% confidence level. There is only a 1.4% chance of getting a slope of this magnitude if the null (no relationship between the variables) were true. Meaning the null hypothesis must be rejected. I believe the opposite of the desired relationship may have occurred because of the way provider groups were divided. Perhaps the categories were too broad and alternative providers should have been defined as only those providers who do not intend to make a profit from providing medical liability insurance.

The cap-ranking variable had the hypothesized effect on rates; however, it was not statistically significant. Note that states with no caps were given a higher ranking so that a positive relationship would result. The slope means as you increase a level of cap ranking (meaning you move toward having no cap or a less effective cap setting) the average premium rate increases by $6798.540 holding all other variables constant. The t-

vale of 1.793 and the corresponding significance level of .08 indicate the null must be accepted and there is no relationship between a cap level and premium rate. This is because there is an 8% chance of getting a slope of this magnitude if the null were true. Although very close to reaching the 95% confidence level it does not quite make it. Perhaps the number is not truly representative of the effects of caps because so few states have enacted caps and many companies provide insurance in many states so they keep premium levels high in cap states to offset the loss in no cap states.

The percent urbanization rate had the hypothesized effect on premium rates. The slope indicates that as the percent urbanization rank of a state increases by one, the average medical liability premium decreases by $273.663 holding all other variables constant. This indicates that premiums are lowered as a greater proportion of a state's population resides in cities as predicted. However, the t-value of – 1.226 and a significance level of .227 show this variable is not statistically significant. This means we must accept the null hypothesis because the data did not meet the 95% confidence level. The data may be flawed in that Nebraska ranked twelfth indicating it is a very urban state when most would consider it rural. Perhaps the percent of urban land mass would have been a better statistic to test.

The tort system-ranking variable also had the opposite of the predicted value. The ranking system was created such that a higher ranking meant a less comprehensive tort system, which would be likely to raise premiums. However, the slope shows that as you move up a tort system ranking value or toward a less comprehensive system, the average premium rate decreases by $2066.930 holding all else constant. The slope is not a statistically significant variable because the t-value to -.601 and the significance level is

.551. This means you must accept the null hypothesis that the tort system ranking has no effect on premium rates because there is a 55.1% chance of getting a slope of this magnitude if the null were true.

My hypothesis is further disproved when one examines the standardized coefficients. They indicate that the number of insurers and the percent of alternative providers had the two largest impacts on the dependent variable. This is disheartening considering both had the opposite of the predicted effect. However, the cap ranking had the third largest impact. The independent variables do not provide a comprehensive explanation for the variance in the malpractice insurance premium rates for ob-gyns amongst states. This is because the adjusted R-square value is only .247, meaning the independent variables only explain 24.7% of variance of premium rates. In addition, the multiple R-value is .568 indicating that there is a great deal of scatter around the line of best fit to the data. This means many data points are far from the linear equation to determine medical malpractice premiums.

Overall, only two variables, the percent urbanization and the cap ranking, had the predicted relationship and neither was found to be significant. Two variables, the percent of alternative providers, and the number of insurers had statistically significant unpredicted effects. The tort system ranking was determined to have no effect on premiums whatsoever. Even though the regression analysis determined an equation for the line, it is unlikely that this equation would be applicable in predicting the average medical liability insurance premium rate for ob-gyns in any state.

My hypothesis was most likely refuted because I attempted to explain the variance of premium levels among states versus why the average premium rate increases

more in some states than others as most other research has attempted to do. Examining the actual variance most likely introduced many state factors that would be controlled for if I had examined the percent change in medical liability premiums. For example, Florida may have a higher rate than Iowa simply because it has a higher population.

Conclusion

In general, my results are best categorized as inconclusive; therefore, it is difficult to draw any broad meaning from them. My results are not supported by any other study and refuted by several others. However, the fact that both of the insurance market indicators (percent of alternative providers and the number of insurers) had the opposite of the predicted effect may indicate that tort reform legislation plays a larger role in determining premium rates than the insurance market. It may also indicate that companies with greater market share can afford to charge lower premiums. Nevertheless, a comprehensive tort reform system ranking showed almost no effect on insurance premiums. In fact, my research generates many new questions, as the unpredicted relationships need to be explained.

The most important conclusion that can be drawn from my research project is that more research needs to occur as to why some states have higher physician malpractice premiums than others. More data collection needs to occur so that the insurance market can be better analyzed. Data needs to be collected as to the market share and the number of physicians each company represents and to the breakdown of the type of providers. This would enable accurate statistics about the percent of alternative providers, the competition in each state, and the actual average premium in each state. If insurance company data on mean overall losses were collected a hypothesis more accurately

depicting the real world could be tested. Until this is done, it will be hard to know how much of a role the insurance market and the tort system play in the variance of malpractice premiums.

Currently, federal legislation is attempting to create a nationwide cap on awards based on the assumption that caps lower premium rates. Past studies fail to take a comprehensive approach and do not specify the effect for a particular specialty. Research indicates caps may not lower rates and that other tort reforms are even less significant. This represents the larger political phenomenon that policies are often created with little statistical support. Large interest groups can set the agenda and create a perception about the effects of a solution with little support of their stance. It is clear there is a medical liability crisis, however it is unclear why some states have higher ob-gyn malpractice insurance rates than others.

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