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THE EFFECTS OF MEDICAL MALPRACTICE LEGISLATION:  
CAPS, LIABILITY INSURANCE PREMIUMS, AND PHYSICIAN SUPPLY  
IN OBSTETRICS & GYNECOLOGY

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## ABSTRACT

Medical malpractice reform in the United States has been an important legal and medical issue for several decades. Protecting patients from medical errors while ensuring that desired physician behavior is not compromised is a significant challenge faced by legislators and policy makers. This thesis examines the possible effect of reward caps in medical malpractice claims on liability insurance premium rates and physician supply in obstetrics and gynecology. Two hypotheses are analyzed: (1) Imposing caps on medical malpractice rewards decreases liability insurance premium rates, and (2) States with caps on medical malpractice rewards experience an increase in the population of practicing obstetricians and gynecologists.

Findings for the first hypothesis were drawn from the comparison of average OB/Gyn. liability insurance premium rates and physician population, pre- and post-cap. The second hypothesis was analyzed using the change in liability insurance premium rates measured against the change in the population of practicing obstetricians and gynecologists. All data were restricted to a ten year period (1995-2005) in order to provide a relevant picture of recent developments in these medical malpractice trends.

The results of the analysis showed that the effect of reward caps on premium rates and on physician supply in obstetrics and gynecology is inconsistent. Although the results are inconclusive, they provide lawmakers and health policy officials with some enhanced understanding of this relationship upon which to base future malpractice reform.

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## CHAPTER I

### INTRODUCTION

According to the well-known Institute of Medicine publication, *To Err Is Human* (2000), medical errors cause up to 98,000 deaths per year in the United States, making it the fifth-leading killer of Americans. Malpractice law is the primary means for protection against medical errors as well as compensation of victims, but empirical data suggests that the legal deterrence of malpractice law has been neither effective nor efficient in reducing medical errors (Studdert, 2004). Furthermore, several studies have demonstrated the negative effects of malpractice law, including the practice of defensive medicine, decreases in access to high-risk care, and increases in the overhead cost of healthcare delivery. Champions of patient safety also argue that by its litigious nature, malpractice law opposes the non-punitive and cooperative strategies now gaining support in the patient-safety movement.

The consequence of malpractice law that has had the most notable impact on both the healthcare and insurance industries is the economic cost. During the past several decades, the increased cost to insure physicians against liability for medical malpractice has resulted in several “malpractice crises” (Gallagher, 2003). These crises have historically resulted from increased payouts in malpractice lawsuits which become so expensive that most insurance providers discontinue liability insurance products. Those insurance providers who are able to continue to offer liability insurance during these periods of crisis can afford to do so only because they raise premiums to largely

unaffordable rates. The result is that many physicians lose liability insurance coverage (Studdert, 2004).

The repeated failure of the insurance industry to meet physicians' liability insurance needs during malpractice crises, along with the continued inflation of premium rates, has increased the financial burden on individual physicians, as well as hospitals, to protect themselves from bankruptcy resulting from malpractice lawsuits (Hellinger, 2003).

Perhaps the most distressing consequence of the inflation in liability insurance premiums is the abandonment of high-risk specialties and procedures by physicians and hospitals. The cost of liability insurance in high-risk specialties is highest because larger risk increases the likelihood that a medical error will occur, leading to a possible malpractice lawsuit (Studdert, 2003). In addition to financial deterrents, the potential harm to a physicians' reputation following a malpractice claim can be so devastating that physicians choose to relocate or to stop performing high risk procedures (Studdert, 2003). When physicians discontinue the provision of high risk care, patients' access to needed care diminishes.

This circumstance motivated state legislators to introduce tort law reform called "caps" that placed dollar amount limits on various types of damage awards in malpractice cases. Caps are intended to control payout amounts so that the insurance industry can offer affordable liability insurance coverage to physicians (Rosenblatt, et. al., 2002). The evolution of tort reform and caps will be discussed in further detail in Chapter Two.

The actual success of imposing caps in decreasing liability insurance premiums as well as its success in supporting the continued provision of high-risk specialty care has been examined by several scholars who have come to varying conclusions. This study attempts to provide further assessment and clarification by examining the relationship between caps on payouts in malpractice suits, liability premium costs, and physician supply on the state level. Increased understanding of these relationships may provide guidance for future tort reforms that can provide effective protection against medical errors without compromising economic stability in the healthcare and insurance industries.

## CHAPTER II

### BACKGROUND & LITERATURE REVIEW

Malpractice law is a subset of tort law, or personal injury law, since it is supported primarily by the theory of negligence. The purpose of medical malpractice law is to provide a means for victims of medical errors to be compensated and to deter future acts of medical malpractice (Hellinger, 2005). Tort law defines public procedures through which individuals and businesses are expected to interact.

In malpractice law, the civil wrong typically takes the form of a medical error. A “medical error” is legally defined as a deviation by individual physicians from a legally defined “standard of care,” which is based on the professional opinions of medical experts in the relevant specialty (Rosenblatt, et. al., 2002). A physician who deviates from this standard of care is considered to be negligent and therefore liable according to malpractice law.

Before the 1960s, physicians and hospitals were insulated from tort liability for medical negligence primarily by the doctrine of charitable immunity. Charitable immunity dates back to the late 1800s, when hospitals were operated as charities that provided care to low income patients. Since then, hospitals have evolved into large entities serving paying patients as well as those who cannot afford to pay. Accordingly, this kind of protection has been abandoned, giving way to malpractice litigation (Rosenblatt, et. al., 2002).



## **Malpractice Insurance Crises and Tort Reform**

Since the introduction of malpractice law, there have been several financial crises resulting from a growing number of legal claims and increasingly large judgments against physicians. As a result, the cost to insure physicians against malpractice litigation became unsustainable for the majority of insurers, who periodically discontinued their liability insurance products during times of crisis. The term “crisis” signifies the market’s failure to provide physicians with affordable liability insurance coverage. Without coverage, physicians are exposed to the risk of losing a large portion of their personal assets in the event that they are involved in a lawsuit. These crises have led to the negative effects discussed in the literature including the practice of defensive medicine, decreased provision of high-risk care, and increased overhead costs of healthcare delivery (Studdert, 2004).

By the mid-1970s, the first of several malpractice crises in the United States had begun (Studdert, 2004). There was a massive inflation of the payouts for claims which caused insurance companies to respond by inflating liability insurance premiums. The inflated premium rates discouraged physicians from being covered for medical liability, and as physicians dropped out of the various insurance plans, the risk pools became smaller and more costly. Subsequently, the market experienced a sharp decline in insurers which caused participating physicians to lose coverage. It was this turn of events that gave birth to joint underwriting associations, which were state-sponsored insurance vehicles created as a last resort for physicians who no longer had access to liability insurance coverage (Studdert, 2004).

At about the same time that this malpractice crisis occurred, the California Hospital Association and the California Medical Association conducted the Medical Insurance Feasibility Study, which represents one of the first attempts to evaluate the system's efficacy. The study was conducted in California and included a sample of 23 hospitals and 21,000 medical records. The results of this study showed a wide gap between medical negligence injuries and malpractice claims, at a ratio of 10.24 injuries to 1 claim (Mills, 1978). According to these discouraging results, the tort law system was failing to serve those injured by negligent medical care.

By the late 1970s, the malpractice crisis had abated largely due to tort reform measures from state legislatures. Tort reform has been executed through changes to components of the fault-based system. These changes included decreased financial responsibility for providers and insurers, some reform of insurance markets, alternative dispute resolution, reduced standard of care, and increased procedural and cost barriers to recovery (Rosenblatt, et. al., 2002).

Despite these tort reforms, history repeated itself in the mid 1980s as malpractice claims began to rise and liability insurance premium costs spiked dramatically, causing another malpractice crisis. Again, market forces pushed insurers out of the liability insurance market and physicians were left without coverage. This induced a new type of state tort reform which placed dollar amount limits on damages awarded in malpractice cases. These limits came to be known as caps and can be applied to non-economic or punitive damages (Rosenblatt, et. al., 2002).

Again, tort reform resolved the crisis in the late 1980s, but the instability of liability insurance witnessed by many physicians had shaken their confidence in the industry. It was during this time that self-insurance and “bedpan mutuals” became popular liability insurance options. Bedpan mutuals were small-scale insurance vehicles owned and managed by physicians that created the opportunity for physicians to pool their malpractice liability risk at a more affordable cost than with a commercial insurer (Studdert, 2004).

The 1990s saw little growth in claims rates along with manageable increases in average settlements, and because insurers had simultaneously raised premiums, the market was favorable and more insurers entered the market. A shocking 70% of claims closed without payment, as defendants won most cases. The malpractice environment was encouraging to physicians and insurers, but the system was becoming more difficult to navigate for patients who had been injured as a result of malpractice (Studdert, 2004). This circumstance continues today as more states place caps on malpractice settlements as the prevailing means of tort reform.

### **Consequences of Medical Liability**

The literature on malpractice and tort reform widely criticizes malpractice law for failing to provide compensation to patients who are victims of medical errors without producing undesired effects on physician behavior. For example, the legal deterrence resulting from malpractice law has encouraged the practice of defensive medicine, decreased the provision of high-risk care, and increased overhead costs to the U.S. healthcare industry (Gallagher, 2003).

As damages awarded in malpractice cases increase and the cost for physicians to purchase liability insurance coverage increases, doctors are growing increasingly cautious of avoiding medical malpractice claims. Physicians' increased caution in caring for patients has led to the practice of "defensive medicine." Defensive medicine involves over-treating and over-testing patients in order to decrease the chance that a physician will be sued for negligent care (Hugman, 2007). Some definitions of defensive medicine also include the avoidance of high-risk patients or procedures in order to reduce potential liability for adverse outcomes. The practice of defensive medicine results in increased stress on the patient and family as well as additional risks for adverse events such as a hospital-acquired infection resulting from the unnecessary administration of intravenous medication.

In addition to its negative effects on the patient, defensive medicine has been estimated to account for 4% to 14% of total healthcare spending (Mello, 2010). Whatever the actual figure, the cost of defensive medicine represents a significant component of the large healthcare bill that the United States struggles with today.

The financial and emotional burden placed on healthcare providers by the threat of malpractice law has generated even more extreme reactions than that of defensive medicine. That is, the negative consequences associated with protection against malpractice litigation are not limited to influencing *how* a physician practices medicine, but also *where* and *whether* a physician practices certain specialties in medicine.

### **Malpractice Law, Tort Reform, and Physician Supply**

Although legislators intend to increase safety in healthcare through medical malpractice legislation, the resulting lawsuits often decrease access to care in certain high

risk specialties (Hellinger, 2005). Due to the increased likelihood that medical errors will occur in the context of high-risk medical specialties, these specialties are being abandoned by physicians and hospitals (Hellinger, 2005). This presents a new problem for those who need this type of care, as decreased access is a significant negative consequence of malpractice litigation.

This effect is prominent in the field of obstetrics and gynecology, as demonstrated by the fourteen closures of obstetrics units in the 10-year period from 1997-2007 in the state of Pennsylvania alone (Maternity Care Coalition, 2005). Decreased access to care has caused overcrowding in the remaining OB units and has raised concern regarding patient safety and capacity in those units (Maternity Care Coalition, 2005). In this example and in other states, the medical liability system has created a situation in which patient safety has been compromised instead of protected.

Malpractice litigation has been shown to have a negative effect on physician supply, especially in certain medical specialties and subspecialties that are considered high-risk (Hellinger, 2005). One explanation for the link between malpractice laws and decreased supply of physicians is the inflating effect that the laws have on liability insurance premiums. Despite significant discussion in the literature, studies seeking to define this relationship have been inconclusive (Hellinger, 2005; GAO, 2003; Studdert, 2004).

Several studies have examined the interplay of medical malpractice litigation, payout amounts in awarded damages, and liability insurance premiums with physician supply. In other words, the medical liability system's effect on the cost of liability

insurance and the number of doctors in states with varying medical malpractice laws has become a popular topic in modern malpractice literature.

The rising cost of liability insurance does create significant financial pressure for physicians. Despite the adjustments made through tort reform efforts in some states, including those states that impose caps on payout amounts, the average award given to a successful malpractice plaintiff in the United States in 2006 was a startling \$485,348 (Studdert, 2005). Many researchers have conducted studies examining the effect that these caps have on the premiums physicians must pay insurance companies for medical malpractice protection. According to a 2005 publication by the *Journal of the American Medical Association (JAMA)*, caps on damages help to contain payout amounts, but more research is needed to assess the relationship between caps and premiums. The same article declares that states enacting legislation to cap damages enjoy an increase in physician supply. In the absence of a demonstrated relationship between damage caps and liability insurance premiums, the shown relationship between damage caps and physician supply is unclear.

The theory adopted by some researchers is that physicians are drawn to states with more favorable malpractice laws that minimize the amount of monetary liability incurred by doctors being sued for negligence (Hellinger, 2005; GAO, 2003). A prominent example of legislation that produces this effect is the placement of caps on damages awarded. If financial protection is the primary motivation for physicians to practice in states with more favorable malpractice laws, it may also be the case that reduced liability insurance premium payments for physicians stimulate increased physician supply in states that have caps on damages.

The Agency for Healthcare Research and Quality (AHRQ) has found that states with caps on noneconomic damages for medical malpractice claims maintained a twelve percent greater physician supply per capita than states without caps (Hellinger, 2005). In another study, the U.S. General Accounting Office (GAO) concluded that although many factors affect fluctuations in medical malpractice premium rates, the most significant indicator is losses on claims (GAO, 2003). Since caps on damages are purposed to reduce the magnitude of these losses, these studies are complementary. Together, the indication is that caps reduce losses on claims, which in turn has the implied effect of reducing premium rates. This finding supports the notion that a liability premium rates could serve as a motivation for changes in physician supply.

Research by Weis Ratings, Inc. offers contrasting findings, which affirm only the effectiveness of caps as a means of reducing losses and refute the direction of the influence of the caps on liability insurance premiums (2003). In fact, the study identified caps on non-economic damages as a possible barrier to containing or reducing premium costs in states with such caps. Weis Ratings, Inc. also found that more states with caps failed to keep their premiums flat than states without caps. These interactions are counterintuitive, and therefore more research is required to provide explanation for or disprove the findings of these studies.

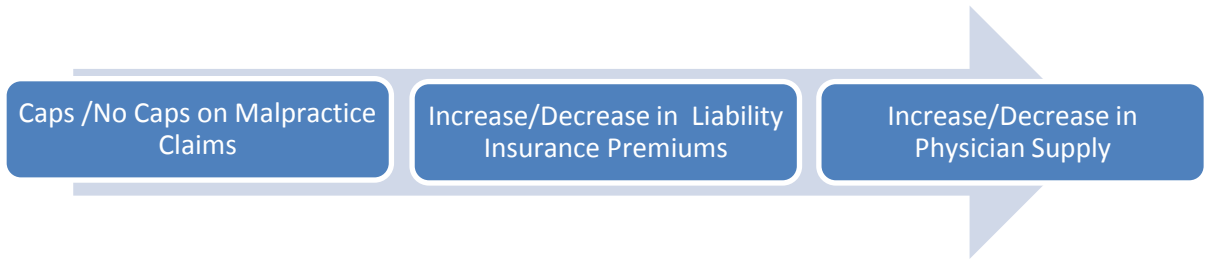
With these conflicting theories, the one fact that remains clear is that medical malpractice premiums are a tremendous burden to physicians practicing in the United States. The motivation for this study is to understand whether continuing to implement tort reform through capping damages will sufficiently curb physicians' behavior. The driving theory behind the reforms of the past has been that caps will serve as a "cure all"

for the array of problems caused by the threat of malpractice litigation. The motivation for this study is to examine the relationship between tort reform and physician behavior in the specialties of obstetrics and gynecology. Defining and understanding these interactions more clearly will inform lawmakers and policymakers and better prepare them to identify the changes needed to maintain appropriate punishments for medical negligence without diminishing physician supply and decreasing access to specialty care.



CHAPTER III  
RESEARCH FRAMEWORK & HYPOTHESES

Prior research has shown a relationship between malpractice caps and physician supply, but there are not conclusive findings on the existence of a relationship between caps and liability insurance premiums (Hellinger, 2005; GAO, 2003; Herbert, 2005). In order to understand the primary motivation for increased physician supply in states with caps, this study will attempt to establish a more direct line of association by assessing the effect of caps on liability premium rates. Subsequently, the relationship between premium rates and physician supply will also be examined. This theoretical relationship can be more easily summarized by the causal diagram below:



Data compiled in separate studies by the U.S. Agency for Healthcare Research and Quality (AHRQ) and General Accounting Office (GAO) indicate together that caps on medical malpractice claims reduce losses on claims, which is the most significant predictor of trends in liability insurance premium rates. The inference that this study seeks to affirm is that this hypothesized relationship between caps and premium rates actually exists, and furthermore, that changes in liability insurance premium rates correlate to changes in physician supply.

There is a wide variation across medical specialties in liability insurance premium costs and in the level of risk for being involved in a malpractice lawsuit. The literature

suggests that financial considerations motivate changes in physician behavior, including the choice of where to practice. Therefore, this study will focus on the high-risk specialties of obstetrics and gynecology since physicians practicing in this medical specialty have among the highest liability insurance costs and greatest financial risk.

This study will test two hypotheses in an attempt to examine the above-stated theoretical relationship in the field of obstetrics and gynecology:

**Hypothesis 1:** States that impose caps on medical malpractice damages experience a decrease in liability insurance premium rates and an increase in physician supply for obstetrics and gynecology.

**Hypothesis 2:** States that have lower average liability insurance premiums for obstetrics and gynecology experience an increase in obstetric and gynecologic physician supply when compared with states that have higher average liability insurance premiums for obstetrics and gynecology.

## CHAPTER IV

### METHODS

#### **Overall Approach**

Two analyses were completed in this study, including one for each hypothesis. The first step for both of these analyses was to identify states that have undergone a transition from no caps on damages to the establishment of some form of legal cap(s). Caps can be punitive, non-economic (i.e. emotional suffering), or based on total damages. According to an article in *New York University's Law Review*, placing caps on one type of damage has a “crossover effect” on other damage awards (Sharkey, 2005). This means, for example, that if a state legislature imposes caps on non-economic damages, then the total damages and punitive damages awarded will increase to compensate for the limitation imposed on the non-economic damage award. According to Sharkey, the type of cap(s) is unimportant; thus, for the purposes of this study, any combination of cap types will be grouped into the general category of “caps on damages”. Data on state laws concerning caps on medical malpractice payouts was obtained from the Database of State Tort Law Reforms (DSTLR, 2<sup>nd</sup> 1980-2005).

Nine states that have imposed caps on payouts in malpractice cases between the years 1995 and 2005 were identified in this dataset, including Alabama, Arkansas, Maine, Mississippi, New Jersey, North Carolina, Pennsylvania, Ohio, and Oklahoma. These states are termed “change states” and will be used to analyze each hypothesis in the two-step analysis plan detailed in the analysis section of this thesis. Some of the remaining 40 states were selected to be included as a control group. This allowed for comparisons

between states that have imposed caps and states that have not made any changes to their existing laws. These states are “comparison states” or “control states.” Four comparison states were matched with each change state using *The Dartmouth Atlas of Health Care’s* Medical Care Cost Equation.

### **Methods for Hypothesis 1**

The first hypothesis predicts that states imposing caps on medical malpractice damages will experience a decrease in liability insurance premium rates and an increase in physician supply for obstetrics and gynecology. The analysis for hypothesis one was completed in two steps.

#### Study Sample

The study sample for the first hypothesis includes nine change states; Alabama, Arkansas, Maine, Mississippi, New Jersey, North Carolina, Pennsylvania, Ohio, and Oklahoma; and twenty comparison states; Arizona, Colorado, Connecticut, Delaware, Georgia, Illinois, Indiana, Kansas, Kentucky, Maryland, Michigan, Nevada, Rhode Island, South Carolina, Tennessee, Utah, Virginia, Washington, West Virginia, and Wyoming. Table 3 in the Tables and Figures section of this thesis shows which comparison states were matched with each of the nine change states.

#### Data Sources

The data used in hypothesis one was compiled from the following sources: the Database of State Tort Law Reforms (DSTLR, 2<sup>nd</sup>), the *Dartmouth Atlas* Medical Care Cost Equation, the Annual Rate Surveys by the Medical Liability Monitor (MLM), and

the Area Resource File (ARF). All data were obtained for the ten year period (1995-2005) in order to provide a relevant picture of recent developments in medical malpractice law and each of the related trends.

### Measurement

The data identifying each state's medical malpractice cap litigation were taken from the Database of State Tort Law Reforms, 2<sup>nd</sup>. The dataset includes records for the years 1995-2005, which is consistent with the data for the other two variables being examined. The DSTLE, 2<sup>nd</sup> contains detailed information regarding medical malpractice litigation and tort reform, including the imposition of caps, for each of the 50 states. The types of caps matched with the years during which the caps were enforced as law are available in this dataset.

The *Dartmouth* Medical Care Cost Equation was used to match each change state with four comparison states that had similar medical care costs. This was chosen as a criterion for state matching because it constitutes a subset of each state's cost of living that is specific to the provision of healthcare.

Data measuring average liability insurance premiums for physicians by state was obtained from the Annual Rate Surveys by the Medical Liability Monitor (MLM). Annually, the MLM surveys major writers of liability insurance for physicians. Manual rates for specific claims by specialty are obtained, along with rates from public sources. Premium rates are presented by three specialties: internal medicine, general surgery, and obstetrics/gynecology. Since this study focuses on the field of obstetrics and gynecology,

the premium rates for that specialty will be used. The data are presented at the county level and have been aggregated to the state level in Microsoft Excel.

Physician supply was determined using information available in the Area Resource File. Data from the ARF were gathered and reported by county; thus, the county-level data was aggregated to the state level using Microsoft Excel software. The data pertinent to this analysis is contained in the Health Care Professionals section of the ARF. This dataset was also used to obtain the total population of each change state for 1995-2005 as a comparison to physician supply trends.

#### Statistical Analysis

The first step was to plot each change state's average annual liability insurance premiums for obstetrics and gynecology with the corresponding plots of each comparison state over the ten year period beginning in 1995 and ending in 2005. Caps on damages and/or year will be the independent variables, while the average premium rate will be the dependent variable. The comparison states were also included in a corresponding chart over the same ten year period. The results of this analysis were determined through observation of trends in the plot. The procedure for analysis was followed for each of the states, and any trends identified in the change states were compared with results for the corresponding control states. The expected outcome was that liability insurance premiums will decrease as states impose caps on damages, and that the premiums will be consistent in states that do not institute tort reform using caps. Average annual liability insurance premiums for obstetrics and gynecology were calculated using data from the 1995-2005 Annual Rate Surveys by the Medical Liability Monitor (MLM).

The second step of the first analysis was to conduct a t-test for each change state to determine the significance of any observable change in average annual liability insurance premium rates for obstetrics and gynecology that took place after a cap was imposed in a change state. This analysis was followed for each of the change states, and any statistically significant difference in annual liability insurance premiums before and after a cap was imposed in a change state was identified.

Each of the two steps in this analysis was repeated using obstetric and gynecologic physician supply as the dependent variable in place of average annual liability insurance premiums. The purpose of the analysis of change in caps and change in physician supply was to examine the nature of the relationship found in previous research. Prior research shows that states with caps have a higher physician per capita than states without caps; this longitudinal analysis was used to examine the possible causal relationship between caps and physician supply. The physician supply in each change state was calculated using data from the Area Resource File (ARF) compiled by the U.S. Department of Health and Human Services.

## **Methods for Hypothesis 2**

The second hypothesis predicts that states with lower average liability insurance premiums for obstetrics and gynecology will experience an increase in obstetric and gynecologic physician supply when compared with states that have higher average liability insurance premiums for obstetrics and gynecology.

### Study Sample

The study sample for the first hypothesis includes nine change states; Alabama, Arkansas, Maine, Mississippi, New Jersey, North Carolina, Pennsylvania, Ohio, and Oklahoma; and twenty comparison states; Arizona, Colorado, Connecticut, Delaware, Georgia, Illinois, Indiana, Kansas, Kentucky, Maryland, Michigan, Nevada, Rhode Island, South Carolina, Tennessee, Utah, Virginia, Washington, West Virginia, and Wyoming. Table III in the Tables and Figures section of this thesis shows which comparison states were matched with each of the nine change states.

### Data Sources

The data used in hypothesis two was compiled from the same sources as were used in hypothesis one: the Database of State Tort Law Reforms (DSTLR, 2<sup>nd</sup>), the *Dartmouth Atlas Medical Care Cost Equation*, and the Area Resource File (ARF). Again, all data were obtained for the ten year period (1995-2005) in order to provide a relevant picture of recent developments in medical malpractice law and each of the related trends.

### Measurement

The methods used for measurement in each of these data sources are identical to those described in the Measurement section for hypothesis one.

### Statistical Analysis

The analysis for hypothesis two was conducted in two steps. First, simple regression was used to examine the relationship between average annual liability insurance premiums and physician supply for the medical specialties of obstetrics and



gynecology in each of the nine change states. In this analysis, average liability insurance premium rate was the independent variable, while physician supply was the dependent variable.

Step two was to plot physician supply against total population within each state over the ten year period from 1995-2005 as a comparison for the shifts in physician supply. If a trend in a state's population growth or decline matched with any trend found in the state's physician supply, the trend was found not to be attributable to changes in malpractice litigation or liability insurance premiums.

## CHAPTER V

### RESULTS

Overall findings indicate that the effectiveness of caps in reducing or controlling the inflation of liability insurance premium rates is evident in some change states but is inconsistent across the sample. The relationship between caps and physician supply was evident in about half of the change states, but was not strong enough to be conclusive. Finally, the hypothesized relationship between the cost of liability insurance premium rates and the physician supply in a change state was confirmed in only one change state.

**Hypothesis 1:** States that impose caps on medical malpractice damages experience a decrease in liability insurance premium rates and an increase in physician supply for obstetrics and gynecology.

**Figure A: Graphic Overlay of Premium Rates in All Change States**

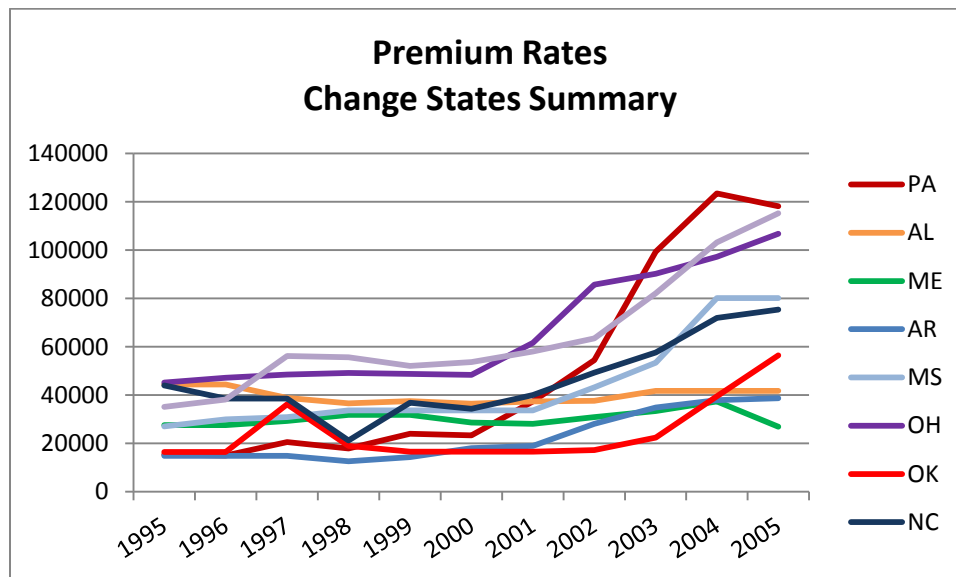


Figure A displays the trending of premium rates for each of the nine control states. Overall, the findings for the first hypothesis indicate that all change states experienced an increase in liability insurance premiums except for Maine and Alabama, possibly as a result of the instatement of caps. The change was statistically significant according to the results of the t-test, summarized in Table A, in four of the seven states that experienced an increase in premium rates. Those states which had a statistically significant increase in post-cap premiums include Arkansas, Mississippi, Ohio, and Pennsylvania.

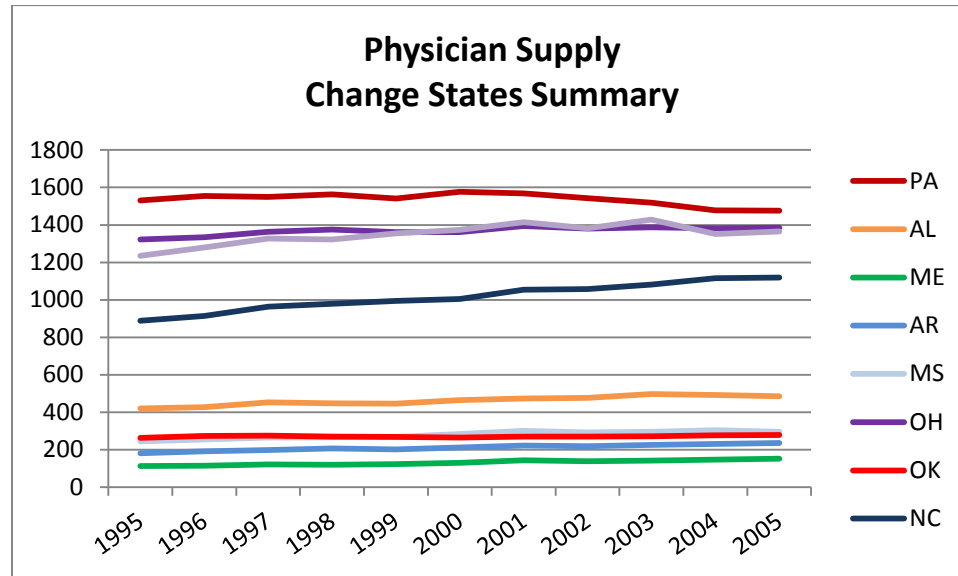
**Table A: T-test Results for Change States (Premium Rate and Physician Supply)**

State	Year of Cap	Variable	T-Tests				
			Method	Variances	DF	t Value	Pr >  t
Alabama	2000	Premium Rate	Pooled	Equal	9.00	-0.19	0.8503
Alabama	2000	Physician Supply	Pooled	Equal	9.00	-4.79	0.0010
Arkansas	2003	Premium Rate	Pooled	Equal	9.00	-3.48	0.0069
Arkansas	2003	Physician Supply	Pooled	Equal	9.00	-2.37	0.0418
Maine	2000	Premium Rate	Pooled	Equal	9.00	-1.00	0.3424
Maine	2000	Physician Supply	Pooled	Equal	9.00	-7.02	<.0001
Mississippi	2003	Premium Rate	Satterthwaite	Unequal	8.00	-16.71	<.0001
Mississippi	2003	Physician Supply	Pooled	Equal	9.00	-1.75	0.1146
New Jersey	1996	Premium Rate	Pooled	Equal	9.00	-1.98	0.0796
New Jersey	1996	Physician Supply	Pooled	Equal	9.00	-4.02	0.0030
North Carolina	1996	Premium Rate	Pooled	Equal	9.00	-0.45	0.6640
North Carolina	1996	Physician Supply	Pooled	Equal	9.00	-3.25	0.0100
Ohio	2003	Premium Rate	Pooled	Equal	9.00	-3.36	0.0084
Ohio	2003	Physician Supply	Pooled	Equal	9.00	-1.09	0.3045
Oklahoma	1996	Premium Rate	Satterthwaite	Unequal	8.00	-2.16	0.0625
Oklahoma	1996	Physician Supply	Pooled	Equal	9.00	-0.87	0.4052
Pennsylvania	1997	Premium Rate	Satterthwaite	Unequal	7.18	-2.86	0.0238
Pennsylvania	1997	Physician Supply	Pooled	Equal	9.00	0.49	0.6326

Figure B displays the trending of physician supply in each of the nine control states. In regard to physician supply, six of nine change states experienced an increase in physician supply over the ten year period. The post-cap change in physician supply was

positive and statistically significant in five of the nine change states, including Alabama, Arkansas, New Jersey, North Carolina, and Maine.

**Figure B: Graphic Overlay of Physician Supply in All Change States**



**Hypothesis 2:** States that have lower average liability insurance premiums for obstetrics and gynecology experience an increase in obstetric and gynecologic physician supply when compared with states that have higher average liability insurance premiums for obstetrics and gynecology.

Analysis of the second hypothesis revealed that eight of the nine change states experienced either a moderate increase or no significant change in physician supply across the ten year period. The only state experiencing a decline in physician supply was Pennsylvania. Six of the nine change states showed a statistically significant correlation between premium rate and physician supply, including Arkansas, Mississippi, North Carolina, Ohio, Oklahoma, and Pennsylvania. Table B provides a summary of the

regression analysis results. Five of the six states showed a positive correlation while Pennsylvania showed a negative correlation. Pennsylvania was also the only state whose physician supply declined while the total population of the state increased.

**Table B: Regression Analysis Results for All Change States**

<b>Regression Analysis</b>			
Physician supply [Physician Supply (OB/Gyn.)] is the outcome variable for the independent variable premium rate [Premium Rate].			
State	Coefficient	Confidence Interval	
		Lower 95%	Upper 95%
Alabama	-0.00184	-0.00814	0.00446
Arkansas	0.00141	0.00072	0.0021
Maine	0.00131	-0.00177	0.00439
Mississippi	0.00072	0.00015	0.00129
New Jersey	0.00112	-0.00033	0.00257
North Carolina	0.00334	0.00084	0.00584
New Jersey	0.00112	-0.00033	0.00257
Ohio	0.00062	0.00008	0.00116
Oklahoma	0.00028	0.00013	0.00042
Pennsylvania	-0.00068	-0.00098	-0.00039

The results of this study indicate that caps alone do not control or decrease the financial disincentives which motivate the negative physician behaviors outlined above. There is some evidence that physician supply is higher in states with caps in place, but this trend was found only half the time and was not always statistically significant.

One plausible explanation for the weak relationship found between caps and physician supply is that physicians may anticipate changes in tort law and react before the legislative changes take place. In a working paper produced at the University of Chicago, researchers found that when accounting for what they termed as “anticipation effect,” the

estimated effect of tort reform on physician supply doubles (Malani & Reif, 2010). If anticipation theory were applied to this study, the results would be twice as strong and therefore the hypothesized relationship between caps and physician supply would be supported by the results.

## CHAPTER VI

### LIMITATIONS AND CONCLUSIONS

The application of this study to medical malpractice tort reform is relevant only with consideration for the limitations that exist in the data and methods used. Despite the existence of limitations, the results and conclusions of the thesis can be used to guide further research that aims to advise future applications of tort reform in malpractice law.

#### **Limitations**

There are several limitations to this study. The first is that caps are measured solely on a cap versus no cap basis, and no dollar amount is included in the analysis. Although this is an important detail to consider, analysis of how and whether the value of the cap influences the relationship between caps, liability insurance premiums, and physician supply should be part of a supplemental study that will seek to improve understanding of the relationships identified in this study. Without first demonstrating this relationship, such a detailed analysis is premature and unwarranted. This study is intended to be a basic examination of the interactions between caps on damages, liability insurance premiums, and physician supply. A more thorough study should be completed to verify and more closely examine these preliminary results.

Another limitation to the study is that medical malpractice laws are not the only consideration for where physicians choose to practice. There are other reasons that a particular state or city may be attractive: family, climate, environment, and salary are

some examples of important factors in this decision. Although this is true and may be a confounding variable for some states, these variables cannot reasonably be generalized to an entire state's population of physicians. No secondary data set exists that provides specific details about why physicians choose their state of practice, and thus assumptions about some possible considerations would be unfounded. Therefore, these variables were not included in the analysis. Instead, general population shifts were used as a measure of control for these confounding variables.

A third limitation is in the method used in the MLM dataset to obtain average premium rates. The premium rates reported in this data do not consider credits, debits, dividends, or other factors that could affect actual premium amounts for individual physicians. There is also no reflection of underwriting factors that may increase premium rates. If these oversights were significant enough to result in an inaccurate representation of premium rates, there could be a threat to validity present. However, these omissions are consistent across all data measuring premium rates, and it is expected that adjustments for these potential contributing factors would be minor and insignificant to the findings. Exact premium rates per physician are not a requirement of the study; averages are adequately representative for its purposes.

Despite these limitations, this study provides a foundation for more thorough analysis of the relationship between caps and physician supply. This low budget, preliminary examination is available to guide future research in this area and suggest other possible explanations for its findings.



## Conclusions

The findings of this study call for alternative methods of tort reform in medical malpractice to ensure that physicians in high risk specialties, such as obstetrics and gynecology, are uninhibited by the financial burden that is experienced today. Previous research has already shown that the risk and cost of litigation in obstetrics and gynecology has led to increased overhead costs, the increased practice of defensive medicine, and a decrease in physician supply. The imposition of caps has failed to mitigate these negative outcomes of tort law in medicine and therefore other solutions should be considered to address these problems.

Several alternatives to litigation exist today in various states, but litigation remains the most dominant form of dispute resolution. Arbitration is one alternative to filing a malpractice claim. It is a voluntary procedure in which both sides agree to be heard by a neutral third party, the arbitrator, who makes a decision based on the facts of the case (ExpertHub.com, 2011). In this less stringent procedure, evidence that may not be admissible in court is more likely to be considered by the arbitrator. An arbitrator's ruling is final and binding, and there can be no further legal proceedings between the parties concerning the same incident (ExpertHub.com, 2011).

Another variation of arbitration is called the "hi-lo gamble." In this instance, both parties agree on prospective amounts to settle the claim, naming both high and low possible figures (ExpertHub.com, 2011). This means that if the arbitrator finds in the claimant's favor, the claimant will be awarded no more than the high figure and no less than the low figure. The arbitrator does not know what these amounts are until after his

decision is made in the claimant's favor. Although many states enacted arbitration as a legitimate alternative to litigation as early as the year 1975, this form of dispute resolution has not been as widely used as the traditional legal process (GAO, 1992).

More proactive alternatives to litigation also exist. One example of this unique approach is Maine's Medical Liability Demonstration Project, which was enacted in 1990 (GAO, 1992). The project allowed for medical specialty advisory committees in four specialties to establish accepted standards of care. This eliminates the need to litigate in order to establish the standards and also provides physicians with a better definition of the care they are expected to provide. This approach has been criticized for allowing physicians immunity from litigation, but it does have the potential to reduce the cost of malpractice litigation to the healthcare industry by eliminating one step in the process.

This paper provides only a brief discussion of alternatives to malpractice litigation and there are others that exist in varying degrees of actual utilization. The purpose of presenting alternatives is to examine different methods for dispute resolution that exist and how those could address some of the negative consequences of the more widely used legal process. The results of this study indicate that enacting caps on damages has not achieved the intended outcome and that other methods should be considered by legislators and policy makers. Perhaps arbitration or the method used in the Medical Liability Demonstration Project can provide some guidance in pursuing more favorable dispute resolution in the future.

Further research about alternative dispute resolution will provide a more thorough understanding of their efficacy in reducing the negative consequences of litigation that

are experienced in medicine today. Patients who have suffered as a result of negligent care should be compensated, but the physicians who do not commit acts of negligence should also be unconstrained in practicing medicine as they deem appropriate. Balancing patient rights with physician rights is the goal of tort reform and subsequent research on this topic should focus on how best to achieve that balance.

TABLES AND APPENDICIES

**Table I: State Tort Reform Data**

State	Year of Cap Instatement
Alabama	2000
Arkansas	2003
Maine	2000
Mississippi	2003
New Jersey	1996
North Carolina	1996
Ohio	2003
Oklahoma	1996
Pennsylvania	1997

**Table II: Summary of T-test Statistics\***

T-Tests							
State	Year of Cap	Variable	Method	Variances	DF	t Value	Pr >  t
Alabama	2000	Premium Rate	Pooled	Equal	9.00	-0.19	0.8503
Alabama	2000	Physician Supply	Pooled	Equal	9.00	-4.79	0.0010
Arkansas	2003	Premium Rate	Pooled	Equal	9.00	-3.48	0.0069
Arkansas	2003	Physician Supply	Pooled	Equal	9.00	-2.37	0.0418
Maine	2000	Premium Rate	Pooled	Equal	9.00	-1.00	0.3424
Maine	2000	Physician Supply	Pooled	Equal	9.00	-7.02	<.0001
Mississippi	2003	Premium Rate	Satterthwaite	Unequal	8.00	-16.71	<.0001
Mississippi	2003	Physician Supply	Pooled	Equal	9.00	-1.75	0.1146
New Jersey	1996	Premium Rate	Pooled	Equal	9.00	-1.98	0.0796
New Jersey	1996	Physician Supply	Pooled	Equal	9.00	-4.02	0.0030
North Carolina	1996	Premium Rate	Pooled	Equal	9.00	-0.45	0.6640
North Carolina	1996	Physician Supply	Pooled	Equal	9.00	-3.25	0.0100
Ohio	2003	Premium Rate	Pooled	Equal	9.00	-3.36	0.0084
Ohio	2003	Physician Supply	Pooled	Equal	9.00	-1.09	0.3045
Oklahoma	1996	Premium Rate	Satterthwaite	Unequal	8.00	-2.16	0.0625
Oklahoma	1996	Physician Supply	Pooled	Equal	9.00	-0.87	0.4052
Pennsylvania	1997	Premium Rate	Satterthwaite	Unequal	7.18	-2.86	0.0238
Pennsylvania	1997	Physician Supply	Pooled	Equal	9.00	0.49	0.6326

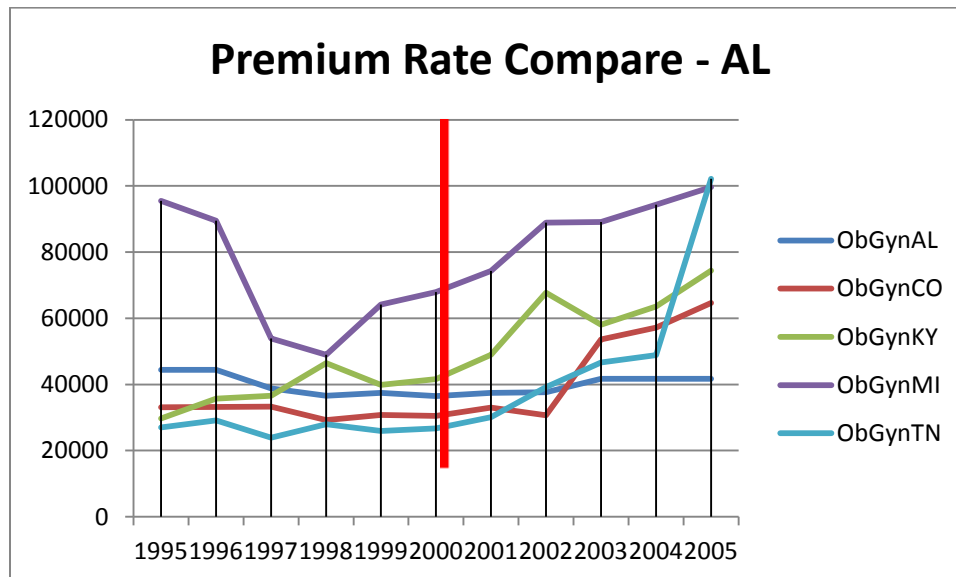
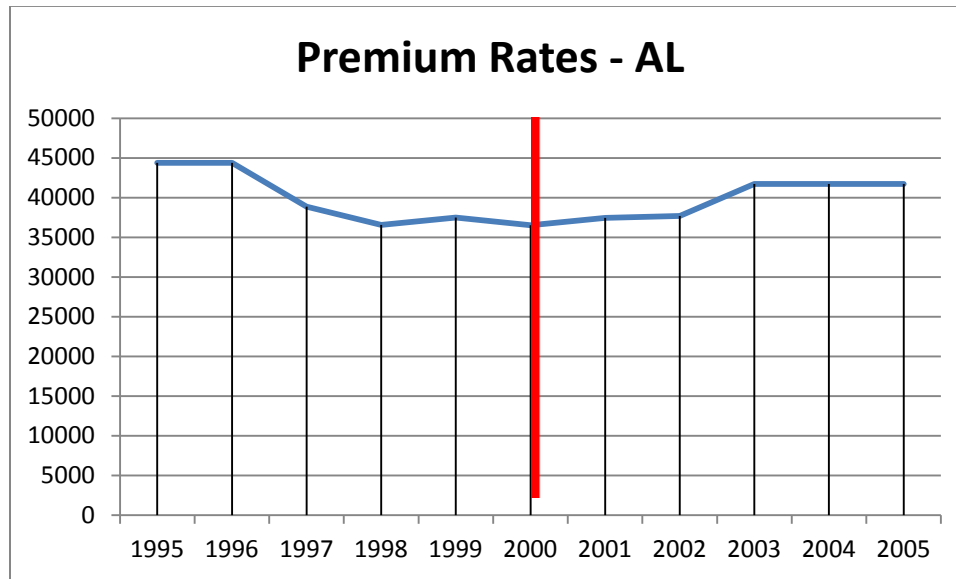
\*Analyses of t-test results are included in Appendix I.

**Table III: State Matching by Dartmouth Atlas Medical Care Cost Equation (1995)**

<b>Change State</b>	<b>Medical Care Cost Equation</b>	<b>Comparison States</b>	<b>Medical Care Cost Equation</b>
Alabama	4983.53	Colorado	4587.03
		Kentucky	4417.93
		Michigan	5142.52
		Tennessee	5079.07
Arkansas	4291.99	Arizona	4636.94
		Indiana	4462.41
		Kansas	4276.67
		West Virginia	4363.9
Maine	3830.21	Kansas	4276.67
		South Carolina	3983.47
		Virginia	4043.62
		Washington	4021.74
Mississippi	4678.96	Delaware	4330.98
		Georgia	4768.48
		Illinois	4801.53
		Tennessee	5079.07
North Carolina	4029.19	Utah	4011.34
		Virginia	4043.62
		Washington	4021.74
		Wyoming	4135.08
New Jersey	5058.21	Michigan	5142.52
		Nevada	4924.63
		Rhode Island	5059.87
		Tennessee	5079.07
Ohio	4578.69	Delaware	4330.98
		Georgia	4768.48
		Illinois	4801.53
		Tennessee	5079.07
Oklahoma	4938.61	Georgia	4768.48
		Illinois	4801.53
		Nevada	4924.63
		Rhode Island	5059.87
Pennsylvania	5185.7	Connecticut	5268.16
		Maryland	5346
		Michigan	5142.52
		Tennessee	5079.07

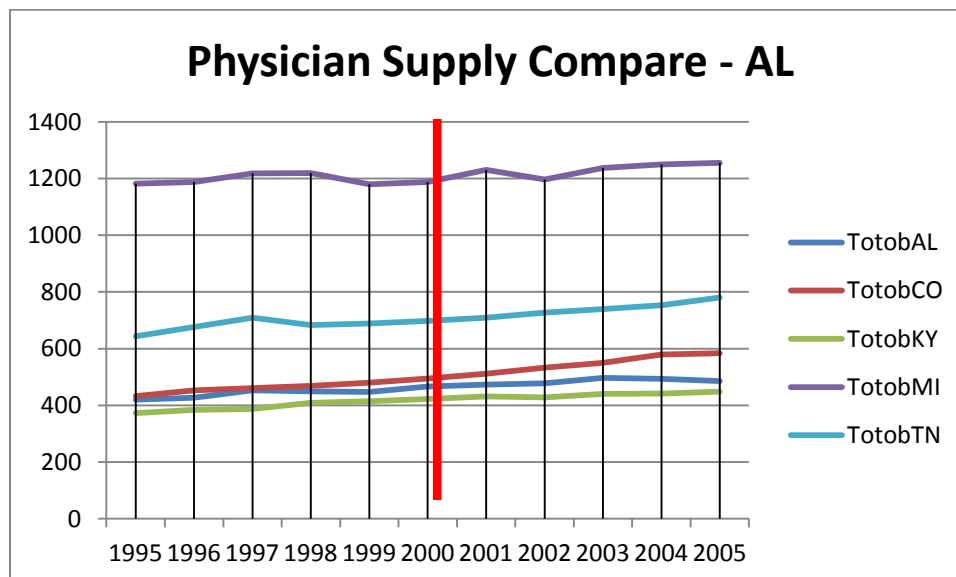
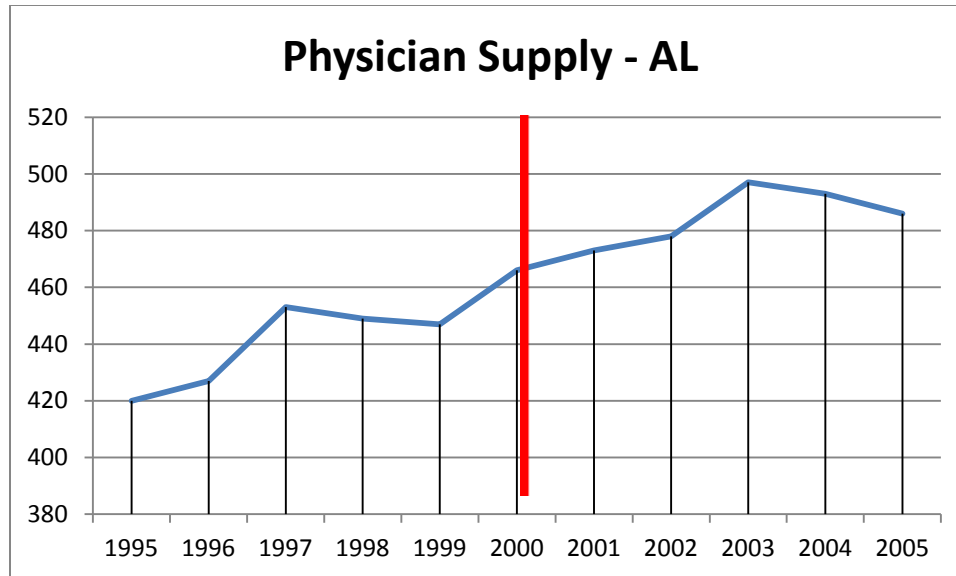
## Appendix I: Graphs and Analyses of Results for All Change States

### ALABAMA



Alabama shows fairly consistent premium rates over the ten year period, but the state did experience a slight decline in premium rates before the cap is applied in 2000 that is reversed post-cap. In contrast to the comparison states, Alabama's premium rates seem to be more controlled and it is also the state with the lowest average liability premiums at the end of the observation period in 2005. This shows some evidence that the instatement of caps may have helped to control the overall inflation of premium rates, despite the post-cap incline shown in the first graphic.

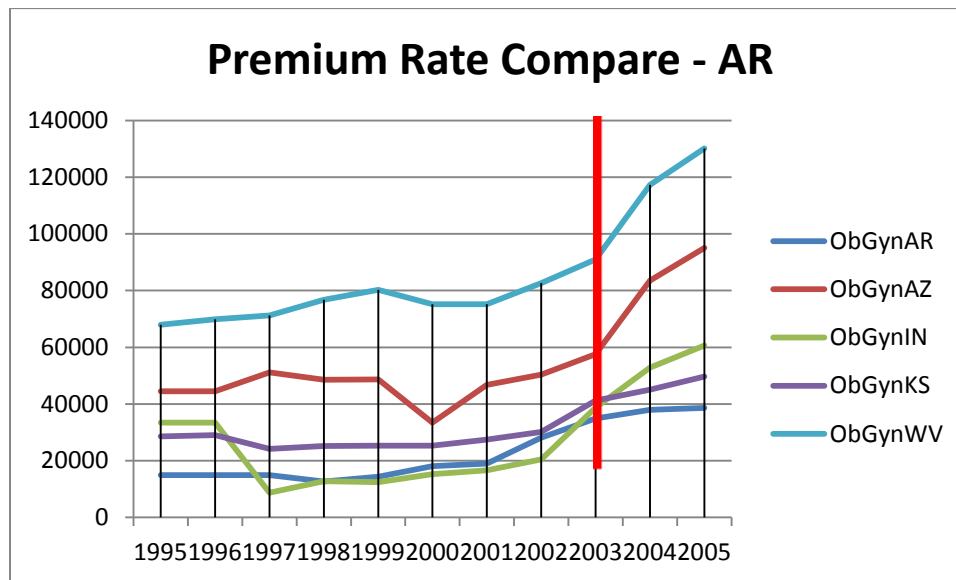
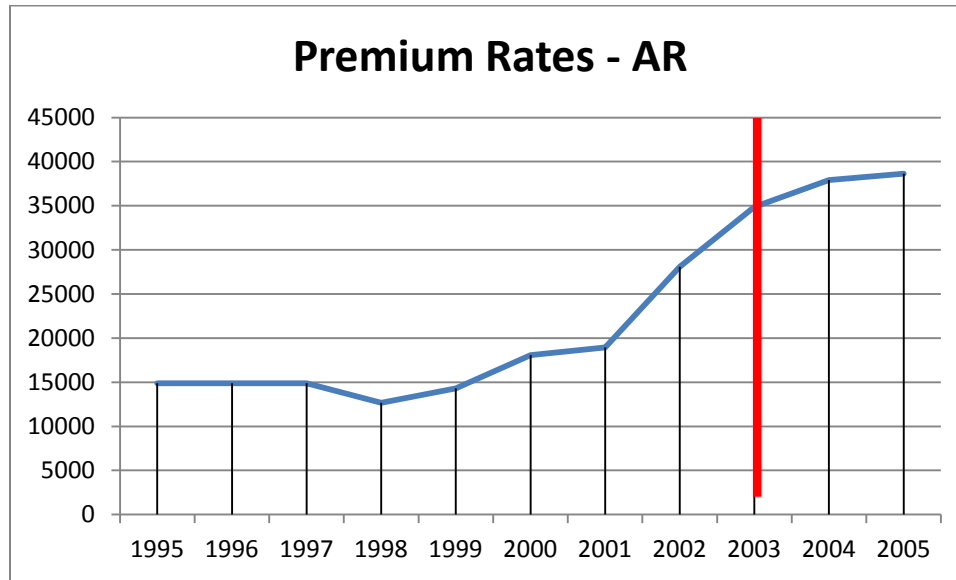
For the variable premium rate, the t-test results indicate that the difference between pre- and post-cap rates is not significantly different.



Physician supply in Alabama shows steady increase across the ten year period with a change of direction in 2003, three years after cap instatement. The trend observed in Alabama is fairly consistent with those observed in comparison states, but Alabama is also among the states with lowest physician supply among the comparison group. This result does not support the hypothesis that states with caps on malpractice damages will enjoy an increased physician supply.

For the variable physician supply, the t-test results indicated that the difference between pre- and post-cap physician supply is statistically significant. This can be explained by the steady upward trend experienced in Alabama's physician supply and the cap's position in the exact middle of the observation period.

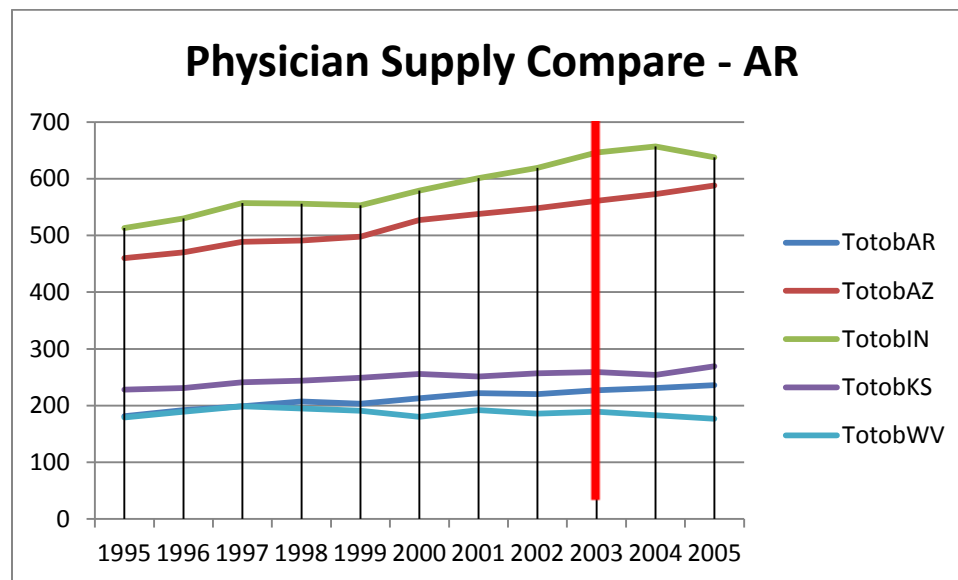
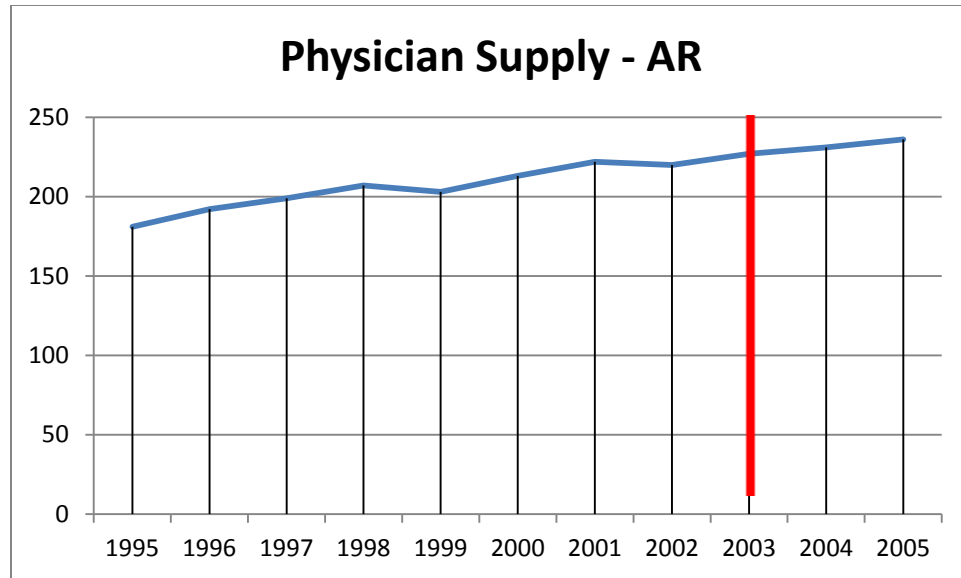
## ARKANSAS



Arkansas experienced a sharp increase in premium rates beginning in 2001 that was curbed following 2003, which is the same year that caps were imposed in the state. Despite the premium increase after 2001, the state of Arkansas maintains a significantly lower average annual liability insurance premium when compared with the control states Arizona, Indiana, Kansas, and West Virginia. The evidence does not suggest that this difference is related to the instatement of caps since the reform did not take place until 2003 and since the state's premium rates were consistently below the averages of all control states throughout the ten year period.

For the variable premium rate, the t-test results indicated that the difference between pre- and post-cap premium rates is statistically significant. This statistical difference can be explained by the low rates in the beginning of the ten-year period as compared to the rates in 2004 and 2005 after the cap was established.

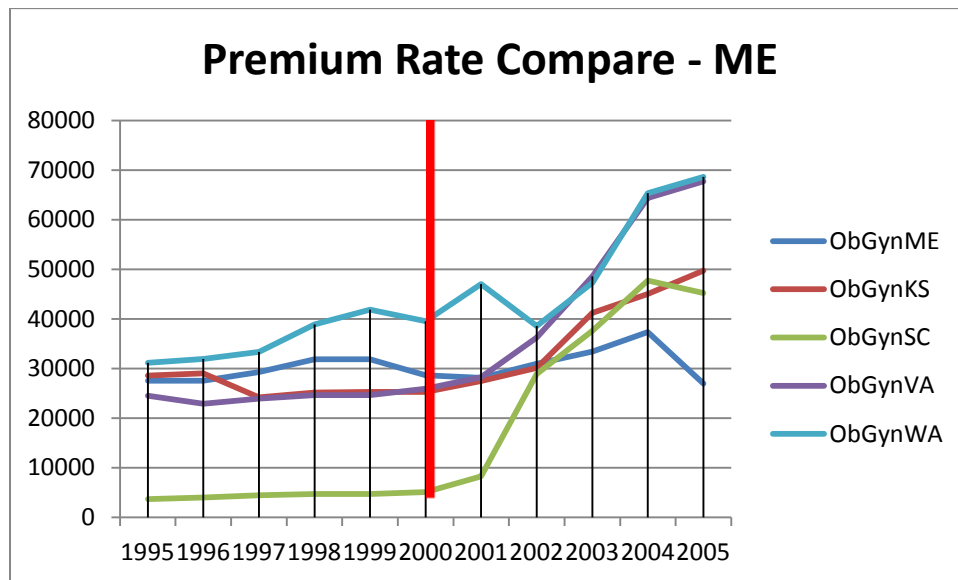
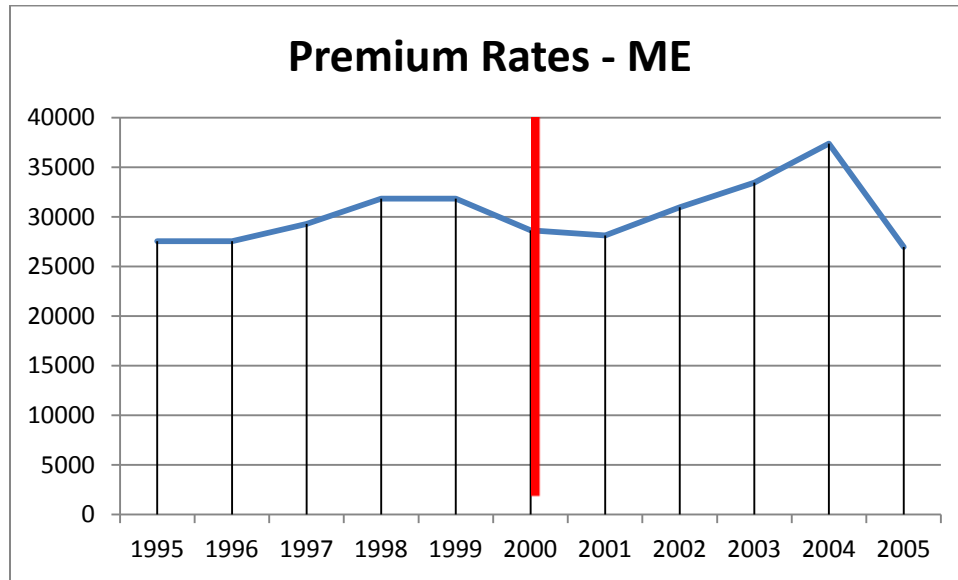




Physician supply in Arkansas increased steadily from 1995-2005. In its comparison group, Arkansas was among the three states with the fewest obstetrics and gynecologic physicians in the five-state group. Of those three states, Arkansas enjoyed the largest total increase in physician supply. However, the evidence does not suggest that this resulted from tort reform because the post-cap increase was negligible in comparison with the pre-cap increase.

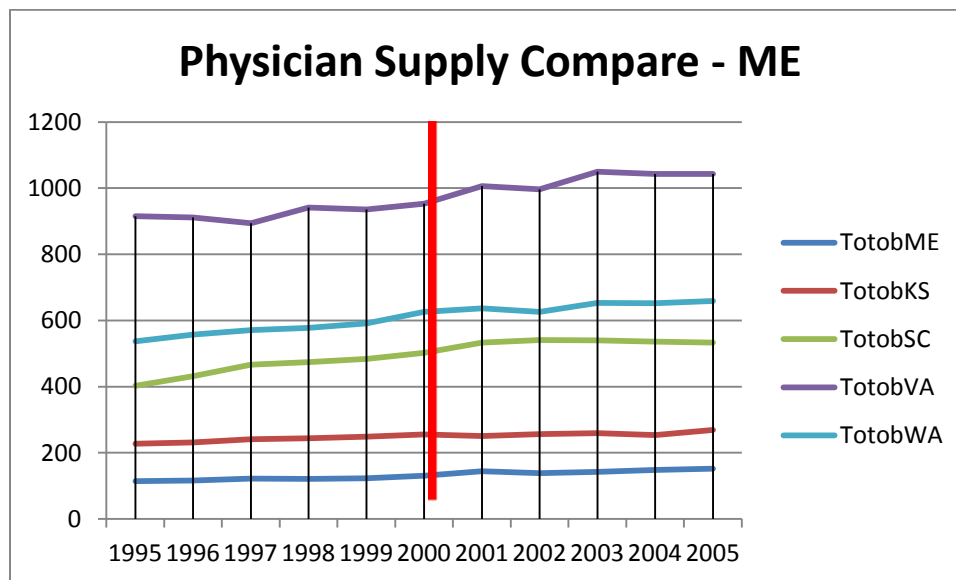
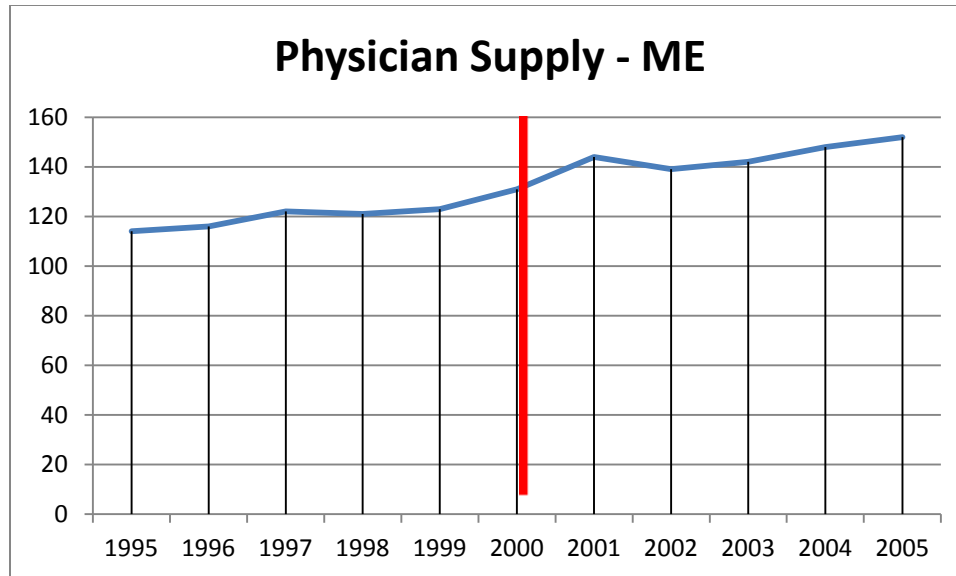
For the variable physician supply, the t-test results indicated that the difference between pre- and post-cap physician supply was statistically significant. Again, a low starting physician supply can explain this difference.

**MAINE**



Maine has experienced fairly consistent liability premium rates over the ten year period with a steep decline after 2004. This decline takes place four years after the instatement of caps in the state, and therefore it is not likely that it can be attributed to the application of caps. In the comparison group, Maine has the most consistent trend and from 2002 to 2005 maintains the lowest premium rates of any comparison state. This indicates that there may be some element of premium rate control gained from the instatement of caps in Maine.

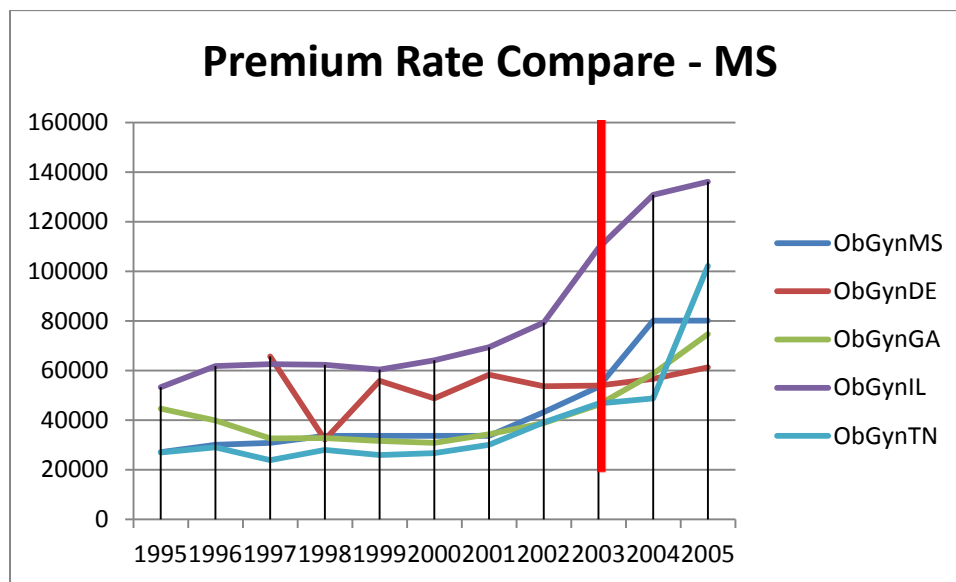
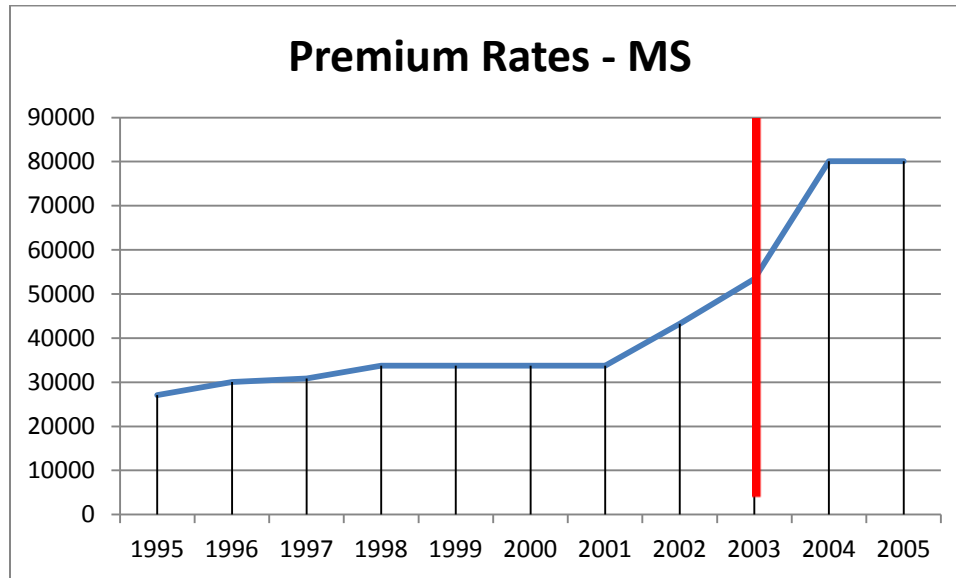
For the variable premium rate, the t-test results indicated that the difference between pre- and post-cap premium rates is not significant.



Physician supply in Maine experienced a steady increase throughout the entire ten year observation period, with a small area of steep increase from 1999-2001. The state instated caps in 2000, making it plausible that this increased physician supply could have been an anticipatory reaction to the changing legislation. However, Maine ranks lowest in physician supply among all comparison states. This challenges the hypothesis that states with caps experience higher physician supply than those without caps.

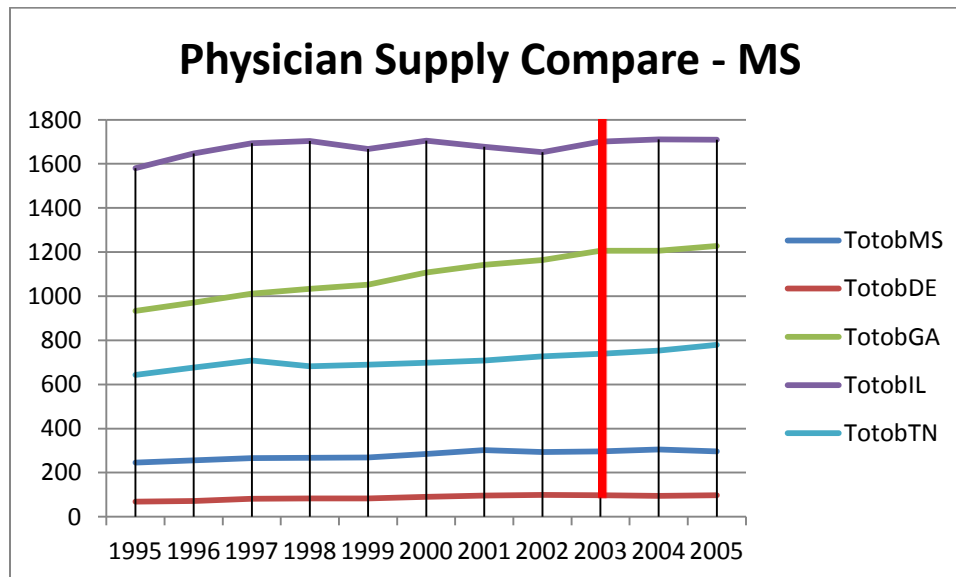
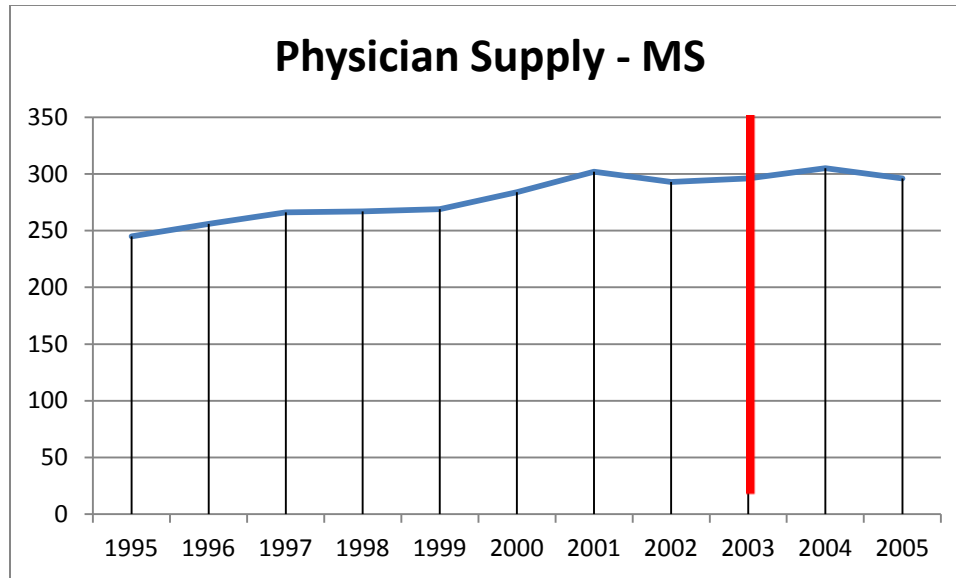
For the variable physician supply, the t-test results indicated that the difference between pre- and post-cap physician supply is significant. The significant difference is likely due to the placement of the small period of increase and its alignment with the year the cap was instated.

## MISSISSIPPI



Mississippi experiences a sharp increase in premium rates after 2001 which continues until 2004, one year after the instatement of caps. This shows encouraging results for the hypothesis that caps may control the inflation of premium rates, but is too short a time frame to understand the long-term effects of the application of caps. Among comparison states, Mississippi has a relatively flat premium rate trend. The steep increase in 2001 is also experienced in Illinois, which may be indicative of some liability insurance trend that affected both states.

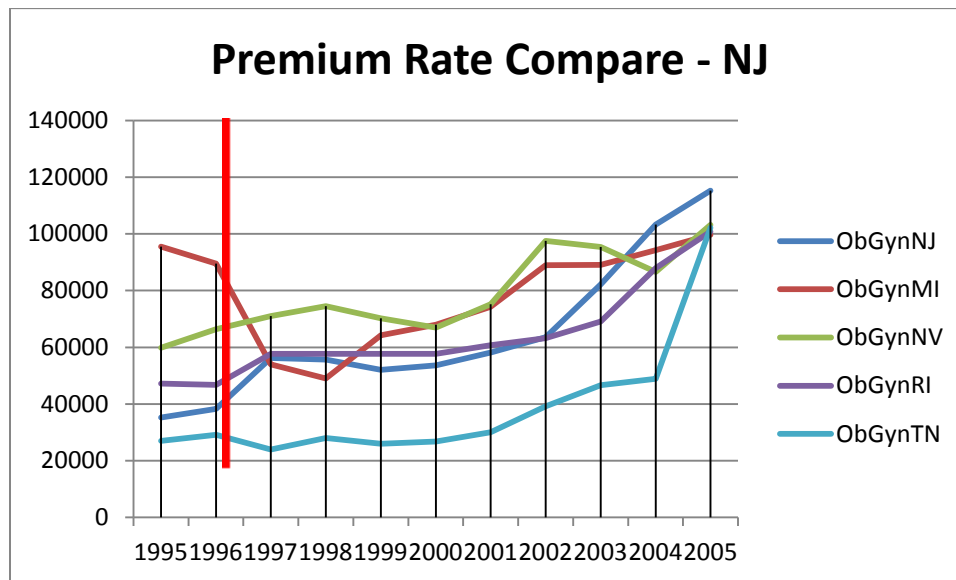
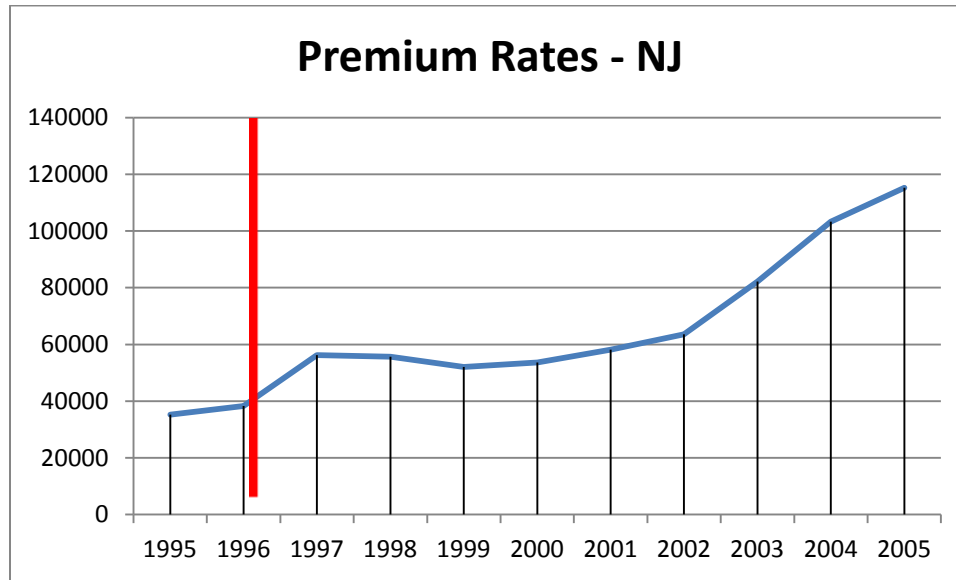
For the variable premium rate, the t-test results indicated that the difference between pre- and post-cap premium rates is statistically significant. This is a result of the steepness of the incline and the placement of the caps near the end of the ten year period, which has the effect of skewing the average post-cap premium rate.



Physician supply in Mississippi increased steadily throughout the ten year observation period. Among comparison states, Mississippi has the second lowest physician supply. This result does not confirm the hypothesized relationship between cap instatement and physician supply.

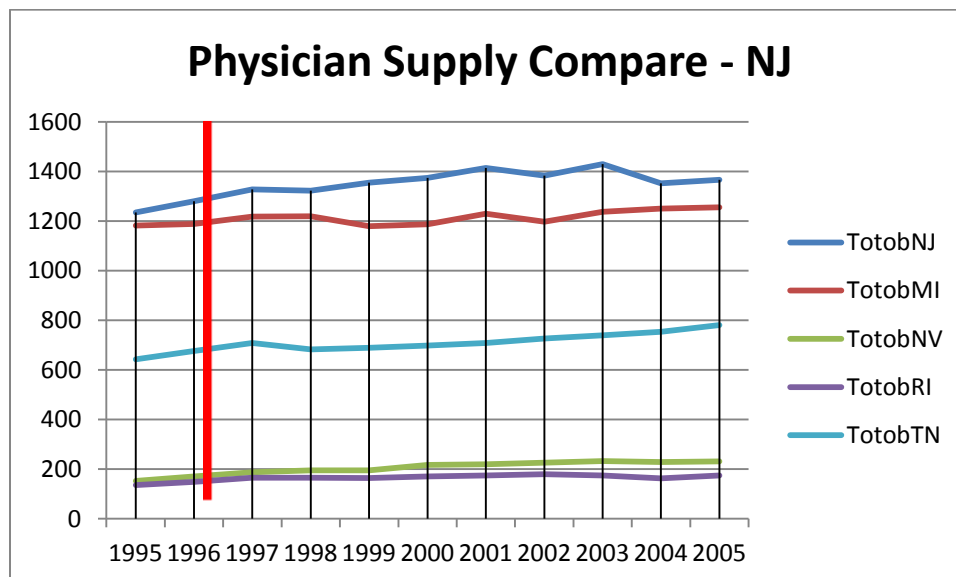
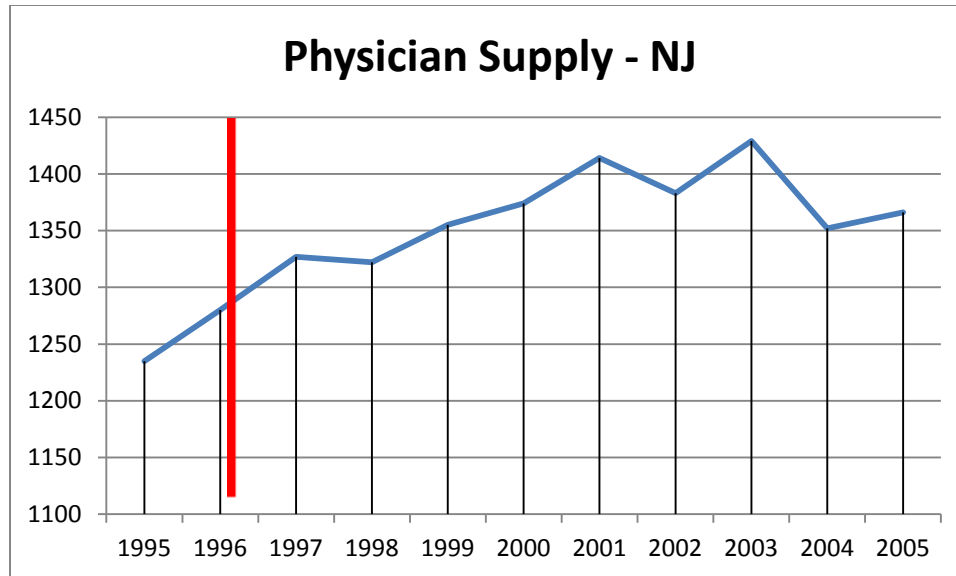
For the variable physician supply, the t-test results indicate that the difference between pre- and post-cap physician supply is not significant.

## NEW JERSEY



New Jersey experiences a steady premium rate increase that is amplified after 2002. There is also a steep incline immediately following the instatement of caps in the state in 1997. This result does not support the hypothesis that cap instatement can control or reduce inflation of premium rates. Among comparison states, New Jersey has the highest premium rates and largest increase over the ten year period.

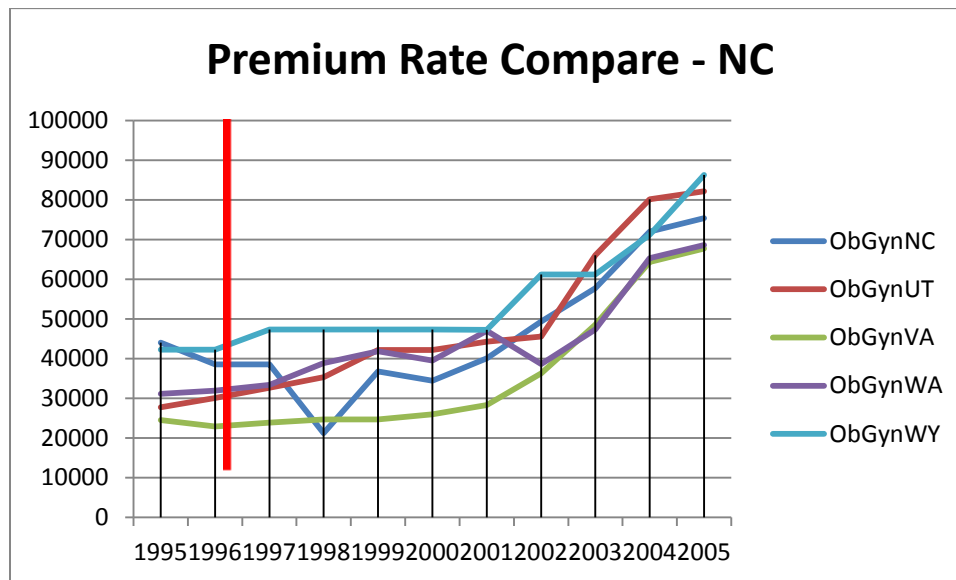
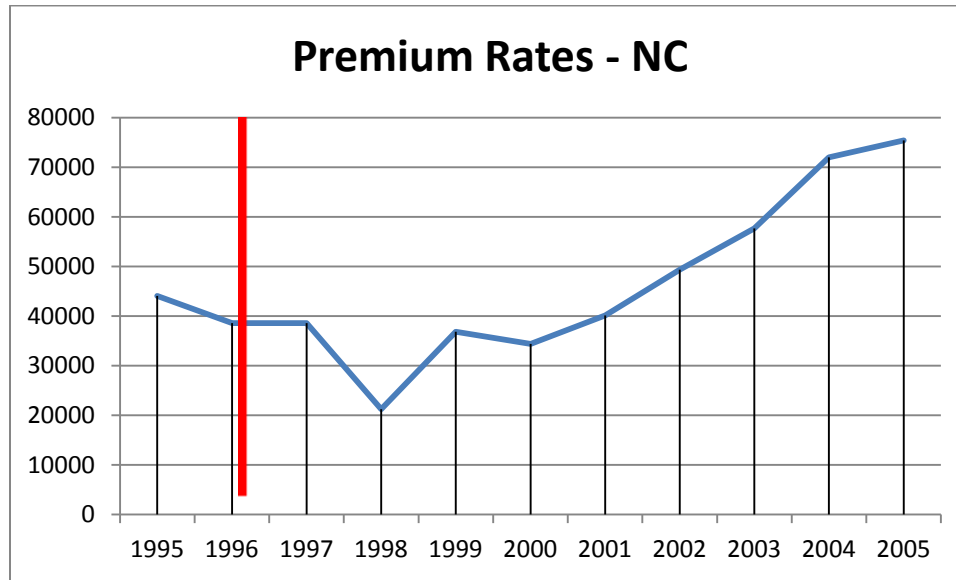
For the variable premium rate, the t-test results showed that the difference between pre- and post-cap premium rates is not statistically significant.



Physician supply in New Jersey increased significantly throughout the ten year observation period. This increase does not appear to be related to the instatement of caps, however, because the largest increases occur five years after the application of caps. Among comparison states, New Jersey enjoys the largest physician supply. This result suggests that there are other confounding factors, especially in light of the high premium rates incurred by physicians in the state.

For the variable physician supply, the t-test results indicated that the difference between pre- and post-cap physician supply is statistically significant. This result verifies the large post-cap increase in physician supply.

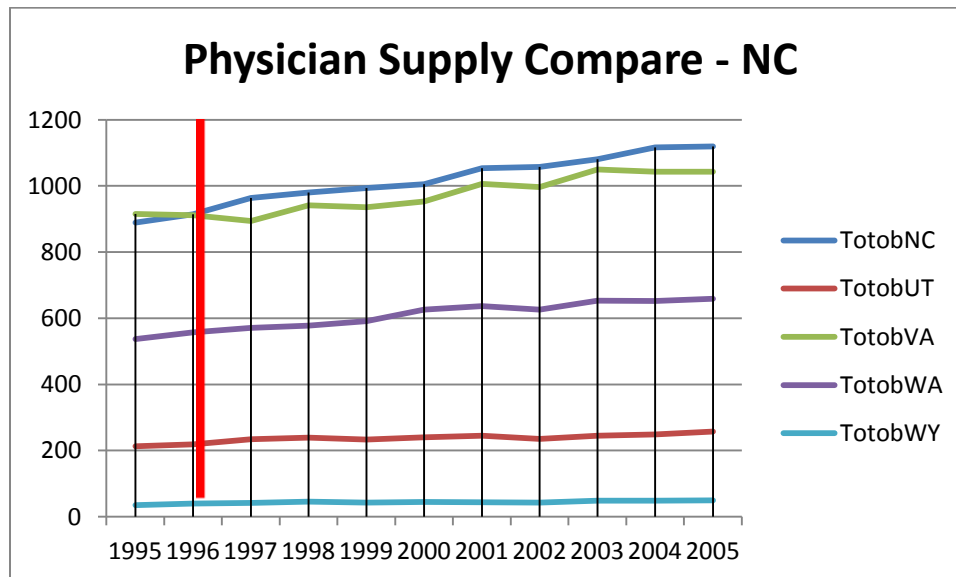
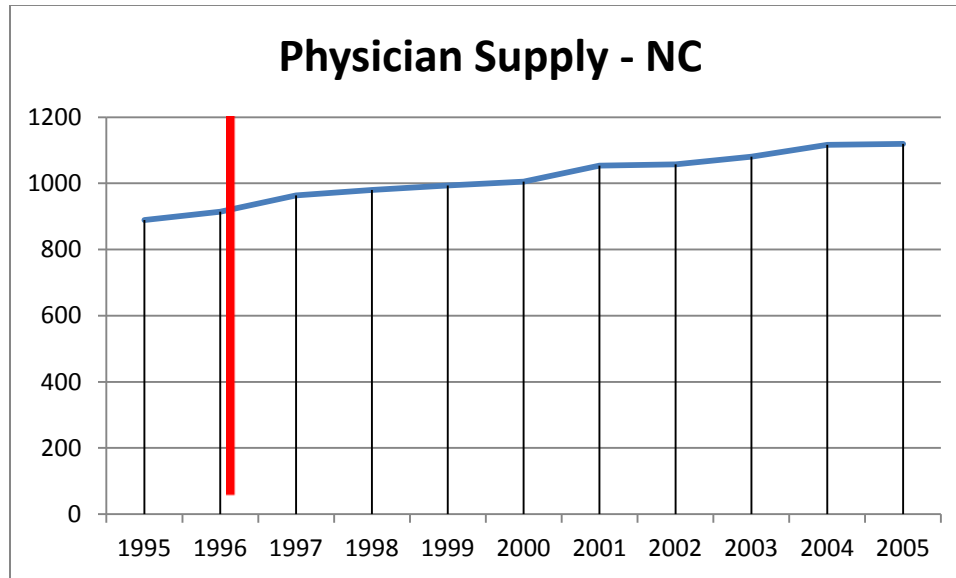
## North Carolina



North Carolina experiences a steep decrease in premium rates in 1998, followed by a steep increase in 1999 and after. This could show evidence of a short term effect of caps on premium rates, since the decrease takes place two years after the cap is instated. Among comparison states, North Carolina follows the general trend of the group and has the third highest average liability premium rates in 2005.

For the variable premium rate, the t-test results indicate that the difference between pre- and post-cap premium rates is not statistically significant.

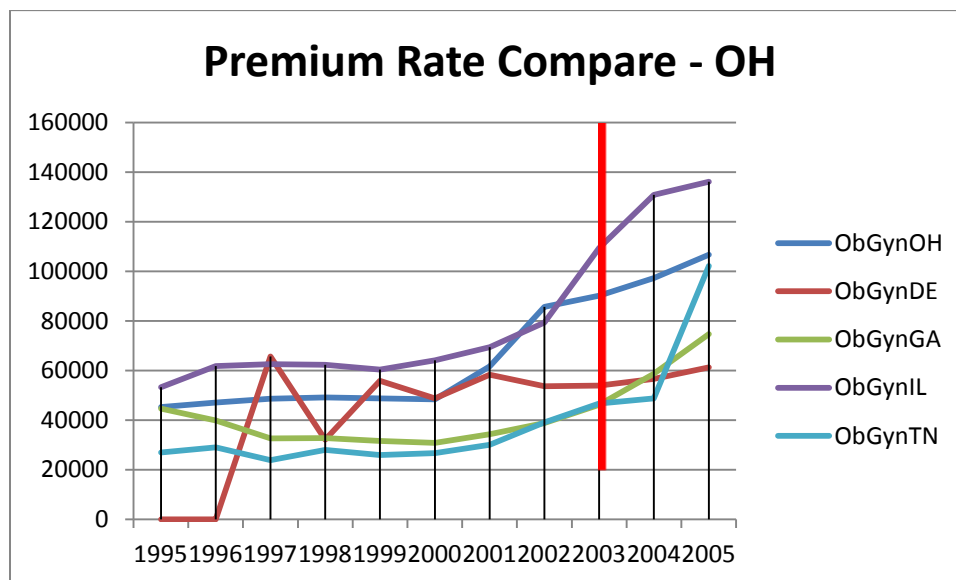
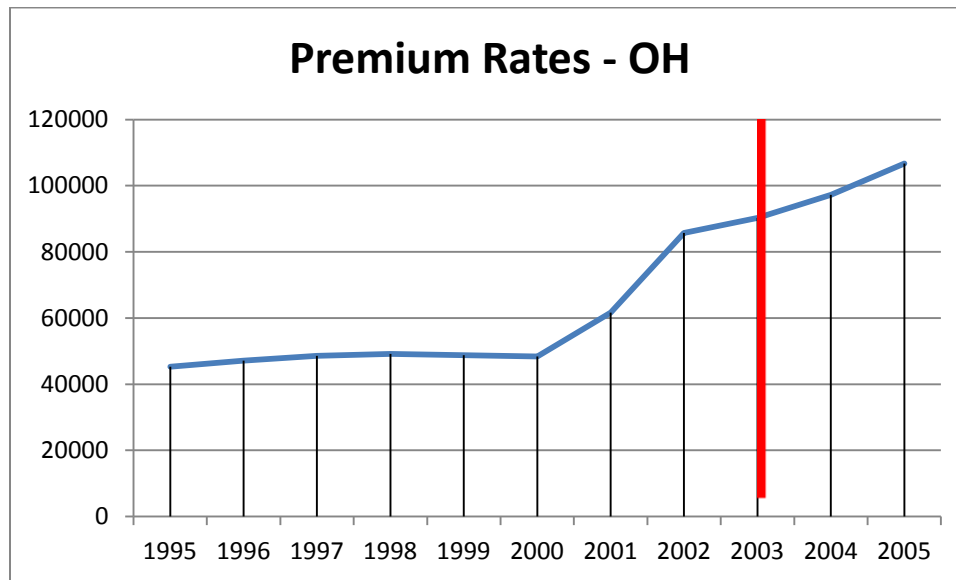




Physician supply in North Carolina steadily increases throughout the ten year observation period. This trend matches those of the comparison states, but North Carolina has the highest physician supply of any comparison state for the majority of the ten year period. This is supportive of the hypothesis that the placement of caps on rewards in malpractice claims is related to higher physician supply.

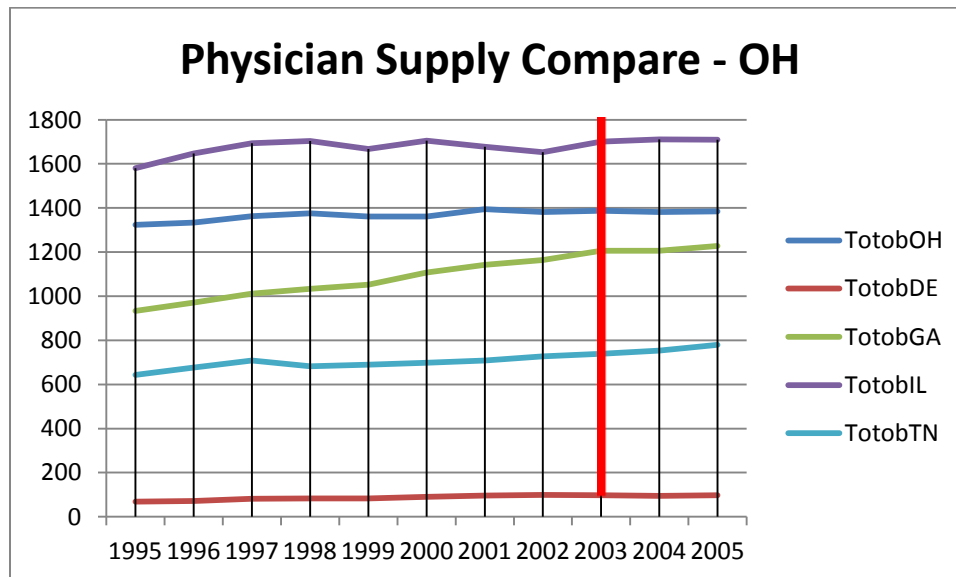
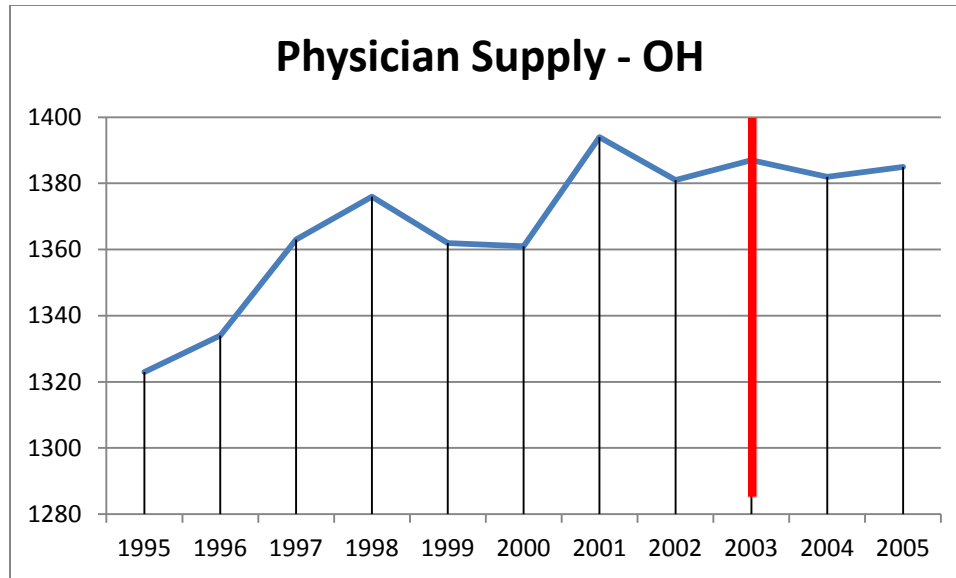
For the variable physician supply, the t-test results indicate that the difference between pre- and post-cap physician supply is statistically significant. This verifies a positive effect that could be the result of the instatement of caps in the state.

## OHIO



Ohio experiences a sharp increase in premium rates after 2000 which is flattened in 2002, one year before the instatement of caps. This could be the result of liability insurance providers anticipating the effect of the cap, or it could be the result of some other confounder. Among comparison states, Ohio shows the sharpest increase during that period and in 2005 has the second highest average premium rates of all comparison states.

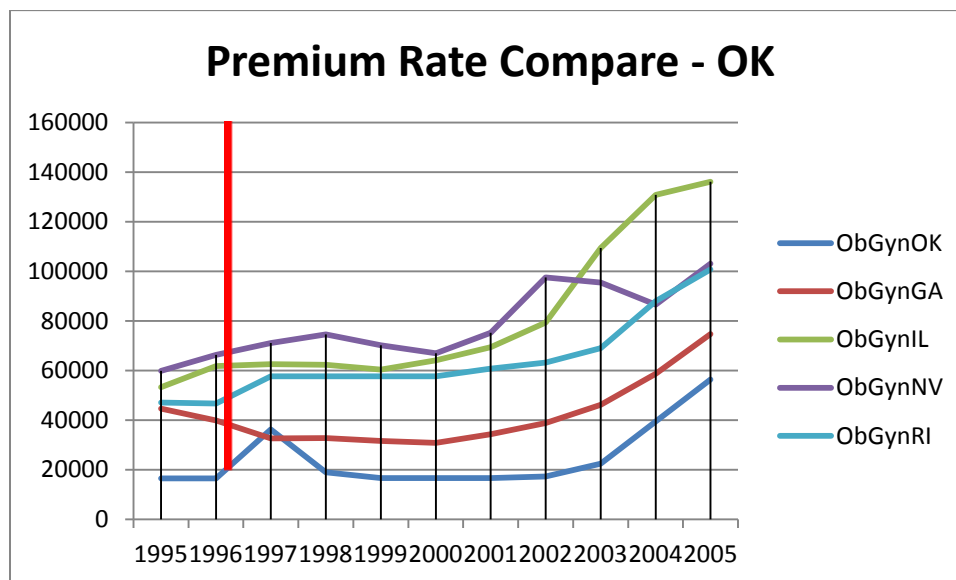
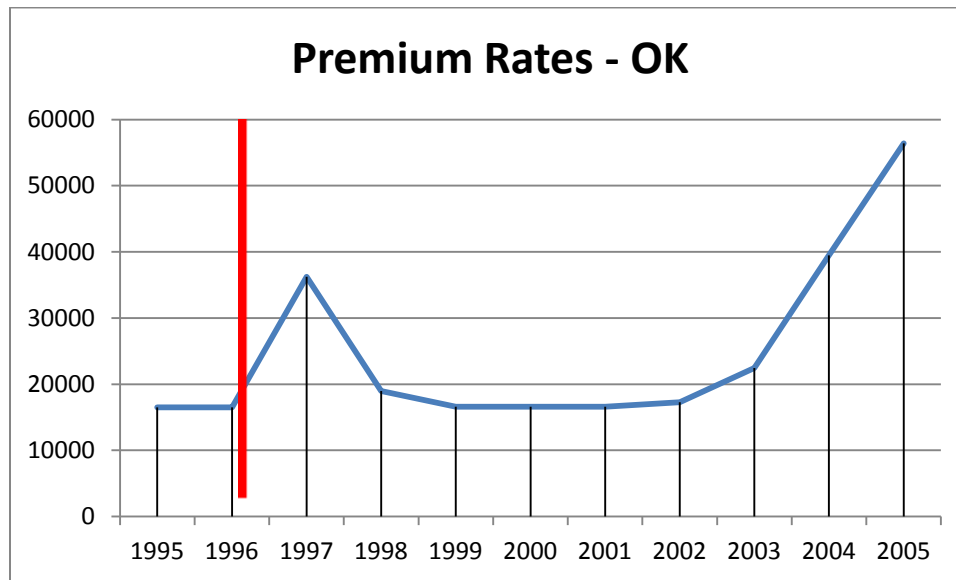
For the variable premium rate, the t-test results indicate that the difference between pre- and post-cap premium rates is significantly different. This supports the hypothesis that the instatement of caps controls the inflation of premium rates.



Physician supply in Ohio increases until 1998, then experiences a small decline until 2000 when there is a sharp increase. Among comparison states, Ohio has the second largest physician supply. This supports the hypothesis that states with caps on rewards in malpractice claims enjoy a larger physician supply.

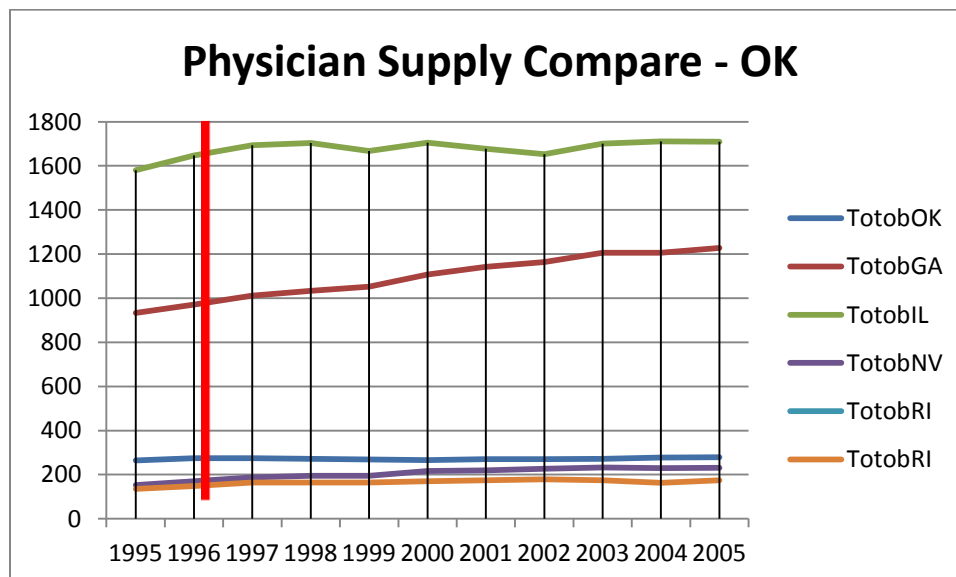
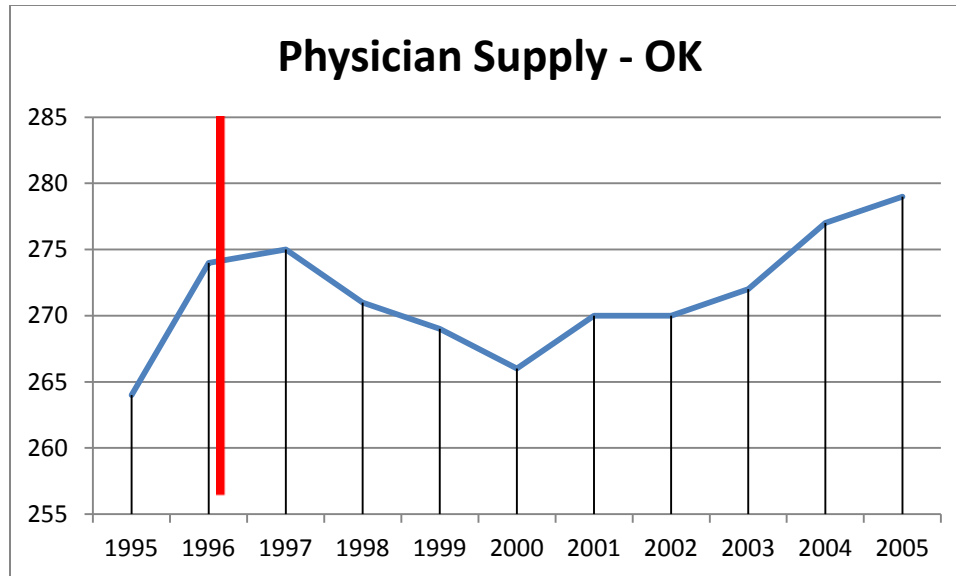
For the variable physician supply, the t-test results indicate that difference between pre- and post-cap physician supply is not statistically significant.

## OKLAHOMA



Oklahoma experiences a sharp increase in premium rates at two points in time: immediately following the instatement of caps in 1996, and again in 2003. Among comparison states, Oklahoma follows the trends of the group but has the lowest average premium rates of all comparison states. This supports the hypothesis that caps control premium rate increases, but the overall trend disputes this finding.

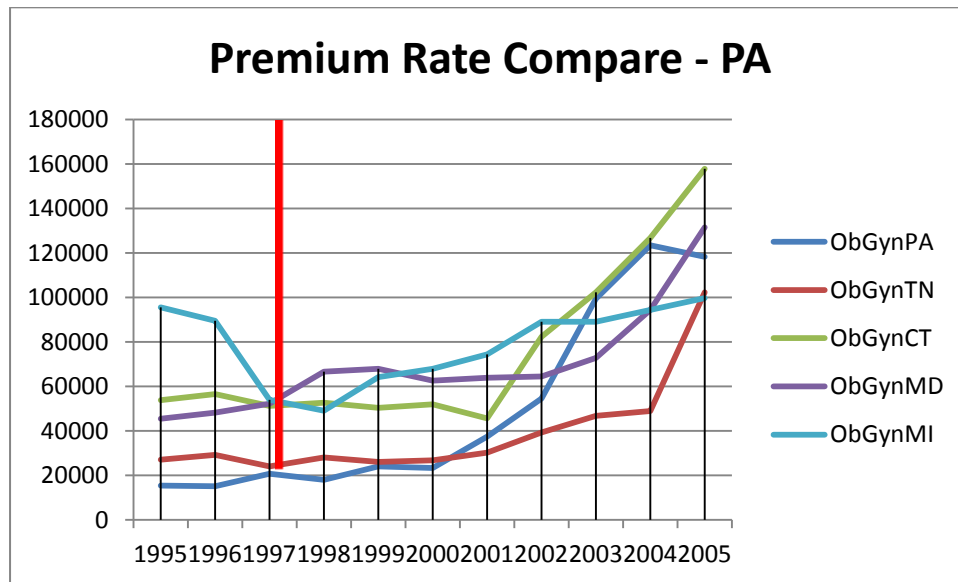
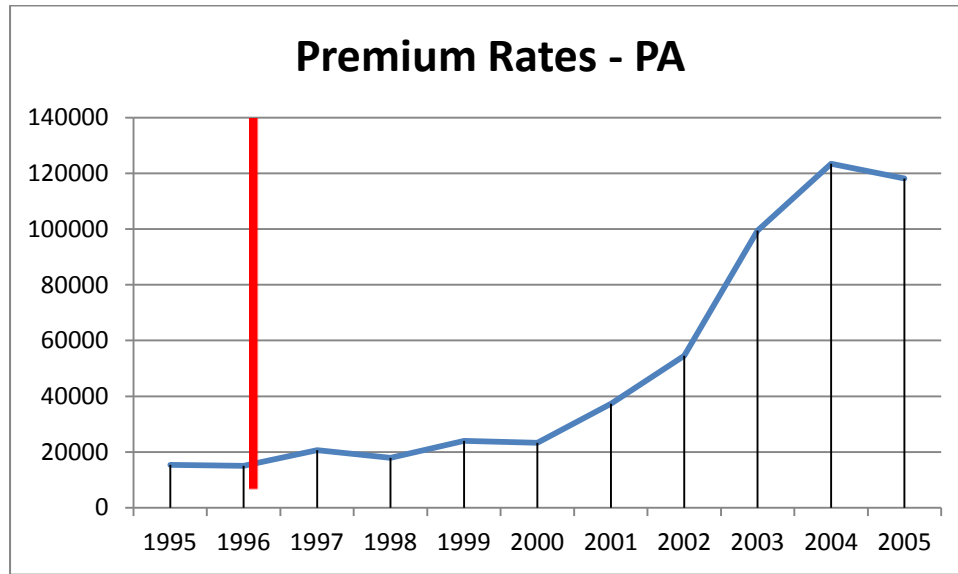
For the variable premium rate, the t-test results indicate that difference between pre- and post-cap premium rates is not statistically significant.



Physician supply in Oklahoma experienced a significant decrease beginning one year after caps were instated. In 2000, four years post-cap, the decline reversed and the state experienced a steady incline in physician supply. Among comparison states, Oklahoma has the third lowest physician supply. Taken together, these observations do not support the hypothesis that states with caps enjoy higher physician supply.

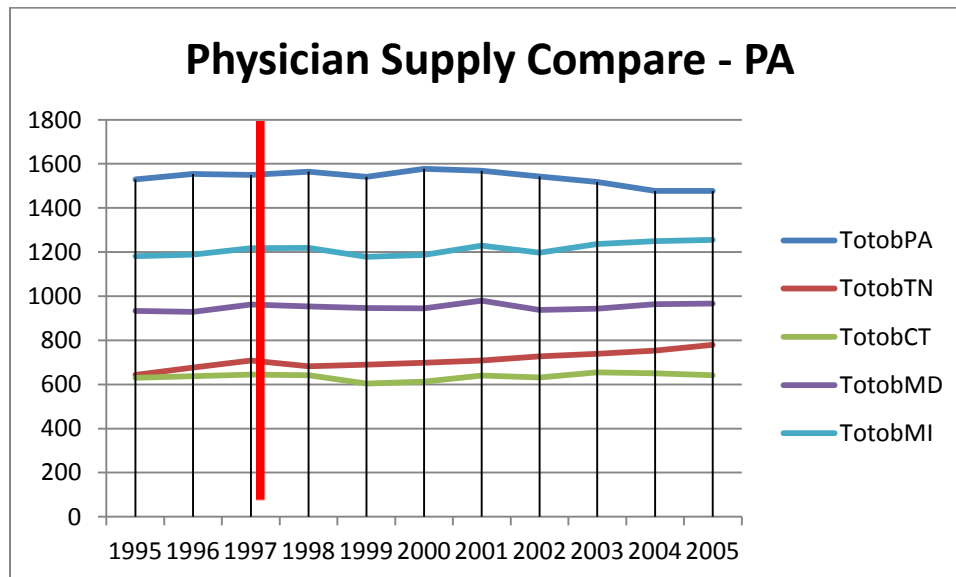
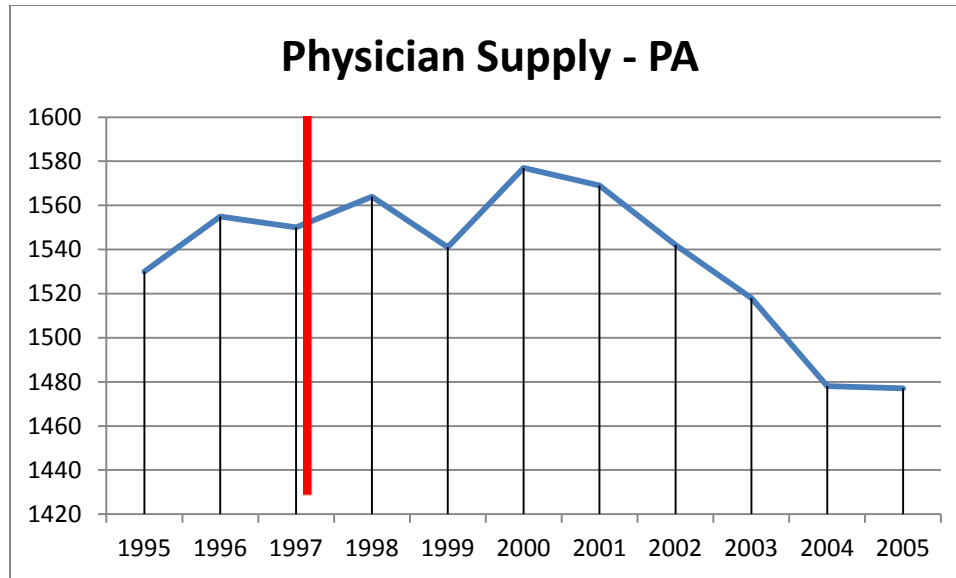
For the variable physician supply, the t-test results indicate that the difference between pre- and post-cap physician supply is not statistically significant.

**PENNSYLVANIA**



Pennsylvania experienced steady premium rates until 2000, when a steep increase began and continued for four years. The cap was instated in 1996, and the initial premium rate was maintained for four years post-cap. Among comparison states, Pennsylvania began with the lowest premium rates and ended with the third highest rates. This does not support the hypothesized relationship between cap instatement and premium rates.

For the variable premium rate, the t-test results indicate that the difference between pre- and post-cap premium rates is statistically significant. This is reflective of the steep incline in 2000 and the position of the cap instatement near the beginning of the ten year observation period.

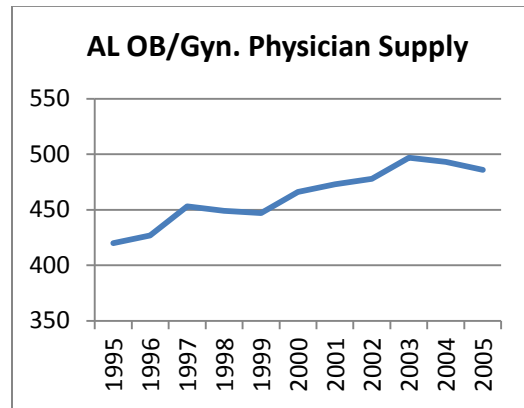
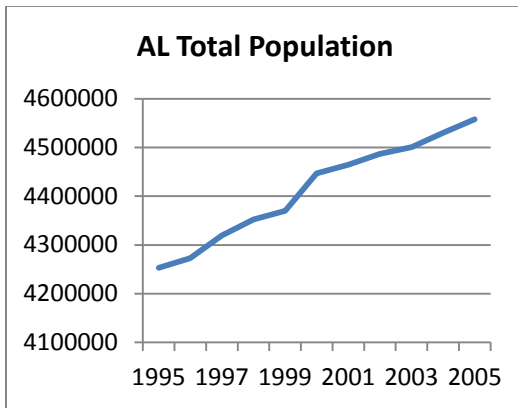


Physician supply in Pennsylvania was consistent until 2000, when a decline began. This trend aligns with the trend of increased premiums, which supports the hypothesis that premium rates affect physician supply. However it does not support the hypothesis that the imposition of caps increases a state’s physician supply. Among comparison states, Pennsylvania enjoys the highest physician supply. This result does support the hypothesis that states with caps have higher physician supply.

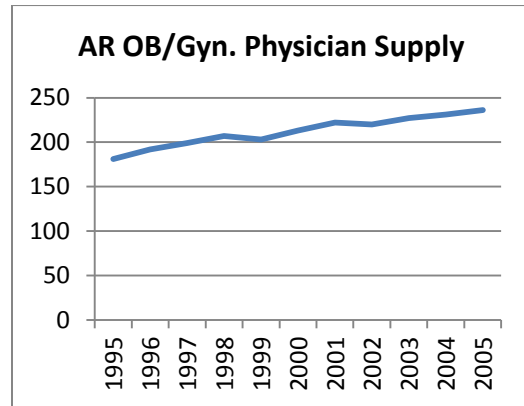
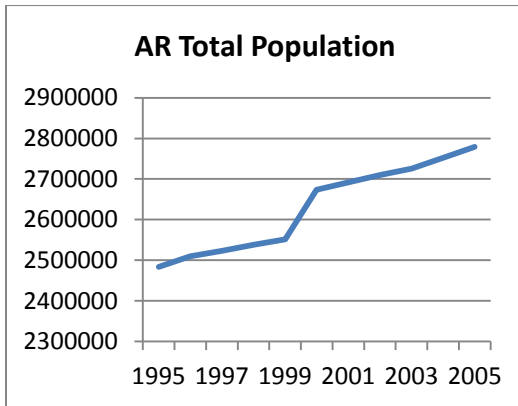
For the variable physician supply, the t-test results indicate that the difference between pre- and post-cap physician supply is not statistically significant.

**Appendix II: Comparison Graphs, Total Population and Physician Supply by State**

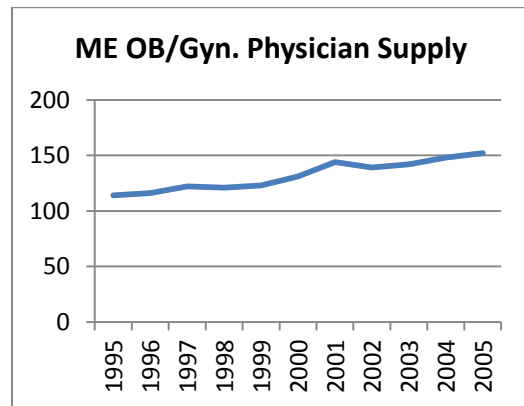
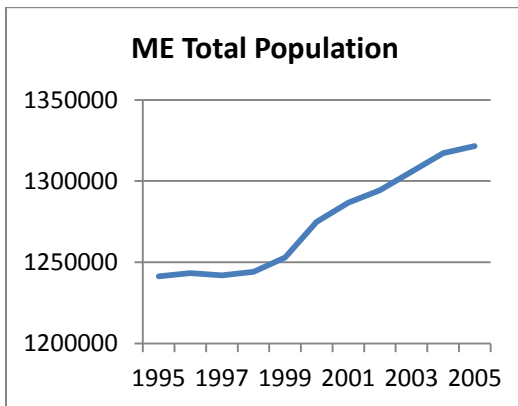
**ALABAMA**



**ARKANSAS**

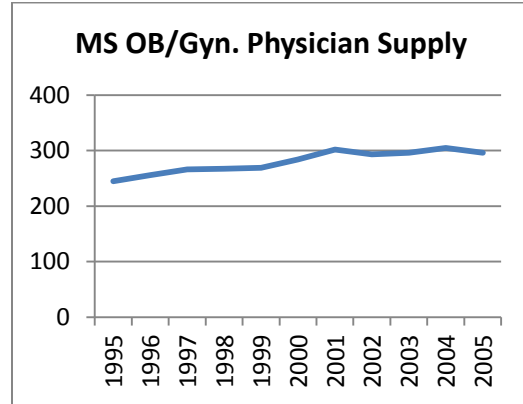
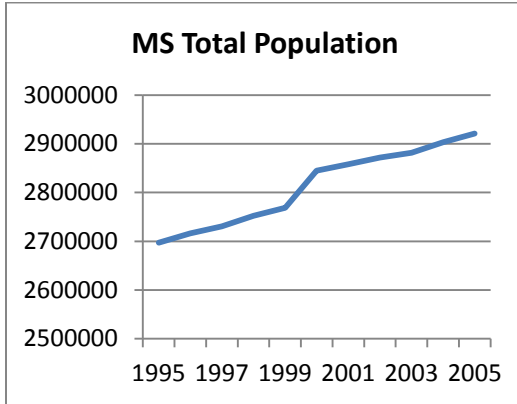


**MAINE**

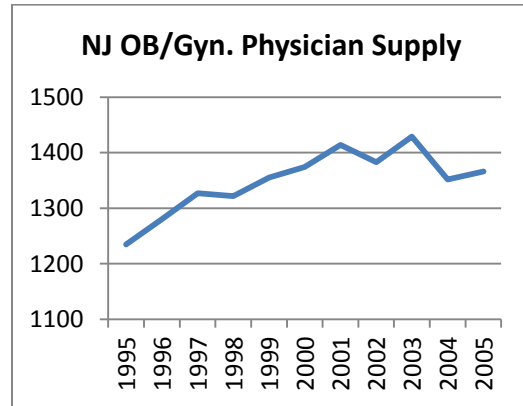
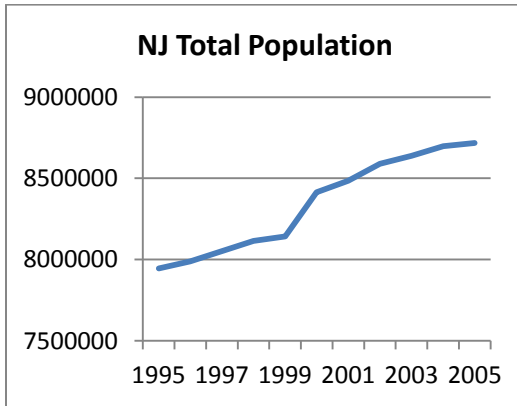




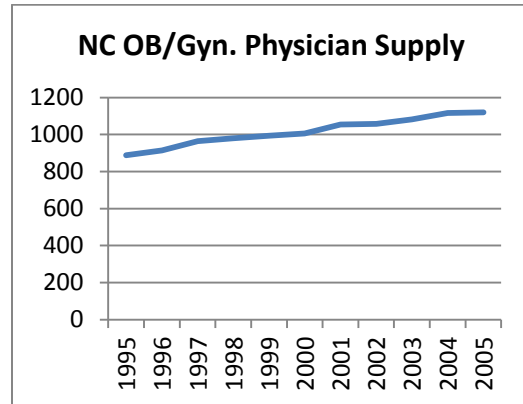
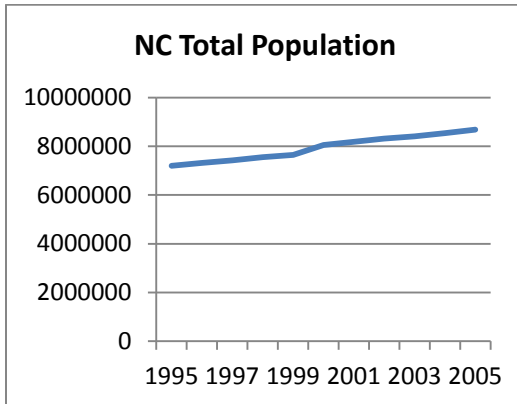
## MISSISSIPPI



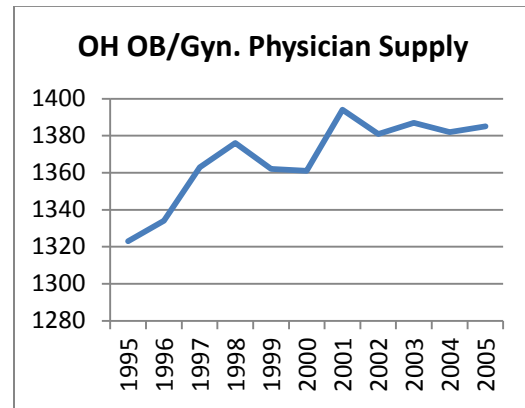
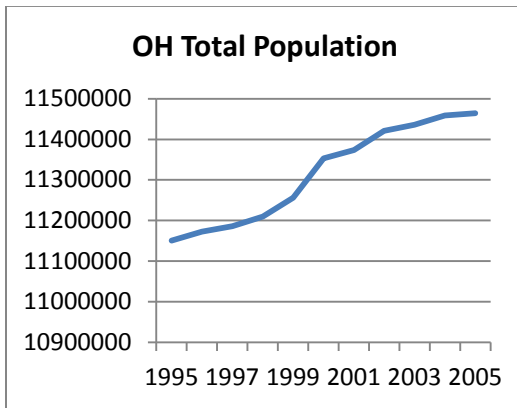
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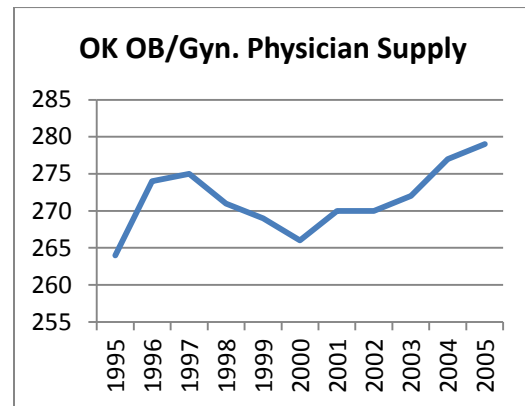
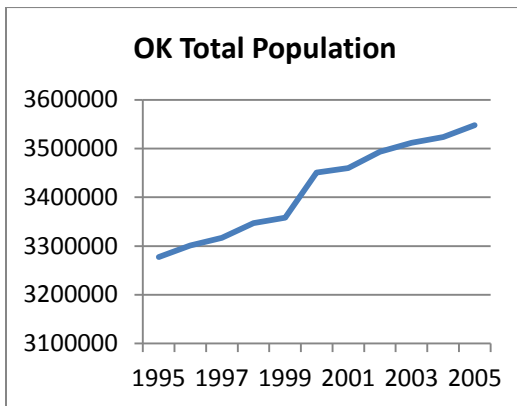
## NORTH CAROLINA



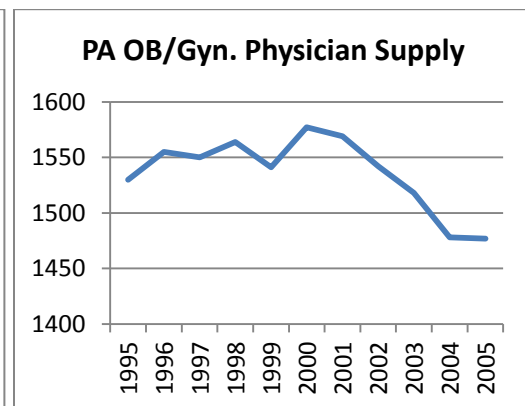
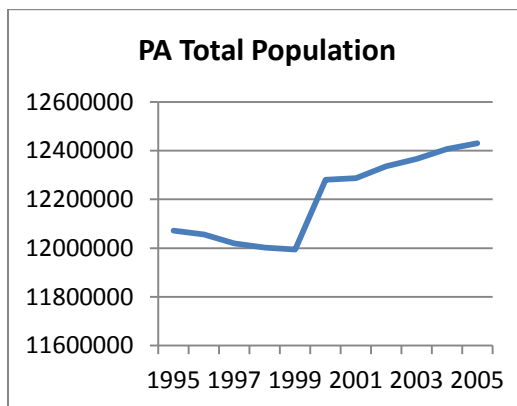
## OHIO



## OKLAHOMA



## PENNSYLVANIA



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Thesis Title: The effects of medical malpractice legislation: Caps, liability insurance premiums, and physician supply in obstetrics & gynecology  
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Supervisor: Anna Roman, PhD  
Summer 2010

Undergraduate Internship with University of Pennsylvania Health System at Good Shepherd Penn Partners (a long-term care hospital and inpatient rehabilitation facility)  
Supervisor: Michael Soisson, MHA  
Summer 2009

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Dean's List (2006-2011)

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THON Chair for Penn State Powerlifting Club  
Social Chair for Penn State Powerlifting Club  
Member, Medical Group Management Association  
Member, American College of Healthcare Executives