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Determinants of Market Entry: Evidence from Medical Malpractice Insurance

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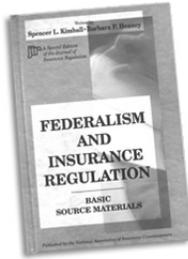
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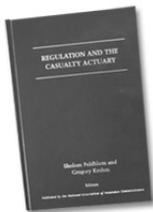
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Determinants of Market Entry: Evidence from Medical Malpractice Insurance

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Abstract

This paper examines the extent to which state-level medical malpractice insurance market conditions are associated with entry levels of risk retention groups (RRGs). We hypothesize that medical professionals are a unique customer base and are well equipped to form insuring organizations of their own in response to adverse conditions in the medical malpractice insurance market. We find evidence that RRGs are more likely to enter markets with higher medical malpractice insurance prices. In the course of our analysis, we also find evidence that profit motives drive stock insurance company entry levels. Overall, our results indicate that medical professionals respond to price levels in the medical malpractice insurance market by transitioning from insurance customers to insurance competitors via forming RRGs.

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Introduction

Competition in an economic marketplace is one of the most important and well researched topics in economics. Much of the literature related to market competition considers how barriers to entry, competition and/or concentration ultimately influence the economic rents of various market participants, including insurance firms. However, one topic related to market competition that has received relatively little attention in both the general economics literature, as well as the insurance literature, is the extent to which competitive market forces lead market customers to become market competitors. That is, in response to market conditions, customers acquire the necessary “means of production” and provide the service themselves. We believe that insurance markets, and particularly medical malpractice insurance markets, are an ideal settings for providing further evidence on the extent to which customers become competitors in economic markets.

Relative to various other property and liability insurance products, physicians and other medical professionals may be unique insurance consumers. They are likely better educated and wealthier than the average insurance consumer and are a more homogeneous group.¹ In addition, through professional organizations, they may be better connected than the average consumer. Thus, relative to the average insurance consumer, medical professionals may be better equipped to respond to adverse insurance market conditions by banding together to insure one another via the use of risk retention groups (RRGs).² In this scenario, medical professionals essentially transition from the customer of insurers to the competitor of insurers.

1. This is true compared to the average individual insurance consumer though it may not be true if comparing medical professionals to other professionals that purchase professional liability coverages (e.g., lawyers, etc.).

2. An RRG is an insurer type that “...can conduct business nationwide under the authority of a single license. To qualify as an RRG, the firm must be an insurance entity composed of owners or members of an association connected by similar business practices and encountering similar liability exposures” (Leverty, 2011). RRGs are associated with a unique set of operational and regulatory characteristics that distinguish them from other organizational forms and insuring mechanisms such as stock or mutual insurance companies. RRGs may be used by all medical professionals, including physicians, hospitals and nursing homes. Table 1B shows that the growth in use of RRGs is fastest by physicians. In addition, physician premiums made up approximately 62.5% of all medical malpractice insurance premiums during our sample.

In an effort to evaluate whether medical professionals respond to adverse market conditions by becoming insurers themselves, we examine the determinants of insurer entry into malpractice insurance markets at the state level. More specifically, we examine the extent to which state-market factors—such as profitability, competition and the price of insurance—influence the market entry decisions of RRGs, stock insurers and other insurer types. If medical professionals do respond to adverse market conditions by insuring themselves, then we would expect that state-wide malpractice market factors have different effects on the determinants of RRG entry compared to other insurer types. As part of our analysis of marketplace entry, we are also able to evaluate various hypotheses found in the literature related to the competition, concentration and profits in insurance markets.

By way of preview, our results indicate that the determinants of entry into medical malpractice insurance markets are quite different from other insurer types. In particular, we find evidence that RRGs enter markets where medical malpractice insurance premiums are high, regardless of market profitability. This suggests that the RRG marketplace entry decision is associated with the affordability of medical malpractice insurance. In contrast, we find evidence that the entry decision of non-RRG companies, and particularly stock companies, are driven more by profit concerns. Considered in their entirety, our results provide evidence that, in response to adverse market conditions, such as high medical malpractice insurance prices, medical professionals form RRGs and transition from customers to insurers.

Our results are important in many respects. Our examination of customers becoming competitors in insurance markets is a novel contribution to the insurance literature, as well as the broader economic literature. In the course of our analysis, we also provide evidence as to the relation between concentration and profitability in medical malpractice insurance markets, thereby contributing to the body of literature that examines competition in insurance markets. We also provide an overview of medical malpractice market operations and trends in recent years that is likely of value to malpractice market participants, researchers, policymakers and others seeking information related to malpractice market operations. Our analysis also contributes to the growing body of literature that examines various regulatory and operational aspects of medical malpractice insurance markets.

Our results also have regulatory and public policy implications. If medical professionals continue to form RRGs in response to adverse market conditions, then regulators must consider whether additional regulatory constraints are necessary to ensure stability in medical malpractice insurance markets. Our analysis finds little support for a relation between concentration and profits, suggesting that regulatory attention toward market concentration may have little influence on medical malpractice insurance market performance. From a broader perspective, policymakers must also consider whether the economic and social

benefits of medical professional insuring arrangements outweigh the economic and social costs.³

The remainder of our paper is organized as follows: The next section contains the literature review. That is followed by the data section, including a market overview of medical malpractice insurance. The hypotheses section is then followed by the results and conclusions.

Relevant Literature

In the industrial organization literature, there are several prominent views relating to market competition. The first is the structure-conduct-performance (SCP) paradigm, which considers market performance as endogenously determined by an exogenously determined market structure (Reid, 1987; Scherer and Ross, 1990). The theory argues that firms in less competitive markets have more market power, derived from collusion and entry barriers, and, therefore, predicts a positive relation between market concentration and profits.⁴ A second theory in the literature, the relative market power (RMP) hypothesis, postulates that firms with large market shares and sufficiently differentiated products can exploit market power and enjoy large economic rents (e.g., Shepherd, 1982).⁵ A third view of market competition in the literature is the efficiency structure hypotheses proposed by Demsetz (1973), which suggests that, if a firm is more

3. It is likely that medical professional insuring arrangements are associated with both economic and social costs and benefits, the discussion of which are outside the topics of this paper, that could be explored in future analyses. More specifically, physician-directed insuring mechanisms likely differ from other insurer types in ways such as operational strategies, business expertise of managers or profit motives. Such differences could be associated with costs, such as higher likelihood of insolvency, or benefits, such as increasing the availability and affordability of liability insurance. From a societal perspective, physician insuring arrangements may influence physician behaviors in ways that could improve or degrade patient care, health care costs or similar health care components. Therefore, it is likely prudent for regulators and policymakers to consider the benefits and costs associated with physician insuring arrangements when making policy and regulatory decisions.

4. Many studies have found empirical evidence in support of the SCP paradigm. Marvel (1978) finds evidence of a positive relation between gasoline prices and retail market concentration. The work of Salinger (1984) suggests a positive relation between Tobin's Q and concentration in the marketplace. Berger and Hannan (1989) and Hannan (1991) find evidence of a higher loan rates and lower retail deposit rates in concentrated banking markets.

5. The theory has been further examined by others, such as Rhodes (1985), who indicates that firms under the RMP hypothesis are "perceived to be better simply by virtue of their position in the market." There is a degree of empirical support for the RMP hypothesis in the literature. For example, Berger (1995) finds evidence that market share is positively related to profitability in the banking industry, even after controlling for concentration and efficiency.

efficient than its competitors, the firm will enjoy higher market share and higher profits.⁶

The literature relating to market competition is not devoid of insurance-specific studies. Carroll (1993) considers both the SCP paradigm and the efficiency structure hypothesis in the workers' compensation insurance market and finds no support for either hypothesis. Bajtelsmit and Bouzouita (1998) find a positive relation between market concentration and profitability in combined liability and physical damage lines of insurance, which they suggest indicates support of the SCP paradigm. Evidence in support of the SCP paradigm is also provided by Chidambaran, Pugel and Saunders (1997), who find a positive relation between concentration and performance among a sample of property-liability insurers. Choi and Weiss (2005) examine competition among property-liability insurers and find support for the efficiency structure hypothesis. Weiss and Choi (2008) do not find evidence in support of the SCP paradigm among a sample of U.S. automobile insurance companies and find mixed results relating to the RMP and efficiency structure hypotheses.

The mixed evidence in the literature relating to competition in insurance markets seems to warrant additional analyses of the nature of competition among insurers and a portion of this paper endeavors to do so in the context of medical malpractice insurance markets. As such, we rely upon studies that have examined various topics relating to medical malpractice insurance in order to gain perspective on competition among medical malpractice insurers. Many studies find that malpractice tort reform measures, and particularly caps on non-economic damages, influence malpractice insurer performance via a reduction in incurred losses and loss ratios (e.g., Grace and Leverty 2008; Viscusi et al, 1993; Viscusi and Born, 1995; Born and Viscusi, 1998; Viscusi and Born, 2005). Born and Boyer (2011) examine the use of claims-made and occurrence policies in the medical malpractice insurance market. Karl, Born and Viscusi (2013) find evidence of a relation between state-wide levels of health insurance losses and medical malpractice insurance losses.

Other medical malpractice insurance related studies provide insight into the role of firm-specific characteristics and medical malpractice insurance market operations and performance. Hoyt and Powell's (2006) comprehensive examination of medical malpractice insurers' financial performance and capitalization indicates that, during their sample period, medical malpractice insurers were neither overcapitalized nor earning extraordinary profits. The findings of Neale, Eastman and Drake (2009) indicate that loss levels were the primary cause of medical malpractice market deterioration from 1998 through

6. Many studies have argued that the merits of the efficiency structure hypothesis outweigh the SCP paradigm. For example, Smirlock, Gillian and Marshall (1984) find evidence that firms with high market shares earn rents that cannot be attributed to concentration. Among a sample of firms in the banking industry, Evanoff and Fortier (1998) find strong support of the efficiency structure hypothesis. Research highlighted in Berger, Demirguc-Kunt, Levine and Haubrich (2004) further indicates the extent to which the literature values efficiency considerations in market competition research.

2003. Lei and Schmidt (2010) find that physician-directed medical malpractice insurers demand less reinsurance and exhibit differences in loss volatility and leverage.⁷

As it particularly relates to medical malpractice insurance markets, we draw particular attention to Born, Boyer and Barth (2009) and Lei and Browne (2009). Born et al. (2009) examine the economic and regulatory consequences of the National Insurance Act of 2006⁸ and part of their analysis considers the decision for RRGs to enter a state marketplace. The authors provide evidence that the business climate, measured as the ratio of RRGs to non-RRGs in a given state, is an important determinant in the decision for RRGs to enter a state. Lei and Browne (2009) examine factors associated with insurer entry into a state medical malpractice insurance market. Their findings indicate that medical malpractice insurance market entry and exit is related to the presence of tort reforms, organizational form of insurers operating in the market, variation in underwriting performance, product line and geographic diversification of the market participants, and market profitability.

In the marketing literature, Fodness, Pitegoff and Sautter (1993) discuss the possibility that customers can become competitors with regard to services. That is, customers can acquire the “means of production” of the service themselves and be lost as future customers. In medical malpractice insurance, this is equivalent to medical professionals forming RRGs and providing their own insurance coverage. Fodness et al. (1993) examine the likelihood of co-option based on the skills and facilitating goods that may be necessary to produce the service. Boyer and Nyce (2012) break the inputs necessary to provide insurance into two economic categories: capital and labor. While the skilled labor needed to underwrite medical malpractice insurance may be scarce, medical professionals likely have better access to the capital necessary for co-option than many other groups of insurance consumers, making RRG formation in medical malpractice more likely.

RRGs have higher capital requirements than captives but still lower than traditional insurers. Lower capital requirements may lead to more RRG formation. In addition, having the flexibility to choose their members may also lead to more

7. More specifically, Lei and Schmidt (2010) posit that physician-directed insurers are associated with relatively unique operational characteristics, which may ultimately influence the amount of reinsurance demanded by such firms. Lei and Schmidt (2010) propose that physician-directed insurers possess unique informational power, leading such firms to manage risk in a way that reduces the demand for reinsurance. Alternatively, the authors propose that, due to capital constraints associated, physician-directed insurers demand higher levels of reinsurance. The analysis of Lei and Schmidt (2010) suggests that several organizational and operational factors are associated with lower demand for reinsurance, including physician-directed insurers. As it relates to our analysis, the evidence presented by Lei and Schmidt (2010) suggests that physician-insurers, relative to other insurer types, are associated with unique operating characteristics and these unique characteristics may permit physicians to band together to form insuring arrangements in response to adverse market conditions.

8. The National Insurance Act of 2006 could potentially allow for federal regulation of insurance. It allowed for the formation of the Office of National Insurance. For a more complete discussion see Born, Boyer and Barth (2009).

RRG formation. As the cost of medical malpractice insurance continues to be an issue for medical professionals, and may worsen if markets harden or cycles return, these additional factors may further increase the likelihood of RRG formation. Alternatively, forming an RRG requires the owners to commit to “managing” the RRG and this commitment may impede RRG formation. However, our analysis does not explicitly consider these additional factors that increase or decrease the likelihood of RRG formation.

Data Sources and an Overview of Medical Malpractice Markets

Data come from the NAIC financial statement database, supplemented with data from the U.S. Census Bureau, the U.S. Bureau of Labor Statistics and the American Tort Reform Association.⁹ We make use of the state pages in the NAIC annual filing to capture medical malpractice premiums and loss levels of insurer i in state j during year t , as well as organizational form data from the demographics page. We aggregate to the group level (i.e., we assume an insurer group operates as a single entity) before finally aggregating to the state level.¹⁰ The final state-level dataset is a complete panel of 450 observations that reflects the state-level operations of all medical malpractice insurers in all 50 states for the years 2002–2010. Summary statistics are given in Table 1A. Table 1B contains some statistics on medical malpractice insurance for physicians only from Supplement A of Schedule T of the NAIC financial statements. The growth rate of RRGs overall in medical malpractice for the years 2002–2010 was 9.71%, while it was 26.4% for physicians. RRGs were being used more in general medical malpractice insurance, as the average percentage of companies in a state in general medical malpractice is just over 25%, while it is just under 22% for physicians. However, the growth has been much faster in the physicians market.¹¹

9. Active physicians, the number of females and the number of people older than 65 are obtained from the U.S. Census Bureau. Family and general practitioners is from the U.S. Bureau of Labor Statistics. Information regarding the enactment of caps on noneconomic damages is acquired from the American Tort Reform Association.

10. The group-level aggregation implies that variables such as the Herfindahl-Hirschman Index and state-level company counts reflect the activity of the entire group.

11. The three-year average of the inverse loss ratio is calculated as the total premiums earned over a three-year window divided by the total losses incurred over the same three-year period.

**Table 1A:
Variable Definitions/Statistics**

2002–2010 U.S. States (450 Obs.)					
Variable	Description	Mean	Std. Dev.	Minimum	Maximum
Med Mal DPE	Medical Malpractice Direct Premiums Earned (000's)	219,663	272,596	12,167	1,694,116
# of Companies	Number of Med Mal Insurers Writing Business in Each State	45.34	12.54	27	97
% RRG	% of Med Mal Insurers that are RRGs	.2504	.0898	.0714	.4948
% Stock	% of Med Mal Insurers that are Stock Companies	.5964	.0832	.3814	.7805
% Change in # of Companies	All Med Mal Insurers	.0361	.0710	-.1563	.3469
% Change in # of RRGs	RRGs Only	.0971	.2000	-.5	1.158
% Change in # of Non-RRGs	All Non-RRGs	-.0232	.0414	-.1810	.0968
% Change in # of Stock Cos.	Stock Med Mal Insurers Only	-.0272	.0570	-.2292	.1613
% Change in # of Other	Med Mal Insurers that are not RRG or Stock	.0042	.1223	-.2708	.5968
Herfindahl-Hirschman Index	Market Concentration Measure	.2097	.0958	.0502	.5745
Market Profitability	Three-year Average Inverse Loss Ratio	2.803	11.22	-65.93	164.59
Market Size	ln of Number of Companies with Positive DPW	3.781	.2593	3.296	4.585
% of Family and General Practitioners	% of All Physicians in State that are Family and General Practitioners	.1643	.0784	.0309	.4216
Med Mal Prem per Physician	Med Mal DPW Divided by Adjusted Number of Physicians in State	16.88	6.275	4.107	42.40
Physicians per Capita	Active Physicians in State, Scaled by Population	.00255	.0006	.0016	.0048
% Female (Population)	Number of Females in State, Scaled by Population	.5060	.0082	.4758	.5220
% Old (Population)	Number of Persons Older than 65 in State, Scaled by Population	.1236	.0176	.0560	.1730
Cap on Noneconomic Damages (D)	Dummy Equal to 1 if State Limits Noneconomic Damage Awards	.4489	.4979		

**Table 1B:
Physicians Only Medical Malpractice Statistics
(Supplement A, NAIC Annual Statement)**

2002–2010 U.S. States (450 Obs.)					
Variable	Description	Mean	Std. Dev.	Minimum	Maximum
Med Mal DPE	Medical Malpractice Direct Premiums Earned (000's)	137,321	170,511	4,246	1,005,134
# of Companies	Number of Med Mal Insurers Writing Business in Each State	21.95	9.24	9	54
% RRG	% of Med Mal Insurers that are RRGs	.2195	.1333	0	.6047
% Stock	% of Med Mal Insurers that are Stock Companies	.6394	.1363	.3256	1
% Change in # of Companies	All Med Mal Insurers	.0803	.1380	-.25	.8
% Change in # of RRGs	RRGs Only	.2635	.4999	-1	3.5
% Change in # of Non-RRGs	All Non-RRGs	-.0372	.0707	-.2162	.2
% Change in # of Stock. Cos.	Stock Med Mal Insurers Only	-.0436	.1023	-.3056	.5
% Change in # of Other	Med Mal Insurers that are not RRG or Stock	.0663	.3380	-.5690	1.875
Herfindahl-Hirschman Index	Market Concentration Measure	.3900	.1792	.0979	.8620
Market Profitability	Three-year Average Inverse Loss Ratio	3.687	13.8897	-6.571	226.21
Market Size	In of Number of Companies with Positive DPW	3.004	.4121	2.197	3.990

Table 2 provides broad, summary information relating to medical malpractice insurance markets during our sample period. The total amount of medical malpractice premiums earned by insurers in our sample ranges from a low of approximately \$8.7 billion in 2002 to a high of approximately \$12.1 billion in 2006. In terms of raw dollars (loss ratios), insurers incurred the most losses in 2003 (2002) and the least in 2010 (2010). Unreported analysis indicates the standard deviation of the medical malpractice insurance industry's loss ratios is approximately 0.2, which suggests that our sample period is marked by substantial variation in loss levels. Table 2 also shows that the average amount of premiums written per physician, a rough proxy for the price of medical malpractice insurance, increased over the beginning part of our sample period and started to decline in the latter years of our sample.¹² State-level profitability, given as the three-year average of the inverse loss ratio, generally increased over the course of our sample period.

12. Premiums per physician is defined as the total dollar amount of direct premiums written in a given state in a given year scaled by active physicians in a given state in a given year.

Table 2:
Medical Malpractice Market Statistics

Year	Total DPE	Total Losses Incurred	Loss Ratio	Premiums per Physician	Three-year Average of ILR
2002	8,795,033	8,188,964	93.11%	11.98	1.82
2003	10,495,471	8,424,210	80.27%	13.15	1.30
2004	11,450,067	7,228,587	63.13%	14.63	1.28
2005	11,859,465	6,156,813	51.91%	15.26	1.48
2006	12,102,245	5,230,687	43.22%	15.49	1.75
2007	11,653,840	4,781,351	41.03%	14.65	2.39
2008	11,267,335	3,952,809	35.08%	14.03	2.71
2009	10,754,008	3,834,601	35.66%	13.22	4.31
2010	10,471,219	3,363,458	32.12%	13.06	8.19

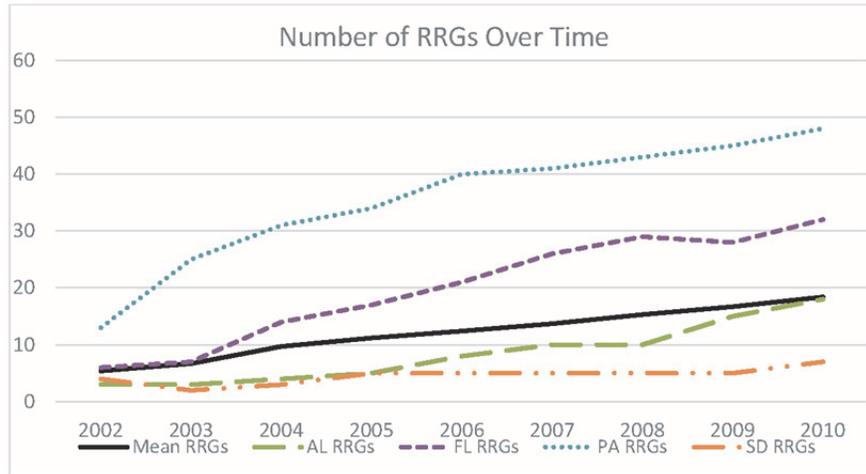
Note: Dollar values are expressed in terms of thousands.

Table 3:
Organizational Form of Medical Malpractice Insurers

Year	Total Stock Companies	Total RRGs	Total Non-Stock and Non-RRGs
2002	65	28	28
2003	69	53	34
2004	70	85	41
2005	72	95	44
2006	72	110	44
2007	69	118	44
2008	75	126	45
2009	73	126	46
2010	78	125	46

Table 3 provides information about the organizational form of insurers in the medical malpractice insurance industry. The number of stock insurers with positive premiums written in medical malpractice insurance generally increased over the course of our sample period. In addition, while the number of companies not classified as a stock insurer or an RRG (i.e., mutuals, limited liability companies, etc.) increased over the course of our sample period at a greater rate than stock insurers, they are still the least common insurer type. However, the number of insurers incorporated as an RRG increased dramatically over our sample from 28 in 2002 to 125 in 2010. This nearly 350% increase suggests that RRGs are entering more marketplaces and motivates our investigation of the determinants of RRG entry into a medical malpractice insurance marketplace.

**Figure 1:
Trends in the Number of RRGs**



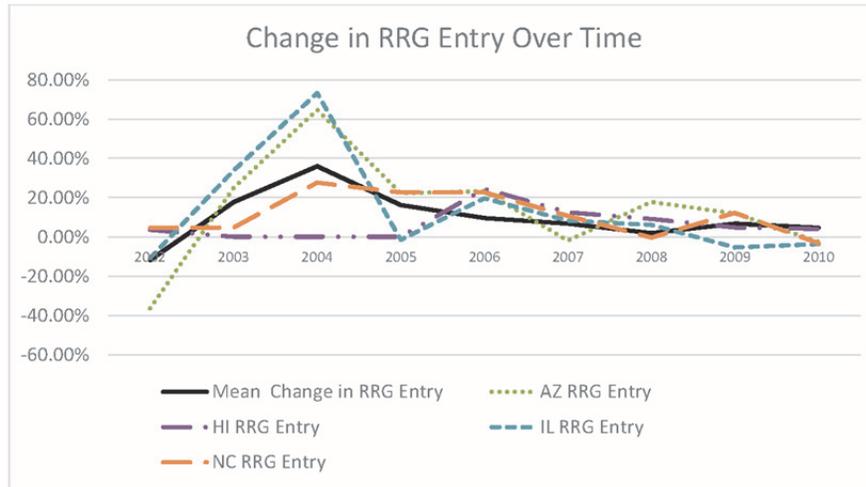
Because Table 3 suggests that RRGs have become more prevalent in the marketplace over time, we further investigate the role of RRGs at the state level. Figure 1 provides data on the number of RRGs operating (i.e., firms with positive premiums written) in a given state at a given time. As Figure 1 indicates, the mean number of RRGs operating across all states in a given year has increased over the course of our sample period, from approximately 5.4 in 2002 to 18.4 in 2010. A closer look at specific states indicates heterogeneity in the number of RRGs participating in the medical malpractice insurance market. Some states, such as Florida and Pennsylvania, have far outpaced the national trend and, by 2010, 32 RRGs and 48 RRGs operated in each state, respectively. In contrast, states such as Alabama and South Dakota have only experienced moderate growth in the number of RRGs operating in the medical malpractice insurance market. This observed heterogeneity in the number of RRGs in a given state further suggests that the certain factors or characteristics of state-level medical malpractice environments may influence an RRG’s entry decision.

Table 4:
RRG Net Entry by State

State	Mean Change in RRG Entry	State	Mean Change in RRG Entry
AK	3.12%	MT	7.13%
AL	14.33%	NC	11.29%
AR	12.08%	ND	8.28%
AZ	13.78%	NE	6.30%
CA	11.23%	NH	7.44%
CO	8.84%	NJ	12.77%
CT	6.98%	NM	9.68%
DE	6.89%	NV	9.66%
FL	12.65%	NY	12.59%
GA	9.84%	OH	10.14%
HI	6.49%	OK	9.09%
IA	8.30%	OR	10.81%
ID	9.69%	PA	12.24%
IL	13.30%	RI	7.65%
IN	16.13%	SC	10.57%
KS	7.43%	SD	20.47%
KY	10.42%	TN	12.43%
LA	9.21%	TX	11.37%
MA	6.03%	UT	6.70%
MD	12.02%	VA	9.75%
ME	4.83%	VT	2.57%
MI	10.37%	WA	10.19%
MN	4.68%	WI	7.46%
MO	7.81%	WV	12.81%
MS	13.60%	WY	6.96%

Table 4 and Figure 2 provide further evidence of heterogeneity in observed participation of RRGs in state-level medical malpractice insurance markets. Both consider change in RRG entry, defined as the percentage change in the relative proportion of RRGs in the marketplace of a given state from year $t-1$ to year t . Table 4 shows that some states, such as Minnesota, had little change in the relative number of RRGs participating in the medical malpractice insurance market, while other states, such as New Jersey, experienced significant changes in RRG market entry. Figure 2 highlight this observation and adds a time element. States such as Illinois and Arizona experienced significant volatility, in terms of RRG entry into the medical malpractice marketplace, while others, such as Hawaii and North Carolina, experienced a lesser degree of variation in RRG entry. Again, this variation suggests that there may exist certain state-specific factors associated with entry of RRGs into the medical malpractice insurance market.

Figure 2:
Trends in RRG Entry



Hypotheses

We evaluate medical malpractice insurance markets at the state level, rather than company level. This approach allows us to not only consider RRG entry determinants, but also allows us to examine the validity of the SCP paradigm, one of the prominent hypotheses in the market competition literature, in medical malpractice insurance markets. The SCP literature predicts that some barrier to entry must exist for markets to become highly concentrated and for firms to earn excess profits. While that barrier to entry may not be directly observable, the level of concentration and the profit level of insurers are observable. The SCP paradigm predicts that markets that are more concentrated are more profitable and as previously discussed many, though not all, insurance market-specific studies find support for the SCP paradigm. Based on this literature, we propose our first hypothesis.

H1: There exists a positive relationship between market concentration and profitability in medical malpractice insurance markets.

Our next hypothesis relates to the decision of a malpractice insurer to enter a particular market. As noted in the previous section, most medical malpractice insurance companies are stock companies organized as profit centers for their owners. Stock companies are organized as profit centers for their owners who, from a wealth maximization perspective, likely desire to operate in profitable medical malpractice insurance markets. That organizational form would influence insurer operational decisions, such as market entry, is consistent with the agency theory literature, which is replete with evidence suggesting differences in insurer organizational form are associated with differences in insurer operational strategies. Therefore, because the majority of medical malpractice insurers are organized as stock companies, we expect that, in the aggregate, profit potential is a significant determinant of market entry for medical malpractice insurers. This expectation is formalized in our second hypothesis.

H2: There exists a positive relationship between the level of profitability and the level of insurer entry into a medical malpractice insurance market.

Our final hypothesis addresses the extent to which medical professionals' transition from insurance market consumers to insurance market competitors. We note that, while an RRG can be formed to be profit centers for its owners, the proliferation of RRGs seems to be in response to the crises that have arisen in insurance markets. As noted in Born, Boyer and Barth (2009), while there are regulatory advantages to RRGs, there are limitations on the scope of insurance they are able to sell and access to capital markets. These limitations may limit the RRG as a preferred structure for insurers seeking to be profit centers. Therefore, the market entry decisions of RRGs may be determined less by profit motives and more by the availability and affordability (i.e., premium levels and not profit margins) of medical malpractice insurance in a given market. Further, if RRG entry is motivated by market conditions such as high prices, this would suggest that medical professionals respond to adverse market conditions by banding together and forming their own medical malpractice insuring arrangement. As an RRG, medical professionals can choose their members and control and lower the cost (and prices) associated with insurance. Because RRGs are likely not the preferred structure for profit centers and can be used by medical professionals to address unfavorable medical malpractice market conditions¹³, we expect that RRGs enter markets with high premium levels, not profit levels.

13. We refer to unfavorable market conditions generally as market conditions that are disadvantageous for the purchase of medical malpractice insurance by medical providers. For example, we would consider a large spread between the price of malpractice insurance and the wage rate of medical professionals as an unfavorable market condition. Another example is low supply of malpractice insurance, at any price level.

H3: There exists a positive relationship between the level of premiums and the level of RRG entry into a medical malpractice insurance market.

Methods

Two of our hypotheses consider the determinants of market entry. We evaluate these hypotheses at the state level by examining net entry of medical malpractice insurers into each state for the years 2002–2010. We examine not only total net entry, but net entry of the different organizational forms, including RRGs, stock insurers and “all others” to determine if different organizational forms have different determinants of entry.¹⁴ We measure net entry as the percentage change in the number of insurers with positive direct premiums written in state j from year $t-1$ to year t .¹⁵ We use the net entry variable as our dependent variable in the following model:

$$Entry_{jt} = \beta_1 Profit_{jt} + \beta_2 HHI_{jt} + \beta_3 PremLevel_{jt} + \beta_n \gamma_{jt} + \varepsilon_{jt} \quad 1)$$

Where:

Entry = A measure of the amount of firms that entered the medical malpractice insurance market in a given state in a given year. This measure is different for each model specification.

Profit = A measure of the profitability of the medical malpractice insurance market. This is quantified as the three year average of the inverse loss ratio in state j during year t .

HHI = The Herfindahl-Hirschman Index based on firm i 's market share in state j during year t .

PremLevel = The medical malpractice direct premium written divided by the adjusted number of active physicians in state j during year t . The adjustment is the number of active physicians divided by $1 - \text{percentage of family and general practitioners}$ to reflect that specialists pay a higher average premium than family and general practitioners.

14. We verified the organizational form at the time of market entry from NAIC financial statements. There were two cases of entrants that were RRGs at time of entry that later became stock companies, but there were also two cases of stock companies at time of entry that later became RRGs.

15. We also calculated an alternative measure of entry as the percentage change (as opposed to the relative percentage change) in entry from year $t-1$ to year t . Our results remain qualitatively similar with the alternative measure, and are available from the authors upon request.

γ = A vector of financial and demographic characteristics hypothesized to influence medical malpractice insurance entry in state j during year t .

To test our first hypotheses, we calculate the *HHI* for each state by year as a measure of concentration in the medical malpractice insurance market.¹⁶ We then create a measure of profitability for each state/year, *Profit*, as the three-year average inverse loss ratio.¹⁷ The three-year average inverse loss ratio is the average of the past three year's premiums earned divided by the past three year's average losses incurred. Subtracting one from this measure is the percentage of premium not used to pay losses, which would also proxy for profits.¹⁸ We use a three-year average because of the volatility in the medical malpractice line of business. One year measures would be subject to the volatility caused by infrequent large claims along with big changes in loss reserves as claims mature. The three-year window serves to smooth these issues and present a better picture of profitability.

To determine if the price of medical malpractice insurance is a determinant of entry, a measure of price is necessary. The average premium paid by a doctor in a given state/year, *PremLevel*, can be determined by dividing the direct premiums earned by the total number of physicians in the state.¹⁹ This does not account for the fact that specialists in a state often pay higher medical malpractice premiums than family and general practitioners. To adjust for this, we first calculate the percentage of family and general practitioners in each state by dividing the family and general practitioners by the total number of physicians in the state. We then adjust the number of physicians in the state by taking the actual number of physicians and dividing by one minus the percentage of family and general practitioners.²⁰ This adjustment allows for a more accurate estimate of the medical malpractice insurance costs faced by the medical professional community in a

16. This variable is calculated using only premiums written in medical malpractice insurance. We also aggregate data to the group level when creating the HHI.

17. The inverse loss ratio is often used as a measure of price, the "cost" of insurance over and above expected losses (Choi and Weiss, 2005; Weiss and Choi, 2008). We use this variable in a slightly different context, in that we use it to measure how much profit is built into the cost. We use the term "price" to refer to the premium level charged for coverage, similar to the terminology used in consumer markets (i.e., the price of a TV is what you pay for it). The correlation between the three-year inverse loss ratio and the premium level is -.0873 and is not significant at the 10% level.

18. This number would include the expenses of the insurer, as well as the profit margin.

19. This is not a perfect measure because it will not reflect the number of doctors who chose not to purchase medical malpractice insurance, nor will it reflect any premiums paid to insurers that do not report to the NAIC. However, we believe that it is an appropriate proxy that accurately reflects heterogeneity in price levels across state-level medical malpractice insurance markets. In our analysis, the variable is scaled by 1,000.

20. We note that our results are unchanged if we do not use the adjusted premium value. However, the ratio of specialists to generalists varies widely across states, as noted in Table 1A, and the ratio of generalists to total physicians varies from just over 3% to more than 42%. As such, in an effort to ensure thoroughness, we keep the adjusted values in the models reported in this paper.

given state. This variable is important in testing the last two hypotheses to determine if RRGs have different determinants of entry than other organizational forms.

In addition to the primary variables of interest of profitability and price, there are a variety of control variables used in the analysis. In addition to concentration, we also control for the number of competitors in the market (market size), as measured by the natural log of the number of companies with positive direct premiums written in the state/year. We also control for the potential that the nature of physician demand may influence insurer entry and include the proportion of the physician population that are family and general practitioners, as well as the number of active physicians per capita in a given state in a given year. The percentage of the population in a state that is female and the percentage of the population that is older than 65 as population are included as demographic controls.²¹ Finally, because prior literature suggests that tort reforms reduce the losses of medical malpractice insurers, we include a dummy variable equal to one if the state has any caps on noneconomic damages.²²

Results

As an initial test of Hypothesis 1, we examine the pairwise correlation of the three-year average inverse loss ratio and the HHI over the nine years of data and all 50 states. We find a correlation of $-.0986$, significantly different from zero at the 5% level, which provides initial evidence of a non-trivial relation between profitability and concentration in medical malpractice insurance markets.²³ Additional evidence on the validity of Hypothesis 1 can be gained from our tests of Hypothesis 2 and Hypothesis 3. Because we believe that profits and the entry decision are endogenously determined, we employ a two-stage least squares (2SLS) approach and instrument profits in the first stage.²⁴ Thus, the results of the

21. Because health care consumption and patient interaction may influence malpractice exposure (and, ultimately, medical malpractice insurer profitability levels), the percentage of the population that is female is included to account for differences between males and females in health care consumption. In addition to controlling for differences in health care consumption, persons older than 65 controls for the expectation that, on average, an inverse relation exists between the size of a malpractice award and age. This is due to the fact that senior citizens likely have lower current income levels and/or fewer years of earning potential than younger people (e.g., Avraham, 2007).

22. Controlling for caps on noneconomic damages is important because damage caps' influence on profitability may influence an insurer's willingness to enter a state.

23. An OLS regression model with profitability as the dependent variable and concentration and time dummies as the independent variables yields the same negative and significant relationship.

24. More specifically, the first stage of our 2SLS approach estimates a model where the dependent variable is a profitability measure and the independent variables include measures of insurance market operations, demographics, year indicator variables and an instrument. The second stage is then a model where the dependent variable is a measure of market entry and the

first-stage regression provides an indication of how concentration influences price levels. We follow an approach similar to McShane, Cox and Butler (2010) and use the average of neighboring states' three-year average inverse loss ratios to instrument profit levels in the first stage. The first- and second-stage results of all model specifications are reported in Table 5 through Table 9.²⁵

Table 5:
Percentage Change in Total Number of Companies

	First Stage (DV = 3yr ilr)		Second Stage (DV = % Change)	
	Coef.	Std. Err.	Coef.	Std. Err.
3yr inv. loss ratio			-.0009*	.0005
HHI	-7.543	5.599	.058*	.032
Ln(# of cos)	-1.024	3.155	.085***	.017
% gen. practitioner	5.625	5.2001	.018	.031
Adj. price	-.097	.093	.0002	.0005
active Dr. per capita	-3326.666**	1476.558	-.835	4.724
% pop female	280.905**	132.335	-.482	.474
% pop over 65	-77.484*	42.845	.155	.139
Cap on non-econ. damages	2.315**	1.055	.002	.005
Instrument (neighbor ilr)	-9.683**	4.151		
Constant	-102.952**	48.945	-.043	.194
Year Dummies incl.	Y		Y	
Cragg-Donald Wald F statistic	85.41			
10% critical value	16.38			
Centered R ²			.3009	
Uncentered R ²			.4463	
Chi-sq(1) p-val			.1996	

*** p<0.01, ** p<0.05, * p<0.1, N = 429

independent variables include the first-stage profitability measure, as well as the same measures of insurance market operations, demographics and year indicator variables included in the first stage. All models are corrected for heteroskedasticity and cluster standard errors at the state level.

25. As it relates to the validity and relevance of the estimation techniques and instrument used in our analysis, the results tables provide information on the test for weak instruments and also indicate the statistical relevance of the instrument in the first stage. The results tables also indicate the results of the test for endogenous regressors. We also perform an underidentification test, as well as the F test of excluded instruments, but do not report the results. We note in our discussion any circumstances where tests indicate invalid or inappropriate estimation techniques or instruments. Finally, to mitigate the potential that our results are driven by highly influential observations, we exclude observations with studentized residuals greater than three or smaller than negative three and provide these results in the tables. We note that our main results remain qualitatively unchanged when we estimate models using the full sample of 450 observations.

Table 6:
Percentage Change in Number of RRGs

	First Stage (DV = 3yr ilr)		Second Stage (DV = % Change)	
	Coef.	Std. Err.	Coef.	Std. Err.
3yr inv. loss ratio			-.0024**	.0013
HHI	-8.201	5.965	.033	.044
ln(# of cos)	-.997	3.177	.051***	.019
% gen. practitioner	6.146	5.171	-.077	.071
Adj. price	-.093	.092	.0014**	.0006
active Dr. per capita	-3342.936**	1516.906	-15.633**	7.125
% pop female	293.177**	143.197	1.741***	.560
% pop over 65	-81.884**	44.605	-.325	.288
Cap on non-econ. damages	2.322**	1.102	.001	.008
Instrument (neighbor ilr)	-9.688**	4.151		
Constant	-108.659**	53.635	-.953***	.243
Year Dummies incl.	Y		Y	
Cragg-Donald Wald F statistic	84.84			
10% critical value	16.38			
Centered R ²			.5041	
Uncentered R ²			.6041	
Chi-sq(1) p-val			.0427	

*** p<0.01, ** p<0.05, * p<0.1, N = 425

Table 5 contains both stages of the regression results using the percentage change in the total number of companies writing medical malpractice in each state/year as the dependent variable. This model serves as our baseline model to see if different organizational forms have different determinants of entry. Table 5 shows that the profitability of neighboring states appears to be a suitable instrument as the instrument (neighbors' inverse loss ratio, or NILR) appears in the first-stage regression as negative and significant and the Cragg-Donald Wald F statistic (85.41) is well above the 10% critical value (16.38), rejecting the null hypothesis that the equation is weakly identified. In addition, while we cannot reject the null hypothesis of no endogeneity in this model, it is rejected in later models, indicating that the profitability variable is endogenous and the instrumental variable approach is the correct econometric model.²⁶

26. For consistency with the ensuing results, we display the 2SLS results in Table 5, even though we cannot reject the null of no endogeneity for the specification reported in Table 5. However, as expected, the unreported results of an OLS model are consistent with the second-stage results presented in Table 5.

Table 7:
Percentage Change in Number of Non-RRGs

	First Stage (DV = 3yr ilr)		Second Stage (DV = % Change)	
	Coef.	Std. Err.	Coef.	Std. Err.
3yr inv. loss ratio			.00076**	.00035
HHI	-7.579	5.501	.006	.011
ln(# of cos)	-.853	3.066	-.023***	.005
% gen. practitioner	5.923	5.141	.011	.018
Adj. price	-.094	.092	-.00045***	.000159
active Dr. per capita	-3283.797**	1458.277	1.500	1.794
% pop female	280.851**	131.946	-.631***	.173
% pop over 65	-78.878*	42.789	.041	.070
Cap on non-econ. damages	2.268**	1.040	-.001	.002
Instrument (neighbor ilr)	-9.683**	4.152		
Constant	-103.577**	49.212	.385***	.083
Year Dummies incl.	Y		Y	
Cragg-Donald Wald F statistic	85.43			
10% critical value	16.38			
Centered R ²			.3807	
Uncentered R ²			.5348	
Chi-sq(1) p-val			.0571	

*** p<0.01, ** p<0.05, * p<0.1, N = 429

The first-stage results presented in Table 5 indicate that *HHI* is not significantly related to profitability and, therefore, does not provide support for Hypothesis 1. The second-stage results presented in Table 5 indicate that three variables are significant determinants for market entry for all medical malpractice insurers. Of importance to our hypothesis testing is that the profitability measure exhibits a negative and statistically significant coefficient, indicating no support for the predicted profit motive entry of all insurers in the aggregate. In addition, the premium level variable is insignificant. While not of significance to our hypothesis testing, we note that the coefficients on the number of competitors already in the market and the concentration of the market are positive and significant. While the evidence presented here does not provide support for our hypotheses, Table 5 serves as our baseline comparison to examine whether different organizational forms have different determinants of entry.

**Table 8:
Percentage Change in Number of Stock Insurers**

	First Stage (DV = 3yr ilr)		Second Stage (DV = % Change)	
	Coef.	Std. Err.	Coef.	Std. Err.
3yr inv. loss ratio			.0008*	.0005
HHI	-7.080	5.364	.034**	.013
ln(# of cos)	-.710	3.036	-.003	.009
% gen. practitioner	6.069	5.058	.010	.022
Adj. price	-.105	.092	-.0007**	.0003
active Dr. per capita	-3349.889**	1473.529	-.110	2.005
% pop female	288.894**	131.831	-.770***	.210
% pop over 65	-77.003**	42.370	.074	.086
Cap on non-econ. damages	2.370**	1.053	-.001	.003
Instrument (neighbor ilr)	-9.693**	4.152		
Constant	-108.306**	49.134	.389***	.102
Year Dummies incl.	Y		Y	
Cragg-Donald Wald F statistic	85.91			
10% critical value	16.38			
Centered R ²			.4212	
Uncentered R ²			.5391	
Chi-sq(1) p-val			.0848	

*** p<0.01, ** p<0.05, * p<0.1, N = 430

Table 6 contains the instrumental variables regression results where the percent change in RRGs in the medical malpractice markets is the dependent variable. As noted earlier, RRGs make up a significant portion of entrants and is the organizational form exhibiting the most significant growth. Unlike the results shown in Table 5, the endogeneity test in the models displayed in Table 6 suggest that profitability and the level of RRG entry is endogenously determined. The important variables for testing Hypothesis 2 and Hypothesis 3 are the profitability measure and the premium level variables. The profitability variable is negative and significant, while the premium level variable is positive and significant. This indicates that RRGs are likely to enter states where premium levels are high, not profit levels. This result not only supports our hypothesis, but it also provides evidence that medical professional insuring arrangements arise when medical malpractice insurance premium levels are high. This is consistent with the notion that medical professionals respond to unfavorable market conditions by transitioning from insureds to insurers.

Table 9:
Percentage Change in Number of Other Insurer Types

	First Stage (DV = 3yr ilr)		Second Stage (DV = % Change)	
	Coef.	Std. Err.	Coef.	Std. Err.
3yr inv. loss ratio			.000479	.001
HHI	-7.14	5.395	-.0580	.0386
ln(# of cos)	-.939	3.055	-.074***	.0168
% gen. practitioner	6.128	5.226	.031	.069
Adj. price	-.093	.093	-.001	.001
active Dr. per capita	-3325.744**	1466.182	4.186	7.231
% pop female	279.671**	130.819	.659	.672
% pop over 65	-80.941*	42.954	.243	.207
Cap on non-econ. damages	2.339**	1.051	.010	.007
Instrument (neighbor ilr)	-9.733**	4.166		
Constant	-102.399**	48.707	-.132	.282
Year Dummies incl.	Y		Y	
Cragg-Donald Wald F statistic	85.55			
10% critical value	16.38			
Centered R ²			.3155	
Uncentered R ²			.3157	
Chi-sq(1) p-val			.9000	

*** p<0.01, ** p<0.05, * p<0.1, N = 426

The results presented in Table 6 sharply contrast the results presented in Table 7, where the entry determinants of non-RRG medical malpractice insurers are examined. Here, the positive and significant coefficient on the profitability variable suggests that profit motives are a significant determinant of medical malpractice market entry by companies not organized as an RRG. In addition, the negative and significant coefficient on the premium levels variable suggests that non-RRGs are less likely to enter and compete in markets where malpractice insurance is more costly. When compared with the results in Table 6, the results of Table 7 indicate RRGs and non-RRGs have opposite motives for entering the marketplace and, in support of our hypothesis, suggest that profitability is a determinant for entry for non-RRGs.

For robustness, we consider two additional model specifications. In Table 8, we provide the results of the regression when the percentage change in stock-only organizational forms is used as the dependent variable. These results are similar to the non-RRG results in that the profitability variable is positive and significant, while the premium level variable is negative and significant. These results provide additional support for the profit motive hypothesis of non-RRG insurers. The final table, Table 9, contains the results for organizational forms other than stock and RRG (e.g., mutuals, reciprocals non-profits, etc.). These results suggest that the entry decision of insurers not organized as a stock insurer or an RRG are not determined by profitability or premium levels, as neither variable exhibits a significant coefficient. The results presented in Table 9 highlight the spectrum of entry motivations into medical malpractice insurance markets across RRGs, stock insurers and other insurer types.

In summary, we find little evidence in support of Hypothesis 1. The first stage results of all of our models indicates that concentration is not related to competition in a statistically significant manner. We do find support for Hypothesis 2 and Hypothesis 3. In particular, we find that RRG entry is associated with higher premium levels and lower profitability levels in a given state. We find the opposite result for stock insurer entry, suggesting profit motives are an important entry determinant for stock insurers. Considered in their entirety, our result suggest that, in response to high medical malpractice insurance prices, medical professionals form RRGs, thereby transitioning from insureds to insurers.

Conclusion

In this paper, we evaluate the factors associated with the entry of RRGs, stock insurers and other insurer types into the medical malpractice insurance market. Our analysis is motivated by the notion that medical professionals, compared to other insurance consumers, are likely better equipped to form insuring mechanisms of their own in response to market conditions such as high medical malpractice insurance prices. If medical professionals do band together and form insuring arrangements of their own in response to unfavorable medical malpractice insurance market conditions, then we would expect differences in the determinants of market entry into the medical malpractice insurance market for RRGs and other insurer types. In particular, we hypothesize that RRG (insurers not organized as an RRG) entry into a malpractice market will be positively (negatively) related to the price of medical malpractice insurance paid by the medical professional and negatively (positively) related to the profit potential of a market. That is, we do not expect the entry decision of an RRG to be motivated by the desire to earn profits.

Our analysis provides support for the hypothesis that, compared to other insurer types, RRGs have different motivations for entering medical malpractice insurance markets. Our results, which are consistent with the medical professionals transitioning from insureds to insurers in response to medical malpractice insurance market conditions, indicate that RRG entry is higher in markets where medical professionals pay more for medical malpractice insurance and where profit potential is low. In contrast, we find that stock insurer entry is motivated by profit potential. In addition to evaluating entry determinants, our methods are such that we are able to shed light on the SCP paradigm and we find little evidence in support of a positive relation between concentration and profitability in medical malpractice insurance markets.

The results of our analysis are important in many respects. Our evidence on insureds becoming insurers is an area that has received relatively little attention in the insurance literature. We also make contributions various subsets of the economics and insurance literature related to market competition, market entry and medical malpractice insurance market operations. Further, if medical professional insurers continue to enter markets with high prices and low profit potential, there exists the potential for such insurers to encounter financial instability and insolvency issues. As such, additional regulatory attention toward medical professional insurers may be required to ensure the stability of medical malpractice insurance markets. The evidence that medical professionals are forming their own insuring arrangements in response to medical malpractice insurance market conditions suggests that policymakers may have more work to do in order to ensure the existence of a malpractice environment that enables the medical professional labor force to devote all available time and resources toward maximizing health care outcomes for patients. If market conditions are such that greater numbers of physicians and health care professionals continue to form their own insuring entities, then more research is needed to evaluate the consequences for patient care, health care costs, defensive medicine practices and other factors related to the nature of services rendered by physicians and other health care providers.

References

- Avraham, R., 2007. "An Empirical Study of the Impact of Tort Reforms on Medical Malpractice Settlement Payments," *Journal of Legal Studies*, 36(s2): s183–s229.
- Bajtelsmit, V.L. and Bouzouita, R., 1998. "Market Structure and Performance in Private Passenger Automobile Insurance," *The Journal of Risk and Insurance*, 65(3): 503–514.
- Berger, A.N. and T.H. Hannan, 1989. "The Price-Concentration Relationship in Banking," *The Review of Economics and Statistics* 71(2): 291–299.
- Berger, A.N., 1995. "The Profit-Structure Relationship in banking--Tests of Market Power and Efficient Structure Hypotheses," *Journal of Money, Credit and Banking*, 27(2): 404–431.
- Berger, A.N., A. Demirguc-Kunt, R. Levine and J.G. Haubrich, 2004. "Bank Concentration and Competition: An Evolution in the Making," *The Journal of Money, Credit and Banking*, 36(3): 433–451.
- Born, P.H. and W.K. Viscusi, 1998. "The Distribution of the Insurance Market Effects of Tort Liability Reforms," *Brookings Papers on Economic Activity: Microeconomics, 1998*.
- Born, P.H. and M.M. Boyer, 2011. "Claims-Made and Reported Policies and Insurer Profitability in Medical Malpractice," *Journal of Risk and Insurance*, 78(1): 139–162.
- Born, P.H., M.M. Boyer and M.M. Barth, 2009. "Risk Retention Groups in Medical Malpractice Insurance: A Test of the National Chartering Option," *Journal of Insurance Regulation*, 3–33.
- Boyer, M.M. and C. Nyce, 2013. "An Industrial Organization Theory of Risk Sharing," Forthcoming, *North American Actuarial Journal*.
- Carroll, A., 1993. "Structure and Performance of the Private Workers' Compensation Market," *The Journal of Risk and Insurance*, 60(2): 185–207.
- Chidambaran, N.K., T.A. Pugel and A. Saunders, 1997. "An Investigation of the Performance of the U.S. Property-Liability Insurance Industry," *Journal of Risk and Insurance*, 64(2): 371–382.
- Choi, B.P. and M.A. Weis, 2005. "An Empirical Investigation of Market Structure, Efficiency and Performance in Property-Liability Insurance," *Journal of Risk and Insurance*, 72(4): 635–673.
- Demsetz, H., 1973. "Industry Structure, Market Rivalry and Public Policy," *The Journal of Law and Economics*, 16(1): 1–9.
- Evanoff, D.D. and D.L. Fortier, 1998. "Reevaluation of the Structure-Conduct Performance Paradigm in Banking," *Journal of Financial Services Research*, 1: 277–294.
- Fodness, D., B.E. Pitegoff and E.T. Sautter, 1993. "From Customer to Competitor: Consumer Cooption in the Service Sector," *Journal of Services Marketing*, 7(3): 18–25.

- Grace, M.F. and J.T. Leverty, 2008. "How Tort Reforms Affect Insurance Markets," Northwestern Law Research Symposium on Insurance Markets and Regulation.
- Hannan, T.H., 1991. "Bank Commercial Loan Markets and the Role of Market Structure: Evidence from Surveys of Commercial Lending," *Journal of Banking and Finance*, 15(1): 133–149.
- Hoyt, R.E. and L.S. Powell, 2006. "Assessing Financial Performance in Medical Professional Liability Insurance," *Journal of Insurance Regulation*, 25(1): 3–13.
- Karl, J. B., P.H. Born and W.K. Viscusi (2013). "The Relationship between the Markets for Health Insurance and Medical Malpractice Insurance," *Working Paper*.
- Lei, Y. and M.J. Browne, 2009. "Medical Malpractice Insurance Market Entry and Exit: 1994–2006," *Journal of Insurance Regulation*, 2–28.
- Lei, Y. and J.T. Schmit, 2009. "Factors Influencing the Demand for Reinsurance in the Medical Malpractice Insurance Market: A Focus on Organizational Form," *Journal of Insurance Regulation*, 48–71.
- Leverty, J.T., 2011. "The Cost of Duplicative Regulation: Evidence from Risk Retention Groups," *Journal of Risk and Insurance*, 79(1): 105–127.
- Marvel, H.P., 1978. "Competition and Price Levels in the Retail Gasoline Market," *Review of Economics and Statistics*, 60(2): 252–258.
- McShane, M.K., L.A. Cox and R.J. Butler, 2010. "Regulatory Competition and Forbearance: Evidence from the Life Insurance Industry," *Journal of Banking and Finance*, 34: 522–532.
- Neale, F.R., K.L. Eastman and P.P. Drake, 2009. "Dynamics of the Market for Medical Malpractice Insurance," *Journal of Risk and Insurance*, 76(1): 221–247.
- Reid, G.C., 1987. "Theories of Industrial Organization," New York and Oxford: Blackwell.
- Rhoades, S.A., 1985. "Market Share as a Source of Market Power: Implications and Some Evidence," *Journal of Economics and Business*, 37: 343–363.
- Salinger, M.A., 1984. "Tobin's q, Unionization and the Concentration-Profits Relationship," *RAND Journal of Economics*, 15(2): 159–170.
- Scherer, F.M. and D. Ross, 1990. "Industrial Market Structure and Economic Performance," Boston, MA: Houghton Mifflin.
- Shepherd, W.G., 1982. "Economies of Scale and Monopoly Profits," *Industrial Organization, Antitrust and Public Policy*, edited by J.V. Craven.
- Smirlock, M., T. Gilligan and W. Marshall, 1984. "Tobin's q and the Structure-Performance Relationship," *The American Economic Review* 74(5): 1051–1060.
- Viscusi, W. Kip, R. Zeckhauser, Patricia H. Born and G. Blackmon, 1993. "The Effects of the 1980s Tort Reform Legislation on General Liability and Medical Malpractice Insurance," *Journal of Risk and Uncertainty*, 6: 165–186.

- Viscusi, W.K. and P.H. Born, 1995. "Medical Malpractice Insurance in the Wake of Liability Reform," *Journal of Legal Studies*, 24: 463–490.
- Viscusi, W.K. and P.H. Born, 2005. "Damage Caps, Insurability and the Performance of Medical Malpractice Insurance," *Journal of Risk and Insurance*, 72: 23–43.
- Weiss, M.A. and B.P. Choi, 2008. "State Regulation and the Structure, Conduct, Efficiency and Performance of US Auto Insurers," *Journal of Banking and Finance*, 32: 134–156.

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Cummins, J. David and Richard A. Derrig, eds., 1989. *Financial Models of Insurance Solvency*, Norwell, Mass.: Kluwer Academic Publishers.

Manders, John M., Therese M. Vaughan and Robert H. Myers, Jr., 1994. “Insurance Regulation in the Public Interest: Where Do We Go from Here?” *Journal of Insurance Regulation*, 12: 285.

National Association of Insurance Commissioners, 1992. *An Update of the NAIC Solvency Agenda*, Jan. 7, Kansas City, Mo.: NAIC.

“Spreading Disaster Risk,” 1994. *Business Insurance*, Feb. 28, p. 1.

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