The Performance of Risk Retention Groups:

Does Organizational Form Matter?

Yi Yao[1]

Ph.D. Candidate

Actuarial Science, Risk Management and Insurance Department

Wisconsin School of Business

University of Wisconsin - Madison

Joan Schmit

American Family Insurance Chair in Risk Management and Insurance

Actuarial Science, Risk Management and Insurance Department

Wisconsin School of Business

University of Wisconsin – Madison

[1] We appreciate the useful discussions, comments and suggestions received from Rui Wang, Karen Cutts, Peng Shi and Shinichi Kamiya.
Contact information: Yi Yao, Email: yao4@wisc.edu Tel: (608) 886-6695. We are also grateful for financial support from the Professional Liability Underwriting Society (PLUS) Foundation.

Abstract

RRGs provide a unique opportunity to compare effects of regulatory options, given that RRGs in the U.S. have the choice to be organized either as a captive insurer or under the rules applicable to traditional insurers. With this option, we can compare the performance of captive RRGs and RRGs regulated as traditional insurers from solvency perspective using 2005-2007 NAIC data. The results indicate that captive RRGs have higher insolvency risk, calling for re-evaluation of captive regulations.

Keywords:

RRGs, Regulation, Organizational form, Solvency

I. Introduction

Insurer organizational form has received extensive attention in the academic literature for more than 25 years, as we try to understand the incentives and ramifications of operating under different regimes. In the professional liability area, particularly medical malpractice, this question has become increasingly important because of the proliferation of insurers operating under newly available forms, particularly risk retention groups (RRGs), and within that category, most especially RRGs operating as captives. As the General Accountability Office (GAO, 2005) points out, market conditions in the late 1990s and early 2000s led to a rapid rise in RRGs, with the majority of the increase coming in the health care professional liability area.[2] This proliferation is considered due in part to the spread of captive laws across the states, allowing RRGs to form with limited regulatory oversight. The GAO (2005) and others (see Cutts, 2007) have expressed concern that this shift in coverage to captive RRGs may be exposing health care providers to undesirable levels of risk. We undertake the analysis reported here, therefore, to consider differences in experience across RRGs operating as captives and those operating as "traditional insurers." Specifically, we compare solvency measure across the two organizational forms for the period 2005-2007. Our results are intended to offer input to policymakers, regulators, and policyholders as to the implications of permitting captive and non-captive RRGs to provide professional liability insurance.

1.1 Background for RRGs

Professional liability in the U.S., particularly that associated with health care providers, experienced several "crisis" periods during the 1970s, 1980s, and 1990s. While tort reform advocates responded to these periods with efforts to alter the liability landscape through modification of state legal systems, the Federal government also responded with passage of the 1986 amendments to the 1981 Liability Risk Retention Act. The 1981 Act was passed in response to concerns about a product liability insurance availability and affordability crisis. Under its provisions, entities could form risk retention groups (RRGs)

[2] The GAO reports that from 2002 to 2004, more RRGs were formed than in the prior 15 years, starting in 1986 when RRGs were made possible outside of the product liability insurance line. Of the 117 RRGs formed in that period, 96 of them provided coverage for health care providers.

that would provide product liability insurance to its member policyholders while being subject to more relaxed regulatory oversight than would a traditional commercial insurer. Most notable was the permission to be regulated by a single state even though policyholders operated in multiple states. In 1986, the Act was amended to incorporate the majority of liability lines, with workers' compensation be excepted. Originally, RRGs were regulated mostly in connection under the same requirements as "traditional insurers," but were allowed to follow the rules of just one jurisdiction rather than each state where its policyholders had exposures. With recent enactment of captive legislation in a variety of states, RRGs now have the option to operate either as a captive or as a traditional insurer. Furthermore, in most jurisdictions, the rules associated with captives are less rigorous than those associated with traditional insurers (see GAO, 2005 for a discussion).

Today, RRGs are actively operating in various liability areas including coverage for healthcare providers, professional services, transportation, environmental, government and institutions, property development, leisure, manufacturing and commerce, with approximately more than half of total gross premium generated by physicians and healthcare organizations. They have grown to act as a small, yet increasingly important, market player in liability lines. The number of RRGs has almost quadrupled since 2000, from 65 at the end of 2000 to 253 as of May 2009,[3] with gross premium written increasing from 1.7 billion in 2003 to an estimated 2.62 billion in 2008.[4]

1.2 Literature Regarding RRGs

Until recently, very little attention had been given to the operations of RRGs. With the discussion of a Federal Optional Charter, however, and furthermore, with increased influence of RRGs, more interest is flowing to an understanding of this organizational form. Born and Boyer (2008), for example, consider medical malpractice liability insurance RRGs in comparison with similar entities that are not RRGs to assess the potential effects of a Federal Optional Charter. They conclude that RRGs increase insurance

[3] Source: www.rrr.com (Risk Retention Reporter website)
[4] RRG '08 Premium Hovers Close to'06 $2.6 Billion Level, RRR Survey Finds, RRR, Vol22, No.10

availability by decreasing insurance concentration. Their results are similar to the GAO (2005). Born and Boyer comment specifically, however, that they did not consider the implication of RRGs on solvency, and urge future researchers to consider this question. Furthermore, Born and Boyer did not analyze differences between captive and non-captive RRGs.

The GAO (2005), however, did consider the differences between these two organizational forms. They identify a variety of reasons to be concerned about the captive form, but do not have statistical evidence to demonstrate that the concern has merit. Cutts (2007) also expresses concern, yet presents evidence that a greater percentage of RRGs formed as traditional insurers has become insolvent than that of RRGs formed as captives. The evidence on the captive formation, however, remains young, and a new "crisis" period has not emerged since the significant movement to use the captive form.

One line of reasoning presented by the GAO was the concern that in some instances, RRG members are not equity holders. As policyholders but not owners, these members have limited incentive to take an active interest in the organization's practices. This same concept is the foundation of work done by Lei and Schmit (2008) in which they compare physician-owned medical malpractice insurers to non-physician-owned insurers. Their results suggest that physician-owned insurers are more conservative and potentially better managed because the physicians have greater interest in stability over profits. Further, physicians are expected to have better information about the underlying risks than will non-health care provider managers. Lei and Schmit did not, however, consider differences between captive and non-captive insurers.

Overall, therefore, we anticipate differences between RRGs formed as captives versus those formed as traditional insurers, but are unaware of empirical analysis of those differences. We intend to fill that gap here by comparing measure of solvency.

1.3 Solvency Measure of RRGs

We adopt insurer's capital to asset ratio as a measure of solvency or risk for performance of RRGs.

Pottier and Sommer (2002) provides an extensive study of risk measures of insurance company. They compare insurers' capital to asset ratio, Risk Based Capital (RBC) ratio, FAST score, A. M. Best's financial strength rating, and A. M. Best's Capital Adequacy Relativity (BCAR) ratio in each measure's ability to predict insurer insolvency. Pottier and Sommer conclude that the predictive ability of risk measures produced by the private sector are superior to those produced by the public sector, i.e. Best ratings are better than FAST, and BCAR is better than RBC. Moreover, they found that surprisingly, the capital to asset ratio, which serves as a proxy for a simple non-risk-adjusted ratio, performs even better than RBC ratio. Because the NAIC does not reveal insurer FAST scores and Best's does not release BCAR which is unavailable for all RRGs, we rely on the capital to asset ratio as our measure of risk.

II. Data

To compare solvency performance between captive and non-captive RRGs, we use data extracted from the 2005-2007 National Association of Insurance Commissioners (NAIC) Property-Casualty annual Statement Database. The 2005 data report 194 RRGs, rising to 210 in 2006, and 224 in 2007, bringing the total sample size of RRG-years to 628. From this sample, we deleted all the RRGs without premium and loss experience for the entire period from 2005 to 2007, leaving the valid sample size of 583 RRG-years. Of these, 511 relate to captives and 72 to non-captives.

Table 1 reports summary statistics stratified by organizational form, RRGs regulated as captives and non-captives. The average (median) captive RRG has approximately $27.2 (10.9) million in total assets, while the average (median) non-captives RRG has significantly larger total assets with roughly $32.6 (15.5) million. In terms of profitability, the average (median) captive RRG has a return to policyholders' surplus (RPS) at 6.1% (7.6%) and the corresponding non-captives RRG has RPS at 7.3% (6.3%). As to the loss experience, Captive RRGs has a more favorable one, with average (median) loss ratio at 0.544 (0.555), compared to those of non-captives RRGs' at 0.640 (0.664).

In terms of financial strength indicator, the traditional insurer RRGs in this sample have an average (median) capital asset ratio of 1.164 (0.4), twice as large as that of the captive RRGs at 0.491 (0.346). However, the captive RRGs outpaced non-captive RRGs in their premium growth rate, at 0.672 (0.076) and 0.278 (0.034) respectively.

III. Empirical Analysis and Results

3.1 Solvency model

We estimate the following model as a measure of an insurer's solvency, in which the dependent variable is the capital to assets ratio (CAR) for RRG i in year t. A higher CAR is associated with lower risk of insolvency (or stated alternatively as greater strength) because it implies a larger buffer in case of emergencies. We expect risk (or strength) to be a function of several variables including company size, leverage, profitability, liquidity, asset mix, growth, and organizational form (See Lee and Urrutia, 1996, for a discussion).

The regression model takes the following form:

$$\mathrm{CAR}_{i,t} = \alpha_0 + \alpha_1 \mathrm{Size}_{i,t} + \alpha_2 \mathrm{Leverage}_{i,t} + \alpha_3 \mathrm{Profitability}_{i,t} + \alpha_4 \mathrm{Liquidity}_{i,t} + \alpha_5 \mathrm{AssetMix}_{i,t} + \alpha_6 \mathrm{Growth}_{i,t} + \alpha_7 \mathrm{OrganizationalForm}_{i,t} + \epsilon_{i,t}$$

Where:

$$\mathrm{CAR}_{i,t} = \frac{\text{Capital}}{\text{Total assets}} \text{ for insurer i in year t}$$

$$\mathrm{Size}_{i,t} = \log\left(\mathrm{Assets}_{i,t}\right) = \text{logrithm of total assets for insurer i in year t}$$

$$\mathrm{Leverage}_{i,t} = \frac{\text{Net premiums written}}{\text{Policyholders}'\text{surplus}} \text{ for insurer i in year t}$$

$$\mathrm{Profitability}_{i,t} = \text{Return to policyholders}'\text{surplus (RPS)} = \frac{\text{Net income}}{\text{Policyholders}'\text{surplus}} \text{ for insurer i in year t}$$

$$\mathrm{Liquidity}_{i,t} = \frac{\text{Current asset}}{\text{Current liability}} \text{ for insurer i in year t}$$

$$\mathrm{AssetMix}_{i,t} = \frac{\text{Market value of invested bonds}}{\text{Total admitted assets}} \text{ for insurer i in year t}$$

$$\mathrm{Growth}_{i,t} = \frac{\text{Net premium written}_{i,t} - \text{Net premium written}_{i,t-1}}{\text{Net premium written}_{i,t-1}} \text{ for insurer i in year t}$$

$$\mathrm{OrganizationalForm}_{i,t} = 1, \text{ if insurer i regulated as captive in year t, and 0 otherwise}$$

We include a size variable (log of total assets) in the model because a larger company typically can accept additional levels of risk at lower cost than a smaller company. Therefore we anticipate an inverse relationship between size (Assets) and strength (CAR).

We also anticipate an inverse relationship between strength (CAR) and leverage, which we measure as net premium written to surplus. With each premium dollar written, the insurer exposes itself to increased levels of loss. In essence, the insurer is accepting contingent debt. They receive a loan from the policyholder in the form of premium that is paid back only upon the occurrence of a specified type of loss. Once the loan is called, however, it is large relative to the premium. Thus, the more premium accepted, the larger that contingent debt. Similarly, a rapidly growing insurer exposes itself to increasing risk by taking in more contingent debt before it can harness surplus to pay for future losses. Harrington, Danzon, and Epstein (2006) show that growth is a good predictor of solvency risk in the medical malpractice insurance line.

Return on policyholders' surplus (RPS), on the other hand, is expected to be positively related to financial strength, as increased profits increase funds available to pay expenses. Similarly, a high liquidity ratio is expected to be positively related to strength because it indicates availability of funds to cover losses as they occur. The liquidity raio is measured as liquid assets divided by liquid liabilities. Asset mix as defined here further is anticipated to be positively related to strength (CAR). Our measure of asset mix is defined as the market value of invested bonds to total admitted assets, which represents a conservative investment strategy.

Our variable of interest, however, is organizational form. Based on the GAO (2005), Cutts (2007), and Lei and Schmit (2009), we anticipate that captive insurers (given the value "1" for our organizational form measure) will be negatively related to strength (CAR).

3.2 Results of Solvency Model

Regression results are reported in Table 2. They reveal that captive RRGs have a significantly lower CAR than non-captive RRGs, indicating greater risk.

Other results are consistent with expectations. Larger firms demonstrate greater risk while those with more conservative investment mix demonstrate lower risk. We also observe that a higher leverage ratio is related to greater risk, although at a weak significance level. These results are consistent with previous literature, where Lee and Urrutia (1996) also found that both bond ratio and leverage ratio yield a positive relationship with insurer's risk. Harrington and Nelson (1986) use a different way to measure asset mix by adding market value of common stocks divided by admitted assets, and it is reported to be negatively related to solvency measure, which confirms our result of investment strategy from another perspective.

The results reveal that it's important to emphasis a more rigid regulation of captive RRGs, as proposed by NAIC Task Force, considering the unfavorable condition of financial strength measured by capital assets ratio of captive RRGs in recent years. Especially, given the condition that state sponsored insurance insolvency guaranty funds are not available for RRGs, the security for the RRG is solely provided by the owner-insured's long-term commitment to the organization, and their ability to manage their own risk and the operations of the RRG with the expertise and support of the attorney-in-fact.

3.3 Detection of multicollinearity

As we have included a number of independent variables in our model, multicollinearity could be a potential problem causing the insignificance of each individual variable. Therefore, we calculated the variance inflation factor (VIF), as well as the covariance matrix for the model, trying to detect the existence of severe multicollinearity problem.

The results of VIF and covariance matrix are presented in table 3 and table 4 respectively. The solvency model has a mean VIF around 1.1, which is far below the cutoff value of 5, suggesting that multicollinearity is not a serious problem in our model.

IV. Conclusion

In this article we compare the performance of captive RRGs and non-captive from solvency perspective using recent NAIC data. Our results indicate that captive RRGs are less financial sound than non-captive RRGs.

RRGs are growing in importance in the professional liability market, and the majority of the growth is occurring in captive formation. Given the results reported here as well as the concern expressed by the GAO (2005), we believe that the NAIC's increased attention on captive RRGs is warranted. Furthermore, we believe that industry members should be involved in the discussions regarding appropriate regulation of these RRGs so that a proper balance between sufficient flexibility to meet market needs and sufficient regulatory oversight to protect policyholders is found. Current discussion about a Federal Optional Charter further highlights the importance of industry input.

Reference

Born, Patricia, Martin M. Boyer, 2008, "Risk Retention Groups in Medical Malpractice Insurance: A Test of the Federal Chartering Option," presented at the Searle Center Research Symposium on Insurance Markets and Regulation, Chicago, IL, April.

Choi, Byeongyong Paul and Mary A. Weiss, 2005, "An Empirical Investigation of Market Structure, Efficiency, and Performance in Property-Liability Insurance," *The Journal of Risk and Insurance*, 72, 4, 635-673.

Cutts, Karen, 2007, "Regulation RRGs as Captives Shows Better Solvency Record," *National Underwriter. P&C*, Nov. 19, 2007, 111, 43, 28.

Cummins, J. David, Martin F. Grace and Richard D. Phillips, 1999, "Regulatory Solvency Prediction in Property-Liability Insurance: Risk-Based Capital, Audit Ratios, and Cash Flow Simulation," *The Journal of Risk and Insurance*, 66, 3, 417-458.

Cummins, J. David, Scott E. Harrington and Robert Klein, 1995, "Insolvency Experience, Risk-Based Capital and Prompt Corrective Action in Property-Liability Insurance," the Wharton Financial institutions Center working paper.

Harrington, Scott, Patricia M. Danzon, and Andrew J. Epstein, 2006, "'Crises' in Medical Malpractice Insurance: Evidence of Excessive Price-Cutting in the Preceding Soft Market," Dynamics of Insurance Markets: Structure Conduct, and Performance in the 21st Century, *Journal of Banking and Finance* Conference, Philadelphia, Pa.

Harrington, Scott and Jack M. Nelson, 1986, "A Regression-Based Methodology for Solvency Surveillance in the Property-Liability Insurance Industry," *The Journal of Risk and Insurance*, 53, 4, 583-605.

Kraus, Alan and Stephen A. Ross, 1982, "The Determination of Fair Profits for the Property-Liability Insurance Firm," *The Journal of Finance*, 37, 4, 1015-1028.

Lee, Suk Hun and Jorge L. Urrutia, 1996, "Analysis and Prediction of Insolvency in the Property-Liability Insurance Industry: A Comparison of Logit and Hazard Models," *The Journal of Risk and Insurance*, 63, 1, 121-130.

Lei, Yu and Joan T. Schmit, 2008, "Influences of Organizational Form on Medical Malpractice Insurer Operations," presented at the Searle Center Research Symposium on Insurance Markets and Regulation, Chicago, IL, April.

Mayers, David, Clifford W. Smith, Jr., 1988, "Ownership Structure across Lines of Property-Casualty Insurance," *Journal of Law and Economics*, 31, 2, 351-378.

Pottier, Steven and David W. Sommer, 2002, "The Effectiveness of Public and Private Sector Summary Risk Measures in Predicting Insurer Insolvencies," *Journal of Financial Services Research* 21, 1, 2, 101-116.

Ren, Yayuan and Joan T. Schmit, 2009, "Measuring Franchise Value of Insurance Companies," working paper.

Risk Retention Reporter, 2009, "NAIC 'Sensitivity Test' Could Pose Problems for RRGs," 23, 3.

Risk Retention Reporter, 2009, "Regulation of RRGs Under Uniform Standards Will Be Required by 2011," 23, 3.

Risk Retention Reporter, 2007, "Risk Retention Group 2006 Premium Grows 7.7% to $2.6 Billion," 21, 7.

Risk Retention Reporter, 2008, "RRG '08 Premium hovers Close to '06 $2.6 Billion Level, RRR Survey Finds," 22, 10.

Risk Retention Reporter, 2008, "2008 Risk Retention Reporter Survey of Risk Retention Group Premium and Number of Insureds," 22, 10.

United States Government Accountability Office (GAO), 2005, "Risk Retention Groups Common Regulatory Standards and Greater Member Protections Are Needed."

Graph 1: Gross premium written by RRGs from 2003-2008 (in million dollars)

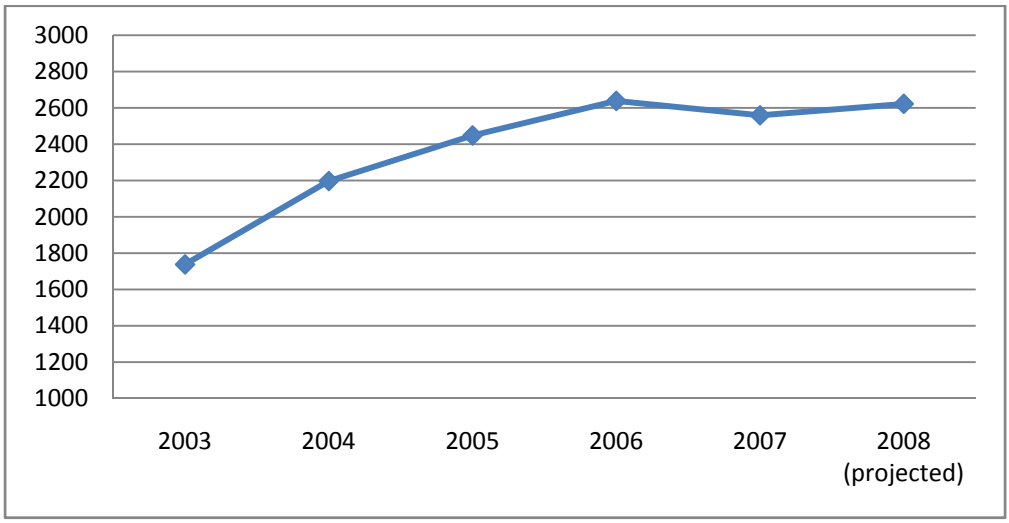

Table 1: Summary Statistics stratified by organizational form

	RRGs Regulated as Captives					
Variable	N	Mean	Median	Std. Dev.	Min.	Max.
Total assets	511	27213907	10869779	9848471	350465	504000000
Number of states	511	12.587	4	15.378	2	53
Return to surplus	511	0.061	0.076	0.0288	-3.409	0.634
Advertisement ratio	511	0.003	0	0.016	0	0.2
Market share	511	0.005	0.002	0.010	0	0.115
Herfindahl index	511	174.8801	170.3626	10.717	163.790	188.890
Loss ratio previous	511	0.544	0.555	0.754	-9.137	7.765
Invested bonds ratio	511	0.298	0.239	0.299	0	0.952
Capital assets ratio	511	0.491	0.376	0.958	0.002	18.006
Premium surplus ratio	511	0.904	0.704	0.870	-1.924	5.982
Liquidity ratio	511	1.334	0.594	5.260	-56.881	65.895
Premium growth rate	511	0.672	0.076	5.101	-22.866	81.754
	RRGs Regulated as Non-captives					
Variable	N	Mean	Median	Std. Dev.	Min.	Max.
Total assets	72	32551697	15541408	50681757	725825	244000000
Number of states	72	15.153	6	17.396	2	53
Return to surplus	72	0.073	0.063	0.114	-0.173	0.507
Advertisement ratio	72	0.006	0	0.017	0	0.095
Market share	72	0.009	0.002	0.017	0	0.074
Herfindahl index	72	175.393	170.362	10.847	163.790	188.890
Loss ratio previous	72	0.640	0.664	0.402	0	2.081
Invested bonds ratio	72	0.443	0.519	0.287	0	0.842
Capital assets ratio	72	1.164	0.400	3.572	0.016	26.138
Premium surplus ratio	72	0.684	0.602	0.564	0.037	3.556
Liquidity ratio	72	6.667	0.304	45.835	0.031	389.222
Premium growth rate	72	0.278	0.034	1.067	-1	7.192

Table 2: Regression results for solvency model[5]

Variable:	Coefficient	Standard Error	p value
Size	-0.3659***	0.054	0.000
Leverage	-0.130*	0.075	0.082
Profitability	0.218	0.231	0.348
Liquidity	-0.001	0.003	0.691
Asset mix	1.086***	0.229	0.000
Growth	-0.006	0.013	0.633
Organizational form	-0.567***	0.189	0.003
Observation	583		
P value in F-test	0.0000		
Adjusted R square	0.1029		

Table 3: VIF for the solvency model

Variable	VIF
Size	1.24
Leverage	1.07
Profitability	1.07
Liquidity	1.03
Asset mix	1.28
Growth	1.02
Organizational form	1.05
Mean VIF	1.11

Table 4: Covariance matrix for the variables in solvency model

Covariance	CAR	Size	Leverage	Profitability	Liquidity	Asset mix	Growth	Org. form
CAR	1.0000							
Size	-0.2004	1.0000						
Leverage	-0.1260	0.0674	1.0000					
Profitability	0.0561	0.1176	-0.1858	1.0000				
Liquidity	0.0062	-0.0895	-0.0598	-0.0067	1.0000			
Asset mix	0.1231	0.4117	-0.0862	0.1809	-0.0939	1.0000		
Growth	-0.0089	-0.1081	0.0380	0.0132	0.0649	-0.0740	1.0000	
Org. form	-0.1427	-0.0547	0.08663	-0.0146	-0.1043	-0.1581	0.0270	1.0000

[5] ***,**, and * indicate two-tailed statistical significance at 0.01, 0.05 and 0.10 levels, respectively.