A Synopsis of

Costs and Benefits of Reinsurance

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Costs and Benefits of Reinsurance

For every insurer, there is a gap between the date of accident/loss occurrence and date of settlement; during this period, insurers must remain economically viable so as to carry out their contractual duty to policyholders. Insurers have many methods to manage their capital structure, but the topic of this paper is the method of reinsurance. Reinsurance is essentially a capital structure decision because of its effect on surplus, loss reserves, and unearned premium. When insurers transfer risk to a reinsurer they can receive a number of benefits, examples of which are increased capacity, limited losses, and a smoother insurance cycle. However, the costs of reinsurance can be rather expensive, with many insurers paying several times the price of the actuarial risk transferred. This synopsis addresses "The Costs and Benefits of Reinsurance," by J. David Cummins, Georges Dionne, Robert Gagne, and Abdelhakim Nouira[1]. In the analysis, costs are measured as a function of 4 outputs, with reinsurance being an output quality variable. The benefits are measured by analyzing changes in the growth rate in ceded premiums to non-affiliate reinsurers relative to the change in the growth rate in the volatility of the loss ratio. The analysis is directed at testing the impact that different quantities of reinsurance purchased by different firms has on both the costs and benefits of purchasing it. Before delving into the above analysis, it is first necessary to understand the costs and benefits of reinsurance, and why the reinsurance market exists as it does today.

Reinsurance costs, as mentioned, can be quite high. Generally reinsurance agreements are contracts in which the insurer's risk is priced and transferred to the reinsurer, with the reinsurer returning a ceding commission to the transferee. Reinsurance risk pricing can be above the actuarial price of the risk assumed, and additionally insurers will pay a loading fee on top of that. Total

[1] Cummins, J. David David, Dionne, Georges, Gagné, Robert, and Nouira, Abdelhakim. *The Costs and Benefits of Reinsurance. June 2008*. Available at SSRN: http://ssrn.com/abstract=1142954

consideration given for reinsurance can add up to be rather expensive, even with the ceding commission taken into account. There are obviously benefits that seem to outweigh these costs, or the reinsurance market would not exist in the size it does today. Ideally, an insurer's risk pools consist of mostly statistically independent risks, so as to limit losses and predict losses (i.e. reduce the uncertainty of losses) with reasonable accuracy. A catastrophe violates this principle of independence, and insurers can be suddenly hit with a large number of losses that can drastically reduce their surplus, the effects of which will be increased borrowing costs, limited capacity, and if great enough, solvency issues. But catastrophe losses across countries are generally independent risks from one another; this feature allows reinsurers to harness the principle of statistical independence and diversify such risks in a global marketplace. Reinsurers can thus afford to take on the catastrophic risk that could potentially prove to be ruinous to local insurers, proving themselves greatly beneficial to an insurer's capital structure. When these large catastrophic losses occur, the insurer's ability to raise capital is hampered, so it turns to reinsurance as a substitute. However, the same catastrophes often cause reinsurers to raise prices, causing strain on insurers when they can least afford it. Fortunately, hard markets such as these do not last very long due to capital markets' responsiveness to reinsurers' needs. Once reinsurers are able to raise capital they can lower prices, which eventually shortens the time it takes for capital markets to open back up to insurers. Thus, a hidden benefit of reinsurance is the smoothing out of the insurance underwriting cycle.

Before the modeling and analysis of reinsurance is addressed, a presentation and explanation of the data used is in order. The data used in the authors' research is pulled from the National Association of Insurance Commissioners (NAIC). The data selected represents multi-line property/casualty insurers with positive output (i.e. they are writing business) in four lines: long tail personal, short tail personal, long tail commercial, and short tail commercial (*long tail* refers to losses where the settlement is in the distant future from the loss event's occurrence; an example would be

an asbestos claim for mesothelioma. *Short tail* refers to losses where the settlement is a reasonably shorter time after the loss event's occurrence; a standard auto collision claim would be an example). The sample selected consists of 554 firms and policies written by those firms account for approximately 87% of the total premium volume for 2003. Any firms that are not currently operating or insolvent are left out of the analysis for obvious reasons. The authors found that on average, insurers ceded $124 million in premiums to reinsurers, which accounts for roughly 21% of premiums written. Insurers also generally wrote more personal than commercial insurance, and a higher share of liabilities were long tailed rather than short tailed. The insurers in the sample also had an average volatility in loss ratio of 9%, and were more likely to be organized as groups and use independent agents as a distribution method.

In the model the authors use, total cost is represented as the cost of net business assumed, the cost of underwriting ceded premiums to non-affiliates, and the cost of capital; the purpose here is to find the total costs of *all business written*. Overall, total costs are a function of the amount of reinsurance purchased, asset liability management activity, financial intermediation activity, and all administrative costs. The cost outputs are measured as the present value of all incurred losses arising from total business written in the *current* year. Since total business written is being analyzed, losses arising from ceded premiums should also be included. The amount of reinsurance purchased is an attribute of the output, as it should affect the amount of losses that insurers incur during the year, and ultimately, the loss ratio. Financial intermediation and risk management are both intermediate outputs in the study. Financial intermediation is defined as the investing activities of the firm, and is measured as the total value of assets under management. For the purpose of this study, the authors rely only on financial risk for risk management activities, which in this case is interest rate risk. Reducing the interest rate (financial) risk can reduce the discount in premium rates for insolvency risk, and thus will have an effect on the outputs. Interest rate risk is measured as the dollar duration

of surplus, much like the duration on a bond or other fixed income security. The variable inputs for total costs consist of three labor inputs (risk management labor cost, financial intermediation labor cost, administrative labor cost), materials and business services costs, and the cost of equity and debt capital.

The benefits of reinsurance are analyzed with an emphasis on changes in the volatility of the loss ratio. In this analysis, the growth rate in the dollar quantity of reinsurance purchased is the independent variable, and the growth rate in the volatility of the loss ratio is the dependent variable. The authors want to control for several variables to make sure their results are not skewed or misinterpreted. Since change in an insurer's underwriting risk exposure year over year and change in any underwriting diversification strategies will have an influence on the volatility of the loss ratio, these two factors are accounted for and controlled.

The analysis of the costs yielded data about the operating nature of different insurers. From an observational analysis of the 554 firms' data, the authors found that insurance groups tend to have higher asset-liability risk, a larger number of assets under management, and generally use more reinsurance that unaffiliated single insurers. Further, firms that utilize independent agents generally have lower asset-liability risk, a smaller number of assets under management, and use less reinsurance than direct writers. The statistical analysis (through use of the models mentioned earlier) shows that increased investing activities decrease the costs of the insurance activities, and that higher surplus durations and lower risk management activities increase the costs of insurance activities; the increase in insurance activity costs due to lower risk management activities can easily be explained the increase in the cost of capital, relating to the riskier nature of a firm engaging in less risk management activities. The analysis also found that the more reinsurance a primary company purchases, the higher its costs of performing insurance activities. This was in line with the authors' predictions.

The authors' statistical analysis of benefits show that an increase in the premiums ceded to reinsurers significantly decreases the volatility in the loss ratio, proving that reinsurance does indeed stabilize the loss experience of an insurer. Further, a higher growth rate in share of premiums ceded to reinsurers also significantly reduces the volatility in the loss ratio. The analysis also shows that writing more premiums (gaining market share) or further diversifying underwriting activities in place of using reinsurance both do not significantly alter the volatility in the loss ratio. This would make sense as an insurance company, due to fortune and human error, cannot completely control all risk; thus, reinsurance offers a solution to control the residual risk that the insurer is not able to.

The data clearly show that reinsurance does significantly increase the insurer's costs of doing business, but it also can reduce the volatility in the loss ratio. If the price of reinsurance is not prohibitively high, the purchase of reinsurance can yield benefits that significantly outweigh the costs. Some of these benefits are highly visible, such as increasing an insurer's surplus (resulting in an increase in underwriting capacity), decreasing the risk of becoming insolvent, decreasing the cost of capital, and decreasing uncertainty in the amounts of loss the insurer might experience in the future. A less visible benefit is that continued demand for reinsurance leads to the operation of a healthy reinsurance market, which as discussed earlier in the synopsis, leads to a smoother underwriting cycle and can significantly reduce the time the industry spends in a hard market. However, such benefits are not free and insurers must accordingly weigh the costs and benefits of any decision to purchase a certain quantity of reinsurance.