Title: Empirical Measure of Reserve Level Uncertainty Relative to Discounting and Financial Solvency for a Monoline Medical Professional Liability Insurer.

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EMPIRICAL MEASURE OF RESERVE LEVEL
UNCERTAINTY RELATIVE TO DISCOUNTING AND FINANCIAL SOLVENCY
FOR A MONOLINE MEDICAL PROFESSIONAL LIABILITY INSURER

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A Review By William J. Hibberd

The topic of this paper is particularly timely given the attention currently being given to discounting by the GAO and IRS. The authors use a monoline medical professional liability insurer to demonstrate the use of investment income to offset uncertainty in carried loss reserves. While a company such as this has perhaps the largest degree of uncertainty, the ideas are valid for any type of insurer.

Uncertainty is generally expressed as a confidence band about the expected value. Three recent papers ([1], [2], and [4]) discuss confidence intervals in the context of loss reserve estimates. The authors' paper does not give a method for calculating confidence intervals. It simply shows the range of estimates that can be produced from the same data. The size of the range here is an indication of a great deal of uncertainty.

The authors' idea is to translate the confidence band into something more familiar. This is called the interest rate uncertainty differential. It is defined as the interest rate which equates the discounted high estimate with the expected value. The method in the paper actually overstates the uncertainty differential, if in fact, the estimates represent the full range. Only the chance that reserves are inadequate should be offset, i.e. there should be no penalty for the chance that reserves will ultimately be redundant.

The major point of the paper is the statement that the lower bound on carried reserves should be the present value of the most conservative estimate. While a

much more definite standard would be needed in practice, the statement is equivalent to requiring solvency (equalization, fluctuation) reserves. These reserves are mandatory in the insurance codes of several European countries. Pesonen (6, p. 248) defines the solvency reserve as "that part of the technical reserves which exceed the present value of the net expected insurance liabilities. It is required because conventional technical reserves do not take into account the random nature of the claims amount."

Arata has demonstrated (see [2]) the use of solvency reserves for a hypothetical captive insurer. Using simulation he has shown that solvency reserves reduce the probability of an insolvency. Several other papers (see [3], [5], [6], and [7]) show methodologies to calculate the solvency margins. It should be pointed out that the term solvency reserve is really a misnomer. All the above methods deal only with loss distributions. An insurance company faces many other risks that could potentially threaten solvency, such as investment losses, natural disasters, or failure of a reinsurer. These risks are not easily quantifiable, and hopefully (see [5, p. 246]) a solvency margin calculated using one of the above methods will be sufficient.

Explicit calculation of a solvency reserve is not required in the U.S. This doesn't mean they don't exist. Pesonen's definition implies they exist whenever the carried reserves exceed the present value of the ultimate losses. Many analysts feel that the reserves for the industry as a whole are inadequate. The Insurance Services Office feels the inadequacy is 10% of carried reserves. While one can disagree with these opinions, many insurers surely rely on the implicit solvency margin to remain solvent.

Discounting of reserves can be a serious threat to solvency for some insurers.

As an example, assume the authors' Physicians Insurance Company in Exhibit B carried $82,600 instead of the full value of losses of $96,000. This deficiency of 15% is well within the 40% margin for error provided by the future investment income. If allowed to discount, this insurer would carry less than half of the ultimate losses. There is now no margin for error to compensate for the initial 15% deficiency. This deficiency will eventually have to be funded out of current operations.

Solvency margins can alleviate much of the concern over discounting. The major stumbling block would probably be the IRS, which seems to feel that reserves are redundant. The authors' paper can be said to be possible short and long term approaches to minimizing the impact of discounting on solvency. In the short run, a required interest uncertainty differential would reduce the discount rate used. In the long run, if one discounts an explicit calculation of solvency reserves is needed. It is hoped that this paper and other recent papers will lead to further developmental-work on solvency reserves.

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