

Economics, December 1992, 15(4): 485-508. (Reprinted with permission of North-Holland Publishing Company.)

Portfolio Selection by Mutual Insurance Companies and Optimal Participating Insurance Policies, by Christian Gollier (Groupe HEC, Paris, France) and Serge Wibaut (Facultés Universitaires Notre Dame de la Paix, Namur, Belgium)

The specific problem of portfolio selection by insurance companies is addressed in this paper. Assuming risk aversion on capital markets, it is optimal to transfer part of the investment risk to policyholders (participating policies), as done in life insurance. This remark leads to two results. First, it implies that underwriting profits should be countercyclic. Second, it allows for riskier investments by the insurer. Indeed, optimal risk transfer increases the risk tolerance of the pool. Regulatory constraints on investment behavior in the insurance industry may then be questioned when participating policies are provided. *Insurance: Mathematics and Economics*, October 1992, 11(3): 237-245. (Reprinted with permission of North-Holland Publishing Company.)

A Simulation Procedure for Comparing Different Claims Reserving Methods, by Teivo Pentikäinen and Jukka Rantala

The estimation of outstanding claims is one of the important aspects in the management of the insurance business. Various methods have been widely dealt with in the actuarial literature. Exploration of the inaccuracies involved is traditionally based on a *post-facto comparison* of the estimates against the actual outcomes of the settled claims. However, until recent years it has not been usual to consider the inaccuracies inherent in claims reserving in the context of more comprehensive (risk theoretical) models, the purpose of which is to analyse the insurer as a whole. Important parts of the technique which will be outlined in this paper can be incorporated into over-all risk theory models to introduce the uncertainty involved with technical reserves as one of the components in solvency and other analyses (Pentikäinen et al., 1989).

The idea in this paper is to describe a procedure by which one can explore how various reserving methods react to fictitious variations, fluctuations, trends, etc. which might influence the claims process, and, what is most important, how they reflect on the variables indicating the financial position of the insurer. For this purpose, a claims process is first postulated and claims are simulated and ordered to correspond to an actual handling of the observed claims of a fictitious insurer. Next, the simulation program will "mime" an actuary who is calculating the claims reserve on the basis of these "observed" claims data. Finally, the simulation is further continued thus generating the settlement of the reserved claims. The difference between reserved amounts and settled amounts gives the reserving (run-off) error in this particular simulated case. By repeating the simulation numerous times (Monte Carlo method) the distribution of the error can be estimated as well as its effect on the total outcome of the insurer.

By varying the assumptions which control the claims process the sensitivity of the reserving method vis-à-vis the assumed phenomena can be tested. By