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LIFE OFFICE MODELLING

SEMINAR, 27 JANUARY 1995

A seminar on life office modelling was held by the Faculty of Actuaries on Friday 27 January at the Business Executive Centre at Heriot-Watt University. The seminar was attended by about 40 participants.

Following an introduction by the Chairman, Mr David Forfar, the first presentation was given by Mr Angus Macdonald, who described the model office as a key tool in the actuarial management of a life office. He emphasised the distinction between the whole model, which covers all stages from definition to solution of a practical problem, and the computational tool, which is just one part of the model.

Mr Macdonald then outlined the various types of model and how they are used. In a deterministic model the scenario is defined, whereas in a stochastic model some of the assumptions, usually those relating to inflation rates and investment returns, have a random element. Furthermore, there are static and dynamic models; the latter permit decision rules to amend the assumptions during the projection according to the global model results to date. A static deterministic model is useful for projecting revenue accounts, and can be used for dynamic solvency testing, although a dynamic deterministic model may be preferable for the latter. Stochastic models are invariably dynamic, and are used for asset liability modelling and solvency investigations.

Finally, Mr Macdonald contrasted profit tests, which are carried out for one policy at a time, with the model office, where the decision rules are at a much higher level than individual policies. He concluded that to construct a model office by adding profit test results is the wrong approach.

The second session was presented by Mr Henry Pollock, on the subject of modelling data. This important subject is often neglected in comparison to the attention given to the assumptions and the calculation processes used in the model. Mr Pollock expressed the view that the purpose of the model will determine the data to be used, and too much detail can be counter-productive. He went on to discuss possible sources of data, for example servicing files, valuation records or Schedule 5 if modelling a competitor, and considerations affecting transfer and formatting of data. Finally, the question of using grouped or individual policy data was discussed, along with considerations for grouping data and the importance of using judgement in this area.

There was a lively discussion amongst the participants who debated the

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advantages of using sampled policies and grouped data.

The final formal presentation was given by Mr Richard Humble on the subject of designing and using a model office program.

He started by considering stochastic modelling, which provides an objective method of assessing risks and analysing alternative strategies. If stochastic techniques are not used, these decisions are based on judgement, and, in Mr Humble's view, the use of judgement without support from a stochastic model may lead to a different assessment from that which would be made if such a model had been used.

Mr Humble highlighted the importance of a good asset model, although he noted that, for some investigations, an imperfect asset model could still be useful. In addition, he described the importance of modelling the effects of asset results on liabilities, both direct, e.g. bonus declarations, and indirect, e.g. surrenders increasing if investment performance is poor. The points made were illustrated using the results of a stochastic investigation into a French capitalisation bond with guaranteed bonus.

Dynamic solvency testing was described as being similar to selected stochastic simulations, but using deterministic parameters, thus reducing the number of simulations. Mr Humble expressed the view that it is preferable for the probability of occurrence of the selected scenarios to be tested using a stochastic model. Dynamic solvency testing is available to those companies without the ability to carry out stochastic modelling, making it more appropriate to adopt as a requirement for regulatory reporting. It also makes presentation of results easier to a non-technical audience.

Mr Humble concluded by considering the future of modelling. His view is that both stochastic modelling and dynamic solvency testing will become significantly more important in the future, driven by both regulatory requirements and the need to provide information to analyse and quantify the effects of alternative strategies.

During the day, there were also two workshop sessions in which the participants, divided into six groups, worked with a simple model office using the program 'MO', which has been developed by Mr Angus Macdonald for research use. Each group was asked to consider two problems, both of which were topical.

For the first problem, the groups had to report to the directors of two separate offices (which were broadly similar, but with different past persistency experience) on the financial consequences of various proposed market-driven improvements in surrender value terms.

The second problem required the groups to consider their responses to a regulatory requirement for the introduction of dynamic solvency testing, using four mandatory scenarios (an immediate 25% drop in equity prices, a temporary reduction in gilt yields and equity price growth, a temporary

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increase in lapse rates and a temporary increase in new business growth), together with the freedom to include other scenarios.

The ease of setting up new investigations and the rapid performance of 'MO' enabled each group to carry out model office investigations and analyse the results under several different scenarios in the time available.

The seminar ended with a report back from each group on the workshop sessions. Each group had had different experiences, and some different conclusions had been reached, but there was consensus that the experience of using the model had been valuable, as had working in groups to determine which questions to ask and how to interpret the results. Many groups reported that some results had not been in line with their expectations, and that they had particularly benefited from the ensuing discussions seeking the explanation for these results.

Following the seminar, the participants were all provided with a copy of 'MO' to enable them to continue the research.

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