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22nd INTERNATIONAL CONGRESS OF ACTUARIES, SYDNEY, AUSTRALIA, 21–27 OCTOBER 1984

THE scientific programme covered the following subjects:

NATIONAL REPORTS

Political, social and other influences on the actuarial profession.

SUBJECTS FOR INDIVIDUAL PAPERS

1. Social, economic and political pressures affecting risk underwriting practices and benefit provisions.
2. Design of retirement and other benefits.
3. Adequacy of reserves (including considerations of solvency).
4. Development in computer technology and mathematical modelling in relation to the work of actuaries.
5. Actuarial aspects of investments.

Separate reports follow.

National Reports

The main contribution was made by Peter Wickens who reviewed all the national reports. He noted first that the official designation of actuary varied from country to country but in most cases referred to the national organization where that existed. Most actuaries were in life assurance but the proportion in consultancy was growing. Some were in the Government service. Changes were taking place. In Poland there were still few actuaries because there was little life assurance and general insurance was a government monopoly; but in Yugoslavia there was a growing volume of private insurance and growing demand for actuaries.

Computers had had a profound effect upon the methodological capability of the actuary permitting the building of more effective and responsive statistical models.

Legislative direction, for example, to prescribed valuation bases had in some cases seriously constrained the working practices of actuaries.

There had been major social and economic changes in part following the decline in mortality, in part from the rise in real incomes. There had been an orientation from death protection to survival protection and a growing volume of money flowing into savings. Life offices were in competition with banks, building societies and other financial institutions for these savings and had to provide new forms of policy. Changes in the economic environment had made it difficult to maintain equity between successive generations of policy-holders.

Some offices depended heavily on pension schemes. Actuaries were increasingly entering into general insurance though only in a few countries were they required to do so by law. It was noted that Finland had introduced solvency tests based on risk theory.

The ageing of populations where this was occurring was a threat to pension schemes and social security systems especially where these were unfunded.

In some countries actuaries were losing ground to administrators and were being relegated to the role of technical advisers. There had been a failure to extend their field of interest or even to prevent invasion of their existing field. The problem was often one of numbers of actuaries available or of publicity. Legislation was always a problem to be dealt with. In many countries there was government control over product design, premium calculation, valuation, or investment. But there is still room for judgement especially in the distribution of profits. In pension schemes, taxation can inhibit the actuary by limiting investment or contributions.

The relationship of the actuarial profession to other professions posed a continuing problem. Auditors and accountants were inclined to introduce uniformity, for example in valuation bases. In general insurance there were problems in the checking of reserves for outstanding claims. Auditors tended to take a short term view of a problem that was essentially long term. There could be difficulties with the legal profession, particularly where the expertise of the actuary was not understood. Generally speaking there was good collaboration with medical advisers.

The discussion which followed Peter Wicken's paper was interesting and informative, if somewhat limited in country representation.

C. Genest of Canada said that there were now 1233 qualified Fellows in Canada, the majority of them in life companies but a growing proportion in consultancy. They had established standards of professional conduct. They had the benefit of wide recognition in the pension field. Here there was a great debate. Some wanted to legislate for indexation; others wanted it declared illegal.

K. Yoshizawa of Japan was difficult to understand but made the point that though there was legislative control over life insurance, actuaries acted as extra auditors.

M. Lacroix of France gave an explanation of the E.E.C. and the challenge it had presented to actuaries. As a consequence they had combined together in a liaison group.

H. Bohman of Sweden said that technical problems especially in general insurance were growing and more, not fewer, actuaries were needed. Their knowledge too had to be extended, for example, to a full understanding of stochastic processes.

E. Falk of Norway referred to new taxation legislation which encouraged saving but possibly at the expense of life assurance.

W. A. Halvorsen of the United States of America listed a number of important recent changes in the U.S.A., which had affected the world economy. Economic recovery at the expense of high interest rates; of consumer confidence with higher purchases and less saving; a huge influx of capital; hot money and the attendant insecurity of those institutions which depended upon it; shortage of demand for natural resources; protectionism.

S. H. Leckie of Hong Kong referred to the recent agreement between Great Britain and China as to the future beyond 1997 when the colony had to be handed back to China.

C. B. H. Watson of the U.S.A. spoke of the challenge of other professions and stressed the importance of a code of conduct. Professor Carla Angela of Italy said that in Italy actuaries were well protected by legislation and had good relations with other professions.

M. H. Field of Great Britain explained the background to the present Government enquiry into pensions and social security. He mentioned the concept of personal portable pensions. The latter was immediately attacked by N. D. Freethy on the grounds that it meant a diminution in the protection provided by the employer and a threat to final salary schemes.

B. BENJAMIN

Subject 1

This subject is both wide and practical, affecting materially as it does the environment in which actuaries carry out so many of their everyday activities and their longer-term planning. The 22 papers were submitted by authors from 13 countries—a perhaps surprisingly low proportion of the nearly 40 countries represented at the Congress.

The implied topicality of the subject caused much of the discussion (something of a misnomer, in the formal Congress session) to be focused on updating of the papers which had been prepared many months earlier; among the speakers were those from the United Kingdom who referred in particular to the demise of LAPR for new life assurance contracts and the pressures being exerted by the pension investigations of many kinds at various stages of completion.

Drawing on the papers presented, the opener, U.K.'s Stewart Lyon, divided the social pressures between those concerned with the ethics of discrimination and those relating to consumerism, and the economic pressures between those resulting from inflation, unemployment and the ageing of populations, while the political pressures reflected the social and economic pressures. Such breadth of coverage resulted in considerable overlap with other subjects discussed at the Congress.

The main social issue of our time was clearly discerned as being that of sexual discrimination and much interest centred on the papers describing the effect in the U.S.A. stemming from a Civil Rights Act of 1964 which as A. Gill described it, requires "equality in employment for all races and both sexes, including equality of wages". The relevant problems arise in seeking to apply the equal reward criterion to fringe benefits. The Supreme Court decision in the Norris case was outlined and the position now arrived at, that insurers must provide equal employee benefits under occupational pension schemes for equal contributions, regardless of sex; such benefits include both periodic pension payments and cash options. Whatever the actuarial logic, authors and speakers regarded it as imperative that the consequences for rating techniques and product design should be faced and practical solutions, hopefully with at least one negotiated degree of freedom, should be derived. Whatever actuarial training led one to expect by way of rating for homogeneous groups, that approach needed to take account of modern social thinking in the U.S.A. (and now Europe) as exemplified by the stunning question posed by a U.S.A. congressman "How do actuaries justify making rates on the basis of group data when they know there are some members of the group who will not fit the average of the group?"

Many of the papers referred to the social pressures relating to the ethics of discrimination of various kinds. An interesting paper by J. Rich expounded the effect on the South African Life Assurance Industry of the changing social scene there including the assertion that South Africa has probably the largest range of participating life/investment policies of any country in the world; the paper also referred to the now general absence there of differential rates on the basis of racial origin and described some of the problems that have had to be overcome to arrive at that position.

J. R. D. Orrett described, *inter alia*, the extension of pension scheme membership and benefits over the past 20 years in response to social pressures, the problems posed for funded schemes by high levels of inflation and the influence of legislative measures and quasi-political groups in moulding forms and levels of benefit.

Not only life and pension aspects were considered. The author K. Okanoya reported on the history of car insurance in Japan and the developments under which automobile insurance is required to give financial relief to the victims of accidents—a social problem as a result of the 'Traffic War'. The subdivision of the rate classification was described, with the paper concerning private car insurance by W. M. Abbott referring particularly to the practice of some insurers of giving female policyholders discount—permissible under certain conditions under the U.K.'s Sex Discrimination Act 1975. A. H. Fraser in a wide-ranging paper dealing with pressures affecting underwriting practices and benefits in respect of individual life assurance contracts referred to that Act and its effect; he also drew attention to the consumer pressures giving rise to the granting of life assurance with minimal medical information and to the medical profession's more evident reluctance to give information about a patient. The ways in which consumer views have influenced contract terms and design, distribution channels and codes of selling practice in the U.K. both historically and currently were described in a paper by T. A. Sibbett and J. Sinclair while R. Belin and J.-C. Jegou described the comparable situation in France.

The ever present contributor to all the discussions, Martinez Vazquez, ensured that the approach of modelling to investigate and prove the statistical differences between male and female mortality was not overlooked. Modelling approaches were also described in a paper by three Canadians in the context of risk-sharing in the presence of moral hazard.

Other papers and contributors referred to the feasibility of unemployment insurance, already undertaken in France, novel forms of motor policies in Japan which could include a maturity refund in certain circumstances, pressures affecting occupational pension scheme benefits and their funding, the effects of economic recession and of ageing of populations on pay-as-you-go methods of state pension provision, and disability pension awarding ratios in Finnish pension schemes. The Australians referred to recent legislation allowing no change during a new contract's life which could affect adversely an individual policyholder—in the absence of change, difficulties are expected for certain classes of contract such as particular disability contracts.

No résumé as brief as this can do justice to the depth nor the large range of matters of considerable actuarial import contained within the bounds of this subject. I commend study of the relevant papers—with discerning discrimination.

R. Q. BOWLEY

Subject 2

Volume 2 contained contributions from 15 countries of 39 papers, nine of which emanated from Great Britain and none from the host country. The session was chaired by the Institute and then the Japanese Vice Presidential/Secretarial team and consisted of a lively debate by 17 speakers from nine countries (six speakers from Great Britain). The papers ranged from the descriptive to the analytical and the opener particularly commended the paper by Frank Livsey of Canada and John Roberts of the U.S.A. on 'Introducing employee choice into benefit design'. Possibly as a result no other speaker referred to this paper!

The interest of the debate was greatly sustained by only four of the speakers being authors updating their papers with the other 13 commenting on issues raised, often referring to more than one paper. The most popular subject, attracting four speakers, was the debate between funding and pay-as-you-go with the next most popular subjects being personal pensions and pension scheme tax reliefs. Many comments included references to escalation in benefit provision and its relationship to inflation experience. Other subjects which were mentioned were international investment, the changing age structure of the population and pension scheme membership and the effects of unemployment.

C. W. F. LOW

Subject 3

The discussion on Session 3 was split into three sections:

life assurance;
general assurance;
pensions.

The following remarks relate solely to the pensions session.

Volume 3 contained 10 papers on pensions subjects emanating from seven countries, with two papers from Great Britain. The discussion on pensions was held in the Playhouse, which did not have simultaneous translation facilities. Nevertheless there were 17 speakers from seven countries, with six speakers from Great Britain, the session being chaired by the South African Vice Presidential/ Secretarial team.

The opener classified the subjects into five areas:

benefit design;
legislation;
actuarial funding methods;
actuarial assumptions;
investment policy.

A lively debate followed, principally between British and United States members. The most popular subjects were the real rate of interest rather than the absolute level of interest rate and salary assumptions. Disclosure of information to members also arose frequently and there was general agreement that actuarial assumptions and methods must be credible in the eyes of lay recipients. The most frequently referred to paper was that by Paul Jackson of the U.S.A. entitled 'Variable actuarial assumptions and the solvency of private pension plans' which adopted a generation approach to the absolute level of interest rates, leaving assumptions previously made for specific calendar years unaltered unless there was subsequent information justifying an alteration. Dangers of participating in multi-employer schemes were also discussed.

C. W. F. LOW

Adequacy of Reserves (including considerations of solvency)

The subject of solvency and adequacy of reserves is wide ranging and 47 papers were presented covering life assurance, general insurance or pension funds. The discussion was divided into 3 sessions to deal with each of these subjects.

Many of the papers consider the question of solvency from first principles and much of the discussion followed on from this. Solvency is a philosophical concept but it needs practical interpretation. It is a matter of probability and not certainty and this theme is common to many of the life and general insurance papers. Some authors consider ruin theory to interpret the concept of solvency and a number of fairly complex mathematical models are used. However the view was expressed that probability of ruin is not a meaningful concept to management who are likely to be more concerned with other criteria such as stability of results. Use of a stochastic approach clearly presents problems for a statutory authority to define in terms of legislation. A recent Finnish research work which used a computer to simulate the operations of an insurer is dealt with in papers by both Finnish and U.K. authors.

Several papers consider the various parties interested in solvency and in particular the role of the statutory authorities for both life and general insurance attracted a wide range of comment. One speaker maintained that their role should be limited to consideration of issues of solvency and expressed concern at creeping statutory control. However the view was also expressed that they must go further and be in a position to restrain a company from taking more extreme policy decisions. No simple rules exist that are adequate or equitable for demonstrating solvency for all types of companies. The investment analyst's viewpoint also got some airing with consideration of the problems posed to an external analyst who is trying to form a view on an insurer from published material.

The meaning of solvency for pension schemes is less clearly defined than for insurance companies and this is discussed in several papers coupled with the issues of financial supervision and reporting to members. There is an interesting case study in one paper which helps throw light on this subject. Some papers deal with the form that disclosure of information to members should take with regard to both solvency standards and the pace of funding.

Inevitably, the issue of policyholders' reasonable expectations and what this means, stability of bonus rates in changing conditions and bonus projections were extensively covered. The importance of an internal valuation using a realistic basis, allowing for policyholders' reasonable expectations and looking at the effect of varying assumptions on both assets and liabilities was stressed. Reference was made to the changing financial environment and to the difficulty of defining reasonable expectations against this background. The problem of how bonus rates should be adjusted equitably in an era of lower interest rates was also discussed. Differing views were expressed on whether bonus illustrations with warnings create expectations but general concern was evident on the use made of bonus illustrations in selling life assurance and one speaker stressed the need for self-regulation by the Industry.

The discussion on the life assurance papers was weighted towards U.K. speakers but there was some interesting discussion on the role of the actuary in the U.S.A. and controversy in Australia on the question of solvency.

R. G. BROWN

Subject 4

This subject attracted 37 papers by authors from 18 countries, the most papers coming from Great Britain (7), Germany (6) and France (4). Although all the papers were in some way concerned with the use of computers in a particular application, the papers divided into two nearly equal groups. The first group was primarily concerned with computer technology, with applications being described by way of illustration, while the second group was concerned with particular applications, where the approach described depended on the data handling or computational power of the computer.

In the first group it was surprising that only two authors (R. S. Parkin & K. Sakakihara) described the use of personal computers in any detail, while several authors described APL-based systems. In general, there was little reference to the developments in computing that were going on around the end of 1983, when the papers were being written. In general, the emphasis was on programming technique rather than systems technique.

Several papers gave a historical perspective. T. Fujita traced the history of computing in Japanese insurance, while J. T. Woolhouse on management and Mrs J. V. Evans and K. P. Kelly on systems showed the lessons to be learnt from the past.

A number of authors described the use of packages for particular problems. M. Voivalin described a statistical and graphics system, S. Stoye and M. Chuard general pension fund systems, and H. Schmid and A. Brown general actuarial systems.

Of the second group of papers describing particular applications, the main emphasis was on management systems for life offices, including S. Solomon and R. Friedman on forecasting. A number of papers covered aspects of general and health insurance. Reinsurance and stop loss strategies, the most traditional use of computers by actuaries, were covered by A. Reich, H. H. Panjer and G. E. Willmot, and Y. Goldstein. A number of papers, including D. H. Reid on motor insurance, were concerned with rate making.

The remaining papers covered a wide range of applications. S. Benjamin broke new ground by applying control theory, while J. Plymen described the valuation for purchase of a unit-linked office, and J. J. McCutcheon described spline graduation.

The papers were divided into two groups for discussion, the main discussion handling the computer technology papers, while a smaller hall covered the modelling papers, although the numbers in each hall, and the time for which the discussions continued, were about the same.

The emphasis on the computer technology discussion was on practical matters. Relationships with data processing departments were described more freely than in the printed papers, and the theme of education and computer literacy recurred. While one speaker said it was up to actuaries to write actuarial software, another thought that a little knowledge of computing makes an actuary dangerous.

The use of personal computers received more mention than in the papers, and after the meeting A. Brown demonstrated the ANZ-75 notation, implemented on a personal computer both in Basic and PL/I.

G. T. HUMPHREY

Subject 5

A number of themes crystallized during the discussions of the various papers. These notes reflect these ideas in sequence. There were 26 papers in all.

1. *Inflation and Real Rates of Return*

1.1 The discussion was opened by Professor Harold F. Bell of Macquarie University with an address on 'The Changing Economic Background to Investment'. After describing the recent economic background he moved to the more general theme of discussing real interest rates. He identified a number of institutional changes which he felt had influenced recent interest rate behaviour—taxation, deregulation and the internationalization of investment. He concluded that fund managers with long term liabilities need stable savings institutions as a backdrop and urged us to come to grips with the structural problems of deficit spending.

Professor Bell stated his belief that interest rates will remain high unless budgetary deficits are overcome.

1.2 These comments on real interest rates led to some discussion on papers addressing the impact of inflation on investment media and returns. A paper by Ercoli (Italy) discussed indexed mortgages as a form of investment for pension funds and a paper from Komarnicki (France) provided a means for valuing floating rate notes in an inflationary context.

The paper by Frost and Hager (G.B.) had researched real rates of return. Bragg (U.S.A.) had considered real rates of return in the U.S.A. over a period of 93 years. Barker (Australia) in his introductory comments wondered whether British actuaries were perhaps being too cautious because of the events of 1974. Two or three per cent as a long term real rate of return on equities, in his view, was somewhat inadequate. Barker referred to the Wilkie (G.B.) model which used Arima methodology and regarded it as very attractive for estimating real rates of return.

2. *Risk and Performance*

2.1 In discussing the second main theme of risk and performance it was clearly felt that this is a very complex subject particularly if one allows for risk in the measurement of performance. Morrison's (G.B.) paper in particular had highlighted the problems of such measurement when considered internationally. Attwood's (U.S.A.) paper was one of the few linking liabilities and assets when considering the problem and a report from the Netherlands working group was very thorough in this respect. There was also some discussion on Modern Portfolio Theory (MPT) including an excellent introduction by Purvis (Australia) and a succinct description from Professor Moore. It was felt that there was a gulf of credibility in the profession on the subject of MPT. Although a number of papers seemed sympathetic to MPT the discussion was more critical in its assessment of the technique in the practical world. The consensus view was that MPT was of limited value in life office and pension investment if only for the reason that it does not effectively recognize the varying nature of the liabilities of different funds.

2.2 A number of speakers were unhappy about the undue attention on short term as compared with long term performance and indeed that insufficient weight is given to the different risk profiles of different investment portfolios. The presence of sheep in the markets these days as well as bulls and bears is very common and fund managers in the U.K., certainly since 1974, have been very sheeplike in their attitudes on occasions. On this theme of performance it was suggested that investment managers are running a marathon but there are too many sprinters. Might some drop the baton? The average trustee seems to take comfort in being wrong along with everyone else rather than being right when everyone else is wrong. The conclusion was that league tables are here to stay and fund managers will have to learn to live with them.

2.3 Milburn-Pyle (South Africa), in his paper, referred to the performance of large funds and asked the question whether bigger funds meant better performance. The South African view over a period of seven years was that it made no difference to the results. Barker pointed out that over seven years in Australia smaller funds had beaten the larger ones by 1% or 2%.

3. *Social Responsibility*

3.1 In his summing up, Craig (Australia) saw the third main topic as the question of social responsibility of fund managers. Hall (G.B.) had produced a masterly summary of the problems facing the large investor and Arthur's (G.B.) paper was held to be very logical and very readable.

3.2 The main question posed was should fund managers strive to achieve the best possible return for their clients or direct their investments into what might be considered socially desirable areas? The meeting, and it was large, was at one in agreeing that the fund manager's responsibility was to aim for the best possible investment return.

A. J. FROST