

THE FUTURE OF ASTIN*

By HANS BÜHLMANN

My assistants at ETH have a wall calendar—not with the usual pictures of Swiss mountains, hills and lakes, but with “quotations for intelligent people”. Recently, the quotation for the week read as follows: “Even the future is no longer what it used to be in the past”.

Observe that also in this supposedly intelligent approach it seems impossible to speak about the future without referring to the past. I shall not deviate from this rule. Of course, my task is greatly simplified by the fact that Paul Johansen has just entertained you in a charming way about the past 25 years of ASTIN and the earlier endeavors leading to the foundation of ASTIN.

In the year 1693, Edmond Halley constructed the first mortality table based on mortality data from Breslau which he had obtained through the intervention of Leibniz. This can be regarded as the starting point of actuarial *science*. In my opinion it can however not be considered as the starting point of the actuarial *profession*. Why? Yes, Halley’s table was used for some eighty years because subsequent information coincided with his estimate of mortality. Yes, De Moivre, in his classic textbook of 1725, performed ingenious calculations of annuities, based on the same table. Yes, Süssmilch published the first basic and substantial work of demography in 1741 but—here comes the big but—no government (and nobody else sold annuity insurance at that time) made use of the available scientific method to calculate annuities. Perhaps the first statistical results to be taken seriously were the Northampton tables of 1780, devised by Richard Price. Incidentally, this date coincides reasonably well with the first valuation by William Morgan in 1786. Hence, I think that either of these dates may be taken, at the earliest, as the start of the actuarial profession, a profession being by definition a dedicated group of people *accepted by society* for the performance of a particular skill. Let me make my point explicit: We have historical evidence of the existence of actuarial *science* about 90 years prior to the emergence of the actuarial *profession*. Had I gone back to Johan de Witt and Johannes Hudde instead of Edmond Halley, this span would even exceed 100 years!

Of course, ASTIN is still within these first 100 years of endeavor. If for the sake of time comparison you agree that I identify Halley with Filip Lundberg, ASTIN’s chance to create a profession within 100 years extends until 2009 or approximately to its fiftieth anniversary in 2007. With this outlook we have touched upon one of the essential purposes of ASTIN: to create a profession, the profession of the non-life actuary, according to the definition just given: “a dedicated group accepted by society for the performance of a particular skill”. Has this possibly been achieved already? The answer varies from country to country. It is a clear “yes” for countries where the non-life actuary has a function by law or where common practice is such as if the function were stipulated by

* Presented at the 25th Anniversary celebration of ASTIN, September 27th, 1982, Liège, Belgium.

law. In how many countries has this point already been reached? In some, but undoubtedly the professional standing of the life actuary is still far ahead of the non-life actuary's. In the historical perspective the non-life side is, however, not doing too badly. Observe that by the time shift agreed upon we are still 14 years prior to the Northampton tables and 20 years prior to Morgan's reserve calculations, hence 82 years before the foundation of the Institute of Actuaries!

Being still in the moulding period of the profession, it might be appropriate to look at this moulding process in more detail. What made this process start? The background for it must be seen in a development of the thinking in this century. This development—philosophically speaking—is characterized by a change of attitude against determinism. According to your personal taste, you may trace this back to the theoretical developments in quantum mechanics or to the social conditions of a crowded depersonalized world or simply to a philosophical reaction against the exaggerated determinism of the 19th century.

Mathematics as a highly specialized language for the scientist has organized this new philosophical attitude in an axiomatically based discipline called probability theory. Statisticians have become aware that the probabilistic view would highly increase the scientific value of their conclusions when interpreting data. This led to the creation of a new science called mathematical statistics. Economists have incorporated risk and uncertainty into their theories. Operation researchers have designed strategic decision schemes for a non-deterministic environment and engineers have started to review their traditional pragmatic safety concepts on the basis of probabilistic models.

The interaction of this new attitude in science has also had its impact on the actuarial community. This interaction took place and is still taking place in two directions:

1. It allowed a new understanding of the concepts underlying the already existing actuarial activity.
2. It opened new fields of activity for the actuary, especially—of course—in the non-life branches.

1. We have probably forgotten that in the last century mortality tables were considered as laws of nature, and some time earlier, e.g., by Süssmilch, even as an example of divine order. It was left to our century to reinterpret this basic tool of the life actuary as a table of probabilities. With this understanding, it was now possible not only to calculate mean value premiums and mean value reserves but also fluctuation loadings, contingency reserves, retentions and solvency margins. Life assurance has become probabilistic. Looking backwards, it seems extremely astonishing that it had not always been that way. The answer to this puzzle might be found in the fact that in the traditional forms of life assurance the savings component predominates heavily over the risk component. In spite of this side remark it is clear that the techniques of the life actuary have been substantially refined since the advent of probabilistic methods and that these methods have opened new possibilities in life assurance. There is, of course, room for further refinement.

2. The first new fields which have opened up to actuarial activity in the non-life area are sickness insurance and workmen's compensation. These branches stand somewhere between the long-term nature of life assurance and the short-term nature of fire. For this reason, actuaries had always been in close connection with developments in these fields, and quite successfully so. But then actuaries were asked to put their skills to work in motor insurance. As you know, in this line of business we have seen a tremendous improvement in both thinking and practice over the last 25 years. It is fair to say that many actuaries have substantially contributed to this progress. Then came fire insurance, aviation, marine. In all these areas one can find pieces of actuarial work which have deeply influenced practical development.

This *process of interaction* of modern thought with our actuarial profession and with the whole insurance industry is what ASTIN is all about. What keeps the process going?

It is, first of all, *people* who keep it going. And the diversity of people makes it a fascinating group indeed. Here are influential managers who by their decisions can set the style and tone in the industry. Whether another branch of insurance should go scientific or not depends very much on their judgment. Here are the practical actuaries who bring the knowledge of the problems. They are faced daily with risk selection, risk rating and possibly reserving. Their participation in the process is motivated by their longing for a better understanding of their problems and for good solutions to them. And here are the theoretically minded researchers. Carrying the torch of modern methods, they hope to demonstrate the power of these methods, being sometimes possibly more motivated by scientific recognition than by the aim to solve all of the industry's problems. If you now imagine all the possible mixtures of the types just described, you have a more or less realistic picture of the group.

The fact that ASTIN comprises all these people is a *necessary* condition for the interaction process to go on. Without the support of the managers, the work of the non-life actuary would have little chance to be accepted by the industry; without the practicing actuaries the process would end in an ivory tower, and without the theoreticians solutions would remain *ad hoc*.

The fact that this diversified group gets together is—on the other hand—not *sufficient* for the functioning of the interaction process. The key to interaction and, let me add, to a successful future of ASTIN, is communication. This is a commonplace remark, but I still make it because we must realize that this may be our severest problem in the next twenty-five years. Paul Johansen has told us that ASTIN has grown from a handful of members to well over 1000, say by a factor of 50. Assuming that communication possibilities and their consequences are proportional to the number of pairs of members, the communication problems must have increased in the proportion of 1 : 2500.

This implies a completely different interaction style. It must also mean that not all channels of communications can function any longer, simply because the number of possibilities is getting too high. This has to be accepted because it is unavoidable.

But remember that historically we are still in the pre-Northampton table period. Hence, many things still have to be done. Can they be achieved? How? We must improve communication! Here are some concrete proposals:

1. Encourage the formation of formal or informal small interaction groups by vertical splitting (leading to national ASTIN groups) as well as by horizontal splitting (grouping according to special interests like e.g., RESTIN, Oberwolfach, etc.). These smaller groups are the places where the spark must catch and we must see to it that we create as many of these occasions as possible.

2. The most important turntable of communication is the ASTIN colloquia. How can they fulfil this function as the number of participants gets bigger and bigger? We must realize that in the past the glamor of these colloquia has greatly derived from the spontaneity of the discussions and from the fact that contributions were not necessarily presented in a perfectly polished form. This ideal setting for small meetings is not necessarily optimal for larger ones. I submit that we should try to have more survey talks on both theoretical and practical progress. The average colloquium participant profits more from such lectures than from so-called discussions where, for the most part, authors speak about their own papers.

3. The *Astin Bulletin* should be used more frequently for publication of practical work. When have we seen the last publication illustrating the application of a useful method with real data? (I can assure you that the lack of such papers is not due to the policy of the editorial board.)

4. Communication is finally a matter of personal style and commitment. We all must take our communication partners seriously and put more effort into understanding what the other person has to say to us than into what we want to say to him.

I hope that these proposals sound reasonable to you. Of course, it is easy to make them, but here comes another crucial point. Interaction not only requires people and communication facilities; it also needs *time*. The interaction process simply cannot take place if nobody has time to interact. Unfortunately, this time problem is rather unevenly distributed in our group. Using my classification of ASTIN members, let us count out the managers, because they don't have time by definition. Academics seem to be more fortunate as far as time allowance is concerned. But it is most deplorable that, according to my experience, the practical actuaries are given too little time by their employers to work seriously on fundamental problems. In the daily routine of the practical actuary, urgency is constantly superseding importance. Of course, there are exceptions, but not enough of them. May I add at this juncture that also ASTIN as an organization has this time problem. Without a permanent secretariat, and with a committee spread all over the world, typically meeting three times in four years, we are trying to keep together an organization of more than a thousand members and to publish a journal appearing twice a year. It sometimes seems to me that the functioning of ASTIN is a miracle.

Well having now reached the level of miracles why not express some wishful projections for the next 25 years:

1. The techniques of the life and the non-life actuary should move closer to each other. Both the life actuary exploring the behavior of homogeneous risks over time and the non-life actuary modelling heterogeneous risks in a short-term period can contribute something to each other.

2. The non-life actuary incorporating time more naturally into his models should develop a clear methodology for loss reserving. At the next jubilee of ASTIN it might be commonly accepted that—with the exception of case reserves for extraordinary claims—claims reserving clearly lies within actuarial responsibility.

3. The life actuary might use risk analytic methods for the analysis of the asset part of the balance sheet. This seems, indeed, the part of his business most vulnerable to chance fluctuations. Hence, by the year 2000, like his probabilistically-minded colleagues in engineering, he will argue on the solid basis of a stochastic model to explain his solvency safety factors, and he will advise the insurance company on investment strategies geared to a model of fluctuating assets.

Let me stop with these three wishes. We must—I repeat this in view of the historical perspective—have patience. But history teaches us even more: Could de Witt and Halley, De Moivre and Süssmilch ever have foreseen the economic and social consequences of their intellectual endeavours? I believe that the ultimate effect of the interaction process between scientific thought and professional practice can neither be forecast nor planned. The interaction process itself is—as I said before—a miracle. Let me then wish for ASTIN on its 25th anniversary that the miracle will go on!

THE STATICS AND DYNAMICS OF INCOME

ISBN 0-905028-03-1. 250 pages hardback

Price £14.00 (U.S. \$30.00). April 1981

Edited by N. A. Klevmarcken and J. A. Lybeck

Most work on the personal distribution of incomes has concerned the statics of income. Much interest has been devoted to the measurement of income inequality and to the welfare aspects of inequality. There has been relatively less work to explain the causes of inequality and the changes in inequality. There is a growing need for longitudinal data, which would permit analyses of the dynamics of income, i.e. explain how individuals move up and down the income distribution and how income changes can be explained by market-related activities, schooling, social background and other individual characteristics as well as by policy measures.

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