EDITORIAL AND ANNOUNCEMENTS

EDITORIAL

Whither AFIR?

In an editorial in ASTIN Bulletin 17.2 in November 1987, Hans Bühlmann introduced Actuaries of the Third Kind. In ASTIN Bulletin 19.1 in April 1989, François Delavenne, Chairman of the newly formed AFIR section, described the formation and objectives of that section. These editorials, together with articles by Müller, Schweizer & Föllmer and Dhaene appeared in a special issue of ASTIN Bulletin (19S) in November 1989.

Since then the 1st AFIR International Colloquium has taken place in Paris in April 1990, and by the time this editorial is being read, the 2nd AFIR International Colloquium will have taken place in Brighton in April 1991. Sixty-four different papers were presented to the Paris Colloquium, and 82 will have been presented in Brighton. Some of these, and other articles, may make their way into the pages of ASTIN Bulletin.

What can we say so far about the way AFIR has developed? Most of the papers are derived from the general field of modern financial economics. They are based on statistical and mathematical approaches to the investment of institutional assets, and can clearly be differentiated from the many articles that are of interest to investment analysts around the world, dealing with the fortunes of particular companies, industries or national economies, and with the inmediate prospects for share prices, interest rates or exchange rates.

Although many of the AFIR papers are of interest to financial economists generally, many also are of particular relevance to those actuaries concerned with insurance companies, pension funds and similar institutions that have non-tradable liabilities. It is in this area that AFIR can make its own special contribution.

Many of the papers have been primarily descriptive — what sort of model best describes a particular market, or does a particular market behave in line with some theoretically derived hypothesis? Others are prescriptive — how can theoretical ideas contribute to designing an optimal asset allocation strategy, or to appropriate methods for the calculation of premiums or the valuation of liabilities?

One can also classify the papers in a different way: do they relate to a general investment topic; to the asset side of a financial institution (asset-liability matching); or to the liability side of a financial institution? For actuaries in general, this last theme is perhaps the most interesting. The paper by Cummins in ASTIN Bulletin 20.2 describes some uses of the theoretical models of financial economics to justify particular methods of setting premiums, in a context in which premium rates need to be justified to a State Insurance Commissioner.

A similar application is the use of option pricing theory to calculate the values of pensions or annuities which increase in line with a consumer price index, subject to some upper limit; another is in the pricing of the guarantees inherent in a with profits life assurance as compared with a unit linked policy.

The two main themes for papers for the 2nd AFIR International Colloquium are: asset-liability matching; and interest rate models. A third theme that runs through a number of papers is the application of a stochastic model for investments other than the pure random walk model, in particular what has become known in Britain as the 'Wilkie investment model'.

I should like to suggest a number of areas towards which those interested in AFIR could apply their ingenuity. The first is asset-liability matching models, approached either through fixed interest matching, which requires an analysis of interest rate models and 'duration' measures, or through application of the portfolio selection approach. Although much has been done in this area, there remain many unsolved problems. What are appropriate asset allocation models which take account of liabilities emerging over the very many years that insurance companies and pension funds work in? What are the optimisation objectives of such an institution? It is not simply a matter of maximising terminal wealth or surplus at the end of a long period, since varying bonus rates on life policies or varying contribution rates for pension funds during the course of the period come into consideration. How does one allow for dynamic decision-making with such a long time horizon?

Further problems are: how does one allow for the existing assets held, and the potential costs of changing them? And how does one allow for the uncertainty that must exist in one's estimates of the probability distributions of returns on particular assets? One possible optimum portfolio is usually 100% in the asset that seems to promise the highest expected return, regardless of variability; but if there is uncertainty about one's estimate of that expected return, it is not advantageous to incur expense in pursuit of an uncertain marginal benefit, even for the risk-neutral investor.

In order to implement any asset allocation method, one must have some sort of model of the distribution of returns on the classes of investment under consideration. The statistical investigation of historic investment series seems to me to be the next major undertaking for members of AFIR. Very many investigations by financial economists have concentrated on the short term, gathering data at daily or weekly intervals for a small number of years. They have generally found that a random walk model of some kind fits the data reasonably well. Few investigations have considered the behaviour of such a series over long numbers of years, but those that have done so have generally discovered that the random walk model is an unsatisfactory description over the long run, and that a model that includes some sort of reversion of interest rates to a mean level or of share dividend yields or Price/Earnings ratios to a mean level is more satisfactory.

More gathering of long runs of data from a variety of different countries, and more statistical investigation of such data needs to be done. In an international field, one would also like to see how exchange rates have behaved: randomly in the short run, and according to purchasing power parity in some way in the long run seems a plausible first hypothesis.

Consequential on these first two themes is what sort of equilibrium model results from an international economy, with multiple currencies, in which investors from different countries have different types of liabilities and different possible objectives. The classical Capital Asset Pricing Model (CAPM) assumes that all investors work in one currency (such as US dollars) and measure their utility as functions of wealth in that currency. But many international investors measure their wealth in Swiss francs, German marks or British pounds, and others measure in real terms (after allowing for price inflation) rather than in currency at all. What consequences does such a more elaborate structure have for the CAPM?

The final field of research I should like to propose to AFIR members relates to the liability side, building on the work of Cummins and others in relation to premium-rating, on the use of option pricing methods for valuing liabilities with inherent options included—anything of the form which pays the greater of A and B, or the lesser of A and B, includes an implied option—and the application of the methods of financial economists, whether through the CAPM or otherwise, to the question of the appropriate rate of return for discounting risky liabilities. This is of importance in the valuation of an insurance company where a realistic rather than a prudent valuation is required, for example for profit testing, estimating the value of a company for purchase or sale, or the consolidation of the accounts of insurance subsidiaries in a parent company which is not an insurance company.

All this sounds like plenty of work for the future. It is almost too late to produce a new paper for the 1992 International Congress of Actuaries, but it is hoped that there will be an AFIR International Colloquium in 1993 (location still to be decided), and the pages of the ASTIN Bulletin are available for those who would like a widespread and thoughtful international readership. Your offerings addressed to me or to one of the other editors please.

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