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THE 2ND AFIR INTERNATIONAL COLLOQUIUM

17–20 April 1991

The 2nd AFIR International Colloquium was held between 17 and 20 April 1991 at the Metropole Hotel in Brighton.

AFIR (Actuarial Approach for Financial Risks) is the subsection of the IAA which is particularly concerned with the application of actuarial techniques in the field of financial economics. The formation of AFIR was announced at the IAA Congress in Helsinki in 1988. Its first international colloquium took place in Paris in 1990, and the Brighton colloquium was the second in a planned series of international gatherings.

The colloquium was organised under the auspices of the Institute and the Faculty of Actuaries, operating through a series of committees under the chairmanship of Mr Terry Arthur, Professor David Wilkie, Mr John Jenkins and Miss Val Timlin. Administrative arrangements were handled by the Institute Conference Department. There were 269 participants attending the colloquium drawn from 29 countries, with the largest participation coming from the United Kingdom, which contributed 77 participants.

STRUCTURE

The formal proceedings spanned 3 days, 17–19 April, with a full social programme arranged around them. In all there were 27 formal sessions of which 25 consisted of the discussion of papers submitted to the colloquium with the remaining 2 being devoted to guest speakers. A total of 82 papers were presented to the meeting which had been submitted from 16 different countries. These papers were grouped into common subject areas and were published in advance of the colloquium. For the purposes of the colloquium the papers were taken as read, with authors being restricted to a short summary of their papers to leave adequate time for discussion. Each session was introduced and concluded by prearranged openers and closers.

The colloquium was bilingual in English and French. Every effort was made to sustain the international theme, particularly through the selection of chairmen, openers and closers for each session.

CONTENT

The colloquium content reflected the basic objective of AFIR, which is to provide a forum within which a distinctive actuarial approach to financial economics can evolve. All sessions were linked by this underlying theme and each session then focused on a specific topic area. The range of topics reflected the breadth of the field of financial economics, ranging through banking, option pricing, chaos theory, general insurance, etc. Most attention (in terms of numbers of papers submitted) was generated by the subjects of asset-liability matching and interest rate modelling, to which several sessions were devoted.

Wednesday 17 April

After the formal opening of the colloquium by Mr Terry Arthur, proceedings started with an opening presentation by the first guest speaker, Mr Brian Quinn, who is an Executive Director of the Bank of England.

This opening session consisted of a review of Banking Supervision, an area of considerable potential interest for AFIR. The second session, also a plenary session, linked into the first in that it centred on the discussion of five papers on Banking and Credit. This included an introductory paper by Messrs Reynolds, George and Greenwood describing the work of the Basle Committee on Banking Regulation and Supervisory Practices in developing capital adequacy ratios (the 'Cooke ratios'). Other papers presented in this session compared the capital adequacy of banks in different countries and described the risks to which the U.S. Savings and Loans Associations had succumbed.

In the two afternoon sessions interest rate and yield curve models were considered.

In session A2 five papers which treat yield curves in a relatively traditional way were discussed. In this session American authors, Messrs Robert Reitano and James Tilley extended actuarial understanding of the 'duration' of portfolios of assets and liabilities. Redington's great insight was that assets and liabilities were matched when their durations were equal. This matching was against a change in interest rates identical for all terms, i.e. a parallel shift in the yield curve. In his paper Robert Reitano introduces the concept of 'partial duration', being the effect of a 1% change in interest rates at a point on the yield curve, e.g. 1-year, 5-year and 10-year terms. Using three points he obtains 'key rate durations' and shows that the most dangerous interest rate shift is one that is parallel to the partial duration vector. James Tilley's paper moves to a higher level of complexity investigating various levels of durational immunisation, using Taylor series, key rate durations and orthonormal polynomials, obtaining quite different portfolios in each case.

In the second afternoon session, A3, various more elaborate methods of term structure movements were considered, with papers setting out binomial and stochastic models for the movement of stock prices and interest rate structures.

Thursday 18 April

The first session of the second day was again given over to a guest speaker, Professor Michael Brennan of the University of California, Los Angeles. He spoke on the subject of Efficiency, and in a fast-moving speech explained the way in which all recent innovations in financial markets can be traced back to risk transference requirements. He also highlighted the key distinction between actuaries, who seek to control diversifiable risk, and financial economists, who seek to control systemic, or non-diversifiable risk.

The second session of the day, another plenary session, was devoted to one of the key themes of the colloquium, asset-liability matching. This session provided an opportunity for a wide-ranging discussion of this topic, with a variety of papers each considering asset-liability management against varying differing types of liability, including general insurance liabilities, single premium deferred annuity liabilities, life assurance savings liabilities, etc.

In the afternoon the colloquium split into 5 concurrent sessions, with both afternoon sessions running on this basis, and each offering considerable variety to colloquium participants.

In the first afternoon session, participants were offered a choice between topics which were thought to have been exhausted in the U.K., such as Valuation: Market and Book Values, and topics of current interest such as Pension Fund Applications. Some spice was added to the choice by the session on Portfolio Selection and Portfolio Insurance, which encompassed the most well-established model in modern investment theory, the portfolio selection model first enumerated by Markowitz in 1951, and one of the most recent and controversial models, that of portfolio insurance, which has fallen into disrepute following the 1987 stock market crash. In the Pension Fund Applications session (standing room only) traditional approaches to asset-liability matching and valuation were subject to criticism. Discussion centred mainly on the American paper by Messrs Harold Brownlee and Richard Daskais, who had already caused controversy in the United States of America by arguing that liabilities should be valued using interest rates based on the expected returns on assets.

Again the second session of the afternoon, split into five concurrent sessions, provided considerable choice for colloquium participants, with several sessions being of considerable interest to U.K. actuaries.

The bilingual session on Option Pricing included Mr Andrew Smith's 'introductory' paper commissioned by the Scientific Committee which would be very useful for actuaries wishing to gain an understanding of this important subject.

In the session on Asset Allocation for Pension Funds Mr Philip Scott described the development of strategic asset allocation in a large life office in a way which facilitated communication between the investment managers and the investors. This theme was re-echoed in the paper presented by Messrs Robert Arnott, Peter Bernstein and Alan Hall, who reviewed the way in which asset allocation depends on the maturity of a fund, with a high equity content in a young fund giving way to bonds and cash as the fund matures.

The wide scope of AFIR was demonstrated by the inclusion of a session on Management Expenses, which, despite a small attendance, generated vigorous discussion. Part of the discussion covered Mrs Geraldine Kaye's statistical expense analysis of U.K. life offices, with one of the main difficulties being the confidentiality aspect of expense data and analysis results. Discussion covered the factors expected to influence expense levels the most. Sometimes the results of the investigation supported general reasoning and sometimes not. A particular point on which there was no universal agreement was whether a mutual life office could be expected to exhibit lower expenses than a proprietary office. The discussion also covered approaches to expense control and apportionment in the U.S.A. The regulated pricing existing in some U.S. States was also considered.

Friday 19 April

The morning of the third day started with another set of concurrent sessions. AFIR again demonstrated the breadth of its coverage by offering participants choices between, e.g., Life Insurance Applications and Non-linear Models and Chaos Theory. The latter session combined two papers which use methods derived in the physical sciences for investigating the behaviour of time series with a paper by Mr Robert Clarkson which puts forward a non-linear model for inflation.

The session on Asset-Liability Matching by Linear Programming discussed three papers utilising linear programming methods to approach the asset-liability matching problem. Technical papers produced a technical discussion, including a much appreciated lucid explanation of the concept of linear programming. Approaches to Stock Selection generated a heated discussion of two related papers on stock selection methods which had been produced by one of the Financial Management Group Working Parties. These papers between them cover all systematic stock selection methods in practical use in the U.K.

The final concurrent session contained discussions on Market Efficiency, Theoretical Developments, General Insurance Applications, International Diversification, and Inflation.

The papers included in the sessions on Market Efficiency and International Diversification revisit some of the earliest work and most deeply held opinions in Modern Portfolio Theory. The session on Theoretical Developments included another 'introductory' paper by Mr Andrew Smith, commissioned by the Scientific Committee, covering the use of martingales in actuarial work. This was combined with a paper on 'Arrow Pricing', otherwise known as the 'economics of uncertainty', which introduces some unfamiliar ideas from financial economics which are yet strangely comfortable to the actuarial mind.

The papers in the General Insurance Applications session covered the control and solvency of general insurance companies. Two of the papers covered the use of stochastic financial models to predict cash flow and to assist with asset allocation. There was discussion on the utility of such models in practical situations and of the difficulty in explaining them to non-experts. There were differing views on how general insurance companies should be managed. For example, there was a view that 'free assets' should be considered separately from assets backing technical reserves. Opposing this was the view that what matters is the totality of the assets and how they are best invested to match the liabilities.

It was fitting that the two papers discussed in the remaining session on

Inflation should have originated in Israel and Argentina, which gave great insight into the problems of saving and investing in an unstable financial environment.

The final afternoon of the colloquium was devoted to two plenary sessions. The first of these, Commonsense or Controversy, grouped four papers which have a commonsense approach to financial problems. Discussion centred around Mr Richard Noble's paper, highlighting by example the fact that unthinking use of statistical methods can lead to invalid models based on dubious relationships, and on Mr Roger Urwin's paper on investment manager selection.

The last formal session was on the subject of Prudential Rules and Performance Measurement, two seemingly unrelated topics which are related by the fact that they are based on the past and the present rather than on the future. This session included a discussion on Mr Alex Carpenter's paper on Reporting and Performance Measurement of Futures and Options. This established general agreement with the principles of the paper previously published jointly by Bacon and Woodrow and LIFFE, and produced a useful comparison with the treatment of the same problem in Australia.

Although the last formal session took place in the afternoon of Friday 19 April, the final formal event of the colloquium was the Gala Dinner taking place on the evening of that day. At the dinner, the colloquium ended as it had started, with a distinguished guest speaker, Mr Gordon Pepper, who tackled the difficult task of covering serious technical subjects in an after dinner speech with customary aplomb.

L. P. TOMLINSON