

## REPORT ON THE INTERNATIONAL AFIR COLLOQUIUM 1998

The 8th International AFIR Colloquium was held from Tuesday the 15th of September to Thursday the 17th September in Robinson College at Cambridge University in the UK. The Colloquium attracted over 100 participants from all around the world, most European countries were represented as were, Australia, Japan, South Africa and the USA. Over the three days, 28 papers and a key-note address were presented and participants also had the opportunity to listen and contribute to a formal debate.

The colloquium was opened with a few words of welcome from the President of the Institute of Actuaries Paul Thornton. The first day was organised as a joint day with the Faculty and Institute of Actuaries Investment conference. This provided the opportunity to cover issues that were relevant to both sets of delegates and an opportunity for the British actuarial community, celebrating its 150th anniversary, to strengthen ties with other actuaries visiting the UK as part of the AFIR colloquium.

The first session commenced with a keynote address from Michael Dempster, Professor of Management Studies and Director of the Centre for Financial Research at Cambridge University, who spoke on the subject of "Integrated Asset-Liability Management". Michael Dempster, an expert in optimisation work, showed how stochastic programming techniques could be applied to asset-liability studies. He explained how software under development in Cambridge enabled objective functions to be optimised at each time-step so providing a dynamic solutions to asset allocation problems. The range and sophistication of off-the-shelf commercial optimisation software now readily available could be useful to many actuaries.

The morning continued with presentations from two UK investment working parties. The first considered proposals for a risk measurement and reporting standard. The aim of providing a consistent standard enabling fair comparison across different funds was well supported, but analysis of the existing standards, their advantages and disadvantages, were felt to be needed before further progress could be made. The second working party report was entitled "An update on option pricing theory". This paper gave a clear and concise overview of the development of option pricing. The paper covered theoretical developments, option pricing in practice, model risk and numerical methods. The paper can be recommended as a highly informative introduction to the subject.

The morning concluded with a debate on the motion "This house believes that active management is in terminal decline". The debate started on a surprising path with the proposers advocating what appeared to be a

mechanistic active approach which Robert Clarkson described as “Investment of the third kind”. The preference of lighthearted quotes instead of any significant statistical evidence did not help the credibility of either side. Overall the debate failed to live up to expectations with the majority of the audience finding the arguments advanced by both sides unconvincing.

The invited lecture by Dr Theodora Zemek of M&G provided a thought provoking presentation on investing in sub-investment grade debt. Dr Zemek explained the increasing search for yield in the current low inflation, low interest rate environment had led to greater interest in higher yielding corporate debt. Corporate debt had received further attention with the Russian and Asian crises exploding the myth that government debt is always more credit-worthy than corporate debt. Further corporate debt was divided into investment and sub-investment grade debt by an essential division on the credit rating scale. The low correlation between credit rating and default and the greater exposure to credit rather than interest risk offered a strong case for more attention to be paid to this asset class.

The final UK investment working party reported on “Investment strategies for defined contribution schemes”. This working party revisited the argument for gradually switching investment for equities into cash and bonds in the years leading up to retirement, often called “life styling”. The paper criticised various assumptions often made when supporting the life style approach, such as time diversification, mean reversion in markets and in particular the correlation between salaries and equities. The authors identify the following factors that could result in the life style switching actually observed

1. Considering future salaries as part of current wealth
2. Trustees reducing risk of criticism
3. Mean reversion in the equity market (however evidence is very weak for this)
4. Habit formation and consumption patterns
5. Liquidity effects – members being unable to borrow against pension benefits

Of the factors listed the paper concludes that habit formation in consumption offers the promising concept for rationalising life styling. However they point to the need for further research to understand the impact of tax, other assets and individuals’ wish to have a lower limit to their wealth.

Two parallel sessions completed the first day’s scientific proceedings. Eric Thorlacius described the Falcon asset model, a cascade asset model with many similarities to the Wilkie model, but constructed in continuous time and designed to model asset returns in more than one economy. This was followed by John Pemberton’s paper “On Mathematisation: What actuarial science can learn from economics and philosophy”. This paper focused on how actuarial science used a hypothetico-deductive method and the associated problems with such an approach. While agreeing with some of the descriptions of the scientific process the audience did not share the

author's view that mathematics was a necessary evil that should be kept to a minimum. In the other session Malcolm Kemp gave a paper on methods of inferring investment stances of league table averages using regression analysis, and Robert Clarkson presented his share selection model.

In the evening a reception was held at the hugely impressive Fitzwilliam museum. This gave a welcome opportunity to digest the day's events and discuss the many issues raised with colleagues and friends.

Wednesday started with a paper from Andrew Smith and Cliff Speed who presented an overall framework for building stochastic investment models. Using the proposed framework many traditional difficulties, such as ensuring positive interest rates, reporting in different currencies and the capturing the inter-relationship between economic variables could be overcome. They demonstrated how other actuarial and financial models, for example the Falcon asset model and the Wilkie model, related to the proposed framework. Subsequently Robert Chadburn presented a study of how solvency could be controlled and policyholder value maximised by using various strategies for a with profits fund using the Wilkie model.

The morning continued with three papers on the construction and application of stochastic interest rate models. Miguel Usabel developed a model where the waiting time between changes in the short interest rate was a stochastic variable. Pierre Devolder presented a paper on the stochastic amortization of debt. The morning session ended with Masaaki Kijima and Yukio Muromachi's paper on the evaluating credit risk with stochastic interest rate and default processes. This paper provided an approach to assess both the market and credit risk of a portfolio, this methodology seemed particularly relevant given the claims made for corporate bonds the previous day by Dr Theodora Zemek.

The afternoon was divided into two parallel sessions. One stream covered the detailed exposition of Risk Arbitrage strategies in a series of papers by Nicklaus Buhlmann, Hans-Fredo List and Mark Davies. In their papers they consider diffusion type securities and derivatives and the concept of *limited risk arbitrage* investment management. The papers cover the following topics:

1. Stock option portfolio management  
(co-authored with Vincenzo Bochicchio and Stephane Junod)
2. Pricing and hedging dual trigger stop loss treaties
3. Optimal fund design and optimal portfolio selection in continuous time:
  - securities markets;
  - securities and derivatives markets;
  - a risk/arbitrage pricing theory;
  - an impulse control approach to Limited Risk Arbitrage;
  - a guide to efficient implementations.

In the concurrent session two papers on Guaranteed equity products were presented by Jochen Russ and Dirk Nonnenmacher, although one of the authors was unfortunately unable to attend. Both papers provided closed

form analytical solutions and considered their applicability to the German market. A paper by Hans Gerber and Gerard Pafumi addressed the problem of dynamic solvency and investment fund protection by considering injections of capital made instantaneously as necessary to ensure that the organisation never runs out of capital. This original approach, using a reflecting barrier for the Wiener process, provided a new way of considering a well known problem. However, further research is needed if a practical method of implementing such an approach is to be found.

In the evening an enjoyable formal dinner (in the traditional Cambridge style) was held in Robinson college.

Thursday, the final day of the colloquium, began with two papers focusing on utility theory. Rob Thomson presented a paper where the utility function of members of a defined contribution pension fund was estimated using questions about their wealth preferences. The results could then be used to recommend an investment channel. Although it was commented that the simplified approach did not take account of other sources of wealth (or debt) of the member there was considerable interest in the outcome of a practical application of the approach that Rob Thomson is undertaking in South Africa. In the second paper David Wilkie demonstrated an example of a utility functions which can be parameterised to be consistent with the time diversification of risk, and can also be parameterised to be consistent with no time diversification of risk.

The final session started with Robert Clarkson's paper on the fundamental preferences model of equity share returns which claims to capture the complex results of investors preferences. This was followed by a paper on selecting optimal investment portfolios. In this paper Katja Ainassaari, Markku Kallio and Antero Ranne applied a multi-stage stochastic optimisation approach to manage the working capital required by a Finnish insurance company. This final paper using optimisation techniques neatly recalled the opening address at the start of the colloquium.

Overall the colloquium was a highly successful event providing a rich diversity of papers and drawing people together from all around the world. Of particular note, there were lively discussions after nearly all the presentations. The organisation committee can be proud of the attendance particularly as the International Congress of Actuaries was held in England only a few months before. Looking forward, the 1999 colloquium will be held in Tokyo and will return to the format of the 1997 Cairns colloquium sharing a full week of scientific and social events with the ASTIN colloquium.

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