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# Report on the International ASTIN/AFIR Colloquia 1997

The 28th ASTIN International Colloquium and the 7th International AFIR Colloquium where held in the same week from August 11th to August 15th 1997, in the Cairns International Hotel, North Queensland, Australia. This first ever joint meeting culminated in a "joint day" on the Wednesday, recognising the fact that ASTIN and AFIR delegates have an increasing number of interests in common and that both actuarial and financial skills are necessary to cope with the new challenges ahead. The CNN announcement of the merger of the Winterthur Insurance company and the Credit Suisse Group, news of which spread rapidly among delegates, emphasised this point.

The joint meeting was also an excellent opportunity to celebrate the 100th anniversary of the Institute of Actuaries of Australia. The first gathering of Australian actuaries to discuss the formation of an institute took place on August 12th 1897.

This historic meeting (and possibly also the chance to visit the Great Barrier Reef and the tropical rain forest, two of Australia's World Heritage Areas) attracted a large audience: 193 people registered for ASTIN and 209 registered for AFIR; both numbers include 126 people who took the opportunity to register for both colloquia. The delegates came from 31 different countries with groups of at least ten delegates from Australia, Belgium, Canada, Denmark, Germany, Japan, Netherlands, Norway, Sweden, Switzerland, United Kingdom and the USA.

Eight internationally recognised keynote speakers gave lectures during the ASTIN days, 21 speakers presented papers during the two afternoons, nine during the afternoon of the joint day; 31 speakers presented their research, partly in concurrent sessions, during the two AFIR days. The combined proceedings of both colloquia have an approximate length of two thousand pages. Obviously, we can only mention some general themes and some highlights of the colloquia, which reflect our personal views and understanding.

The ASTIN colloquium opened with a session on the topical subject of catastrophe risk. Bruce Harper held an entertaining invited address on the modelling of natural hazards and insurance risks in Australia. This talk was impressive in showing, amongst others, the absence of reliable data on the losses caused by tropical storms, insurance losses could be simulated using physical models for storms and for the damage caused by such storms with different characteristics.

In the second invited address Prof. Paul Embrechts, ETH Zürich, outlined the possibilities offered by extreme value theory in the modelling of catastrophic risks in the situation where some data are available. The basic message of extreme value theory is that there are natural probability distributions and models for exceptionally large observations in the same way that there are natural models for average behaviour (such as the well known Gaussian normal distribution). Further contributed papers on extreme values by Alexander McNeil and Dietmar Pfeifer indicated that this interesting branch of probability theory is now coming to the attention of practising actuaries.

A second major topic on the first day was classification of risks, and thi
sion showed the broad palette of statistical techniques now being used in ir
research. Talks ranged from the application of cluster analysis in the forr
tariff classes using neural network-based implementations to the evaluation
pational risks using methods from survival analysis. Greg Taylor, who late
week became the recipient of the first ever gold medal of the Institute of Actu
Australia, submitted two papers in this section, one on the use of Whitaker
smoothing to obtain good estimates of risks which vary geographically, the
on the setting up of a bonus{malus scale of premiums in the presence of addit
rating factors.

The final session of the day consisted of papers on the subject of premium r
in which one identifiable theme was the use of Markov state models. Papers prese
by Jose Garrido and by Ermanno Pitacco addressed the use of such models in tarif
disability and health insurance. The day ended with delegates enjoying din
one of two exotic locations. One party sampled traditional Queensland fare
Riverstone Homestead, a historical sugar plantation house; a second group d
the luxury Paradise Palms Golf Course.

In view of the copiousness and excellence of the food and wine it was al
more remarkable that attendance had not declined on the second morning wh
delegates reconvened to hear talks in two sessions entitled statistics and re
the former session David Dickson described an alternative to the classical c
Poisson risk process; he derived results for the probability and the exten
when claims occur as a more general renewal processes. In the latter sessi
papers looked at different aspects of the calculation of development factors
ratios, in the loss development problem. The first paper by Glen Barnett and
Zehnwirth focussed on the use of diagnostics in the selection of competing
for loss development; the second paper by Erhard Kremer looked at a robust ve
of the classical chain-ladder model. After these short but intensive scienti
delegates spent the afternoon on an enjoyable excursion with the Kuranda his
railway from the coast up to Kuranda, passing the Barron Falls, and down again
Skyrail above the canopy of the tropical rainforest. This provided a most u
but congenial backdrop for the important conference activity of catching
networking with colleagues.

The joint ASTIN/AFIR day was mainly devoted to the securitization of insuranc
risk, the issue which best represents the convergence of ASTIN and AFIR interests.
The first keynote lecture by James A. Tilley addressed the securitization of
trophic property risks, the second by Prof. Neil Doherty, University of Penns
was about financial innovation in the management of catastrophe risk.

For ASTIN delegates the first talk followed nicely from the discussion of
trophe risk on day one. The interest in securitization arises because of
exposure to catastrophes and the empirical observation that frequency and s
of large losses are on the increase. Insurance companies alone may not ha
capacity to handle the mega-catastrophes of the future.

A possible way to pass the insurance risk to investors (in return for a corr
ing risk premium) are catastrophe bonds. Investors can use these bonds to di
their portfolios because natural disasters, for example, have a very small c
with financial market risk. Catastrophe bonds can be classified as

- Pure catastrophe bonds, when the principal and the coupons are at risk,
- Principal-protected catastrophe bonds, when only the coupons are at risk
- Deferred catastrophe bonds, when no payment as such is at risk, but the of the payments can be deferred, leaving the issuer of the bond an interes in case of a catastrophe.

James Tilley described some products which have so far been developed, s as the California Earthquake Authority risk bonds (an example of the second of bond above), and looked at reasons why the market for securitized product generally developed slowly. Among these reasons are the favourable catas experience since 1994, the rehabilitation of Lloyds and the weaknesses of p securitization structures. However, he suggested there was still a poten for cost e-cient products with exible annual renewal possibilities and mor simplicity which makes traditional reinsurance arrangements appealing.

In the afternoon presentations of the joint day, several points raise keynote lectures were studied more deeply. The correspondence of catastrophe and defaultable bonds was discussed, both leading to an incomplete market s which causes di-culties in the pricing methodology. An approach, advocate Prof. Martin Schweizer, is to decompose the risk of say a catastrophe bond int hedgeable part and a residual part, which is treated by standard actuarial m to obtain a price. This leads to a bid{ask price spread for the catastroph A speciflc principal-protected catastrophe bond, the Winterthur Insurance c ible bond with WinCat coupons \hail", was considered by Uwe Schmock and sever methods for the estimation of the coupon values were presented; model risk f statistical analysis and the corresponding pricing of the bond were investig ther talks addressed selected topics of asset liability modelling, risk-b allocation, risk-adjusted performance management and reserving for future taking stochastic interest rates into account.

The joint day ended with a lavish ASTIN/AFIR colloquia banquet in the Great Hall of the Cairns Convention Centre, where the gold medal was awarded to Gr Taylor, the chairman of the ASTIN scientiflc committee.

The flrst pure AFIR day started with Prof. Phelim Boyle's keynote lecture o quasi-Monte Carlo methods for numerical integration. He showed that determi low discrepancy sequences outperform crude Monte Carlo methods in low dimensi but that this superiority diminishes for high dimensions or discontinuous in Randomisation of low discrepancy sequences and reduction of the effective dime of the integration problem can come in handy in these cases.

After morning tea, the AFIR prize winning papers were presented and the cer- tiflcates awarded. The first AFIR prize was given to Glen R. Harris, AMP Society, Australia, for his paper on \Regime switching vector autoregressions: a B Markov chain Monte Carlo approach." The second AFIR prize was divided between D. J. F. Nonnenmacher and Jochen Russ, University of Ulm, Germany, for the paper \Equity-linked life insurance in Germany: quantifying the risk of ad policy reserves" and Ken Seng Tan and Prof. Phelim Boyle, University of Water Canada, for their paper \Applications of scrambled low discrepancy sequen exotic options."

Prof. Stanley Pliska, University of Illinois, gave his keynote lecture o for risk-sensitive dynamic asset allocation. For measuring the performanc

model, he presented various inflnite-horizon criteria: expected growth rat portfolio, expected utility growth rate of the portfolio and a risk-sensit rate criterion. A major aim of this model was to combine the statistical wo parameter estimation with the forecast for asset management. Applied to a hi data set, the corresponding management strategy showed an impressive perform

Several contributed talks also presented and compared asset/liability m ment strategies for various settings such as continuous-time pension fund mo portfolios of defaultable assets. Some further themes ranged from in atio elling to an axiomatic classifIcation of usurious loans and tax-e-cient, opt compensation packages for employees.

The last day of the colloquium started with the keynote lecture by Pro David Cummins, University of Pennsylvania, about the use of flnancial deriva in corporate risk management, participation and volume decisions in the ins industry. According to this talk, the main reasons for the use of derivativ insurance industry are to avoid

- { Financial distress costs like bankruptcy costs, additional regulatory r and reputational losses afiecting relationships with key employees, supp customers,
- { Duration problems in the asset/liability management, including the liqui of private placements or real estate,
- { Foreign exchange risk, and
- { Losses due to the convexity of income tax schedules.

In the contributed talks on Friday, partly in concurrent sessions, Pete applied ideas mentioned on the joint day to the pricing of regular options, that option prices should contain a risk premium in any case because a dyn hedge as in the Black{Scholes model is not possible in practice. Godfrey P presented policyholder considerations for the demutualisation of a company Wilkie showed that difierent prices of risk and difierent portfolios cause a f the capital asset pricing model in a multi-currency world. Robert Clarkson c discussed the flnancial risk in the Markowitz and Black{Scholes worlds, expl that investors would not accept a certain level of risk (bankruptcy for exam matter how high the ofiered risk premium is; a comparison with the risk of dea some dangerous sports made his point clear. Further talks concerned the fltt the term structure, pricing rate of return guarantees, the use of genetic al the Italian pension plan or the social security system in Indonesia, for exa

The flnal keynote lecture was given by Dato' Abdul Khalid bin Ibrahim, curre the Group Chief Executive of Kumpulan Guthrie Berhad. He gave an overview of t Asian capital markets with special focus on the development of the capital mar Malaysia and Singapore, and he encouraged the audience the invest in these mar The colloquium closed with the annual general meeting of the AFIR section.

We close with a glimpse of future events. The 8th International AFIR Colloquium will take place in Cambridge, United Kingdom, 7th to 10th of September 1998. Write to David Golden, AFIR 1998 Colloquium Secretariat, Institute of Actuaries, St Inn Hall, London, WC1V 7QJ, United Kingdom, for information. The next Genera Insurance Convention ASTIN Colloquium will take place in Glasgow, Scotland, 7th to 10th of October 1998. For information write to Linda Pritchard at the ab address. The next joint International ASTIN and AFIR Colloquia are scheduled to take

place in Tokyo, Japan, from 22nd to 25th of August 1999, followed by the Centenary Convention 29th to 31st of August.

Alexander McNeil and Uwe Schmock