CONCURRENT SESSIONS

Catastrophe Modelling

Presentation by Oscar Kitasoboka and Pieter Visser

The presentation will be aimed at stimulating discussion around catastrophe modelling in the South African short-term insurance industry, since it relates directly to reinsurance purchasing and Financial Condition Reporting. This discussion aims to:

- Inform stakeholders of the major and subtle issues around catastrophe modelling
- Provide a steer on the data requirements (enhancements?) that may be required to get informative results
- Compare model results by running a data set using three or so catastrophe models and discuss the reasons for the difference in results
- Compare South African short-term insurance market practice against the models' results as a guide to the gap between modelling and not modelling at all
- Encourage debate amongst actuaries around possible approaches to modelling catastrophe losses, in view of the fat that there are so many catastrophe-type losses to take into account (for example, earthquakes, floods, hailstorms etc.)

Generating Interest Rate Scenarios for Fixed Income Portfolio Optimization

Convention paper by M Kruger and H Raubenheimer

One of the main sources of uncertainty in analysing risk and return properties of a portfolio of fixed income securities is the stochastic evolution of the shape of the term structure of interest rates. The authors estimate a model that fits the South African term structure of interest rates, using a Kalman filter approach. Their model includes four latent factors and observable macro-economic variables (capacity utilisation, inflation and repo-rate). The authors' goal is to capture the dynamic interactions between the macro-economy and the term structure in such a way that the resulting model can be used to generate interest rate scenario trees that are suitable for fixed income portfolio optimisation. An important input into their scenario generator is the investor's view on the future evolution of the repo-rate. Their paper provides details on their model and report on the results of the estimation and scenario generation.

Educating for actuarial quality

Convention paper by MW Lowther, WJ McMillan and F Venter

Should our education system deliver:

- an actuary, who can do actuarial things like keeping financial institutions solvent, or
- a 'Superman' (sic), who is an expert business manager, communicator, thinker, ethicist and patriot, or
- none, some or all of the above?

The authors looked at job adverts, other professions, literature and stakeholder interviews to guide the curriculum for South Africa's 2010 actuarial education programme. They argue that the purpose of the actuarial education programme is to encourage the delivery of quality actuarial service. So, a range of technical and normative capabilities should be developed, using three important educational principles for effectiveness. All this extra effort is not just a 'nice to have'. Evidence shows that broad education has the potential to support actuaries in the delivery of quality service, thus restoring trust in the profession.

Optimal annuity strategies after retirement

Convention paper by M Goemans and M Ncube

There is a shortage of South African research on how to make optimal use of one's retirement payout. Most individuals purchase either a guaranteed life annuity or an investment linked living annuity, without necessarily quantifying the potential benefits and potential risks of all the options available to them.

Modern stochastic techniques now enable us to project future income and, where applicable, capital levels for the various annuity types. The paper does this for guaranteed life-, living- and with-profits annuities, comparing them on a purely financial basis. In doing so the authors try to establish optimal combinations of asset allocation and drawdown rates for the living annuity. They then go on to look at whether it makes financial sense for pensioners to hold a living annuity during the early years of their retirement, and move to a guaranteed life annuity in their later years.

The impact of wellness activities on hospital- and chronic claims experience

Presentation by R da Silva

This project has included a cross-sectional and longitudinal analysis of the in-hospital claims experience of adult beneficiaries of South African medical schemes according to their level of participation in an incentivised wellness programme. The project has also focused on the fitness-related behaviours in isolation. The analysis considers the participation level alongside other covariates such as age, gender and chronic status in terms of the explanatory power with respect to differences in observed claims experience, with particular reference to hospital admission rates for different diagnoses.

An initial cross sectional study was conducted to identify the key areas of difference and then the trends in levels of participation and related health expenditure have been analysed on a longitudinal basis over a five year period. The findings indicate that engagement in the programme and, in particular, participation in fitness activities was associated with lower health care costs. However, participation rates in fitness related activities was generally low and further research is required to identify barriers to participation in such programs.

Modelling the market in a risk-averse world: the case of South Africa

Convention paper by RJ Thomson

In this paper, descriptive models of real returns on the market portfolio of South Africa are developed and analysed. The 'market portfolio' is taken to comprise listed equity and government bonds, aggregated in proportion to their market capitalisation from time to time. The models have the attributes that, conditionally on information at the start of a year:

- the real return on the market portfolio during that year is normally distributed; and
- the market price of risk during that year is reasonably greater than zero.

For the purpose of predictive modelling the best of the models considered was found to be a linear function of the risk-free rate. For this purpose it was decided to use ex-ante estimates of expected returns. This led to bias in the observed mean returns, which negates the rational expectations hypothesis. In the light of the literature on the subject, this is considered acceptable for these purposes.

Factors likely to affect the successful completion of an actuarial qualification in SA

Convention paper by N Naidoo, presented by S Soobramoney and P Hellig

The actuarial profession in South Africa is currently a relatively small body of professionals with the race and gender profile heavily skewed towards White male. In a country as diverse as South Africa, the profession needs to investigate ways to make it more representative of society if it is to continue to prosper. This paper aims to review available literature to identify the factors likely to be critical to student success in undergraduate actuarial studies, post-graduate actuarial studies and eventual qualification as an actuary. By identifying these factors, a greater understanding will be gleaned about what may drive the membership profile of the profession and how these drivers can be leveraged to ensure that the membership profile of the profession adequately reflects the demographic profile of the country. While transformation is likely to be a long process, this study will hopefully complement the existing hard work in this sphere, and help in reducing the time taken.

Free Cover Limits and Underwriting as used in Group Risk Business

Convention paper by G Kritzinger and N van der Colff

Both in South Africa and abroad, insurance companies follow a range of different approaches to set Free Cover Limits (FCLs) as well as what underwriting they do above it. In practice, most FCLs are quoted after a manual and subjective change to the "theoretical result", with FCLs as high as twice the "theoretical value" sometimes quoted.

This paper takes a critical look at current market standards, both locally and abroad, with a specific focus on different providers' views as to the appropriateness in terms of general approach, the level of FCLs and underwriting and competition in the market. A stochastic approach is used to evaluate various different FCL approaches and the underwriting done above it, based on a sample of actual group risk schemes.

The paper aims to provide the group risk market with an overview of the science and technical considerations behind FCLs and underwriting in the group market.

An Introduction to Solvency II

Presentation by P Withey

The presentation is aimed at actuaries who do not have practical working experience with Solvency II but wish to know more about Solvency II. The presentation will be a high level introduction to Solvency II covering the history behind it and the elements making up Solvency II.

Prediction Markets - A new investment tool

Convention paper by GM Ovenden

Prediction Markets are trading exchanges for event driven binary options i.e. options that pay out a fixed amount if a strike condition is met. The event in question might be an equity index being above some level at some time or a future CPI release being above a certain level. Research shows that Prediction Market-generated forecasts perform well. For Prediction Market contracts which have as underlying a financial instrument we can use a pricing formula for binary options derived from the Black-Scholes framework. Prediction Markets may be used for hedging and arbitrage. Interesting inferences can be made from contracts on the same underlying but with differing strikes or expiries. A South African Prediction Market under the auspices of BESA has been launched offering contracts based on equity, bond and commodity prices, econometric data and MPC decisions. Data from this market will be freely available to any interested party.

The role of statutory actuaries in Life Insurance

Panel discussion with Peter Doyle (chair), Bozenna Hinton, Gary Palser and Marius du Toit

The role of the Statutory Actuary to a life insurer is a key element of the regulatory supervision and governance of life insurers; yet it has few parallels elsewhere in financial services. This discussion will cover the role of Statutory Actuaries in life insurance, from local, international and regulator perspectives. Concerns with the current South African structure will be highlighted, as well as features of international structures that may appeal to South Africa.

A stochastic programming approach to integrated asset and liability management of insurance products with guarantees

Convention paper by H Raubenheimer and MF Kruger

In recent years insurance products have become more complex by providing investors with various guarantees and bonus options. This increase in complexity has provided an impetus for the investigation into integrated asset and liability management frameworks that could realistically address dynamic portfolio allocation in a risk-controlled way.

The authors propose a multi-stage dynamic stochastic programming model for the integrated asset and liability management of insurance products with guarantees that minimises the down-side risk of these products. They investigate with-profits guarantee funds by including regular bonus payments while keeping the optimisation problem linear.

Uncertainty is represented in terms of scenario trees using a four-factor term structure model that includes macro economic factors (inflation, capacity utilisation and repo-rates). The authors construct discrete yield curve scenarios, suitable for the pricing of fixed income securities. The main focus is on the formulation and implementation of a multi-stage stochastic programming model. Their model is back-tested on real market data.

Measuring Economic Capital in the Life Insurance Industry

Presentation by P Olivier and D Park

The measurement of economic capital in the life insurance industry has risen in prominence with the introduction of Individual Capital Assessments ("ICA") in the UK, the continued development of Solvency II as a unified risk based framework for European insurers, and the introduction of Basel II in the banking environment. The presentation will cover some of the theoretical aspects of building an economic capital model, as well as some practical issues that companies looking at either developing a new model or expanding an existing model may face. The definition of economic capital, various options to calculate economic capital, risk categories to be considered, how economic capital could be used as well as what is being done for Solvency II will be discussed.

There will also be a discussion around some of the issues faced by UK life insurers who have had to calculate an ICA, as well as what they are doing to improve their models and processes in order extract maximum value from the exercise.

Active and Passive Asset Management

Panel discussion with Clyde Rossouw and Rob Rusconi

Rossouw is a portfolio manager and Rusconi is an independent actuary who's recent discussion document ("South African Institutional Investments – Whose money is it anyway?") included a chapter on active and passive asset management. This session aims to stimulate discussion and debate around the pros and cons of active and passive asset management styles.

Has Community Rating Produced Optimal Results in South Africa?

Convention paper by T Chinowona

The prohibition of premium rating in the medical scheme (private medical insurance) environment, also known as 'Community Rating', since the enactment of the Medical Schemes Act of 1998 ('the Act') has been the cornerstone of the Department of Health's ('DOH') philosophy of social equity in the medical schemes industry.

This paper poses the question: Has community rating produced optimal results? 'Optimal' here means various things:

- Has it resulted in the greatest number of people possible belonging to medical schemes?
- Is the status quo economically efficient, in particular, is it Pareto optimal?

The estimation and interpretation of adult mortality rates in SA using Census 2001 data

Presentation by MR Dobbie

This research develops estimates of mortality rates for adult Africans in South Africa for the twelve months preceding census night, 9/10 October 2001, using Census 2001 10% sample data. The methods used to estimate these rates follow the work done by Dorrington, Moultrie and Timæus (2004) working with the full dataset, which is not publicly available, and demonstrate that the 10% sample can be used to produce similar results to the full database. The approach makes use of several indirect estimation techniques. Comparison of the number of deaths by sex and age from the vital registration system corrected for underreporting with those reported by households in the census allows one to estimate adjustment factors that can be used to adjust deaths reported by households in various sub-groups (e.g. by province) to produce more reliable estimates than if the deaths reported by households had been used directly to produce mortality rates.

Thus the researchers are able to produce sex- and age-specific mortality rates for different socioeconomic and other groups.

Practical Implication of Implementing an Effective Enterprise Risk Management Framework

Presentation by Rory O'Brien

There are many definitions of what Enterprise Risk Management (ERM) encompasses. Many organisations see it as a necessary evil only embarked upon as requirement to satisfy regulatory or Rating Agency Requirements. This is a flawed mentality! Effectively implemented ERM provides a long term sustainable competitive advantage. Armed with this motivation the implementation of an ERM system should become a labour of love! The presentation will cover the following (mainly from a short-term insurer perspective):

- Understanding why ERM should be a part of your day to day management
- The 10 step plan to implementing ERM
- The practical problems, operational and technical, that you will encounter

Living Annuities – The advisory process

Honours paper by L Beinash

This paper reports on financial advisers' views on the advisory process used when selling living annuities and subsequently managing them. This includes aspects such as the methods used in assessing the risk appetite and needs of the investor as well as the advice given on appropriate investment and drawdown strategies for the investor. The advisers' views on the mis-selling of living annuities are also presented. Finally, the paper presents a mathematical model to determine an appropriate investment strategy and income drawdown rate for an investor so as to minimise the probability of financial ruin. Eight different investment portfolios are tested to determine the portfolio that will most likely provide an investor with an annuity for life. Results are presented for a specific South African investor assumed in the model. Advisers may use the model suggested to determine the most appropriate portfolio and drawdown rates for their clients.

International developments in pensions provisions

Panel discussion with Ronnie Bowie, Ant Lester (chair) and John Maroney

A discussion around developments in pensions provisions worldwide. It will cover the world in two parts: the West (Mr Bowie, President of the Faculty of Actuaries) and the East (Mr Maroney, currently CEO of the Institute of Actuaries in Australia and previously Government Actuary in Australia).

Widening the reach of Insurance in South Africa – A futures perspective

Convention paper by M Botha

The paper raises awareness of the futures studies field, a social science that incorporates qualitative-and quantitative research methods to explore possible futures and advocate preferable ones. Qualitative research methods are essential in addressing long-term strategic challenges. To show the relevance of the futures studies field various methods are applied to the following insurance futures problem:

Widening the reach of insurance in South Africa to those in the second economy.

Micro-insurance will get increasing attention going forward and viable strategies are needed to move the South African long-term insurance industry from a probable to a preferable future. The author's hope is that this paper will continue stimulating the collaborative action necessary to help improve the financial wellbeing of all citizens in South Africa.