PLENARY ADDRESS TOPICS

PLENARY ADDRESS

Professor Jonathan Jansen, University of the Free State

Presentation
Wednesday, 22 October | 09:30 AM | Auditorium 1

PLENARY ADDRESS

Nonkululeko Nyembezi-Heita, Ichor Coal

Presentation
Thursday, 23 October | 03:00 PM | Auditorium 1

This address will include feedback from Ms Nyembezi-Heita’s interactions with policy makers and business leaders and investors on the challenges and opportunities facing the South African economy.

TREATING CUSTOMERS FAIRLY: QUESTIONS FOR THE ACTUARIAL PROFESSION

R Rusconi and P Truyens, Actuarial Society TCF Committee

Paper
Wednesday, 22 October | 04:15 PM | Auditorium 1

This discussion paper asks how the Treating Customers Fairly (TCF) regime will work in practice and whether it is complete in its formulation. It reflects on how TCF might address the most important issues in five industry sectors in which actuaries work: long- and short-term insurance, retirement funds, investment markets and health-care financing, the last of these not well covered by TCF at present.

Most importantly, however, the paper reflects on how the actuarial profession, with all of its influence and responsibility, could have arrived at this point, where we should need a TCF regime to call on us to prove that we are looking after our customers’ interests effectively.

LIFE TOPICS

ACCELERATED ART ROLL-OUT: AN INVESTIGATION ON THE POTENTIAL IMPACT FOR SA LIFE ASSURERS

ML Strydom, DJ Corubolo, C Nel

Paper
Thursday, 23 October | 09:25 AM | Meeting Room 2.6

Our research investigates the impact of improved (and improving) mortality experience in South Africa (SA) as a result of the increased (and increasing) access to antiretroviral treatment (ART) on SA life assureds, the entry-level insurance market and the wider SA economy. The research focuses on various potential impacts on the entry-level insurance market, including new business profitability, product development and pricing, market penetration and the potential for increased savings. Our research has been done with the assistance of four of the main SA life offices and also draws on the new THEMBSA AIDS model on which a working paper has been produced. We use the THEMBSA model to investigate the potential impact of alternative mortality scenarios on typical entry-level products within the industry where the scenarios have been based on actual current and proposed antiretroviral roll-out strategies by the Department of Health (DoH). Using a profit test model for entry-level market products we quantify potential improvements to profitability, potential premium reductions and benefit enhancements, and the potential for cash-back benefits and reinvestment under various mortality scenarios.

ANNUITIES: SOUTH AFRICAN CHALLENGES

D Dass, S Wiesinger

Presentation
Wednesday, 22 October | 2:55 PM | Auditorium 1

Longevity bases involve not only a suitable base mortality table, tailored to the mortality experience of older lives at the present time, but also mortality improvement factors. Such improvement factors formalize the observation that mortality generally decreases as time progresses. They allow the longevity basis to reflect the demographic dynamic of increasing life expectancies. Base mortality tables are relatively straightforward to estimate, however mortality improvements involve an informed prediction of how the mortality of older lives progresses over the next few decades. The South African landscape in particular poses some tough challenges for longevity actuaries. Socio-economic differences are so pronounced that average mortalities differ by up to a factor of four between different provinces. Simultaneously, the dynamic in mortality development is so inconsistent that any improvement projection between -2% and +5% could be justified. We discuss some of these challenges in more detail as well as possible approaches to solutions.

CATASTROPHE MODELLING: DERIVING THE 1-IN-200 YEAR MORTALITY SHOCK FOR A SOUTH AFRICAN INSURER’S CAPITAL REQUIREMENTS UNDER SOLVENCY ASSESSMENT AND MANAGEMENT (SAM)

AA Plantinga, DJ Corubolo, R Clover

Paper
Wednesday, 22 October | 11:45 AM | Auditorium 1

This paper investigates catastrophe risk for SA life insurers by considering the additional deaths that
could arise from a 1-in-200 year mortality shock. Existing academic research on catastrophic risk has mostly focussed on property losses and the resulting impact on property insurance companies. Life catastrophe risks have not been extensively modelled in a South African context. Local research would be beneficial in terms of quantifying risks for South African life insurers, and would assist firms in assessing their own catastrophe mortality solvency requirements under the new Solvency Assessment and Management (SAM) regime by providing a summary of data relating to various past catastrophes.

This paper models a wide range of catastrophes to assess mortality risk faced by life insurance companies in South Africa. An extensive exercise was undertaken to obtain data for a wide range of catastrophes and this data was used to derive severity and frequency distributions for each type of catastrophe. Data relating to global events was used to supplement South African data where local data was sparse. Data sources included official government statistics, industry reports and historic news reports. Since by nature catastrophic events are rare, little data is available for some catastrophe types. This means there is a large amount of uncertainty underlying some of the estimates. Simulation techniques were used to derive estimated distributions for the potential number of deaths.

This report found that the shock proposed by SAM Pillar 1 may be too high, and would thus over estimate the amount of capital required to withstand a 1-in-200 year life catastrophe event. It was found that a worldwide pandemic is by far the main risk, and given that this is the most significant component of catastrophe risk, prior research on this risk in an SA context is summarised and revisited. The research found that the split of the total catastrophe mortality shock between instantaneous events (e.g. nuclear disasters, earthquakes, floods and tsunamis) and pandemic risk under SAM Pillar 1 gives too little weight to pandemic risk.

CHANGES IN UK LEGISLATION – HOW HAS IT CHANGED THE INSURANCE MARKET?

D La Grange

Presentation

Wednesday, 22 October | 1:55 PM | Meeting Room 1.4

The UK insurance industry has seen a number of legislative changes in recent years. There are concerns that some of the changes will damage the industry, while other changes are deemed necessary to protect consumers and improve the reputation and financial strength of the industry.

This session will summarise the various changes, their current and anticipated effects on the insurance industry and lessons learnt.

CRITICAL ILLNESS TRENDS IN SOUTH AFRICA

J Cooper-Williams, M-R Dobbie

Presentation

Thursday, 23 October | 2:00 PM | Meeting Room 2.4

Critical illness products in South Africa have become increasingly complex and are very different to the original products first launched. These products cover a large number of conditions and diseases while payments are, in some instances, tiered based on severity. In this paper, we seek to identify those conditions that drive incidence rates (and costs), both at an aggregate level and for different subgroups (e.g. males, different age groups). We consider how these disease contributions have changed over time and we estimate how these trends might continue into future periods. We compare our experience against recent findings from the UK. We conclude with a discussion of potential future treatments and early detection/screening initiatives and how these might influence critical illness and lead to possible product revisions in future.
are sometimes a combination of bonds and cash. The South African market does not have a highly liquid corporate bond market and the supply of government bonds are limited to the longest duration bond maturing in 2049. The current swap spreads available also indicate significant higher costs should swaps be used as alternative investments. Subsequently due to liabilities of terms in excess of 35 years, insurers are exposed to mismatch risk. The research question of this paper is to analyse the extent of this investment risk.

Our paper investigates the liability and asset volatility of a life risk products book. We compare the asset and liability profiles under a number of yield curve simulations. We also consider the possibility of losses which occur when bonds need to be reinvested in 2049. Our analysis will focus on the distribution of these mismatch losses (and profits).

As a conclusion we investigate the impact of increasing our exposure in long duration bonds. We briefly look at the trade-off with capital, increased exposure to sovereign risk and the possible future picture in a Solvency Assessment and Management (SAM) environment.

PROSPECTIVE STOCHASTIC LONGEVITY MODELLING

G Woo

Paper
Thursday, 23 October | 11:55 AM | Auditorium 1

Mortality improvement has traditionally been analyzed using an array of statistical methods, and extrapolated to make future actuarial projections. This paper presents a prospective forward-looking approach to longevity risk analysis which is based on stochastic modelling of the underlying drivers of mortality improvement, due to changes in lifestyle, health environment, and advances in medical science. The rationale for this approach is similar to that adopted for structural modelling of other types of dynamic insurance risk, e.g. natural catastrophes, where risk analysts construct a stochastic ensemble of events that might happen in the future, rather than rely on a retrospective analysis of the non-stationary and comparatively brief historical record.

With any stochastic modelling of the future, the time evolution of the underlying dynamical processes is crucial. Understanding these processes is the key to longevity modelling, since they govern the time frame for mortality improvement. By developing meta-models for the underlying causes of medical and healthcare progress, insight is gained into the mechanisms by which significant levels of mortality improvement can be sustained for future decades.

QIS3 LIFE RESULTS FEEDBACK

T Hamman, D Hutchinson (FSB)

Presentation
Thursday, 23 October | 09:25 AM | Auditorium 1

The Financial Services Board has recently concluded its third and final Quantitative Impact Study (QIS) of the Solvency Assessment and Management (SAM) framework. The results of this exercise are a key input into the final measures, and also provide an opportunity for insurers to identify any difficulties they may experience from a financial soundness perspective in the new regime as well as to benchmark their results against the industry.

Overall, results for the life industry in aggregate show a greater free surplus under SAM than under the current regime, although on an individual basis many insurers show a lower free surplus. A number of insurers were not meeting both the Minimum Capital Requirement as well as the Solvency Capital Requirement. The FSB continues to engage with insurers who have concerns under SAM, and to monitor progress and developments through the parallel run period leading up to the planned implementation date of 1 January 2016.

The purpose of the presentation is to share with delegates some of the highlights from the results.

PENSIONS AND SOCIAL SECURITY TOPICS

FINDING HAPPINESS IN RETIREMENT

J Legutko

Paper
Wednesday, 22 October | 01:55 PM | Meeting Room 2.4

Current actuarial views of retirement rest on a number of implicit assumptions, such as that a successful retirement is characterised solely by achieving certain financial outcomes, and that such financial outcomes are best measured in relation to the pre-retirement financial position of an individual.

These assumptions result in retirement planning advice which is primarily focussed on how much one should save, how to invest those savings, and for how long one must save to achieve a replacement ratio that allows an individual to maintain their pre-retirement standard of living.

Such replacement ratios can be impossible to achieve if an individual did not save consistently from the beginning of their working life, especially in light of ongoing increases in longevity. For those who cannot achieve sufficient retirement income, the outlook on retirement is bleak, and within this paradigm there seems to be little that can be done to help them achieve a satisfactory retirement.

We propose however that the financial outcome is but one intermediate target, albeit an important one. We expand the range of “retirement outcomes”, i.e. aspects of an individual’s life which change on retirement, considered to include the activities, home and social environment, and the health of the individual. All of these contribute towards a person’s satisfaction with their life, or happiness.

In our view, a happy retirement is what every individual would like to achieve. When actuaries consider the replacement ratio of a retiree, the underlying
THE IMPACT OF BEHAVIOURAL ECONOMICS AND FINANCE ON RETIREMENT PROVISION

N van Zyl and DJJ van Zyl

Paper
Wednesday, 22 October | 11:45 AM | Meeting Room 2.6

The significant shift from Defined Benefit to Defined Contribution Retirement Funds in South Africa has led to many fund members bearing responsibility for a range of risks. Many of these risks, such as those related to investment, longevity and cognitive deterioration are unavoidable. Another category of risk is that related to the choices made by government, employers, trustees, advisors and/or individuals at either national, scheme or individual level. These choices may also pose a threat to a members’ financial wellbeing in retirement. Behavioural Economics and Finance helps to explain the choices made by all concerned in the retirement industry. This concept is explained in the context of industry stakeholders and the unique South African economic and demographic landscape, focussing on Defined Contribution Retirement Funds.

Key behavioural insights applicable to the retirement industry are explored and, where practical, illustrated by stakeholder behaviour. Possible ways to harness these insights to improve retirement wellbeing are then discussed.

THE LEGACY INDEX – A FRAMEWORK TO EVALUATE AN APPROPRIATE RETIREMENT INCOME

V Boulle

Paper
Wednesday, 22 October | 10:45 AM | Meeting Room 1.4

Deciding on how to structure assets at retirement to provide the required income for the remainder of their lives will be one of the most important financial decisions taken by individuals or couples. A wide range of products exist to attract and service this market. The new business statistics for South African life insurers show that the most popular option is to utilise a living annuity where the investment and longevity risks are borne by the annuitant.

The paper proposes a financial planning framework that enables the planner and retiree to understand the extent of the risks being accepted through the use of a simple measure known as the Legacy Index.

The model underlying the framework is stochastic and allows the effect of various investment outcomes to be illustrated on both the retirement income received and the potential bequest.

WHAT IS THE BEST WAY OF EXTENDING RETIREMENT COVERAGE TO THE SIX MILLION EMPLOYED SOUTH AFRICANS WHO DO NOT HAVE ACCESS TO AN OCCUPATIONAL RETIREMENT PLAN?

DT Chamburuka, C Aitchison

Paper
Thursday, 23 October | 11:55 AM | Meeting Room 1.4

About half of formally employed people are not a part of their employer’s retirement saving fund, and while some people may take action themselves and open an investment account or increase savings, other people display a sense of hopelessness. Many people may not take action themselves and thus mandating or requiring employees to save for retirement through an occupational retirement fund is ideal. The paper explores different models that the South African government can use to extend the coverage of retirement savings.

INVESTMENTS TOPICS

AN INVESTIGATION INTO SOUTH AFRICAN GENERAL EQUITY UNIT TRUST PERFORMANCE DURING DIFFERENT ECONOMIC PERIODS

DE Bertolis, M Hayes

Paper
Thursday, 23 October | 09:25 AM | Meeting Room 1.4

This paper investigates the performance of South African general equity unit trusts relative to the FTSE JSE All Share Index during the period January 1994 to December 2012. The period under investigation was split into six further sub-periods each having a specific economic cycle: a downturn, average growth or robust growth. Unit trusts are shown to have underperformed in economic downturns and outperformed in periods of robust growth, while no conclusions can be made about unit trust performance during periods of average growth. Overall, unit trusts showed slight outperformance, but this was not found to be persistent.

ARTIFICIAL NEURAL NETWORKS – MODELLING MARKET RETURNS IN SOUTH AFRICA

M Smith

Presentation
Wednesday, 22 October | 11:45 AM | Meeting Room 1.4

A more complex world requires more complex solutions. Nowhere is this more apparent than in the financial sector. The aim of this presentation is to introduce the audience to Artificial Neural Networks (ANNs). ANNs is a dynamic modelling technique that is based on a small scale imitation of the human brain. This modelling technique holds a significant portion of the field of Artificial Intelligence. ANNs have the ability to detect and project non-linear relationships between variables. Further, they can adapt in dynamically changing environments while providing accurate results. A method of constructing ANNs in order to form a forecasting system is presented here. In addition, detailed investigations into parameter estimation for ANNs are performed. ANNs and traditional models (ARIMA, seasonal smoothing, geometric Brownian motion, etc.) are constructed to forecast monthly inflation and the average monthly return on the money, bond and equity markets in South Africa from 1975 to 2010. The ANNs constructed are done through an integrated and isolated approach. The performance...
of the ANNs and traditional models are compared. Further, hybrid models are constructed, trained and tested for the money market and inflation.

THE USE OF ENVIRONMENTAL SUSTAINABILITY REPORTING BY SOUTH AFRICAN COMPANIES TO PROMOTE ENVIRONMENTAL SUSTAINABILITY

BS Vos, TL Reddy

Paper
Wednesday, 22 October | 02:55 PM | Meeting Room 1.4

Over the last decade, there has been greater emphasis on corporate environmental sustainability reporting. The aim of these reports is to make companies accountable for the effects of their activities on the environment. This paper aims to demonstrate whether South African companies, based on the information provided in these reports, are promoting environmental sustainability. Economic sustainability is affected by environmental sustainability. Therefore, if there is evidence to suggest that companies are not promoting environmentally sustainability, then this will affect their economic sustainability. This has implications for the advice that actuaries give on SRI. This paper analyses the environmental disclosures of ten South African companies in each industry which were included in the JSE Socially Responsible Investment Index as at the end 2012. This paper finds that these companies disclose very little information about how environmentally sustainable they are. Rather, the environmental disclosures are used to enhance the public image of these companies.

HEALTH TOPICS

HIV MANAGEMENT PROGRAMMES: ARE THEY COST-EFFECTIVE?

T Tofas, S Henderson, JF Bruwer

Paper
Thursday, 23 October | 11:55 AM | Meeting Room 2.6

This research project investigates the effect of an HIV management programme, to gain insights into what the achievements have been. These achievements will be split into pure health outcomes (e.g., participants are healthier and live longer) and financial outcomes from the point of view of medical schemes (does the programme result in financial savings, or is healthcare spend actually higher?). The aim of the study is to investigate what particularly makes such programmes successful, by valuing each of the interventions separately. There is some research in the public domain suggesting that the high cost of Anti-Retroviral Therapy (ART) medication outweighs the benefits of HIV management programmes. This paper will investigate whether ART medication adds more financial value than its high cost. The paper will therefore also be applicable to the national HIV programme in South Africa.

IMPACT OF SOCIAL HEALTH INSURANCE ON HEALTH CARE COSTS

F Badat

Presentation
Wednesday, 22 October | 10:45 AM | Meeting Room 2.6

Social Health Insurance can be defined rather simply as a health insurance fund whereby only those who contribute to the fund are eligible for defined healthcare benefits. Membership is usually mandatory for the total or defined groups of the employed population. Thus this analysis will focus on the impact on healthcare costs in the event of mandatory medical scheme membership for the formally employed South African population and further project these costs based on future expectations of the South African population. This analysis will provide an overview of the demographic differences between the currently covered and uncovered lives and will highlight the effects on current private health care costs that arise from the anti-selective behaviour experienced in the current voluntary market. In addition, the projection of healthcare costs will extend to the informally employed and unemployed to provide a view of healthcare costs under a National Health Insurance setting.

NEITHER HERE NOR THERE: THE SOUTH AFRICAN MEDICAL SCHEME INDUSTRY IN LIMBO

S Ramjee, T Vieyra

Paper
Wednesday, 22 October | 02:55 PM | Roof Terrace

Medical schemes are the primary financing mechanisms for private healthcare in South Africa. They are not-for-profit entities owned by their members and are regulated on the basis of social solidarity principles. The key features of the environment are open enrolment, community rating and prescribed minimum benefits. However, social solidarity reforms were not fully implemented and the system lacks any form of income cross-subsidy, risk equalisation or mandatory membership. We argue that the system is intrinsically flawed in the absence of either fully implemented social solidarity mechanisms for risk- and income-cross-subsidies on the one hand, or managed open-market competition on the other. This uncomfortable middle ground means there is currently no incentive for innovation or growth, an administration industry which is prone to incumbency and cover that is increasingly unaffordable and unsustainable.
The presentation discusses the effect of observation errors in earthquake magnitude determination on the assessment of insurance losses due to seismic activity. The implications of estimators that include observation error of key seismic parameters for the insurance industry are discussed. This applies to procedures serving as tools to improve the quantification of risk of earthquake perils covered by short term property insurance. A discussion of the probabilistic seismic risk assessment methodology and an application to the South African insurance industry underpins the above investigation. The classical assumption that the real observation is a sum of two random variables, namely the actual (true) value of the observed variable, such as the earthquake magnitude, and observation error, is considered. Most often the error is assumed to follow the normal distribution; however, other distributions such as the Laplace distribution may sometimes offer better approximations. The two error models are applied to estimate parameters of the frequency-magnitude Gutenberg-Richter relation, which describes the distribution of different earthquake magnitudes.

### QIS3 SHORT-TERM RESULTS FEEDBACK

**I Abrahams, D Hutchinson (FSB)**

*Presentation*

Wednesday, 22 October | 11:45 AM | Roof Terrace

The Financial Services Board has recently concluded its third and final Quantitative Impact Study (QIS) of the Solvency Assessment and Management (SAM) framework. The results of this exercise are a key input into the final measures, and also provide an opportunity for insurers to identify any difficulties they may experience from a financial soundness perspective in the new regime as well as to benchmark their results against the industry.

Overall, results for the non-life industry in aggregate show a smaller free surplus under SAM than under the current, although on an individual insurer basis it is worth noting that free surplus is higher than under the current regime for some insurers. A number of insurers were not meeting both the Minimum Capital Requirement as well as the Solvency Capital Requirement. The FSB continues to engage with insurers who have concerns under SAM, and to monitor progress and developments through the parallel run period leading up to the planned implementation date of 1 January 2016.

The purpose of the presentation is to share with delegates some of the highlights from the results.

### ERFM TOPICS

#### A DAY IN THE LIFE OF AN ERM-SAVVY EXECUTIVE

**L Schmaman, W Savage, P van den Berg**

*Presentation*

Wednesday, 22 October | 01:55 PM | Meeting Room 2.6

As regulatory and technical advances bring us hurtling towards a new integrated financial, risk and capital future, this presentation takes a look at what a typical day might look like in an organisation where business decisions are driven from a risk-inclusive viewpoint. The presentation helps to bring together two main trends: (a) regulatory trends requiring companies to enhance their risk management practices, and (b) a shift in management focus from risk management as a corporate function to risk management as a discipline which is embedded across the organisation and viewed as a strategic asset. In this presentation, we take the audience through the day in the life of an ERM savvy executive and illustrate how these trends fundamentally change the way in which we do business.

### NEEDS-DRIVEN REINSURANCE

**N Naidoo, G Solomon**

*Presentation*

Thursday, 23 October | 02:00 PM | Meeting Room 2.6

The presentation shows how reinsurance fulfils various needs in the market, moving from conventional ideas to the less common structures used worldwide.

To ensure a common starting point, we offer a brief introduction to the reinsurance market and the main players, before moving onto the value proposition of a reinsurer and the key factors in a selling decision. We consider how reinsurance buying decisions are made in the real world, from the desired quantitative impact of the cover, through to the more qualitative factors like turnaround times, availability of services, and potential biases introduced in the behavioral economics sphere.

We finish off with some of the less conventional reinsurance solutions, focusing on reinsurance financing for capital management purposes, and catastrophe covers (including earthquakes, epidemics and worksite catastrophes, amongst others), which are key for the risk management of a life company.

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**SHORT-TERM TOPICS**

**THE EFFECT OF OBSERVATION ERRORS ON THE ASSESSMENT OF INSURANCE LOSSES DUE TO SEISMIC ACTIVITY**

**S Pretorius**

*Presentation*

Wednesday, 22 October | 01:55 PM | Roof Terrace

This session will discuss the difficulties associated with reserving for long-tailed lines of business and will offer suggestions for estimating these liabilities. With a focus on workers compensation insurance and asbestos/environmental liability, the session will discuss issues of inflation, advances in medical technology, manifestation and judicial interpretation of coverage. Current approaches to reserving for these coverages will be examined, and alternative approaches explored.

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**THOUGHTS ON RESERVING FOR LONG-TAILED LINES OF BUSINESS**

**P Teufel**

*Presentation*

Thursday, 23 October | 10:55 AM | Meeting Room 2.6

This session will discuss the difficulties associated with reserving for long-tailed lines of business and will offer suggestions for estimating these liabilities. With a focus on workers compensation insurance and asbestos/environmental liability, the session will discuss issues of inflation, advances in medical technology, manifestation and judicial interpretation of coverage. Current approaches to reserving for these coverages will be examined, and alternative approaches explored.
PRACTICAL METHODS OF MODELLING OPERATIONAL RISK

AP Groenewald

Paper
Wednesday, 22 October | 10:45 AM | Meeting Room 2.4

With regulatory frameworks for banks and insurers requiring capital to be held against operational risk losses, greater focus is being placed on the modelling of operational risk - comparable to the modelling efforts on market, credit and insurance risk. Several factors make the modelling of operational risk particularly difficult. This category of risk includes a wide range of disparate risks requiring different modelling techniques. Financial institutions typically do not have sufficient historical data and where adequate data is available, the data seldom include events from the tails of the underlying distributions. The interaction of the different operational risk sub-categories with each other and other risk types is complex to model. However, many banks and insurers develop and use operational risk models. This paper surveys the literature and publicly disclosed information on operational risk modelling and summarises the main methods employed in practice. The paper aims to explain the modelling of operational risk in practical terms and do not focus on the advanced mathematical and statistical methods employed in the modelling process. The paper includes simulated numerical examples to demonstrate the sensitivity of the resulting capital to certain modelling assumptions.

RISK AND CAPITAL ANALYTICS: ENHANCING THE VALUE DERIVED FROM MORE SOPHISTICATED RISK AND CAPITAL QUANTIFICATION

N Smit, A Goosen, M Brinckmann

Presentation
Wednesday, 22 October | 02:55 PM | Meeting Room 2.6

Recent developments in financial and capital management have led to an ongoing improvement in the sophistication of capital and risk quantification. But are the full benefits of these new techniques being utilised by senior management and the Board? With the increasing focus on risk and capital information, we take a practical look at enhancing business decision-making through effective analysis and communication of risk and capital metrics. Specifically, we will cover:

• An overview of emerging international and local trends in risk and capital reporting and monitoring
• Exploring approaches to present easily digestible capital metrics in a logical way, in order to assist senior management and the Board with timely, meaningful financial information (and support decision-making)
• An indication of what is needed to make all of this happen, i.e. what tools are required and an indication of challenges to be expected, including an overview of approaches to capital projections
• Consider how to deal with certain practical challenges of designing and implementing an effective risk appetite framework.

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The SAM ORSA requires balance sheet and solvency projections. We note that the embryonic approaches that many companies (especially non-life insurers) are currently taking to do solvency/capital projections is very approximate and hence may not provide the business with suitable insights into the impact of future business developments on the business’ risk profile.

This paper will briefly comment on some of the current approaches that are used in the South African market by life and non-life insurers.

The focus of the paper will be on a useful but practical model office approach to solvency/capital projections. The technique that will be described is based on life insurance model office techniques that are commonly used in Europe. This approach will be demonstrated through a case study where a UK based life company applied this approach to analyse the key issues affecting their future solvency position and which used the tool to develop their response to mitigate the issues that were foreseen – ultimately this tool was used in deciding to merge the business with another company.

The methodology will be developed and applied to the SAM ORSA requirements to demonstrate how this technique could be used to analyse future risks and extract additional value from the ORSA projections.

We will also explore whether this technique can be adapted to use for non-life companies and we will discuss the practical implications and approaches.

This paper summarises the modelling methodology used and the application of the results of the modelling performed, as well as demonstrating that these techniques can potentially be used under SAM. The results are relevant to both life insurers and potentially short term insurers depending on their business models.

PROFESSIONAL MATTERS TOPICS

THE CHANGING ROLE OF THE ACTUARIAL PROFESSION IN LIFE INSURANCE

A Thomson, D Jewell

Presentation
Wednesday, 22 October | 11:45 AM | Meeting Room 2.4

The emergence and development of the global life insurance industry has been closely entwined with the actuarial profession, a symbiotic relationship between industry and profession. Actuaries have for decades played key roles across the business, from product development and pricing, valuations and performance measurement to risk management and strategy, as well as executive leadership roles. The profession has been central to the growth of the life industry and its effectiveness. In recent years this relationship has started to change. Roles reserved for actuaries have been curtailed or removed. Actuarial functions’ scopes have reduced – both in regulation and in practice. Non-actuaries are performing traditional actuarial roles.

Are these trends inevitable - is the actuarial contribution becoming less important to the life industry?

Our view is that for the actuarial profession to retain its historical role in life insurance, the skillsets of actuaries need to change, as do their roles and how they are organised. And the profession can play a stronger role in supporting these changes.

The presentation – to be delivered by Alex Thomson of EY and David Jewell of Liberty – will cover topics such as:

- The future of the actuarial function in light of changing business needs and regulatory requirements
- The impact of the changing risk role on actuaries and actuarial functions
- The threats to the continued relevance of the profession to the life industry
- How educational and professional development initiatives can evolve to support the relevance of the profession
- Building employee value propositions that support actuaries to realise their career potential

THE COMMITMENT OF SOUTH AFRICAN ACTUARIES TO THEIR PROFESSION

S Ramjee, K Mokonyane, J Bagraim

Paper
Thursday, 23 October | 09:25 AM | Meeting Room 2.4

In this paper we examine the nature and outcomes of South African actuaries’ commitment to their profession and professional association, the Actuarial Society of South Africa (ASSA). Commitment is defined as a mind-set that binds an individual to a course of action of relevance to one or more targets. We conduct interviews and a multi-part survey of Fellow members of ASSA to gauge their commitment, their levels of professional involvement and their intention to remain as relates to the profession and to ASSA. South African actuaries are found to have high levels of affective and continuance commitment to the profession, where affective commitment is defined as a desired based mind-set relating to an emotional attachment and continuance commitment is defined as a mind-set borne of an awareness of the costs associated with not maintaining the commitment. Affective commitment to ASSA is found to be significantly lower than affective commitment to the profession.

ENVIRONMENTAL, SOCIAL AND ECONOMIC SUSTAINABILITY: IMPLICATIONS FOR ACTUARIAL SCIENCE

TL Reddy, RJ Thomson

Paper
Wednesday, 22 October | 10:45 AM | Roof Terrace

The heart of actuarial science lies in its models. These models form the basis for the advice we provide and for decision-making. The assumptions we use in our models rely on past and current information. Therefore, if there is evidence that the future will not look like the past, we need to ask what the effects will be on what actuaries are doing now and what actuaries should be doing in the future that we are not doing now. Given
actuaries’ skills and experience in the modelling of the outcomes of entities’ activities in the economic domain and the eclectic nature of our discipline, the actuarial profession has a unique position in society relative to other professions to address the challenges of environmental, social and economic sustainability. This paper aims to:

- define what is meant by ‘sustainability’;
- establish the requirements of accountability for sustainability;
- consider how institutional investors and actuaries can promote sustainability; and
- explore the challenges for the actuarial profession.

As the principal decision-makers in retirement funds, the trustees have a number of duties placed upon them including a duty of care, a duty of impartiality, a duty to avoid and manage conflicts of interest, a duty to act in accordance with the purpose of the fund and a duty of accountability. Decision-making by trustees and the actuaries that assist them in the context of a complex environment with multiple stakeholders can be informed by considering various ethical theories. This paper reviews the theory of right action, virtue theory and the ethics of care together with the theory of justice and interprets the duties of trustees and actuaries in terms of these theories. A six-step decision-making framework based on the actuarial control cycle is developed to provide an initial attempt to formalise the process of ethical decision-making in South African retirement funds. This framework is applied to case studies involving the review of an investment policy statement, the distribution of death benefits, and annuitisation options. The case studies illustrate that although the framework does not provide ethical solutions in their own right it assists trustees and the actuaries who advise them with the process of making an ethical decision.
**WIDER FIELDS TOPICS**

**BIG DATA ANALYTICS**

**K Bhoola, K Kruger, J Peick, P Pio, NA Tshabalala**

*Paper*  
**Thursday, 23 October | 11:55 AM | Meeting Room 2.4**

The amount of structured and unstructured data becoming available to the insurance industry continues to grow rapidly. Analysing these large datasets, also referred to as Big Data, can provide helpful information to avoid risks, discover new opportunities, identify customer trends and develop new products. Hence, Big Data analysis is fast becoming the competitive, innovative edge insurers are looking for. Although data analysis is not new to the insurance industry, the volume and range of data being available is constantly changing. The true value of Big Data is only realized when relevant information can be extracted rapidly and when it can be structured in a way that fact based decisions can be made based on it. This paper sets out the history and definition of Big Data, the challenges and opportunities around Big Data using case studies that may be applied in the local South African insurance industry as well as the technology and tools needed to analyse Big Data. It also explores the roles actuaries can play in Big Data Analytics and insurance space. A short introduction into the data governance and regulations as well as a possible outlook of what the future might hold are included as well.

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**EFFECTIVENESS OF SHARE-BASED PAYMENTS TO EXECUTIVES**

**Z Motala, N Fourie**

*Paper*  
**Thursday, 23 October | 10:55 AM | Meeting Room 2.4**

Share-based payments are very commonly part of executive remuneration packages and, in recent years, have comprised a large proportion of executive compensation. This study entails an empirical analysis to identify whether the proportion of total executive remuneration granted in the form of share-based payments has an impact on company performance for companies listed on the JSE. It is hypothesised that by increasing the percentage of salaries that are comprised of share-based payments, this will in turn positively affect the performance of the company. It is believed that share-based payments reduce the issue posed by principal-agent theory by aligning the interests of the executives to that of the shareholders. Suitable company performance measures are identified to be accounting benchmarks: return on assets (ROA) and return on equity (ROE). The executive compensation structure of 19 South African retail companies was investigated over the 2008 to 2013 period to identify the level of share-based awards expensed by the company. Subsequently, a thorough regression analysis indicates that there is little evidence to support the hypothesis that a relationship exists between equity-based compensation and company performance.

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**DEVELOPING A DATA-DRIVEN BUSINESS: AN INTERNATIONAL PERSPECTIVE**

**D Isaacs**

*Presentation*  
**Thursday, 23 October | 02:00 PM | Auditorium 1**

An insight into how businesses overseas are developing big data strategies, utilising both internal and external data sources to create new competitive advantages. With major partnerships with some of Australia’s largest organisations, Quantum has been at the forefront of the evolution of data analytics for more than a decade. Also being one of Australia’s largest employers of actuaries, they have a strong view on how the actuarial community can position itself as a premier profession and thought leader in big data. Case studies will be presented from businesses spanning a wide range of industries including Insurance, Retail, Fast Moving Consumer Goods (FMCG), Financial Services and Media, highlighting world’s best practice in execution of insights and measurement of outcomes.

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**STRATEGIC WORKFORCE ANALYTICS**

**A Theophanides**

*Presentation*  
**Thursday, 23 October | 10:55 AM | Meeting Room 2.4**

The objective of this presentation is to explain how data analytics and statistical modelling can be employed to:
- Generate insights, predict outcomes, simulate scenarios and optimise decisions related to an organisation’s workforce.
- Develop a robust workforce plan down to a role level, year-on-year, over a predetermined forecast horizon.
- Identify employees with high risk of attrition and the leading factors attributable to the predicted exits.
- Quantitatively measure and test hypotheses on the degree of correlation among employee remuneration, productivity and performance.
- Provide management with intelligent data on which to base objective, scientific, fact-based decisions relating to the strategic composition of the workforce.

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**USING BIG DATA TO BECOME US PRESIDENT – IMAGINE WHAT IT CAN DO FOR YOUR BUSINESS**

**P Temple**

*Presentation*  
**Thursday, 23 October | 11:55 AM | Meeting Room 2.4**

This presentation will look into the case study of how Barack Obama used Big Data in his presidential election and re-election campaigns. These concepts will then be applied to insurance and how big data can and will transform insurance in the future.
In the past decade, the topic of microinsurance has received much attention from researchers around the world as the drive to alleviate persistent global poverty intensifies. Although microinsurance is a powerful tool that can be used to assist in the fight against poverty by acting as a safety net for policyholders, the problem of claims fraud is a serious threat to its long-term sustainability. Analysis of the existing literature reveals a severe shortage of research into the problem of microinsurance claims fraud, even though we have found that it poses a greater threat in microinsurance than regular insurance. In this paper we highlight the problem of claims fraud in low-income markets and we explain how fraud makes microinsurance unsustainable. After establishing that action is needed to combat fraud in microinsurance we briefly present a number of fraud mitigation techniques that have been successful in conventional insurance. However, certain characteristics that differentiate microinsurance from regular insurance reveal that most of these fraud combating approaches are not appropriate to microinsurance; for example, the proportionately higher costs of identifying claims fraud relative to policy size, the lack of data and the lack of resources experienced by microinsurers render these methods impractical and unaffordable in the context of microinsurance. We proceed to demonstrate the workings of a statistical method known as Principle Component Analysis of RIDIT Scores (the PRIDIT method) which has been shown to effectively identify fraudulent claims without the need for a training sample. The method can thus be easily applied by microinsurers to assist in the detection of claims fraud. While the method of fraud detection that we propose in this paper is not without limitations, it may provide a pragmatic and cost effective way for microinsurers to begin tackling claims fraud. Furthermore, the method is clearly explained by means of a worked example to help microinsurers implement the method by themselves at low cost.