



## SYNOPSIS

### A FRAMEWORK FOR THE VALUATION OF NON-MARKET BASED EMBEDDED OPTIONS IN LIFE INSURANCE PRODUCTS

*Stuart Blackhall, Murray Glase, Graham Kelly, Lee Wallace, Joshua Corrigan, Wayne Brazel, John Wright Jones III, Mathieu Jones*

**Key words:** Embedded options; Pricing; Valuation; Risk management

**Purpose of your paper:** The purpose of this paper is to challenge the existing approach in valuing behavioural options in life insurance products.

Reasonable frameworks exist for valuing market-based embedded options. For example, approximations of the value of Guaranteed Minimum Accumulation Benefits can be found using the Black-Scholes formula. More complicated products (such as Guaranteed Minimum Withdrawal Benefits) can be valued using stochastic simulation.

Behavioural (or non-market based) options are options whose value depend on individual policyholder circumstances and behaviours. Actuaries have generally overlooked these in the pricing of life insurance products. We propose a framework in which to both value and understand the underlying risks behind these types of options.

**Synopsis:** Insurance regulations require life insurers to value all embedded options. Reasonable frameworks exist for valuing market-based embedded options, be it formula-based or stochastic pricing. Behavioural options, however, are much more difficult to value; life insurers have so far made little progress in valuing these types of options.

The purpose of this paper is to challenge the existing approach in valuing behavioural options. We will argue that some of the current problems in the life insurance industry stem from a lack of understanding of not only the value of embedded behavioural option, but also the underlying drivers of the risk behind these options.

The paper

- Outlines the various behavioural options embedded in products offered in Australia.
- Gives an overview of the framework currently used to value these options by the life industry.
- Develops a framework for identifying the risk drivers that might lead a policyholder to value an embedded option more highly and the implications of these on life insurers' risk profile.
- Proposes a method for the quantitative valuation of embedded options.



## SYNOPSIS

### **ACTUARIAL IMPACTS OF LIFE INSURANCE COMMISSION REFORM**

*Dale Jackson, Tyson Johnston*

**Key words:** Life insurance, commission reform, assumptions, modelling customer behavior.

**Purpose of your paper:** The purpose of the presentation is to discuss the actuarial implications of the current movement towards reforming how financial advisers are remunerated for life insurance advice.

**Synopsis:** During 2014-2015, the life insurance industry has been strongly challenged by regulators to address issues of poor financial advice and perceived conflicts of interest. The combined efforts of industry and government culminated in a proposed Life Insurance Framework, announced on 25 June 2015 by the then Assistant Treasurer. The focus of these proposed reforms is on changing commission structures and related rules regarding adviser and licensee remuneration. At the time of preparing this synopsis, the details of the proposed reforms are under further consideration, but change remains on the agenda.

This presentation will consider how adviser, customer and insurer behavior is expected to change following the reforms, and the impacts on actuarial practitioners working in life insurance. Areas for discussion include:

- Assumption setting
- Modelling
- Data
- Product design
- Pricing
- Profitability and value metrics
- Balance sheet and return on capital



## SYNOPSIS

### **APPLICATION OF STATISTICAL TECHNIQUES IN GROUP INSURANCE**

*Chit Wai Wong, Jih Ying Tioh, John Low, Keong Chuah*

**Key words:** Group insurance, statistical techniques, stochastic modelling, pricing, reserving, stress margins, contingency margins

**Purpose of your paper:** To consider how we can improve pricing and reserving in Group Insurance using statistical techniques.

**Synopsis:** Historically Group insurance pricing and valuation techniques have been deterministic in nature, in a large part driven by the absence of large volumes of reliable data and limited availability of appropriate statistical tools. The quality and quantity of Group Insurance data is growing and is expected to grow through APRA and the FSC initiatives that continue to focus on collecting more and better quality data. This paper looks at the following:

- potential applications of statistical techniques in Group Insurance (loss ratio uncertainty and contingency margins, stress margins for capital reporting, option cost calculation for profit share arrangements);
- available techniques and tools to efficiently perform the statistical analysis;
- learnings from attempts so far and avenues for future success.



## SYNOPSIS

### CLIMATE RISK AND AUSTRALIA'S FINANCIAL SYSTEM

*Sharanjit Paddam, Kate Mackenzie*

**Key words:** Climate Change, Stranded Assets, Investment, Regulation, Systemic Risk

**Purpose of your paper:** How will climate change affect Australia's financial system in the future? We explore where financial institutions will be impacted by identified climate change risks, how well existing safeguards may address these risks, and what further actions may be required.

Drawing on studies and regulatory decisions from Australia and overseas – including the recent paper from the Bank of England – we set out why climate change deserves careful consideration from Australian financial institutions and regulators.

**Synopsis:** Our presentation will be based on

- the recent paper by The Climate Institute:  
<http://www.climateinstitute.org.au/articles/publications/australias-financial-system-and-climate-risk.html/section/478>
- the recent paper by the Bank of England:  
<http://www.bankofengland.co.uk/prd/Documents/supervision/activities/pradefra0915.pdf>

### Key points

#### Broad categories of climate financial risk:

- Physical risk, where assets are damaged or devalued as a result of climate change itself
- Transition risk, which includes financial exposure to the risk of carbon emissions or carbon-intensive assets being priced, regulated, stranded by technology, or incurring legal risk
- Liability risk, which includes financial liabilities arising out of the above

#### How climate risk may originate:

- Efforts to avoid climate change, including domestic, foreign and international policy measures
- Shifting demand for carbon-intensive exports
- Shifting investor appetite for carbon intensive assets
- Fiscal risk from unfunded public contingent liabilities arising from the effects of climate change
- Uninsured or uninsurable assets exposed to increasingly probable catastrophic disasters
- Individuals and institutions are incentivised to ignore risks

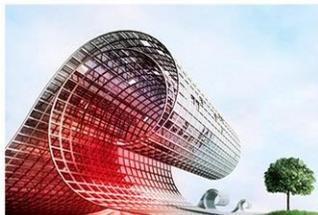
#### Points of transmission and amplification:

How the effects of climate risk may magnify and spread throughout Australia's financial system. These include:

- Australian sovereign debt, if affected by factors including macro outlook changes due to our carbon-intensive economy (transition risk); and fiscal position shifts due to our exposure to climate change itself (physical risk)
- Exposure of Australian banks to carbon intensive assets via their business loan books (transition risk)
- Exposure of Australian banks and parts of the insurance sector to climate impacts via their concentration in residential property & mortgage debt (physical and transition risk)
- Exposure of large superannuation (pension) asset pools, due to concentration in domestic assets of a carbon-intensive, climate impact-exposed economy (physical and transition risk)
- Shortage of low-carbon assets potentially leading to over-inflation of such assets (transition risk)

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## Information barriers and opacity:

- Scientific climate models are subject to uncertainty; however this is improving
- Information is unevenly distributed, with some key financial agents lacking visibility of climate risk which may expose them to loss
- Both public and private disaster mapping data and modelling is unco-ordinated and difficult to access



## SYNOPSIS

### INDUSTRY FUNDS - THE NEXT DEMUTUALISATIONS?

*Colin Yellowlees*

**Key words:** Industry Funds, Superannuation

**Purpose of your paper:** The aim of this paper is to take both a serious and light hearted look at one possible future of Australia's Industry Funds - demutualisation. Although there are many political, practical and legal barriers it is not hard to imagine that in 20 years' time that the industry funds of today will be large diversified financial services companies listed on the ASX.

**Synopsis:** There are many parallels that you can draw with the Industry Funds of today and the large mutual insurance companies of days gone by. As we know those mutual are now a seamless part of Australia's financial landscape but to get there they went through a process of demutualization to both grow their businesses and to introduce a high level of accountability and strict discipline that is hard to achieve as a not-for-profit organization. This presentation looks at the possibility of industry funds demutualising, what the barriers are how this might be achieved. To conclude it also looks at the value that you might place on an industry fund.



## SYNOPSIS

### INSURANCE REGULATION REIMAGINED

*Rob Curtis and Julian Braganza*

**Key words:** Regulation, Risk, Insurance, APRA, Disruption, Technology, Disclosure, Conduct, Supervisor, Reporting

**Purpose of your paper:** To provide a perspective on where risk and regulation is heading and what supervision might look like going forward.

**Synopsis:** This presentation will look at the changing landscape of risk and regulation and the level/focus of supervisory intervention. We will look at the emerging trends in risk & regulation particularly:

- 1) The move toward global risk based capital frameworks and the breaking down of jurisdictional differences
- 2) The move toward group-wide supervision and regulation of insurance groups
- 3) Global/Domestic Systemically Important Insurers - Their identification and enhanced regulation
- 4) Enhanced focus on Non-Traditional Non Insurance activities
- 5) Rising importance of risk culture and the emerging focus on conduct and consumer outcomes

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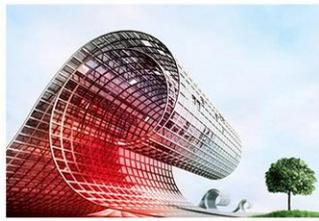
### LIWMPC UPDATE ON THE AUSTRALIAN LIFE INSURANCE INDUSTRY

#### LIWMPC

**Key words:** Update, LIWMPC, Life Insurance industry

**Purpose of your paper:** To provide an update on recent developments in the Life Insurance and Wealth Management Industries.

**Synopsis:** An update on the Australian Life Insurance Industry.



## SYNOPSIS

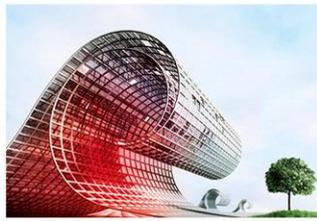
### NOT TIME TO GIVE UP ON DISABILITY INSURANCE YET

*Mark Raberger, Emily Galer*

**Key words:** Disability Insurance, Claims Management

**Purpose of your paper:** Provide delegates with insights into the application of global best practices in disability claims management within the Australian market.

**Synopsis:** The authors have been working with a number of international claims management experts on enhancing disability claims management practices over several years within the Australian market. This session will shed light on a number of insights gained from the exercise.



## SYNOPSIS

### REBIRTH OF AN INDUSTRY – LIFE INSURANCE DISRUPTER

*Paul Caputo and Kenneth McIvor*

**Key words:** life insurance disrupter, changing consumer behaviours and needs, inflexible products, big data, business model

**Purpose of your paper:** Are life insurers prepared to compete with a market disrupter that will challenge product distribution, design, profitability and their overall business model? What should life companies do now to ensure they can effectively compete with future market disrupters?

**Synopsis:** The life insurance industry exhibits characteristics that suggest it may be attractive to market disruptors – high cost infrastructure and distribution, legacy issues, extensive benefit terms and conditions and poor market perception of advice.

What might the business models look like in the new world and how will life companies evolve? A key will be obtaining a greater understanding of current and potential client's needs, behaviours and effective touch points and then translating this information in an efficient distribution and service model.



## SYNOPSIS

### RISK BASED CAPITAL – A PRACTITIONER'S PERSPECTIVE

*Richard Cornwell*

**Key words:** Risk Based Capital, Stress Testing, LAGIC, Economic Scenario Generators

**Purpose of your paper:** How is Risk Based Capital used in practice? What are its strengths and weaknesses? What insights does it provide? What is its place in the various tools available to assess capital strength?

**Synopsis:** Risk Based Capital (RBC) is a very powerful tool in capital management for insurance companies.

It is one of the tools used for capital management.

- LAGIC
- Stress Testing
- Risk Based Capital

RBC is a complex tool with three main components

- Economic Scenario Generator
  - There are many considerations around the choice of ESG. Through the cycle v short term? Calibration to market volatility, period of data used? Market consistent v long term? Sensitivity of results to changes in ESG between runs at different points of time.
  - There are some other issues about ESGs. Dependence of results on a particular model? Is there sufficient diversity of models across the industry?
- Insurance Scenario Generator
  - How do you set volatilities for experience items like mortality, morbidity and lapses as there the distributions of these are very uncertain? What correlations should exist between these and other elements of the projections such as economics?
- Operational Risk Generator
  - Calibration of the model needs to be done in close collaboration with the business.

Insights from RBC

A large number of insights can be obtained from RBC, including the distribution of profits, capital results, risk drivers, impact of embedded options, capital structures, benefits of diversification.

Analysis of tail scenarios gives insight into what mix of events gets a company into trouble and encourages consideration of mitigating management actions.



## SYNOPSIS

### **SHIFTING SANDS IN BANKING REGULATION: BASEL 4 AND IFRS 9**

*Senthoran Nagarajan*

**Key words:** Regulatory capital, Banking, Credit Default Provisioning

**Synopsis:** Banks are facing two sets of key regulatory changes over the next 3 years: 'Basel 4' and IFRS 9. These impact regulatory capital requirements, and credit loss provisioning and reporting respectively. The Basel Committee for Banking Supervision has flagged a series of changes to regulatory capital regime for banks. The details for Basel 4 will be finalized in the coming year. On the other hand IFRS 9 is well progressed. Banks are at various stages of implementation. IFRS 9 changes the way that banks model, calculate, report and analyse credit default provisions, a key item in a bank's profit and loss.

Basel 4 refers to a series of changes flagged by the Basel Committee for Banking Supervision (BCBS) late in 2014. BCBS has raised concerns with comparability and consistency in the current regime, in particular with banks using internal models for calculating regulatory capital. Changes include the introduction of capital floors based on standardised formulae for different risk types, and a leverage ratio. Many banks may need to increase the level of capital required if the proposals are accepted. Banks will need to review the approach to financial management including capital allocation, performance measurement, and loan pricing.

IFRS 9 changes the banks classify transactions in their portfolio and how they calculate provisions for credit impairment. IFRS 9 requirements are designed to recognise credit impairment for loans earlier, i.e. before the actual default event. This is done using triggers signaling significant changes in credit quality. A key challenge is developing suitable triggers. This requires building or leveraging current credit risk models. This feature of IFRS 9 also means that credit provisions can be more volatile, presenting challenges in analysis and reporting of financial results.

This presentation explains the regulatory changes and implications for modelling, reporting and financial management of banks.



## SYNOPSIS

### SUPERANNUATION FUND TRUSTEE CAPITAL MANAGEMENT

*Tim Gorst*

**Key words:** Superannuation, Risk, RSE, Capital, ORFR, Regulatory Change, Member Interest, Sustainability

**Purpose of your paper:** This presentation discusses the capital management responsibility of a Superannuation Trustees with regards to the risk and financial management of their business.

**Synopsis:** New requirements to hold capital against operational risk (SPS114), in place since 1 July 2013 ensures a Superannuation Fund Trustee is now focused on the risk based capital management of Operational Risks. A Fund Trustee's capital management responsibilities should however go beyond just the management of operational risk financial capital designed to protect members. By taking a broader perspective on capital management responsibility beyond just financial capital (e.g. natural, human, social and manufactured), and the stakeholder responsibility beyond just members (e.g. shareholders, service providers, employees, competitors, regulator, community) a superannuation business is able to be managed beyond just delivering on short term fiduciary obligations towards true long term sustainability. As an example, this presentation demonstrates how a Trustee can use this broadened perspective to assess the impact of low frequency high impact Operational Risk events on not just members but also the long term sustainability of their business.



## SYNOPSIS

### THE FUTURE OF FINANCIAL REPORTING

*John Nicholls and Paul Caputo*

**Key words:** financial reporting, IFRS, economic capital, financial modelling, management information

**Purpose of your paper:** We examine what financial reporting could look like in five years, following implementation of the proposed changes to IFRS for insurance contracts and global developments in insurance market regulation, and what companies can be doing now to ensure they meet their current and future financial reporting requirements

**Synopsis:** The changes to the financial reporting for insurance contracts that are currently being considered by the IASB will lead to a number of fundamental changes to the reporting of life insurance results. We examine the potential impact of the proposed changes on a range of common life insurance products. Taking into account the potential impacts, we will discuss whether the information that will have to be presented in financial statements will be valuable to users and to those managing the business, and whether there will be a need for supplementary measures such as embedded values.

Alongside changes to IFRS, insurance market regulation is increasingly being standardized. We will examine developments in major regions such as Asia, Europe and the US and how well placed Australian companies will be to compete in the global market.



## SYNOPSIS

### THE FUTURE OF LIFE INSURANCE STRESS TESTING

*Thuy Truong, Elizabeth Baker and Meera Sardana*

**Key words:** Life insurance, stress testing, capital management and risk management.

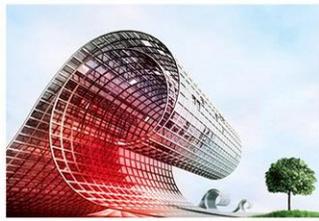
**Purpose of your paper:** The purpose of the presentation is to discuss expected future developments to stress testing by Australian Life insurers.

**Synopsis:** Following the 1 January 2013 requirement for APRA regulated institutors to have an ICAAP, there has been an increased focus on stress testing by Life insurers. This has been recognised as an area for development by many Life insurers and also APRA through industry feedback provided.

Previous focus has tended to be on stress testing the balance date capital position. With the implementation of the APRA Life insurance industry stress test, an increased focus has been placed on stress testing the projected capital position over a 3 year period. This presentation will consider how stress testing capabilities are expected to develop in future to meet key stakeholder expectations.

Areas for discussion include:

1. The current stress testing capabilities of Australian Life insurers.
2. Expected future developments to stress testing capabilities.
3. The benefits and challenges associated with developing multi-state and multi- period stress testing capabilities.
4. The use of stress testing to inform business strategy and business decision making.
5. A global perspective on the approach to stress testing including key learnings.



## SYNOPSIS

### **TRAUMA – WHAT'S IN A DEFINITION?**

*Kris Boundy, Bill Monday*

**Key words:** Trauma, Experience Analysis, Insights, Pricing

**Purpose of your paper:** To provide delegates with updated experience analysis and insights that have potential implications for pricing and product design.

**Synopsis:** MRA will share insights from their most recent Trauma Experience, drawing out key implications for pricing and product design.



## SYNOPSIS

### GROUP INSURANCE INDUSTRY CLAIMS STUDY

*Revsion Tam, Geoff McRae*

**Key words:** Group insurance, experience study, claims, incidence, termination, pricing

**Purpose of your paper:** To produce relevant Australian industry group insurance claims incidence and termination rate tables. Discussion of insights and trends arising from the study.

**Synopsis:** The group insurance market in Australia has recently seen spiraling claim costs and increased uncertainty, making premium rate decisions difficult. Actuarial tables such as IAD89-93 and 1985 CIDA are commonly being used as crude benchmarks for incidence and IP termination rates and reserving. However, these tables are significantly out of date and derived from the Retail market and are inappropriate for the Australian group insurance market today, in particular with recent shifts in the claims environment and insurance practices.

To address the demand for better claims analysis and an industry benchmark, Rice Warner, with the assistance from Pacific Life Re, recently published the first credible Australian industry tables for Industry Funds, Master Trusts and Public Sector funds. These tables were derived from data involving 5 million insured lives per year and 140,000 claims, spanning 16 superannuation funds over a 4 year period from 2010 to 2013.

We will highlight:

- The scope of the study including the key risk rating factors;
- Insights arising from the incidence and termination rates;
- Statistics for claim reporting patterns;
- Claim cause analysis across age groups and benefit types; and
- Future developments and how funds and insurers can contribute to the study.



## SYNOPSIS

**The Challenges of Pricing Long Term Group Salary Continuance  
(Impact of Notification Delay on Termination Rates)**  
*Francis Burgess*

**Key words:** Group Risk, Pricing, Long Term Group Salary Continuance, Termination Rates, IBNR

**Purpose of your paper:** To assist Actuaries in Group Risk with the pricing of Long Term Group Salary Continuance benefits.

**Synopsis:**

It has been widely acknowledged that there has always been an issue with the interaction of notification delay and termination rates. The LIWMPC discussion note on IBNR specifically discusses the issue that poorer termination experience for late reported claims means that it may be appropriate to use a different termination basis for the calculation of the IBNR for both pricing and valuation of group risk schemes.

Whilst the theory has been long established the challenge has always been to find reliable credible data on which to make the appropriate adjustment especially as the fund specific data is in many cases not sufficiently credible.

With the recent publication of the Rice Warner termination rates based on a large credible data set the data now exists to allow for this know issue with more certainty. The Rice Warner published termination table allows for notification delay as a material rating factor.

The paper provides a detailed methodology of how to appropriately allow for this issue in the pricing and valuation of Long Term GSC benefits as well as providing worked examples as to the overall financial impact of this issue for different types of funds with different reporting delays.