The Fifth International Professional Meeting of Leaders of the Actuarial Profession and Actuarial Education in Asia and the Pacific

Roles for actuaries in non-traditional areas

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The traditional areas

- Life Insurance
- Reinsurance
- General Insurance
- Health Insurance
- Defined benefit superannuation (pensions)
- Investments/Fund Management
Non-traditional areas

- Banking and Finance
- Enterprise Risk Management
- Environmental Finance
- Defined contribution superannuation
- Wealth management and financial planning
- Social Security
- Media effectiveness
- Data mining
- Health financing
Banking and Finance

- IAAust Banking Finance and Investments Taskforce
- Enterprise wide risk analysis in financial institutions, including Basel 2 implementation
- Capital management and allocation in financial institutions
- Credit risk analysis and credit derivatives
- Derivatives structuring and sales (sell side) and buy side analysis and execution
- Structured finance (eg hybrids and securitisation)
- Illiquid investments
- Ratings agencies
Banking and Finance

Case Study – Model Audit

- Project Finance, infrastructure development, public private partnerships, property and infrastructure funds, securitisation and mergers and acquisitions

- Primary tool for evaluating and assessing the benefits of the transaction

- Risks are general (ease of use and flexibility of spreadsheets) specific (formulae, logic and mathematical configuration)

- Australian actuarial division of a multinational consulting organisation:

  - In last two years over two hundred model audits in more than 25 countries (including Thailand)

  - Power; Mining & Forestry; Water; Sewerage and Waste; Social Infrastructure; Renewable energy; Oil, Gas and Refinery; Transportation; Media & Telecommunications; Financial Services

- Sydney, Hong Kong & London offices
Banking and Finance

Case Study – Global Bank

- Vice President – Structured Markets Group
- Create products to assist insurers in capital efficiency, risk management and return enhancement

Case Study – Global Bank

- Vice President – Hybrid Capital
- Origination and execution of hybrid capital securities
Enterprise Risk Management

- RM overview (culture, frameworks, governance, risk tolerance, profiling)
- Regulatory frameworks (Banking – Basel II; Insurance – Solvency II; APRA; Ratings Agencies)
- Risk mathematics (loss distributions, dependence)
- Tools and techniques (GLMs, risk measures, aggregation and coherence, simulation)
- Application and aggregation (credit, market, reserving, pricing, alm, operational risk)
- Risk control and mitigation mechanisms (reinsurance, hedge, alternative risk transfer)
Enterprise Risk Management

Case Study – ERM role – Investment Bank
• Analysis of aggregate risk from a wide range of businesses
• Provide management information to support business decisions
• Economic capital model used to assess risk levels and capital required
• Specific deals/new products/new businesses assessed for impact on profits and total risk

Case Study – ERM role – Major Bank
• Executive Manager – Risk Accountability & Governance Project
Environmental Finance

Environmental finance refers to the application of finance techniques and practices to environmental issues. This includes:

- the use of market mechanisms to ration environmental goods (such as water) or environmental bads (emission of pollutants).
- creation of environmental commodity instruments that place a value on beneficial environmental activities.
- use of financial instruments to manage risk arising from natural events such as weather.
Environmental Finance

Examples of markets

- Climate change and emissions trading
- US pollutant trading schemes
- Renewable energy certificate trading
- Water trading
- Salinity trading
- Weather derivative
Environmental Finance

Relevant actuarial skills include:

- Quantitative analysis and decision making when data is scant and unreliable
- Recognising the impact of uncertainty and considering alternative scenarios
- Combining technical analysis with financial analysis
- Complex modelling exercise that combine financial and technical factors with uncertainty
- Determining capital required for long term viability or sustainability
Environmental Finance

Case Study – Sustainability Research role – Global Insurer

- Identify emerging climate change issues & risks affecting business plans
- Build relationships with key internal & external stakeholders
- Apply actuarial, statistical, mathematical techniques as required
- Provide reports to CRO and senior managers re sustainability issues
- Project manage various initiatives to mitigate risks and maximise competitive advantages
Environmental Finance

Case Study – Sustainability Actuary

• Lake Macquarie City Council

• Drive the measurable attainment of a sustainable eco-footprint

• The sustainability Actuary identifies and prioritises sustainability risks
Defined contribution superannuation (pensions)

- Unit pricing
- Risk reserves
- Asset/liability matching
- Capital management
- Experience analysis
- On-line calculators
- Product development
Defined contribution superannuation (pensions)

Case Studies

- Establishment of Operational Risk Reserve
- Subsequent discovery of unit pricing error
- Rectification involved no loss to members

- Identification of errors in unit pricing formulae
- Reconstruction of unit pricing model after correction
- Supervising reprocessing of data
- All unit pricing changes requiring actuarial sign off for a major Australian bank

- Determination that current superannuation balance and contributions were insufficient
- Assistance in working through investment, contribution and retirement age strategies
Media effectiveness

“An Actuarial approach to Measuring Media Effectiveness”
Adam Driussi et al, Institute of Actuaries of Australia 2005 Convention

Questions

- What is the relationship between marketing investment and sales revenue?
- Where could additional sales come from?
- Which components of my media activity work best (or worst)?
Media effectiveness

**Approach**

- Measure exposure to advertising. Matrix of (spend/exposure/impact/reach/frequency) and (television/radio/press and magazines/online/cinema/billboards/bus panels)

- Collect data on external factors (economic data, socio-demographic factors, geography, seasonal effects)

- Determine best fit for model
Media effectiveness

**Results**

- Use simulation on model to optimise media spend
- Allocate media spend in accordance with model results (strategic, tactical, mix and matching)
- Assists bargaining
- Supply side strategies
Wealth management and financial planning

• Application of traditional actuarial skills to broader wealth management firms
• Financial risk management (eg use of exotic derivatives to reduce risk)
• Develop innovative products via advanced techniques
• Design, analyse & monitor hedging programs with embedded financial options
• Risk based capital analysis & modeling
Wealth management and financial planning

Case Study – actuarial career
• Senior role in banking
• Managing Director of small bank
• CEO of Retail Funds business of major insurer
• Chairman of Wealth Management arm of major bank, master trust for corporate superannuation funds, Director of Trustee etc. etc.

Case Study – investment manager, investment bank
• Associate Director – managing Asia Long Short Fund
Social Security

- Population projections
- Advice on aspects of the development of social security and pensions policy
- Financing of provision for long-term care
- Office of the Chief Actuary – Social Security Administration (USA)
- Government Actuary’s Department (UK)
- Australian Government Actuary – limited role
Data mining

• Process of exploration and analysis of large quantities of data in order to discover meaningful patterns and rules

• Techniques include: Decision Trees, Logistic Regression, Neural Networks, Fuzzy Logics, Genetic Algorithms, Hybrid Algorithms

• Applications include fraud prediction, churn prediction, customer segmentation, claims analytics, pricing
Data mining

Pharmaceutical Company role – Portfolio Performance analyst

• Analysis of global R&D portfolio
• Manage risk and value profile
• Applied maths, operational research, economic & actuarial skills for research & financial analysis
The actuarial value add

- Risk modelling expertise
- Risk management skills
- Commercial and creative problem solvers
- Strong analytic and financial training
- High level of professionalism

Additional components

- Ability to work in a multi-disciplinary team
- Communication skills
- General commercial skills