



Institute of Actuaries of Australia

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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**



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



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 Optimising the Trade-Off Between Media and Price Promotions” Adam Driussi et al, Institute of Actuaries of Australia 2007 Convention

- What is the effect of each media channel?
- How are channels inter-dependent?
- What impact do brand promotional activities have on immediate sales volumes?
- How does competitive activity influence sales volumes?



Media effectiveness (cont)

- What is the minimum spend required to deliver a certain sales target?
- What is the response tail for each media?
- What is the optimal media mix by channel, region and week/month?
- Which regions have higher conversion rates and profitability?
- What impact does this have on the optimal media strategy?



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 & modelling**



Social Security

- Population projections
- Advice on aspects of the development of social security and pensions policy
- financing of provision for long-term care
- actuarial aspects of compensation through the Courts for loss of earnings
- Office of the Chief Actuary – Social Security Administration (USA)
- Government Actuary's Department (UK)
- Australian Government Actuary – limited role



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



For further information:

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