R : Modelling Tool for Life Insurers

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Agenda

1. Introduction
2. Background of Actuarial modelling in Life Insurance
3. Modelling Challenges for medium/small Life Insurance companies
4. R based solution
5. R Tool : Demo
6. Conclusion
1. Background : Modelling in Life Insurance

- Life insurance modelling primarily involves projecting asset and liability cash flows to facilitate the calculation of:
  - Profit and loss account
  - Balance sheet
  - Pricing, supervisory reserves and capital

- As life insurance business and regulations have evolved, insurance companies now use these models to:
  - Capture the interaction between assets and liabilities
  - Perform detailed scenario analysis, analytics, optimisation
  - Calculate additional metrics; Return of capital, cash metrics, liquidity ratios

Overall objective of a life insurance model is to enable the Actuarial function the tools to demonstrate the company is financially sound.
2. Challenges of Modelling in Life insurance

- Increased outputs/results take time!
  - Increased metrics, scenarios and model outputs take time to produce
  - Increase impact on operations teams and Actuarial function

- Output communicating
  - Presenting additional output from models to the business and C suite
  - Tailoring to suit different stakeholders with varying interests

- Platform, Hardware, Licencing costs
  - Increase outputs require additional platforms, hardware and licencing costs
  - Margin challenge already, are the Actuarial models the most demand on IT!

- Worse for medium/small life insurers:
  - Struggle to bear the cost of the expensive life modelling platforms
  - Much smaller teams, so lack expertise and experience
  - Make do with Excel based/VBA models

- Potential solutions:
  - Low cost, efficient, formal modelling platform that already has life insurance and financial packages for valuations
  - R proves to be a great fit for this purpose
3. R based Solution

1. Shiny User Interface
   - R Package: shinydashboard
   - Data and Assumptions are input here

2. Shiny User Interface/Excel/Database
   - R Package: FinCal, lubridate
   - Cash Flow Projections from the model

3. Shiny User Interface/SpotFire
   - Visualization Analysis:
     - Business Planning
     - Analysis of Movement
     - Sensitivity Testing
     - Reserve Analysis
   - Visualization Results from the model

Counter to Challenges:
- Flexibility
- Availability of Skill set
- Cost Effective
4. R Tool: Demo

R: Calculation Engine & Visualization Tool
5. Conclusion

- Evolving insurance landscape
- Increased demands from the regulators
- Increased reporting requirements
- More and more output, faster!
- Complexity of products = complexity of analysis
- Costs rising

**Summary:** Management and analysts are increasingly bombarded with vast amounts of numeric results and other qualitative, intricate and caveated information – it takes time, costs a fortune to produce, and difficult to understand!

**So, what could the future modelling landscape look like?**

- Analytics led life insurance modelling is the future
- Graphical presentation of results:
  - Useful in showing large amounts of complex information in a structured format
  - Figure out any trends or pinch points that might need further investigation – e.g. A vs L mismatch, data errors
- Flexibility of the tools to communicate with various data systems and modelling platforms to read-in data and results for performing analytics and visualizations.
- Lower cost platforms, open source packages, further cloud usage (serverless computing), revisit outsourcing
- Instant results: Why not provide the management direct access to results so they get what they need, when they want it, cheaper?
Thank You !