

The Actuarial Profession

making financial sense of the future

Risk Modelling and Management:
Lessons from Life

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Risk Modelling and Management: Lessons from Life

- Assumptions
- Big Issues
- Consequences

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Lessons from Life: Assumptions

- Management Actions
 - PPFM (Principles and Practices of Financial Mgt)
 - "The ORSA should ... provide an impact assessment of them"
- Market Data
 - "Data used for the internal model shall be accurate, complete and appropriate"
 - Extrapolation challenges

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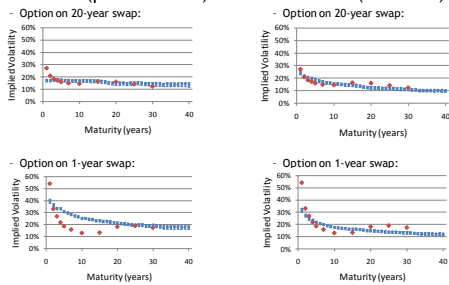
Interest-rate swaption calibration issues

- + Issues relating to Libor Market Model calibration
 - Fit to market data could be improved
 - Calibration parameters are hard to interpret
 - "Best fit" often implies unrealistic correlations between short and long ends of the yield curve
- + New version of LMM in iESG v6.2 was developed to address all of these issues
 - More parameters giving greater flexibility in fitting market data
 - More intuitive calibration parameters
 - Stable and plausible correlations based on "real-world" estimates

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Example calibration:
GBP at end-December 2008

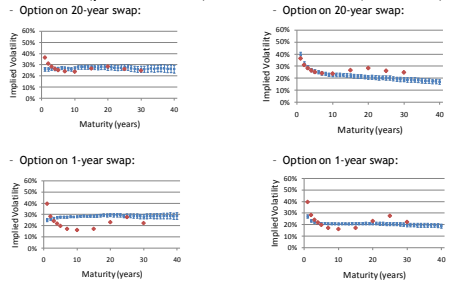
- + Old LMM (pre ESG v6.2)
- + New LMM (ESG v6.2)



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Example calibration:
EUR at end-December 2008

- + Old LMM (pre ESG v6.2)
- + New LMM (ESG v6.2)



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Stochastic Volatility Jump Diffusion (SVJD)

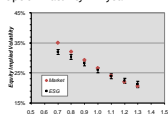
- + iESG v6.2 contains a new equity model - *Stochastic Volatility Jump Diffusion (SVJD)*
- + This is a flexible model for equity returns incorporating realistic features as observed in historical market returns:
 - Stochastic Volatility
 - Jumps
- + These features naturally give rise to term structure and fat tails/skew in realised and implied volatility
- + Calibrations developed for MC and RW use
- + Alternative to local volatility for MC use
 - More "realistic" dynamics than local volatility
 - Fast calibration and no trial-and-error required

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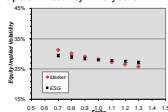
Example calibration: FTSE100 at end-June 2009

+ Local Volatility

- Option maturity = 1 year

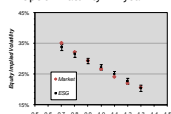


- Option maturity = 10 years

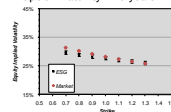


+ SVJD

- Option maturity = 1 year



- Option maturity = 10 years

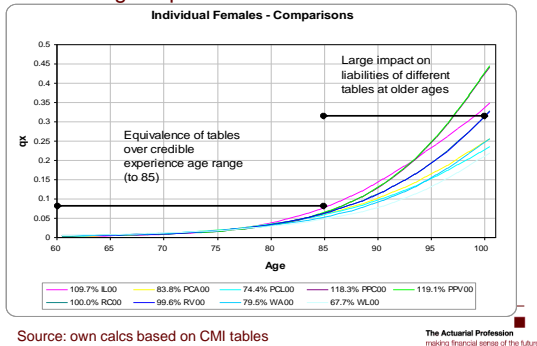


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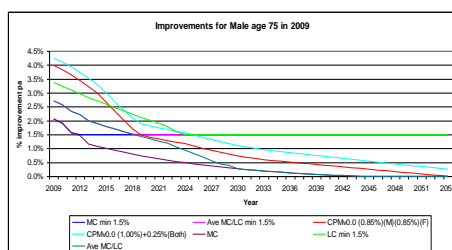
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 - Extrapolation challenges
- Longevity
 - Current experience (at older ages)
 - Longevity improvement allowance

Predicting the present



Predicting the future



Lessons from Life: Big Issues (at least, some of them!)

- Annuities
 - Can illiquidity be counted?
 - What is the risk-free rate?
- Own funds
 - Eligibility criteria (e.g. what tier will VIF be?)
 - Transition arrangements?
- Unavoidable market risk
 - Treatment of UK-style with profits business
- Uncertainty of requirements
 - SCR calibration
 - Has emphasis moved from management to capital?
 - IMAP – data, documentation, use test

Lessons from Life: Consequences

- ICAS
 - Impact on risk awareness and management
 - Common currency for risk discussions
- Policyholder outcomes
 - With profits surpluses (e.g. equity risk premium)
 - Product attractiveness and availability
- Shareholder value
 - Capital and returns
 - Volatility of returns
- Governance
 - Actuarial Function and the Risk Management System



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