Faculty Sessional Meeting Monday 21 February 2005 at 5.00pm in Merchant Hall, 22 Hanover Street., Edinburgh

"*Realistic Valuation of Life Office Liabilities"*

Chairman
David Forfar

Panel Members
James Tuley
Adrian Eastwood
Alastair Clarkson
James Hillman

The Chairman will pick out 2 or 3 of the key issues for the discussion to focus on in the initial stages of the meeting. However, a full range of topics that participants might wish to think about in advance of the meeting and raise during the meeting is given below.

SAMPLE OF TOPICS FOR DISCUSSION

Background

- FSA Policy Statement 04/24 and 05/01(*Treating Customers Fairly*). Culmination of work on with-profits starting in 2001,
- *Realistic valuation of life office liabilities* from end-2004 including accrued terminal bonus and all options/guarantees. Realistic Balance Sheet (RBS)- Form 19,
- Accounting standard *FRS 27*,
- Risk Capital Margin (RCM), 'stress test',
- Principles and Practices of Financial Management (PPFM) and its consumer friendly version (CFPPFM),
- Rôle of actuarial function holder, with-profits actuary and reviewing actuary,
- New Guidance Notes GN 39-47,
- Individual Capital Assessment (ICA) taking account of the liabilities for the specific office.

Form 19

- Line 31: With-profits benefit reserve (asset share) – value of guarantees to also be shown?
- Line 41: Future costs of contractual guarantees (other than financial options),
- Line 43: Future costs of financial options,
- Line 44: Future costs of smoothing (possibly negative item),
- Constraints arising from the Principles and Practices of Financial Management (PPFM)?

Risk assessment and management

- What risks is the with-profits fund exposed to:
    - interest rate risk, equity risk, longevity risk, expenses risk, decade of retirement risk, maturity payout risk (arising from principles/practices in the PPFM), surrender value risk (arising from the PPFM), other risks?
- Which risks can be, even partially, hedged out or reduced and which cannot?
    - As equity/bond split and asset share determined at 'fund' level not 'individual' policy level makes for different problem from Black-Scholes option/hedging problem?
- Statistical distribution function of the risks? How wide is the distribution? What quantile does the RCM cover?
- Financial strength required to deal with these risks?

No 'one value' for liabilities in with-profits fund

- The "*Realistic Balance Sheet"* is taken to be a 'market consistent' valuation of assets and liabilities,
- No 'one value' for the liabilities as no actual market exists to price the long term guarantees written by life offices (e.g. maturity guarantees increasing by guaranteed bonuses, guaranteed annuity rates at maturity etc.)?
- Equity/bond split determined at 'fund' level so not possible to hedge at 'individual' policy level?
- Is the market consistent value the 'expected value' of a number of 'market consistent' simulations? i.e. using the current yield curve, current equity and bond volatility etc?
- The Risk Capital Margin ('stress test') expected to cover a percentage (how much?) of the 'tail' of distribution for an average life office?

Guaranteed maturity value options (guarantee given at maturity that the payout will not be less than the sum assured plus reversionary bonus)

- The guaranteed maturity payout determined at 'individual' policy level so, because the equity/bond split is decided at 'fund' level, there will, of necessity, be a statistical distribution of the shortfall or surplus at maturity?
- Is the 'market consistent value' the mean of this distribution?
- How wide this distribution? If very wide, then is RBS+RCM adequate?
- Is the *Individual Capital Assessment* the 99.5% percentile of this distribution?
- Right balance between the size of the guarantee (e.g. guaranteed investment return on future premiums of x%), the equity/bond split (y%), and the charge for the guarantee (e.g. z% of the fund)?
- Somewhat different problem from options/hedging in capital markets or in investment banks because cannot hedge at 'individual' level (in the way Black-Scholes did in their approach to options)?

Guaranteed annuity rate options (GARO)

- If the terminal bonus has to be the same for a policy with no GARO, then inherent risks are – interest rate risk, equity risk, longevity risk, retirement risk?
- Not possible to hedge out all risks, distribution of surplus/deficit inevitable?
- 'Swaptions' help provided they are not counted as being in the 'asset share' on which the cash maturity is based?
- Problem of 'fund' level equity/bond split versus 'individual' level split?

Support for with-profits fund

- Internal (as opposed to external) financial strength in the with-profits fund, how much internal strength? Size of estate in the with-profits fund?
- Smoothing of maturing payouts cannot be done fairly, if can only be done by borrowing from unsmoothed asset shares of in-force policies? *(*Penrose Report on Equitable Life)*,*
- Shareholders' willingness to support unitised with-profits fund limited? (e.g. may not be prepared to support smoothing because shareholders only receive residual of the management charge)?
- In conventional with-profits, because of the 90/10 gate, shareholders may not be willing to give much support to with-profits fund?
- RCM needed inside the with-profits fund? RCM covers percentile of risk,
- Faculty paper of 6 December 2004 shows that in practice, you cannot hedge perfectly even at an 'individual' level?

Management actions in with-profits fund

- Model management actions in a stochastic simulation?
- In respect of the guaranteed reversionary bonuses of conventional with-profits fund?
- In respect of the guaranteed increase of unit value of unitised with-profits units?
- In respect of the equity/bond/property ratio ('fund' split) of with-profit fund's investment strategy?
- In respect of the maturity payouts (possibly constrained by PPFM)? Range of payout compared with the unsmoothed asset share?
- In respect of the surrender values (possibly constrained by PPFM)?

Calibration of asset model

- Volatility of equities?
  - Give the same (short term) call/puts as in the market?
- Volatility of bonds?
  - Swap rates of market reproduced?
- Whole yield curve modelled?
- Discount using the yield curve?
- Project using real-world probabilities and discount surpluses/deficits at bond rate assuming bonds cover the surplus/deficit?
- Discount using deflators?
- Project using risk-neutral probabilities and discount at risk free rate – proxy for hedging strategy? Covers equity/bond split but at 'individual' level not 'fund' level.
- Correlation equities/bonds?

Computational requirements

- Number of PCs?
- Number of model points?
- Number of simulations?
- Model management actions?
- Things you can do so it does not become an enormous computational exercise?

Use of "Realistic Balance Sheet (RBS)"

- Ratios compared by commentators? Ratio of excess capital to assets (of fund) to replace Form 9 ratio?
- By the life office itself? Used by life offices to drive management decisions?
- Degree to which figures in RBS depend on management actions assumed?
- Disclosure of management actions?
  - Active funds?
  - Closed funds?

Longevity risk

- Longevity risk un-hedgeable?
- Projection of future survivance?
- Problem for life offices with annuity exposure?
- Are actuaries close enough to medical research?
- Problem for pension funds (e.g. major U.K. company where the value of liabilities in the pension fund is 10 times the value of the company)?
- Longevity bonds?
- Longevity bond of December 2003 (Swiss Re.) and of November 2004 (EIB/BNP Paribas)?

Individual Capital Assessment

- The "*Individual Capital Assessment*" (assessed for firm as a whole) directed at the tails of any distribution? i.e. the life office has a 99.5% probability of success of meeting its *"Realistic Value of Liabilities*" at the end of the year?

Other guarantees

- 'Free' of any Market Value Adjuster (MVA) at 10 year point (or a period of time after 10 year point)?

Risk Capital Margin

- Market risk 'stress tests'
  Equity risk (20% max.), Bond yield (17.5% of 4.6% long-gilt = + or - 0.8% in yield)
- Credit Risk 'stress test',
  Corporate bonds, re-insurance and derivatives stress test
- Persistency risk 'stress test' (32.5% increase in withdrawal rates)
- Worst overall scenario

Abstract of Actuary's Valuation Report

- Completion of table therein (see FSA PS 04/16 Appendix 9.4A)?
- Completion of price of various 'put' options on equities, bonds, property, mixed portfolio and swaps for different times to expiry up to 35 years (and in case of swaps stretching 25 years after that) and different strike prices?
- Difficulties in doing this as there may be no market for long term 'swaps'?
- Assume a volatility for equities, bonds, property and swaps and put this into the Black-Scholes formula?