The Actuarial Profession

2003 Pensions Convention

Pricing Annuities

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OBJECTIVES

- Insight in to how life offices look at annuity business.
- What's changed over the last couple of years.
- New ideas for pension scheme buy-outs.

CONTENTS

REGULATORY FRAMEWORK

FRAMEWORK

- No particular constraints on pricing but rules on levels of reserves and matching of assets.

RESERVES

- Reserves must be prudent.
- Solvency margin must be covered.

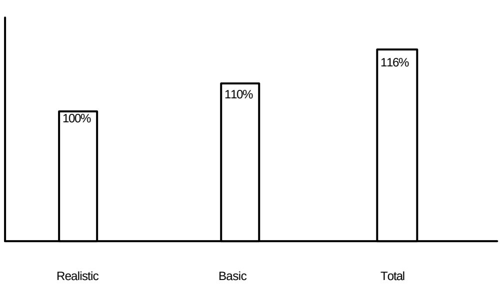
PRUDENCE

- Each element of basis must be “prudent”, i.e. a margin over a best estimate should be retained.
- In addition, a mismatching reserve should be established.

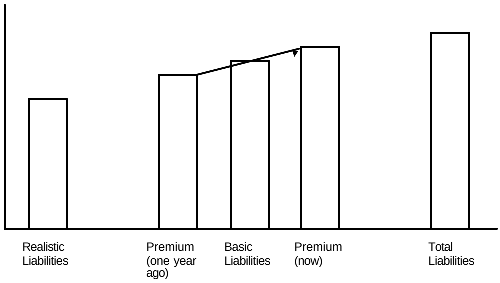
INVESTMENT RESTRICTIONS

- Mismatching reserve calculation virtually precludes equity investment for guaranteed business.
- Index-Linked liabilities must be closely matched.

RESERVING REQUIREMENTS



CAPITAL REQUIREMENTS



ASSESSMENT OF RISKS

KEY RISKS

- Credit / Default
- Mortality
- Reinvestment risk

DEFAULT RISK

- Non-government bonds carry a risk of default.
- Not just concerned with average defaults, but also variance.
- Historical data is available.
- Reasonable evidence that risk-adjusted returns on bonds can be higher than gilts (depending on credit spread).

MORTALITY RISK

- Current mortality (particular to individual/scheme).
- Future mortality (what improvements will we see?).
- Model past trends and project.
- Calibrate against various potential scenarios.

MISMATCHING RISK

- Shorter term cash-flows can be matched reasonably well (though deferreds are a problem).
- Main problem is long-term cash-flows, beyond the maturity of the longest bonds. (Especially index-linked).
- Need to consider range of possible investment yields available in 30+ years time.

ALLOWANCE IN PRICING

- Pricing margins in basis

  and / or

- Capital charge

STOCHASTIC MODELLING

ADVANTAGES OF STOCHASTIC MODELLING

- Combine risks.
- Estimate likelihood.
- Assess capital adequacy.

OBSTACLES TO STOCHASTIC MODELLING

- Need to build and maintain a model.
- Need to determine suitable distributions of key parameters.

OVERCOMING OBSTACLES

- Statistical analysis of past data.
- Calibration, based on experience and judgement.

PRELIMINARY CONCLUSIONS

- Current statutory model leads to “AAA” reserving standard for life assurers.
- Remains a risk that some policyholders won’t be paid in full.

IMPACT ON PRICING

- Adequacy of statutory reserves.
- Review of risk charges.

CURRENT PRICING

PRICING EXAMPLES - PENSIONERS

Joint Life (M65, F60) immediate annuity £100,000 investment.

	New	One Year Ago
Level annuity	£6,137	£6,982
RPI-Linked	£4,220	£4,910

CURRENT BASES - DISCOUNT RATES

- In current conditions, gilts - 20 basis points fairly typical.
- Slightly lower rate may be used for deferred annuities.
- Lower reinvestment rate will apply after, say, 30 years. Perhaps gilts - 100 bps.

CURRENT BASES - MORTALITY

- Best estimate basis likely to be adjustment to new “short cohort” table.
- Adjustments made for scheme (occupation, geography).
- PMA/PFA 92 u 2003 short cohort, for office scheme.

CURRENT BASES - EXPENSES

- Principally volume related, so average pension important.
- Typically 1-3% of total cost.

ALTERNATIVES TO SIMPLE BUY-OUT

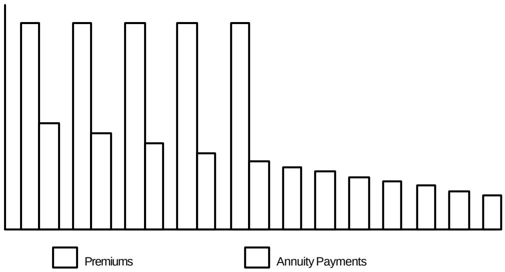
POTENTIAL ALTERNATIVES

- Regular premiums.
- Profit sharing.
- Mortality only.

REGULAR PREMIUMS

- Scheme pays several premiums rather than one up-front premium.
- May reduce insurer's capital needs.
- Scheme can disinvest over longer period (particularly appropriate for larger scheme).

REGULAR PREMIUM - EXAMPLE



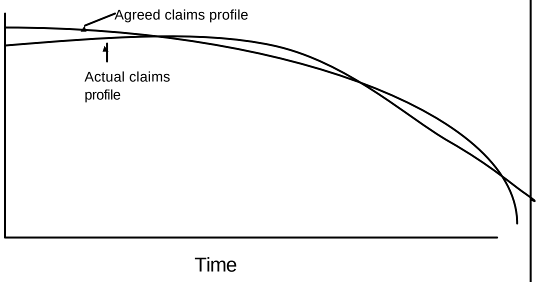
PROFIT SHARING

- Scheme pays higher than normal premiums.
- In exchange scheme receives share of future profits if experience better than premium basis.
- Lower capital costs for insurer that can be shared with scheme.
- Risk transfer reduced for scheme, but liability is capped.

MORTALITY ONLY

- Scheme transfers longevity risk, but not investment risk, to the insurer.
- Scheme pays "claims" on agreed mortality profile to insurer.
- Actual claims are paid by the insurer.

MORTALITY ONLY - EXAMPLE



CONTENTS

1. Summary of regulatory framework
2. Assessment of risks
3. Stochastic modelling
4. Current pricing
5. Alternatives to simple buyout

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