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Assessing Multi-Asset Investment Strategies for Annuity Funds

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Introduction

This session:

- Introduce market leading tools for risk and capital analysis in annuity funds
- Illustrate with the use of a model office
- Investigate possible investment strategies for the office

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Internal Stochastic Models for Annuity Business

- Generally not as well developed as for with-profits
- Increasing use by larger providers of stochastic annuity models for risk and capital measurement
- Models can be used to:
  - Calculate risk-based capital implications of alternative strategies
  - Quantify expected returns and uncertainty of alternative strategies

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Our Modelling Approach

The B&H & NUL ALM are used to project portfolios and annuity liabilities in 1,000 simulations:

- Allowing for credit transitions/ defaults
- Changes in credit spreads
- Changes in risk-free yield curve
- Changes in mortality

Practical Modelling Considerations

- Establishing an economically coherent appraisal framework is crucial
- Having an internal model to populate the framework can provide key insights
- But fundamental challenges and judgements abound with regard to:
  - Definition of economic measure (e.g. choice of time horizon?)
  - Assessment of economic capital (stochastic asset model and calibration)

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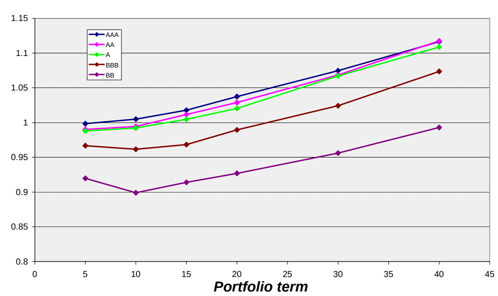
95th Percentile Excess Returns



Based on B&H June 2006 Calibration

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Case Study

We use a model office to demonstrate the techniques:

- A typical mix of traditional bonds
- Fixed pension increases
- Average credit rating of AA-
- Asset duration 8.3yrs v Liability duration 9.6yrs
- No new business

Definitions

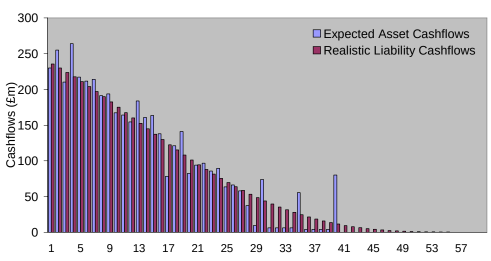
1 year VaR:

- Capital required to fund realistic liability reserve after 1 year with 99.5% confidence

Run-off VaR:

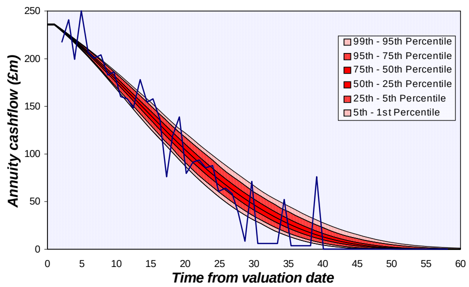
- Capital required to fund run-off cashflow shortfalls with 95% confidence

Expected Cashflows



Credit rating	GOVT	AAA	AA	A	BBB
% of portfolio value	26%	19%	16%	28%	11%

Realised Annuity Cashflows



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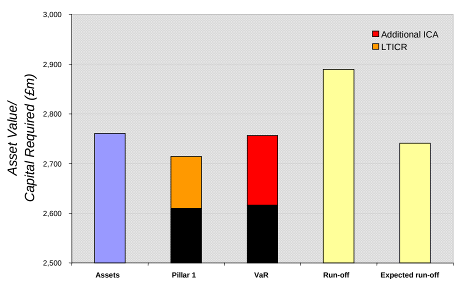
Base Case Capital Requirements



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Commercial Property

We introduce a limited property exposure:

- Initial 5% investment into property
- Asset mix otherwise unchanged
- Annual rebalancing to maintain property exposure at 5%
- Modelled using lognormal equity methodology, correlated to existing portfolio

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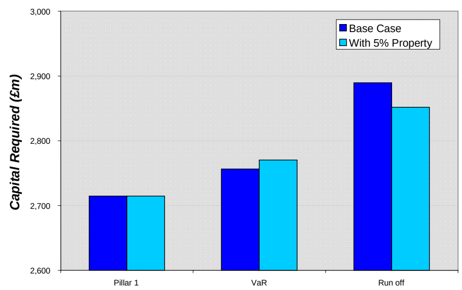
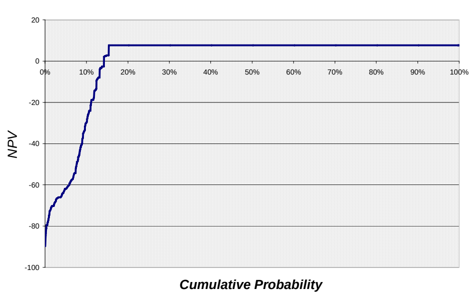
Capital Impact of Property



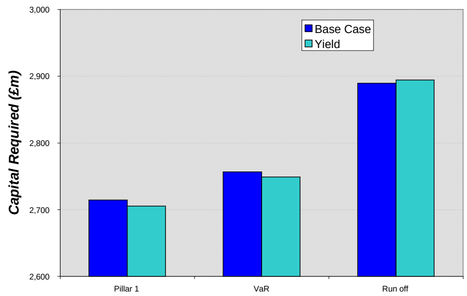
Structured Credit

- Structured credit (e.g. CDOs) is topical in UK annuity market:
  - Yield enhancement and
  - Credit protection
- We consider one of each structure; both 10 year terms

Yield Enhancement Payoff



Yield Structure



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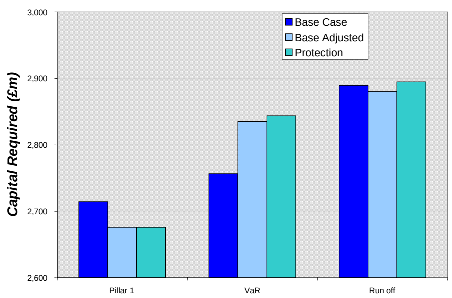
Protection Structure



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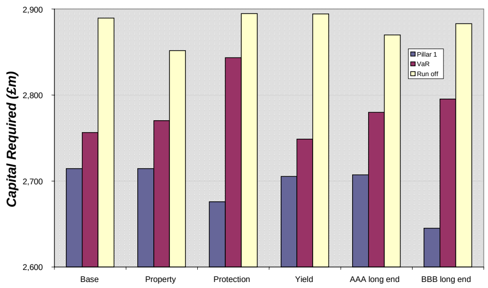
Capital Summary



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Appraising annuity capital management strategies

- Investment risk and return borne by shareholders
- Need a metric of shareholder value to steer appraisal of investment strategy
- Despite potential effects of risk adjustment basic return on capital is a commonly used measure

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Analysis of Return on Capital

The release of capital and any required capital injections have been modelled:

- Capital injections have been modelled at +4% LTICR and dividends at +6% LTICR, and
- Higher of Pillar 1 and Pillar 2 capital requirements

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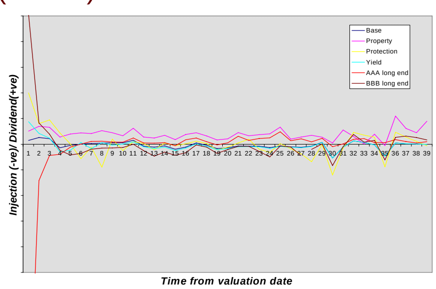
Capital Management
(Pillar 1)



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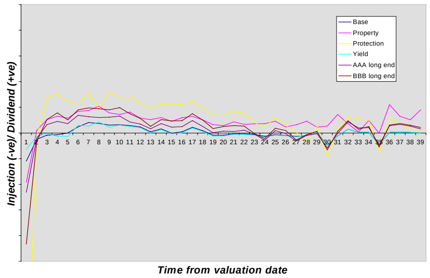
Capital Management
(Pillar 1 & Pillar 2)



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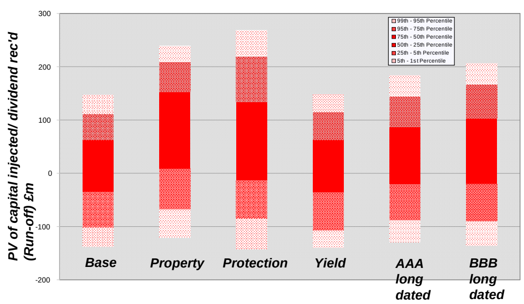
Appraising Dividend Income



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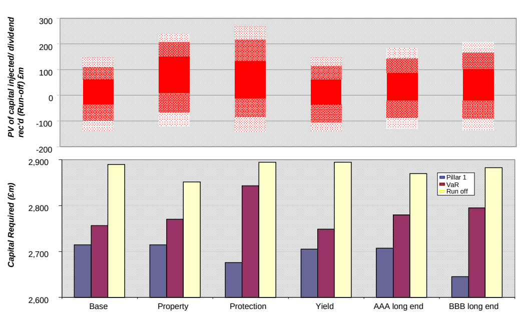
Capital Management Summary



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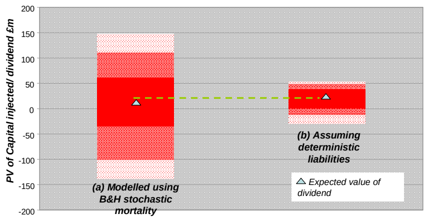
Modelling Mortality and Capital Management (Base scenario)



NB Mean value of annuity is not the deterministic value

Conclusions

- Shown how different investment strategies impact on the various capital and return numbers
- Holistic framework gives insights into interactions between risk factors
- Ultimate choice of strategy depends on the risk metrics
- Relationship between risk measures depends critically on degree of asset / liability mismatch

Questions and discussion