Stochastic Modelling for PEPPs

Presentation to AAE IC, PC and RMC Joint Meeting

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Agenda

- Background to Pan European Personal Pensions (PEPPs)

- Stochastic modelling aspects

- Broader implications?

Presentation based on EIOPA PEPP page (see here) and PEPP Package issued 14 August 2020 (see here).

Background

Background (1)

- PEPP Regulation entered into force on 14 August 2019

- PEPPs are voluntary, complementing state-based and occupational pensions. Aim to be cost-efficient, tailored to consumer needs and portable Union-wide.

  – Possibility to switch providers every 5 years, at capped costs

  – Mobility across member states

  – Full transparency, including costs and fees, via a pre-purchase Key Information Document (KID) and subsequent personalized pension benefit statements

  – Affordable default investment option (Basic PEPP): 1% cost cap

  – Protection of capital invested with Basic PEPP (may be costed separately)

- A facet of the EU's broader Capital Markets Union, Single Market and other integration goals?

Background (2)

- In August 2020, EIOPA delivered a PEPP Package to European Commission to support introduction of PEPPs, including:

  - Proposed infographics

  - Proposed Regulatory Technical Standards

  - Technical Advice on (1) supervisory reporting and (2) criteria for EIOPA's product intervention powers

  - Proposed Implementing Technical Standards

  - PEPP Impact assessment and Report on consumer testing of PEPP information documents

  - Description of EIOPA's stochastic model

Background (3)

- Not clear how successful product will be

- Capital protection for Basic PEPP intuitively appealing to customers but potentially difficult to manage for providers. Can involve:

  – A guarantee on the capital due at start of decumulation phase, or

  – A risk-mitigation technique consistent with objective to recoup capital

- But if Europe integrates further and if occupational pensions decline, maybe mobility will be a strong selling point

- Wide range of financial providers can offer PEPP products (banks, insurers, occupational pension funds, asset managers). Longer-term implications for actuaries?

- What does the proposed stochastic model look like and are there lessons for elsewhere?

Stochastic modelling aspects

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- Provision of KID and subsequent regular benefit statements

- Guarantees / risk mitigation techniques link with option pricing

- EIOPA Delegated Regulation draft includes classification of Basic PEPP and alternative investment options based on:

  a)   risk of not recouping inflation-adjusted contributions

  b)   the expected shortfall

  c)   expected rewards

- Expected shortfall, risks and rewards to be determined stochastically Some flexibility on how modelling might be done

  – Next two slides summarise model that seems to be preferred by EIOPA. Further details, e.g. on process EIOPA has used for parameter estimation, is provided in "*Pan-European Personal Pension Product (PEPP): EIOPA's stochastic model for a holistic assessment of the risk profile and potential performance of a PEPP*" (part of PEPP package issued by EIOPA in August 2020), see https://www.eiopa.europa.eu/sites/default/files/publications/eiopa-20-505_pepp_stochastic_model.pdf

'Preferred' stochastic model (1)

- Modular approach covering at least:

  - Nominal interest rates

  - Credit spreads, including migration and default

  - Equity returns

- Nominal interest rates

  - G2++ short-rate model, equivalent to a two-factor Hull-White model allowing for negative interest rates

  - Adapted to a real-world price measure which may be chosen as a constant, time-independent market price of risk

  - Term structure output used to determine returns on risk-free bonds, and short rate outputs potentially as inputs to modelling of equity returns and potentially property returns

- Credit spreads

  - Model via hazard rates for different rating classes using Cox-Ingersoll-Ross (CIR) processes, with a suitable market price of risk linked to the hazard rate

'Preferred' stochastic model (2)

- Equity returns

  – Model using geometric Brownian motion

  – Risk-free rate derived from earlier nominal yield curve

  – Yearly volatility from standard deviation of annualized monthly returns on appropriate equity index

  – Equity risk premium from expected market return in excess of relevant 10-year spot rate, growth rate from (EPS forecast-based) dividend discount model with 5-year fade to perpetuity

- Price inflation (Harmonised Index of Consumer Prices)

  – More prescriptive? One-factor Vasicek process (i.e. with mean reversion) incorporating central bank inflation target and Eurosystem / European Commission economic forecasts for mean reversion parameter

- Wage inflation

  – Base on Eurostat data

  – Potentially allow for age-dependent wage growth

Broader implications?

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- Possible questions for meeting participants to consider:

  - Will PEPPs be successful over the longer term and if so, will this include Basic PEPPs with guarantees / risk mitigation techniques?

  - What sorts of institutions might typically 'own' the customer relationship and will this impact actuarial work in the future?

  - Are there issues we foresee with using 'real world' rather than 'risk-neutral' stochastic models, e.g. in how to identify appropriate risky return assumptions, impact of 'time diversification' etc.?

  - Will the form of the stochastic model preferred by EIOPA influence (stochastic) models used for other regulatory purposes, e.g. other KIDs, Solvency II internal models, …?