Periodical Payment Orders
A Life and Pensions Perspective

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Celestial Financial Services

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Session Overview

• About us
  – Life and pensions backgrounds and now involved in a start-up insurance venture which has the objective of developing a market solution to help non-life insurance companies in the UK and beyond manage their Periodical Payment Order (and similar) exposures more effectively by way of reinsurance and/or court-sanctioned portfolio transfer

• Share our observations based on our experience developing that solution, drawing parallels with the management of annuity/pension liabilities
  – PPO background and market context
  – Best estimate assumptions and sensitivities
  – Longevity considerations
  – Interplay with existing reinsurance arrangements
  – Approach to Asset Liability Management
  – Capital requirements

• Scope for a market solution.
PPO Background

- Prior to the Courts Act 2003 (which came into force in 2005), compensation for future pecuniary loss following personal injury was typically awarded as a cash lump-sum, with only limited use of PPO-type awards (“structured settlements”)

- PPO payments are generally made once a year. An initial payment amount is specified in the PPO, and subsequent payments will be determined by changes in the index to which the payments are linked (as specified in the PPO)

- Originally was by reference to the UK Retail Price Index (“RPI”), but following several rulings by the Court of Appeal, most PPOs awarded since 2008 are linked to sub-section 6115 of the Annual Survey of Hours and Earnings (“ASHE 6115”), published annually by the Office for National Statistics. Sub-set 6115 of ASHE measures the hourly earnings for “care workers, home carers and senior care workers”, and thus is judged by Courts to be a better measure of the inflation in care costs for PPO recipients than RPI

- Other features could include stepped payments; variation orders; reverse indemnities

- Scotland has in place its own framework for awarding PPOs

- Estimated UK market PPO SII BEL of £6-7 bn. with 90% of industry PPOs arising from motor insurance.
Market Context

Regulator Scrutiny

“PPOs are already changing the risk profile and balance sheets of motor insurers significantly… It is why we are so interested in them”

(Bank of England)

Investor Concern

Moody’s

“Increase in PPOs: Credit Negative for UK Motor Lines”

Fitch Ratings

“Motor Insurers Face Growing PPO Risk”

Impact of Solvency II

- Pillar I: increased, more complex BEL / stress capital
- Pillar II: enhanced risk management framework
- Pillar III: increased reporting and disclosures

Personal Injury Discount Rate in UK

- Moved from 2.5% to - 0.75% in 2017. Subject to review: possible new rate 0 – 1%
- Future PPO propensity?

Ireland

The Civil Liability (Amendment) Act empowering courts to make PPOs was enacted in November 2017. Brought into effect from 1 October 2018

Some high and growing company exposures

Non-life run off market

“The level of non-life run-off market activity has increased significantly”

(PwC)

Topic that warrants the focus of boards and actuaries

PPOs  Non-Life
## Observations – PPO Risks

<table>
<thead>
<tr>
<th>PPO Risk</th>
<th>Challenges</th>
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<tbody>
<tr>
<td>Market</td>
<td>Managing assets to meet very long term liabilities</td>
</tr>
<tr>
<td></td>
<td>• Contrasts with the short duration of most classes of non-life business giving greater exposure to interest rate changes</td>
</tr>
<tr>
<td>Indexation</td>
<td>PPO payments typically increase in line with ASHE 6115</td>
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<tr>
<td></td>
<td>• Fixed interest investments are not suitable for matching liabilities that escalate with wages inflation</td>
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<td></td>
<td>• In particular, there are no market hedges available for ASHE 6115</td>
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<tr>
<td>Longevity</td>
<td>Inherent uncertainty in estimating the longevity of a small number of severely impaired lives</td>
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<td></td>
<td>• Exposed to three categories of risk - base table, trend and volatility</td>
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<tr>
<td>Counterparty</td>
<td>Exposure to XOL reinsurers</td>
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<tr>
<td></td>
<td>• Exposure to multiple XOL reinsurers over a very long period</td>
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<td>• Capitalisation clauses which transfer PPO risks back</td>
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• If bringing principles and practices of life insurance to bear, it is instructive to first consider the parallels with pension annuities.
PPOs versus Pensions Annuities

• Standard annuity investment approaches (e.g. close matching) likely to be important to reduce balance sheet and revenue accounts volatility

• But there are important differences:
  – PPOs are payable over a much longer period to younger lives than payments to the typical pension annuitant aged over 60
  – PPOs are indexed to wage inflation whereas annuities are level, fixed escalation or price inflation linked
  – Companies will typically have only a small number of PPO cases (counted in single or double digits), whereas an annuity book generally runs into tens of thousands
  – Variation orders
  – Reverse indemnities

• This translates into differing cashflow profiles, sensitivities to experience variations/assumption changes and spread of potential outcomes.
PPOs versus Pensions Annuities

• In the analysis that follows, the following parameters have been used for an illustrative PPO and annuity

<table>
<thead>
<tr>
<th>Illustrative Cases</th>
<th>PPO</th>
<th>Escalating Annuity</th>
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<tr>
<td>Age</td>
<td>34</td>
<td>65</td>
</tr>
<tr>
<td>Amount pa</td>
<td>£100k</td>
<td>£7.5k</td>
</tr>
<tr>
<td>Indexation</td>
<td>ASHE 6115</td>
<td>RPI</td>
</tr>
<tr>
<td>Population Life Expectancy</td>
<td>c54 yrs</td>
<td>c22 yrs</td>
</tr>
<tr>
<td>Impairment</td>
<td>11 yrs</td>
<td>-</td>
</tr>
<tr>
<td>Assumed Life Expectancy</td>
<td>c43 yrs</td>
<td>c22 yrs</td>
</tr>
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</table>

• For simplicity, a conventional pension annuity is assumed (i.e. no allowance is made for any individually assessed impairment) while for the PPO, the impairment to life expectancy is equivalent to the individual having an expected life expectancy of 80% of “normal”, which is equivalent to a rating to age of plus 9 years (ie rated age of 43).
# PPOs versus Pensions Annuities

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<tr>
<td>SII BEL</td>
<td>£8.3m</td>
<td>£0.2m</td>
</tr>
<tr>
<td>SII Risk Margin as % of BEL</td>
<td>22.1%</td>
<td>13.3%</td>
</tr>
<tr>
<td>Duration</td>
<td>29 years</td>
<td>14 years</td>
</tr>
<tr>
<td>No of cases for BEL=£100m</td>
<td>12 cases</td>
<td>500 cases</td>
</tr>
</tbody>
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Notes: (1) SII BEL calculated as PV of probability weighted cash flows using assumptions at 1/7/2018 including the SII interest rate curve (2) Mortality rates are consistent with the 2014-based population projections published by the ONS (3) Gross PPO liability pre XOL reinsurance (4) Indexation based on RPI of 3.25% plus 0.5% margin for ASHE 6115.

Very different level of payment, duration and consequent BEL per case – as well as inherently more uncertain mortality and escalation features
Comparison of Cashflow Profiles

Note: Based on £100m BELs. Assumptions as per previous slide.
Relative Sensitivities

### Discount rate down (or indexation up) by 0.5%

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<th>Base, £m</th>
<th>PPO</th>
<th>Annuity</th>
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<tr>
<td>BEL</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Risk Margin</td>
<td>22.1</td>
<td>13.3</td>
</tr>
<tr>
<td>SII Technical Provisions</td>
<td>122.1</td>
<td>113.3</td>
</tr>
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</table>

<table>
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<tr>
<th>Interest Rates -0.5%</th>
<th>PPO</th>
<th>Annuity</th>
</tr>
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<tbody>
<tr>
<td>BEL</td>
<td>115.5</td>
<td>107.1</td>
</tr>
<tr>
<td>Risk Margin</td>
<td>28.8</td>
<td>15.5</td>
</tr>
<tr>
<td>SII Technical Provisions</td>
<td>144.3</td>
<td>122.7</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>% Change</th>
<th>PPO</th>
<th>Annuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEL</td>
<td>+15%</td>
<td>+7%</td>
</tr>
<tr>
<td>Risk Margin</td>
<td>+30%</td>
<td>+17%</td>
</tr>
<tr>
<td>SII Technical Provisions</td>
<td>+18%</td>
<td>+8%</td>
</tr>
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### 20% reduction in mortality rates

<table>
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<tr>
<th>Base, £m</th>
<th>PPO</th>
<th>Annuity</th>
</tr>
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<tbody>
<tr>
<td>BEL</td>
<td>100.0</td>
<td>100.0</td>
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<tr>
<td>Risk Margin</td>
<td>22.1</td>
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<td>122.1</td>
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<table>
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<th>Standard Formula Longevity Stress</th>
<th>PPO</th>
<th>Annuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEL</td>
<td>109.8</td>
<td>112.3</td>
</tr>
<tr>
<td>Risk Margin</td>
<td>26.9</td>
<td>17.4</td>
</tr>
<tr>
<td>SII Technical Provisions</td>
<td>136.7</td>
<td>129.7</td>
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<tbody>
<tr>
<td>BEL</td>
<td>+10%</td>
<td>+12%</td>
</tr>
<tr>
<td>Risk Margin</td>
<td>+22%</td>
<td>+31%</td>
</tr>
<tr>
<td>SII Technical Provisions</td>
<td>+12%</td>
<td>+14%</td>
</tr>
</tbody>
</table>

- Longer duration of PPOs results in greater interest rate sensitivity. Significantly greater than for typical motor insurance reserves. However, PPO slightly less sensitive than pensions annuity to uniform mortality change.

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Predictability of PPO Cashflows – Mortality Volatility

- The small number of cases in a typical PPO portfolio means that mortality volatility is quite pronounced and is reflected in the distribution of possible discounted values of future payments. As the number of PPOs increases, the distribution of the discounted liabilities converges towards the mean.

3000 simulations of the PV of the liability payments for 12, 50 or 100 PPOs. Survival in each period is determined randomly such that the average experience in each period is exactly consistent with the best estimate mortality rates. Therefore there is no variation in mortality rates in the simulations, only variation in mortality experience.
Annual Survey of Hours and Earnings (ASHE)

- ASHE is based on a 1% sample of employee jobs taken from HM Revenue and Customs Pay As You Earn (PAYE) records. 6115 based on sample of some 6000 individuals.
- 80th percentile in survey published October 2017 was £11.04 gross hourly pay (up 2.7% on 2016).

- Impacts of:
  - Minimum wage 1999
  - Care Standards Act 2000
  - National Living Wage 2016

- Outlook:
  - Brexit?
  - Fundamental economic drivers in long term

CAGR 2002-2017: 2.5%
Setting the ASHE Assumption

- In setting the future assumption for ASHE 6115, thought has to be given to:
  - ASHE historical data only available back to 2002
  - Can longer established wage inflation measures be used as a proxy prior to 2002?
  - What is the relationship with price inflation – RPI or CPI – i.e. real ASHE?
  - What is a reasonable assumption for future real ASHE? Will be volatile over shorter durations
  - What should underlying price inflation assumption be based on to derive nominal ASHE?

- If were to use RPI inflation swaps as a benchmark for future inflation, then it would be in the range 3.2%-3.45% depending on duration. Adding, say 0.5% margin, would give nominal ASHE of 3.75%

- In terms of calculating BEL using EOIPA £ discount rate of around 1.5% pa, leads to an effective discount rate being applied to the current PPO amount of -2.25%.

- This compares to the typical discount rate used in the market which seems to be in the range -1% to +1% based on previous PPO Working Party analysis. And the personal injury discount rate of -0.75%

- Use of Volatility Adjustment effectively increases the net discount rate.
Longevity – An Underwriter’s Perspective
Longevity Considerations

• Motor (non-MIB) PPO Claims - summary statistics:

<table>
<thead>
<tr>
<th></th>
<th>Mean (Years)</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at settlement</td>
<td>34.1</td>
<td>509</td>
</tr>
<tr>
<td>Delay until settlement</td>
<td>6.3</td>
<td>502</td>
</tr>
<tr>
<td>Future life expectancy at settlement</td>
<td>45.0</td>
<td>491</td>
</tr>
<tr>
<td>Life expectancy reduction</td>
<td>10.8</td>
<td>474</td>
</tr>
</tbody>
</table>

Primary causes of claim: 75% traumatic brain injury, 21% spinal cord injury, 4% other

Source: IFoA PPO Working Party, GIRO 2016 Report

• Comparison with life assurance and pension annuities:
  - Longer durations
  - Greater reductions in life expectancy
  - More limited causes of impairment
  - Unimpaired minority (<5% compared with >75%), and
  - Much smaller volumes - less likely to meet expected outcomes.
Longevity Considerations – Case Assessment

• Challenges to accurately assessing claimant’s mortality:
  - Limited recent, relevant & reliable published research
  - Adjustments to published research to reflect UK (compensated) care environment
  - Variable interpretation of published research by medical expert witnesses
  - Litigation bias (instructed by defendant or claimant) of medical expert witnesses, and
  - Whether to use cohort or period mortality

  ▪ Individual considerations:
    - Age and gender
    - Pre-accident additional mortality
    - Accident mortality
    - Lifestyle mortality (e.g. smoking, obesity),
    - Post-code
    - Interval between accident and settlement
    - Date of medical reports.
Longevity Considerations – Future Outlook

• Medical advances
• Claims analyses
• More relevant published research, and
• Periodic review of estimated future expectation of life.
Impact of Excess of Loss Reinsurance
Liability Profile Post Excess of Loss (XOL) Cover

- XOL means that exposure to longevity and ASHE risk is shared between cedant and reinsurer(s). Example of XOL cover with £5m (indexed) retention:

Note: Based on example PPO of £100k pa, ignoring mortality. Assumptions as per previous slide. Assumes PPO starts at t=0 and no lump sum award.
XOL Observations

• “Deductible creep” can still result in the cedant being liable for a significant proportion of the gross PPO even after XOL cover is activated, depending on the level of the retention

• The impact of adverse longevity or ASHE experience versus assumptions will be shared between the parties, with the cedant having greatest exposure to ASHE due to the mechanics of deductible creep but the reinsurer(s) have greatest exposure to longevity due to covering the larger proportion of the long-date PPO payments
Impact of 5% ASHE “Spike”

Note: Based on example PPO of £100k pa, ignoring mortality. Assumptions as per previous slides. Assumes PPO starts at \( t=0 \) and no lump sum award.
XOL Observations (continued)

• Complications due to “Capitalisation Clauses”

• XOL reinsurance means that for many companies their net PPO liabilities may only be 50% or less of the gross liabilities. There is therefore significant counterparty exposure over a very long period.

• In practice, there are likely to be multiple layers of XOL cover with different attachment and detachment points. Given that in any year the PPOs in payment will relate to insurance cover provided in a (growing) number of prior years, the number of XOL reinsurance counterparties can be lead to administrative complexity.

• Generally reinsurance exposure is not collateralised and relies on the continued financial strength of the reinsurer. Any concerns may be compounded by there being a tail of reinsurers no longer active in the new business market and potentially having failed.

• Scope for a market solution to address that fragmentation for a company.
Asset Liability Management
Selecting Assets to Back PPOs

- A typical non-life asset mix of gilts, corporate bonds and cash is not suited to PPOs. Assets should address the combined effect of ASHE indexation and the long, but uncertain duration of the liabilities and consequent interest rate sensitivities.

- No ASHE linked instruments are available. If believe ASHE is correlated to RPI then the use of index linked gilts and collateralised swaps provides some mitigation of ASHE risk, both short term fluctuations and longer term experience.

- However, with long dated gilt returns being very low by historical standards, the actual run off cost of meeting the PPO obligations will be high. Therefore, need to consider the scope for investments which offer potential for higher returns and higher degree of correlation with future ASHE.

- Leads towards real assets (e.g. equities) and alternative investments such as asset backed debt, ground rents and creation of a dynamically managed matched portfolio (“ Liability Driven Investment”).

- Also higher returns can potentially help absorb higher than expected life spans.

- But trade offs – capital requirements; complexity; scale; cost.

- Scope for a market solution that builds a large enough scale to bring more sophisticated ALM strategies to bear.
Capital Requirements
Thoughts on Capital Requirements

• Standard Formula SCR does not explicitly allow for ASHE. Two aspects to consider - “spikes” and long term assumption

• Is the SF calibration of the mortality stress applicable to PPO cases?

• Where it is a practical option, should approval of an internal model or partial internal model be sought?

• ORSA view of potential adverse long term mortality experience more insightful than a one year “shock”

• Hedging of interest rate and inflation sensitivities to mitigate capital requirements

• The more adventurous the asset strategy, the greater the capital requirement – so need to understand the trade-offs and constraints

• Benefit of diversification between PPO and non-life risks, but limitations and how much can this be relied upon longer term?
Developing a Market Solution
Building Blocks for a Market Solution

• Creating a viable market solution, like any new insurance venture, requires all the various stakeholders’ interests to be addressed
  – What is the demand for a solution and the acceptable pricing of a transaction – in the UK and beyond?
  – Existing stock of settled PPOs, future potential PPOs on known claims and IBNR claims
  – How much capital is available to back such a venture and what are the investor(s) risk/return expectations?
  – Choice of domicile? What do the regulators require?
  – What are the hurdles for a Part VII transfer?
• At all times, the interests of the PPO recipient have to be safeguarded.
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