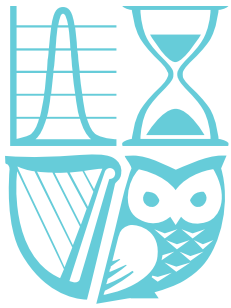

Society of Actuaries in Ireland

Report of the Working Party on PPOs

March 2020

Contents

1. Introduction

The Society of Actuaries in Ireland ("the Society") is the professional body representing the actuarial profession in Ireland. The Society seeks to make an impartial contribution to public interest matters where an actuarial perspective can add value.

This report on Periodic Payments Orders ("PPOs") has been prepared by a Working Party of the Society ("the Working Party"). In preparing this report, the Working Party has sought to identify and describe various issues that the Working Party feels merit consideration by actuaries and others when analysing PPO claims.

Whilst care has been taken to ensure the accuracy of the information in this document, the Society does not accept any responsibility or liability for any errors and/or omissions, including any errors and/or omissions in the data on which this document is based. This document does not constitute advice and should not be relied upon as such. The Society does not accept any responsibility or liability for any loss to any person or body as a result of any action taken, or any decision taken not to act, on foot of any statement, fact, figure, expression of opinion or belief contained in this document.

1.1 Status of this report

This report has not been prepared with the intention that it will be adopted by the Society to have any formal standing in terms of mandatory or recommended use by members. It seeks to assist actuaries and others who analyse PPO claims by describing various issues that the Working Party considers to be relevant.

1.2 What is a PPO?

Claimants who have suffered injuries, whether through road traffic incidents, accidents at work, medical negligence or otherwise have, prior to the introduction of PPOs, only been able to receive compensation in the form of a lump sum payment. Such payments transfer the risks of insufficient investment proceeds and above average longevity from the defendant (or their insurers) to the claimants.

The lump sum payment includes past costs incurred by the claimant together with an estimate of their future costs, including the cost of care and compensation for their loss of earnings. The valuation of these costs relies on assumptions regarding the claimant's future life expectancy and the investment income to be expected from the assets in which the lump sum is invested.

Where claimants have ongoing care expenses in relation to these injuries there is a possibility that the compensation payment is not sufficient, therefore the claimant is undercompensated and these costs may fall back to the State or would lead to a much lower level of care than that envisaged by the court. It is also possible that claimants are over-compensated, either because their condition improves and they require a lower level of care, or because they die earlier than expected and the remaining compensation becomes part of their estate.

PPOs are a mechanism to remove some of the risks associated with lump sum payments from seriously injured claimants by providing a series of annual payments for the lifetime of the claimant. The structure of a PPO will set out the amount payable per year and whether there is to be any variation in the amount.

Even when a PPO is awarded many of the heads of damage will continue to be compensated via a lump sum including past costs, pain and suffering, and in many cases the loss of future earnings.

These forms of whole life annuities are a common compensation mechanism in other countries. Of particular interest is the introduction of PPOs in the UK in 2003, due to the similarities between the UK and Ireland of the legal regime and the nature of motor and liability insurance.

The PPO Working Party of the Institute and Faculty of Actuaries ("the IFoA Working Party") has undertaken a substantial body of research on UK PPOs, a large amount of which is relevant to actuaries looking at the recent introduction of PPOs in Ireland. There are, however, several key differences to the introduction of PPOs between the UK and Ireland including the different claims environment, the different PPO legislation and the different discount rate used for lump sum claims.

1.3 Scope and aim of paper

The aim of this report is to provide a reference to actuaries when analysing PPO claims awarded in Ireland.

The Working Party has not attempted to create a full report on how to deal with PPO claims as much of this work has been undertaken by the IFOA Working Party. This work can be found on the IFOA website[1] and includes their original 2010 report, a 2011 update and a body of presentations covering their research since 2011, including their annual survey and updates on mortality.

Of particular use is their paper "Information for Actuaries Valuing Periodical Payment Orders: A Helpful Handbook"[2] issued in 2016. We would strongly advise actuaries analysing Irish claims who are not familiar with UK claims to read this handbook in conjunction with this report.

In particular the sections on Reserving can be read in conjunction with Chapter 2 of this report on the Valuation of PPOs; The "Helpful Handbook" sections 5.6 on Propensity and 5.5 on Mortality may be of use when reading Chapters 3 and 4 of this report; and lastly section 7 of the "Helpful Handbook" may be useful whilst reading Chapter 5 of this report.

In the report, we have discussed areas of interest to actuaries; however we have not considered investment strategy which may be an important consideration, especially in light of the prudent person principle of Solvency II.

[1] https://www.actuaries.org.uk/practice-areas/general-insurance/research-working-parties/periodical-payment-orders-ppos

[2] https://www.actuaries.org.uk/system/files/field/document/IFoA%20Periodical%20Payment%20Orde%20Working%20Party%20Information%20Paper-2_0.pdf

1.4 Legislative position

PPO legislation is contained in the Civil Liability (Amendment) Act 2017 ("the Act"). The Bill was originally published in January 2017 and was signed into law by the President in November 2017. The PPO element of the Act was commenced by Ministerial Order with effect from 1 October 2018.

In relation to PPOs, the Act addresses five issues which are of relevance to insurers and claimants:

- It amends the Civil Liability Act 1961 to recognise PPOs and some of the details that have to be clarified. These details include which elements of an award can be paid by a regular payment, circumstances to which the court should have regard in deciding whether to make a PPO, allowance for stepped payment, a requirement that the court should consider whether the PPO is reasonably secure and provision for indexation.
- It amends the Insurance Act 1964 to remove the limit in the Insurance Compensation Fund in cases of PPOs.
- It amends the Bankruptcy Act 1988 to take account of cases where the individual in receipt of the PPO becomes bankrupt, essentially protecting the care elements of the payments.
- It amends the Taxes Consolidation Act 1997 exempting the PPO payments from income tax.
- It amends the Civil Liability & Courts Act 2004 in respect of the form in which formal offers are to be made and in respect of considerations to be taken into account when awarding costs.

The first PPO was awarded in the Republic of Ireland in February 2019 in the case of Saibhe O'Connor v Rotunda Hospital[3].

The future of PPOs was brought into question in November 2019[4], when Ms Justice Deirdre Murphy gave her judgment[5] in a test case involving a four-year-old boy who suffered brain injury after his birth in Cork University Maternity Hospital, and in respect of whom liability had been admitted and an interim settlement reached in October 2016. The State Claims Agency sought to deal with the balance of the claim by a PPO, but Ms Justice Murphy, having heard from a range of experts, found that the provision of the Act linking payments under the PPO to the index of consumer prices (HICP) means such plaintiffs will be undercompensated as future care costs are expected to rise faster than price inflation. She said that no judge could approve payments linked to that index.

1.5 Claims environment

The majority of compensations claims in Ireland fall under the following headings: personal injury, fatal injury, criminal injuries and Garda Compensation. The two types of claim of interest to actuaries are personal injury and fatal injury, although PPO claims would only be awarded in cases of personal injury.

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[3] https://www.irishtimes.com/news/crime-and-law/courts/high-court/brain-damaged-girl-to-receive-610-000-annually-1.3801858

[4] https://www.irishtimes.com/news/crime-and-law/courts/high-court/new-law-on-payments-for-catastrophically-injured-a-dead-letter-court-says-1.4088266

[5] https://beta.courts.ie/view/judgments/e3fb19c3-20f5-4536-af8a-48eb79556b39/45b2b9b3-c69e-4b61-a1fc-fe38705c33b3/2019_IEHC_788_1.pdf/pdf

Examples of personal injury cases include accidents at work, motor accidents, medical negligence and public liability accidents. Damages are usually sought under two main headings: general damages and special damages, where general damages relate to pain and suffering experienced and special damages are in respect of monetary loss. Examples of special damages include future loss of earnings, loss of retirement benefits, care costs, aids and appliances, assistive technology and medical expenses.

All personal injury claims in Ireland (except for cases involving medical negligence) must be submitted to the Injuries Board. The Injuries Board is an independent State body which provides an independent assessment of personal injury claims for compensation. Once the Injuries Board are in receipt of a claim, they must assess it within a period of nine months or request an extension from the parties involved if necessary. Generally speaking, the Injuries Board does not assess claims for psychological damages or claims where the prognosis of the injury is likely to carry on beyond the two year statute of limitation period. If the respondent does not agree to an assessment by the Injuries Board or if either side rejects the Board's award, an Authorisation will be issued, meaning the matter can then be referred to the courts. Court proceedings can be lodged at District Court, Circuit Court or the High Court depending on the severity of injuries and the amount of compensation sought. As a general rule the District Court would deal with all cases up to the value of €15,000, the Circuit Court would deal with cases up to the value of €60,000 with anything over this threshold being referred to the High Court.

1.6 Insurance Types impacted

The majority of PPO claims against private defendants can be expected to affect third party motor policies although there may also be claims made against Employer's Liability and Public Liability policies. Whilst third party motor policies provide unlimited cover for personal injury claims, liability covers in the Republic of Ireland will normally have a fixed limit which is often €13m for Employer's Liability and between €1.3m and €6.5m for Public Liability.

For claims where the Insurance cover has a fixed limit there is likely to be reduced propensity as judges would be unwilling to award a PPO if there is a possibility that the limit is breached. If this occurs the liability will pass back to the policyholder who may at that time have ceased to exist and therefore the claimant would be uncompensated. The propensity levels for liability claims may be expected to increase with size of claim initially before reducing as the fixed limit impact becomes more dominant.

The Motor Insurers' Bureau of Ireland (MIBI) is liable to pay valid third party injury claims made against uninsured or unidentified drivers and in these cases PPO claims may be awarded in the same way as for normal insurance claims.

Where an insurer is insolvent a claim can be made against the Insurance Compensation Fund which is usually limited to a minimum of 65% of the value of a claim or a maximum of €875,000. The Act removed the limit on the Fund and a PPO claim awarded in such circumstances will be paid in full. This may lead to the circumstances where an individual can only be compensated in full if a PPO is awarded and as a consequence the definition of the circumstances in which a PPO can be awarded may be tested in full.

The Insurance (Amendment) Act 2018 removed the cap for third party motor insurance claims and will pay out claims in line with MIBI levels. This will not affect the position of claims against Employer's Liability or Public Liability insurance.

1.7 Structure of the report

The contents of this report address five different topics relating to PPOs. Each topic has its own chapter in the report:

- Chapter 2: Valuation
- Chapter 3: Propensity
- Chapter 4: Mortality
- Chapter 5: Capital
- Chapter 6: Data

An appendix setting out references is also included in the report.

1.8 Working Party

At the beginning of the project (September 2017), the Working Party carried out a qualitative survey through insurance companies to measure the degree of concern in respect of the anticipated introduction of PPOs in Ireland. Seven of the eight major insurers answered.

Their concern was moderate but they recognised that there was a need to anticipate the possibility of a PPO depending on the type of injury, on the claimant age or the claim size.

Some key facts observed in the survey:

- Irish insurers expect less than 10 PPOs per annum
- Wide range of approaches and sophistication to dealing with potential PPOs
- An explicit reserve is held for PPO claims
- HICP similar to past or between 2% and 3%
- Reinsurance not tailored due to PPO and no capitalisation clause
- No change in investment strategy

Overall, there was uncertainty in the market at that time in respect of the timing of PPOs in Ireland and uncertainty as to the extent of the similarity with UK.

The members of the Working Party were as follows (in alphabetical order):

John Byrne
Nicolas Daxhelet
Ken Deane
Nigel Finlay
Niamh Gaudin
Joe Kelleher
Heike Koenicke
Miriam King
James Mulrooney
Clive Niven (Chair)
Dermot O'Hara
Shauna Rabbitt
Nigel Tennant

2. Valuation

The estimation of Technical Provisions for PPOs will present a range of new challenges for non-life actuaries. Traditional non-life projection methods based on historical claims triangles will not be appropriate for the valuation of PPO liabilities. Actuaries will have to become familiar with life insurance projection techniques, the data and assumptions, and the limitations of different projection options.

In this section we consider the valuation techniques that could potentially be used in estimating the reserves for PPOs, the elements of a company's PPO reserve and techniques that could potentially be appropriate for the different elements. We also consider stochastic reserving techniques and the impact of reinsurance on Technical Provisions.

This section focuses on Technical Provisions for Solvency II purposes. We have not considered other valuation requirements such as FRS 103 or IFRS 17. However, as an aside, it is noted that it may be possible for undertakings to discount the PPO reserves on an IFRS basis. In Ireland, for example, an application to hold discounted reserves should be made to the CBI in accordance with Schedule I, Part IV, 59 of the European Union (Insurance Undertakings: Financial Statements) Regulations 2015 (S.I. 262 of 2015).

2.1 Why Not Traditional Non-Life Techniques

Traditional non-life triangulation methods have an inherent assumption that the historical claims development of homogenous segments can be used as a basis for future claims projections. When calculating Technical Provisions for PPO claims there are a number of limitations to this approach:

- There is insufficient historical data available. Irish actuaries will look to data from other countries as a benchmark in their valuation models. For example, PPOs were introduced in the UK in 2003. However, the number of PPO settlements was very low for many years and it takes many years before PPO settlements are fully run-off. In effect, using triangle terminology, there is no tail available for projection purposes;
- Historical claims trends may not be appropriate for projection purposes. For example, the Thompstone v Tameside[6] case in the UK (2008) led to a calendar year effect whereby there was an increase in PPO settlements post 2008. The presence of calendar year effects in historical data leads to increased uncertainty within triangle-based methods;
- Grouping claims into homogenous segments is difficult as this potentially ignores information relating to individual claims which could alternatively be used to improve the claims projections.

[6] Thompstone –v– Thameside and Glossop Acute Services NHS Trust [2008 2 AII.E.R. 537]

2.2 PPO Valuation Elements

The PPO liability can be separated into three main categories with varying levels of claim information available:

2.2.1 PPOs in payment

These PPOs have been settled and are being paid. There is a considerable amount of information available about the individual person, the level of payment being made, the various elements of the payment and the reinsurance program(s) applying to the PPOs.

2.2.2 Reported large claims with potential to settle as PPOs

An insurance company typically has a portfolio of large claims reported but not settled. These claims have a potential to settle as a PPO. There is information about each of the claims (age, gender, type of injury) etc. There may also be some information on the likely propensity to settle as a PPO.

2.2.3 Pure IBNR PPOs

There are claims where the loss has occurred at the valuation date but the claim has not yet been reported as a large claim to the insurance company. The claim may be reported to the insurance company in some respect but without sufficient information to classify it as a large claim or may not be reported at all yet to the company.

2.3 Techniques Used to Value PPOs

The techniques used to value PPOs vary depending on the element of the PPO reserve and the level of information available. Claims that have already settled as a PPO have all the necessary claimant information available to use life insurance discounted cashflow techniques. By contrast, when valuing the Technical Provisions for pure IBNR claims that have no individual claim information, non-life triangulation techniques are useful in estimating the value of these claims.

2.3.1 Life Insurance Techniques (PPOs in Payment)

The valuation of Technical Provisions using life insurance techniques involves discounting the future cashflows arising from present obligations. Future expected claims payments and future expenses relating to the claims payments are typically included within the projection.

Historically life insurance Technical Provisions are calculated using annuity factors which incorporate the expected future lifetime of the claimant and the effective discount rate. The disadvantage with using annuity factors is that annuity factors do not project estimated future cashflows. The projection of estimated future cashflows is important for various purposes such as the calculation of the Solvency II Risk Margin, asset liability modelling, risk and sensitivity testing etc.

Non-life actuaries may need to develop deterministic projection models which project the expected future cashflows to PPO claimants. The information relating to each individual claimant is captured in a “model point” and each model point is input into the projection model. The PPO model point includes information such as age, gender, amount of PPO etc.

Future cashflow projections are based on expected payments for each time period (PPO payment, expenses, fees), the probability of the payment being made in each time period using a mortality assumption and then discounted back at the valuation rate of interest.

The following key assumptions can be used in the future projections:

- Inflation of PPO in payment
- Inflation of PPO expenses
- Expected mortality of the claimant
- Impact of any variation orders
- Impact of any offsetting deductions (e.g. social welfare, pension)
- Payment frequency

The cashflows are discounted using the valuation discount rate. The discount rate varies depending on the valuation basis used.

Life insurance techniques would be expected to be used to calculate Technical Provisions for PPOs in payment where individual claim by claim data is available.

The model used to value PPOs in payment could also be used to inform the uplift factor, which is an assumption in the valuation of the other PPO elements. The uplift factor can be calculated by comparing the discounted value from the life insurance model with the cost of the claim were it to settle as a lump sum.

2.3.2 Non-Life Insurance Techniques (Pure IBNR PPOs)

Non-life techniques do not project an individual model point but project a group of claims (homogenous segment). The projections use historic claims trends as a basis for projecting future claims developments. The underlying assumption is that historic trends will repeat in the future. Various projection models are produced and compared to gain an understanding of the drivers of historic trends and to make adjustments to trends where necessary.

Traditional non-life insurance models can be used to project the frequency of large claims. The projected large claims frequency, combined with a selected propensity factor, can produce an estimate of PPO claim numbers.

The valuation of Potential PPOs and Pure IBNR is calculated by multiplying the expected number of PPOs from the non-life model by an expected average cost. The expected average cost can be based on an uplift to the large claim average cost for non-PPO claims, where the uplift factor is calculated as described above. In this way the uplift factor will incorporate the increased cost of PPOs arising from items such as discount rates or PPO expense costs.

2.3.3 Life/Non-Life Hybrid (Potential PPOs)

Claims that have already been reported as large claims will have claim by claim details available that would be used in the life-insurance valuation were they to settle as PPOs. In this case a hybrid of life and non-life techniques could be used as follows:

- Propensity could be modelled using non-life frequency techniques. However, details of the individual claim may influence the propensity so a credibility weighted method may be considered;
- The uplift could be calculated on an individual claim by claim basis using the life insurance model.

2.4 Valuation Bases

Solvency II separates the valuation of Technical Provisions into the following three elements:

Claims Provisions: The claims provisions relate to claims that have occurred by the valuation date. The claims provision includes PPOs in payment, Potential PPOs and Pure IBNR.

Premium Provisions: Premium provisions relate to the expected cashflows arising from periods of unexpired cover under bound contracts.

Risk Margin: The Risk Margin is the cost of capital necessary to cover the Solvency II Solvency Capital Requirement (SCR) of the claims and premium provisions.

Solvency II includes all future expected cashflows arising from the premium and claims provisions and discounts the cashflows back at the risk-free rate as prescribed by EIOPA. There is some potential to increase the risk-free rate through volatility or matching adjustments. The underlying principle of Solvency II is to use best estimate valuation bases.

2.5 Reserve Uncertainty

Actuaries will be required to consider the range of possible outcomes for PPO liabilities. Reserve uncertainty could arise from various risks such as:

- Longevity risk: The mortality experience of a claimant may be different from that assumed in the valuation model. This uncertainty is more pronounced for impaired mortality than standard mortality and for companies with a low number of PPOs;
- Inflation risk: The level of inflation applied to PPOs in payment may be greater or lower than assumed in the valuation model.
- Market risk: The rate of return achieved may be higher or lower than that assumed in the valuation model. There is historical information available for the calculation of this risk and economic scenario generators could be used to stochastically estimate this risk.
- Counterparty default risk: Counterparty default is typically calculated using probability of default and cost given default. Probability of default can be calculated using implied default from credit ratings. Cost given default can be derived from the recoveries expected from the reinsurance model. The calculation of probability of default over the long term horizon of a PPO payment is challenging as there is a potential for long term deterioration in credit quality. Tail dependencies will also need to be considered.

Stochastic modelling for PPO liabilities will present many challenges for actuaries. There is not a common approach to stochastic modelling in the UK market, even though PPOs are in existence for a number of years. Stochastic models will need to be developed to suit the company's risk profile. As companies have differing risk profiles, a common approach is not appropriate.

Scenario testing may be more appropriate as a way of highlighting the key areas of uncertainty within the best estimate assessment. This could lead to an estimation of low and high estimates. Scenarios such as changes in propensity, step changes in inflation, one-off medical advances leading to improvements in life expectancy and interest rate changes could be considered.

2.6 Events Not In Data

As part of Solvency II, insurers are required to set a provision for Events Not In Data ("ENIDs"). This largely relates to the possibility of adverse claims experience in future years which is not currently evident from historic claims data.

Clearly, the assessment of such a provision requires judgement. Wider industry experience as well as collaboration with colleagues (Claims, Underwriting) can provide many useful insights as to what can cause claims outcomes to be worse than expected. Insurers may also look to adverse ORSA scenarios to help inform the types of events that might feed into the overall ENIDs provision.

Irish insurers will have little or no direct experience of PPOs. Thus, inclusion of a PPO component into the overall ENIDs provision is something that non-life insurers could usefully consider. This follows from the observation that PPOs typically cost more than equivalent lump sum settlements as well as the fact that reinsurance protection is often incomplete where capitalisation clauses exist.

This needs to be considered in light of the exposure to PPO liabilities (possibly as a function of relative importance of liability classes – Motor TPL & Employers Liability) together with the range of other liability-side risks faced by the firm.

2.7 Other Considerations

Once a claim is reasonably likely to be a PPO or has been settled as a PPO, the claims handlers may require actuarial assistance in establishing case estimates for the claim. However, actuaries who have responsibilities for reserving, capital or pricing will need to be cognisant of the potential for conflict of interest when assisting in case estimation. Actuaries will also need to be familiar with the process and assumptions used within the claims department to ensure that PPO case estimates are calculated on a consistent basis. Items such as potential liability, claim handler's view of propensity and expected PPO expenses will need to be input into the PPO case estimation calculation.

Actuaries may also be required to contribute to the case settlement strategy (i.e. does the company prefer to settle by means of lump sum or PPO) and to understand the interactions of any particular strategy with the company's Risk Appetite.

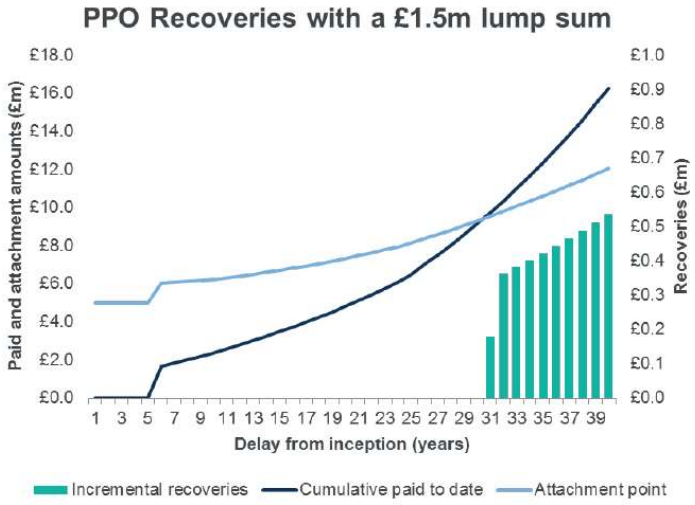
2.8 Impact of Reinsurance

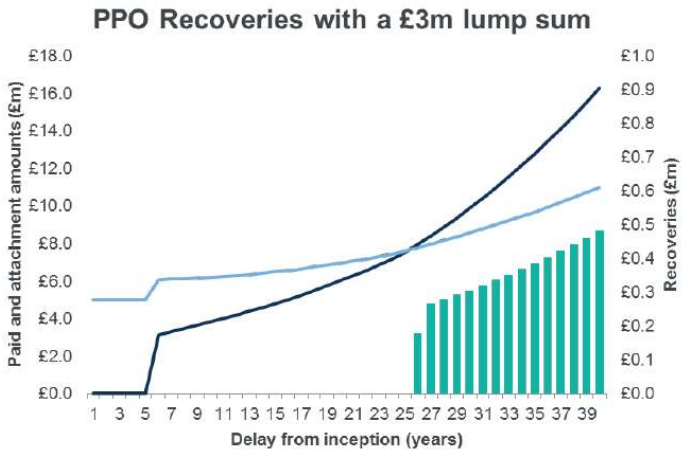
The cession of PPOs to reinsurance becomes material for non-proportional excess of loss treaty type and can evolve over time due to the indexation clause. The valuation of the ceded reserves from Excess of Loss reinsurance is necessarily complicated since the deductible (and the limit if not unlimited cover) of the reinsurance program is likely to be indexed and will increase over time as the money-weighted value of the index at the time of each payment increases.

An index clause is a specialised clause that distributes the effects of inflation on claims costs, which tend to fall on the reinsurer, between the ceding insurer and the reinsurer. Different type of index

clause might be defined in the treaty wording: Index Clause, Full Index Clause, Severe Index Clause. The retention and limit are adjusted based on a defined index (usually national wages) and an agreed margin, following the various claim payments. The reinsurance program for PPOs can be indexed at payment dates or at settlement date following the definition of the treaty wording.

To illustrate that: "the quicker you pay, the more you recover from your reinsurer", consider the graphs below. These show the effect of changing the balance between the size of the lump sum and annual periodical payments on the indexation of treaty limits, assuming both inflation of the lump sum and indexation of the periodical payments is at 4% p.a., for an excess of loss treaty with unlimited cover attaching at £5m, with an indexation clause. The PPO with an accompanying £3m lump sum has a periodical payment amount of £150k in contrast to the PPO with a £1.5m lump sum and a £167k periodical payment, both giving the same paid to date after 40 years.





Reinsurers in the UK have responded to PPOs by introducing capitalisation clauses to the reinsurance treaties in order to limit the duration that they will be involved in the payment of the claims. These are not universal across the market; there are various clauses used which may differ in respect of the following features:

- The date of the capitalisation: Either the date of the settlement, 5 years after settlement or 20 years post the inception date of the treaty are currently used.
- The adjustment made for the mortality of the claimant: unadjusted, adjusted by a fixed addition to life expectancy, or adjusted in accordance with a medical expert's opinion.
- The interest rate to be used in the calculation.
- The method of calculation: Either the IUA capitalisation model[7] or a calculation based on the current Ogden Multipliers.

The prevalence of capitalisation clauses depends on the attitude of insurers and reinsurers, the relative price of capitalised vs non-capitalised reinsurance, as well as the hard or soft status of the market as to whether reinsurers can impose clauses or insurers can resist clauses. At present, the non-capitalisation clause tends to be more popular as the cover is closer to the real risk.

2.9 Risk Margin

The calculation of the Risk Margin may need to change as a result of the introduction of PPOs to the balance sheet. Before claims have settled, the Technical Provisions would reside within the line of business of the original contract before they move line of business at settlement to a Life line. This will have implications for the Risk Margin, the change from a lump sum award to a PPO will adjust the TPs which may distort the ratio of the SCR to the Technical Provisions; furthermore, the run-off of the SCR underlying the calculation of the Risk Margin will be much longer. For these reasons, approximations used in the calculation of the Risk Margin may need to be re-assessed and depending on proportionality a different approach applied.

Depending on proportionality there may be a need to project the SCR at a more detailed level than previously. This may involve a recalculation of each future annual SCR to allow for the changing diversification between lines of business as the shorter tail lines of business run-off leaving a more concentrated reserve fund.

Consideration should also be given to other risk types such as counterparty default and operational risks which may now exist for a longer period. A revised calculation may also need to allow for the movement of PPOs expected to settle in the future into the settled PPO line at each future projection year.

[7] This is issued and maintained by the IUA's Casualty Treaty Group

3 Propensity

3.1 UK Experience of PPO Propensity

The aim of this section is to consider the work undertaken by the IFOA Working Party and assess how this can be used to assist actuaries in Ireland when selecting assumptions in relation to propensity.

All graphs and information can be found in the 2015 IFOA Working Party Survey Report.

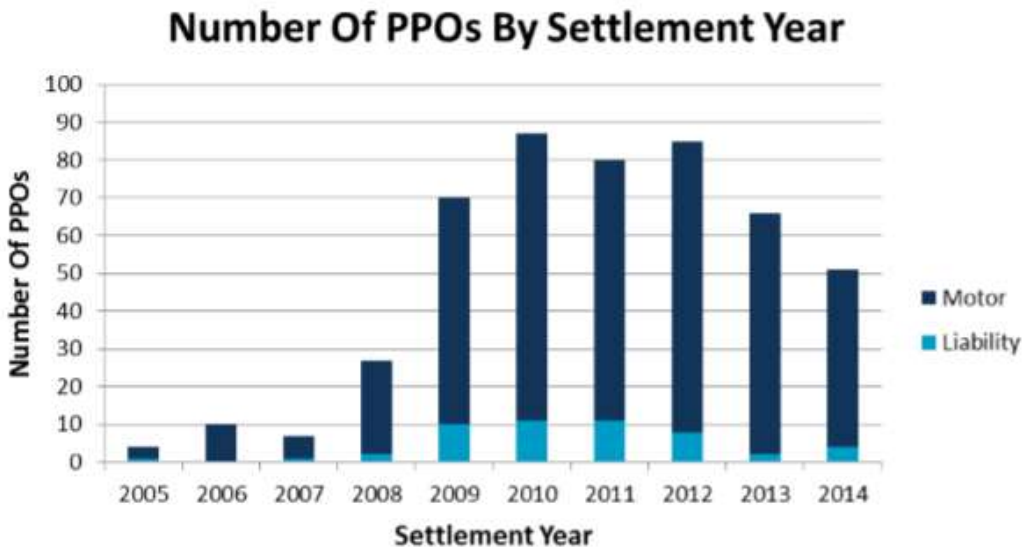
The data used in the survey is taken as at 31 December 2014 and compiles data from a number of insurers across the market. The data includes details on settled PPOs and on settled individual large claims.

One approach towards selecting propensity assumptions is to consider PPO settled claim counts, preferably relative to a consistently calibrated exposure measure. An insurer looking to reserve, price or set capital for PPOs might, for instance, use vehicle years as a consistent exposure measure in the same way as they might do for large claims in general. The IFOA Working Party survey doesn't use this methodology, so users may have to infer other observations from the published results.

3.1.1 PPOs by Settlement Year

The number of PPOs by settlement year is shown in the graph below:

Figure 1 (Source 2015 GIRO Survey Report, figure 2.2 page 7)



PPOs were introduced in the UK with the implementation of the Courts Act 2003 in April 2005.

The number of PPOs remained low from their inception in 2005 up until 2008. In 2008, two key events occurred, one was the change to the indices that can be used as the PPO indexation rate and the other was the change in the economic environment.

The Thompstone vs Tameside appeal in 2008 allowed suitable indices other than the RPI to be used in the indexation of PPOs. In particular, the appeal allowed the use of wage inflation indices. PPOs were originally indexed using the RPI, but after the Thompstone vs Tameside ruling in 2008 other approaches were adopted, with indexation in line with the Annual Survey of Hours and Earnings (ASHE) being the most popular.

Another event in 2008 was the stock market crash which led to depressed returns for investments. This would have hampered the relative attractiveness of lump sum settlements which have to be invested to provide the long-term care needed, leading to an increase in the attractiveness of guaranteed periodical payments, such as PPOs.

In the period 2010-2012, the numbers of PPOs were relatively stable. They have since appeared to be on a downward trend in the two latest settlement years.

Measuring propensity by settlement year is not necessarily that useful. In any one settlement year, the PPOs settled could come from a range of prior accident years. In particular, the period 2008 – 2012 may have been impacted by a "catch-up" of settlements from older years and may be exposed to a change in behaviour.

3.1.2 Delay to Settlement

The IFOA Working Party produced some information on settlement delay for PPO cases. The delay in settlement is calculated as the time elapsed between the accident and PPO settlement, rounded to the nearest whole year.

Figure 2 (Source 2015 GIRO Survey Report, figure 3.9 page 58)

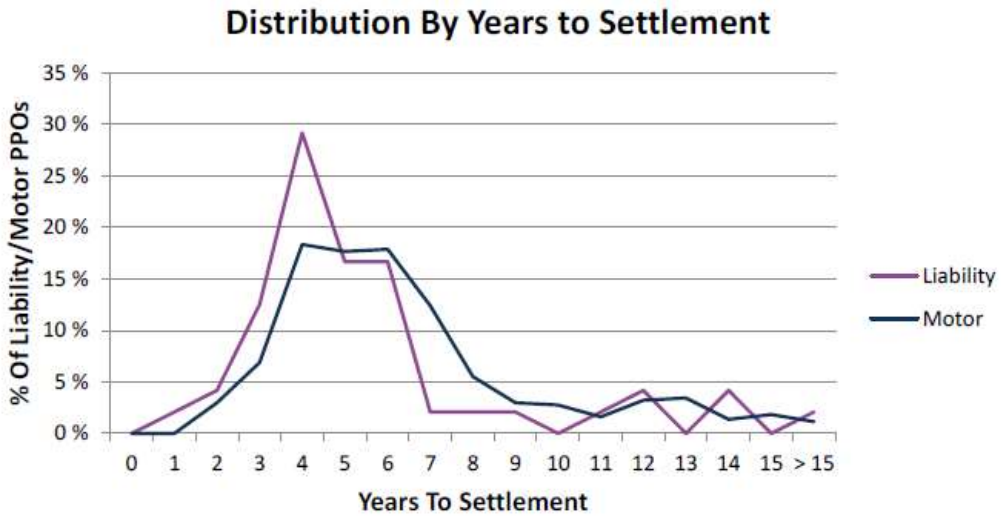


Figure 2 shows the years to settlement for Liability and Motor PPOs.

There appears to be a slightly lower settlement delay for liability PPOs than for Motor PPOs. However this apparent difference may not be statistically significant due to the small number of liability PPOs.

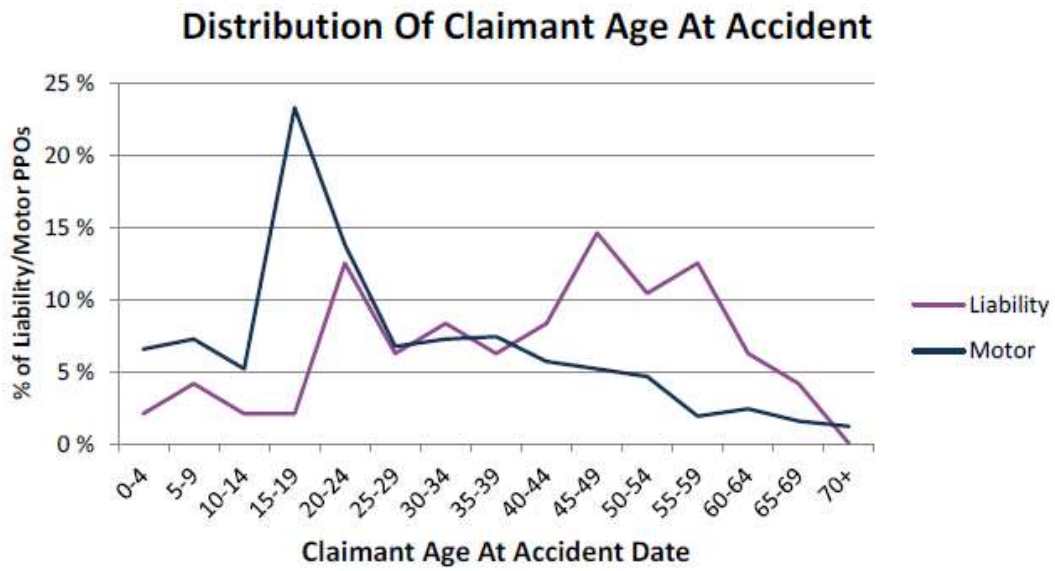
Younger claimants tend to have longer delays to settlements than older claimants. This is probably because minors would be advised to wait until they reach the age of majority before settling the

claim, when a more reasonable medical prognosis of their condition can be made and the expectation of the level of care that they will require in future will be more reliable.

Liability claims emerge mainly from employer's liability coverage and would have very few minors, thus this could justify the faster settlement time seen for Liability PPOs compared with Motor PPOs.

The graph below shows the number of PPOs by age of claimant for Motor and Liability. There is a significant peak in the number of PPOs at the age band 15-19 for Motor, which would follow from the explanation above for the longer settlement delay for younger claimants. The graph also shows that there are significant settlements at the upper age bands, from 45 until 59, for Liability due to the nature of the cover being for those typically of working age.

Figure 3 (Source 2015 GIRO Survey Report, figure 7.7 page 57)

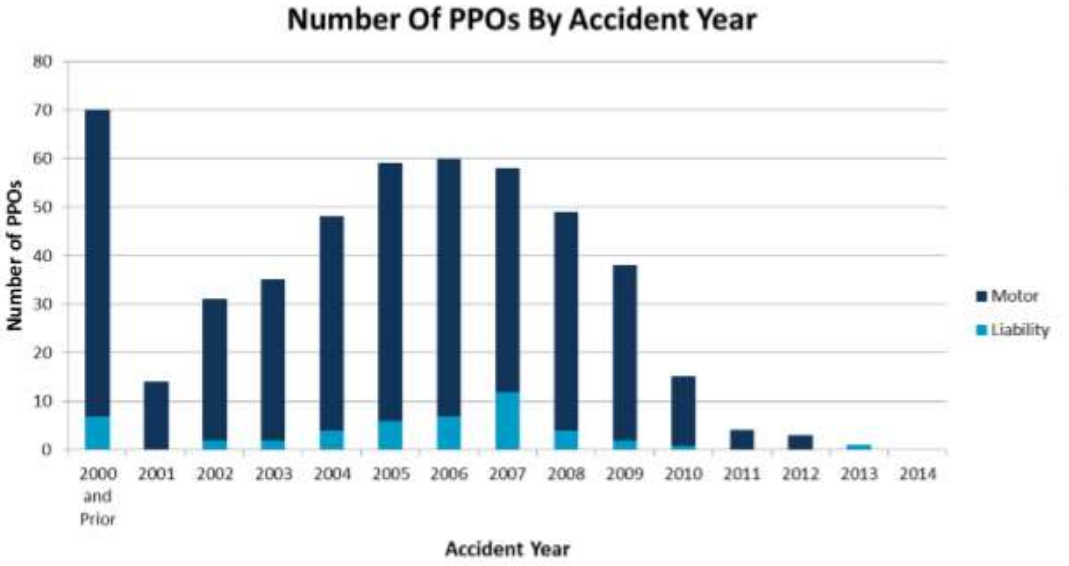


3.1.3 PPOs by Accident Year

It is arguably better to compare propensity across successive exposure periods as accidents happening at similar times should be exposed to similar social and economic circumstances. The number of settled PPOs by accident year is shown in the graph below, although it should be noted that these don't allow for IBNER or IBNR cases.

There will certainly be an understatement in the more recent accident years as the average delay in settlement is 6 years and these would not capture all claims.

Figure 4 (Source Reserving Seminar 2016, slide 21)

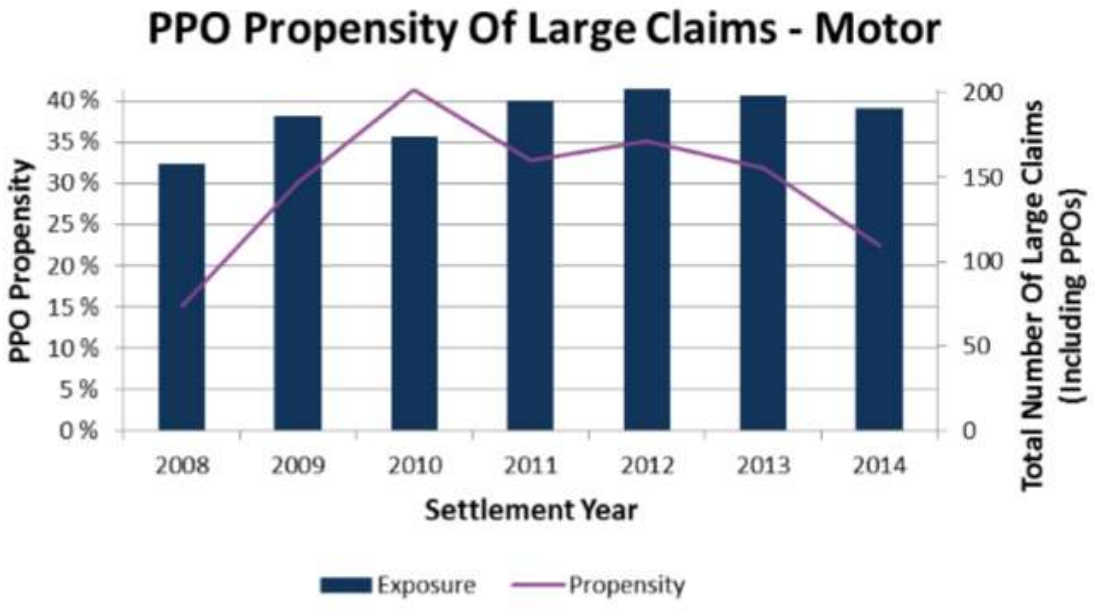


3.1.4 Motor PPO Propensity as proportion of Large Claims

Another way to consider the propensity of PPOs is to look at the proportion of large claims that ultimately turn into PPOs. If an insurer has a robust understanding of large claim emergence, then this information could be used to allocate some cases to PPO count, based on an understanding of the possible drivers.

The PPO propensity for Motor claims is shown in the graph below. The PPO propensity is calculated from the number of PPOs divided by the number of large claims. The IFOA Working Party defines a large claim as being greater than £1m in 2011 values, with indexation applying at 7% per settlement year.

Figure 5 (Source 2015 GIRO Survey Report, figure 2.5 page 9)



The graph shows an upward trend in the PPO propensity from 2008 until 2010, after which a downward trend is seen.

In November 2010, an announcement was made that the Ogden discount rate would be reviewed, which may have caused a delay in the settlement of large claims as can be seen by the dip in the exposure bar in the graph for 2010 and possibly is the reason for the high PPO propensity in that year.

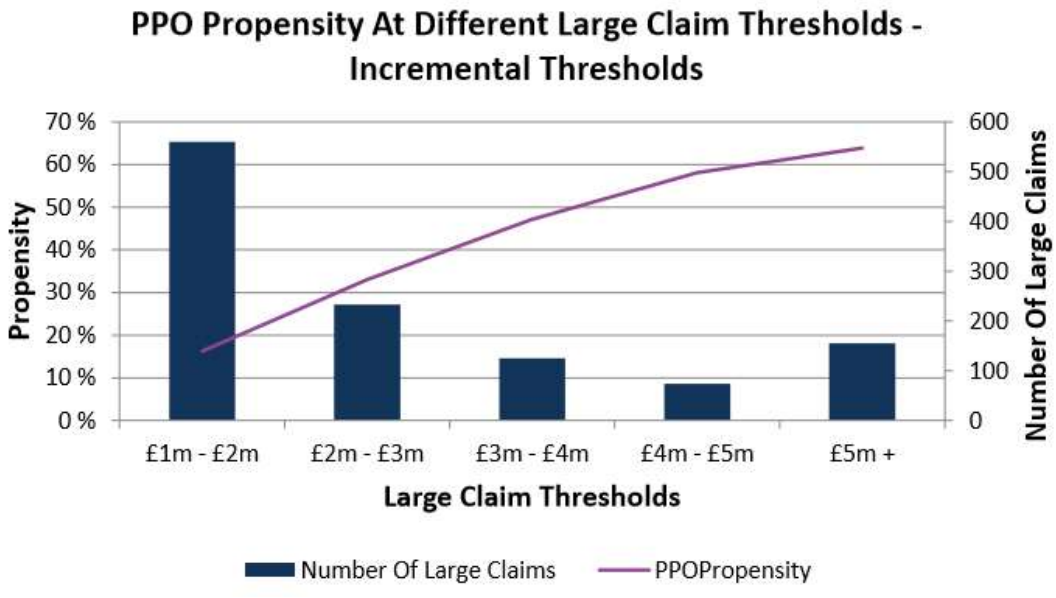
The PPO propensity for Motor was in the range of 30% - 40% of large claims for 2009 to 2013. In 2014, the PPO propensity appears to be lower.

The IFOA Working Party lists a number of reasons that may have caused the reduction in the PPO propensity for 2014:

- Data collection issue (late recording of PPOs)
- Change in mix of insurers contributing to the survey
- Impact of Ogden rate consultations
- Run off of back-log in potential PPOs in prior years
- Insurer claims management behaviour change
- Reduced appetite for PPOs over lump sums by claimants

There is an increase in the likelihood that the claim will settle as a PPO as claim size grows. The graph below shows how the PPO propensity varies at different thresholds, for claims settled since 2009.

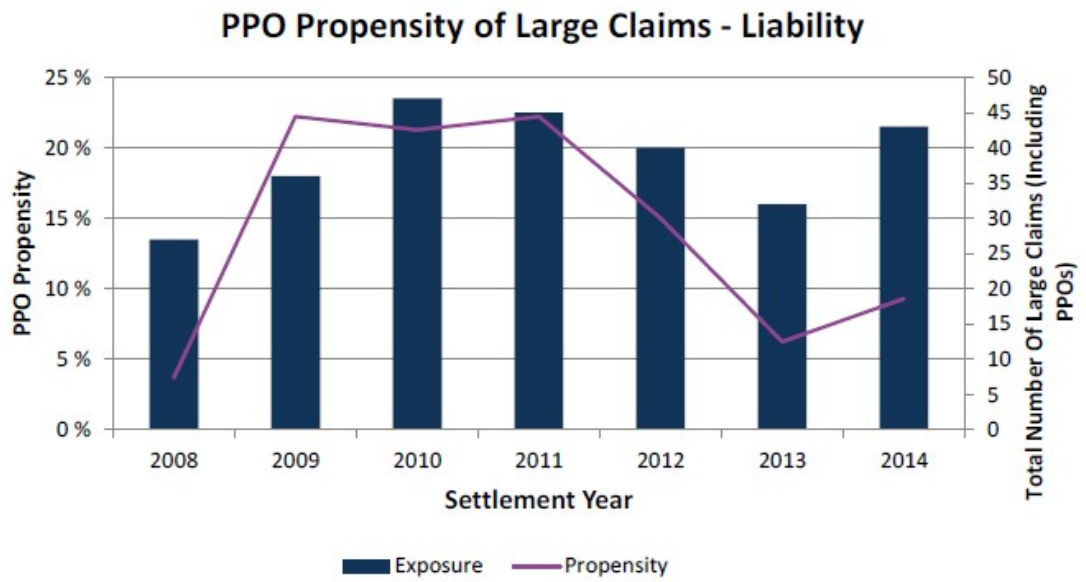
Figure 6 (Source 2015 GIRO Survey Report, figure 2.6(a) page 11)



3.1.5 Liability PPO Propensity as a proportion of Large Claims

The PPO propensity as a proportion of large claims is shown in the table below for Liability claims. A large claim is defined as being greater than £1m in 2011 terms, indexed at 7% per settlement year.

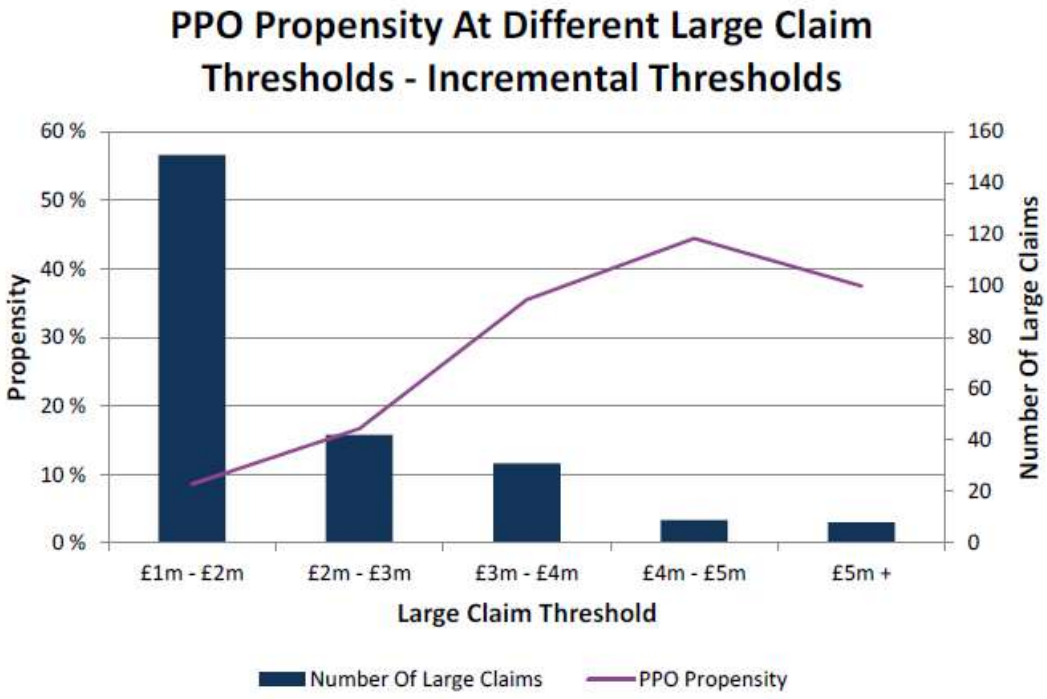
Figure 7 (Source 2015 GIRO Survey Report, figure 2.21 page 21)



The PPO propensity for Liability claims is lower than that for Motor claims and is very volatile due to the small numbers of PPO Liability claims. In 2008, only one liability claim was settled as a PPO.

The graph below shows the variation in the PPO propensity for Liability claims at different thresholds. The graph shows a dip in the PPO propensity beyond the threshold of £5m, however there were only five Liability PPOs at this level.

Figure 8 (Source 2015 GIRO Survey Report, figure 2.22 page 22)



3.2 Differences between UK and Ireland: Factors to Consider when setting a Propensity Assumption

While PPO propensity in the UK is interesting, it cannot be expected that the UK experience of PPOs will be precisely repeated in Ireland. In addition, different insurers are likely to have differing individual experience as a result of a number of factors. The variability of experience between insurers is not covered in the UK PPO survey.

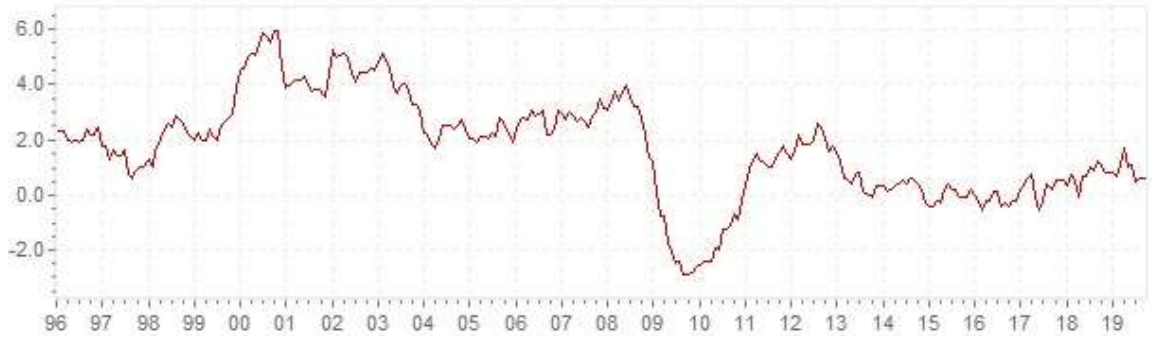
The PPO structure for Ireland differs from the current UK PPO structure in a number of respects and these will have a direct impact on the perceived attractiveness of PPOs over lump sum awards.

3.2.1 Index

In the UK, the allowance to use indexation rates on the PPO payments other than the Retail Prices Index (RPI) in 2008 was one of the driving factors in the increase in PPO numbers. This resulted in a move towards the use of the Annual Survey of Hourly Earnings (ASHE), which is a measure of care workers' salaries. This move in the indexation from the RPI to ASHE made PPOs relatively more attractive.

For PPOs in Ireland, the Act provides that the PPOs will be indexed according to the Harmonised Consumer Price Index (HICP). The HICP is compiled by Eurostat and measures changes in the consumer price inflation for countries in the Eurozone. The recent history of the HICP is shown in the chart and table below. The index used will be periodically reviewed by the Minister for Justice every five years to ensure that the index remains a reasonable match to changes in the costs incurred by PPO claimants post-settlement.

Figure 9 – historic HICP inflation Ireland (yearly basis) – full term[8]



[8] http://www.inflation.eu/inflation-rates/ireland/historic-inflation/hicp-inflation-ireland.aspx

Historic harmonised inflation Ireland (HICP) – by year

annual inflation (dec vs. dec)	inflation	annual inflation (dec vs. dec)	inflation
HICP Ireland 2018	0.80 %	HICP Ireland 2008	1.33 %
HICP Ireland 2017	0.50 %	HICP Ireland 2007	3.16 %
HICP Ireland 2016	-0.20 %	HICP Ireland 2006	3.04 %
HICP Ireland 2015	0.20 %	HICP Ireland 2005	1.88 %
HICP Ireland 2014	-0.30 %	HICP Ireland 2004	2.38 %
HICP Ireland 2013	0.30 %	HICP Ireland 2003	3.04 %
HICP Ireland 2012	1.74 %	HICP Ireland 2002	4.52 %
HICP Ireland 2011	1.45 %	HICP Ireland 2001	4.33 %
HICP Ireland 2010	-0.21 %	HICP Ireland 2000	4.67 %
HICP Ireland 2009	-2.62 %	HICP Ireland 1999	3.88 %

The year on year change in the HICP is currently very small and has been since the stock market crash in 2008. However, it will be at the discretion of the Minister for Justice whether to adopt an alternative index to the HICP at the five-yearly review.

As noted in the introduction section, in November 2019, a High Court judgment states that linking payments under the PPO to the HICP means such plaintiffs will be undercompensated as future care costs are expected to rise faster than price inflation.

3.2.2 Economy

The current economic situation in Ireland will affect the relative attractiveness of PPOs. A lump sum amount would need to be invested and over time to earn interest. Interest rates in Ireland are currently very low, this would increase the relative attractiveness of PPOs.

3.2.3 Lump sum discount rate

Ireland historically had been using discount rates of 3% in the calculation of lump sums. This changed in November 2015, when the Court of Appeal upheld an Irish High Court action to use a 1% discount rate for future care costs and 1.5% discount rate for other costs in the HSE case, Russell v HSE[9].

Any potential movement in the lump sum discount rate needs to be considered. A downward movement in the discount rate would increase the value of lump sums, and consequently increase the attraction of a lump sum over a PPO.

The current discount rate in Ireland at 1%, is at a much lower level than the historical UK discount rate of 2.5%.

[9] Russell (a minor) V HSE [2015] IECA 236

In the UK, *Actuarial Tables with explanatory notes for use in Personal Injury and Fatal Accident Cases* (known as the Ogden tables[10])are used to calculate lump sums using a discount rate set by the Lord Chancellor which was changed from 2.5% to -0.75% in February 2017. A review was subsequently announced by the UK government, and on 15 July 2019, the Lord Chancellor announced a new Ogden discount rate for England and Wales of -0.25%, effective 5 August 2019. This will lead to complications in assessing the propensity of claims in the UK as the historic propensity before February 2017 will be different to the propensity post February 2017, and the propensity could reasonably be expected to change again following the review in 2019.

Given the lower discount rate applicable in Ireland following the Russell case, the numbers of PPOs here may not be at a similar level to those experienced in the UK prior to 2017.

3.2.4 Variation Orders and Stepped PPOs

Unlike the UK legislation, the Act does not include any provision for variation orders to allow for subsequent renegotiation of the PPO terms if, for example, the injured party's condition were to seriously deteriorate or significantly improve.

Stepped PPOs will be permitted. These are changes to the PPO payment that are specified at the outset. The date on which the changes are to occur are outlined at the settlement as well as the amount of the increase or decrease to apply. An example of where a stepped payment would apply would be to allow for the additional care a person would need as they age. It is unclear if this difference in structure would have a big impact on PPOs propensity.

3.2.5 Insurers' Claims Settlement Process

The approach taken by insurers in settling claims should also be considered in the PPO Propensity assumption. Certain insurance companies may prefer lump sums and may opt to settle the claim quickly at a higher value whereas other companies may prefer to settle as PPOs.

3.2.6 Size of claim amount

The experience in the UK has shown that PPO propensity varies by the size of the loss. The higher the loss amount, the higher the PPO propensity. Actuaries should be aware of this factor when selecting propensity assumptions in Ireland.

3.2.7 Business Mix

PPO propensity can differ for different profiles. The UK experience has shown that there is a higher PPO propensity for younger claimants. If a portfolio has an exposure to a large proportion of young drivers, there would be an expectation of a higher PPO propensity.

[10] https://www.gov.uk/government/publications/ogden-tables-actuarial-compensation-tables-for-injury-and-death

3.2.8 CBI observations

The Central Bank Bodily Injury Thematic Review report (published in November 2015[11]), stated that for the **Day 1** impact on open claims "it would be reasonable to assumed a propensity for a claim to settle as a PPO in the range of 30% to 60%". In the same report the CBI stated that the longer term PPO propensity could be similar to the UK in the range 30% to 50% of motor reserves covering PPO liabilities; however they indicated that the propensity could be significantly higher than the UK propensity rate of 30%-35%, as PPOs would be imposed by judges. Of course, this was based on pre-Ogden changes in the UK and a new view of UK propensity will take time to emerge.

3.2.9 Day 1 Impact

When selecting propensity assumptions in Ireland, actuaries should consider the Day 1 impact propensity as well as the ongoing propensity. There may be large claims that were not settled in anticipation of the PPOs legislation. There could potentially be a large influx of PPOs initially, due to this.

If using a benchmark approach, using industry experience from the UK or elsewhere, the appropriateness of the benchmark needs to be considered.

[11] https://www.centralbank.ie/docs/default-source/news-and-media/speeches/bodily-injury-thematic-review.pdf

4. Mortality

4.1 Introduction

Currently in Ireland, the uncertain future life expectancy of a catastrophically injured claimant is decided by the court, based on medical evidence presented to it, when setting the scale of a lump sum award.

This assessment is typically based on the evidence of independent medical experts who opine on the future life expectancy of the injured party based on the extent of the injuries and allowing for advancements in medical care and assistive technology among other factors. These opinions can then be used to estimate the present value of the future cost of care or loss of earnings of the injured party which is used by a legal team in support of their client's claim or in the defence against a claim.

It is common for there to be differing opinions as to the future life expectancy of catastrophically injured claimants among medical experts which in turn produces a range of potential lump sum awards to be evaluated by a judge.

However, once the award has been issued by the courts, the uncertainty for the (re)insurer around the life expectancy of the claimant is removed as it has been encapsulated in the lump sum award.

The introduction of PPOs will create an additional source of uncertainty to the valuation of Technical Provisions because

- PPOs will remain on the (re)insurer's balance sheet for the full duration of a claimant's lifetime, whereas previously the liability could have been paid out at the point of settlement;
- The mortality assumptions for evaluating PPO liabilities will need to be considered by the reserving actuary potentially without reference to external medical expertise.

The emergence of PPOs may also create challenges for (re)insurers' internal models with the requirement to produce liability ranges driven by, amongst other things, variable mortality assumptions.

Actuaries in the fields of Life Assurance and Pensions have worked for many decades on the valuation of contingencies dependent on mortality/longevity. However, this is a comparatively new area for most non-life insurance actuaries who will have to become increasingly familiar with the valuation techniques for annuity-type settlements and also in the use of making expert judgements around future life expectancy of seriously injured claimants.

In the future, as the amount of data collected on the mortality experience of seriously injured Irish claimants expands, it may be possible to construct reliable impaired mortality tables for different categories of injuries which can be deployed across a range of actuarial techniques. However, such a developed level of understanding is currently a considerable way off given the number of events necessary to enable a statistically significant set of data to be developed. There is a significant risk that there will never be sufficient data on the mortality of Irish severely impaired lives to provide credible experience.

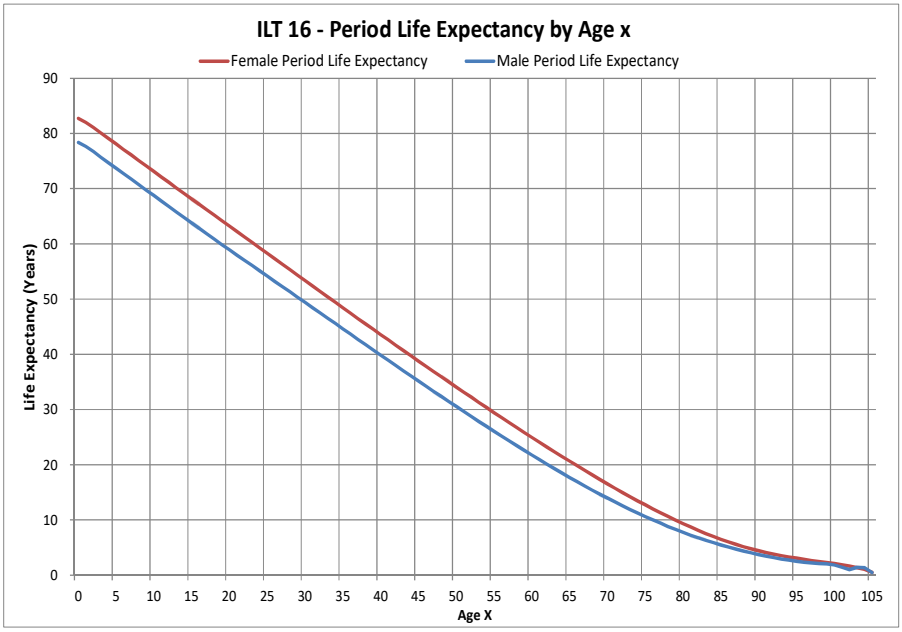
The purpose of this section is to focus on the area of PPO mortality with a number of practical aims:

- Seek to familiarise Irish non-life actuaries with the relevant trends in Irish population mortality tables – these are an important baseline against which expert judgements are overlaid.
- Outline some useful impaired mortality adjustment techniques to apply to existing life tables.
- Reference the latest findings from UK/international research about the degree of mortality impairment of seriously injured claimants (including spinal and brain injuries).

4.2 Population Life Expectancy (Unimpaired) – Irish Life Table 16

The natural starting point in considering mortality assumptions is the experience of the population as a whole. Irish Life Table 16 (ILT16) is the latest life table available from the CSO[12] as part of the ILT series which dates back to the 1920s. The ILT16 Life Table has separate tables for both male and female lives and is intended to be representative of the mortality experience in Ireland in 2011 by using the 2010, 2011 and 2012 estimates and census of population (usually resident) and deaths registered in those three years. The ILT16 life table should reflect normal mortality conditions at about the time of the 2011 Census. ILT16 contains l_x, q_x, p_x and life expectancy (e_x) values for ages in the range [0,105]. ILT16 does not allow for future mortality improvement, instead containing period life expectancies.

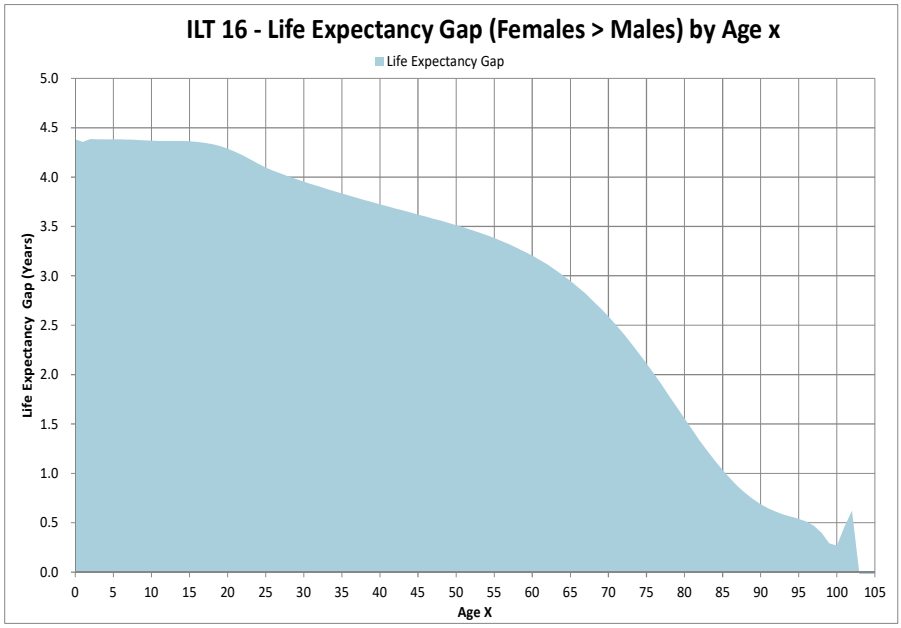
Figure 10 – Period Life Expectancy by Age



From ILT16, the Life expectancy of an Irish new-born is 78.4 years (Male) and 82.8 years (Female) with the life expectancy reducing with age.

[12] Irish Life Table (ILT 16) & Background Notes: Source: Central Statistics Office. http://www.cso.ie/en/releasesandpublications/er/ilt/irishlifetablesno162010-2012/

Figure 11 – Life expectancy gender gap

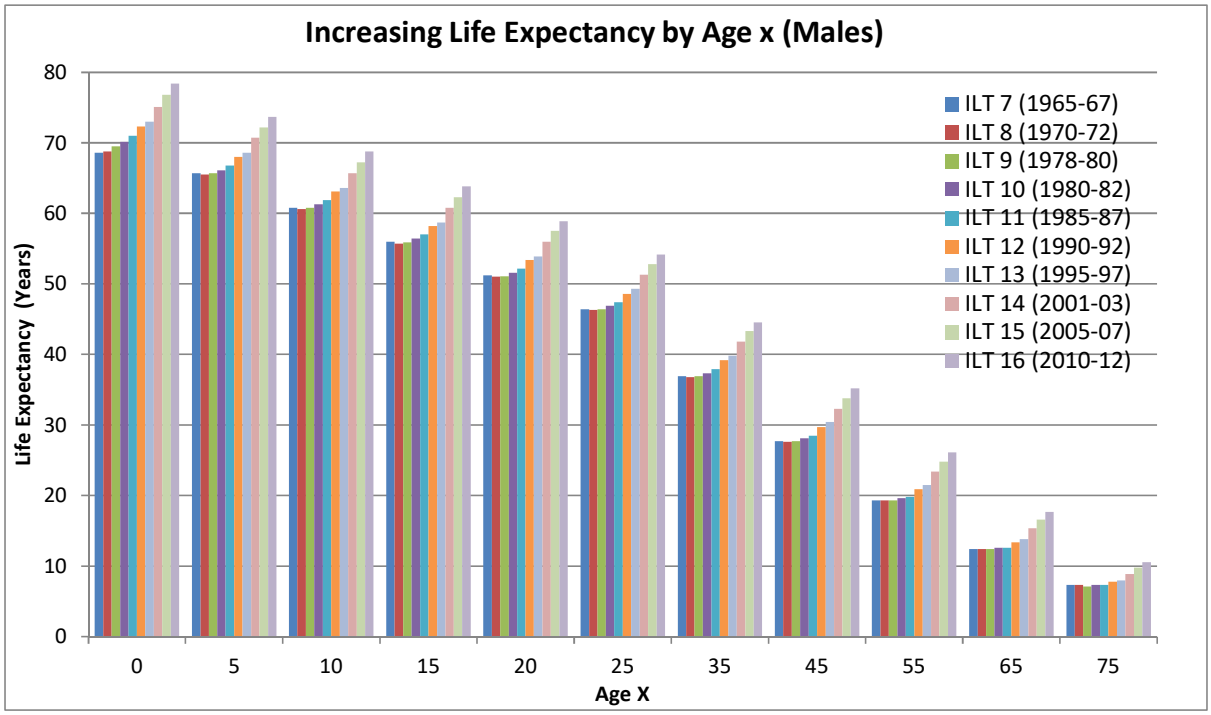


ILT16 shows clearly that Irish Females have longer life expectancy than Males at almost all ages but the life expectancy gap reduces with age.

4.3 Increases in Unimpaired Life Expectancy – Ireland

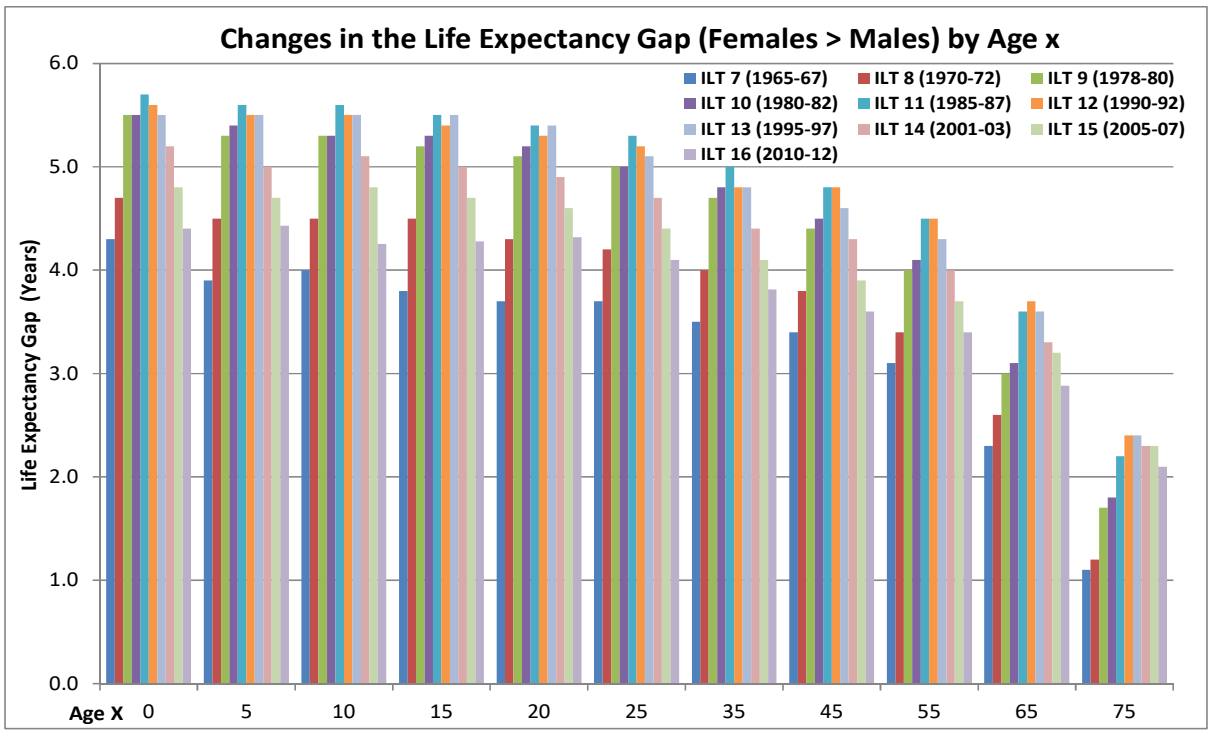
There is evidence of increasing life expectancy across all ages for both males and females - reflecting improvements in Irish mortality over the period in line with Ireland's economic development. This trend indicates the need to consider an allowance for mortality improvement when projecting future mortality rates.

Figure 12 – Changes in Life Expectancy by age



The Life expectancy gap between males and females increased between 1966 and 1986 but then started to reduce across all ages in the most recent versions of the ILTs.

Figure 13 – Changes in Life Expectancy Gap



The tables above consider the improvements in longevity for the population as a whole. As there is little information relating to the mortality of seriously injured individuals, we have no idea whether the longevity of these individuals is improving at the same rate as that for the general population, or at a faster or slower rate. Nevertheless, because of significant improvements in the standards of medical care, from accident site management through emergency room and intensive care to post event stabilisation and care regime, it could reasonably be assumed that the upside in longevity is potentially bigger for seriously injured persons than for the general population.

4.4 Population Life Expectancy (Unimpaired) – Comparison to UK Experience

ILT16 indicates that both Irish life expectancy levels are only marginally lower than the UK across all ages and both genders. Other international comparisons to ILT 16 are available on the CSO website.

Figure 14 – Ireland vs UK Life Expectancy Males

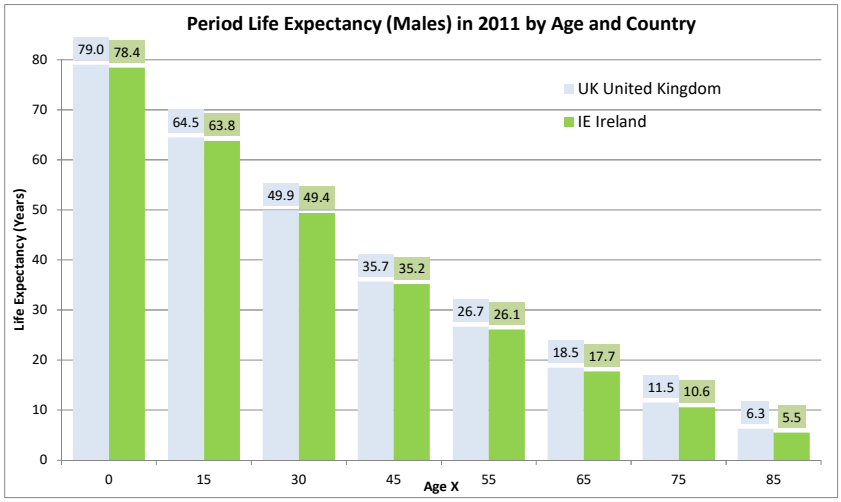
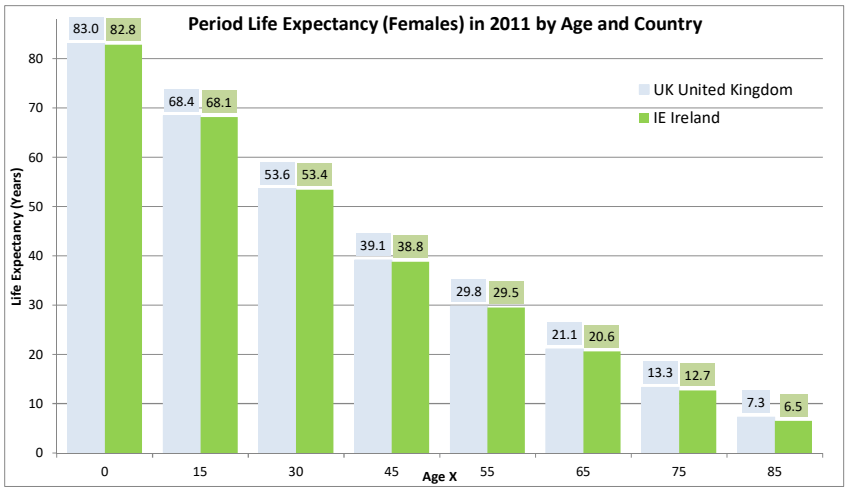


Figure 15 – Ireland vs UK Life Expectancy Females



There are a number of important mortality trends evident in the ILT series of life tables which should be considered when considering the development of PPO-specific mortality adjustments:

- Sufficient differences between male and female mortality exists to justify using separate life tables rather than a more simplified unisex approach when evaluating PPO mortality. Nevertheless, the gap between male and female mortality/life expectancy is converging.
- It is appropriate to make allowance for future mortality/life expectancy improvements as otherwise one may underestimate life expectancy in mortality projections.
- Irish life expectancy is just marginally lower than the UK across all ages and both genders. We also note that Irish life expectancy falls "in the middle of the pack" when compared to other European peers. Therefore, extrapolation from International/UK experience for seriously injured claimants may not be unreasonable for Ireland.

4.5 Impaired Mortality

There is an increasing body of evidence from international research that shows that the level of mortality experience for seriously injured claimants is considerably worse than the standard

population across a variety of jurisdictions (i.e. higher q_x values and shorter life expectancy). Some studies for reference include:

- Strauss et al 2006
- Middleton 2012
- DeVivo MJ, Stover SL. Long-term survival and causes of death. In: Stover SL, DeLisa JA, Whiteneck GG, editors. Spinal cord injury: clinical outcomes from the Model Systems. Gaithersburg (MD): Aspen, 1995, pp 289-316.
- DeVivo MJ, Ivie CS. Life expectancy of ventilator-dependent persons with spinal cord injuries. Chest 1995;108:226-232.
- DeVivo MJ, Krause JS, Lammertse DP. Recent trends in mortality and causes of death among persons with spinal cord injury. Arch Phys Med Rehabil 1999;80:1411-1419.
- Strauss D, DeVivo MJ, Shavelle R. Long-term mortality risk after spinal cord injury. J Insur Med 2000;32:11-16.
- Strauss D, Shavelle R, DeVivo MJ, Day S. An analytic method for longitudinal mortality studies. J Insur Med 2000;32:217-225.
- DeVivo MJ. Estimating life expectancy for use in determining lifetime costs of care. Top Spinal Cord Inj Rehabil 2002;7(4):49-58.
- Krause JS, DeVivo MJ, Jackson AB. Health status, community integration, and economic risk factors for mortality after spinal cord injury. Arch Phys Med Rehabil 2004;85:1764-1773.
- Strauss DJ, DeVivo MJ, Paculdo DR, Shavelle RM. Trends in life expectancy after spinal cord injury. Arch Phys Med Rehabil 2006;87:1079-1085.
- Shavelle RM, DeVivo MJ, Strauss DJ, Paculdo DR, Lammertse DP, Day SM. Long-term survival of persons ventilator dependent after spinal cord injury. J Spinal Cord Med 2006;29:511-519.
- Shavelle RM, DeVivo MJ, Paculdo DR, Vogel LC, Strauss DJ. Long-term survival after childhood spinal cord injury. J Spinal Cord Med 2007;30(Suppl):S48-S54.
- Strauss D, DeVivo M, Shavelle R, Brooks J, Paculdo D. Economic factor and longevity in spinal cord injury: a reappraisal. Arch Phys Med Rehabil 2008;89:572-574.
- Krause JS, Saunders LL, DeVivo MJ. Income and risk of mortality after spinal cord injury. Arch Phys Med Rehabil 2011;92:339-345.
- Cao Y, Krause JS, DiPiro N. Risk factors for mortality after spinal cord injury in the USA. Spinal Cord 2013;51:4418.

This suggests the need to apply an adjustment to standard Irish population mortality when deriving assumptions in respect of the mortality of any seriously injured claimants such as those likely to be in receipt of PPO awards in Ireland in the future.

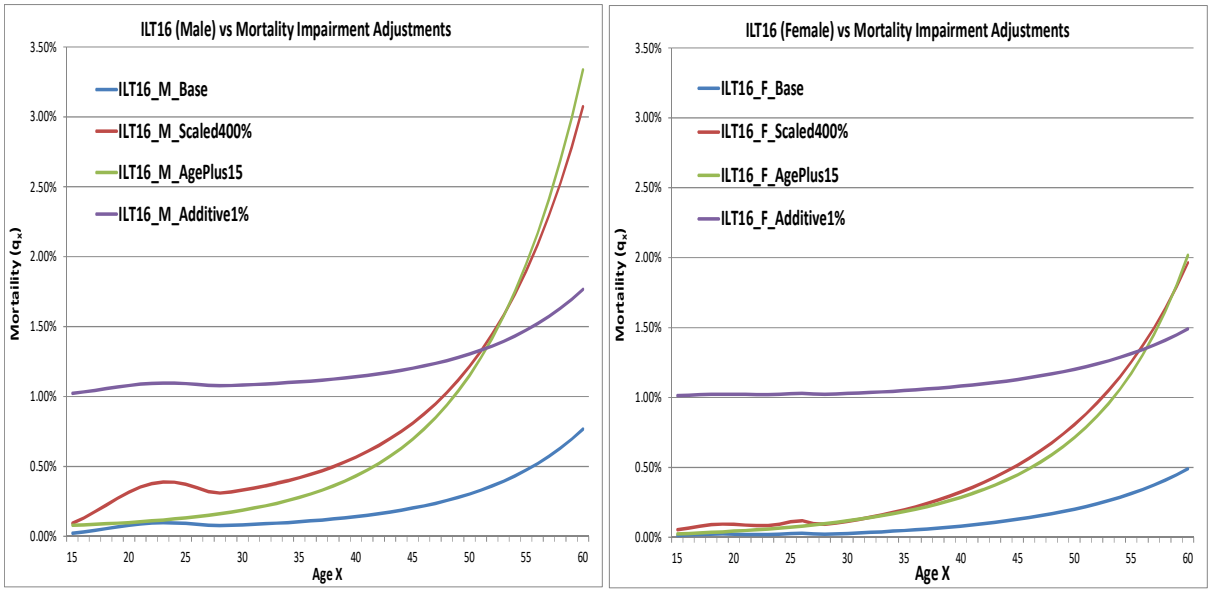
4.5.1 Impairment Adjustment Methods to Standard Population Mortality

In the absence of any suitable impaired mortality tables, Irish non-life actuaries involved in determining the valuation, capital and pricing impacts of PPOs may need to consider different approaches in the derivation of PPO mortality assumptions such as those given in the non-exhaustive list below:

- Additive loadings to standard population mortality rates– by applying loadings that are either constant or those that vary with age and/or time since injury (i.e. $q_x + 0.01$).
- Multiplicative scaling of standard population mortality rates – by applying constant multipliers or multipliers that vary with age and/or time since injury (i.e. $q_x * 400\%$).
- Additive Age loadings (Aging loading) – whereby the mortality rate used is from the standard population life table but for an individual who is a specified number of years older, thus reflecting the higher mortality assumptions for older ages in the standard life table (i.e. q_{x+15}).
- Adopt the future life expectancy estimates provided by expert medical advisors (where available) and then use annuity-certain techniques based on this information
- Other approaches involving some combination of above – e.g. determining suitable constant mortality multipliers which produce an impaired life expectancy consistent with opinion of expert medical advisors.

The following graphs show a comparison between ILT16 Base mortality q_x values and some of the mortality impairment adjustments outlined above over the age range of [15,60].

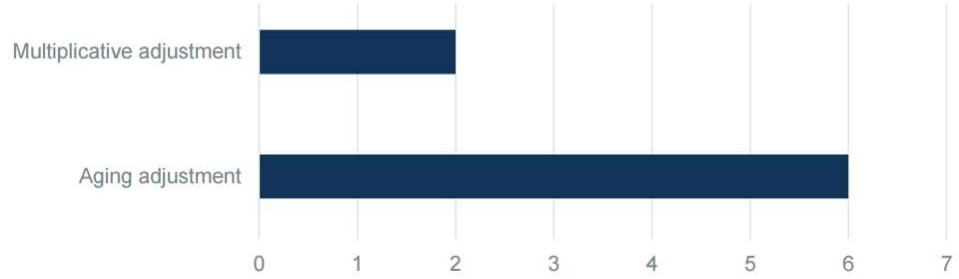
Figures 16 & 17 – Impact of Mortality Impairment Adjustments



A survey[13] presented at GIRO 2014 highlighted that UK (re)insurance companies typically use two main types of mortality adjustment. The results showed that the use of an additive age adjustment was more common than a multiplicative adjustment in the UK when reserving for settled PPOs.

[13] https://www.actuaries.org.uk/system/files/documents/pdf/2014-giro-ppo-workshop-a8-2014-09-24_0.pdf

Figure 18. - 2015 IFOA Working Party Qualitative survey results



There are other potential mortality impairment adjustment and graduation techniques available with varying degrees of complexity. However, the decision as to which is the most appropriate adjustment method will depend on a number of factors, such as:

- the quality and quantity of available life table data;
- availability of international mortality multipliers/adjustments and their comparability to an unknown cohort of PPO claimants;
- the details of the particular claimant (age, gender and other medical factors);
- the known extent/severity of claimant injuries (Brain/Spinal) and level of care required;
- availability of expert medical life expectancy opinions; and
- the purpose of the analysis (i.e. valuation purposes, capital modelling or pricing).

4.5.2 Impaired Mortality - Findings from International Research

While there is as yet no definitive Irish-specific research that outlines the appropriate shape of the life table across all ages and for a wide range of injury types suitable for use in PPO mortality assumptions, there is a growing body of published UK and international research, which while not conclusive, can be used by Irish actuaries to inform their mortality impairment assumptions.

Some of the findings are outlined below:

- Even for the UK and International surveys from larger countries than Ireland, data on serious injuries was sparse and all of the results come with a significant caveat.
- UK experience suggests possible constant mortality multipliers of 300% for Males and 400% for Females[14] might be suitable across a portfolio of potential PPO claimants.
- Spinal injuries have higher mortality than brain injuries – therefore different mortality multipliers could be justified for different injuries, potentially lower for brain and higher for spinal. (In the UK brain injuries were more common than spinal – representing some 70% of PPO cases.)

[14] Constructing impaired life mortality tables and severe injury classification, GIRO 2013 https://www.actuaries.org.uk/documents/e10-ppo-working-party.

- The severity of injury is significant with higher tetraplegia cases having much higher mortality rates with this feature visible across a variety of international jurisdictions.
- The mortality impairment adjustment (i.e. multiplier) may revert back towards standard population mortality at older ages with older claimants more likely to die from other causes.
- Improvement in immediate survival rates in the first two years since catastrophic injury but no evidence of additional improvement at longer duration since time of injury.
- Unsurprisingly, more males are catastrophically injured compared to females due to the accident hump – when applying multiplicative scaling this will scale the accident hump feature at lower male ages which may not be relevant for catastrophically injured lives.

There is a body of work performed by a research and educational group, the "Life Expectancy Project" in the US including Professor David Strauss, Dr Robert Shavelle and Dr Jordan Brooks who have investigated life expectancy for various cohorts including spinal cord injury and traumatic brain Injury.[15]

4.6 Summary

This section outlines some of the considerations that should be made when assessing mortality assumptions in actuarial bases for assessing PPOs. The risks involved are:

- There is little credible data available from which to assess the likely mortality of seriously injured claimants. Any assumptions made will be subject to a wide range of uncertainty.
- It is not unreasonable to assume that PPO claimants will experience higher mortality rates than the general population. However, there is a risk that the improvement in claimant mortality will be stronger than that in the general population, driven on by better healthcare and improved medical treatments.
- As PPO claimants remain on a Company's balance sheet for the full duration of their lifespans, there is a much longer period of time for which the liabilities could be impacted by adverse circumstances (longevity, but also inflation and reinsurance credit risk).

[15] http://www.lifeexpectancy.org/

5 Capital

The topics covered in the capital section comprise:

- Standard Formula
- Internal Model
- Diversification
- ORSA
- QRT's
- Sensitivity

5.1 Standard Formula

For all liabilities categorised as settled PPOs, the Technical Provisions for these cases should be separately identified and classified as a Life line of business ("Annuities stemming from non-life insurance contracts and relating to insurance obligation other than health insurance obligations", C0090 or "Accepted reinsurance" C0100). See section 6 below where a fuller description is included of where PPOs sit within QRTs.

The reserves for unsettled or future PPO settlements remain within the original lines of business (see section 6) and calculated in the same way within the Standard Formula (SF) SCR as reserves for non-PPO claims. Although firms are not required to hold capital for claims which *might* become PPOs, it may be the case that a firm's claims department monitors the progress of all such claims approaching settlement and how many have a potential to settle as PPOs. In this instance, a scenario to consider is making an allowance for the claims seen as having a moderate to significant probability of settling as a PPO. One option would be to ascribe a probability of individual claims settling as a PPO versus a lump sum and derive capital requirements based on a probability-weighted approach. The Risk Margin calculation will allow for such PPOs.

5.1.1 Settled PPOs

The reserve for settled PPOs is stressed through the Life module of the SF of which there are two relevant stresses: Longevity risk and Expense risk (and of course, not specific to PPOs, market risk which applies to all assets & liabilities). The SCR charges for these risks are intended to reflect the uncertainty in the mortality and expense parameters respectively as a result of changes in the level, trend and volatility of mortality rates and the expenses incurred respectively.

For Longevity risk the reserve calculation for those settled PPOs needs to be re-performed using annual mortality factors that are 80% of those used in the BEL calculation. The difference in the cashflow profile between this scenario and the BEL scenario is discounted using the EIOPA yield curve. Depending on the reinsurance structure this may need to be performed separately on the net as well as the gross reserves.

For the expense stress the expenses attributable to PPO claims need to be re-projected using an inflation rate 1% above the assumption used in the BEL. If the expenses are assumed to be a percentage of the Technical Provisions then this may simply be a case of deflating and re-inflating the cashflow profile. In other cases where an explicit inflation rate has been used the expense projection may need to be re-performed. A consideration in the calculation is that the actual

expenses of PPO claims may be substantially different from those for other claims. There may be lower costs for each annual payment yet higher costs for the reserving and analysis of claims. The resulting change of the profile is again discounted using the EIOPA yield curve.

5.1.2 Future PPOs

The TPs for future PPOs reside, and are stressed, in the original non-life lines of business. In the calculation of the Risk Margin the projection of the future SCR requirements should allow for the movement of claims to a life line of business as they settle.

5.1.3 Understand the diversification impact

The overall impact on the SCR of the introduction of PPOs may be to reduce the SCR if the diversification has a more significant effect when the reserves are moved between lines of business than the increase in reserves has on the SCR factors. The impact on the overall balance sheet is likely to be negative due not only to an increased BEL from PPO claims but because the Risk Margin should be significantly higher as the SCR for PPO claims has a substantially longer duration to run off, hence resulting in a significantly higher Risk Margin.

At the start there will be very few PPOs on a balance sheet and there may be a significant diversification impact between the life SCR and non-life SCR initially. However in 10-20 years' time, with many more PPOs on the balance sheet, the diversification benefit may reduce over time. Much of this will depend on the propensity for Irish Courts to award PPOs (or for claimants to seek PPOs).

For the purposes of setting capital requirements, the modelling result should be based on a net of reinsurance position but will also require the position to be calculated gross of reinsurance for reporting. A further consideration here is reinsurer default – particularly given that reinsurance recoveries may be expected over a long future time horizon. The modelling of future Excess of loss ("XoL") reinsurance recoveries could become quite intricate particularly where other complications exist (indexation and/or capitalisation clauses included in reinsurance treaties); further details are given in Section 6.

In terms of diversification, the same concept applies whether using the SF or internal model. However, the position of diversification and how it applies is quite clear for SF. For internal models, it may be possible to argue that further diversification could be claimed within the portfolio of PPO claimants – claimants with different types of injuries, claimants with longer versus shorter life expectancies, etc. For internal models, any claim for additional diversification would require reasonable volumes of data (e.g. numbers of claimants) and would be subject to agreement with regulators.

5.2 Internal model

An internal capital model should capture the range of possible outcomes for PPO liabilities taking into account the risks attaching to the PPO liabilities.

The risks that require assessment are the same as those to be assessed for valuation purposes with a potential addition of risks relating to any reinsurance protection in place. These are as follows:

5.2.1 Longevity risk, including both parameter and process risk

Longevity risk is perhaps the most significant element of uncertainty impacting the range of outcomes for PPOs within an internal model. To give a simple example of why this might be the case, it is instructive to consider the example of a PPO of €100,000 payable to a severely injured individual aged 20. Medical advice might suggest that this individual has a relatively short expectation of life due to the severity of his injuries and the expected payout would reflect this at, say, €500,000 (ignoring the impact of indexation).

In a modelling situation, the model would likely reflect the possibility that the individual could die within the next year, with no further payout, at one extreme. At the other extreme, the model might reflect that medical supervision and advances, and perhaps good fortune, could maintain the individual so that a full normal lifespan is achieved, with a potential payout which could be of the order of €6m.

When the aggregating impact of many PPOs is implemented in the model, the potential for some very extreme pay-out possibilities can easily be imagined.

The challenge for the actuary is to develop assumptions in respect of future longevity for individuals where the data from which to calculate these assumptions is limited. There are studies of the mortality of seriously impaired lives through affinity groups in several overseas jurisdictions which could assist in framing basic assumptions. It is unlikely that there will be sufficient data in any study, however, as the range of circumstances impacting PPO claimants potentially makes each case unique in itself, thus making it impossible to collate statistically significant samples.

A high degree of judgement will therefore be necessary in setting mortality assumptions.

5.2.2 Propensity risk

PPO frequency is a combination of large loss frequency (which won't change because of the introduction of PPO legislation) and the likelihood of large claims settling as PPOs.

Some items to consider when modelling frequency of future PPOs:

For earned business, the serious claim count in largely known, and in many instances the injury prospects of each case are known (this won't apply to very recent earned business where the uncertainty is clearly greater). What is variable, however, is the number of these claims which will settle as PPOs and conversely those which will settle as traditional lump sums. These numbers are negatively correlated in the sense that if more claims settle as PPOs, fewer settle as lump sums.

In unearned business over the next year, the serious claim frequency is a variable, potentially volatile, number. Research into the company's history could assist in calibrating this variable. Again, the proportion of serious claims which might settle as PPOs is uncertain with the same considerations as for earned business above.

For future PPOs uncertainty is increased because, as well as not knowing how many PPOs might occur, the profile of the claimants is totally unknown and thus needs to be modelled. By using a blend of population statistics and company data, it is possible to build a model of claimant profile encompassing age, gender, type and seriousness of injury and so forth.

5.2.3 Inflation Risk

Given the time horizon and complexity of cases which are awarded as PPOs, inflation is a major consideration. PPOs are impacted by a number of inflationary components: Price, Earnings, Medical & Court Awards. The risk to the insurer is that the assumed development of the awarded index is not as expected or that the index used is revised to one which may be expected to lead to greater inflationary increases in the PPO payments. The Act provides that the index used may be changed in future and the November 2019 High Court judgment which stated that the use of HICP undercompensates claimants may lead to a move to an earnings-related index. The ASHE 6115 is the most popular, but not exclusively, used index for PPOs currently in the UK; it's linked to the wages of home & care assistants. Given the longevity of PPOs it is difficult to find matching assets for liabilities linked to the ASHE 6115. As a result, the level of future inflation can be difficult to project and matching is also difficult.

While the development of a particular index itself may be difficult to predict there are also other potential inflation risks. Insurers need to consider the risk of new indices being introduced, the inflation of the base awards themselves or regulatory changes which could impact what costs a PPO is used to cover. Stress and Scenario tests can help in the assessment of these potential risks and can aid in presenting the insurer's potential exposure.

Given the uncertainty with regards to inflation, internal models should be seen as a useful tool to help describe the range and variability of potential outcomes. Models can be used to describe the dynamic relationship between the assumed inflationary measure/index and other economic variables. Ensuring consistency between the behaviour of other inflationary measures is an important component of the risk assessment.

5.2.4 Interest rate and other market risks

Interest rate risk is an obvious area of focus for PPOs given the longevity of claim payments. Small changes to the yield curves used to value the payments can have a very large impact on the resulting outcome. As mentioned in the previous section it's difficult to find matching assets for these liabilities due to the uncertainty in the timing, level and length of the required payments.

Again, consistency between the model assumptions/variables is important from an interest rate risk perspective. There's a need to ensure that the assumptions used as the basis for PPO-related models are consistent with other components of the model; variables need to exhibit logical behaviour and with sensible real-world relationships. Scenario and Stress testing can also provide valuable insight to stakeholders by demonstrating how small changes can translate to large impacts.

The characteristics of PPOs may be considerably different from the liabilities an insurer is currently exposed too, particularly for General Insurers. As a result, the investment strategy may require some changes to allow for such. This may increase existing or introduce new market risks for the insurer, but also may provide some additional diversification within the portfolio. Scenarios and potential changes of the investment mix can be tested in line with varying assumptions (Propensity to award, Market Scenarios, Longevity/Mortality).

5.2.5 Counterparty default risk of a reinsurer (if applicable)

Even the largest insurers tend to purchase reinsurance cover on their motor account while smaller insurers are likely to purchase cover attaching at a low attachment point. In order to counteract the impact of revaluation clauses, many insurers are buying down cover to ensure that large claims are immediately covered by their programmes.

Notwithstanding, because of the long potential pay-out profile of PPOs and the consequence that reinsurers remain as counterparties for many years, there is a longer period of time for "something to go wrong". Indeed, the pay-out period is so long as to extend beyond the window within which it is possible to obtain a projected credit rating for the reinsurers in question, and thus increasing the possibility that at some stage a significant charge will need to be taken. The capital modelling aspects of this are thus complicated.

Depending on the jurisdiction, there may also be the need to consider "Revision Risk" where the claimant can seek an increase in payment related to a deterioration in condition and /or changes in circumstances ("situational" changes). These typically would not apply to PPOs awarded in Ireland or the UK.

5.2.6 Correlation

Consideration will be required as to how the PPOs will be aggregated with the other risks of the firm, with PPOs potentially providing diversification benefits to insurers given the lack of any obvious linkages or correlations between Longevity Risk and traditional non-life risks but other correlations may be stronger (e.g. to inflation).

In the case of an internal model, it will be for the firm to calibrate the one-year risk of a change in longevity for their existing PPO claimants based on the characteristics of the underlying claimants. Alongside that, allowance risk charge for potential PPOs over the coming twelve months will also need to be included within Premium Provisions. Clearly, both of these risk charges will be company specific. This calibration process will be eased by having sufficient volumes of in-house data to conduct this exercise - in the absence of such in-house data, this calibration and model build could be quite challenging.

Other parameters where a risk charge would also need to be modelled and included are inflation and even a shock to this inflation assumption.

5.2.7 Validation

Given the potential lack of data, there may be a substantial element of judgement associated with the calibration of the model which should lead to significant focus on validation and challenge. Potential validation techniques might include:

- Stress and scenario testing, sensitivity testing
- Back testing such as profit and loss attribution and
- Stability testing.

This would also be a helpful list of techniques to include within an ORSA to take into account the impact of PPOs on the firm. Where it can be shown to be relevant, data derived from other sources or pools of data may be useful as a comparator. Examples may include studies of mortality of motor injury victims from other jurisdictions.

5.2.8 Governance

From an internal model governance perspective, adjusting the internal model to allow for PPOs is likely to represent a major/minor model change with regulatory approval required where the model is used for calculating Solvency Capital.

5.2.9 Sensitivity

As with any calibrations where data is incomplete, some level of sensitivity testing should be performed to test which assumption(s) is/are the most sensitive and to assess the impact of individual assumption changes on overall capital needs.

5.3 Impact of Reinsurance on capital

As with all reinsurance, it is designed to provide protection and works to stabilise P&L progression over time. In the case of large Motor TPL / Employer's Liability cover which typically are the source of PPO claims, the type of cover purchased is Excess-of-Loss ("XoL") cover. For example, reinsurance could be purchased which provides cover for any individual bodily injury claim exceeding, say, €3m. This structure works well for lump-sum type settlements where the lump sum award can easily be compared to the reinsurance attachment point (€3m in example above).
For PPOs, the position may be complicated by the possible existence of capitalisation clauses. However, the Act provides that unless a capitalisation applied to a past year where an accident occurred causing a catastrophic injury, then reinsurers will be obliged to provide complete cover.

A capitalisation clause allows reinsurers to commute the remaining annuity liabilities for an individual PPO claim by making an "all-in" payment to the insurer for the reinsurers' share of the expected future lifetime of the claimant. This clause is typically formulaic and can be invoked a set number of years after the Court has awarded a PPO to the claimant.

The capitalisation payment is based on a number of parameters /outcomes including longevity (expected lifetime), investment returns, inflation, etc. The result is that, following capitalisation, the insurer is left with the residual risks associated with all of the above items, notwithstanding that there is an additional asset available (the capitalisation proceeds).

It should be stated that these are more favoured by some reinsurers than others and are not universal. As noted above, the Act provides that unless a capitalisation applied to a past year where an accident occurred causing a catastrophic injury, then reinsurers will be obliged to provide complete cover. This is often referred to as "follow the fortunes" (of the direct writer).

For capitalisation clauses going forward, this is very much driven by reinsurer preference, the risk appetite of the direct writer, the cost differential between capitalised and non-capitalised XoL cover, etc. In summary, this will be determined by negotiation at reinsurance renewal each year.

From an insurer's capital perspective, the impact of capitalisation clauses can be built into the capital model using the agreed formula. This is potentially complex if the capitalisation formula is not standard or doesn't apply to all cases (for instance, applying in some treaty years and not in others).

For a claim that has become a PPO, there is typically the unilateral right for the reinsurer to capitalise expected future payments and "walk away". This means that the protection provided to the direct writer is not complete - unlike the corresponding position for a large claim which settles via lump sum. This means insurers might need to provision for and set SCR on the basis of the Worst Case Scenario where the reinsurer fully capitalises remaining liabilities. Internal models would use a more dynamic modelling approach.

This leaves insurers in the position of keeping the liabilities on their books or seeking to "buy it out" with a specialist provider /reinsurer. Typically, this might be expected to result in a higher cost.

Keeping the annuity on insurer's Balance Sheet brings significant risk /volatility particularly where a small number of PPOs exist and individual claimants can live considerably longer /shorter than the expected future lifetime (unlike a cohort of PPO claimants where the law of large numbers would come into play to a greater extent). Other complications relate to investments, credit risk and investment-matching – particularly for non-life insurers not experienced in asset/liability for annuity liabilities (i.e. liabilities of such a long duration).

This is something that could usefully be explored as part of an ORSA stress. Although not directly linked to capital (unless a capital add-on is imposed on the SCR), this will nonetheless inform discussions around risk appetite – particularly around risk segments that can lead to PPO liabilities.

In summary, the capital implications of PPOs in SCR terms may appear quite benign – particularly due to the significant diversification that can be claimed against other risks that non-life insurers are exposed to. The position for the SF approach to SCR is that much of this potential volatility is not recognised. Clearly, internal models have more scope to capture this volatility. However, the "real world" position is complicated by the significant risks faced by insurers holding a portfolio of PPOs and /or exposed to new PPO claims. This stems from risks including:

- Longevity risk
- Inflation risk
- Investment /reinvestment risk
- Credit risk

Other risks also exist where reinsurers have unilateral capitalisation clauses in reinsurance cover for years from which PPO claims emerged.
In terms of relative solvency position (SCR coverage ratio), the additional Technical Provisions that need to be held (both claims and in particular Risk Margin) mean that solvency coverage ratios are likely to be lower where PPO's exist.

5.4 ORSA

The aim of ORSA is to identify, assess, monitor and manage the short and long term risks an insurer is exposed to, ensuring it has the sufficient funds set aside to deal with these risks.

As described above there are a large number of risks and uncertainties surrounding PPOs. The ORSA process can be used to evaluate and manage these risks but also provides a means of presenting the Board with the uncertainty currently surrounding PPOs. The report can help highlight the sensitivity of the Balance Sheet to these risks ensuring awareness and understanding of the issues at hand.

Scenario and Stress testing can help present how impactful the key underlying assumptions are to the insurer's exposure. This can help focus the insurer's attention to risks which it feels it's most likely exposed too, identifying areas where it can or will need to mitigate/transfer risks. A number of proposed scenarios which might be considered in the UK context are presented in the Helpful Handbook[16] and are discussed further below.

16 https://www.actuaries.org.uk/system/files/field/document/IFoA%20Periodical%20Payment%20Orde%20Working%20Party%20Information%20Paper-2_0.pdf

5.4.1 Propensity

- Legislative change or legal precedent could lead to the mandatory use of a PPO settlement method in certain circumstances (see for example (Prudential Regulation Authority, 2015b, pp. 16-17)); and Information for Actuaries Valuing Periodical Payment Orders Capital Modelling IFoA Working Party Page 69 of 89
- Changes in the discount rate used with the Ogden tables, which may impact both propensity alongside the reserves required for lump-sum settlements.

Generally, the expectation is that a reduction in the discount rate would decrease propensity because this would increase the amounts awarded in lump-sum settlements. The second example highlights that it is likely that any changes to propensity need to be considered in conjunction with the impact on large bodily injury claims experience more generally because a claim that settles by way of a PPO cannot also settle as a traditional lumpsum settlement.

5.4.2 Inflation

Consideration of scenarios that might impact ASHE and other related inflation measures will be particularly important, and could include:

- The impact of a step change in the initial levels of annual awards, which would have an impact on the cost of both future PPOs and future lump sum awards;
- A period of significant price inflation, for example that experienced in the UK in the 1970s; and
- A period of significant real wage growth, either for the economy in general or specifically for the care workers who underpin the ASHE 6115 indices used for most PPOs.

It is likely to be the case that any changes to inflation expectations needs to be considered in conjunction with the potential impact of the given scenario on the yield curve used to discount liabilities. Additionally, the impact of any changes on the valuation of inflation-linked assets should be considered. Given the sensitivity of PPO valuations to small changes in economic assumptions, it is important to articulate to the firm's administrative, management or supervisory body the impact that even a small difference in economic assumptions could have on the valuation.

5.4.3 Longevity

- A one-off medical advance that leads to a sudden improvement in future life expectancy for a significant subset of PPO claimants (both existing and future). For example, the potential for significant improvements in the options available for treating spinal injuries. This may also impact the size of future awards, and the propensity for claims to settle by way of a PPO.
- More generic medical advances that lead to an improvement in future life expectancy for the whole population, including PPO claimants (for example the development of a cure for certain types of dementia).
- The impact of adopting different technical methods to the allowance for impairments to mortality for seriously injured claimants (see section 5.5).
- The impact of any systemic bias in the mortality estimates for PPO claimants (either in the choice of base mortality table or estimates of mortality impairment).

Given the limited availability of market data from which to derive suitable estimates for the mortality rates for PPO claimants, sensitivity testing will be particularly important in quantifying parameter error.

5.4.4 Interest rates

Examples of scenarios that could be considered in the context of the yield curve used to discount liabilities are:

- The impact of wider economic conditions on yield curves, for example, a recession in the Eurozone or the US, leading to a 'safe-haven' status for Sterling assets;
- The impact of changes in the insurer's regulatory basis for setting discount rate assumptions (for example gaining or losing approval to use a Volatility Adjustment); and
- The impact of a change in the insurer's investment strategy on its future investment return, in conjunction with the impact on exposure to other risks.

Firms will ideally hold capital within their 1 in 200 scenario to allow for a potential PPO shock. Consideration needs to be given in relation to any existing PPOs and their potential shocks as well as any PPOs which are yet to be reported. The propensity, longevity and economic environment (interest and inflation) of PPO awards will be key drivers in determining the adequacy of the capital allocation. The scenarios constructed should not assess the impact to PPOs on a standalone basis but also should incorporate any changes to related components where relationships exist; an example would be the appetite for PPOs in relation to a shift in interest rates. Insurers will need to consider their risk appetite and how well equipped they are to assess these potential risks given their current level of expertise in comparison to the potential costs.

Given the immaturity of the PPO environment, it is unlikely that firms have yet developed robust models to assess such. The ORSA process can help identify weak areas of the model or where there are significant risks due to parameter error. It can be helpful to identify areas of particular vulnerability which need further attention. This naturally can aid in the construction of more efficient tools which provide a better understanding of the model and its capability.

An IFoA presentation[17] in 2013 on Capital Modelling for PPOs discusses the risks to be considered and their impacts.

The Life modules of the SF are based on the assumption that the risk relating to the dependence of insurance benefits on inflation is not material[18]. If used for the calculation of ORSA capital a relatively easy way to allow for liability inflation within the SF is to use the expense stress module on the whole reserve not just the expenses.

[17] https://web.actuaries.ie/system/files/forum-attachments/2013%201106%20Capital%20Modelling%20Seminar%20PPOs.pdf

[18] Section 1.3 of EIOPA-14-322 "The underlying assumptions in the standard formula for the Solvency Capital Requirement calculation"

6 Data

6.1 Data Collection

For the administration, valuation and management of PPO claims there are additional data requirements above those needed for lump sum settlements including the annual amount payable (unindexed); the anniversary date payable; any variation order; and any additional information on mortality. There may also be a need to record dates or values to correctly calculate the index to be applied for each future payment.

The relatively small number of PPOs to be expected in Ireland means that each individual company may only settle a small number of claims per year. If any claim system changes are needed to correctly record PPO claims there may not be a sufficient volume to make a system change worthwhile and the claims may need to be recorded out of the main systems. As with any offline system there would need to be control of these to ensure the data is accurate and complete.

The data would need to be regularly extracted for valuation, MI, capital and reporting to reinsurers. An additional consideration is the legislation on General Data Protection Regulation (GDPR) as this may be one of the few areas where actuaries in their valuation of claims will require detailed personal data for each claimant.

The valuation of PPOs is likely to rely to some extent on external data in the setting of certain assumptions including mortality, propensity and inflation. This external data will of course need to be assessed for appropriateness, completeness and accuracy.

6.2 Injury Categorisation

The IFOA Working Party has previously published[19] an injury categorisation system that we strongly encourage the Irish insurance industry and other stakeholders such as the HSE and State Claims Agency to adopt.

There would be a number of advantages to adopting this categorisation system in Ireland:

- Increase the volume of Irish specific data being collected around the mortality experience of Spinal/Brain injured claimants and/or catastrophically injured parties.
- Allow the development of a more reliable framework to make appropriate judgemental overlays to population mortality/life expectancy, thereby facilitating Irish actuaries working in the areas of reserving, capital and pricing for PPOs
- It can provide useful reference information to those involved in assessing large lump sum awards for claims that do not become PPOs.
- It contributes to the international knowledge base allowing direct comparison and bench-marking of emerging Irish specific experience to international sources. In particular the UK,

[19] IFoA Working Party, GIRO 2015 Update https://www.actuaries.org.uk/system/files/field/document/2015%20IFoA%20PPO%20WP%20GIRO%20Update%20Report.pdf.

who by virtue of their greater market size and longer history of PPOs will have more credible data in this area.

Figure 19 - IFOA Working Party - Injury Categorisation

Injury type	Code	Category	Description
Brain	B1	PVS	Permanent Vegetative State – No purposeful motor or cognitive function. Requires a feeding tube.
	B2	Cannot walk - Fed by others	Does not feed self, must be fed completely (either orally or by a feeding tube)
	B3	Cannot walk - Self feeds	Can feed self with fingers or utensils, with assistance and/or spillage
	B4	Some walking ability	Walks with support, or unsteadily alone at least 10 feet but does not balance well
	B5	Walks well alone	for at least 20 feet, and balances well
	B6	No mobility issues	
Spinal	S1	Tetraplegia Ventilator Dependent	C1-C3
	S2	High level Tetraplegia	C4-C5
	S3	Low level tetraplegia	C6-C7
	S4	High level Paraplegia	Thoracic T1-T12
	S5	Low level paraplegia	Lumbar
	Complete/ incomplete flag	Complete or incomplete selected	
Amputation	A1	Double upper limb	Double upper limb amputation (or loss of use), including bilateral brachial plexus injuries etc
	A2	Leg - above knee	
	A3	Leg - below knee	
	A4	Other Amputation	
Other	O1		
Care regime			
	C1	24/7 2 or more care ratio	24 hour care needing two or more carers for all that time
	C2	24/7 1-2 care ratio	24 hour care needing one to two carers for all that time
	C3	24/7 but night sleeper	24 hour care with at least one carer but carers can sleep at night
	C4	9 or more hours duty care a day	
	C5	5 to 8 hours duty care a day	
	C6	0 to 4 hours duty care a day	
	C7	Domestic help only, no personal care	

6.3 QRT

Settled PPO claims need to be removed from the non-life obligations reported into the QRTs and included within certain life QRTs. The following QRTs are involved, in all cases the provisions need to be removed from the non-life templates (notably S.17 and S.19) and then entered here[20]:

The quarterly QRTs are:

S.12.01.02: Gross and Net Technical Provisions by Solvency II Line of Business entered into columns C0090 (direct business) and C0100 (accepted reinsurance).

[20] Details in "COMMISSION IMPLEMENTING REGULATION (EU) 2015/2450" https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R2450&from=EN.

Annual QRTs involved are:

S.12.01.01: Gross and Net Technical Provisions by Solvency II Line of Business entered into columns C0090 (direct business) and C0100 (accepted reinsurance).

S.12.02.01: Gross TPs by Country.

S.13.01.01: Gross Cash in and out-flows split between benefit and expenses, future premiums and other in-flows by each future cashflow year.

S.14.01.01 specific details are required including by product and by homogeneous risk group.

S.16.01.01 this is specifically for PPO type claims, by currency and by line of business and origin year (accident or underwriting year), the following is required:

- Undiscounted annuity claims provisions at the start of year N
- Undiscounted annuity claims provisions set up during year N
- Annuity payments paid during year N
- Undiscounted annuity claims provisions at the end of year N
- Number of annuities obligations at the end of year N
- Best Estimate for annuity claims provisions at the end of year N (discounted basis)
- Undiscounted development result

S.18.01.01: Life cashflow projection which will need to be completed for settled PPO claims.

Appendix - References

1. Irish Life Table (ILT 16) & Background Notes: Source: Central Statistics Office.

http://www.cso.ie/en/releasesandpublications/er/ilt/irishlifetablesno162010-2012/

2. IFoA Working Party, GIRO 2015 Update.
3. IFOA Working Party, Periodic Payment Orders Report, GIRO 2010.
4. IFOA Current Issues in General Insurance 2016, PPO Workshop slides
5. Constructing impaired life mortality tables and severe injury classification, GIRO 2013.
6. IFOA Working Party, GIRO 2014 Workshop B4
7. IFOA 2016 “Information for Actuaries Valuing Periodical Payment Orders”.

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