PERIODIC PAYMENT ORDERS

GIRO Working Party 2010

CONTENT

2. Exec Summary

Courts now have the ability to award Periodic Payment Orders (PPOs) instead of Ogden lump sums in large bodily injury cases. Where awarded, PPOs replace the certainty of a lump sum with the uncertainty of an index linked amount payable to a claimant annually for the rest of their lives possibly 50 years or more. This uncertainty presents a major challenge for the management of insurers and their actuaries and will bring significantly increased costs. The effects are even more acute for reinsurers as the effects are not diluted with small claims. For the companies who responded to our survey the number of PPOs has increased exponentially from a handful per annum in 2007 and prior, to 25 in 2008, and 44 in 2009. To date, the majority of PPO claims have been on motor policies with a smaller number of cases on liability policies.

Individuals who have suffered serious accidents resulting in conditions such as quadriplegia or severe brain injury will require constant medical care which can cost £100,000 or more per annum. Prior to PPOs courts would award lump sums designed to provide enough money for individuals to pay for care for the rest of their lives. These lump sums are calculated allowing for the individual's future life expectancy and future investment returns using a set of actuarial tables known as the Ogden tables. When added to awards for loss of earnings and other damages the total lump sum awarded could easily reach £5 million or more.

Under PPOs individuals receive a payment, normally annually, which is increased by a prescribed index. The landmark Thompstone v Tameside judgement in January 2008 which confirmed that a higher earnings index (ASHE) could be used instead of RPI significantly increased the value of PPOs to claimants and has resulted in the massive increase in PPOs seen in the last 3 years.

From a claimant point of view PPOs are ideal because they remove the risks around mortality (living too long and running out money) and investment (achieving lower returns than assumed in the lump sum calculation). Government is also keen on PPOs because they eliminate the risk that individuals run out of money and fall back on the welfare state. PPOs transfer the uncertainty from the claimant to the insurer / reinsurer with the attendant increase in costs and impact on profit.

This paper starts by giving an overview of PPOs, reviews some relevant court cases and considers what impact PPOs will have on company P&Ls and balance sheets. The industry experience section shows how the number of PPOs awarded has increased exponentially in the last 3 years and gives insight into the age of claimants, the time to settlement, size of payments and reduction in life expectancy. The paper then turns to the key actuarial areas of assumptions, reserving, capital and pricing and suggests the points that actuaries need to consider. PPOs are having a major impact on reinsurance and this section consider the issues of deductible creep, reinsurance pricing, and reinsurer credit ratings. PPOs create a number of important practical issues, such as how to administer payments which may last 50 or more years, obtaining proof of life and so on which are considered in the operational challenges section. Finally the risk

mitigation section looks at how insurers may reduce the impact of PPOs on their businesses.

The rise of PPOs has created some significant new challenges for GI actuaries. Hopefully this paper will be useful in addressing those challenges.

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2. Overview of PPOs

Brief History

Periodical Payment Orders (PPOs) were introduced in the Courts Act 2003, replacing their predecessor structured settlements. Structured Settlements allowed for the claimant to be paid as a series of annual (or semi-annual) payments rather than a lump sum for part or all of the benefit, when both parties consented to this. The payments would be inflated in line with the Retail Price Index (RPI). PPOs move away from this by allowing the judge to impose a PPO without one or both party's agreement. In some cases, the Courts Act requires PPOs to be considered by the judge.

A second major difference is in the way the terms are agreed. Structured settlements were designed so that the insurer could purchase an annuity, and the award was written this way. The normal lump sum would be calculated, and the structured settlement would then be the annuity that could be purchased with that amount. PPOs reverse this, with the annual payments being the same as those that the lump sum is calculated on. This does open the scope for the cost of PPOs to be different to lump sums calculated using the Ogden tables.

The final difference was that the Courts Act 2003 also allowed for variation orders. These are specific orders made at the time of the settlement, allowing for a return to the negotiating table if specific, foreseeable circumstances arise to negotiate a change to the order. Variation orders can be requested by either party.

Since the implementation of the Courts Act 2003 in April 2005, there has been a small but steady stream of PPOs in the private sector – mostly associated with motor claims – and a larger number of clinical negligence claims settling against the NHS via this route. The nature and frequency of the catastrophic injuries occurring with motor and clinical negligence claims, the security of the NHS, the NHS's desire for cashflow based awards, and the unlimited liability attaching to motor claims make PPOs more prevalent with these claims than in most other types of liability insurance.

However, there have been some general liability claims settled via PPOs and it is reasonable to expect that classes other than motor insurance will be impacted to some degree.

The number of claims in the motor market settling as PPOs has risen dramatically since late 2008. There are two main explanations for the increase, both relating to events within that year.

- In January 2008 the Court of Appeal ruled against the NHS in the court case: Thompstone versus Tameside and Glossop Acute Services NHS Trust. The NHS subsequently abandoned its appeal to the House of Lords later that year. This was a critical court case, where the rules around the inflation of

the annual payments were changed, with the judge allowing for an index other than RPI to be used. Specifically, he allowed wage inflation indices to be used.

- The second event in 2008 was the crash of stock markets worldwide as a result of the global credit crunch. This served as a stark example of what could happen to the value of invested lump sums, and has led to a period of depressed returns for most asset classes compared to the proceeding decade. There can be little doubt the blow to savings and investments in the last two years, and the poorer investment outlook will have shaken confidence and led to a rise in popularity for guaranteed regular payments offering security of income.

The exact cause of the increase in PPO propensity or the share of the 'blame' will remain unknown.

Currently lump sum awards remain popular though for some types of claim, such as those involving young people and brain injury, PPOs could be viewed as the more appropriate form of compensation for the claimant. Consideration of the following will influence the decision of the parties to pursue a PPO settlement.

- The injury sustained and the level of care required
- The claimant's mental capacity
- The claimants age
- The claimants family position
- The split of liability between the claimant and the insurer
- The economic climate and outlook
- The claimant's view of risk
- The claimant and insurers appetite for a PPO settlement
- The level of uncertainty/contention on life expectancy
- The individual solicitors employed

To date there appears to be significant variation in the types of claims settling as PPOs with claims settling as lump sum which would have been expected to settle as PPOs and vice versa. This makes identifying potential PPO claims an extremely subjective exercise. As the number of PPOs awarded increases and the legal and insurance fields become more accustomed to the processes it may become easier to identify likely PPO claims

Structure of PPOs

Theoretically, PPO awards can be made against any regularly recurring head of damage. However, most awarded to date cover future care costs with case management costs frequently included in the annual payments. Typically, claims settling as PPOs will include an initial lump sum element to cover chunky upfront expenses such as setting up appropriate accommodation and certain future costs excluded from the PPO. This ensures some flexibility in award levels.

The term of a PPO will vary by head of damage. The claimant will be eligible for future care costs for life, whilst economic loss or loss or earnings are likely to be

paid up until retirement or death if earlier. In fatality cases payments to dependants are likely to be set up until the dependant reaches a particular age.

A PPO is routinely set up as an annual or semi-annual payment, payable in advance. The level of the award will reflect the heads of damage covered by the order and the needs of the individual claimant. The initial award is adjusted in line with changes to a specified index or survey with a yearly indexation point. To receive the payment the claimant or claimant representatives must provide proof of life at least annually. Upon death overpayment can be clawed back by the insurer though this could be a sensitive issue.

The size of the award will consider any contribution covered made by the local authorities. Where there are such payments some insurers decide to pay 100% of the costs and require monies paid by the local authority to be repaid whilst others pay the amount net of local authority funding. In the later scenario the PPO may include a review clause or indemnity guarantee in the event statutory funding is reduced or withdrawn at a later date.

The payments can be structured to reflect the changing needs of the claimant. An example is a stepped PPO that will include a specified change to the award at a specified future date. This change could be to reflect the ageing of key carers such as parents or spouses, or a greater need for care in old age. Where there are dependents there can be an agreed minimum term for the payments.

Another option, though rare is the inclusion of a variation order.

Indexation of PPOs

The Court Act originally allowed for payments to inflate annually in line with the RPI index, allowing insurers to match the liability by purchase of an annuity. Since the Thompstone case where this feature was successfully challenged, wage based indices can be used instead with a number of indices being used to date. This made PPOs more desirable as wages usually increase faster than prices.

The most popular index used so far – and the one selected by the judge in the Thompstone case to be used – is the Annual Survey of Hourly Earnings (ASHE) performed annually by the Office of National Statistics (ONS). The survey includes a number of sub-codes, detailing the level of earnings at a number of percentiles for specialised professions. The court settlement will attach to a suitable percentile consistent with the experience and hence remuneration of the carers required. ASHE reports in a number of formats, such as hourly earnings and annual earnings. PPOs seen to date have been linked to the hourly earnings rate.

PPO awards have generally been made for medical care. These have usually been linked to sub-code 6115 of ASHE –care assistants and home carers' salaries.

It is possible for other indices to be used where agreed by both parties or imposed by the judge. Awards have been made linked to RPI or in some cases a fixed

annual increase agreed. We know of at least one PPO which is linked to the Hospital and Community Health Services Index (HCHS). The payments are adjusted once a year. Smaller costs included in the annual payment such as case management costs may have indexation applied at the same level or with reference to a different, more appropriate index.

Attractiveness

The pros and cons of PPOs will vary for each party and these factors may change on a case by case basis. An advantage for one party is likely to be a disadvantage for another. We therefore highlight some of the main considerations for each group.

Courts

For courts the main difficulty in presiding over PPO awards is the lack of precedent and experience in dealing with these types of claims. Although the Courts Act 2003 prescribes certain times when a PPO should be considered, judges will need to build a feel for when a PPO is appropriate and when it is not. They will also need to be aware that as the number of PPOs grow, the possibility of any change in common law affecting old settlements as well as future settlements is now possible, and would have wide ranging ramifications.

However, PPOs add a new useful tool to the Judges array of options. One of the intentions of the introduction of PPOs in the courts act 2003 was to offer better protection / indemnity for claimants.

- The introduction of the courts act in 2003 enabled courts to impose a PPO award in circumstances where neither the claimant or defendant had requested one effectively increasing the powers of the court
- Judges are able to necessitate a settlement which meets the individual's specific needs.
    - Where the level of care is expected to change at a specific point in the future
    - The claimant / claimants representatives are risk adverse
    - To provide protection against abuse or poor management of funds by their representatives.
    - Where there is a risk of a major turn in the claimants condition in the future requiring materially more funds.

If the PPO is appropriately indexed the settlement is likely to fulfil the aim of 100% indemnity.   This provides greater certainty of sufficiency for at least part of the compensation.

Awarding a PPO in theory avoids the issue of disputed life expectancy which is an essential assumption in the lump sum calculation.

Claimants & their families

For claimants the number of risks associated with lump sum awards are either reduced or transferred to their insurer. These risks are in respect of the lump sum payment being exhausted, either through long life (longevity risk), excessive inflation (inflation risk), poor or unlucky investment (investment risk) or poor/fraudulent management (security risk).

- If a claimant survives longer than the life expectancy assumption used in the calculation of the lump sum award there is a danger the award will be insufficient to last the claimants lifetime
- The size of the fund will vary depending on the prevailing inflation and investment returns which to some extent are beyond the control of the claimant
- There is a tendency for people, especially those without investment expertise, to undervalue the long term future and risk their capital sum.

PPOs are designed to give claimants greater protection and certainty that the real value of their awards is maintained. Receiving regular payments enables families to budget and plan expenditure more easily.

However providing this protection which limits the claimant downsides also limits the potential upsides.

The claimant will no longer be able to benefit from better than expected investment returns or lower inflation levels than anticipated which increase the value of a lump sum award. Furthermore, PPOs are likely to reduce the potential amount left to dependants in the event of early death.

In addition to the more obvious considerations given above the claimant or claimants solicitors are likely to consider:-

- The real discount rate as specified by the Lord Chancellor in the calculation of the lump sum payment (currently 2.5%) and how this compares to current levels achievable. If the outlook for the real discount rate is lower than 2.5% the claimant may consider the PPO option better value for money
- If the insurer in question is protected by the FSCS, this reduces the credit or default risk should the insurer experience financial difficulties which leave it unable to pay claims
- PPOs may not be advantageous where the claimant is partly liable thereby receiving partial rather than 100% compensation. In such circumstances a lump sum may allow the claimant greater flexibility to manage their care and if the worst comes to the worst fall back on state care if the award is exhausted.
- Claimants may dislike being beholden to an insurer, undergoing the annual process of proving eligibility for payment. Some prefer the finality of a lump sum settlement. However, they may no longer have control of the final decision if the court decides to impose a PPO award.

Overall, the number of risks to the claimant reduces significantly under a PPO award since the award provides greater certainty and security.

Insurers

The possible reasons why insurers favour a PPO environment are given below

- Delays the payment of funds into the future thereby easing cash flow concerns for small companies
- Beneficial where life expectancy is overstated or in dispute especially where life expectancy is ultimately shown to be lower than estimated
- Potential benefits if the shape of impaired mortality when compared to the normal lives mortality used in the Ogden factors is more favourable for the insurer
- Reduced costs if the insurer can provide an indemnity against withdrawal of local authority care thereby dissuading claimants to drop out completely through concerns that funding will be reduced or withdrawn in future
- May reduce the possibility of the Lord Chancellor adjusting the discount rate used in the Ogden calculations. This could lead to favourable outcomes for those claims which still settle as lump sums where the real discount rate proves to be lower than the prescribed rate

The concerns for insurers regarding PPO awards can be summarised under the following headings:

Profit

- There is considerable uncertainty over the impact of PPOs on the insurer's costs, and their frequency. Due to their long-tailed nature this may take some time to be established, creating a period where insurers will be uncertain about the sufficiency of their pricing, and a danger they maybe underpricing.
- The overall impact of PPO awards will be diluted by non-motor losses, Motor PD losses and the bulk of bodily injury losses which are likely to continue to be settled on a lump sum basis. This dilution will be increased for insurers writing a diversified portfolio of insurance classes – consequently it is likely to be smaller insurers writing mono motor class business who will experience a greater impact from PPO claims.

Additional risk and uncertainty

- Lump sum awards give insurers finality. Under PPO settlements claims remain open potentially for 40-60 years or more leading to significant uncertainty as to the final value of the claim
- Under lump sum awards it is the claimant who effectively bears the mortality, investment and inflation risks that the award will be insufficient to cover the total value of their costs. These risks are transferred to the insurer under a PPO arrangement. Insurers will need to measure and manage these risks which will take resource and expertise. Reinsurance may pass some of these onto the reinsurer.

- The mortality risk will vary on a claim by claim basis but there could be a systemic risk that the method used to estimate mortality in respect of these lives does not match the models and assumptions used.
- The inflation and investment risk will be of much more concern given shifts in assumptions are likely to impact all losses at the same time and are of a cumulative nature. The real discount rate is the key variable in assessing these risks.
- The inability to match PPO cash flows when payments are indexed to earnings rather than RPI increase investment / inflation risk
- If liability is shared amongst a number of insurers it is unclear if companies are liable should another party become unable to pay their share. We know of at least one company who is seeking legal advice on this issue.

Internal processes

- Insurers are unlikely to be able to purchase suitable annuities to close out claims currently resulting in claims being run off internally
- The implications of this in respect of systems, training and communication will need to be considered together with their associated expenses
    - Systems and / or procedures may need to be redesigned to track annual claim payments, multiple indice values, proof of life confirmation. These will need to be flexible to allow for stepped increases, variation orders, indemnity guarantees and other potential future changes.
    - Records will need to be maintained for decades
    - Staff will need to be trained to understand the features of PPO awards and the systems / procedures in place to deal with them
    - Staff will need to be educated on the consequences of PPO settlements. For example:
        - The increase in the mean term of liabilities and hence possible changes to investment strategies
        - The increase in undiscounted loss ratios for motor classes and other classes liable to PPO settlements
        - The unwinding of the discounted reserves over time
        - Possible impact on the balance sheet in respect to capital requirements and reserves especially relevant for small companies or those writing only PPO exposed classes
        - The uncertainties surrounding the assumptions used to value these claims and the sensitivity of results to small changes in assumptions
        - The implications for credit risk held.
    - Systems will also need to handle discounted reserves and unwinding the discount, however these changes will be coming in under Solvency II as well.

Reinsurance

- The value of reinsurance will need to be considered which is complicated by the indexation of reinsurance excess of loss layers

- The level of outstanding reinsurance recoveries is likely to increase due to the lengthening of the payment pattern
- Given the tail of PPO claims the period over which insurers need to consider reinsurance credit risk will be extended
    - Combined with the increase in outstanding reinsurance recoveries this increases the impact of a reinsurer failure on the balance sheet of an insurer
- The treatment of PPO claims on reinsurance years pre PPO introduction will need to be re-negotiated with reinsurers
- There will be additional expense in maintaining reinsurance records and relationships with reinsurers over a extended number of years
- The insurer will need to consider the implications of PPO on reinsurance price and available which will need to be considered when budgeting and planning

Reinsurer

Many of the advantages and disadvantages listed above for insurers will be relevant to the reinsurance market. For excess of loss reinsurers who provide cover against large loss events the impact of PPOs is likely to be more extreme as the motor account will contain a higher proportion of losses settled as PPOs.

The excess of loss nature of this reinsurance cover leads to significantly extended mean payments terms with the triggering of reinsurance recoveries potentially occurring decades after a PPO award has been made.

On a positive note, the operation of an index clause in excess of loss contracts result in few claims reaching excess of loss layers.

Government and Regulators

There are a number of advantages and disadvantages for governments and the regulators:

Advantages:

- Allows cash-flow benefit under a pay as you go system by postponing payments for claims made against state owned organisations.
- Alleviates the need for the Lord Chancellor to review the prescribed discount rate used in the Ogden factors as claimants can opt for a PPO if they feel this offers better value for money.
- Reduces the likelihood of claimants falling back on the state for their care needs if the lump sum settlement is exhausted reducing pressure on the NHS
- If means testing of local authority support is ever introduced widely PPO payments are easier to translate into annual ability to pay than a lump sum award.

Disadvantages:

- The payments made in respect of PPOs by state run organisations will build over time. Ultimately annual payments will increase to meaningful levels, many of these payments relating to claims settled many years previously. The burden of administrating these claims will add a significant cost element in addition to the original claim amounts
- From a regulatory perspective the implications of PPOs on solvency II, accounting and tax calculations will need consideration and communication to the insurance market
    - The level of reserves in respect of PPO claims will increase over time the number of claims in payment rises, regulators need to confident that reserves set in respect of these liabilities are adequate
    - If these liabilities have been consistently undervalued it may take many years before this is discovered leading to a potential material impact on solvency especially for small, mono line insurers
    - Changes in long term assumptions could lead to material changes in these reserves due to the number of claims in payment and the compound nature of the assumption changes
    - Insurance companies will become more sensitive to the general economy.
    - The treatment of PPO claims, which are essentially life products covered by non life companies, will require additional skills and procedures
    - The difficulty in assessing the PPO models which are likely to be extremely simple or black boxes.
- The implications of a failure of an insurer with significant PPO reserves will be greater given the nature of the larger reserves.
- There could be implications on the MIB levy if the MIB favours settling claims on a PPO basis. The Pay As You Go levy could initially reduce as payments switch from lump sums to PPO awards but gradually increase over time as the number of PPO cases increase
    - The size of the MIB levy is heavily dependant on the premium income of the UK motor market for the year in question. Due to the long tail nature of PPO claims the amount paid in a given year may bear no resemblance to the exposure in that year.
    - The levy could become a deterrent to new entrants.
- PPOs may increase the demand for long term gilts reducing investment return for pension funds. However, it is unlikely that this demand will be sufficient to cause a material impact unless the PPO propensity increases significantly more than expected.
- Pressure may be placed on the Office of National Statistics to minimise changes to the ASHE survey which could cause large jumps in sub-section 6115

Other parties

Brokers may need to start considering how they will handle claims handling costs for books of business where the claims may take up to 60 or 70 years to fully run-

off. The traditional methods of tendering may need to change or reserves to handle these future costs allowed for.

There may also be implications for run-off companies dealing with reinsurance. The long-tailed nature of the PPOs, and the greater cost of these on an undiscounted basis may have implications for the way these companies are set up and run.

3. Case Studies of Recent Court Cases

The legal landscape of periodical payment orders is changing. Each ruling has the potential to set a case precedent and become extremely influential in the settlement of future cases. We have already seen that there are many issues to be dealt with when issuing a PPO. Here we will examine some practical examples of the situations that can give rise to a PPO and the considerations to be addressed.

<u>Moving away from RPI as standard</u>

Periodical Payment Orders and structured settlements were originally indexed according to RPI. RPI has historically been lower than earnings indices, meaning that the real value of compensation is eroded over time. PPOs are usually used to cover ongoing care costs. If the compensation is not enough to cover these care costs then it no longer fulfils its primary purpose. One solution would be to link to the national earnings index. However, each profession's salaries rise at different rates on average and historically carer's earnings have risen at a slower rate than national average earnings. That is where the Annual Survey of Hours and Earnings (ASHE) becomes useful. It provides information on salaries of occupational groups at a more granular level. This is the conclusion that the judge came to in the Court of Appeal of the Flora v Wakom case in July 2006.

<u>Flora v Wakom</u>

This case revolved around the interpretation of the wording in the Courts Act 2003. The Damages Act 1996 gave the court the power to order a periodical payment in personal injury cases as long as all parties agreed. The Courts Act 2003, which came into effect in April 2005, amended this to:

2(1) A court awarding damages for future pecuniary loss in respect of personal injury –
(a) may order that the damages are wholly or partly to take the form of periodical payments, and
(b) shall consider whether to make that order.

2(8) An order for periodical payments shall be treated as providing for the amount of payments to vary by reference to the retail prices index (within the meaning of section 833(2) of the Income and Corporation Taxes Act 1988) at such times, and in such manner, as may be determined by or in accordance with Civil Procedure Rules.

2(9) But an order for periodical payments may include provision –
(a) disapplying subsection (8), or
(b) modifying the effect of subsection (8).

The course of events that led to the predictable questioning of the interpretation of the wording began in May 2002 when a 50 year old Mr Tarlochan Singh Flora fell

35 feet from a ramp at work at Wakom (Heathrow) Limited. It was deemed that Flora's loss of earnings were £12,000 per annum and care costs would be between £18,000 and £27,000 per annum. In July 2006 the Court of Appeal heard a number of arguments from the claimant and defendant on the interpretation of the clauses. The claimant's position was that the historic Average Earnings Index (AEI) and RPI differential had demonstrated that the cost of care and loss of earnings would not be well matched by RPI. The defendant maintained that 2(9) should be used only in exceptional circumstances. The Court of Appeal held that the wording did not imply that section 2(9) can only be used in exceptional circumstances.

Thompstone v Tameside

One of the most influential rulings that deals with using indices other than RPI was in respect of four linked cases in January 2008:

- Thompstone v Tameside & Glossop Acute Services NHS Trust;
- Corbett v South Yorkshire Strategic Health Authority;
- RH v United Bristol Healthcare NHS Trust;
- De Haas v South West London Strategic Health Authority

All four cases involved young people who had suffered birth asphyxia injuries which had left them with catastrophic brain damage. In each case the defendant had admitted liability but there were issues outstanding regarding the agreed damages:

- whether a lump sum or periodical payments should apply
- if periodical payments should apply then whether the court had the power to apply an index other than RPI
- if the court had power to apply a different index, could it only do so in exceptional circumstances
- if another index can be used, which one

Flora v Wakom was the case of reference for the judge in all four cases. In this case it was decided that an index other than RPI could be used whenever it was deemed appropriate and fair to do so. In each of the four cases the judges made periodical payment orders and used ASHE 6115 as the index, which is based on the occupational group of care assistants and home carers.

As ever, the defendants argued against this citing:
- the judgment made in Flora had been decided without reference to a statutory provision or earlier judgment which would have been relevant and therefore was not binding
- in the Damages Act 1996, s.2(8) specifies the RPI and s.2(9) refers to "modifying" the "index". Therefore the argument is that the index must be RPI and the modification can only be to increase or decrease it
- an index other than RPI should only be used in exceptional circumstances due to the principle of distributive justice
- the claimant must show that another index is appropriate

- using ASHE 6115 would lead to a different compensation to a lump sum settlement and therefore contravened the principle of how compensation of future losses should be assessed as set out in Cookson v Knowles 1979 AC 556.
- ASHE 6115 is unsuitable to use as an index

These appeals were dismissed and ASHE 6115 was granted. The ruling allowed judges to vary indices at their discretion to inflation-proof compensation and ensure compensation is fair and appropriate for the claimant.

Using other indices

In one of the most recent periodical payment orders the Hospital and Community Health Services Index (HCHS) has been applied. This is a significant step forwards in using an index that most appropriately meets the claimant's needs. Not surprisingly, the judge commented in this case that periodical payment issues are "uniquely complex and difficult".

Considerations: interim payments

The period until the final compensation is determined can be long and the claimant will often need interim payments. We will now see that even here there are many issues to consider.

Cobham Hire Services Limited v Benjamin Eeles, March 2009

Benjamin Eeles, was born in November 1997 and suffered a serious head injury in a car accident in 1998 when he was only 9 months old. He has made a good physical recovery but will never be able to lead a fully independent life, requiring supervision, therapies and some care. He is very unlikely to be able to work for a living. Ben's legal team believed that it would not have been possible to quantify his claim until about 2010. In the mean time, Ben received interim payments amounting to £450,000.

The existing family home would not provide sufficient room for the family and for Ben's increasing needs. Suitable housing was difficult to find in the village of Brightlingsea in which they live but, in 2008, Brightlingsea Hall came onto the market. It had formerly been a hotel with 9 bedrooms and a separate bungalow in the grounds. They felt that they must move quickly. The asking price was £840,000 and the estimated cost of refurbishment was £200,000. With the costs of purchase, the parents estimated that they needed £1.2m and applied for an interim payment of that sum.

It was likely that the final compensation would consist of both a lump sum and periodical payments. The lump sum that would be awarded at trial was estimated at £1.1m, less than the £1.2m claimed as an interim payment. The defendant argued that this would reduce the judge's freedom to allocate the future losses as he thought fit i.e. the effect would be to reduce the amount of the periodical payment order. The judge decided that although the reduction in available capital

may well reduce the amount of periodical payment, the lump sum would be invested in an asset that would provide a source of income in later years.

The defendant appealed this, arguing that the trial judge may wish to make a periodical payment order for some heads of damage and the likely lump sum would not be large enough to sustain the awarded interim payments and that the current housing was adequate. The result was that the interim payment was refused on appeal.

Considerations: contributory negligence, ASHE range, lump sum v PPO

Where the injured party in some way contributed to their injury, the compensation can be reduced by the proportion they are deemed to have contributed. This means that the award may not meet the intended purpose if the injured party cannot meet the deficit.

Sarwar v Ali, 2007

This well known case is interesting in that it dealt with many of the issues that arise concerning awarding periodical payments.

Mr Sarwar was seriously rendered Tetraplegia as a passenger in a car accident. Mr Sarwar hadn't been wearing his seatbelt at the time of the accident and was therefore suffered a 15% reduction in compensation due to contributory negligence.

Mr Sarwar initially wanted a settlement in the form of a periodical payment but later changed his mind and requested a lump sum settlement, although the judge awarded a periodical payment order. Mr Sarwar was expected to have gone on to earn higher than average earning had it not been for the accident. Therefore his compensation for loss of earnings was linked to the ASHE aggregate for male full-time employees at the 90th percentile. This is an example of where the range of the ASHE is considered rather than just the median.

For care costs, the judge realised that RPI would most likely be too low to keep up with wage inflation. However, he also noted that AEI would most likely be too generous as it has historically increased at a rate greater than carer's wages and awarded ASHE 6115.

4. Projections of a GI Company

Overview

This section projects the reserves of a Motor General Insurance company over time allowing for large claims to be settled as PPOs rather than on the Lump Sum Ogden Multiplier (conventional) basis, allowing investigation of the impact on the reserves, mean terms and reinsurance value. We have also looked at the implications for the reinsurer providing the cover.

The point of comparison is the insurance and reinsurance companies under a stable state with or without PPOs. Due to the long tail on PPO claims this will not in reality be reached for many years to come. However, as all future settlements from any accident year can settle as a PPO, a large proportion of the transition could occur quite quickly.

The main assumption for the base calculations is that the conditions match those underlying the Ogden calculation, so that on a gross basis PPOs are cost neutral for the insurer. It has been assumed that no structural changes will occur - hence reinsurance premiums will remain constant, the loss ratio will remain constant (hence claims and premium inflation is equal) and the peril splits remain constant ignoring PPOs (i.e. the claims inflation is equal across perils, large & small claims).

Key outcomes are:

- For the insurer, under the base scenario on a gross basis PPOs have no impact on the loss ratio, but will eventually increase the discounted reserves by 21% gross, represent 27% of total discounted reserves, and increase the meant term of total outstanding claims by 108%.
- For the insurer, under the base scenario on a net basis PPOs have little impact on the loss ratio, but will eventually increase the discounted reserves by 7%, represent 13% of discounted net reserves, and increase the meant term of total outstanding claims by 43%.
    - For the reinsurer, under the base scenario with no change in reinsurance premiums PPOs will improve the loss ratio by 2.8 points, but mean that the discounted reserves will increase by 82%, PPOs will represent 62% of the discounted reserves, and the mean term will increase by 168%.
- For the insurer changing many of the assumptions has an impact on the mean term or size of the reserves, but most don't have a large impact on the loss ratio. The key driver of cost impacts is the real discount rate.
- For the reinsurer, changing many of the assumptions results in a material change in their loss ratio, adding or subtracting upwards of half a point, as well as having a large impact on the mean term and reserve size.

The exact impact will depend very much on what assumptions each actuary or company makes. However, it is clear that the implications for reinsurers are far greater than for insurers, that PPOs will almost certainly add more uncertainty around outstanding claims estimation, and that the size of reserves and the mean term will increase.

Assumptions and split of the business

Assumptions have been deliberately chosen in many cases to simplify the calculations, and assist in creating a robust model that can be tested for sensitivities to certain factors.

The calculations have been performed on either a current value (CV) basis or an inflated and discounted (I&D) basis.

A current value basis is where all the payments are shown with what their current value would be adjusted for inflation. Historical payments are adjusted up (usually), and future payments have no inflation allowed for them. So all costs are using the current price points as a basis, and any differences are due to reasons other than "normal" inflation. This basis allows comparison across periods at different valuation dates, but also allows comparisons of payments far in the future with those closer in time. It also allows for explicit projections of inflation.

An I&D basis is that used under Solvency II, and is generally being used for PPO claims themselves. It is where the future payments are either implicitly or explicitly inflated and then discounted back. Payments on this basis cannot be compared against historical payments unless they are adjusted for investment income, and the value of the same payment stream changes depending on which time point it is valued at. As the PPO claims are usually being calculated on this basis, it seems reasonable to calculate everything on the same basis. That this will also soon be the universal basis under Solvency II is also an important factor for showing this.

An inflated basis has not been used since the long-tailed nature of PPOs means this would produce a distorted and unrealistic view - although it would be the actual expected amounts in nominal pound figures.

Assumptions

- Company is in a stable state on a current value basis.
    - Therefore, claims inflation matches premium inflation.
    - Assume Reinsurance treaty increases with inflation as well.
    - The split across perils is not changing (i.e. Bodily Injury and large claims aren't growing as a share of the loss ratio, and all share the same claims inflation.)
- PPO settlements and Ogden lump sums are cost neutral if the current economic assumptions underlying Ogden are realised.

- i.e. the 6.6% investment return below is selected so that the real discount rate is equal to the current discount rate of 2.5% set by the Lord Chancellor.
- This is not 6.5% due to the effects of multiplying rather than adding.
- The claimant life expectancy is always met. So the likelihood of dying earlier or later is 0%, and the probability of dying at the estimated age is 100%.
- Gross Large Bodily Injury (BI) claims and reinsurance payments have the same payment pattern.
  - This is a simplifying assumption as it will be wrong in real life.
- The Gross Large BI payment pattern can be used as a proxy for the settlement pattern.
  - This is again a simplifying assumption.
- All PPOs are paid yearly in advance.
- No complex PPO arrangements (stepped, variability orders, multiple PPOs, etc.)
- It is assumed that all large claims >£1m have the same cost - the average.
  - This is a simplifying assumption.
  - If the reinsurance retention is greater than £1m this will generally underestimate the total recoveries as for most claim distributions the average of the claims cost minus the retention is greater than the average claims cost minus the retention. For the base assumptions where the reinsurance retention is £1m this will capture all recoveries.
- That no claims smaller than £1m will become a PPO.
- Reinsurance premiums will not change.
- As the payment stream has been split between a single lump sum and PPO payments, the two normal reinsurance indexation methods (weighted time of payment, or weighted by time of settlement) are identical.
  - For conventional large claims, the amount of reinsurance has been calculated using a single "example" claim based on standard indexation rules, the mean term of large claims and the inflation assumptions. This has been used to calculate the amount of reinsurance.
  - We have not estimated a correct reinsurance payment pattern, but spread the recoveries out in the same pattern as the large claims.

Base Factors

GEP	£1bn
RI Treaty:	Unlimited xs £1m
RI Cost:	7% of GEP
Wage Inflation:	4%
Medical Carers Cost:	+0%
Investment Return:	6.6%
Life Expectancy:	40 years
PPO Lump Sum %:	50%
PPO Take up:	30%

The reinsurance retention of £1m is selected as there is some general market information on proportions of claims greater than £1 million. The cost was based on the feedback of members of the working party.

Life expectancy is based on the information from the industry experience (rounded), as is the percentage that is the lump sum. The propensity rate of 30% is equal to 0.9 claims per £1m of GEP. This is higher than the industry propensity for 2009 (~0.7) but reflects that this has been a rising number (and 30% is a nice round number).

Inflation has been based on wage inflation rather than a price inflation index such as RPI for two reasons. Firstly, the main industry standard reinsurance clauses refer to AEI. Secondly, most PPOs to date have been linked to ASHE 6115, a wage based survey. The model has been designed so that a gap between standard wages and carer's inflation can be added to calculate the sensitivity. However, in the base assumption this is 0%.

Split of the business

	Loss Ratios		CV Mean
Peril	Gross	Net	Terms
Own Property	18.6%	20.0%	0.5
TPPD	23.2%	25.0%	1.0
Small BI	28.6%	30.8%	2.5
Large BI	8.0%	4.2%	7.0
Total	78.4%	80.0%	

The mean terms are for a single accident year from time zero, not for the entire outstanding reserves.

The loss ratios are based on the Deloitte 2009 survey which had a net loss ratio of 78% for the industry. We have adopted a net loss ratio of 80%, with a 20% Own Property, 25% TPPD and 35% BI component. For the BI component, it has been assumed that claims over £1m cost 8 gross loss ratio points in their entirety, with the component under £1m costing 3 gross loss ratio points and the component above costing 5 gross loss ratio points.

The loss ratios above are all in current values.

The mean term is 7 years, so assuming an average 7 year period for inflation of the retention, the cost of claims greater than £1m can be calculated in respect of gross loss ratio. Adjusting for the reinsurance premium gives a net loss ratio of 4.2 points. On a net basis the Small BI claims loss ratio is used as a balancing item to get the 80% net loss ratio.

Recalculation on a gross loss ratio basis is done by adjusting for the reinsurance premium.

We have assumed that the cost of BI Claims >£1m that is below £1m is 3 gross loss ratio points. With a GEP of £1bn, this equates to £30m. Therefore, there are 30 large claims with a cost >= £1m. With a total cost of £80m gross and £39.5m

net, this equates to average sizes of £2.67m gross and £1.35m net per large claim.

From the assumptions the annual CV PPO Payment can be calculated. The lump sum component of the PPO represents 50% of the Ogden cost, which is £2.67m. Therefore the PPO element has a value of £1.34m. The real discount rate is known as it is assumed that the real discount rate is the same as the current assumptions in the Ogden tables (2.5%) and the term of the annuity is known (40 years). Therefore, the annual payment is the amount that solves the annuity function where the value equals £1.35m, n=40 and i=2.5%. This is £51,819 pa.

Glossary

- Conventional basis = traditional lump sum calculated via the Ogden tables.
- Stable state = where adding a new accident year's liabilities is perfectly offset by the winding down of prior year's liabilities.
- TPPD = Third Party Property Damage
- BI = Bodily Injury
- CV = Current Values
- I&D = Inflated & Discounted
- MT = Mean Term
- GEP = Gross Earned Premium
- NEP = Net Earned Premium
- LR = Loss Ratio
- Small BI Claims = Bodily Injury Claims with a cost <£1m
- Large BI Claims = Bodily Injury Claims with a cost >=£1m
- PPO Propensity = the probability of a large claim being settled as a PPO.
- PPO LS = PPO Lump Sum = the lump sum element of claims that become a PPO.

Current liabilities

The following tables show the reserves on the Original basis with no PPOs, and the ultimate position if there is a PPO propensity of 30%. That is the position once the insurer and reinsurer reaches a new steady state with the 30% PPO propensity.

Reserves - Gross, 0% PPO Propensity

Peril	Current Value	Inflated & Discounted	I&D % Share	I&D MT
Own Property	13m	14m	1.1%	-0.4
TPPD	169m	165m	13.0%	1.0
Small BI	632m	608m	48.1%	1.5
Large BI (Ogden)	522m	479m	37.9%	3.4
Large BI (PPO LS)			-	
Large BI (PPOs)			-	
Total	1,336m	1,265m	100.0%	2.2

Reserves - Gross, 30% PPO Propensity

Peril	Current Value	Inflated & Discounted	I&D % Share	I&D MT
Own Property	13m	14m	0.9%	-0.4
TPPD	169m	165m	10.7%	1.0
Small BI	632m	608m	39.6%	1.5
Large BI (Ogden)	365m	335m	21.8%	3.4
Large BI (PPO LS)	78m	72m	4.7%	3.4
Large BI (PPOs)	486m	341m	22.2%	13.0
Total	1,743m	1,535m	100.0%	4.5
Total Difference (+/-)	407m	270m		2.3
Total Difference (%)	30%	21%		108%

Reserves - Net, 0% PPO Propensity

Peril	Current Value	Inflated & Discounted	I&D % Share	I&D MT
Own Property	13m	14m	1.3%	-0.4
TPPD	169m	165m	16.0%	1.0
Small BI	632m	608m	59.1%	1.5
Large BI (Ogden)	264m	243m	23.6%	3.4
Large BI (PPO LS)			-	
Large BI (PPOs)			-	
Total	1,079m	1,029m	100.0%	1.9

Reserves - Net, 30% PPO Propensity

Peril	Current Value	Inflated & Discounted	I&D % Share	I&D MT
Own Property	13m	14m	1.2%	-0.4
TPPD	169m	165m	14.9%	1.0
Small BI	632m	608m	55.1%	1.5
Large BI (Ogden)	185m	170m	15.4%	3.4
Large BI (PPO LS)	74m	68m	6.2%	3.4
Large BI (PPOs)	113m	79m	7.2%	13.2
Total	1,187m	1,103m	100.0%	2.7
Total Difference (+/-)	108m	75m		0.8
Total Difference (%)	10%	7%		43%

Reserves - Reinsurer, 0% PPO Propensity

Peril	Current Value	Inflated & Discounted	I&D % Share	I&D MT
Own Property				
TPPD				
Small BI				
Large BI (Ogden)	258m	236m	100.0%	3.4
Large BI (PPO LS)	0m	0m	-	-
Large BI (PPOs)	0m	0m	-	-
Total	258m	236m	100.0%	3.4

Reserves - Reinsurer, 30% PPO Propensity

Peril	Current Value	Inflated & Discounted	I&D % Share	I&D MT
Own Property				
TPPD				
Small BI				
Large BI (Ogden)	180m	165m	38.4%	3.4
Large BI (PPO LS)	4m	4m	0.8%	3.4
Large BI (PPOs)	372m	262m	60.8%	12.9
Total	557m	431m	100.0%	9.2
Total Difference (+/-)	299m	195m		5.8
Total Difference (%)	116%	82%		168%

The mean terms are for the total outstanding reserves, across all accident years with open claims. Hence the size of the mean term is less than it is for a single accident year from start to finish.

On a gross basis, the impact is quite large for the insurer. The reserves increase by 30%, while they increase by 21% I&D. The proportion of the reserves that is bodily injury moves from 38% to 49%, and the mean term increases from 2.2 years to 4.5 years.

The net basis is quite a bit less. Reserves increase by 10% (CV) and 7% (I&D), while the Bodily Injury proportion moves from 24% to 29%. The mean term has a much smaller increase, becoming 2.7 years from 1.9. However, this would entail a significant increase in the amount of reinsurance recoveries, and hence the credit risk.

This is shown on the reinsurers reserves. The reinsurers' reserves show the largest increase, with the reserves up by 116% (CV) and 82% (I&D). The mean term increases from 3.4 years to 9.2 years, an increase of 168%.

Obviously for reinsurers with only exposure to the large claims, the impact of PPOs is the largest. Over time they can be expected to see significant increases

in the amount of reserves they must hold. This will also mean a commensurate increase in the credit risk that general insurers are holding.

Loss Ratios Change

The loss ratios change slightly when shown on an I&D basis, slightly improving as investment returns offset the claims costs. The loss ratios' include both the premium and the liabilities being discounted. This basis can be considered a better comparison than a standard loss ratio if you wish to be able to see the impact of changing inflation and discount rates on the loss ratio, as we do in the sensitivity section.

Peril	100% Ogden			30% PPOs		
	Gross	Rein	Net	Gross	Rein	Net
Own Property	18.6%	-	20.0%	18.6%	-	20.0%
TPPD	22.8%	-	24.6%	22.8%	-	24.6%
Small BI	27.1%	-	29.1%	27.1%	-	29.1%
Large BI (Ogden)	6.8%	49.3%	3.6%	4.8%	34.5%	2.5%
Large BI (PPO LS)	-	-	-	1.0%	0.7%	1.0%
Large BI (PPOs)	-	-	-	1.0%	11.3%	0.3%
Total	75.3%	49.3%	77.3%	75.3%	46.5%	77.5%

Under the base assumptions, the PPOs are not changing the value of the reinsurance on a purely cost basis by a large amount for the insurer. The change in cost is due solely to the deductible creep under these assumptions. The sensitivity analysis below shows the change in the I&D loss ratios as different assumptions are changed.

For the reinsurer, the change in cost that only represented a 0.2 point increase in the net loss ratio for the insurer is a 2.8 point improvement in the reinsurer's loss ratio. So the deductible creep is a positive for the reinsurer, although as discussed in the previous section there is a significant deterioration in the mean term.

Sensitivities

The following table shows the change in some key statistics as certain factors are changed. The differences are always against the base position.

	Original (No PPOs)	30% PPOs Base Position	15% PPO Pick-up	45% PPO Pick-up	5% Real Discount Rate	0% Real Discount Rate	2% Wage Inflation	6% Wage Inflation	-1% Carers' Inflation	+1% Carers' Inflation	Life Expectancy 30 Years	Life Expectancy 50 Years	Life Expectancy -10%	Life Expectancy +10%	Large BI 10% Higher Avg. Size	Large BI £3.7m Avg. Size
			1	2	3	4	5	6	7	8	9	10	11	12	13*	14*
I&D Gross Reserves:	1,265m	1,535m	1,400m	1,669m	1,392m	1,743m	1,537m	1,532m	1,496m	1,582m	1,459m	1,609m	1,485m	1,587m	1,570m	1,667m
I&D Rein. Reserves:	236m	431m	334m	529m	353m	557m	455m	410m	396m	475m	380m	481m	393m	471m	442m	468m
I&D Net Reserves:	1,029m	1,103m	1,066m	1,141m	1,039m	1,187m	1,082m	1,122m	1,100m	1,107m	1,078m	1,128m	1,091m	1,115m	1,128m	1,199m
I&D Gross Mean term:	2.2	4.5	3.4	5.4	3.6	5.9	4.5	4.5	4.1	5.0	3.7	5.5	4.0	5.0	4.5	4.5
I&D Rein. Mean term:	3.4	9.2	7.1	10.5	7.5	11.6	9.7	8.7	8.3	10.2	7.4	11.0	8.3	10.1	9.1	8.9
I&D Net Mean term:	1.9	2.7	2.3	3.0	2.3	3.3	2.3	3.0	2.6	2.8	2.3	3.1	2.5	2.9	2.7	2.7
I&D Gross Loss Ratio:	75.3%	75.3%	75.3%	75.3%	72.3%	79.1%	75.1%	75.5%	75.1%	75.7%	75.3%	75.3%	75.3%	75.4%	74.8%	73.4%
I&D Rein. Loss Ratio:	49.3%	46.5%	47.9%	45.1%	37.0%	61.9%	48.0%	44.7%	44.1%	49.7%	46.9%	46.2%	45.8%	47.1%	45.8%	44.8%
I&D Net Loss Ratio:	77.3%	77.5%	77.4%	77.6%	75.0%	80.4%	77.4%	77.5%	77.4%	77.6%	77.5%	77.5%	77.5%	77.5%	77.5%	77.4%
Change from the base																
I&D Gross Reserves:			-135m	135m	-142m	209m	2m	-2m	-39m	47m	-76m	75m	-50m	52m	*	*
I&D Rein. Reserves:			-97m	97m	-78m	125m	24m	-21m	-36m	44m	-51m	50m	-38m	40m	10m	37m
I&D Net Reserves:			-37m	37m	-64m	83m	-22m	19m	-3m	3m	-25m	25m	-12m	12m	25m	95m
I&D Gross Mean term:			-1.1	0.9	-0.9	1.4	-0.0	0.0	-0.4	0.5	-0.9	1.0	-0.5	0.5	*	*
I&D Rein. Mean term:			-2.0	1.3	-1.7	2.4	0.5	-0.5	-0.9	1.0	-1.7	1.9	-0.9	0.9	-0.1	-0.3
I&D Net Mean term:			-0.4	0.4	-0.4	0.6	-0.3	0.3	-0.1	0.1	-0.4	0.4	-0.2	0.2	0.0	0.0
I&D Gross Loss Ratio:			-	-	-3.0%	3.8%	-0.2%	0.2%	-0.3%	0.3%	-	-	-0.1%	0.1%	*	*
I&D Rein. Loss Ratio:			1.4%	-1.4%	-9.5%	15.4%	1.5%	-1.8%	-2.4%	3.2%	0.4%	-0.3%	-0.7%	0.6%	-0.7%	-1.7%
I&D Net Loss Ratio:			-0.1%	0.1%	-2.5%	2.9%	-0.1%	0.0%	-0.1%	0.1%	-0.0%	0.0%	-0.0%	0.0%	-0.0%	-0.1%
Percentage Change from the base																
I&D Gross Reserves:			-8.8%	8.8%	-9.3%	13.6%	0.1%	-0.2%	-2.5%	3.1%	-4.9%	4.9%	-3.3%	3.4%	*	*
I&D Rein. Reserves:			-22.6%	22.6%	-18.1%	29.0%	5.5%	-4.9%	-8.2%	10.1%	-11.8%	11.6%	-8.8%	9.3%	2.4%	8.6%
I&D Net Reserves:			-3.4%	3.4%	-5.8%	7.6%	-2.0%	1.7%	-0.3%	0.3%	-2.3%	2.2%	-1.1%	1.1%	2.3%	8.6%
I&D Gross Mean term:			-23.5%	19.7%	-19.5%	31.6%	-0.1%	0.1%	-9.0%	10.9%	-18.9%	21.7%	-10.2%	10.9%	*	*
I&D Rein. Mean term:			-22.2%	14.0%	-18.6%	26.2%	5.2%	-5.5%	-9.7%	11.0%	-19.0%	20.2%	-9.4%	9.5%	-0.8%	-2.8%
I&D Net Mean term:			-14.5%	13.6%	-13.3%	22.3%	-12.9%	11.6%	-3.2%	3.3%	-13.4%	16.2%	-6.3%	6.8%	0.4%	1.6%
I&D Gross Loss Ratio:			-	-	-4.0%	5.0%	-0.3%	0.3%	-0.4%	0.4%	-	-	-0.1%	0.1%	*	*
I&D Rein. Loss Ratio:			3.0%	-3.0%	-20.5%	33.0%	3.2%	-3.9%	-5.1%	6.8%	0.8%	-0.6%	-1.5%	1.3%	-1.4%	-3.7%
I&D Net Loss Ratio:			-0.1%	0.1%	-3.2%	3.8%	-0.1%	0.0%	-0.1%	0.2%	-0.0%	0.0%	-0.0%	0.0%	-0.0%	-0.2%

These scenarios do not show changes to the gross positions because in changing the average sizes the net loss ratio and reinsurance loss ratio were kept constant on a 0% PPO propensity, but the gross loss ratios changed. Therefore, the movement would not be comparing like with like.

A straight change in the proportion of claims becoming a PPO.
The explanation of what is being changed by scenario is:

1. As for #1.
2. A change in the real discount rate, but not any other assumptions. The annual PPO payment of £51,819 is assumed to remain constant.
3. As for #3.
4. A change in the wage inflation assumption, but with the real discount rate staying steady.
    a. This does make a small change to the reinsurance premium as this is based on the indexation and the weighting between BI small and BI large. The net loss ratio is kept constant. This results in a slight reduction in the CV gross loss ratio.
5. As for #5.
6. A change in the carer's inflation.
    a. This applies only to PPO payments, but impacts both the actual payment size and the calculation of the indexation to be applied to the reinsurance deductible.
    b. As two different wage inflations apply the real discount rate is effectively changed overall, although the investment return remains at the Base scenario level.
    c. The assumption that the PPO cost remains equal to the Ogden cost in current value terms at inception no longer applies, although the annual PPO payment of £51,819 remains constant.
7. As for #7.
8. Expected life expectancy is changed, with a corresponding change in the annual PPO payment.
    a. The assumption that the PPO cost remains equal to the Ogden cost continues to apply.
    b. Hence on the base assumptions the gross loss ratio remains unchanged.
    c. This is very different from if expected life expectancies were not being met, e.g. expected 40 years, actual was 30 years.
    d. 100% of PPO recipients will still die at the new age.
9. As for #9
10. .a. An unexpected change in the life expectancy.
     b. i.e. age used to calculate the annual PPO payment.
11. As for #11.
12. The large BI claims average sizes were increased by 10%.
    a. The net loss ratio and reinsurance loss ratios on a conventional basis were kept constant.
    b. The conventional gross loss ratio has changed from 78.4% to 78.1% on a current value basis, and from 75.3% to 74.9% on an Inflated & Discounted basis. Therefore the gross movements are excluded from the table as they are not like for like.
    c. The increase in gross cost is being offset mostly by Small BI, but also partially by Own Property and TPPD due to the changing reinsurance premium (as the net loss ratio has been kept constant for these two perils).

13. As for #13, except that the average size was increased so that it was ~£3.7m, as per the average cost of PPOs from the industry survey.
    a. the gross cost of large BI claims to be an 11% loss ratio.

It is inappropriate to compare scenarios directly as at this time we do not know the different likelihoods of each scenario, or how the different factors may fluctuate. For example, the probability of the PPO Propensity being 15% will have a probability associated with it, say of 20%. The probability of one of the other scenarios occurring compared to the base case might be 30%. In which case comparing the cost of the two is not appropriate as one is much more likely than the other.

We do not know enough information to put reasonable probabilities on each of these scenarios occurring.

However, some trends can be seen. Most of the scenarios do impact the reserves held and mean terms. However, few have any material impact on the loss ratio for the insurer. The main exception to this is where the real discount rate changed. This occurred in scenarios 3 and 4, and to a lesser extent 7 and 8. This implies that economic assumptions will be a major factor in deciding if PPOs have a non-zero cost.

The scenario with the next largest impact for insurers on the net loss ratio is deteriorating the reinsurance retention. At first glance this appears to be a poor idea for PPOs. However, given the issues with using a flat average cost, this may over-estimate the cost of increasing the retention.

For Reinsurers a number of the scenarios have a material impact on the cost. Again, the real discount rate has the largest impact, changing the loss ratio by -9.5 and +15.4 loss ratio points. However, 12 of the 14 scenarios change the loss ratio by at least 0.5 loss ratio points. For the insurer, only the two scenarios where the real discount rate changes have that large an impact on either the gross or net loss ratio.

Reinsurers also generally have the largest movements for the reserve size and the mean term.

It would be nice to be able to investigate the impact of increasing the reinsurance retention above £1m, both to investigate the impact and as many companies have a higher retention. Unfortunately, as we are not using an actual distribution of claim sizes but a point estimate, unless the number of claims exceeding the new retention and the cost of the claims above it is known changing the retention would underestimate the recoveries. As there is little market information on the propensity of large claims other than at the £1m mark, this analysis was not performed.

Although not captured in this section, the Reinsurance section of the paper points out the impact if certain assumptions are assumed to change over time, even if the overall average is equal to the point estimation used in this model. For example, the impact of inflation rotating between being 2% then 6% year on year rather than a flat 4% would cause different results, or using a mortality probabilities rather than a single point estimate time of death. The exact impact is beyond the scope of the current model.

Below are further sets of sensitivities, combining scenarios from the table above.

	Original (No PPOs)	30% PPOs Base Position	Scenarios #1 & #3	Scenarios #2 & #4	Scenarios #1 & #5	Scenarios #2 & #6	Scenarios #1 & #7	Scenarios #2 & #8	Scenarios #1 & #9	Scenarios #2 & #10	Scenarios #1 & #11	Scenarios #2 & #12	Scenarios #3 & #11
I&D Gross Reserves:	1,265m	**1,535m**	1,297m	1,947m	1,402m	1,667m	1,381m	1,740m	1,362m	1,782m	1,375m	1,748m	1,359m
I&D Rein. Reserves:	236m	**431m**	286m	706m	331m	480m	316m	594m	308m	604m	315m	589m	328m
I&D Net Reserves:	1,029m	**1,103m**	1,012m	1,241m	1,071m	1,187m	1,064m	1,145m	1,054m	1,178m	1,060m	1,159m	1,031m
I&D Gross Mean term:	2.2	**4.5**	2.9	7.2	3.4	5.4	3.2	6.0	3.0	6.7	3.2	6.0	3.4
I&D Rein. Mean term:	3.4	**9.2**	5.9	13.0	7.7	10.1	6.5	11.5	5.9	12.5	6.5	11.4	6.9
I&D Net Mean term:	1.9	**2.7**	2.1	3.9	2.1	3.5	2.2	3.2	2.1	3.7	2.2	3.3	2.2
I&D Gross Loss Ratio:	75.3%	**75.3%**	72.4%	79.4%	75.1%	75.5%	75.2%	75.8%	75.3%	75.3%	75.3%	75.4%	72.3%
I&D Rein. Loss Ratio:	49.3%	**46.5%**	39.6%	63.9%	48.6%	42.4%	46.7%	49.9%	48.1%	44.7%	47.5%	46.0%	36.7%
I&D Net Loss Ratio:	77.3%	**77.5%**	74.9%	80.6%	77.4%	77.7%	77.3%	77.8%	77.4%	77.6%	77.4%	77.6%	75.0%

Change from the base

	Original (No PPOs)	30% PPOs Base Position	Scenarios #1 & #3	Scenarios #2 & #4	Scenarios #1 & #5	Scenarios #2 & #6	Scenarios #1 & #7	Scenarios #2 & #8	Scenarios #1 & #9	Scenarios #2 & #10	Scenarios #1 & #11	Scenarios #2 & #12	Scenarios #3 & #11
I&D Gross Reserves:			-237m	412m	-133m	132m	-154m	205m	-173m	247m	-160m	213m	-176m
I&D Rein. Reserves:			-146m	275m	-101m	49m	-115m	163m	-123m	172m	-117m	158m	-104m
I&D Net Reserves:			-92m	138m	-32m	84m	-39m	42m	-50m	74m	-43m	56m	-72m
I&D Gross Mean term:			-1.6	2.7	-1.1	0.9	-1.3	1.5	-1.5	2.2	-1.3	1.5	-1.2
I&D Rein. Mean term:			-3.3	3.9	-1.5	1.0	-2.7	2.4	-3.3	3.3	-2.7	2.2	-2.3
I&D Net Mean term:			-0.6	1.2	-0.6	0.8	-0.4	0.5	-0.6	1.0	-0.5	0.6	-0.5
I&D Gross Loss Ratio:			-2.9%	4.1%	-0.2%	0.2%	-0.1%	0.5%	-	-	-0.0%	0.1%	-3.0%
I&D Rein. Loss Ratio:			-6.9%	17.4%	2.1%	-4.1%	0.2%	3.4%	1.6%	-1.8%	1.0%	-0.5%	-9.8%
I&D Net Loss Ratio:			-2.6%	3.1%	-0.1%	0.2%	-0.2%	0.3%	-0.1%	0.1%	-0.1%	0.1%	-2.5%

Percentage Change from the base

	Original (No PPOs)	30% PPOs Base Position	Scenarios #1 & #3	Scenarios #2 & #4	Scenarios #1 & #5	Scenarios #2 & #6	Scenarios #1 & #7	Scenarios #2 & #8	Scenarios #1 & #9	Scenarios #2 & #10	Scenarios #1 & #11	Scenarios #2 & #12	Scenarios #3 & #11
I&D Gross Reserves:			-15.5%	26.9%	-8.6%	8.6%	-10.0%	13.4%	-11.3%	16.1%	-10.4%	13.9%	-11.5%
I&D Rein. Reserves:			-33.8%	63.7%	-23.3%	11.3%	-26.7%	37.8%	-28.5%	40.0%	-27.0%	36.5%	-24.0%
I&D Net Reserves:			-8.3%	12.5%	-2.9%	7.6%	-3.5%	3.8%	-4.5%	6.7%	-3.9%	5.0%	-6.5%
I&D Gross Mean term:			-35.5%	59.5%	-23.6%	19.8%	-28.7%	33.8%	-34.3%	47.8%	-29.4%	33.7%	-25.6%
I&D Rein. Mean term:			-36.0%	42.1%	-16.0%	10.5%	-29.5%	25.7%	-35.8%	36.4%	-29.4%	24.0%	-24.8%
I&D Net Mean term:			-22.8%	43.8%	-20.6%	29.9%	-16.2%	18.3%	-21.5%	36.4%	-17.8%	23.2%	-16.9%
I&D Gross Loss Ratio:			-3.8%	5.5%	-0.3%	0.3%	-0.2%	0.7%	-	-	-0.0%	0.1%	-4.0%
I&D Rein. Loss Ratio:			-14.8%	37.4%	4.6%	-8.9%	0.4%	7.3%	3.4%	-3.8%	2.3%	-1.0%	-21.0%
I&D Net Loss Ratio:			-3.3%	4.0%	-0.1%	0.2%	-0.2%	0.4%	-0.2%	0.2%	-0.1%	0.2%	-3.3%

	Original (No PPOs)	30% PPOs Base Position	Scenarios #3 & #7	Scenarios #4 & #8	Scenarios #3 & #9	Scenarios #4 & #10	Scenarios #5 & #9	Scenarios #6 & #10	Scenarios #3, #5 & #7	Scenarios #4, #6 & #8	Scenarios #9 & #11	Scenarios #10 & #12	Scenarios #3 & #14	Scenarios #4 & #14	Scenarios #11 & #14	Scenarios #12 & #14
I&D Gross Reserves:	1,265m	1,535m	1,368m	1,825m	1,345m	1,892m	1,461m	1,607m	1,369m	1,821m	1,420m	1,609m	1,513m	1,890m	1,617m	1,719m
I&D Rein. Reserves:	236m	431m	330m	631m	322m	660m	394m	452m	345m	591m	350m	481m	386m	600m	429m	510m
I&D Net Reserves:	1,029m	1,103m	1,038m	1,194m	1,022m	1,233m	1,067m	1,155m	1,025m	1,230m	1,070m	1,128m	1,127m	1,289m	1,188m	1,210m
I&D Gross Mean term:	2.2	4.5	3.4	6.7	3.1	7.8	3.7	5.5	3.4	6.7	3.3	5.5	3.6	5.8	4.0	4.9
I&D Rein. Mean term:	3.4	9.2	6.8	12.9	6.4	14.7	7.8	10.5	7.2	12.4	6.8	11.0	7.3	11.3	8.1	9.8
I&D Net Mean term:	1.9	2.7	2.3	3.4	2.1	4.2	2.1	3.5	2.1	4.0	2.2	3.1	2.4	3.2	2.6	2.9
I&D Gross Loss Ratio:	75.3%	75.3%	72.2%	79.8%	72.4%	79.3%	75.1%	75.5%	72.0%	80.0%	75.3%	75.3%	70.1%	77.5%	73.3%	73.5%
I&D Rein. Loss Ratio:	49.3%	46.5%	35.7%	68.6%	37.7%	63.5%	48.2%	44.3%	36.9%	66.5%	46.1%	46.2%	36.7%	56.9%	44.4%	45.1%
I&D Net Loss Ratio:	77.3%	77.5%	74.9%	80.6%	75.0%	80.5%	77.4%	77.5%	74.9%	80.8%	77.4%	77.5%	74.8%	80.4%	77.4%	77.4%
Change from the base																
I&D Gross Reserves:			-167m	290m	-190m	358m	-74m	72m	-165m	286m	-115m	75m	-22m	355m	82m	184m
I&D Rein. Reserves:			-101m	200m	-109m	228m	-38m	21m	-87m	160m	-81m	50m	-46m	169m	-2m	78m
I&D Net Reserves:			-66m	91m	-81m	129m	-36m	51m	-79m	126m	-33m	25m	24m	186m	85m	106m
I&D Gross Mean term:			-1.1	2.2	-1.4	3.3	-0.9	1.0	-1.1	2.2	-1.2	1.0	-0.9	1.3	-0.5	0.4
I&D Rein. Mean term:			-2.3	3.7	-2.8	5.5	-1.4	1.3	-2.0	3.2	-2.4	1.9	-1.9	2.1	-1.1	0.6
I&D Net Mean term:			-0.4	0.8	-0.6	1.5	-0.6	0.9	-0.6	1.3	-0.5	0.4	-0.3	0.6	-0.1	0.2
I&D Gross Loss Ratio:			-3.2%	4.4%	-3.0%	4.0%	-0.2%	0.2%	-3.4%	4.6%	-0.1%	-	-5.2%	2.2%	-2.0%	-1.9%
I&D Rein. Loss Ratio:			-10.8%	22.1%	-8.8%	17.0%	1.7%	-2.2%	-9.6%	20.0%	-0.4%	-0.3%	-9.8%	10.4%	-2.1%	-1.4%
I&D Net Loss Ratio:			-2.6%	3.1%	-2.5%	3.0%	-0.1%	0.1%	-2.5%	3.3%	-0.0%	0.0%	-2.7%	2.9%	-0.1%	-0.1%
Percentage Change from the base																
I&D Gross Reserves:			-10.9%	18.9%	-12.4%	23.3%	-4.8%	4.7%	-10.8%	18.6%	-7.5%	4.9%	-1.4%	23.1%	5.4%	12.0%
I&D Rein. Reserves:			-23.5%	46.3%	-25.3%	52.9%	-8.8%	4.8%	-20.1%	37.0%	-18.9%	11.6%	-10.6%	39.1%	-0.5%	18.1%
I&D Net Reserves:			-6.0%	8.2%	-7.3%	11.7%	-3.3%	4.7%	-7.1%	11.4%	-3.0%	2.2%	2.1%	16.9%	7.7%	9.6%
I&D Gross Mean term:			-25.1%	49.2%	-30.5%	74.1%	-19.0%	21.8%	-25.3%	49.0%	-25.7%	21.7%	-19.0%	28.4%	-10.3%	9.2%
I&D Rein. Mean term:			-25.6%	40.8%	-30.7%	60.1%	-15.1%	13.8%	-21.4%	34.7%	-26.1%	20.2%	-20.9%	22.8%	-12.0%	6.5%
I&D Net Mean term:			-15.1%	28.5%	-21.1%	56.0%	-20.8%	32.3%	-22.6%	49.2%	-17.1%	16.2%	-10.0%	20.6%	-3.6%	7.3%
I&D Gross Loss Ratio:			-4.2%	5.9%	-3.9%	5.3%	-0.3%	0.3%	-4.5%	6.1%	-0.1%	-	-6.9%	2.9%	-2.6%	-2.5%
I&D Rein. Loss Ratio:			-23.2%	47.5%	-18.9%	36.6%	3.7%	-4.6%	-20.7%	43.0%	-0.9%	-0.6%	-21.2%	22.4%	-4.6%	-2.9%
I&D Net Loss Ratio:			-3.3%	4.0%	-3.3%	3.9%	-0.1%	0.1%	-3.3%	4.3%	-0.1%	0.0%	-3.5%	3.7%	-0.2%	-0.1%

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Summary

The sensitivity tables show that varying some of the assumptions can have a large impact on the results. As such it is very hard to say what hard and tight information can be taken from this analysis, as each actuary will have different views on the degree to which assumptions will, or already have, differed from the base scenario. Depending on the blend of assumptions taken will have a big impact on how beneficial or damaging PPOs will be assumed to be to each insurer's book. Of course, over time we will find out whether they are beneficial or detrimental.

What is clearly apparent is that although the change in ultimate discounted cost may or may not vary, the size of reserves held by insurers, will increase substantially and the mean terms will also increase. Reinsurers may benefit from the deductible creep, but will have a much larger hit to their mean term and reserves sizes compared to insurers. They will also be subject to more uncertainty, with many of the scenarios above having significant impacts on their costs, reserves and mean terms.

It should be remembered the reinsurance pattern being assumed is a simplification, with the large claims pattern adopted. This is likely to mean the base scenario is underestimating the mean term, and the impact of adding PPOs can't be certain. However, the reinsurance flows from the PPOs have been calculated explicitly. Generally, the impacts should follow similar trends to this analysis.

Larger reserves with a longer mean term has a number of implications. The sensitivity of the business to fluctuations in investment yield (both attained and expected) will increase. Larger reinsurance reserves will also add to the credit risk held by direct insurers. Changes in the models will have a larger impact on the size of reserves, and more implications for investment strategy. All else being equal it would be expected that the size of the distribution of the probability of sufficiency of reserves will grow when allowing for PPOs. That the models will probably tend towards vast simplification or black box models may also increase the uncertainty.

And the greater uncertainty from these models will also flow naturally into pricing. The implications of underpricing and building up an insufficient reserve over many years could be devastating to an insurer, and have implications for governments and regulators. Given the probable increase in risks, it would be expected that PPOs will raise the amount of capital required against the business.

On the upside, insurers and regulators will probably require actuaries more than ever.

5.Industry Experience

Introduction

The Industry Experience workstream is made up of two elements:

- a data collection exercise to analyse and summarise actual PPO experience across the industry

- a qualitative analysis of current industry practice on how PPO claims are reserved for, both on an individual and an aggregate basis

A total of 10 insurance groups contributed to the study, including 8 out of the top 10 insurers, who together account for some 79% of FSA regulated entities (based on premium volumes from the 2008 FSA returns). The working party would like to thank the contributors, who included:

- Allianz Insurance

- CFS

- Zurich Insurance

- RBSI

- Aviva

- RSA

- NFU Mutual

- esure

- Liverpool Victoria

- Highway

Summary of Data Collected

Each insurer was asked to submit information with as much of the following information available on individual PPO claims as possible:

- Class of business (Private Car, CV, Fleet etc)

- Cover (Comp/Non-Comp)

- Accident date

- Settlement date

- Date of birth

- Gender of claimant

- Nature of injury

- Contributory negligence

- Life expectancy details:

  - Life expectancy

  - Basis used

  - Life expectancy from when

  - Whether reserve is determined by an average life expectancy or by an annuity approach

- Method of funding

- Basis and percentile of PPO award (e.g. ASHE 6115 at 80th percentile)

- Schedule of payments, including

  - Value of lump sum, date paid and nature of award

  - Amount of periodic payment and nature of award

  - Value of periodic payment on an Ogden basis

  - Frequency of payments

  - Reserve held

  - Method of reserving

- Details of any variation orders

- Any other material facts on the claim, including information if the claim was "commuted", whether the claimant is still alive or not

- Who decided on PPO (claimant, defendant or judge)

- How many claimants with PPOs were associated with the claim

- How will reinsurance work with the claim

- Are there any indemnity guarantees, for example for services by local council (which may become income tested)

In total, details of 97 individual PPOs were collected from the 10 insurers. Not all of the above data was available across all insurers. In virtually all cases, however, critical fields, such as accident dates, settlement dates, lump-sum and periodic payment amounts and life expectancy data, were available.

Of the 97 cases analysed, 7 individuals have subsequently died. Initially this mortality rate appeared to be higher than expected, although the average age at settlement of these individuals was 68, compared to an average across all cases of 33.

Detailed Experience Summaries

In this section, we summarise a number of key outputs from the data collected. The summaries have been categorised into a number of broad categories, including:

- numbers of PPOs across the study

- investment returns at settlement time

- time to settlement

- amount summaries

Summary of number of PPOs

In total, details of 97 PPOs were collected from the contributors. The graph below shows the proportion split by cover type:

Cover Type

Legend:
- Unknown
- Comp
- Non-Comp
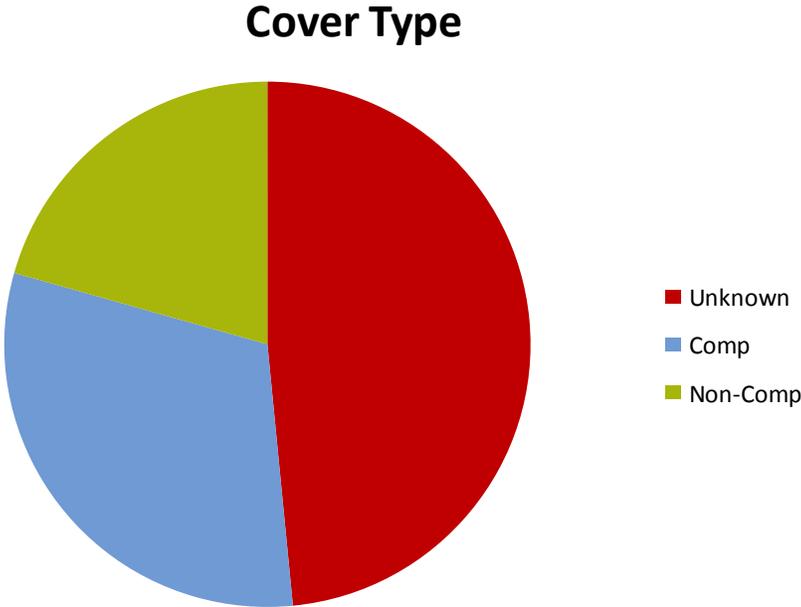
Cover type was not available for a significant number of claims. However, where available, there appears to be a bias towards non-comprehensive claims: of the 50

claims where cover type was available, 20 were non-comprehensive. This is a significantly higher proportion than the proportion of non-comprehensive business written. In the 2008 FSA returns, only 7% of Private Car Motor insurance was written with non-comprehensive cover (both by exposure and premium measures).

The graph below shows the experience by class of business:

Class of Business

- Commercial Motor
- Fleet
- Personal Motor
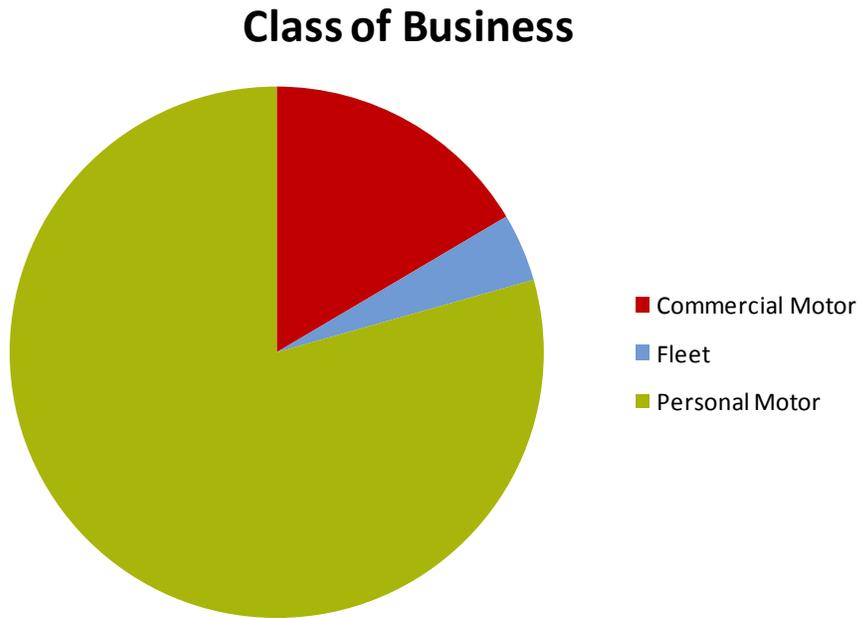
The split between personal and commercial motor is broadly consistent with the split of volumes written in the 2008 FSA returns.

For most claims, the gender of the claimant was available, and is shown in the graph below.

Gender
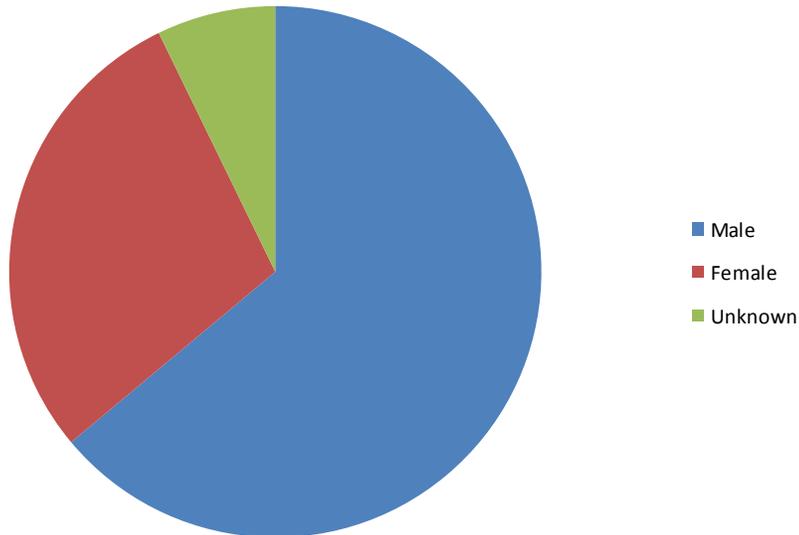
There is a significant bias towards male claimants. Although we did not have the details of the driver at the time of the accident, this bias in claimant gender may reflect a bias in the gender of drivers involved in catastrophic accidents (and perhaps their passengers).

The graphs below show the distribution of claimant age at the date of accident and on settlement.
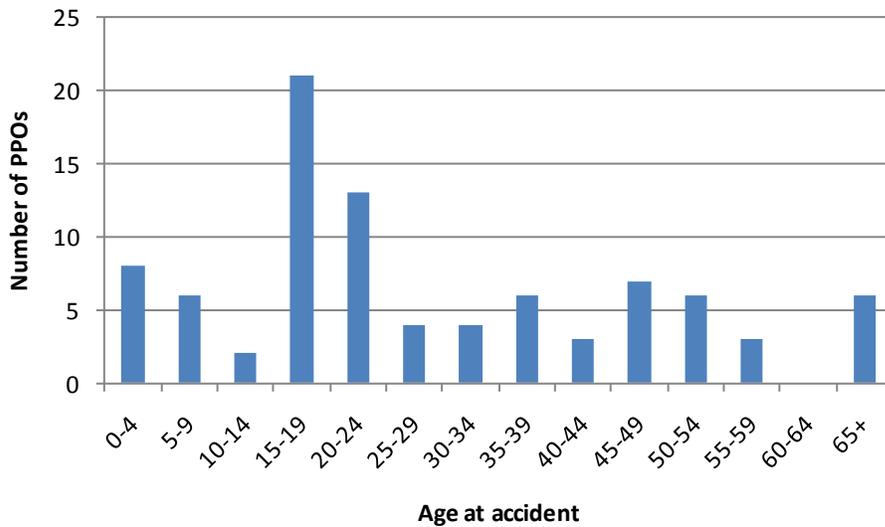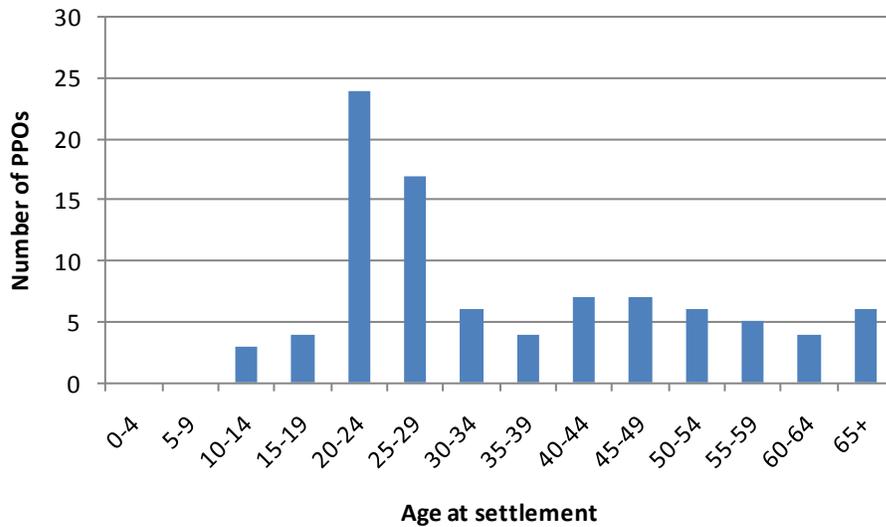
Both graphs show very interesting trends. The age of the claimants at the time of the accident is significantly biased towards younger people; there are a number of possible reasons for this:

- it may reflect a higher proportion of large claims awards involving minors requiring court approval, and so there may not be scope for a lump-sum settlement in that judges may be more likely to award a PPO

- with a longer life expectancy for younger claimants, the greater certainty given to the claimants by a PPO award in terms of paying for future care may be more appealing

A very high number of awards are settled when the claimant is in their twenties. The probably reflects claimants who were minors at the time of the accident being awarded a PPO once they reach the age of majority. This is consistent with the graph showing the delay between accident and settlement shown further below.

The graph below shows the age at accident information but additionally split by gender.
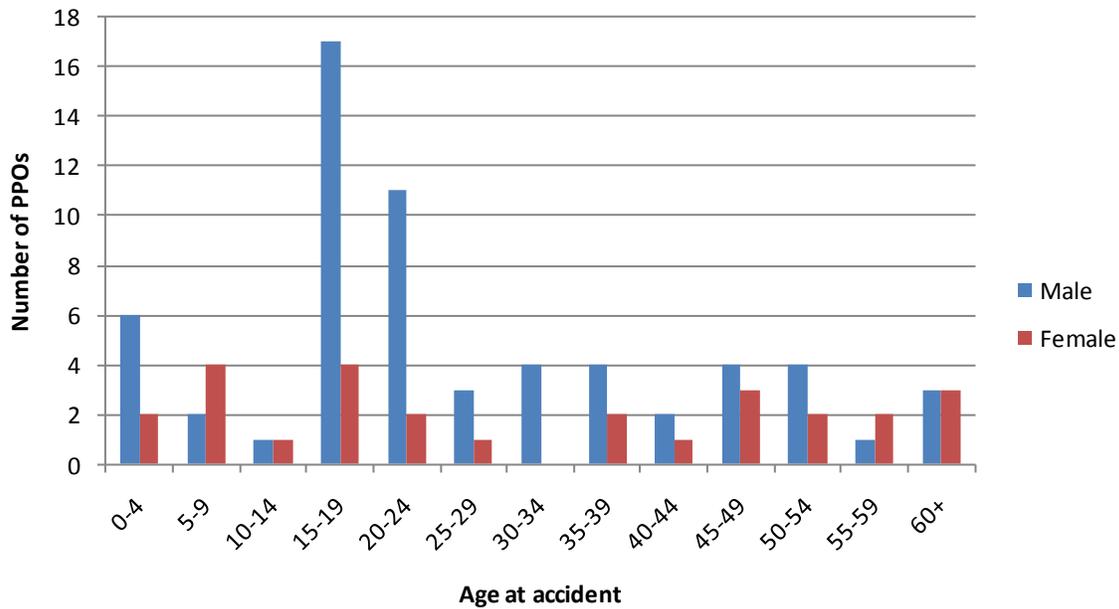
Whilst females have a broadly flat number of PPO claims across different ages, there is a noticeable increase in male claimants in their early twenties, in other words younger males appear to be far more likely to be involved in some form in catastrophic road accidents.

These trends are consistent with more generic road death information. The graph below shows the proportions of road fatalities by age band between 1998 and 2008 by age, alongside the PPO claimant distribution.
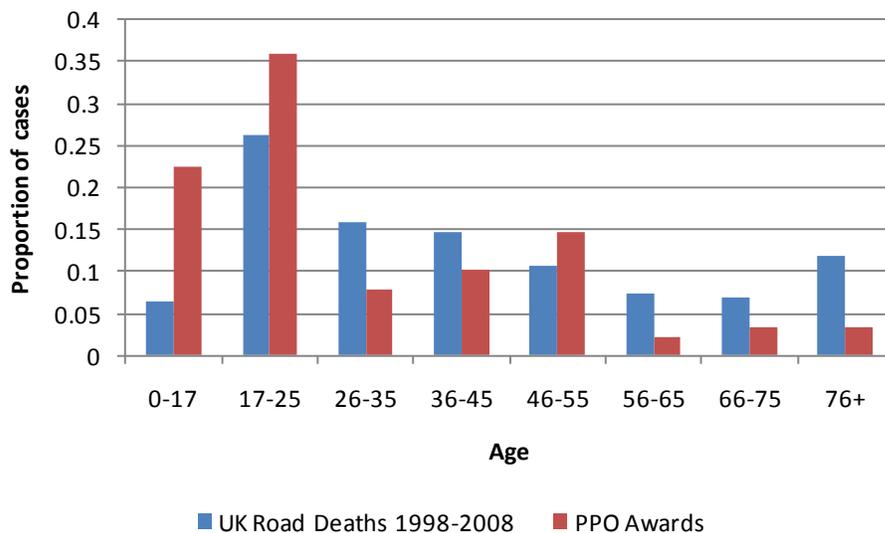
UK Road Deaths Source: Department of Transport

Road deaths by gender also show the same consistency with PPO claimant details.

UK Road Deaths 1998 -2008 by Gender
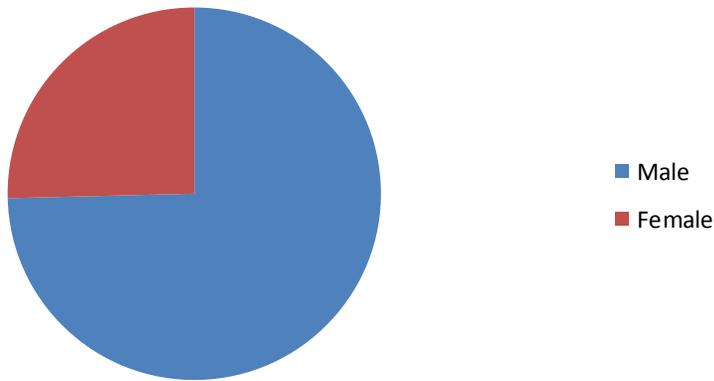
UK Road Deaths Source: Department of Transport

Finally, the graph below shows the relationship between the age at settlement (X-axis) and percentage reduction in life expectation, compared to the sixth edition Ogden Tables (Y-axis).

Percentage reduction in life expectancy by age at settlement
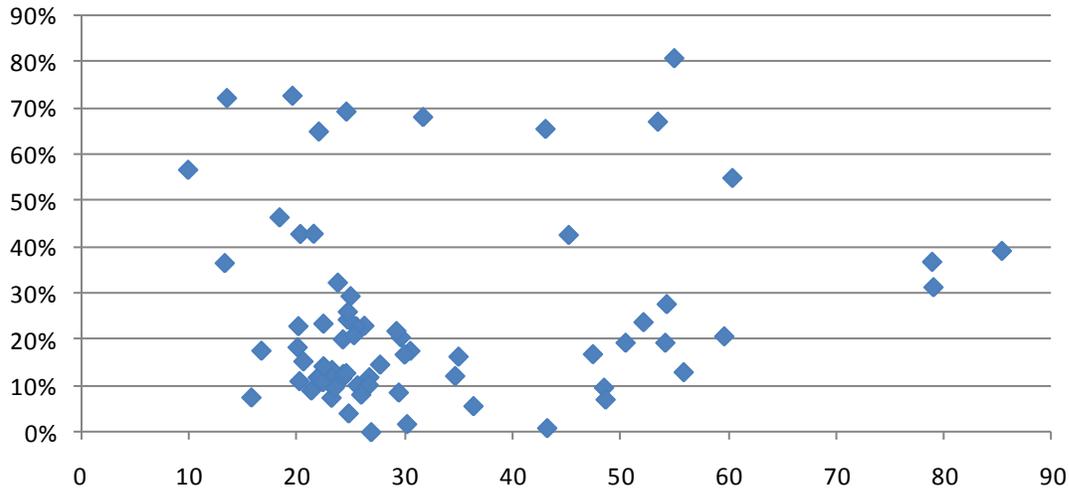
The average reduction in life expectancy is 25%. There is no consistent relationship across age groups to the percentage reduction in life expectancy.

Summary of Numbers by Settlement Period

The graph below shows the number of PPOs awarded by the accident quarter of settlement.
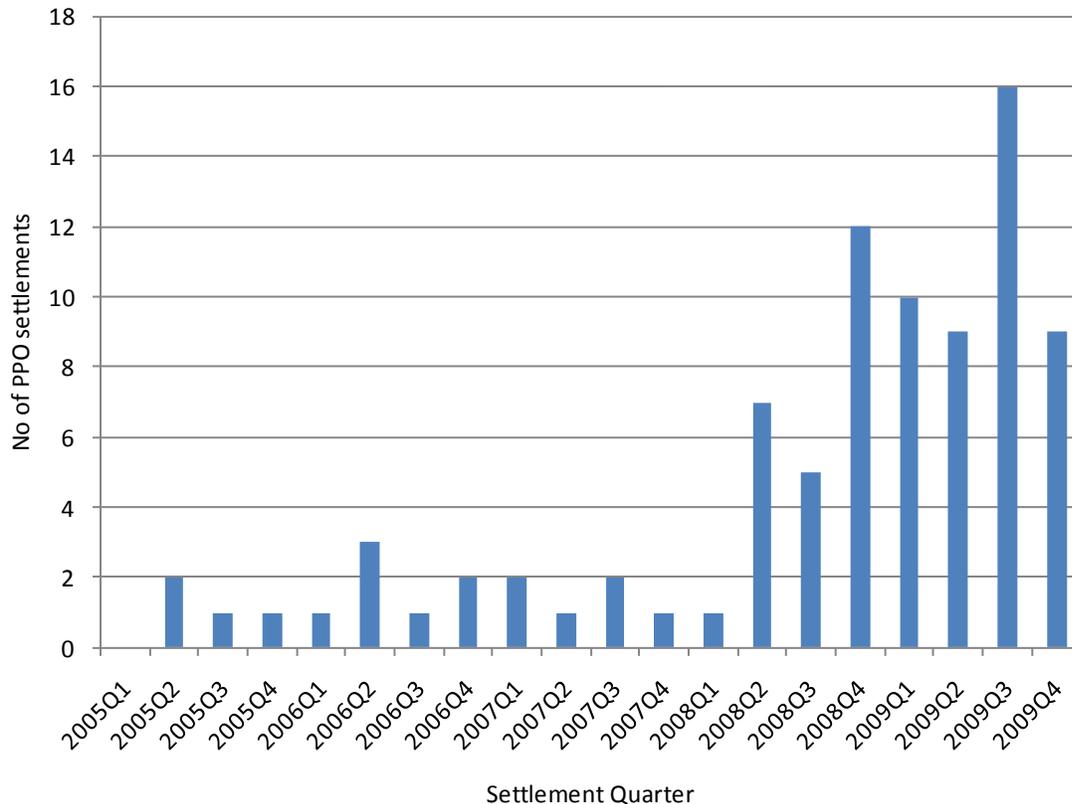
The first awards were made in the second quarter of 2005, and up until the first quarter 2008, the highest number of claims awarded as PPOs within a quarter was 3, with an average of 1.5 per quarter being awarded across the industry.

In the second quarter of 2008, the picture changed, and the industry is now seeing an average of in excess of 9.5 claims awarded as a PPO in each quarter.

The cause of the change in numbers awarded is the source of some debate. The initial low level of take-up of PPOs may simply be because of the newness of the legislation.

However, the suddenness of the change in numbers appears to be closely related to one of two potential significant changes.

Firstly, there was the obvious change in economic conditions during 2008. The graphs below plot the number of PPO settlements alongside Government short term interest rates and the return on Government bonds, and separately we show the number of PPO settlement alongside the FTSE100 index over the period.
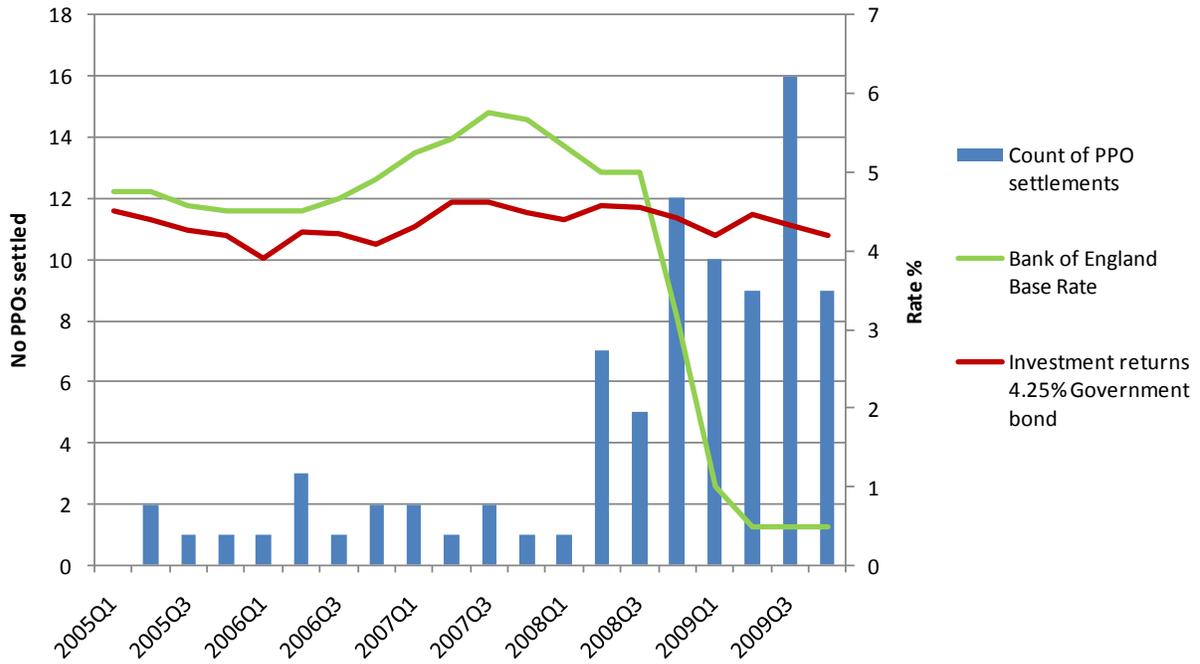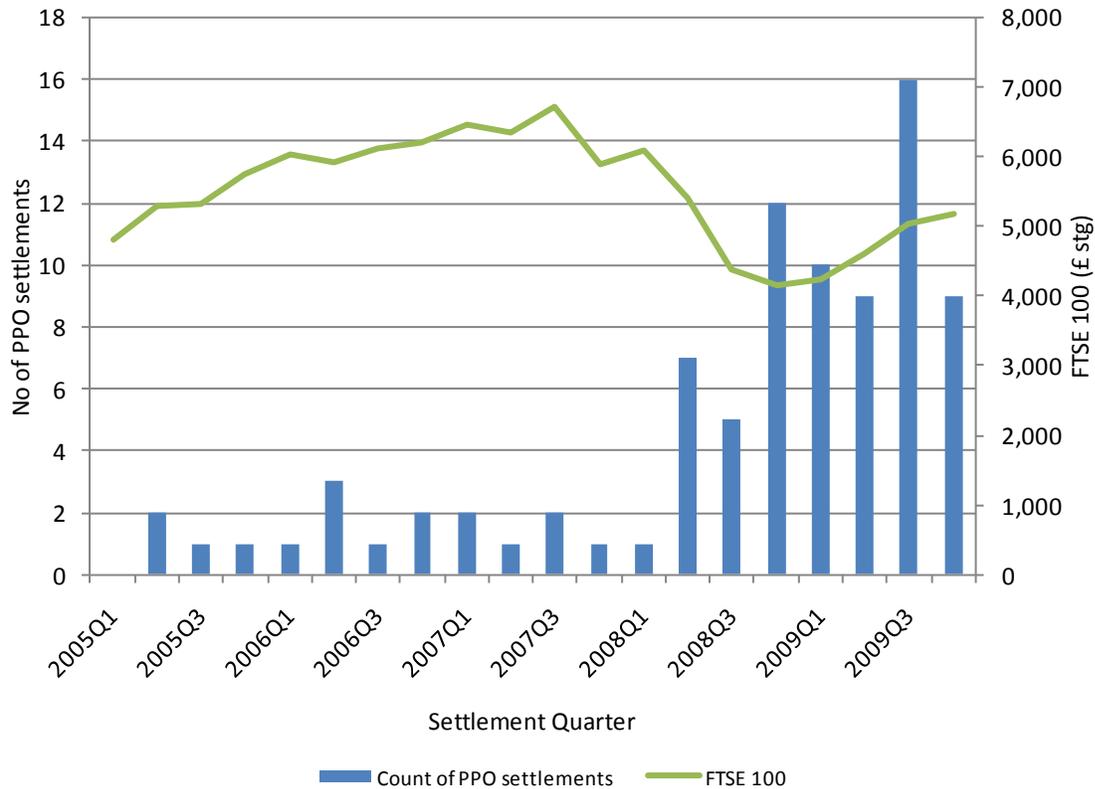
The initial sharp rise in the number of PPOs awarded appears to be very correlated with the fall in the FTSE, with a second jump up in numbers being correlated with lower Bank of England base rates; the rises in the FTSE during 2009, however, has not shown any corresponding reduction in PPO settlements to date.

The second potential source of a significant uptake in PPO claims is very closely related to the date of the Thomstone vs Tameside ruling, and in particular the date of the appeal. The graph below indicates the timing of these events alongside the number of settlements.
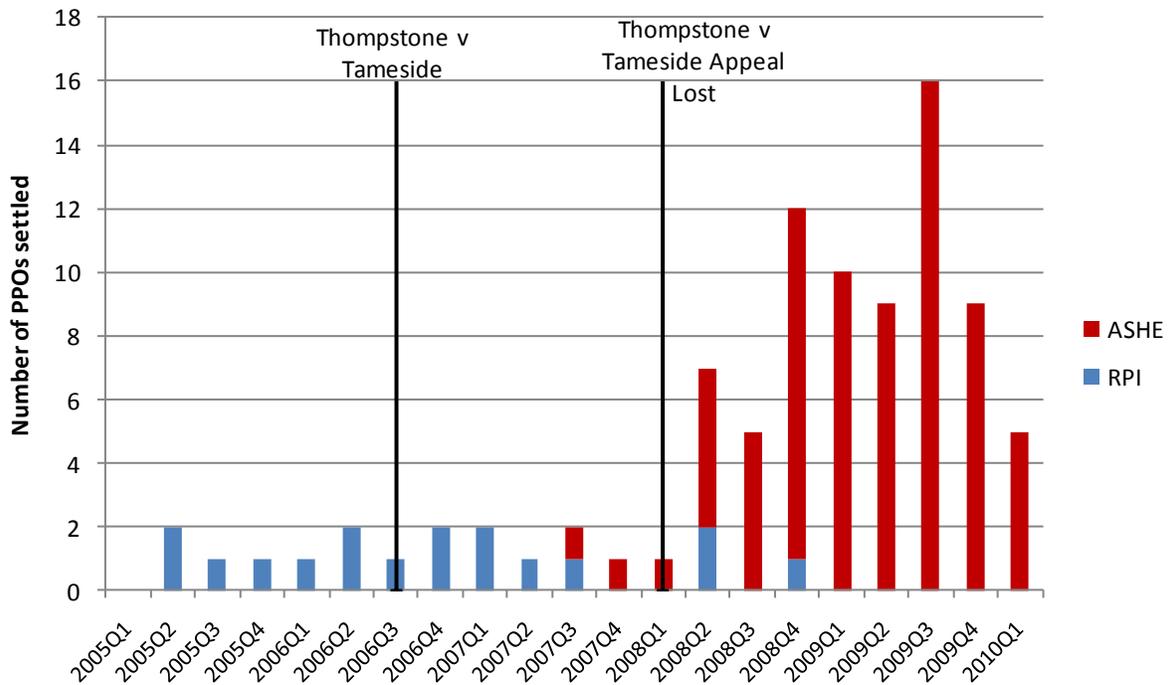
Following on from the original judgement, there was no increase in the numbers of PPO settlements seen across the industry. At the same time, however, most PPOs continued to be settled allowing for RPI increases only. After the appeal, however, most claims have been settled with an ASHE increase, and this has coincided with the significant increase in the take-up rate of PPOs.

Time to Settlement

The graph below shows the distribution of the delay between the date of accident and the date of settlement.
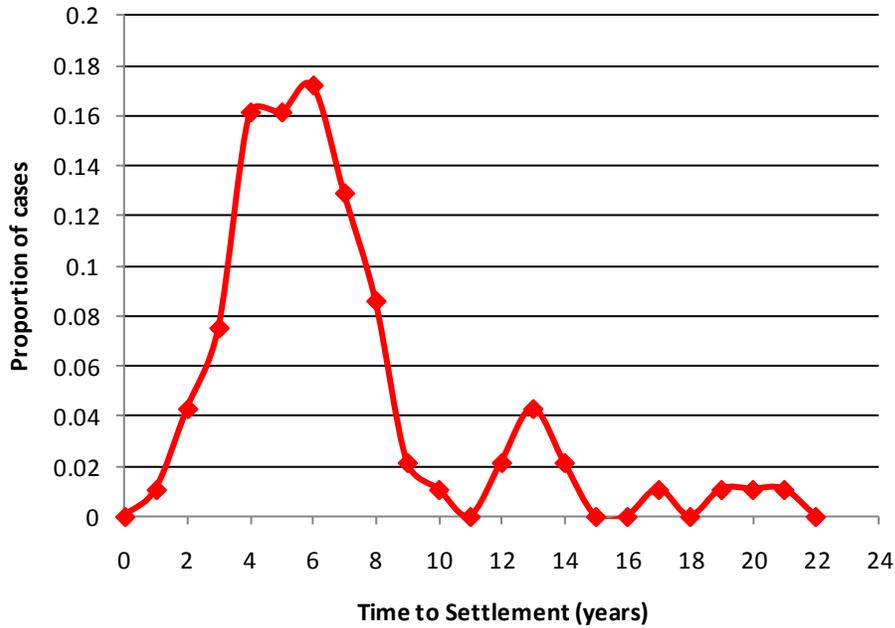
A small proportion of claims are settled within three years of the accident. The bulk of claims are settled between four and eight years after the accident. Some claims take considerably longer to settle as PPOs, with the longest time between accident and settlement within the claims analysed being some 22 years.

Additionally, the graphs below show the relationship between time to settlement and the lump sum amount/periodic payment amount.

PPO Amount Vs Time to Settlement
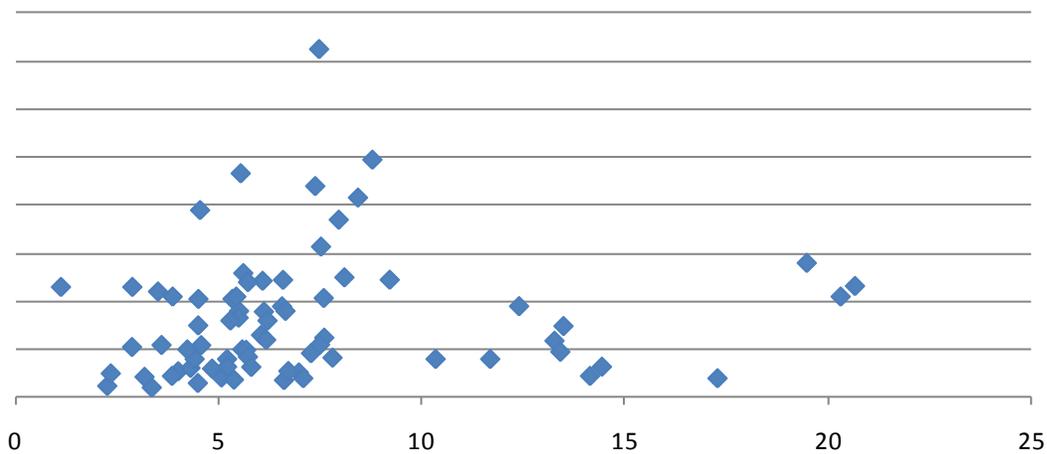
Both graphs show relatively little correlation to the delay between accident occurrence and settlement and size of award.

The graph below shows the relationship between age at accident (X-axis) and time to settlement (Y-axis). For most ages no consistent relationship can be seen. Claimants aged ten and under have a significantly higher average time to settlement than seen for other ages, this is most likely due to these claimants having to reach the age of majority before a settlement is granted.

Time to Settlement Vs Age at Accident
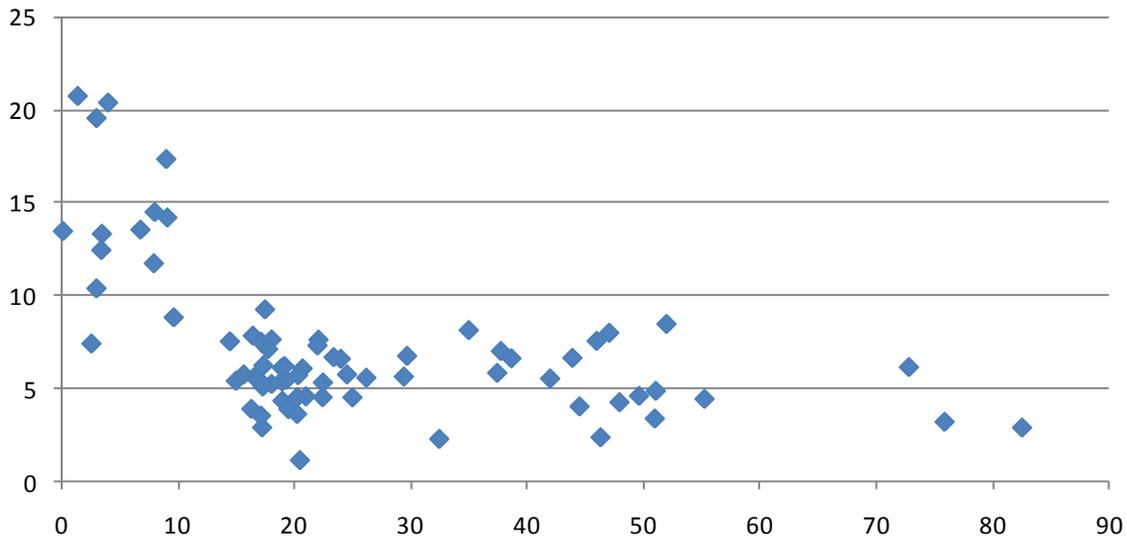
Claim amounts

The graph below shows the distribution of the lump sum associated with the claim (i.e. excluding the value of any periodic payment amounts).
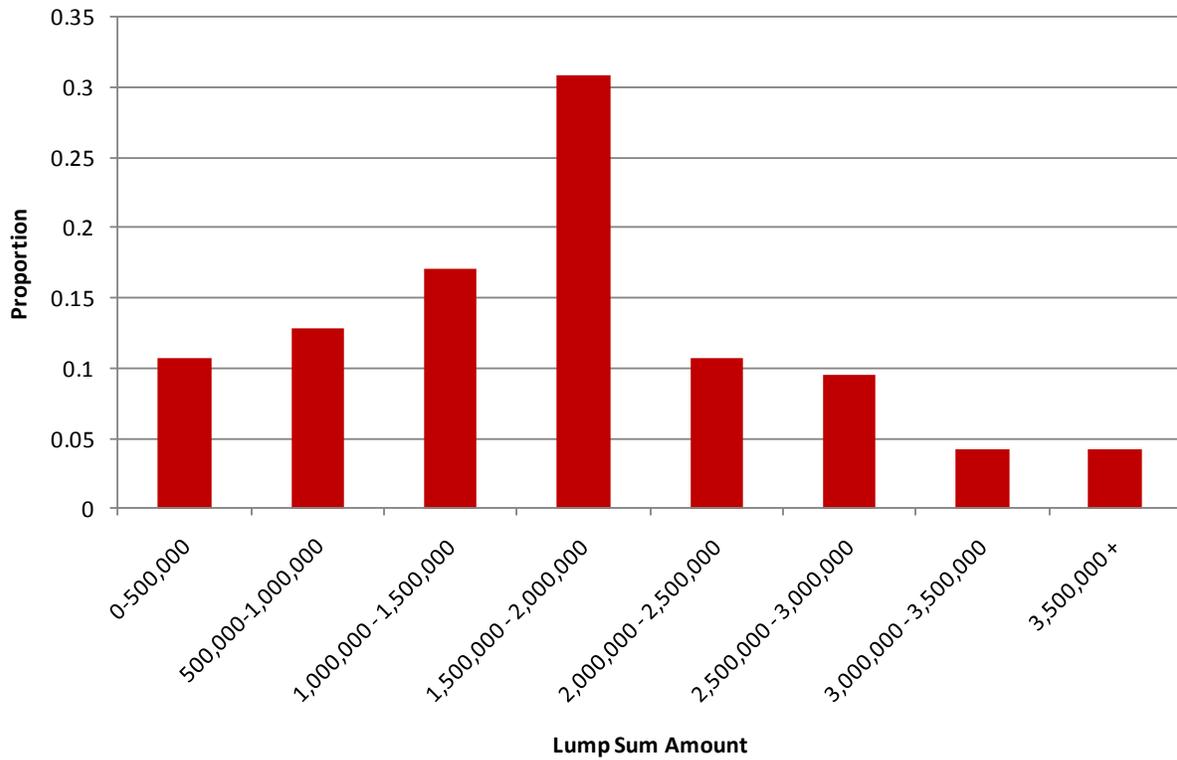
Unsurprisingly, the lump-sums associated with these claims are large, with over 75% of claims having a lump-sum in excess of £1m.

The graph below shows the distribution of the size of the annual PPO payment.
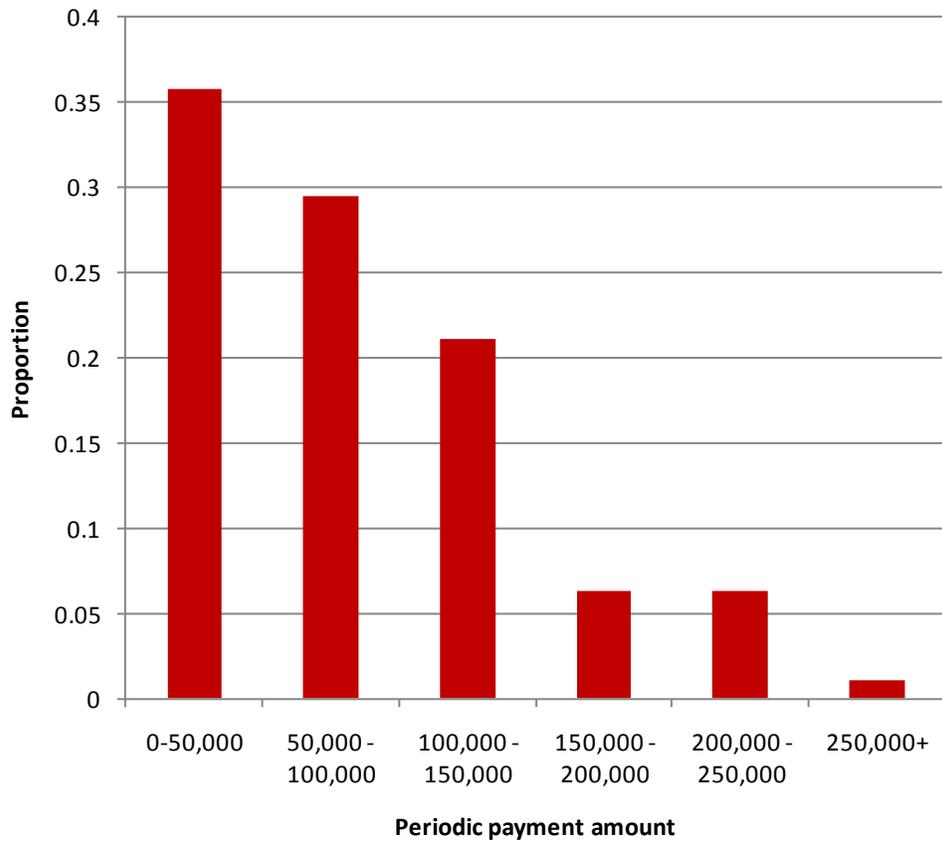
Most PPO annual payments amount to less than £150,000, with a small proportion exceeding this amount. The highest annual award within the study was £362,585 per annum.

The graph below shows the relationship between the lump sum award (on the X-axis) and the annual PPO payment (on the Y-axis).

PPO Amount Vs Lump Sum Amount
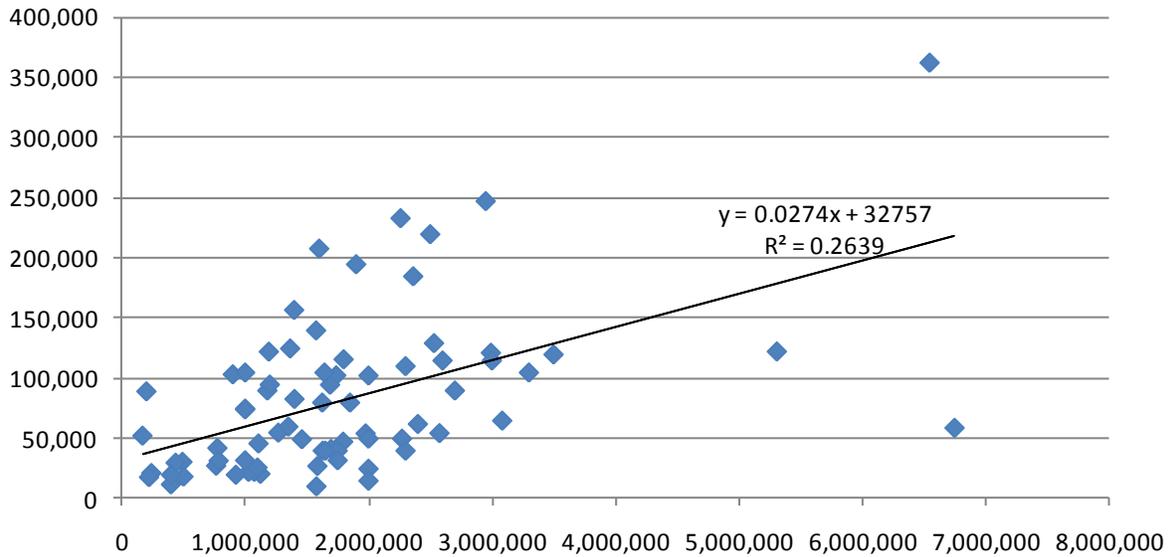
There is some correlation between the lump sum and periodic payment amounts. It is not unexpected that more serious cases, which may require a greater payment in order to service care costs, would have larger lump sum awards associated with them.

The graphs below show the relationship between the reduction in life expectancy of the claimant (on the X-axis) to the lump sum and periodic payment amounts (on the Y-axis).

Lump Sum size by reduction in life expectancy
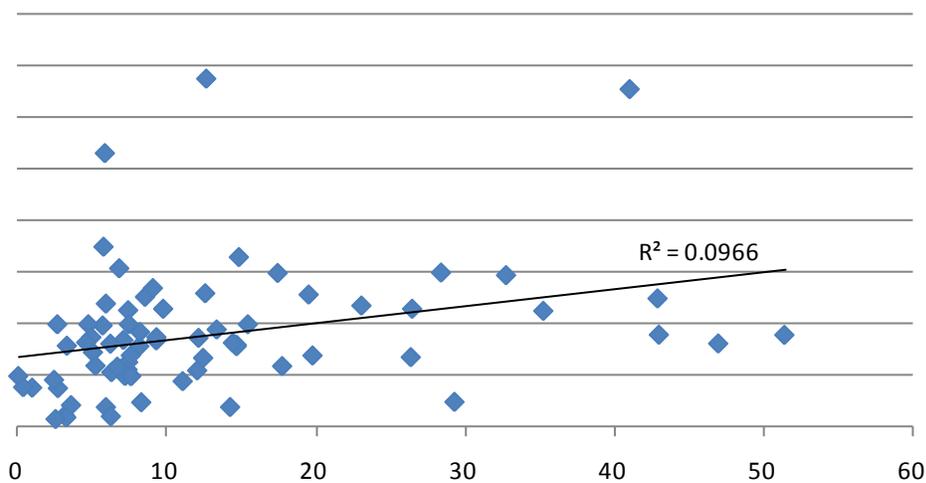
Total PPO amount by reduction in life expectancy
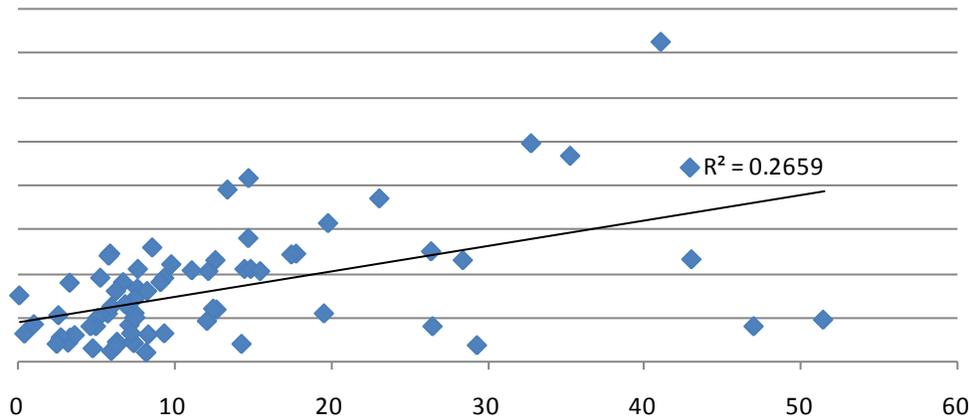
There is some association in both cases. The relationship between periodic payment amount and reduction in life expectancy is more pronounced, reflecting the direct link between severity of injury and cost of care.

Finally, the table below gives some key statistics on the distribution of the main characteristics of the PPO claims.

Factor	Mean	Median	Standard Deviation	Sample Size
Age at settlement	36	27	18	90
Life expectancy	41	45	16	75
Life expectancy reduction (compared to Ogden 6th edition)	12	8	12	75
Annual PPO payment	83,046	61,108	63,775	94
Lump Sum Amount	1,808,397	1,650,000	1,166,955	93
Ogden Cost	3,694,276	3,326,811	2,265,104	75
Non-PPO portion as percentage of Ogden cost	50%	48%	15%	75
PPO portion as percentage of Ogden cost	50%	52%	15%	75

The Ogden cost in the table is calculated as being the lump sum amount plus the net present value of the PPO annuity over the life expectancy of the claimant, discounted at the Ogden rate of 2.5%.

Finally, the graph below shows the distribution of PPO claims split between those that are indexed by RPI and those that are indexed by ASHE.

Index

Legend:
- ASHE 1
- ASHE 3211
- ASHE 6115
- RPI
- Unknown
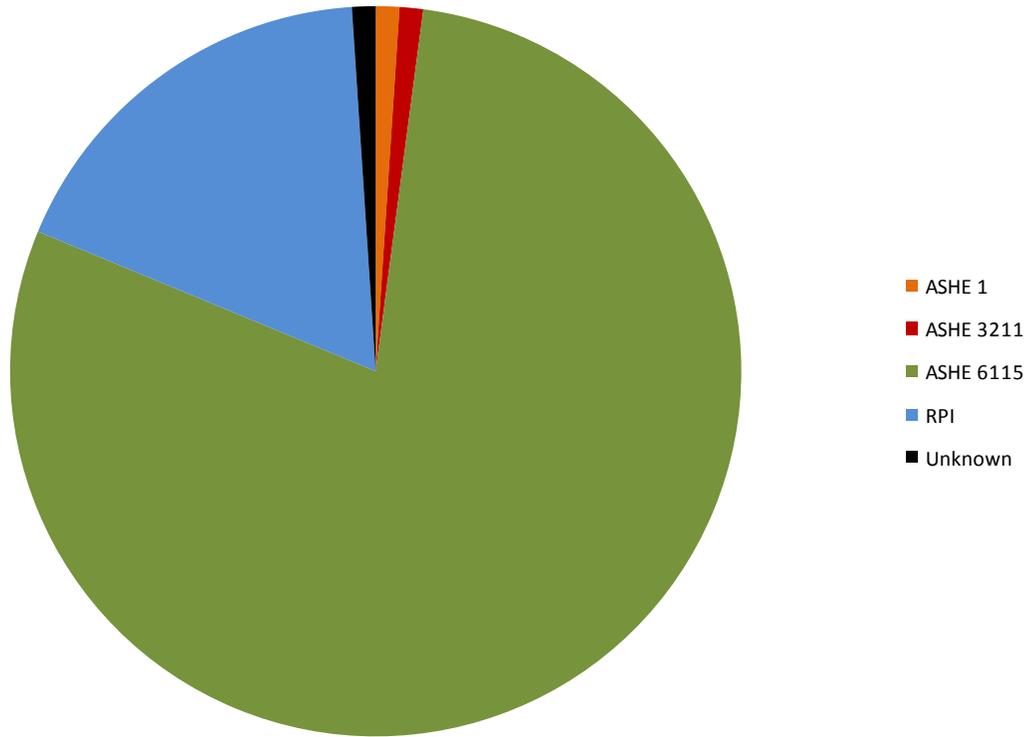
For those claims that are indexed using ASHE, a percentile to which the claim is indexed is specified, and a distribution of this is shown below.

ASHE Percentile

Legend:
- 70th
- 75th
- 80th
- 90th
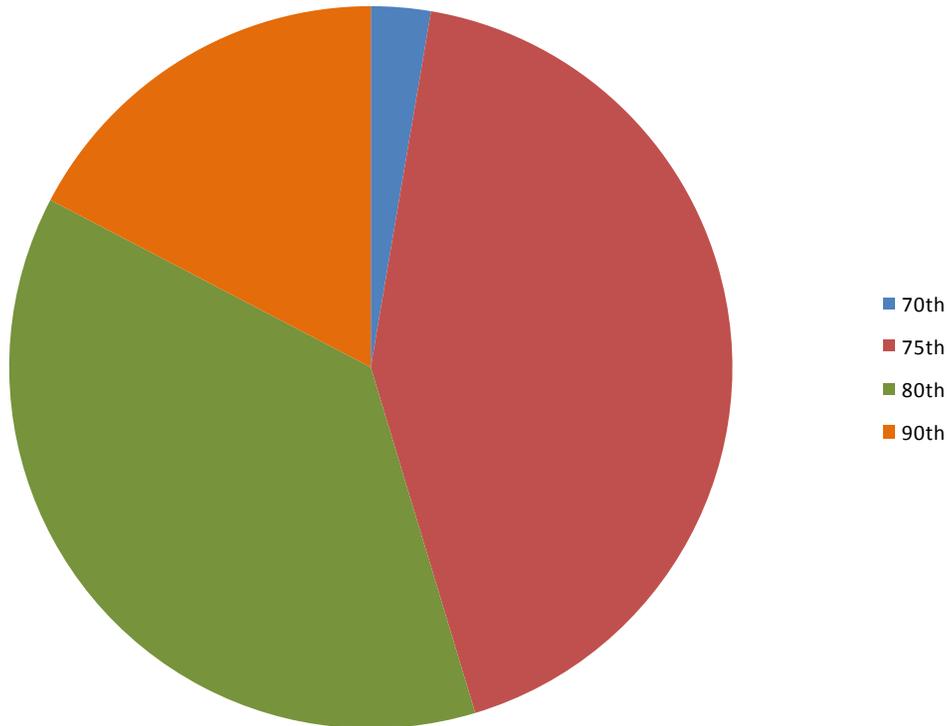
PPO frequencies

It is difficult to provide a single statistic of the propensity for PPO claims given the differences of accident years from which claims are arising. As an indication of relative frequency, we have calculated the following measure: number of PPO claims in a calendar year / total motor premium income taken from the 2008 FSA returns. This gives the following table across the industry by year:

2004	2005	2006	2007	2008	2009
0.0000%	0.0569%	0.0995%	0.0995%	0.3697%	0.6826%

This table masks a range by different insurers. One insurer has not had a single PPO claim, and so obviously has the lowest score. The highest settlement frequency insurer for an individual year had a frequency of 2.09% per £m of premium income.

The table above may be a little mis-leading for insurers that are either growing or shrinking over the last few years. As an alternative frequency measure, the table below summaries the following: number of PPO claims in a calendar year / average motor premium income between 2004 and 2008.

2004	2005	2006	2007	2008	2009
0.0000%	0.0573%	0.1003%	0.1003%	0.3727%	0.6881%

On this measure, the highest frequency insurer has experienced a frequency of 1.48% per £m of premium income.

We did not collect data in relation to large claims which did not give rise to a PPO. We did ask for qualitative views for some insurers, however, and the general view is that:

- an increased proportion of large claims will be settled by a PPO (which is consistent with the experience seen so far)

- large claims will have a higher propensity to become PPOs. Again this is consistent with observed data in that there are few "low-valued" PPO claims

- claims above £1m may have a something like a 25% chance of being settled by a PPO on average, but the very largest ones will almost exclusively be settled by PPOs

Current Reserving Practices within the Market

In addition to contributing data to the Working Party, a series of interviews was carried out in order to ascertain current practice in the market in relation to a number of aspects of the management of PPO claims. In particular, a number of qualitative questions were asked, including:

1. PPO general questions

    1. What is your company's general attitude to PPOs?

    2. How are PPOs payments administered?

    3. How is your reinsurance buying likely to change?

    4. Will you be seeking to commute such claims with your reinsurers?

2. Individual PPO questions

    1. How do you reserve your individual PPO claims?

    2. Do you separately identify potential PPO claims, and how is this done?

    3. Are PPOs reviewed to reflect new information (for example, claimants living beyond the original anticipated life expectancy)?

3. Questions about setting aggregate reserves

    1. Are reserves held for individual PPOs?

    2. Are reserves held for future PPOs?

3. How are reserves determined for future PPOs?

Unsurprisingly, there was a wide range of responses to the questions, and we have distilled the key elements of the responses below.

General questions about PPOs

What is your company's general attitude to PPOs?

A fair summary of the general attitude to the existence of PPOs is "neutral to adverse". The only suggestion of positive news to insurers is that if impaired life expectancy is actually lower than that implied by existing Ogden tables, costs may be lower than anticipated. Most insurers thought that it would add to costs.

Insurers with either a life side or who had experience of using structured settlements in the past felt that they may have an advantage over other insurers in terms of utilising this expertise.

All cases within the data collected are self-funded.

How are PPOs administered?

All insurers who contributed are administering the claims themselves, usually from within the dedicated large claims unit. Processes are relatively manual, but almost all PPOs are annual payments and so it's not a particularly onerous process.

One issue with administration mentioned by a couple of insurers relates to the proof on on-going life. A practical solution implemented by one insurer is that the GP is asked to confirm annually that the claimant is still alive.

How is your reinsurance buying likely to change?

For most insurers, PPOs is one aspect of reinsurance purchase, which will be considered alongside other elements, including outputs from ICA models. Several insurers did mention that reinsurer credit rating would form an increasing input into the reinsurance decision-making process in future. For the larger insurers with very high retentions, the existence of PPOs would have very little impact in any event, and so would not influence the decision-making process.

Will you be seeking to commute such claims with reinsurers?

Only one company mentioned that some PPOs had been commuted, albeit on an old treaty with a reinsurer that was in run-off. As with the reinsurance purchase decision, value for money and other considerations would have a significant influence on any commutation decision.

No insurer commented that reinsurers were particularly pressing for commutations at the moment, although a small number had had informal discussions about it.

Individual PPO questions

How do you reserve for individual PPOs?

For known PPOs, most insurers look at a discounted cashflow approach whereby a view is taken of life expectancy, future increases and future investment returns. This approach also allows for reinsurance treaties with indexation clauses to be applied also.

There were some differences with individual insurers in relation to specifics of calculations. Most take an "annuity-certain" approach, whereby life expectancy from medical evidence is used as a basis for the length of payments. A minority of insurers use a life annuity approach whereby cashflows are probability weighted based on (adjusted) mortality tables. One insurer mentioned that they explicitly allow for future mortality improvements within their projections.

Do you separately identify potential PPO claims, and how is this done?

This question saw a wider range of responses from different insurers. Some do not separately identify PPOs. Others have a more informal process which relies on large claims handlers and/or solicitors identifying potential claims within regular claims forums.

A couple of insurers take a pragmatic approach to identifying potential PPO claims. One identifies claims involving either children or brain injuries, and "tag" these as being potential PPO claims on the basis that these are likely to require court approval. The other periodically goes through the largest cases and looks for potential PPO characteristics.

One large insurer is considering implementing an approach which considers a combination of "risk factors" (such as nature of injury, age of claimant etc) to assign a probability to individual cases becoming PPO claims.

Are PPOs reviewed to reflect new information (for example, claimants living beyond the original anticipated life expectancy)?

Generally PPO calculations are changed to reflect changes in underlying assumptions, any variation orders, and any fatalities. Access to the claimant is generally not available post-settlement, and so it is difficult to make any changes in relation to changes to life expectancy. PPOs have not been around sufficiently long to make any further adjustments.

Questions about aggregate reserves

Are reserves held for individual PPOs?

The universal answer to this question was yes, they are.

Are reserves held for future PPOs? And how are reserves determined for future PPOs?

This probably generated the greatest degree of differences across different insurers as any question.

Some insurers have explicit calculations for future PPO claims based on a combination of:

- assumptions concerning numbers of large claims

- proportions of large claims that become PPO claims

- average uplifts of PPO claims based on economic assumptions

This generates an explicit uplift in reserve requirements.

Other insurers hold explicit margin for PPO claims or alternatively have explicit additional loadings for events which may not be apparent from within the data. One insurer commented that prior to the existence of PPOs they held a reserve for the possibility of the Ogden discount rate reducing, now the reserve is held for a combination of this and additional costs associated with PPOs.

One insurer commented that over time, additional PPO costs will be within standard reserving triangles, and so traditional projection methods will be valid when a stable position arises.

6.   Assumptions

Modelling Assumptions and Issues

There are a number of areas where decisions will need to be made when modeling PPOs. These can be split into three categories: assumptions about PPO claims already agreed, assumptions about future PPO claims arising from claims already reported and assumptions about future PPO claims arising from claims yet to be reported.

Life Expectancy

This is a key assumption, which is complicated by the fact that usually there are two sets of experts arguing a different value. Indeed, a PPO may be adopted because of the disparity of opinions on the life expectancy. Should an insurer's actuary use the life expectancy estimated by the insurer's medical expert to value the claim? Or should the life expectancy estimated by the claimant's medical expert be used more often?

There are a number of ways that life expectancy can be allowed for on existing claims:

- Where there are strong reasons to believe one set of expert's opinions on the claimant's life expectancy is better, adopt that as the life expectancy.

- Alternatively, a weighting between the two assumptions can be used.

Impaired or normal life mortality tables can be used to predict the life expectancy, and to weight the future payments.

It is also possible to use a combination of the above, where the life tables are used to weight future payments and change the life expectancy as the claimant ages, with the experts estimates of life expectancy at settlement being used to reset the "age" of the claimant on the mortality table so that the starting life expectancy matches the experts' estimate(s).

What will complicate this assumption is that generally the insurer has limited or no access to the claimant after settlement, with the exception of providing proof of life. This means that there will usually be no way of updating or monitoring the assumptions, to take into account the good or ill health of the claimant.

For future PPO settlements from unreported claims, either a single point assumption or a set of stochastic assumptions will most likely be used. The source of this assumption could be the industry survey, a company's PPO experience to date, or data from past lump sum settlements.

For future PPO settlements arising from reported claims, the easiest approach may be to adopt a single average value for the future life expectancy at settlement. If this is approach is adopted, some testing should be performed to ensure that the assumption is appropriate given the distribution of the future life expectancy on any claims already reported to the insurer. An alternative option for cases where there is information available about the claimant would be to use individual case details. The claimant's current age and the experts' life expectancy estimates can both be used to estimate the life expectancy.

Indexation

To date we understand that that the large majority of PPOs not linked to RPI have been linked to subgroup 6115 of ASHE which covers 'Care assistants and home carers'. Only a very small number have been linked to other indices. Therefore we have focused our discussion of indexation assumptions on ASHE 6115.

There are a number of issues with ASHE. Firstly, it isn't an index but a survey. This means that because of the way it is constructed and calculated It has greater scope for volatility. Secondly, it has gone through a number of methodology changes in the last ten years. Thirdly, nobody is currently doing long term projections of future ASHE. Fourthly, different PPOs can be linked to different percentiles of ASHE 6115 and there have been differences in the inflation rate between the different percentiles which in some years have been reasonably material.

All of this increases the uncertainty around projection and raises issues in deciding how to project out the inflation costs. It is quite possible other ASHE categories may also be used in the future beyond 6115, or indices or surveys other than ASHE. Depending on their level of use, this may complicate assumption setting.

We understand from the industry survey that a common approach to deal with these issues it to estimate long term inflation in ASHE 6115 relative to another index. For example, projected long term inflation in a common index such as RPI or AEI is taken as a starting position, and a loading is added to represent the historical gap between ASHE and the index chosen. An allowance may be made for different indices to ASHE, or sub-sections/percentiles of ASHE being adopted.

See the section on ASHE below for more information on the index.

PPO Frequency/Propensity

Estimating the ultimate frequency and hence IBNR of PPO claims is extremely difficult due to the scarcity of data to date. Two approaches are:

Industry Benchmark

This working party's industry survey gives some indication of the rates of large claims becoming PPOs. These can be used to estimate the number of future PPO claims. Allowance for the share of BI claims already settled, possibly based on size, should be incorporated.

This is a relatively quick and simple approach, although it does have the disadvantage that it may not reflect the insurers own book of business.

Segmentation and assigning probabilities

The second method is to do a detailed assessment of the insurer's current open large claims, breaking them into categories based on chosen characteristics. These could include the size of the claim, size of the care element, claimant age, mental capacity, type of injury, mobility, share of liability, particular solicitors/barristers involved, etc. Each segment should then be assigned a probability of PPO conversion. Having split the book of open claims between categories multiplying the numbers in each category by the probability of PPO conversion will give the number of future PPOs.

For pure IBNR a rate based on the weighted average of the open claims can be used.

Although time consuming, this approach will provide better estimates of the insurers own risks. The issue is the scarce data to date. The small number of PPO settlements to date means that a significant amount of judgement must be used to decide what characteristics to use for segmenting, or what probabilities for conversion are appropriate. It would however allow tracking of actual experience against expected.

This is probably a stronger option for reinsurers who will have a larger pool of PPO claims to assist in their assumption setting.

A major area of indecision when either adopting the industry benchmark or assigning a probability of PPO conversion is the view of the current and future economic environment. There is a view that the current number of PPO settlements is exacerbated by the recent economic turmoil, and that if investment returns picked up there would be fewer PPO settlements in future.. An opposing view is that inflation may take off, in which case PPOs may become more popular. There may also be other factors affecting the propensity for claims to settle as PPOs. This complicates the process for both reserving and capital modeling.

PPO Average Sizes

For agreed PPO settlements the gross cost is relatively easy to calculate, as it is simply an annuity payment.

There are three main approaches to estimating the cost of a future PPO claim.

- The first is to adopt an uplift factor. This estimates the additional cost of the PPO claim above the cost of a lump sum. The factor can be based on PPOs agreed to date, via testing on dummy data or by using information from the industry survey. This can then be applied to the incurred cost for open claims and IBNR to get a PPO cost. This would estimate the cost if the entire open and IBNR book became PPOs, and should be adjusted for a frequency assumption.

- The second approach is to do in-depth analysis of the current open claims, including estimating their potential Ogden and PPO cost. Some simplifying assumptions could be adopted, such as assuming that only the care element will drive a PPO. This will estimate the cost of the PPO, which in conjunction with the frequency approach above will provide an estimated cost. For IBNR claims either an uplift or average cost based on the analysis of the open and settled claims portfolio can be used.

- Calculate the Ogden cost using a discount rate expected to be achieved by the company based on their view of inflation, market investment return and their particular investment strategy. This uplift would also need to be adjusted for the PPO propensity.

Reinsurance

This will vary significantly by insurer depending on their own current and historical reinsurance treaties. Generally, for current PPOs where the standard clauses apply the reinsurance will be calculated explicitly, allowing for the timing of the payments. The main complication compared to a lump sum is that the indexation will be a weighted average across the PPO payments' dates and the settlement date.

The impact of reinsurance will vary with the timing and duration of payments, size of the annual PPO, time of initial settlement, number of payments per year, any steps in the size of payments and with individual treaties. For IBNR claims there is no information except what the treaty rules are. It may be best to put some dummy PPOs through each treaty to calculate the impact of reinsurance, and assume a set recovery rate per treaty/accident year, or in total.

For reinsurers the techniques will be much the same.

There are also a number of other factors to consider.

Aggregate Deductibles

One complication is aggregate deductibles. These are usually based on a fixed amount, so a PPO on an undiscounted basis is quite likely to exhaust many deductibles. However, this is unlikely to happen for many years. Insurers and reinsurers will need to decide how they allow for the interaction between lump sum and PPO settlements depending on the exact terms of their treaties.

Non-standard treaty terms

A second complication will be where there are non-standard treaty terms. This may arise from very old treaties that existed prior to PPOs. Others might be in-house arrangements, or with more exotic reinsurers. For treaties that were not market standard, adjustments may need to be made to the calculations. For old treaties some assumptions or negotiation with reinsurers may be required. Possibly the current standard clauses could be used as a basis.

Some terms may also have been market standard at the time, but are not now and need adjusting. An example of this would be severe indexation clauses. Where these exist special calculations will be required.

Credit risk

How or if to allow for this is an issue. The long tail of reinsurance recoveries, especially on an undiscounted basis, may mean insurers want to estimate what their risk is. The basis will also matter - accounting, tax, solvency II or internal risk control? Should it be in the best estimate, bad debt provisions or only in the credit control teams?

Estimation may be based on the recoveries calculated above, multiplied by a factor based on reinsurers credit rating. Or it may need something more detailed if there are a range of reinsurers or an undiscounted amount is required.

Investment Return

This will usually be set based on the company's long-term strategy. Issues that will need to be allowed for in the investment strategy, and hence in assumptions about the investment return include:

- Allowing for the depression of long term government bonds.

- The issues companies will have with duration matching these liabilities

- What the mix of assets will be.

It is possible that both the assumptions used and the investment strategy itself maybe impacted by some of the regulatory and tax changes coming in.

A decision will also need to be made on whether to use a single investment rate or a yield curve. Whichever is used, it should apply to both agreed and future PPO claims.

Other

Claim handling expenses

Depending on the reinsurance treaty, any additional claims handling expenses explicitly due to PPO management should be included.

Shared Liability, Variability Orders and Indemnity Clauses

Each of these means there is some probability of a future cost arising on the PPO. For shared liability and variability orders the cost may be roughly known, but for indemnity clauses even that is unlikely. For all three the probability of occurrence is uncertain as well.

With shared liability it may be preferable to consider a second insurer as a credit risk, and deal with it within the credit risk system. If the potential cost of the shared liability is allowed for in some other way, then a probability based on the credit rating could be used.

With variability orders and indemnity clauses the claims handlers are probably the best people to provide an estimate of the likelihood of occurrence, and the cost of an indemnity clause being acted on. These estimates will be based on judgment and be very uncertain, but may be the best approach possible.

It might be appropriate to ignore variability orders in some cases. Where the trigger is a worsening in the claimant's condition, it may be reasonable to assume that any increase in cost associated with it will be offset by a reduction in the life expectancy.

For future settlements these elements could possibly be ignored.

ASHE History and analysis of relationship with RPI and AEI

http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=13101

As mentioned above, to date we understand that that the large majority of PPOs not linked to RPI have been linked to subgroup 6115 of ASHE which covers 'Care

assistants and home carers'. Only a very small number have been linked to other indices.

ASHE is an annual survey performed by the Office of National Statistics. It is based on data up to April of the year that it is published and is usually published in November. It should be emphasises that ASHE is not an index, it is a survey. The survey provides information in a number of different formats, such as hourly wages, annual wages, comparisons of public or private sector, etc.

For PPOs Table 14.5a (Occupation, Hourly pay: gross) is usually used to determine the annual inflation to which the PPO is linked. This table shows the mean, median, and various percentiles of the salary in terms of the hourly wage of each subgroup of workers. The hourly wage information is based on the wages in April of the year of the survey.

PPO settlements are linked to a particular percentile of ASHE 6115. The percentile is usually set based on what the parties agree the average hourly wage will be of the carers in the case in question, and where that value falls on the percentile list in the most recent ASHE survey.

Over the history of ASHE 6115, the year on year inflation of the different percentiles has varied, sometimes materially, and in a volatile fashion such that the order from smallest to largest varies almost every year.

ASHE replaced the National Earnings Survey (NES) in October 2004. At that time a back history of data to 1998 was published to replace the NES data. There was also a methodology change in 2006 but this does not create a discontinuity as the 2006 figures were created on both the 2005 and 2007 methodologies.

When comparing historical ASHE data with RPI or AEI, a number of factors should be considered. These are discussed below.

Despite providing a back history of ASHE data to 1997, for 2001 and prior the subgroups are slightly different to 2002 and post. Sub-code 6115 (Care assistants and home carers) is only in the data back to 2002. For 2001 and earlier the most equivalent form is 644 (Care assistants and attendants). The titles of these subgroups and the detailed descriptions of what they include indicate a significant match between these two classifications but they are not identical. This raises the question of whether the inflation prior to 2002 should be included, and particularly whether the inflation between 2001 and 2002 at the point of change from 644 to 6115 should be included when considering any historical analysis of ASHE 6115.

There have been a multitude of external factors effecting the inflation in care costs over the history of ASHE and some of these can clearly be seen in the data. This makes it difficult to know how much of the external data to include and exclude in any historical analysis. For example,

- the introduction of the minimum wage in 1999 caused particularly high inflation in the lower percentiles of ASHE 6115;

- the Care Standards Act 2000 and the amendments to the Manual Handling Operations Regulations, which both came in during 2002, are likely to have been a contributing factor to the particularly high inflation in 2002 and 2003; and

- in addition to the above the European Working Time Directive and increasing demand for care in an ageing population are likely to have caused increases in hourly wages.

All these factors make it particularly difficult to know how good a guide to the future the historical ASHE data will prove to be.

When comparing ASHE with either RPI or AEI, it is necessary to make a decision about which time period of these indices should be used. ASHE is published in November. Therefore, in an operational sense (ie in terms of the when the inflation is applied to PPOs) it might make sense to compare the inflation in ASHE to November to November RPI or AEI inflation. However, ASHE is based on data in April. Therefore, to compare inflation in the same underlying time period, the comparison would need to be done on April to April RPI or AEI. This decision has a less material impact than the factors discussed above although it is not insignificant. The average difference between RPI and ASHE 6115 between 2004 and 2009 is around 0.3% higher if the comparison is done on April to April RPI data rather than November to November RPI data.

The chart below shows the historical performance.

Annual Rate of change of 75th, 80th and 90th percentile of ASHE 6115 (November to November
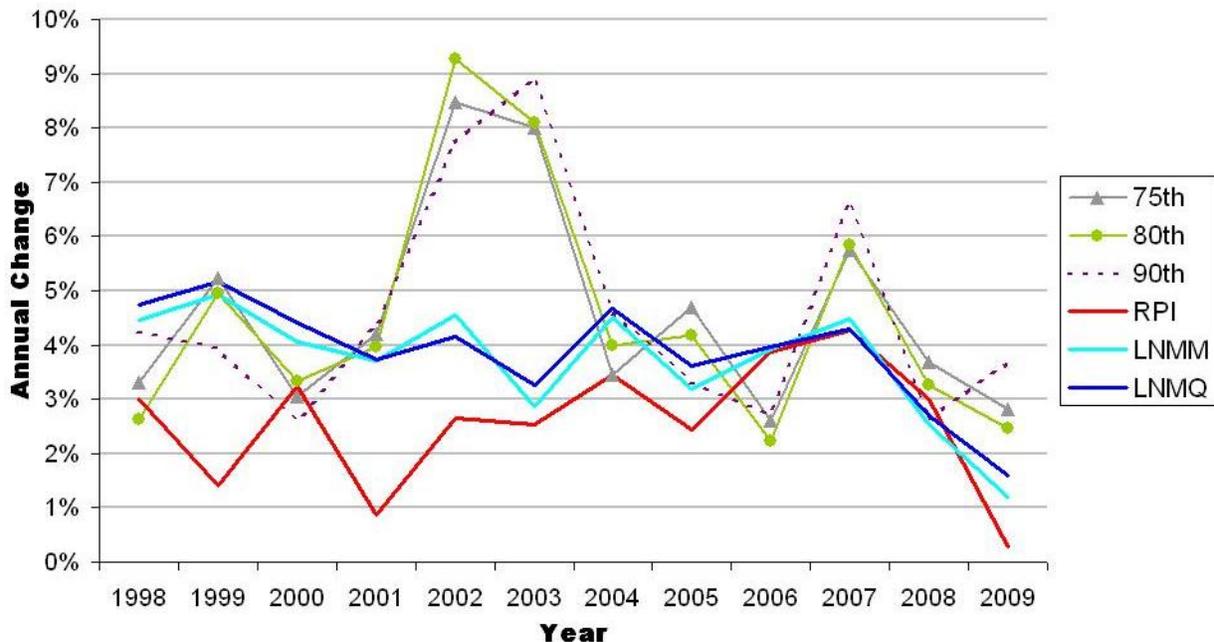
LNMM = Average Earnings Index for the Whole Economy, unadjusted for seasonality.
LNMQ = Average Earnings Index for the Whole Economy, adjusted for seasonality.

Projecting Inflation

A common method when projecting forward ASHE, given there are no long term forecasts, is to forecast an index that is frequently analysed and include an adjustment for the expected difference to ASHE. This difference can then be selected from historical performance of ASHE against your forecast index. Two commonly forecast indices will be AEI and RPI.

The following table shows the average annual inflation over a number of periods for different percentiles of ASHE 6115, AEI and RPI.

Index	Annual Inflation			Total Exc.	Recent Years
	1997 => 2001	2002 => 2009	1997 => 2009	2002, 2003	2003 => 2009
ASHE 6115 - Percentile 10	6.8%	5.0%	5.9%	5.6%	4.8%
ASHE 6115 - Percentile 25	6.2%	4.7%	5.4%	4.9%	4.1%
ASHE 6115 - Percentile 50	5.0%	4.7%	4.9%	4.5%	4.1%
ASHE 6115 - Percentile 75	3.9%	4.4%	4.6%	3.9%	3.8%
ASHE 6115 - Percentile 80	3.7%	4.3%	4.4%	3.7%	3.7%
ASHE 6115 - Percentile 90	3.8%	4.6%	4.5%	3.9%	3.9%
Apr => Apr					
RPI	2.6%	2.7%	2.6%	2.6%	2.6%
AEI (LNMM)	4.7%	3.6%	4.0%	4.1%	3.7%
AEI (LNMQ)	4.9%	3.7%	4.1%	4.2%	3.8%
LNMM - RPI	2.3%	1.0%	1.5%	1.6%	1.2%
Nov => Nov					
RPI	2.1%	2.8%	2.6%	2.6%	2.9%
AEI (LNMM)	4.3%	3.2%	3.7%	3.7%	3.3%
AEI (LNMQ)	4.5%	3.4%	3.9%	3.9%	3.5%
LNMM - RPI	2.4%	0.6%	1.3%	1.3%	0.6%
Difference to RPI (Apr)					
ASHE 6115 - Percentile 10	4.3%	2.3%	3.4%	3.0%	2.2%
ASHE 6115 - Percentile 25	3.6%	2.0%	2.8%	2.3%	1.5%
ASHE 6115 - Percentile 50	2.4%	2.0%	2.4%	1.9%	1.5%
ASHE 6115 - Percentile 75	1.4%	1.7%	2.0%	1.3%	1.2%
ASHE 6115 - Percentile 80	1.1%	1.6%	1.9%	1.1%	1.0%
ASHE 6115 - Percentile 90	1.2%	1.9%	2.0%	1.3%	1.3%
Difference to AEI (LNMM) (Apr)					
ASHE 6115 - Percentile 10	2.2%	1.4%	2.0%	1.5%	1.1%
ASHE 6115 - Percentile 25	1.5%	1.1%	1.4%	0.8%	0.3%
ASHE 6115 - Percentile 50	0.3%	1.1%	0.9%	0.3%	0.3%
ASHE 6115 - Percentile 75	-0.7%	0.8%	0.6%	-0.2%	0.1%
ASHE 6115 - Percentile 80	-1.0%	0.7%	0.5%	-0.4%	-0.1%
ASHE 6115 - Percentile 90	-0.9%	1.0%	0.6%	-0.2%	0.2%

Note: Adjusted for methodology change in 2006

The table is showing annual inflation for AEI and RPI from April to April and November to November. The differences are in relation to the April figures.

The impact of excluding the 2002 and 2003 years with the high inflation is clear. For a typical ASHE percentile such as the 75th percentile, the full 1997 => 2009 period difference between ASHE and RPI or AEI is 0.7 points greater than the same period excluding 2002 and 2003. The period using sub-code 644 periods are very different from the 2003 to 2009 ASHE 6115 period. However, the difference varies between RPI and AEI. For RPI the 1997 to 2001 period is much higher (+1.1% for 75th percentile), while it is lower for AEI (-0.8%).

This leads to several key decisions when deciding the future inflation rate.

A) Whether to project off AEI or RPI.

B) Whether to include the 1997 => 2001 period which uses sub-code 644.

- If you do include it, do you keep in the 2001 to 2002 year which transitions from sub-code 644 to sub-code 6115? This is one of the two high years, which might be due to the government funds poured into the NHS or due to differences between sub-codes 644 and 6115.

C) Is it appropriate for a long term view to keep in the two years with the super-inflation, or should spikes be allowed for in the risk margin and capital calculations? If included, should they be diluted over a longer period than the current ratio of 1 spike to 6 years?

A balanced approach maybe the best. RPI should be relatively stable over the long term due to the Bank of England inflation goals, and should therefore be a reasonable basis. As the 2002 and 2003 inflation is "event" driven, excluding it in your base projections or diluting it makes sense. Removing these years also reflects that for 2001 to 2002 the inflation is calculated between two different sub-codes. Including the 1997 => 2001 period increases the historical data relied upon, and a period with a slightly larger gap between ASHE and RPI. This larger gap reduces the impact of removing the 2002 and 2003 years. And so the "Total Exc. 2002, 2003" column would be used, leading to a 1.3% uplift for the 75th percentile, or a 1.9% uplift for the 50th percentile.

When projecting forward you may want to use a weighted mix of ASHE percentiles, based on the outcomes of the industry survey.

Uncertainties

There are a number of areas where there is great uncertainty around the appropriate assumptions used to value PPOs. These include:

- How general mortality will change over time.

    - Will sedentary lifestyles and poor diets push mortality down?
    - To what degree will pandemics which are in most risk/operational risk models, actually be beneficial?
    - Will changes such as climate change have impacts on at risk lives' mortality?

- How the mortality of the claimants may be affected by improvements in medical care and new treatments.

- Are the life assumptions accurate?

    - There are a number of factors that may lead to over-estimation of the life expectancy. These include plaintiff lawyers pushing up life expectancy, courts wanting to ensure sufficient funds, suicide or drug use by claimants, reducing care to save money.
    - There are a number of factors that may lead to under-estimation of the life expectancy. These include the impacts of full time care (for example,

picking up tumours or medical needs sooner) and removal of a number of risk factors (driving, extreme sports).

- What would be the cost and legal implications of cures found to these major injuries?

- How an ageing population will impact carers' wages.

- How future governments may react to future NHS build ups of costs.

    - Will they try to suppress ASHE?
    - Allow greater immigration for carers specialists?
    - Change the law?

- Will sub-code 6115 continue? Will new specialist indices form?

- What new markets/products may evolve around PPOs.

    - ASHE linked bonds?
    - Specialised reinsurance?
    - Industry forced commutation clauses?

- Although the AEI and discount rates may work together over time, how will a small subset of AEI (carers) wage inflation behave? Can we expect greater volatility on this than "normal" discount rate gaps?

- If ASHE is 4% to 5%pa, is a 10% large claim inflation too high? If not, what is driving the 10% inflation?

- Implications if ASHE goes negative?

    - Standard wording does not put any floors or ceilings on the indexation link.

- Where the life expectancy of the experts varies wildly, how do you allow for this in the best estimate?

7. Impaired mortality – lessons that can be learned from our life colleagues

A new market for impaired life annuities has grown up over the last decade in response to the demand from impaired lives who were getting a poor deal from standard annuities. In this section we consider the techniques used by life actuaries and consider how these could be applied to assessing expected mortality in PPOs.

This is intended as an introduction, as until PPOs become a more significant proportion of an insurer's liabilities it may be judged that the work involved in deriving such models is not yet worth the additional effort. This is not an attempt to suggest best practice but to produce food for thought and to possibly inspire further investigation in the future.

Unfortunately, we cannot just directly use the results of our life colleagues. The structured settlement market was always limited and the wider use of current life impaired annuities available in the market tends to relate to diseases such as heart disease, cancer or strokes. (Or, to lesser degree, as a result of considerations such as smoking, obesity, high blood pressure, high cholesterol or diabetes, for example.) The nature of life impairments for individuals which a PPO covers will more likely be injury based such as spinal cord injuries or traumatic brain injury. They also tend to relate more to retirees and older segments of the population. However we can learn from the techniques applied and so minimise reinvention of the wheel.

Structured settlement annuity market

Prior to the development of the impaired life annuity market a structured settlement annuity market did exist for the payment of claims in personal injury actions, though it never really took off.

On 19 July 1989, judicial approval was given in the case of *Kelly v Dawes* for the part-settlement of the claim in the form of a structured settlement annuity. This form of annuity was only available to fund all or part of a personal injury claim settlement, since approval had been given by the (then) Inland Revenue for the annuity to be paid free of personal taxes thus mirroring the tax treatment of a lump sum award. Distinctive features of a structured settlement annuity were therefore that they were individually underwritten, were generally linked in payment to the retail prices index (though a with-profits form of annuity was subsequently created), they could have very long guaranteed payment periods, and as mentioned above they were tax-free.

Structured settlement annuities did not become commonplace after the ground-breaking decision in *Kelly v Dawes*. There were many reasons for this not least the fact that settlements could only be structured with the agreement of both parties to the action. Whilst a failure to agree was challenged in certain claims, the Court confirmed that no

reason need be given for withholding agreement nor did there need to be any form of reasonableness test on any refusal. Other reasons were consequential upon the unique features listed above. For example, the restriction of indexation to the prices index caused long-term shortfalls for the claimant as care costs generally increase in line with an earnings index, the life industry was generally reluctant to issue appropriate annuities due to perceived difficulties in individual underwriting, and quite separately, falling interest rates during this period led generally to higher annuity costs that were uncompetitive when compared with using a multiplier based on a 2.5% p.a. net, real, discount rate.

In enabling periodical payment orders, the Courts Act 2003 removed many of these disadvantages though at the time of writing the discount rate remains at 2.5% p.a.

Adjustment to standard mortality bases

One approach that is commonly used to estimate impaired mortality is to adjust results from published standard mortality tables.

Tables available

Mortality tables can be split into two broad types; those that cover annuitants and those that cover the general population. Annuitant mortality tends to be lighter than for the population in general as there is a selective element with respect to individuals who choose to purchase an annuity (i.e. those that purchase an annuity expect to live for longer in general than those that don't). In addition most annuity tables relate to retirees so there is not always the data available at younger ages. Most PPO claimants prior to their accident are more likely to be similar to the general population than the annuitant population.

The latest UK general population mortality tables, compiled by the ONS, can be found at http://www.statistics.gov.uk/statbase/Product.asp?vlnk=14459.

Approaches to adjusting standard mortality tables

In the equation below if q_{x+t} is the mortality of a healthy life, where x is the age at which the individual purchased an annuity and t is the number of years since purchase. A, B and C represent different ways in which adjustments can be applied to modify the mortality for an impaired life.

$$A_t \times q_{x+B,t} + C_t$$

A – applying a multiple to the base mortality

A percentage adjustment to life expectancy can be a suitable approach to take if the expectation is that the additional mortality is expected to increase generally over a

longer period. This kind of adjustment is used for impairments due to illnesses such as heart disease or diabetes and is familiar to life underwriters who term it the 'k-rating' method. It is also the adjustment most likely to be appropriate for brain trauma or spinal injury. In the case of spinal injury, for example, the patient is likely to be susceptible to external impacts such as those that can occur as a result of failings in care received (for example dehydration through not being given sufficient fluids, or the wrong medication being administered). There can also be long term effects from methods of treatments such as the effects on health of being fed by tube over a long period of time.

B – applying a constant addition to age x

This 'age rating' method has been used as an approach in the life industry for a long time, particularly as it was administratively convenient. However, medical research does not tend to express extra mortality in this way and for traditional life insurance annuities it has been found to not necessarily mirror an appropriate pattern of mortality over time.

C – adding a variable to mortality

A reducing addition variable is appropriate when extra mortality as a proportion of the total mortality decreases over time e.g. more aggressive cancers, where substantial extra mortality is experienced in the early years but where the differential reduces over time

Alternatively a constant addition can be applied, this approach is currently used for example for myocardial infarction or less aggressive cancers such as breast cancer.

Example

To illustrate the above effects, the following example is based on a male, aged 20. Typical normal life expectancy life would be 60 years based on the AMC00 life tables. Adjustments to the mortality rate, A, B and C (as outlined above) have been derived to be commensurate with an impaired life expectancy of 43.

The graph below shows the effect of applying each of these adjustments on the mortality rate.

Mortality rates - age 20, life expectancy 43 years
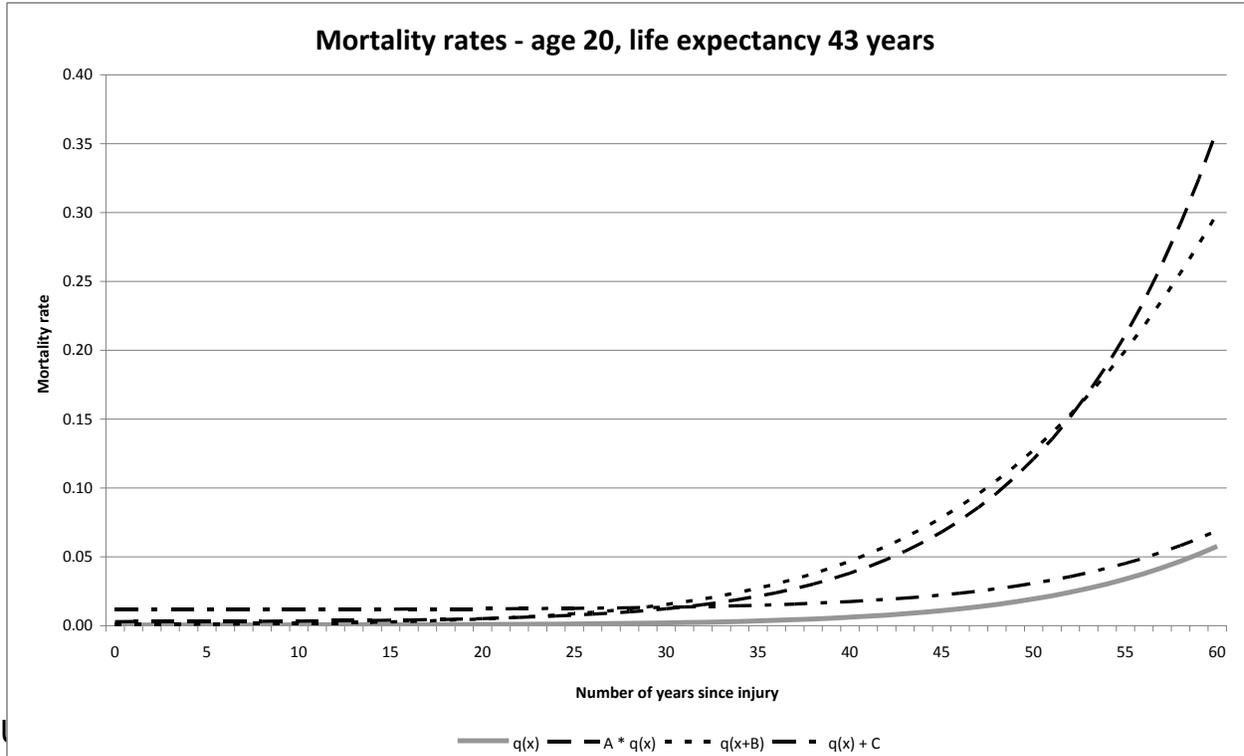
the most closely and has the least impact in the later years.

Both using a multiplier, A, and applying a constant addition to age B can be seen to have the effect of increasing mortality at a significant rate in the later years. It may be that in the case of PPO mortality applying a constant addition to age is not such an unreasonable approach as it is in life insurance. When looking up multipliers from the Ogden tables this is the approach that is taken; i.e. adding an addition to age to allow for any reduction to the life expectancy of claimants.

If we look a little closer at the first 30 years post accident we see the following:

Mortality rates - age 20, life expectancy 43 years
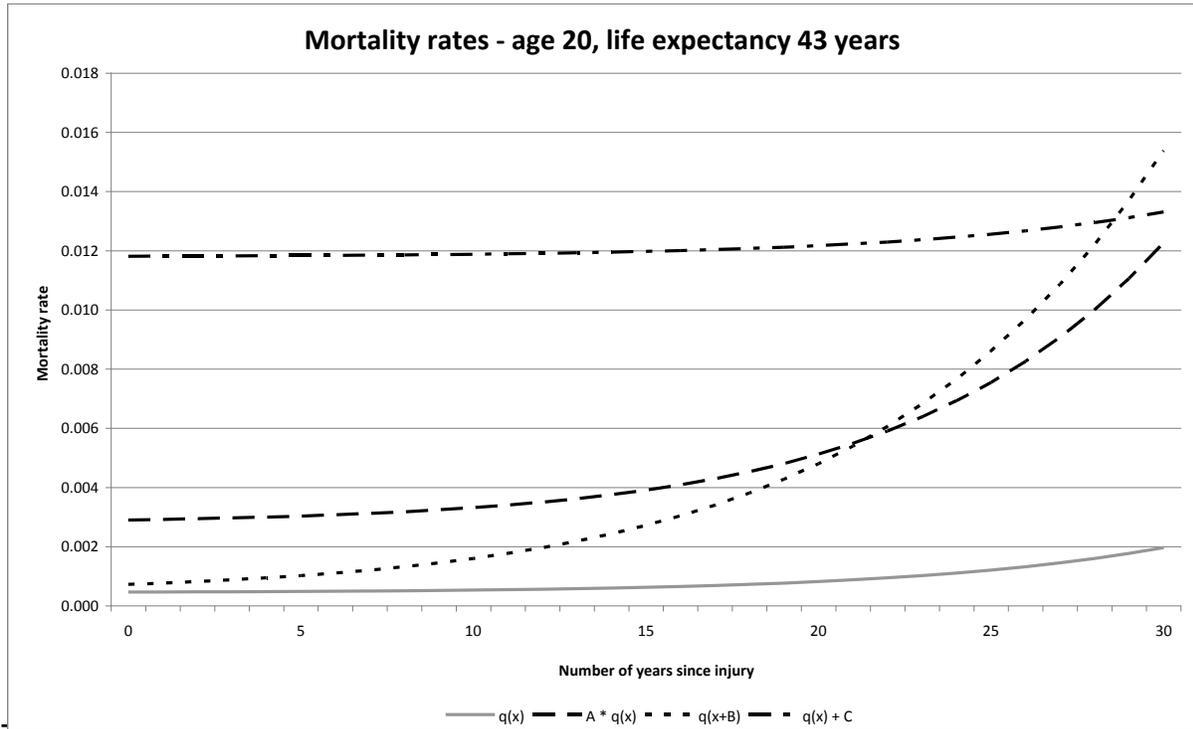
The multiplier to mortality, A, shows a higher level of mortality increasing over time. This pattern is consistent with spinal injuries where the rate of mortality is expected to increase over time.

The effect of applying a constant addition to age, B, also shows the level of mortality increasing over time, though at a greater rate. The mortality in the early years with this adjustment is much closer to normal mortality.

The following graph shows the effects of each of the adjustments on the distribution of deaths.

Distribution of deaths - age 20, life expectancy 43 years

Legend: q(x) —— A * q(x) · · · q(x+B) —·— q(x) + C

X-axis: Number of years since injury
Y-axis: Number of deaths
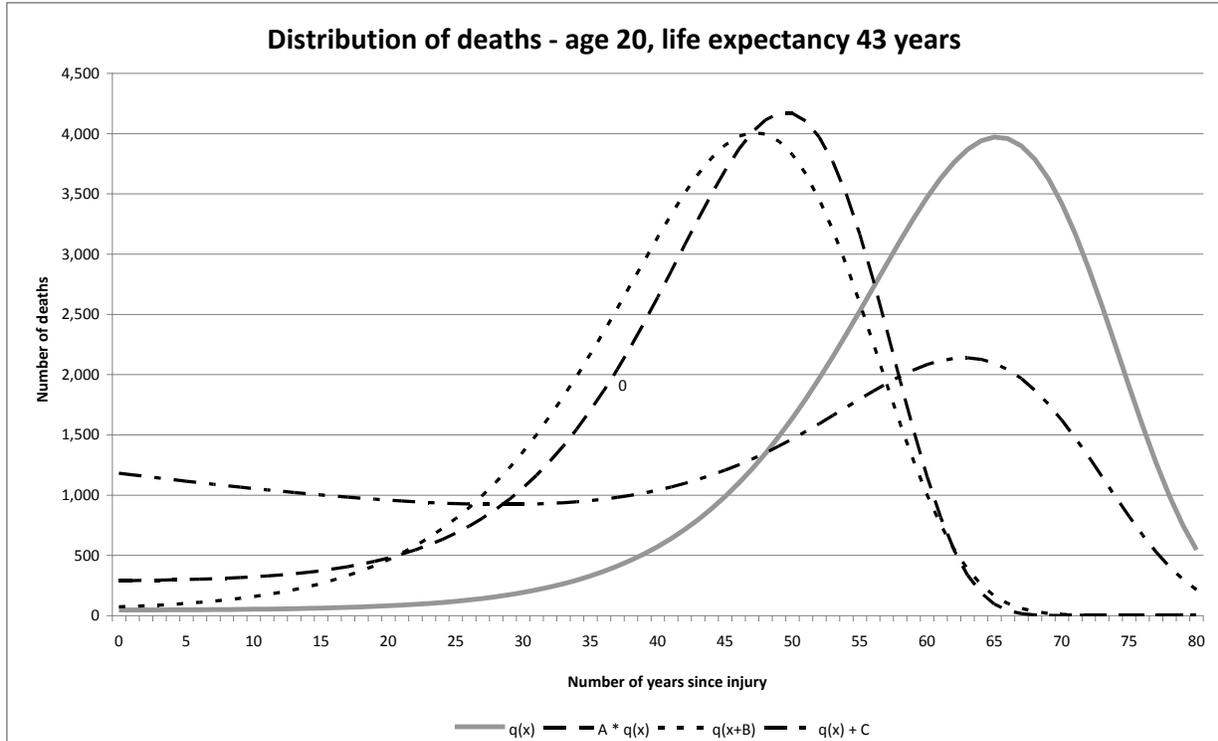
Examples of effects on mortality of Spinal Cord Injury ("SCI")

Example 1: Australian study of mortality following spinal cord injury

This was a study of 1,453 patients in Sydney, Australia over a 40 year period published in 1998.

The life expectancy by severity of injury is shown in the table below relative to standard life expectancy. Patients who died within 18 months of the spinal injury were excluded from the analysis.

Motor functional	Paraplegia	Tetraplegia
92%	84%	70%

Source: http://www.ncbi.nlm.nih.gov/pubmed/9601112

Example 2: National Spinal Cord Injury Database

This database collects 13% of new SCI cases in the US.

- It has been in existence since 1973

- It Tracks information on 25,000 patients

- 47% of cases were as a result of a road traffic accident

Life expectancy as a proportion of life expectancy of a life with no SCI 1 year post-injury by severity of injury and age at injury					
Age at injury	Motor functional	Paraplegia	Low Tetraplegia	High Tetraplegia	Ventilator Dependent
20	91%	79%	71%	65%	40%
40	88%	72%	63%	55%	28%
60	82%	61%	49%	40%	14%

Source: http://www.fscip.org/facts.htm

These are by no means a panacea for the answer to true underlying mortality rates and there are a number of issues which would limit the value of this work. One such issue is that the above studies comprise very small sample sizes with limited databases. The balance of complexity of the model against the credibility of data available has to be weighed. The issue of small sample sizes is exacerbated by differences from case to case such as severity of injury, health/lifestyle of the claimant at the time of the accident and quality of care. It should also be noted that the studies are of patients not resident in the UK and that other studies have drawn different conclusions.

In addition it could be argued that the tables above are too crude. For example, individuals who suffered spinal injury in childhood have lower life expectancies than those injured in adulthood. Life expectancy for those with spinal injuries has improved significantly in recent decades with mortality rates having fallen by some 50% during the critical first few years after the injury. For the subsequent period, however, there has been little if any improvements in survival. This would be particularly relevant for PPOs as there is normally a delay of a number of years between the injury occurring and the settlement. Smoking and being morbidly obese have been seen to be especially deleterious for individuals with spinal injuries.

However, this type of knowledge, whilst not perfect, is likely to lead to improved estimates of mortality. It also enables the (re)insurer to understand the effects on mortality of certain injuries and to make more informed decisions at various stages in the management of PPOs, such as when settling in court or when assessing the application of Ogden multipliers.

Other sources of data

General Practice Research Database

The General Practice Research Database (GPRD) is a UK database collating information from GPs. It represents 7% of the UK population in the form of 4 million currently registered patients from 520 practices. It contains 55 million person year records and has been collecting data since 1987. It is not yet widely used in the enhanced annuity models.

Free academic subscriptions are available or extracts of the database can be purchased.

http://www.gprd.com/home/default.asp

The Health Improvement Network (THIN)

THIN is another similar database which contains data from GP practices.

http://www.thin-uk.com

To our knowledge no specific work has been undertaken as yet using these databases, however, using some of the techniques from our life colleagues, and as the number of PPOs increases, it may be there are useful insights to be discovered that will help us derive better estimates of future mortality through applying an actuarial perspective.

References

SIAS paper: "Annuity and Insurance Products for Impaired Lives" by Ross Ainslie

8. Reserving Methodology

In this section we consider the reserving issues for PPOs looking at gross and net reserves, discounting, Solvency II issues and reserve uncertainty.

Typically, motor bodily injury claims will be reserved using standard chain ladder and Bornhuetter-Ferguson methods based on paid, incurred and claim number triangles as well as average cost of claim methods and exposure based methods. This information can then be used to derive frequency/severity assumptions for projecting claims to ultimate.

Both the chainladder and Bornhuetter-Ferguson methods implicitly make the assumption that development patterns in the past will be a good indicator of future development. With accident period triangles, the development factors will include allowance for both IBNER and IBNR. This is generally not the case given the increased frequency of claims being settled by PPO.

Large motor bodily injury claims are generally settled either by a lump sum, a combination of a lump sum and a PPO (generally to cover care costs). In reserving it is necessary to separate out the lump sum from the annuity element due to the very different characteristics, particularly as discounting may not be allowable for the lump sum element but would have a significant impact on the PPO.

Considerations in reserving for the lump sum element of a PPO claim are:

- The development of lump sum payments may be more suited to reserving using triangulation methods but since these claims are generally large and complex in nature there may not be stability in the past development data, particularly for smaller insurers.

- The development data may become distorted as claims that were previously settled purely as lump sums may now settle as part lump sum/part PPO. This could potentially result in an understatement of the development of large claims IBNR. The insurer will need to assess whether the impact of PPOs are significant enough to have distorted large claims development patterns. If this is the case then there may need to be separate triangles, one showing the development of claims in the pre PPO world and one showing claims thereafter. This will mean there may not be triangles with enough relevant history for some time.

- If there is a change in the basis used to calculate lump sums then the development shown in the triangle will not be stable and hence not suitable for projection purposes.

- It could be argued that if the PPO elements of claims are reserved on the same basis as lump sums then they could be left in the triangles and projected as normal. However, this methodology is probably over simplistic and would not be appropriate particularly when looking at reserving risk where the PPO and lump sum elements would behave very differently.

The focus of this section though is to consider the reserving issues for PPOs as most UK non-life insurers will have a limited experience in dealing with PPOs.

With PPOs, there are several reasons why such conventional methods are unlikely to be appropriate which may be obvious but we have spelt out here for completeness:

- The timing of court hearings can be unpredictable

- The timing of payments will be heavily influenced by the dates of court decisions which are unpredictable.

- The complex nature of the claim, the timing and consistency of the medical options may add further to the uncertainty of case estimates compared with other claims

- If the claim is not capitalised, then the timing of future payments will be known. The amounts of future payments will be known to some extent although there will be uncertainty around future changes to the index used & the existence of any variation orders.

- If the claim is capitalised, then the timing of the lump sum payment to the annuity company will be again dependant on factors that are unlikely to be easily predictable from past history. This is only a theoretical option as no annuities currently exist that might match the PPO liabilities (ie are linked to ASHE).

As such, a different approach is necessary for reserving for PPOs. We will consider the three elements of case estimates, IBNER and IBNR.

Case Estimates

The setting of case estimates for PPO claims refers to claims which have been reported and are either agreed PPOs or potential PPOs.

For potential PPOs, the case estimates for these claims are most appropriately set by experienced claims handlers rather than actuaries. However once a claim is reasonably likely to be a PPO or is an agreed PPO then actuaries are in a better position to estimate the case estimates as this involves estimating the present value of future cashflows.   Alternatively, actuaries could assist the claims handlers by developing a tool to calculate the reserve required.

However actuaries need to be aware of the process and assumptions used by claims in order to be able to assess the IBNER and IBNR elements and it may be appropriate for actuaries to provide input on this process to facilitate the IBNER and IBNR estimates. It will be important to capture the additional data required on PPOs claims for reserving purposes.

This will include details of:

- When do claim handlers reserve a claim as a PPO? Generally is this only at the date of award or when there is an expectation that a PPO will be paid? If it is the expected cost of a PPO how is the probability estimate assessed?

- Do the claim handlers expect anything less than 100% liability for the claim? Is a less than 100% liability being used for the purposes of case estimates?

- What is the basis of the calculation of the case estimate? Generally case estimates used are based on applying the Ogden multipliers to the annual care costs. If this is not the case then what are the assumptions on inflation, mortality and discount rates? For ease of reserving and reporting, a company may adopt a composite rate (i.e. the net rate between the discount and inflation rate) rather than have explicit assumptions. This means a fixed differential between ASHE and the risk-free investment rate could be adopted as there are no statutory bases for determining ASHE assumptions. For example, ASHE = risk free-1%. Although there may be statutory bases for selecting the discount rate for financial reporting, it is feasible that a company may choose to use a different basis for management reporting and making operational decisions. For example, the Solvency II rules may require balance sheet reserves to be valued at a risk-free rate, but the company may prefer to operate the business at a different rate provided IBNR calculations allow.

- What is the process for identifying potential PPOs? Should there be a checklist of criteria that could be used? Responses from our market survey showed that some companies were flagging potential PPOs claims based on the claim characteristics such as claims for minors or brain injury claims.

- How are PPOs/potential PPOs reported to the other functions in the insurance company?

- How likely is a claim to become a PPO? This will include consideration of the claim's features such as severity of injury and the injured party's personal circumstances. For example, a young claimant is possibly more likely to be awarded a PPO if the judge deems him/her less responsible in managing a large lump payment to fund their future care costs.

- Control of the claim - is there any action that can be taken to help control care costs? E.g. rehabilitation, regular medical reviews sent to insurers & reinsurers.

The data required for the assessment of the PPO will include:

- Age of claimant

- Sex of claimant

- Life expectancy and the uncertainty over this expectation or life impairment assumptions

- Date of retirement (where PPO covers loss of earnings)

- Annual value of the payments including date/frequency of payment and the index that applies

- Whether there are any stepped clauses or whether a variation order applies

- There could be other data requirements depending on the exact details of the PPO claim. For example, it is theoretically possible that the PPO is based partly on the survival of the claimant's dependants.

The estimate of life expectancy is arguably not really necessary in settling a PPO other than to enable a PPO to be compared to the value of the lump sum alternative. The estimate will be available at the time of settlement but it may not be available in the future. Although the claimant has the duty to submit proof of life in order to receive each payment, there is no requirement (unless agreed at the time of settlement) for any further medical evidence to be submitted. Therefore, the reserving process will need to make an adjustment each year to allow for the claimant being one year older.

A possible approach is to take the life expectancy at the time of settlement and work out the effective age of the claimant (i.e. the age in a mortality table that has that life expectancy). This effective age can then be rolled forward for future reserving evaluations. This raises possible issues when the mortality table used for the basis of settling claims changes, for example, with a new release of the Ogden tables, resulting in a step up/step down in case reserves.

IBNER

The method of assessing this and the amount required will depend on the method used to assess the case estimate and the insurer's approach to dealing with these claims i.e. if the case estimates are based on the Ogden multipliers or whether they have been determined by actuaries looking at the present value of the future payments. In any case there may be movements in the claims which are the incurred but not enough reported element.

If the insurer is self funding then variation clauses may result in changes in the level of the payment due to changes in the claimant's condition. There will also be IBNER if the case estimates have been based on assumptions which are not best estimate.

An assumption will need to be made over the future expected lifetime of the claimant which could be many years. Where differing medical opinions exist, an internal view as to the life expectancy of the claimant will need to be taken in conjunction with the claims handlers. Therefore there is considerable uncertainty over the estimate of IBNER. Also by the very nature that these claims are large and infrequent, even the larger insurers will not be able to set IBNER to a degree which is not highly sensitive to changes in assumptions or changes in one of its PPO claims. The principle of "average" assumptions resulting in overall adequate IBNER reserves is unlikely to hold true. This of course has implications for considering reserve uncertainty and the capital requirements for such claims. This is discussed in Section 9.

Pure IBNR

This element of reserving is trying to identify the claims which have not been reported but have the potential to become PPOs and estimating the expected cost of those claims. As the trend for settling claims by PPO continues, patterns may emerge as to timings of when it becomes known that a claim is likely to settle by PPO, the types of claimants\ injuries etc. Exposure measures could be considered along with a frequency/severity approach.

Frequency

Currently there is a paucity of data with relatively small numbers of claims being awarded as PPOs. Our survey which comprises 79% of FSA regulated companies includes only 97 claims which have been settled by PPO. However given this limitation

it is still useful to consider the number of large claims in the recent history and to consider the proportion of these claims that were awarded PPOs. An appropriate definition of "large" for motor bodily injury claims is £1m to £2m and above.

The total number of IBNR large claims could be derived using chain ladder methods or exposure based methods.

Of these a proportion could become PPOs. This proportion could be based on past experience but considerations need to be given to the following which may result in the past level of PPO activity being different to the future:

- Increases in interest rates making PPOs less attractive to claimants

- Changes in the Ogden discount rate used to assess lump sum awards impacting claimants attractiveness to settling by means of a PPO

- Increases in the indexation of PPOs making them more attractive to claimants

- Changes in size or mix of book eg writing more younger drivers is likely to result in a higher proportion of large claims becoming PPOs

- Possible headline stories reporting on claimants running out of money after settling by lump sum.

Severity

The severity of future large bodily injury claims are likely have both a lump sum and annuity element. Due to the different nature of each part of the claim it makes sense to split out the estimation separately. The lump sum average severity can be based on the historical data but there may be distortions in this as the lump sums awarded in the past may have included different heads of damage. For example, if the lump sums in the past included care costs whereas now they are more likely to be paid as a PPO. It may therefore be necessary to split the estimate by head of damage.

The assumptions on the PPO severity can be broken down into the amount of an initial lump sum award, the amount of the annual payment and the actual duration of the payments made. The annual payment amounts will depend on:

- Level of care required as a result of the injuries. Are parents/spouse able to contribute to providing some of the care? Care costs typically range from £50k to £200k per year and our market survey showed that most PPOs were for amounts of less than £150k pa.

- Any contribution by local authorities

- Indexation applied

- Stepped orders

- Changes in what is deemed an acceptable level of care which will increase the cost of future PPOs.

- Contributory negligence

The duration of the annuity is dependant on the actual life expectancy of the claimant. Our market survey showed that most companies were reserving for PPOs using an annuity certain based on the life expectancy of the claimant. In reserving for annuities, mortality improvements are normally allowed for whereby the base mortality tables are reduced by a percentage improvement.

When considering impaired life annuities there is limited information available unless the impairment is specific, smoking for example in the case of Life companies. Severe bodily injury claims tend to be the claims which are more likely to be awarded a PPO. These are too diverse in nature for the traditional impaired life tables to be used for the estimation of life expectancy of a claimant.

The estimation of an average cost of a claim could be assessed in relation to the average cost of large claims and a loading to allow for the claim being settled as a PPO. This requires making an assumption about the proportion of each claim that is settled by lump sum or by an annuity. If the split of the lump sum element and the annuity element seen in the past is expected to continue into the future then the loading could simply be based on past PPO claims and the estimated proportional impact of the claim being settled at PPO compared to just a lump sum settlement.

If there have not been a large number of claims in the past then it may be worthwhile to assess the impact on large non PPO claims to provide "what if" scenarios and to generate some pseudo PPO claims history which could be used for the average severity assumption.

As PPOs become more widespread it may be the case that market benchmarks may become available.

Discounting

For annuity business, and hence PPO claims, the discount rate can be set at either the mean value weighted return or the internal rate of return on assets backing the liabilities. For non-life insurers it is unlikely that there will be specific assets held to match PPOs so the return is likely to be in respect of short term gilts or corporate bonds. However this could change in the future when PPOs constitute a higher proportion of reserves. The rate used for discounting annuities (which falls under the definition of long term insurance liabilities) is set out in INSPRU Prudential Sourcebook for Insurers (section 3.1.28) as:

- The internal rate of return on assets matching the liabilities net of tax

- Less credit risk adjustment

- Less reinvestment risk adjustment

This gives the risk adjusted yield.

The discount rate must not exceed 97.5% of this risk adjusted yield.

An allowance also needs to be made for investment expenses, further reducing the discount rate.

The application of discounting will, for most insurers, be a departure from current practices. However this will change in any case under Solvency II where discounting is required for all liabilities.

Net reserves

In allowing for future reinsurance recoveries, additional considerations are:

- The application of indexation clauses in typical motor excess of loss contracts makes estimation of the reinsurance recoveries more complex

- Credit risk involved due to the longer term that recoveries can potentially be made

- Timings between gross and net cashflows may be mismatched.

The treatment of proportional reinsurance recoveries is no different than for non-PPO claims although there is the added issue of credit risk. Section 11 discusses the impact of PPOs on reinsurance. It shows that for lump sum payments, the reinsurance

recovery can be estimated as for any other claim. The impact on the net reserves will depend on whether the claim is capitalised or not.

No Capitalisation with reinsurer

For PPOs, the timing of the payments (and hence the amount of indexation that applies) is critical for determining the level of recoveries. Therefore the net reserves will need to be modelled on a cashflow basis as in Section 11 where the payments and level of retention are indexed each year to estimate the recoveries.

The level of net reserves will then be equal to the present value of future claims net of recoveries using the discount rate used for the gross reserves. There will need to be an estimate of the bad debt reserve which is likely to be more significant due to the longer duration of the reinsurance recoveries. Section 11 discusses the issues around reinsurance credit risk and PPOs.

Capitalisation

To reduce the reliance on a reinsurer many years into the future, the insurer may capitalise the claim (ie submits to the reinsurer the present value of the PPO in order to recover against this calculated lump sum). However the impact of this is that there would be a large recovery payment but no corresponding large gross payment, resulting in a large drop in net paid claims. Net paid claims may in fact become negative.

After capitalisation there will no longer be any recovery reserves so the gross and net reserves will then be equal and the Reinsurer credit risk will also be set to zero.

Our market survey suggests that capitalisation is not commonplace at the moment.

Solvency II

In this section we discuss the specific implications of the requirements for Solvency II calculation of technical provisions on reserving for PPO claims. We do not discuss the general requirements of Solvency II as this is being covered more extensively in other papers and by other working parties.

Mortality assumptions: These assumptions will need to be on a best estimate basis but other than that, Solvency II does not place further requirements on the assumptions used.

Unbundling: The requirements states that where claims arising from non-life insurance obligations give rise to the payment of annuities then these annuities should be treated as life obligations and calculated separately to other non-life obligations. This is the principle of substance over form (see section 3.69 in Former CP 39 – Actuarial and statistical methodologies to calculate the best estimate http://www.ceiops.eu/media/files/consultations/consultationpapers/CP39/CEIOPS-L2-Final-Advice-on-TP-Best-Estimate.pdf).

This requirement means that insurers will have to unbundle the PPO part of claims, even if the reserving basis of the PPO is the same as the lump sum. The principle of proportionality also applies so in the near future unbundling may not be required. However, our suggested projections of the impact of PPOs over time show that they could have a material impact.

Traditional life actuarial techniques are different to non-life techniques as these methods calculate the best estimate based on discounted cash-flow models, generally applied on a policy-by-policy basis. They also take into account in an explicit manner risk factors such as mortality, survival and changes in the health status of the claimant. Non-life insurers will therefore have to adopt a different mindset when reserving for these claims although the requirement for a cashflow basis for all liabilities means there will be convergence of approaches between life/non-life to some extent.

Cashflow basis: The best estimate component of technical provisions will need to be calculated as the probability weighted average of future cashflows. The future cashflow of a PPO claim will be known in terms of the timing of the payments as they are normally paid at a set date(s) either annually or bi-annually. In this respect the estimation of future cashflows is more straightforward than for other claims.

As the cashflows need to be a probability weighted estimate this implies an estimation of the future mortality of the claimant. The mortality of impaired lives are very different to that of unimpaired lives as discussed in section 7. The assumption of impaired life mortality will therefore be a critical assumption.

Any reinsurance recoveries arising from PPO claims will also need to be estimated separately and again on a cashflow basis. Where a claim may be partly lump sum and partly PPO there would need to be some allocation of reinsurance recoveries between

the two as unbundling requires separation of the two types of payment. A proportionate allocation would be the most straightforward approach.

A cashflow approach seems logical for PPO claims anyway given the complications in indexation of the retention over the period of the PPO claim payments. The expected value of future cash-flows will need to take into account the time value of money using the relevant risk-free interest rate term structure. The draft CEIOPs advice was that there would be no allowance for an illiquidity premium which would have had a significant impact on annuity business. However, the illiquidity premium is only relevant if the assets backing the liabilities are held in illiquid assets. For non-life insurers it is unlikely that the asset strategy will change significantly as a result of PPOs in the short term so the application of an illiquidity premium may not be relevant as assets will continue to be held in relatively liquid assets. The reserves relating to PPOs may well make up 25% or more of the total gross reserves after ten or twenty years. By that time, insurers may well hold specific assets for PPO claims. Insurers with a higher proportion of PPO claims will therefore need to consider whether to change their investment strategy much sooner than insurers with very few PPOs or a very low proportion of PPOs.

Risk margin: Under Solvency II, a risk margin will need to be held in excess of the best estimate assumptions for non-hedgeable risks. The risk margin is approximated as the present value of the cost of capital for all future Solvency Capital Requirements or economic capital requirements which will have to be held for the entire run-off of the liabilities. This could be a significant issue for insurers with PPOs as the capital requirements, and hence the risk margin, for PPOs will be higher than for lump sum claims.

QIS 5

The draft technical specification for QIS 5 was published in April 2010 and is expected to be finalised early July (http://ec.europa.eu/internal_market/insurance/docs/solvency/qis5/draft-technical-specifications_en.pdf). It proposes two approaches to the treatment of annuities in non-life business (TP.1.149-TP.1.163). Participants are required to identify which approach was used and why it was considered to be more appropriate than the other. The two approaches are:

1) Separate calculation of non-life liabilities. This approach separates the annuity element from the claims triangulation so all payments relating to annuities are excluded from the triangle. The total best estimate of claims provisions is the sum of the result of the application of an appropriate actuarial reserving method to the run-off triangle and the amount of the best estimate calculated separately for the block of annuities.

2) Allowance for agreed annuities as a single lump sum in the run-off triangle. The approach includes annuities converted into a lump sum payment in the claims development triangle at the date of annuitisation and it also includes payments in respect of annuities prior to annuitisation.

Due to the construction of the run-off triangle, (1), this best estimate would not include the best estimate related to the annuities in payment which would be valued separately using life principles (i.e. there would be no "double counting" in relation to the separate life insurance valuation).

Where the analysis is based on run-off triangles of incurred claims, (2), the "lump sum payment" representing the present value of claims of the annuity (as above) should be removed from case reserves at the date of annuitisation.

The total best estimate for the claims provision and the annuity liabilities is thus given by the sum of the result of the application of an appropriate actuarial reserving method to the run-off triangle above described and the amount of the best estimate calculated separately for the block of annuities.

The approach adopted will very much depend on the level of data and the materiality of the annuity element of PPOs in relation to other claims. Other considerations are the calculation of reserve risk where the first approach makes it easier to allow for the different nature of these claims as the IBNR is calculated separately rather than being included with the IBNR for non-annuity claims.

Reserve uncertainty

Assuming the insurer is self-funding, uncertainty arises due to variances in the number of claims and the expected cost of claims. Our industry survey shows that frequency has increased substantially over the last couple of years. There is considerable

uncertainty over the extent to which this is the result of market conditions and whether this trend will continue in the future.

The expected cost of claims may vary due to:

- The mortality experience of a claimant being different than expected. This can arise from differing medical opinions given for the life expectancy of a claimant and the natural uncertainty surrounding claimant mortality.

- The level of Indexation applied in the PPO being greater or less than expected. Currently ASHE 6115 is being used but this is in fact a survey of earnings data rather than an index and it is not a very stable measure. The "Assumptions" section shows ASHE at different percentiles.

- Differences in the real rate of return actually achieved compared to the discount rate assumed in the present value of the expected future claims. This variance to the assumed discounting basis will result in an impact on reserves due to the unwinding of the discount rate.

- Net cost of claims affected by Reinsurer default experience; capitalisation amount and mismatching of annuities with liabilities.

Due to the relatively small volume of PPO claims there will not be sufficient data to adopt life insurance techniques in assessing reserve uncertainty.

The most suitable approach will be sensitivity testing of the key assumptions to form a range of high and low estimates. Examples of the impact of different sensitivies are shown in section 4, Projections of GI Company. A combination of more than one assumption change, for example, changes in life expectancy together with changes in the real discount rate, will impact reserves by more than the sum of the changes of each individual assumption separately so it will be important to test such scenarios as well.

9. Capital Issues

This section of the report discusses the effects on capital of PPO type liabilities. PPO liabilities have characteristics that differ substantially from bodily injury liabilities settled by lump sum. A large bodily injury claim settled by lump sum will often take 5-10 years to settle; some claims for minors will take 20 years to settle. In contrast PPO claims may be paid over a 30-40 year period with some claims taking 60+ years until closure. Capital will need to be held for longer with greater uncertainty which will increase capital requirements. This is likely to have a significant effect on the behaviour of insurance companies, investors, reinsurers and regulators with likely impacts on the run-off and life industries. This section starts with a discussion of factors driving capital for PPOs before investigating the implications of Solvency II on capital requirements and the differences from the pre-2012 ICA regime. The section concludes with possible implications for the insurance and related industries.

PPOs Capital Structures

Any insurance undertaking needs capital to assure policy holders that claims can be paid in the future. Where risks are less predictable, less diversifiable or take longer to reach settlement capital requirements are higher. In the current embryonic stage, companies exposed to PPO liabilities suffer from all three problems. It is probably realistic to say that periodical payment orders have the potential to alter the motor insurance industry.

Given that time period that PPO liabilities can take to run off compared to bodily injury claims settled by lump sum it is worth considering how the reserve structure of insurance companies may change. If a large motor insurer (so that experience is smoother!) currently expects a claim ratio of 60% of premiums maybe 1/10, 6% of premium, is taken up by bodily injury claims over £1M.

The initial level of PPO liability will be a small proportion of total claim but as time goes on the PPO liability runs off slowly so many years reserves will build up. One result of this is that the mean term of reserves will increase and insurers will have more exposure to investment markets. The "standard" motor insurer alters from a company that takes premiums (and can distribute profits two years later) to a company that has to maintain reserves for 30-40 years or more with huge exposure to investment markets and general economic forces - more hedge fund than general insurer.

This would have an effect on a large general insurer - larger reserves will require more capital to back them either raised from investors or from retained profits. For small insurers PPOs will hugely increase the volatility of results, where an insurer has no PPOs more capital will be needed just in case. If the company has even one PPO claim

it could be impossible to sell. This is likely to deter investment in new entrants to the motor market adversely affecting the efficiency of the market.

Just as importantly the risk factors affecting PPO liabilities are likely to make results even more volatile than the increase in reserves and term of reserves suggests.

Risk Factors

PPO liabilities have a significantly different risk profile to bodily injury claims settled by lump sum award. Before a PPO award is made the reserve and capital are likely to be linked to general claims inflation (as for a lump sum). The general claims inflation will include elements relating to care cost escalation, asset return and general longevity risk but will also link to other factors including judicial, social and legislative factors. When a lump sum award is made liability is (generally) extinguished. On finalisation of a PPO the liability alters profile and links explicitly to future lifetime, asset return and general longevity risk.

General problems likely to be experienced by a motor insurer include;

- Life type liabilities instead of non-life,

- No matching assets – basis risk remains even with real assets,

- Difficulties in calculations - no reliable history. Solvency II will require more robust methods,

- No reliable secondary market exists for PPO liabilities. (This may change once there is sufficient mass of PPOs but this cannot be anticipated with certainty.)

- PPOs may invalidate some business models currently used by smaller insurers and impact the M&A market.

The main risk groups are;

- Escalation risk – claims linked to earnings are likely to escalate more rapidly with more volatility than RPI/CPI and may involve deferred step changes.

- Regulatory/Judicial risks (level of take up, different indices selected, changes to capital requirements),

- Investment risk that returns are lower than expected or default occurs on bond investments

- Investment condition risks (higher/lower desirability of PPO vs lump sum - correlation of asset returns and desirability of PPO)

- Individual mortality risk (significant with small portfolio but diversifiable as portfolio expands),

- Aggregate mortality risk (potentially upside risk given recent trends),

- Emergence of secondary markets (upside risk of extinguishing liabilities early, risk of higher expenses),

Long term credit risks,

- MIB risk (MIB PPOs are paid from industry levees without a fund being set up (PAYG)– levees likely to rise over time which impacts the SII balance sheet hence insurer capital),

- Cost of capital risk (CEIOPS may alter the prescribed return – sudden increase in MVM for liabilities – specific to SII rather than ICA).

Judging from initial take-up PPOs appear to be more likely for young claimants i.e. <25. Younger claimants are exposed to greater inflation risks over the expected period of payment than a claimant with a shorter expected lifetime.

In considering these risk factors general longevity risk is comparatively low compared to the escalation and asset risks. Over a 40 year period an improvement in mortality giving an extension in lifetime of 25% would be very extreme, an alteration of inflation or asset returns to alter payments by this level is not extreme. More specifically the adverse experience of a life over one year (for the insurer) is likely to be minimal – most claimants will survive the year. The experience on assets and the gap between asset and earnings inflation measures is vastly more variable (against the insurer) - historically wages can rise rapidly but in bad economic times wages tend to fall minimally or stay level.

Considering a portfolio of PPO liabilities the major risk factors are alarming. Apart from diversifiable specific longevity risk, most of the risk factors strongly correlate across contracts. A one off shock will have a strong effect on reserves but a change in future expectations could have a devastating effect on capital. Higher inflation or lower asset returns are likely to drive a change in the cost of capital required to calculate SII liabilities affecting the entire industry at once. In addition, capital relief from reinsurance is likely to be tempered by long term credit risks. This may provide further impetus towards a capitalisation clause. How good is a AAA rating over a 10+ year time period? How good over 25 years? The lack of safety net for insurers on reinsurer default is an issue – contract terms are drafted well before default is an issue. These effects are likely to increase the period and magnitude of the reserving cycle - the emergence of loss making business will take longer and be more severe for insurers.

Capital Methods: ICA and Solvency II

The reader should bear in mind that at the time of writing Solvency II (SII) is still 18 months from implementation and some major features are still uncertain. The ICA regime in the UK was set up when SII was first mooted as an intermediate step to bridge the gap from the formulaic Solvency I rules to SII (based on the understanding of SII in 2004/5). The ICA requirements required companies to look at the ultimate liabilities at a 1 in 200 level and hold capital to cover this level of loss. Business to be

allowed for includes past liabilities and the next year of incepting business where this results in an additional capital requirement i.e. future profit is not allowed to offset the 1 in 200 result. An ICA consistent balance sheet would include outstanding claims, IBNR/IBNeR (or alternative wording) to ultimate, UPR and loading to the 1 in 200 ultimate level. Modelling of liabilities is principle based rather than rule based and should be appropriate to the undertaking and the liabilities involved – this is backed up by regulatory challenge and review.

SII is a pillar based approach which goes far beyond the capital requirement. The pillars are;

1. Demonstrating adequate Financial Resources (formula or internal model approach for capital)

2. Demonstrating an adequate System of Governance

3. Public Disclosure and Regulatory Reporting Requirements.

Pillars 2 and 3 are general across all classes of business and relate more to governance and reporting rather than capital issues so are only touched upon here. For the capital requirement insurers can opt for a formula based approach, an internal model or a mix of the two. The formula based approach is intended for smaller/simpler insurance companies and is intended to be penal for larger and multi-line insurers. For larger or more complex organisations an internal model approach can be used under SII where the organisation can, as for the ICA, follow an approach appropriate for the undertaking and liabilities involved. Under the mixed approach some material elements can be produced using an internal model and other elements using a formula based approach. The company would be required to justify the approach taken on an element by element basis. The SII balance sheet would include claims provisions, premium provisions, a market value margin and capital.

In particular;

- Liabilities must be discounted at a risk free rate (with partial allowance for the liquidity premium on corporate bonds)

- Business that the undertaking is obliged to accept at the valuation date should be included – this includes quoted business allowing for lapses or non-take up (the ICA basis includes all business incepting prior to the valuation date).

- The loading should allow for the 1 in 200 level deterioration over a one year time horizon (rather than to ultimate for the ICA basis).

- An additional loading should be made for the market value margin (no analogue under ICA).

Market Value Margins
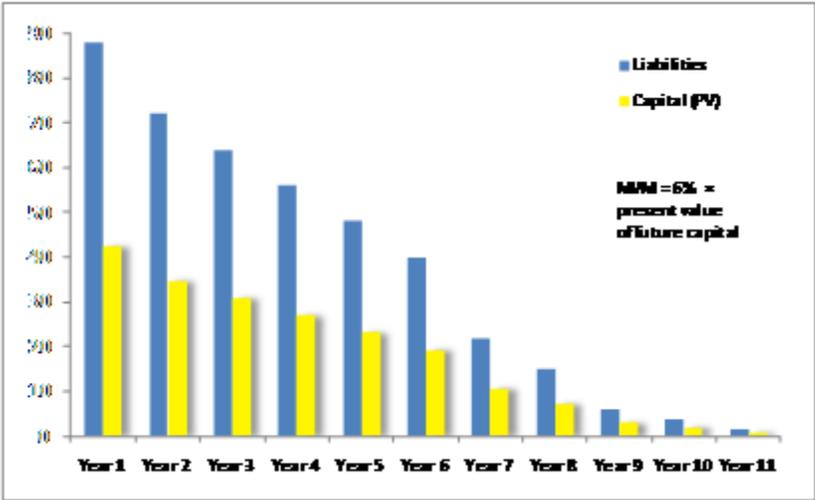
The market value margin (MVM) originates in the need for accounted liabilities to be at fair value i.e. monies required by an independent party to take on the liabilities in an informed, arms length transaction. Where there is a liquid market or matching assets exist the value can be observed from the market prices charged. Where there is no liquid secondary market for liabilities CEIOPS mandates a cost of capital approach. A purchaser taking on liabilities will need to hold capital - the deal would only go ahead if the purchase price includes sufficient margin that the internal rate of return is greater than the required return on capital. (Solvency II guidance states the margin should be calculated for a single line of business with a purchaser which is an empty undertaking so issues of strategic fit etc are ignored.) For PPOs this second approach would be required as there is (at the time of writing) no secondary market and there are no financial instruments that can be used to match the liabilities. In most cases the 1 in 200 deterioration will be less over one year than to ultimate but the additional MVM is likely to be sufficient to increase the capital requirement over the ICA level. It should be noted that the one year deterioration can be caused by changes in the expectations of assumptions used to value liabilities as well as adverse loss experience over the year. For PPOs where financial measures such as inflation are material this can be the major driver of capital.
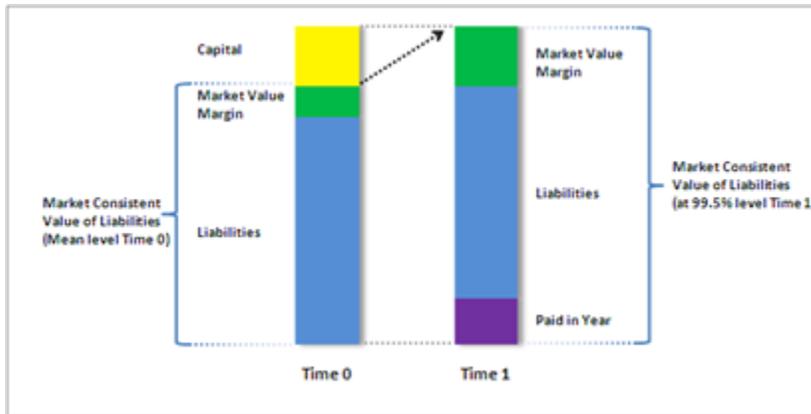
Calculation of the capital and market value margin are somewhat circular; capital depends on possible changes in liabilities and market value margin which in turn depends on all futures year's capital. The effect of this recursion is explored in the literature (references a) but is complex.
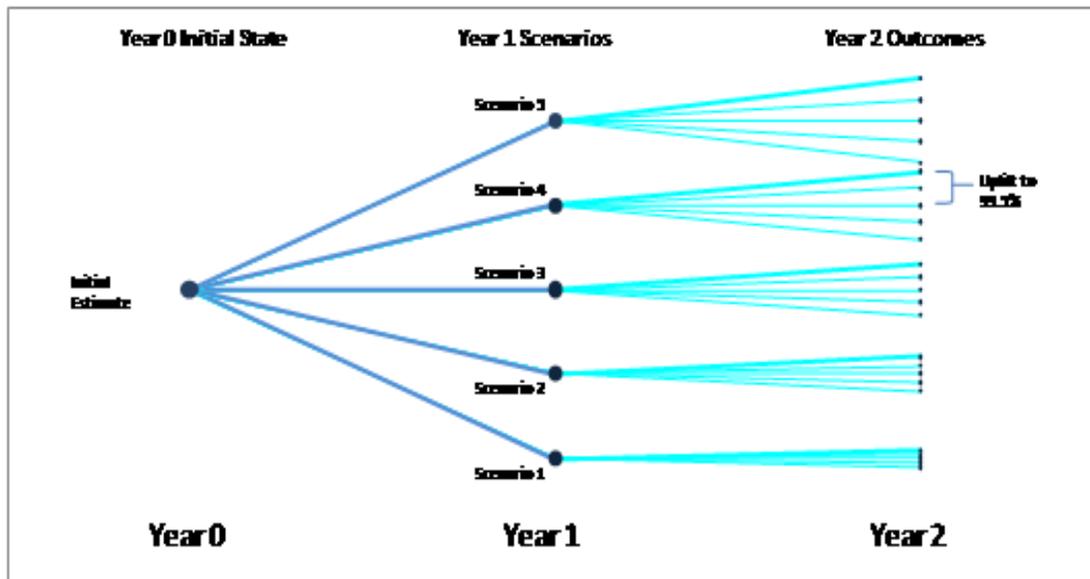
Considering the example above, liabilities are settled after two years of uncertainty and capital and market value margin are required at year 0 and year 1. At each branch of the tree the capital requirement and market value margin can be evaluated and the values at previous points then calculated in turn.

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At time 1 (no market value margin or capital at time 2)

$$Cap_{1|1} = [Liabs_{2|1}]^{99.5\%} - Liabs_{1|1} - MVM_{1|1}$$

$$MVM_{1|1} = RoC \times Cap_{1|1}$$

At time 0

$$Cap_{0|0} = [Liabs_{1|0} + MVM_{1|0}]^{99.5\%} - Liabs_{0|0} - MVM_{0|0}$$

$$MVM_{0|0} = RoC \times (E[Cap_{0|0}] + E[Cap_{1|0}]) = RoC \times \sum E[Cap_{T|0}]$$

Or more generally at time T

$$Cap_{T|0} = [Liabs_{T+1|0} + MVM_{T+1|0}]^{99.5\%} - Liabs_{T|0} - MVM_{T|0}$$

$$MVM_{T|0} = RoC \times \sum E[Cap_{V|0}] \quad \text{where } V \geq T$$

In general many capital modelling questions are solved using simulation but due to the recursive nature of this problem a rigorous simulation method without simplification would take huge computing power. To work out the change in liabilities and market value margin from year to year would require nested simulation upon nested simulation which, for long tail business, would be prohibitive. For most organisations, without supercomputer access, simplifications will be required.

Capital Simplifications

Due to the nature of PPO liabilities common factors across a portfolio are likely to dominate the risk profile. As discussed earlier for a moderate portfolio of PPOs the dominant risk factor is likely to be the spread between the escalation index and a hedgable measure such as the retail price index. This will mean that the liabilities and market margins for individual PPOs will move in concert giving less diversification than for a more agreeable portfolio of risks.

It is also worth considering the non-escalatory risk profile. For many general insurance risks the distribution of outcomes is heavily skewed with large loss events or deteriorations being rare but severe. In the case of PPOs the survival of a life is generally the more likely outcome so the rare event (death) reduces liability. For this reason some of the simplification techniques may not be applicable. In addition the nature of PPOs makes calculation of one year deterioration much easier than for many portfolios. Where events or deteriorations are rare or severe it is hard to predict when events will happen and most techniques are more suited to predicting ultimate levels. For PPOs the probability of death in one year or the probability distribution of an asset spread is likely to be an input and the ultimate built up year on year.

The combination of risk factors also make it possible to get to the same level of loss in different ways for the same starting portfolio i.e. all risks surviving with low real

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escalation or half of risks dying prematurely but with high real escalation. The options may have the same expected payment profile but would have quite different spreads of outcome which makes simplification based on recombining trees less favoured as a method.

For a given scenario the liability and associated market value margin in the next time period are strongly linked to the economic factors which affect the whole portfolio. This suggests that one simplification may be the use of a proportional proxy where the capital requirement is proportionate to the liability. If the capital levels for each node were approximately known the market value margins can be estimated which can then be used to re-estimate the capital requirements. As an iterative process there is a possibility that this will not approximate to a steady state but the nature of a PPO portfolio is more likely to lend itself to a convergent form.

Capital for a Portfolio

This section considers the qualitative aspects for different portfolios rather than calculating THE capital requirement. The actual requirements for a given portfolio are highly sensitive to the assumptions employed.

Under the SII governance requirements, management will need to show understanding of the economic scenarios used and the risks involved underlying the modelling of liabilities, capital and margins! Several of the risk factors affecting PPOs will affect an entire portfolio at the same time so a risk driver approach may be favoured over a correlation approach for modelling. The risk driver approach readily links into stress testing that can be used to demonstrate understanding of the risks affecting the portfolio.

The capital effects resulting from PPOs will vary considerably depending on the type of insurer. These can be split into three broad groups; large primary insurers expecting regular PPO claims, small insurers expecting few PPO claims and excess reinsurers. This analysis does depend on several assumptions;

- That lump sums based on Ogden 2.5% are cost neutral. In reality this assumption has not been borne out by gilt returns for 10+ years. Under Solvency II a market discount rate (with partial allowance for liquidity premium) is required and this would currently (mid-2010) give values consistent with Ogden 0.5%. Movement to PPO from lump sum would increase liabilities significantly - for a 15 year mean term around 30% increase in liabilities, for a 30 year mean term 80%.

- The variability of the earnings/investment return gap. The 1990s and 2000s saw low volatility in these measures compared to the history i.e. inflation 15%+ in the 1970s. If future experience sees higher volatility the capital requirements for PPOs will increase relative to shorter tail liabilities.

- The propensity for claims of a given severity to settle via PPO remains constant. If smaller claims start to settle via PPO then the proportion of PPO liability will increase more rapidly than expected.

- Insurers covering groups with a higher propensity for severe claims i.e. young male drivers, heavy vehicles are likely to see more PPOs so may have a higher than average capital requirements.

For a large primary insurer writing a broad book of business the variation of attritional/large non-PPO claims will dominate the PPO claim variability for a single year of business in the first year. With level writings year on year the PPO liability increases as a proportion of total liabilities over time - as the book of business approaches steady state (40 to 50 years down the line) the PPO element becomes a bigger driver of the capital.

For a small insurer with low levels of PPOs i.e. expecting 1 claim every 10 years the effect is material. If there is a claim in a year the level is likely to be 10-20% of total liabilities. This will represent a significant increase in the linkage to escalation risks but often the variability of new business experience is likely to outweigh the PPO variability.

The risks are compounded where an insurer has a sizable portfolio including PPO liabilities and the size of writings reduces over time (or reduces to zero in the case of run-off). The proportion of PPO liability increases with the run off of attritional and lump sum liabilities and this impacts the market value margin. Back of the envelope calculations indicate that the market value margin for a book of purely PPO liabilities could be around 10-20% of the value of the liabilities (highly dependent on the volatility of the escalation/investment linkage). Due to the linking to escalation/investment risk this volatility does not diversify away for a larger portfolio. This is a significant increase over the pure liability and points towards an additional loading for this type of claim. It is worth noting that the market value margin for the short tail attritional type business is less significant than for long tail liabilities as capital is held for a shorter period of time so the total return required on the capital is lower.

For an excess reinsurer a significant proportion of liabilities are likely to be PPO related as there is no attritional run off element. In addition the gearing effect of the excess increases both the volatility of claims and the duration of payment streams - both of these effects will increase the market value margin and capital requirements. As a result the effect of PPOs or anticipated PPOs is likely to impact excess insurers more rapidly and to a greater degree than for primary insurers. Capital is required for as long as for a primary insurer but with a slower run off of liabilities thus the market value margin requirements will be higher than for the run off of primary business.

Overall the impact of PPOs is likely to increase capital requirements for many insurers. The effect of Solvency II is likely to be mixed; the addition of a market value margin will increase liabilities, where discounting has not been used allowing for it will decrease liabilities - the effects on capital will be complex. Calculation on various bases has shown that in some circumstances capital can decrease although for long tail business increases are more likely.

References
- The ultimate and one-year views of reserving risk with respect to solvency and risk margins, *Peter England; Andrzej Czernuszewicz* presented GIRO 2009

10. Pricing

PPOs are likely to affect the cost of large claims that involve providing long term care or replacing income lost. As it has already been mentioned in other sections of this paper, PPOs are likely to add to the uncertainty over the ultimate cost of such claims as well as extend the length of the underlying loss reserves. Essentially all of the issues discussed at length in the reserving, assumptions and capital sections will need to be considered when pricing.

In this section we primarily look at the potential impact of PPOs from the perspective of direct insurers. The reinsurance pricing is covered in the reinsurance section.

It is useful to differentiate between the actual price that the insurance buyer is likely to pay and pricing, that is, the sellers' process for formulating a best estimate of the cost of providing the insurance product allowing for an appropriate contribution towards the expected cost of claims of the relevant insurance portfolio, internal expenses, external costs and profit (often referred to as the technical price of the product).

The impact of PPOs on the actual price will depend primarily on the significance of the PPO related costs within the relevant portfolio and the prevailing market conditions. Therefore, it is likely to be of more consequence for:

- reinsurers than insurers

- excess of loss than primary, such as for fleet covers with £1m deductibles

- Small insurers, who rely more on reinsurance than large companies,

since for large primary insurers, the large bodily injury claims will be a small proportion in comparison with the property damage and small bodily injury costs, such as whiplash.

As with reserving and capital the frequency and severity will be the critical assumptions for assessing the cost of PPOs, and the considerations for these are discussed in length in the assumptions section so we do not cover them here. One key difference to reserving is that the claims are likely to have already been notified, so distributions around the age of claimants would need to be considered more carefully for pricing than reserving.

A consideration for primary insurers is to decide whether the PPOs require a different loading allocation to normal lump sums. Insurers may need to decide whether certain risk factors are driving the likelihood of a PPO and consider whether to apply a large loss uplift evenly across the risk classes or to differentiate by perceived risk contribution, for example if younger drivers are perceived to be more likely to produce a PPO they may require a significant. Possible approaches to differentiating may be to use market

benchmarks, discussions with reinsurers, who may have more experience of PPOs, or by subjective judgment of underwriters.

Some insurers may assess the gross price and the reinsurance spend is assessed to optimise the risk/return balance on the capital. Consequently the calculation is simplified as only the present value would need to be considered. This would still need assumptions regarding the cost and number of losses, as well as cost of claims handling and capital charges. Insurers rating on a net basis will need to adjust the expected net cost of reinsurance for any higher retained proportions following increased indexation of the deductible as well as the change in the reinsurance price.

The direct insurers may need to adjust prices in response to:

- Changes in the availability and terms (including the cost) of reinsurance

The insurer would need to consider whether reinsurance claims would be capitalised or not as this has implications for inflation, longevity and credit risk pricing. The insurer may wish to take out reinsurance with no indexation post settlement if available, to remove deductible creep. An extra cost for this, above the price of indexed deductibles, would need to be factored in.

- The additional cost of handling the claims for a longer time period for example.

Arguably when a PPO is awarded additional claims management is needed is to check proof of life manage reinsurance deductible indexation. In addition there may be a one off cost of upgrading the claims system to allow for PPO claims to be processed.

- Changes in the legal environment affecting the expected frequency and severity of PPO claims

For example, if the Ogden Discount rate were to change then the perceived attractiveness of PPOs would be affected. Any impact could apply to all unsettled claims. As the average settlement delay is around 7-8 years, with possible delays of 18-20 years or more, then the change in legislation or case precedent could be many years into the future and still impact a majority of the claims.

- Changes in the regulatory environment affecting the valuation basis of annuities and the required solvency capital

Given that all PPOs on business being priced at the time of writing this report will be likely to settle on a SII basis, the possible impact of this should be considered.

- Inflationary effects on the balance sheet linked to the longer tail of the underlying liability

Combined with an indexed deductible post settlement, the retained element of a claim will be subject to significant increase in the inflation risk. The insurer view on inflation may change with the increased time frame.

- Extra credit risk of reinsurers

Given that the reinsurance recoveries will be made at a later time than under lump sum compensation, the probability of a reinsurer defaulting would be higher. Consequently the loadings for reinsurer default are likely to be higher, without switching to stronger reinsurers.

- View on inflation and investment income

As PPOs are indexed in line with an inflation indexed, the assumption regarding inflation will have a significant impact on the present value of the losses.

- Availability and cost of impaired life annuities

Impaired life annuities can be held as an asset to match the liabilities, used as a benchmark on capitalisation bases and to remove the risk from the balance sheet by buying on behalf of the insurer. Currently these are viewed as expensive and are not available linked to ASHE. However, if the market changes in the future then this can affect both net pricing and as an approach to discounting.

The ability to effectively transfer risk to reinsurers will be affected by:

- The application of indexation clauses on the deductible and limits

- Treaty wordings and particularly the basis on which claims will be split between primary and excess layers

- Potential commutation of treaties enforced to, amongst other reasons, contain reinsurance credit risk

- Risk inherent to capitalisation of long tail liabilities that may be implemented by insurers or reinsurers

- The investment income over the extended period of the liabilities and availability of matching assets in order to discount the cashflows

As has been discussed elsewhere in this paper, the legal environment around PPOs is currently at an embryonic state and as such pose an increased risk for both insurers and reinsurers.

The impact of PPOs on pricing is likely to be linked to the increased uncertainty over the ultimate impact of PPOs. The increase in the capital intensity of the relevant insurance and (particularly) reinsurance products and would be expected to increase the technical prices.

In addition to the amount of capital required, the length of time that capital will need to be held must be considered, as this would be a significantly longer time than for Lump sums. For a minor with a ten year impairment capital would be expected to be held for over fifty years. The profit required to maintain this capital would need to be allowed for in the current pricing.

Apart from the increased uncertainty and its impact of capital intensity the pure risk premium component of the technical price may also be affected by the assumption that will need to be made on the number of large claims that will end up being settled by PPOs and how the value of the corresponding annuities will compare to the value of these claims under the current Ogden regime.

At present there is little information available to help actuaries and underwriters produce estimates of the additional cost from PPOs with any confidence. Insurers and reinsurers will be watching closely the developments around PPOs and their impact on their efforts to manage risk effectively and within the financial resources available to them.

11. PPOs and their impact on reinsurance

This section aims to discuss the issues surrounding the impact PPO claims are likely to have on reinsurance both from the perspective of the buyer and seller.

Currently the use of PPOs is at an embryonic stage and it is difficult to assess the extent to which their introduction has had an impact on reinsurance pricing over the past few years. What is apparent is that as the number of PPO awards builds momentum

- both insurers and reinsurers are keen to understand implications of PPO claims on reinsurance purchasing decisions;
- a minority of reinsurers' appetites have been partly or wholly curtailed, thus lifting pricing;
- all parties are reviewing the implications on their balance sheet of carrying annuity risk types as a principle; and
- specifically they are concerned as to
  - how to finance ASHE-linked liabilities without the availability of any matching assets
  - how to judge the implications of the shift in reinsurer credit risk, which in relation to PPOs now needs to be judged over a much longer time frame.

The analysis is broken down under the following sections

1. The current index clause in operation for UK motor business
2. The indexed anomalies arising from the index operation for PPO claims which leads to a gradual deductible creep
3. Outline a modelling methodology for estimating reinsurance costs based on a simplistic pricing formula including any limitations and observations

   $$\text{Reinsurance Cost} = \text{Loss Cost} - \text{Investment Return} + \text{Cost of Capital} + \text{Expenses} + \text{Profit}$$

4. Reinsurer Credit risk

Current Index Clause

There are several features which differentiate the UK motor industry from other classes of liability business.

- Under the road traffic act it is compulsory for drivers to purchase unlimited third party liability cover
- Reinsurance layers follow the underlying policy and offer unlimited limits

It is common for motor excess of loss programmes to incorporate some form of indexation. The most common clause is fully indexed (FI) but severe inflation clauses (SIC) are still in existence.

The aim of the clause is to protect reinsurers from inflationary pressures on claims which exist between the inception of the reinsurance contract and the payment of the claim. Claim inflation can be significant especially for large losses and for long tail business this can amount to a substantial erosion of the nominal reinsurance retention level.

The index to which claims are related will be stated in the reinsurance contract. For the UK it is usually a published average earnings index or in some (rare) cases RPI. In general a fully indexed clause operates by adjusting payments by the factor:-

$$\frac{\text{Index at the time of inception}}{\text{Index at the time of payment}}$$

Equation 1

which shares the inflationary impact between insurer and reinsurer – or at least that part of claims inflation which is attributable to wage inflation. Estimates of the overall scale of large claim inflation vary, but numbers in the range 7% to 12% are often viewed as realistic over a period when wage inflation has been nearer 4% to 4.5%.

The retention and limit are then re-valued by applying the following multiplier

$$\frac{\text{Cumulative value of paid claims}}{\text{Cumulative value of adjusted claims}}$$

Equation 2

There are several variations on how the adjustment is applied to losses. For example all interim payments could be adjusted using the date of the last payment or each payment can be treated individually.

Clauses of this nature have been in circulation for many years and have generally worked quite well for claims settled on a lump sum basis. With the introduction of PPO claims the standard index wording required adaptation. The main revisions to the policy wording include:-

- Methodology for substituting the index prescribed in the slip with the relevant index to which the PPO payments are linked, for consistency. Equation 1 becomes

<table>
<tr>
<td align="center">Value of Slip Index for the period
embracing the commencement date
of continuing regular payments</td>
<td align="center">X</td>
<td align="center">Value of PPO index
<u>for the period embracing the Date of
Payment</u>
Value of PPO index for the period
embracing the commencement date of
continuing regular payments</td>
</tr>
</table>

Equation 3

The operation of the equation above is graphically shown below.

Adjusting the slip index for PPO payments
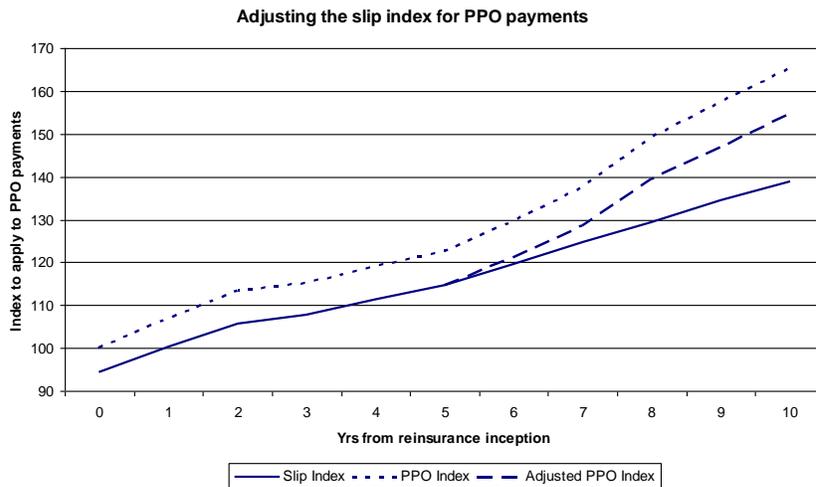
- Revising the wording where necessary so each PPO payment is adjusted independently at the date of payment

Deductible creep

A well documented consequence of the changes to the index clause is the gradual creep in the reinsurance deductible over time for claims settled as PPO awards. This feature is illustrated with an example below with initial reinsurance retention of £2m.

Year	Lump Sum	PPO	Total Incremental	Total Cumulative	Adjusted Incremental	Adjusted Cumulative	Reinsurance Retention	Recoveries excess £2m
0							2,000,000	
5	1,500,000	150,000	1,650,000	1,650,000	1,356,180	1,356,180	2,433,306	0
6		156,000	156,000	1,806,000	123,289	1,479,469	2,441,417	0
7		162,240	162,240	1,968,240	123,289	1,602,758	2,456,067	0
8		168,730	168,730	2,136,970	123,289	1,726,047	2,476,143	0
9		175,479	175,479	2,312,448	123,289	1,849,336	2,500,842	0
10		182,498	182,498	2,494,946	123,289	1,972,625	2,529,570	0
11		189,798	189,798	2,684,744	123,289	2,095,914	2,561,884	122,860
12		197,390	197,390	2,882,134	123,289	2,219,203	2,597,449	284,685
13		205,285	205,285	3,087,419	123,289	2,342,492	2,636,012	451,407
14		213,497	213,497	3,300,916	123,289	2,465,781	2,677,379	623,537
15		222,037	222,037	3,522,953	123,289	2,589,070	2,721,404	801,549
16		230,918	230,918	3,753,871	123,289	2,712,359	2,767,974	985,896
17		240,155	240,155	3,994,026	123,289	2,835,649	2,817,010	1,177,015
18		249,761	249,761	4,243,787	123,289	2,958,938	2,868,453	1,375,334
19		259,751	259,751	4,503,538	123,289	3,082,227	2,922,263	1,581,275
20		270,142	270,142	4,773,680	123,289	3,205,516	2,978,416	1,795,264
21		280,947	280,947	5,054,627	123,289	3,328,805	3,036,902	2,017,725
22		292,185	292,185	5,346,812	123,289	3,452,094	3,097,721	2,249,091
23		303,872	303,872	5,650,684	123,289	3,575,383	3,160,883	2,489,801
24		316,027	316,027	5,966,712	123,289	3,698,672	3,226,408	2,740,304
25		328,668	328,668	6,295,380	123,289	3,821,961	3,294,319	3,001,061
26		341,815	341,815	6,637,195	123,289	3,945,250	3,364,651	3,272,544
27		355,488	355,488	6,992,683	123,289	4,068,539	3,437,442	3,555,242
28		369,707	369,707	7,362,391	123,289	4,191,828	3,512,735	3,849,656
29		384,496	384,496	7,746,886	123,289	4,315,117	3,590,580	4,156,307
30		399,875	399,875	8,146,762	123,289	4,438,406	3,671,030	4,475,732
31		415,870	415,870	8,562,632	123,289	4,561,695	3,754,145	4,808,488
32		432,505	432,505	8,995,137	123,289	4,684,985	3,839,986	5,155,151
33		449,805	449,805	9,444,943	123,289	4,808,274	3,928,621	5,516,322
34		467,798	467,798	9,912,741	123,289	4,931,563	4,020,122	5,892,619

Year = Time since reinsurance treaty incepted
PPO payments are assumed to increase at 4% p.a.

At year five, the time elapsed from the index base date, the reinsurance deductible has risen to £2.43m. If the claim settled on a traditional lump sum basis at this time the reinsurance deductible would have been £2.43m. Settling via the PPO route leads to a much higher ultimate retention if the assumptions are borne out. If the claim is paid for 30 years the reinsurance retention doubles to £4.02m, a 100% increase on the original value.

Ultimately insurers are carrying higher reinsurance retentions.
- The size of the increase in retention could mean that some claims are no longer recoverable
- The annual percentage increases in the reinsurance retention is an increasing function. The graph below plots the percentage increase in reinsurance retention from one year to the next based on our example claim above
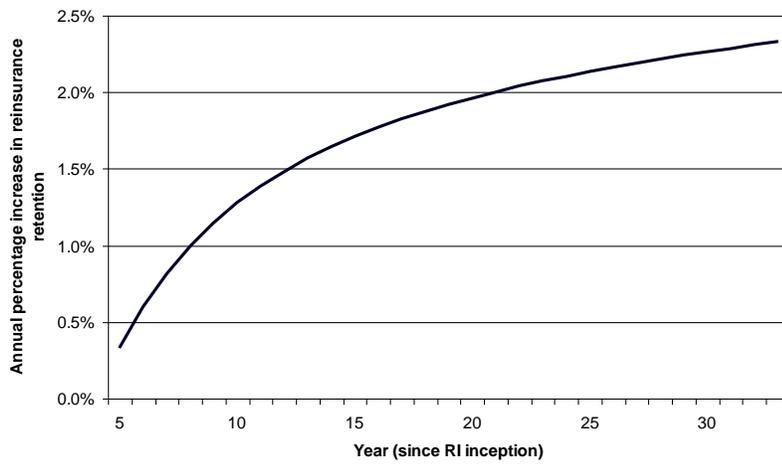
- The percentage increase in reinsurance retention can be reduced to

$$\frac{1+\% \text{ increase total cumulative}}{1+\% \text{ increase in adjusted cumulative}} - 1$$

Variables which influence this value are:-

Life Expectancy:	The longer a claim is paid the greater the impact on the reinsurance retention
Index Increase:	The greater the assumed increase in index the greater the impact on reinsurance retention
PPO award relative to lump sum:	The greater the PPO percentage the greater the impact on reinsurance retention. The results are most sensitive at lower life expectancies and converge as life expectancies increase. X% represents the initial PPO award as a percentage of the lump sum value

Illustrations of these features are given below for the example claim above. Results can be quite sensitive to small changes in assumptions.
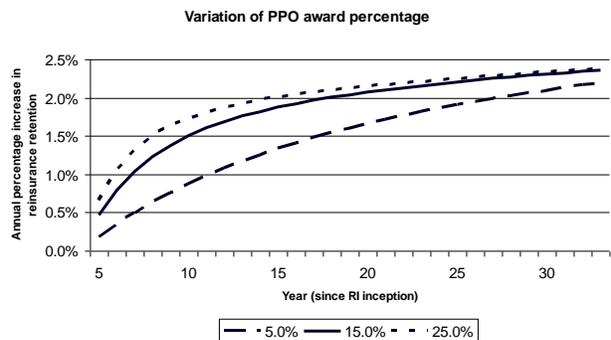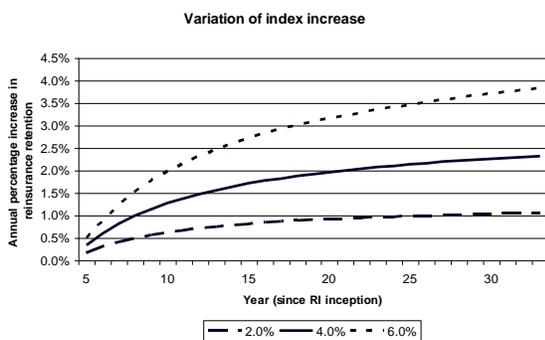
This feature is not unique to the initial reinsurance deductible. All reinsurance layers exhibit the same annual percentage increase in retention.
- Increasing retention levels reduces the probability that a reinsurance layer is activated
- Once recoveries are paid on a given layer the exposure (limit) to the layer continues to increase

- Compared to a deductible un-indexed from settlement, the insurers have a significant increased cost following the introduction of PPOs, as their deductible is fixed, whereas the limit (reinsurance programme deductible) continues to escalate

The figures presented above assume the reinsurance layer is fully indexed. Below we briefly comment on layers with SIC.

In the majority of instances the percentage deductible creep will be identical to a fully indexed layer and the ultimate retentions X% lower than on a fully indexed basis (where X is the SIC percentage from the reinsurance slip).

There are exceptions, for example if the index increase is low or claims settle early, such that the index is 1.00 when the initial payment (especially if this includes the lump sum element) is paid.

Index Increase = 2% p.a.

Claim settled after 3 years from reinsurance inception
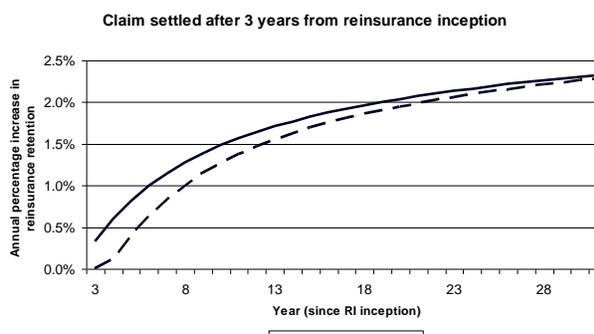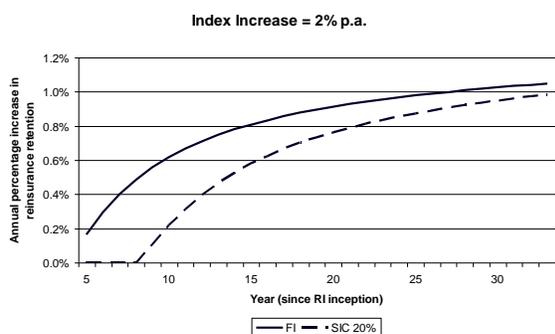
Modelling methodology

a. Loss Cost

Definition: Estimate of un-discounted losses to a given reinsurance layer

Reinsurers use a variety of methods to model reinsurance excess of loss layers. These include experience rating, frequency & severity analysis and benchmarking. This section focuses on the frequency & severity and benchmarking methods.

Experience rating by its nature uses past experience to model the future year which will include only limited experience of PPO claims.

ai. Frequency & Severity approach

Below we include a general discussion of the assumptions required to perform a stochastic frequency / severity analysis.

Similarly to above the frequency and severity assumptions are usually derived from past loss experience. However a frequency severity stochastic approach to modelling allows adjustment to the assumptions to allow for changes in the behaviour of claims in the future. Admittedly this in itself requires additional assumptions which are tricky to derive as data is limited.

A possible approach to pricing is to use the frequency and severity assumptions derived from historical data (assuming all claims settled on a lump sum basis) and adjust to allow for expected changes in the make up of the book in respect of the split of claims settled as lump sums or PPOs.

Cash-flows can be modelled to derive expected losses to the reinsurance layers.

Frequency

If we assume that traditional methods of deriving the frequency distribution assume all claims are settled on a lump sum basis we need to consider
- The distribution relates to the mean and variance of the number of losses above a selected threshold. The threshold relates to the NPV of claims using the prescribed Ogden real discount rate
- PPO claims are modelled undiscounted so we need to consider that some PPO claims may have a NPV less than the threshold provided by the insured yet still lead to recoveries especially after applying claims inflation. Claims which are most likely to fall below the radar are
    – Losses on older years where claims inflation is most significant
    – Claims which if settled as a PPO would have a small lump sum element

On the whole this is not likely to be a significant issue but the actuary will need to be aware of the appropriateness of the threshold of claims provided and the reinsurance retention level to be modelled

Severity

To adjust the pricing methodology to allow for PPO claims assumptions are required for:-

Proportion of losses settling on PPO basis.

- This in itself is likely to be a highly judgemental estimate until the PPO emergence becomes more stable
    - The run on pattern for PPO claims since their introduction in April 2005 is unlikely to be an accurate assessment of the likely proportion of losses settled as PPO claims for the reinsurance year in question
    - The time between the inception of a reinsurance contract and settlement of large losses is likely to be 5-10 years on average. The trend in PPO claim numbers needs to be considered over this period. Additional considerations include
        - Economic conditions and how these are likely to compare to the lump sum assumptions
        - Claimant preferences for lump sum
        - Trends in court awards
- Is this proportion likely to vary by size of loss?
    - Losses involving severe injury and / or involving young people are highly likely to settle via the PPO route. These are likely to be the larger bodily injury losses
    - Not all large losses are bodily injury losses. Selby type loss scenarios would be included in the modelling. These claims are likely to include a large proportion of physical damage costs
    - Anecdotally, there have been instances where claimants have requested a PPO settlement when the amounts involved are relatively small

Below we discuss the additional assumptions required to model the cash flows generated from PPO claims and provide examples to demonstrate the sensitivity of results to changes in these assumptions.

Number of Payments: Life Expectancy

- In theory the introduction of PPO claims attempted to remove the need to put a number on future life expectancy of the claimant. Unfortunately, for modelling purposes both insurers and reinsurers need to estimate life expectancy for pricing and reserving purposes

- Modelling is sensitive to the life expectancy assumptions assumed both in respect of the total size of the modelled loss and the distribution between the insurer and reinsurers by layer

- Insurers / reinsurers may be able to compile information from historical losses settled on a lump sum basis to help derive a distribution of expected life expectancy for PPO losses
  - Care would need to be taken in deriving this distribution since not all claims are likely to go down the PPO route
  - The life expectancy assumption which is subjective by nature may not be an accurate reflection of the true life expectancy for the group of claimants

- The longer a claim is payable the greater potential for the claim to reach reinsurance layers so life expectancy assumptions are key to estimating reinsurance recoveries

The chart below illustrates the points above. We will return to this claim for each assumption to demonstrate how changes to the assumptions impact reinsurance pricing.

Example
Lump Sum   = £0
Annual award   = £100,000 linked to ASHE
Life Expectancy   = 30 years
Reinsurance Retention= £2,000,000

Lump Sum and PPO (Un-discounted) comparison
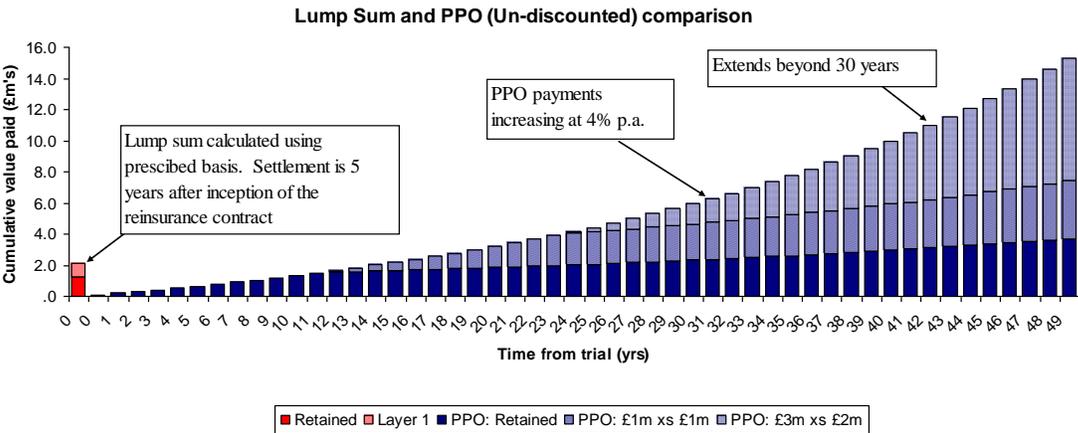
The red bars represent the amount payable should the claim settle on a lump sum basis at the trial date. The value represents the NPV of payments based on a prescribed mortality table and a real rate of return of 2.5%.

Estimates of reinsurance loss costs will consider the level of indexing to apply to the limit and retention at the time of settlement.

The process for estimating reinsurance loss cost for an equivalent PPO claim is more involved since the amount and timing of every cash flow will need to be considered. The blue bars above illustrate the total PPO claim should the claimant survive to the given date.

1. Although life expectancy is estimated at 30 years the claimant could die sooner or live longer. The graph illustrates this by indicating the amount payable should the claimant die 0 to 49 years after the date of trial (though could be longer). Under a PPO award it is the insurer and reinsurers who now bear the mortality risk.
2. For each year an estimate of reinsurance recoveries by layer is calculated using the index clause formula for PPO claims. In this example recoveries to the second reinsurance layer become payable if the claimant survives beyond 23 years

Probability of Payment: Mortality

- There is a fundamental flaw in using mortality rates based on normal lives to estimate cash-flows for modelling impaired lives. Although this is a recognised constraint there are currently no impaired life tables available for the UK which could otherwise be used. The significance of this flaw will depend on the level of impairment suffered and the assumed reduction in mortality as a consequence.
  - A claimant with limited impairment and a small to zero reduction in life expectancy could be expected to exhibit close to normal mortality levels
  - This is unlikely to be the case for a claimant with a substantial reduction in life expectancy as a result of severe injuries
  - The results of the industry survey show average age of claimant around 30 years with average life expectancy of 40 implying a material reduction in normal life expectancy

- The graph below illustrates this for a male with an expected life expectancy of 30 years. The solid black line represents the probability of the life living for x yrs after the trial date based on normal life expectancy from the Ogden tables, the reduction in P(Alive) is smooth and gradual.

Male with life expectancy of 30 yrs at time 0

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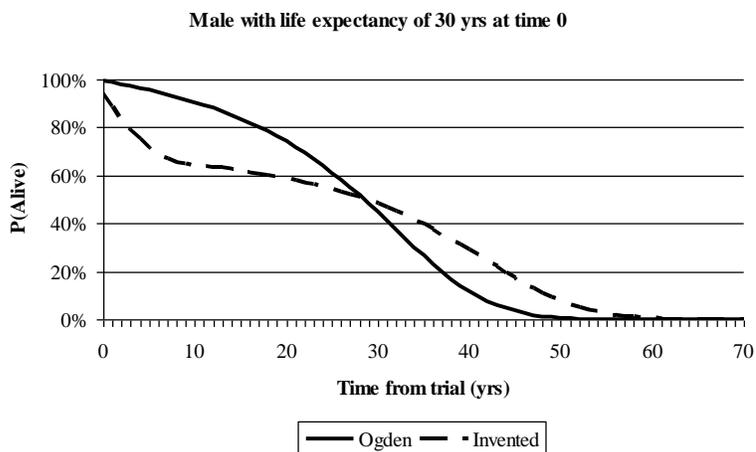
The dotted line is based on an invented impaired life mortality table intended to represent possible mortality for a severely impaired life who has recently suffered a traumatic injury. This example, for illustration only, demonstrates that the underlying mortality rates for impaired lives could be very different from adjusted normal lives.

Mortality levels for the first ten years post trial date are assumed to be higher than those experienced for normal lives with a similar life expectancy. Thereafter the life is assumed to experience normal mortality levels. If life expectancy for the individual is 30 years (as agreed at the trial date) the mortality levels post ten years would be lower than for the normal lives above with similar life expectancy at outset to ensure the expected overall life expectancy is 30 years.

The mortality rates illustrated in the graph could lead to significant differences in the calculated expected loss. For example the invented curve increases the chance of extreme results
- Claimant dies early and the total claim paid is low and there are no reinsurance recoveries
- Claimant survives to a ripe old age increasing the total amount paid and the exposure to higher reinsurance layers

Alternatively deterministic mortality assumptions could be used by assuming the life lives to the estimated life expectancy. This approach ignores the variation surrounding the life expectancy estimate and in particular the probability that there may be extreme results

For our example claim we estimate expected loss split by layer based on the various approaches to mortality given above.
1. Assuming the claim settled as a lump sum
2. Using the 6th edition of the Ogden tables which would be consistent with the Lump Sum methodology but un-discounted
3. Using the invented mortality curve illustrated above
4. Using the deterministic value of life expectancy

Lump Sum and PPO (Un-discounted) comparison
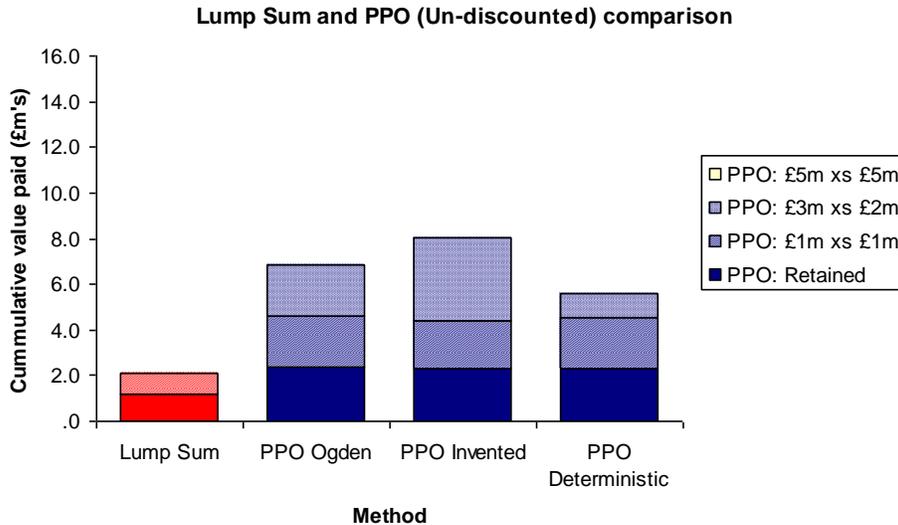
The total estimated amount paid is materially larger under a PPO award since PPO payments are undiscounted whilst the lump sum award already includes an allowance for discounting. Consequently under a PPO award there is a greater chance that higher reinsurance layers are triggered. This leads to a shift in the distribution of reinsurance costs by layer which we investigate later.

It can be seen that the total size of the un-discounted loss under a PPO basis can vary significantly depending on the mortality assumptions assumed. The invented PPO mortality assumption produces the highest total loss due to the higher probability of extreme results compared to the Ogden mortality assumption. The deterministic approach excludes any variation in the mortality assumption producing a lower estimate. The variations in these figures will depend on the circumstances of each claim.

Increase in index to which PPO payments are linked: ASHE

Given the Thompstone ruling in 2008 it is more likely that future PPO claims will be linked to an ASHE type index rather than RPI. The ASHE 6115 index has been available since 2002 (when the occupation codes were revised) though there have been several changes in methodology over this period. This makes the analysis of trends difficult over a long term, see graph below.

There have been periods where annual increases in the ASHE index have been similar to LNMQ (seasonally adjusted average earnings for whole economy (UK) on ONS website) but 2003 and 2007 in particular stand out as exceptions to this rule. These anomalies could be partially explained by changes in methodology and the difference in analysis period (LNMQ: Jan – Jan and ASHE Apr – Apr)

Annual increase in earnings
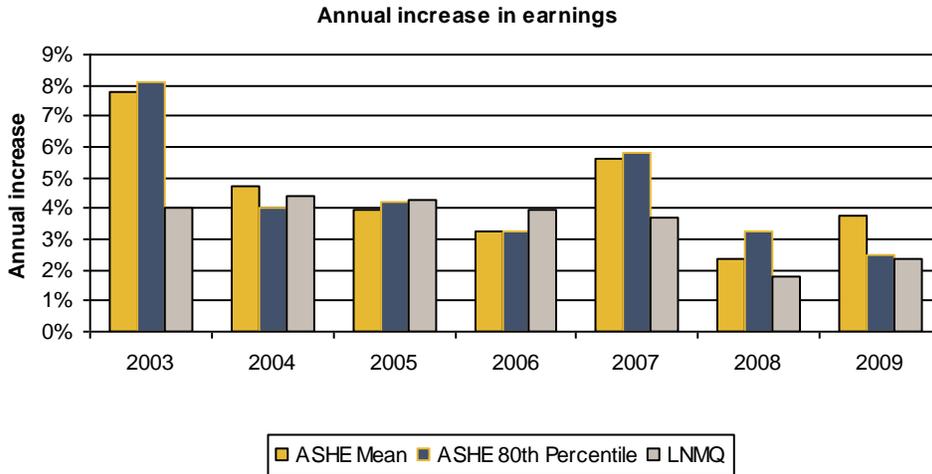
Given the ASHE index is compiled from a smaller pool of participants, for specific occupations and likely to be heavily influenced by government spending decisions it is unlikely that the two indices will be comparable every year.

As an alternative to using the ASHE index an index for the economy as a whole could be used as a proxy to produce long term estimates of average earning increases. This estimate could be adjusted if there are specific circumstances which the modeller believes would lead to different ASHE results compared to the economy as a whole.

10 year rolling average for average earnings increases
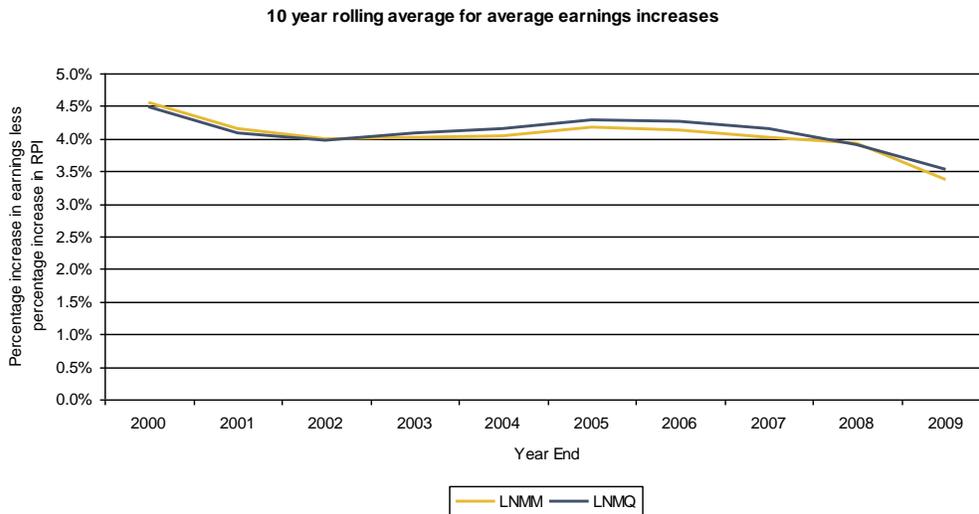
We illustrate the sensitivity of the calculated loss costs for our example claim based on small variations in the ASHE long term assumption using the deterministic mortality approach detailed above.

PPO (Un-discounted) comparison
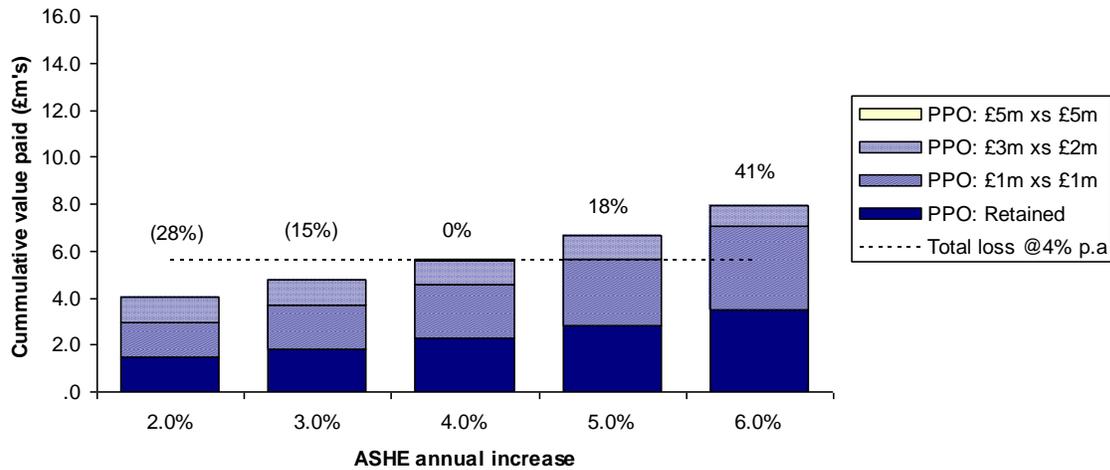
As would be expected the greater the ASHE increase assumption the greater the total claim modelled and vice versa. For methods which produce higher initial loss costs for example assuming Ogden mortality the percentage change in loss cost will be more pronounced.

However, the percentage change in the loss by layer is not necessarily linear as demonstrated in the graph below. The figures have been calculated for the example claim but shown as a percentage change over the 4% p.a. ASHE increase by layer.
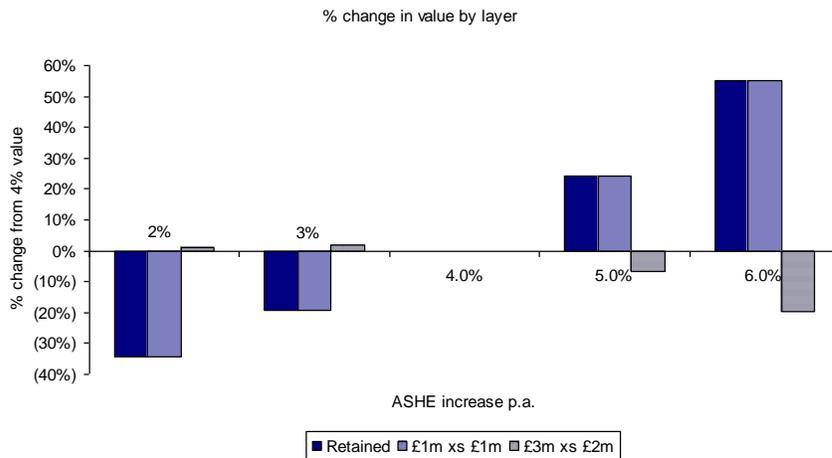
The percentage changes observed from alterations in the ASHE assumption will vary on a claim by claim basis and is a function of size of the PPO payment, any lump sum element, life expectancy and reinsurance retention levels. The impact to each layer will depend on whether the layer is exhausted or partially exposed.

In the example above the retained loss and £1m xs £1m recoveries move in line with expectations and to a similar degree. Using the assumptions stated the £1m xs £1m layer is exhausted after 30 years of PPO payment and the £3m xs £2m layer is partially exposed. If losses on the lower layer reduce the recoveries emanating from the higher layer increase and vice versa.

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The example given above assumes a linear increase in the ASHE hourly rate each year. In reality this is unlikely to be the case since earning increases tend to be cyclical. We provide an indication of the variation possible in the loss cost estimate by repeating the analysis above using various assumptions for ASHE all producing a long term estimate of 4% p.a.

For our example claim the exercise produces a swing of (9%) to +10% in the expected loss costs (for all layers assuming future life expectancy is 30 years).

The loss amount: Size of lump sum payment and initial PPO award

Impact of variations in ASHE index on distribution of loss
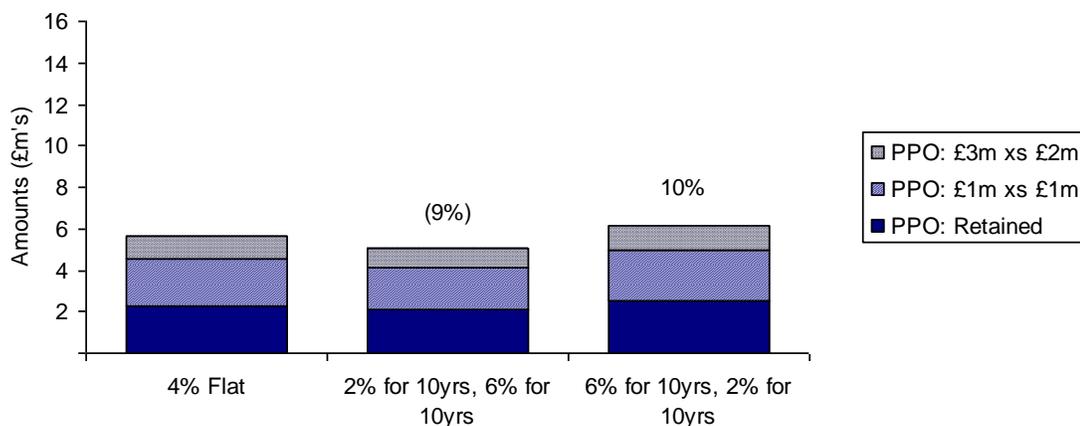
Our survey results outline a potential distribution for the lump sum and PPO elements of current PPO claims. This could be used a guide to estimate the distribution for future claims.

Care should be taken to ensure that the NPV of the claims modelled (assuming claims settled on a lump sum basis) are consistent the current severity distribution for lump sum claims.

Correlation between the lump sum value and PPO award could be built into the modelling process though currently there is only a weak correlation observed from the limit sample size.

As the number of PPO awards increases these assumptions can be reviewed.

In theory the modelling of loss amounts should consider the potential for variations orders and the impact these would have on PPO cash-flows. Any allowance for variation orders in the modelling would be judgemental at this time as there is currently limited experience to derive assumptions. Given variation orders could be enacted at a

predefined date in the future with payments increasing or decreasing any allowance is likely to have a geared effect on reinsurance loss costs.

aii. Benchmarking

Companies often use benchmark loss costs for standard reinsurance layers derived from market studies adjusted for company specific features. These benchmarks are derived from historical market statistics spanning the past 10 years or more and therefore are currently unlikely to include many PPO claims as a proportion of total. In the discussion below we assume the benchmark rates are derived from a frequency severity analysis (including claims >£1m) assuming all claims are settled on a lump sum basis.

Given the features of PPO claims discussed above we consider how the relativity of the reinsurance loss cost benchmarks could change as the number of PPOs increases. To do this we compare the discounted loss costs for PPO claims with the lump sum equivalents to make comparison more meaningful. Some simplifying assumptions have been used as we attempt only to illustrate how the reinsurance loss cost relativities could change.

We do not discuss the loadings which reinsurers apply to the discounted loss cost to arrive at the final reinsurance rate in this subsection.

In general the findings show:-

- PPO undiscounted cash-flows determine the exposure to reinsurance layers
    - The amount retained by the insured increases due to the deductible creep
    - The indexed limit and retention of all reinsurance layers increases due to the deductible creep
    - The extent to which losses now expose higher layers is a function of the undiscounted cash flows and the level of deductible creep
- Discounting cash-flows for the time value of money reduces the loss cost of the reinsurance layers
    - The relationship between the real discount rate applied for PPO cash flows and the 2.5% currently used for lump sum values will be crucial
    - Discounting has a greater impact on higher layers where the payments are further away
        - Less discounting will apply to the insured's retained amount
        - Higher layers will be heavily discounted
- If the real discount rate remains the same as under lump sum conditions the NPV of the total loss remains unchanged and it is the distribution of losses by layer that alters

The scenarios summarised below make several simplifying assumptions:
- Treatment of large losses: we assume all large losses are bodily injury and not physical damage catastrophes
- All lump sum claims with a value excess of £2m settle as a PPO claim in future. Claims below £1m continue to settle on a lump sum basis
- We use deterministic life expectancy assumptions. This is not ideal as it does not allow for any variation around this estimate. However, using age adjusted normal life tables may also not be appropriate as discussed in section 3a: Probability of payment: Mortality
- The current working simplistically assumes life expectancy is fixed at 30 years for all PPO claims. A life expectancy distribution could be derived from the results of the market study but this lead to increased modelling sophistication. Alternatively several deterministic analyses could be performed to assess variation in outcomes given a range of life expectancy assumptions
- Claims are assumed to settle five years after the reinsurance inception. It is assumed the lump sum payment and the first PPO award are paid together
- The increase in the ASHE index is assumed to be constant
- The real discount rate applied is assumed to be constant
- The NPV of the loss is calculated as at court settlement date
- We have used various assumptions for the split of the claim between the lump sum element and the PPO award. These assumptions are 75%, 50% and 25% lump sum proportions
    - For example if a claim of £4m is modelled with a lump sum proportion of 75% then the lump sum element is £3m and the NPV of the PPO payments is £1m

The graph below summaries the change in the distribution of large losses above £1m between the reinsured and various reinsurance layers.

Distribution of NPV of loss costs to fully indexed layers relative to the lump sum pricing
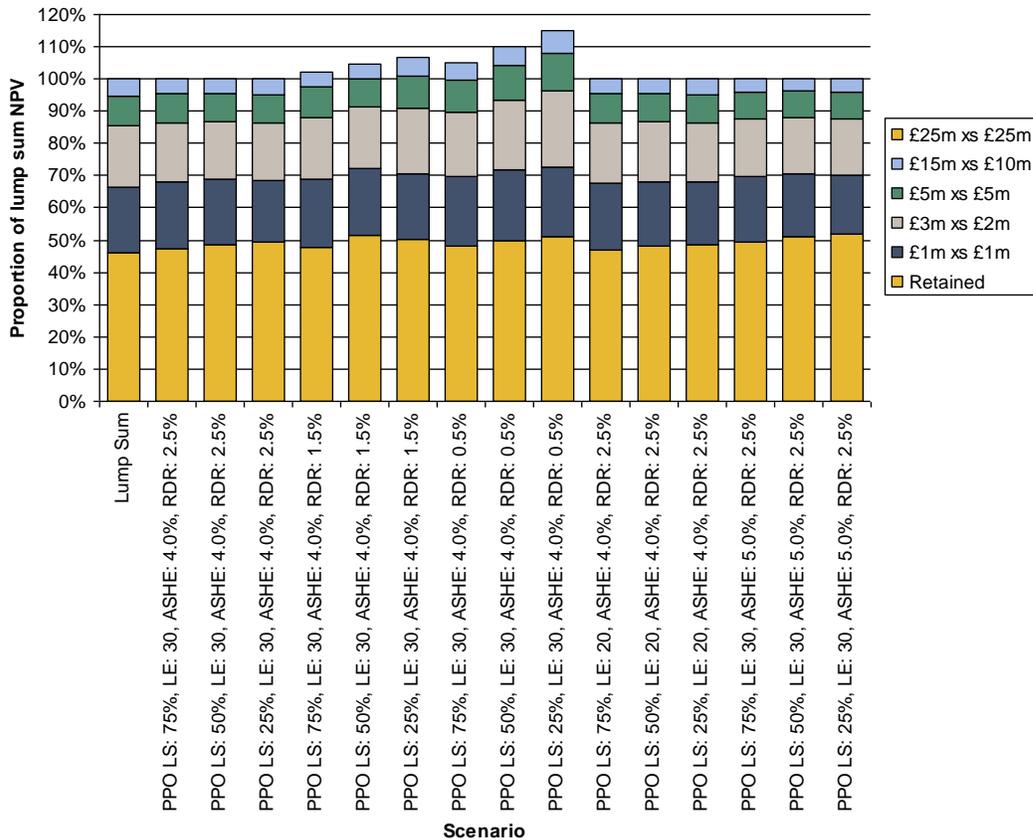
Key:
LS: Proportion of the loss settled as a lump sum payment
LE: Life expectancy
ASHE: The annual increase in the ASHE 6115 index
RDR: The real discount rate

The scenarios shown above demonstrate the increased reinsured retention when compared to lump sum conditions. This is a direct result of the deductible creep which for losses with reasonable life expectancy could be significant. This increase in deductible is not offset by investment return.

Applying a lower real discount rate than stipulated for lump sum awards increases the total NPV of the PPO payments. In the example above moving from 2.5% real discount rate to 1.5% increases the NPV of the total losses (above £1m) by between 2.25% and 6.75% based on our severity distribution, This increases to 5.0% to 15.0% when a real discount rate of 0.5% is applied.

To observe the impact on the reinsurance layers in isolation the graph below removes retained losses. In the deterministic scenarios shown the loss cost to the reinsurance layers is lower under most of the scenarios shown.

Distribution of NPV of loss costs to fully indexed layers relative to the lump sum pricing
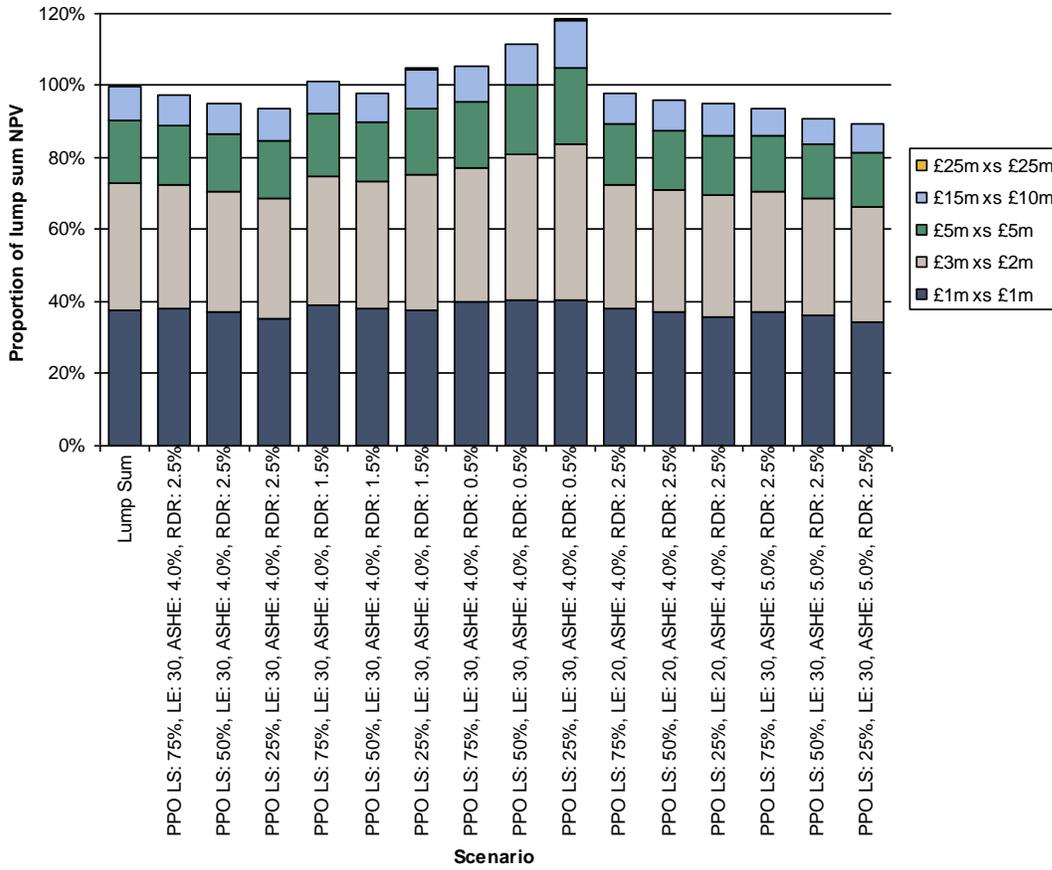
It may also be helpful to summarise the average lump sum amounts and PPO awards under the scenarios given above. These can be found in the table below.

Scenario	Avg Lump Sum	Avg PPO award
PPO LS: 75%, LE: 30, ASHE: 4.0%, RDR: 2.5%	3,600,000	60,000
PPO LS: 50%, LE: 30, ASHE: 4.0%, RDR: 2.5%	2,400,000	110,000
PPO LS: 25%, LE: 30, ASHE: 4.0%, RDR: 2.5%	1,200,000	170,000
PPO LS: 75%, LE: 30, ASHE: 4.0%, RDR: 1.5%	3,600,000	55,000
PPO LS: 50%, LE: 30, ASHE: 4.0%, RDR: 1.5%	2,400,000	110,000
PPO LS: 25%, LE: 30, ASHE: 4.0%, RDR: 1.5%	1,200,000	170,000
PPO LS: 75%, LE: 30, ASHE: 4.0%, RDR: 0.5%	3,600,000	55,000
PPO LS: 50%, LE: 30, ASHE: 4.0%, RDR: 0.5%	2,400,000	110,000
PPO LS: 25%, LE: 30, ASHE: 4.0%, RDR: 0.5%	1,200,000	170,000
PPO LS: 75%, LE: 20, ASHE: 4.0%, RDR: 2.5%	3,600,000	75,000
PPO LS: 50%, LE: 20, ASHE: 4.0%, RDR: 2.5%	2,400,000	150,000
PPO LS: 25%, LE: 20, ASHE: 4.0%, RDR: 2.5%	1,200,000	225,000
PPO LS: 75%, LE: 30, ASHE: 5.0%, RDR: 2.5%	3,600,000	55,000
PPO LS: 50%, LE: 30, ASHE: 5.0%, RDR: 2.5%	2,400,000	110,000
PPO LS: 25%, LE: 30, ASHE: 5.0%, RDR: 2.5%	1,200,000	170,000

b. Investment Returns

Definition: An adjustment to the un-discounted lost cost to allow for the time value of money.

The most significant issue facing an investment manager is the lack of suitable assets which can be purchased to match the underlying liabilities. This mis-match arises from the unavailability of assets which increase in line with earnings inflation and the mean term of the liabilities.

This unavailability of matching assets increases the risk that the investment returns could be insufficient to meet the liabilities as they fall due. PPO awards transfer the investment risk from the claimant to the insurer and reinsurers.

For reinsurers the mean term of the liabilities will be of greater concern since it is likely to be longer, significantly longer for the upper layers than for the insured.
- Payment is delayed for a reinsurer which automatically increases the mean term of the liabilities.
- The distribution of the payments is different to the insured. The insured benefits from lump sum payments which could be significant and which are likely to occur at a relatively early stage.   For a reinsurer, especially participating on higher layers the payments are likely to be more evenly distributed.
- The actual payments on higher layers will be more volatile than for the insured on the lower layer insurers. These features are demonstrated in the diagram below
- The impact of the time value of money is highly leveraged producing a gearing effect as the reinsurance retention increases

Distribution of retained payments: Mean Term = 12.5 yrs

Distribution of £3m xs £2m recoveries: Mean Term = 21.0 yrs
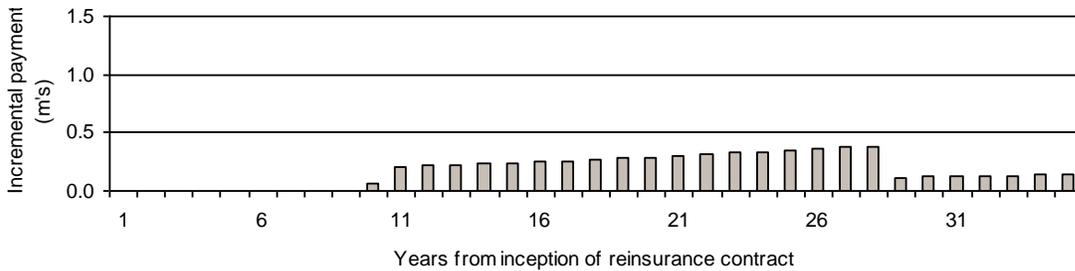
Distribution of £5m xs £5m recoveries: Mean Term = 31.0 yrs

Where there is a significant delay between receiving reinsurance premium and payment of losses there is a choice to;

- Initially invest in assets with greater capital growth and low income stream, switching over to investments generating an income as the claim becomes payable

- Invest in assets and re-invest the income stream until the claim becomes payable.

The allowance for investment return in the pricing calculation should reflect the rate of return expected on the assets likely to be held in respect of the PPO liabilities

The higher layers will benefit from the greatest discounts.

Results are particularly sensitive to the NPV assumption especially for claims with a long pay out pattern the discount factor will be considerable. In the example given below we demonstrate the sensitivity of the result to changes in the discount rate by reference to the example claim and the current methodology for discounting applied for lump sum losses.

Discounting the cash-flows for our example loss using a real rate of return of 2.5% produces the following result at each year from the settlement date. The difference between the values at each age is less pronounced than on an un-discounted basis.

**Lump Sum and PPO (Discounted) comparison**
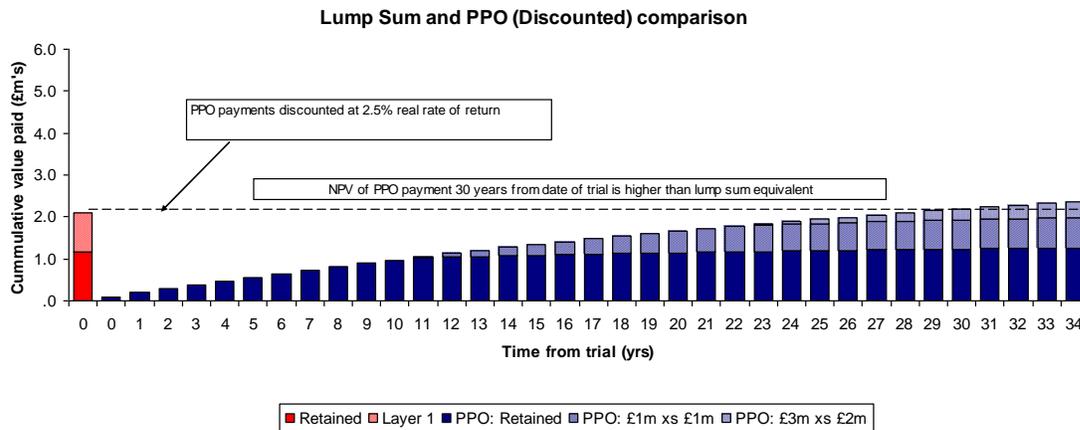
However, in contrast to claims settled on a lump sum basis the real discount for PPO cash-flows is not prescribed. If the real discount rate applied to cash-flows is lower than the current 2.5% specified for lump sum payments the NPV of the PPO payments will be greater than the equivalent lump sum and vice versa. The graph below illustrates this point for the example claim assuming various investment return assumptions. The methodology in respect of mortality (probability of payment) is consistent with a lump sum approach for consistency where the real rate of return is 2.5% p.a.

Lump Sum and PPO (Discounted) comparison
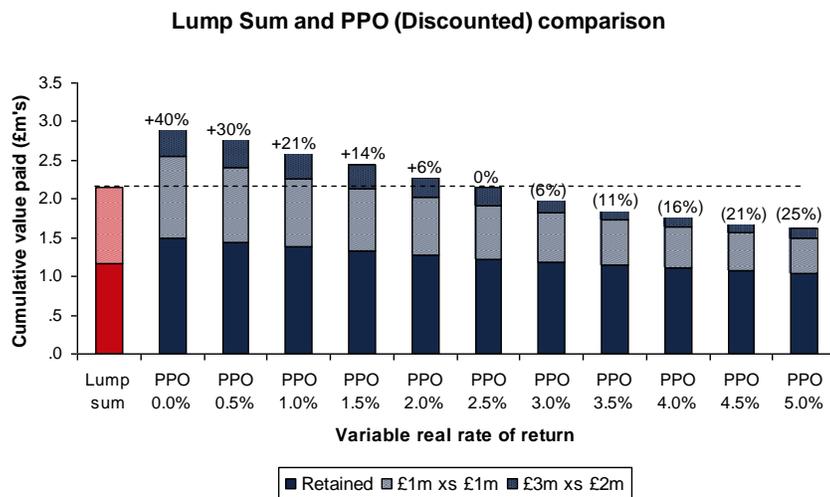
The results are heavily geared as we move up through the reinsurance layers. The graph below illustrates the percentage increase or decrease by layer.

Gearing effect on discounted values
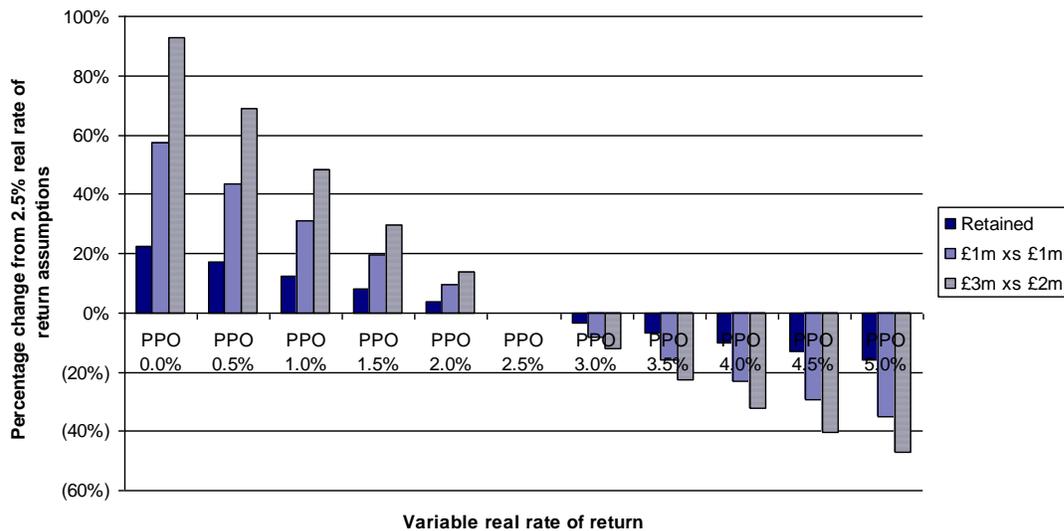
The extent to which the reinsurance price will reflect investment returns will depend on
- The assumed rate of return on the assets backing the PPO liabilities
- The implied real rate of return i.e. the difference between the assumed increase in ASHE and the rate of return
- The distribution of the losses between lump sum element and PPO award
- The distribution of life expectancies and their mortality rates assumed in modelling
- The layer to be priced

In the chart above the PPO discounted retained amount at a real rate of discount of 2.5% is higher than under the lump sum basis. In respect of reinsurance recoveries the discounted loss cost to the £1m xs £1m layer is lower but there is exposure to the £3m xs £2m layer where under a lump sum settlement there would have been none.

c Cost of Capital

The price of a reinsurance layer includes an element for the cost of capital to support the business. The level of capital generally increases as the retention increases. This is a function of the rising uncertainty and volatility at higher levels.

The introduction of PPOs increases the uncertainty and volatility for reinsurers due to the time which elapses before recoveries become due and the length of time recoveries are payable. The longer a claim remains open the greater the uncertainty surrounding the final value due to;
- The uncertainty surrounding the increases in the index to which the payments are linked

- If earnings inflation transpires to be higher than expected the costs could increase considerably and the claim will trigger the reinsurance protections sooner changing the amount recoverable
- Conversely, a period of lower than average earnings inflation could dramatically reduce the level of recoveries expected
- The mortality risk
  - The uncertainty surrounding the initial life expectancy estimate which currently cannot then be revisited at a later date
    - If this assumption cannot be monitored over time reinsurers are not able to improve the confidence in their pricing parameters
  - How should mortality risk be measured
    - Using deterministic assessments of mortality ignores the variability around the initial estimate
    - Using mortality rates derived from adjusted normal life tables assumes mortality for impaired lives is smooth and steady over their future lifetime which may not be the case especially for those lives which have suffered a serious injury
  - Small changes in the life expectancy assumption could result in large percent increases or decreases in expected recoveries due to the geared effect of reinsurance
  - Trends in mortality over the period of payment including improvements in medical treatments and procedures increase the uncertainty surrounding the total amount payable
- The investment risk associated with the mis-matched assets and liabilities together with the mean term of the liabilities
- The industry has already experienced the impact of legislative changes on the run off of older accident years. For years prior to the introduction of the Courts Act 2005 the reinsurance cost is unlikely to have included a consideration for PPO type losses. However a significant number of the PPOs seen to date will have emanated from business written pre 2005.
  - The Thompstone settlement in 2006 was a reminder that changes are possible. It is now more likely that PPO awards are linked to the ASHE index than RPI as intended in the original act wording leading to an increase in claim amounts

The level of capital required to support the reserves from PPO claims will include an allowance for the uncertainties listed above. This is likely to increase the capital requirements for reinsurers who are essentially providing coverage in the tail of the distributions.

We have established through some of the sensitivity analysis above that small changes in assumptions can lead to highly geared impacts in respect of loss cost for reinsurers particularly on higher layers and that these changes can work both to increase or decrease loss costs.

The increase in the mean term of liabilities will require companies to hold capital for longer. As shown above the increase in the mean term of liabilities is greater for reinsurers so is most likely to effect these organisations. Holding capital for longer is likely to increase the cost of capital for a reinsurance contract and this will need to be factored into the pricing formula.

Capital will need to be held in the same manner as a lump sum up until the point of settlement. However, after a claim is settled and a PPO has been awarded, capital would need to be held until the claimant dies. This extra capital would require a return which increases the price charged even if the discounted loss costs remain the same.

As mentioned in the Reserving Section, under Solvency II, once a PPO is awarded capital reserves would probably need to be held assuming annuity capital charges. Consequently the capital charges included in the pricing would need to reflect that, as clearly any PPO settled on a piece of business priced at the time of writing this would be subject to Solvency II requirements.

d Expenses

Similarly to underlying insurance business the expenses associated with the management and administration of PPO claims represents a significant increases over claims settled on a lump sum basis.

For an excess of loss reinsurer the proportion of claims settled as PPOs is likely to be significant in the future, the proportion being much higher than the insurer where the majority of claims are physical damage or small injury losses which continue to settle as lump sum payments.

Therefore the impact for reinsurers is likely to be greater than for insurers.

Insurers and reinsurers need to maintain records for claims settled as PPOs. Reinsurers may wish to monitor all PPO claims since these may at a later date become recoverable.

Initial expenses in respect of staff training and system updates to handle PPO payments could be amortised over a period to recoup costs.

Reinsurer Credit Risk

When modelling the cash-flow of claims settled on a PPO basis it is easy to see that reinsurance recoveries are deferred sometimes for many years. There is a risk that one or more of the reinsurers experience difficulties in the intervening period resulting in an inability or an unwillingness to pay all or some of the recoveries owing at a later date. In these circumstances the insured would be responsible for paying the full amount owed to the claimant whilst being unable to collect recoveries owed from one or more of the reinsurers.

The potential for reinsurer bad debt erodes the value of the reinsurance cover especially for classes of business with long payout patterns. Insurers are locked into a contract for which they pay upfront but are dependent on the fortunes of the reinsurers in the intervening period which determines their financial ability to pay recoveries at a later date. If a reinsurance company fails the insurer effectively ends up paying out twice.

The simple example below illustrates how the level of outstanding recoveries can escalate under the new PPO regime for a company writing UK motor business where a small number of claims are settled as PPOs each year for the next 20 years.

Example

A company has three large losses per year all of which settle on a PPO basis with the following agreed terms. If the assumptions are borne out in practice how do the outstanding reserves relating to PPO recoveries excess of £1m change over 20 years. For simplicity we assume a stable portfolio and no claims inflation

Claim	Lump Sum	PPO	Life Expectancy
1	1,000,000	150,000	10
2	750,000	250,000	20
3	500,000	50,000	30

Accumulation of outstanding reinsurance recoveries
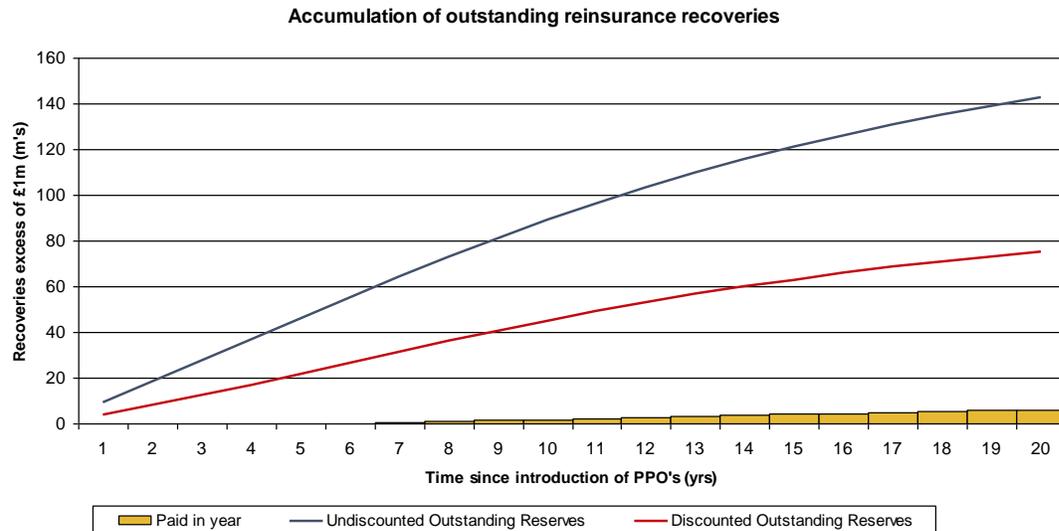
The figures suggest that with only a small number of PPO claims per year it doesn't take long for reinsurance outstanding recoveries excess of £1m to increase to meaningful levels even after discounting.

The long mean term of liabilities leads to a compounding of recoveries per year such that if a reinsurer participating on the programme were to cease paying recoveries the amount in question could be material.

Consideration of reinsurer bad debt is nothing new but it has gained in importance with the introduction of Solvency II. The provision for some classes, in particular motor which is unlimited liability and most likely to be impacted by the introduction of PPO awards is likely to increase. Motor excess of loss business is a long tailed class but with run off patterns potentially stretching to 40 years or more even more emphasis is being placed on the quality and longevity of the selected reinsurance panel.

Whilst it isn't possible to see into the future insurers use information and measures available to mitigate or limit their exposure to reinsurer credit risk. These generally fall under two basic headings:-

(A) Select reinsurers with a strong track record ("Hit and hope")
  1. Financial strength ratings from rating agencies
  2. Reinsurance brokers also maintain a list of reinsurers that are considered by the broker's security committee to be creditworthy. Reinsurance brokers have a duty of care to ensure that the reinsurers recommended to clients are solvent and good credit risks.

(B) Manage exposure ("Trust and verify")
  1. Monitor accumulations
  2. Retain more risk
  3. Letters of Credit or similar type arrangements
  4. Capitalisation

(A) Select reinsurers with a strong track record

Company ratings from agencies such as Standards & Poor (S&P) provide an indication of the current financial strength of a company as viewed by the agency. These ratings have the potential to move up and down over time as new information comes to light and market conditions change. Given the prospective run off patterns of the losses these ratings may not turn out to be very reliable indications of long term future financial strength.

Financial Strength today may not be maintained

Past experience has shown that many A rated companies (insurance rather than reinsurance) became insolvent with alarming speed. Examples from recent history include-

- The Independent Insurance Company which moved from an AM Best rating of A (March 2001) to B- (June 2001) with on going implications just before the company went into run off
- The Underwriter which moved from a rating of A- in (July 2002) to B+ (May 2003) within the space of 12 months before going into run off in July 2003

Rating agencies have been subject to widespread criticism for failing to foresee the insolvencies of a number of well known insurance companies. In response to this criticism, ratings have become more conservative in the last few years.

As an example the chart below tracks 10 reinsurance companies and their ratings over an 11 year period. The 10 companies were selected from a typical motor reinsurance panel and do not change over the 11 year term. The chart plots the number of reinsurers in each S&P category over the 11 year period.

Comparison of reinsurer security over time
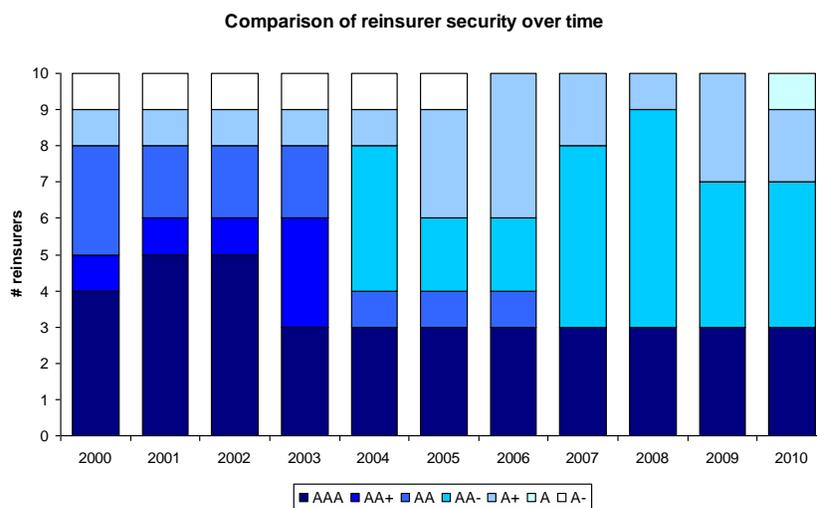
Even over this relatively short period there is a strong perceived reduction in the overall security of the group as the number of reinsurers in the top three rating bands has reduced from 8 to 3. It is interesting to note as an aside that over the same period a variety of additional reinsurers joined the specific panel from which this review was taken, but none with a rating higher than A+. This could be as a consequence of the rating agencies greater recent conservatism mentioned above.

If the insurer required an AA rating or above for their reinsurers, the pool of potential reinsurers has been reducing over this period.

What happens if things turn sour?

Research undertaken by Swiss Re found that the likelihood of bankruptcy in the reinsurance sector is extremely rare, finding only 24 instances globally between 1980 and 2002. This could be partially explained
- by evidence that reinsurers in difficulty are often taken over by other companies who take on the claims run off; but also
- by the very important nuance that for most buyers of reinsurance, it is not bankruptcy that is the prime concern – many reinsurers fall into various states of "run-off" behaviours in which buyers encounter a wide range of undesirable problems.

Examples of such instances of the first kind (being taken-over situations) include:-
- CNA Re Co Ltd acquired by TAWA in 2002
- St Paul Re moved over to Platinum underwriters holdings in 2002
- Zurich Financial Services became Converium in 2001 which is now in turn owned by Scor (2007)
- Copenhagen Re run off acquired by Marlon Insurance a wholly owned subsidiary of Enstar group in 2009

As mentioned, insolvency is not the same as defaulting on payments. It may be that companies elect to go into run off but are still able to pay claims as and when they fall due. Increasingly common are
- Run-off claims management companies, and
- Schemes of arrangement.

Run-off management companies have grown to become something of a cottage industry over the past two decades. Many owners of non-functional reinsurance businesses find that it is dramatically cost-effective to delegate the management of the run-off claims obligations to an external agent. This avoids difficult questions being raised about the owners' broader commercial relationships, which claimants often try to use to obtain "fair" settlements – the owners can simply refer the claimant back to the agent.

Schemes of Arrangement are a phenomenon developed in the UK to use historic Court procedures to enable managers to enact various forms of orderly partial payment of claims. If a sufficient proportion of creditors can be persuaded to vote in favour of a

Scheme of Arrangement, it is possible to obtain court blessing to an outcome which denies some claimants what would otherwise be their rights. Where this is applied to a simple portfolio of liabilities, it is often equitable and effective. However where some creditors have exposure which is very heavily weighted as IBNR claims, these arrangements can be distortive in that the Scheme of Arrangement may deny IBNR creditors their true proportion of the relevant vote and may also result in disproportionate outcomes of final claims settlements.

Both these two situations (principally the first) have caused concerns among buyers of reinsurance.

These comments underline that even without major market shocks, there are problems about making purchasing decisions based upon what an reinsurer appears to have by way of credentials when the reinsurance product is needed to last for many years.

(B) Manage Exposure

It isn't possible to eradicate reinsurer credit risk completely; but insurers can manage their exposure to it.

Historical evidence suggests that there is a low chance of a systemic collapse of the entire reinsurance industry (Sigma 5/2003). There have been peaks or reinsurance bankruptcies notably during the early 1990s when there was a significant market strengthening of reserves in respect to long tail casualty business and latent claims. This represented a small percentage of the overall market in terms of claims.

It is also true that the reinsurance sector has survived several major market shocks, the terrorist attacks for September 11th 2001 and the current depressed asset values caused by the global financial crisis. This is proof that the reinsurance industry has the capacity to survive under extremely difficult conditions. The problem for many buyers is that their counterparty is not the market as a whole.

Diversity of panel

Reinsurance is usually placed on a subscription basis so the risk is shared amongst a number of reinsurance parties. This reduces the exposure to any one company in the event that a company stops paying or delays payment of monies due.

Insurance companies can monitor their exposure to any one reinsurer across classes of business and years. A picture of exposure by company and mean term of liabilities can be gathered to help monitor bad debt risk. In fact this is a requirement of solvency II to ensure the exposure to any one reinsurance company is not too great

Reinsurers who are diversified geographically maybe perceived to be better security than reinsurers who are concentrated in their home country. Though recent experience

has shown in an increasingly global financial environment it is possible for many territories to be affected by an event emanating from another country.

Retention levels

Insurers may decide that their favoured course of action would be to reduce their exposure to reinsurance completely and increase the reinsurance retention. This would lead to a lower number of claims ceded to the reinsurance thereby reducing the burden of maintaining large reinsurance reserves. This action would consequently increase the mean term of the remaining reinsurance liabilities (on higher layers purchased).

The decision to change the reinsurance retention should not be taken in isolation and without consideration of the potential consequences on all other areas of the business.

Collateralisation

Reinsurer bad debt could be mitigated by ensuring reinsurers post collateral to ring fence money for the purpose of settling reinsurance claims.

A traditional approach would be to post a letter a credit at a bank. This involves additional costs such as bank and administrative fees for both the insurer and reinsurer but does provide a cushion against the reinsurer becoming insolvent and the insurer left with no recourse.

There are various types of contract in use; most likely for monetary transactions a standby letter of credit will be used. Neither party anticipates that the letter of credit will be drawn upon but it is set up as a secondary payment method in case the reinsurer is unable to fulfil their obligations to pay recoveries when they fall due.

In such circumstances the insurer presents the relevant documentation to the bank (as laid out in the letter of credit agreement) which the bank will review. If the documents provided comply with the agreement the bank will pay the insured. A letter of credit effectively strengthens the credit worthiness of the reinsurer as the bank promises to pay on behalf of the reinsurer should they be unable to fulfil their obligations.

The insured would need to consider the quality of the bank involved especially in light of the recent banking crisis in 2008 and for overseas reinsurers wishing to post letter of credits at banks outside of UK. Letter of credits usually have time limits and which will need to be drafted to capture the worse case scenario outcome.

An alternative to a traditional letter of credit is reinsurance trusts. A reinsurance trust is intended is a similar type of arrangement but designed to offer more flexibility than a traditional letter of credit.

The trusts are designed to reduce costs and to be more flexible for contracts which may be renewed annually.

A concern for reinsurers with letters of credit in addition to the extra cost would be the opportunity cost of tying up the capital. This is likely to be passed on to the insurers as an increase in the reinsurance cost.

Capitalisation

Another way to manage credit risk is to capitalise the claim. When a claim is capitalised the reinsurer(s) agree to pay an amount to the insurer to cover expected future reinsurance recoveries on a claim by claim basis.

The amount paid will be arrived at by debate but in principle will represent the NPV of future recoverables. The discussions are necessary to agree the assumptions in respect of life expectancy, mortality, increases in the index to which the payments are linked and the real discount rate.

In deciding whether to capitalise a claim, the insurer would need to consider the capital required on the gross reserve and whether they are prepared to accept the increased risk. As mentioned above, this capital would need to be held until the claimant dies.

To avoid a protracted debate on each and every claim it may be more practical to produce a standardised formula to minimise the areas of contention in respect of the assumptions used to calculate the capitalised amount.

The most contentious input will be life expectancy assumption which will be specific to each claim for which there may be differing views from the interested parties.

From the table below it can be seen that capitalisation of PPO claims are currently stacked in favour of the reinsurers.

Insurer	Reinsurers
Pros	Pros
- Reduces the reinsurance bad debt risk by receiving early payment of reinsurance recoveries (better deal than if the reinsurer were to go into run-off at a later date) - Benefits if claimant dies sooner than expected - Benefits if investment returns are higher than anticipated - Lower administration costs of maintaining relationships with	- Reinsurers able to settle claim and close claim early - Avoids mortality risk that claimant survives longer than expected -Avoids investment risk that returns are lower than expected over the long term - Avoids the risk that legislative changes are retrospective and lead to much higher costs on claims already in payment

reinsurers	- Reduces tail on reinsurer book of business and costs of claims management - If standard practice will reduce capital requirements relative to un-capitalised claims to a level consistent with lump sum amounts
Cons	Cons
- Unless agreement is reached with all participating reinsurers the administration of claims may become quite complicated - If the insured is unable to purchase a matching annuity (currently unavailable) the insurer retains the mortality risk that a claimant lives longer than expected - If no matching assets available the insurer takes on the risk that investment returns are poorer than expected in the intervening years between money received, payment of claim and duration of payment - Insurer capital requirement likely to increase - Insurer open to changes in legislation which may have retrospective effect on PPO claims already in operation	- Pays out more than necessary in instances where claimant dies sooner than expected

To make capitalisation more attractive to insurers assets need to be available to match the liabilities faced such that both the insurer and reinsurers are able to offset their liabilities through the purchase of an impaired life annuity product. In the mean time assumptions could urge on the side of caution which would mitigate the mortality and investment risks insurers take on.

12. Operational Challenges

Additional Data Requirements and IT implications

In order to efficiently manage settled PPOs and project the future impact of PPOs on the business a variety of data would ideally be captured which general insurers might not typically be used to recording. In addition, some of this data may need to be maintained for the remainder of the claimant's life which could be upwards of 60 years.

As such, the data requirements and the way in which data is stored is a key operational issue for PPOs.

To give a feeling for the level of data required when dealing with PPOs we have discussed below the key data items likely to be required to handle settled PPOs. We have also discussed some of the data that might be required to value the outstanding liabilities and for pricing and capital setting work.

In order to value the liabilities associated with settled PPOs details will be needed for every individual claim including:

- Claimant's gender

- Settlement date of claim

- Claimant's date of birth

- Whether of not claimant's life expectancy is impaired and if it is impaired what their life expectancy is at the time of settlement;

- Payment details including frequency, details of steps/changes and triggers for these changes, indexation to be applied, when to apply indexation, any minimum duration on the payments

- Whether or not a variation order exists and if it does details of the order;

- A copy of the court order or original agreement relating to the PPO (which should be provide much of the above information); and

- Historical and recent data on the relevant indices, mostly like to include RPI and certain percentiles of ASHE 6115.

It may also be necessary to record:

- Each and every individual payment made under the PPO over the whole of the claimant's life and the date of payment. This may be required by both the insurer and the reinsurer to calculate ongoing reinsurance payments.

Ideally information on the claimant's health throughout their life might also be captured by the insurer or another independent body to enable a more robust liability valuation to be performed. Typically this is not going to be acceptable to claimants, so it is likely that such an approach would need to be "sold" to the claimant or included in settlement negotiations.

All of the above information will need to be maintained for the whole of the claimant's life and therefore careful consideration will need to be made as to the IT solutions used to store this data.

When considering reported outstanding claims, a number of data items may be of interest in setting assumptions to value the PPO liabilities. These might include:

- Details as above for individual claims that are expected to settles as PPOs

- Data for large value claims to help assess the likelihood of settling as PPOs including:

- Size of overall claim and care element of claim;

- Claimant's age;

- Type of injury and/or mental capacity of claimant;

- Level of contributory negligence;

- Who the solicitors are for the claimant and defendant.

Suitable expertise to handle settled claims

The administration of settled PPOs encompasses a number of areas in which general insurers are unlikely to be familiar. Anybody against whom a PPO is made ought to consider whether their current systems and procedures are appropriate to efficiently manage PPO claims or whether adaptation is required. Factors to consider might include:

- Who will be responsible for calculating the level of annual payments;

- How will this be checked and validated;

- Does the person calculating the payments have suitable expertise to understand the intended payment structure set out in the court award and if not how will this be rectified;

- Who will be responsible for ensuring payment is made on time to the right person;

- How will this be checked and validated;

- What systems and procedures will be used to achieve the above and to ensure continuity in the event that key staff leave the company or business continuity is interrupted;

- How will survival of the claimant be verified to ensure continuing payments are required;

- In the event that a claimant wishes to take advantage of a variation clause on a PPO how will this be handled and who will have responsibility for ensuring that the original court order is adhered to;

In the event of the claimant's death, how will monies be recovered if there has been overpayment to the claimant in that period?

Relationships between insurers and reinsurers

There may be a need to maintain a relationship between the insurer and the reinsurer for the remainder of the life of any claimant where reinsurance recoveries are expected on the claim. This is because annual payments may be required from the reinsurer to the insurer for the remainder of a claimant's life. This is discussed in detail in the section on reinsurance.

This could require a relationship between the insurer and the reinsurer for upwards of sixty years.

Where an insurer has several reinsurers participating on their programme and they have changed their reinsurers over time, this would lead to an insurer having to maintain a long-term relationship with several reinsurers. The same will be true of reinsurers from the opposite perspective. Keeping track of the payments and liabilities being made on such policies over this kind of time frame is not something that general insurers currently have to cope with.

As a result, consideration should be made of whether current systems and procedures will need to be adapted or replaced to deal with this issue.

Interpretation of reinsurance contracts

Many of the reinsurance contracts that are in existence that cover policies where PPOs may arise contain clauses that were not specifically designed to cope with PPOs. In addition, the interpretation of these clauses is in some cases ambiguous and not fully tested. As a result, there is an operational challenge in trying to achieve clarity on existing reinsurance cover. This is discussed further in the section on reinsurance.

Other Operational areas to consider

Impact of IFRS regarding P&L

We understand that any guidance on changes to producing Statutory Accounts will not come out until at least September and until then it is not possible to say what additional work there will be in producing technical provisions for IFRS accounts as opposed to Solvency II accounts, and also possibly internal management accounts. We expect that it is likely there will be some divergence in respect of areas such as discount rates to be used, calculation of a Premium Provision and calculation of Risk Margins.

Given discount rates in particular are of key importance when valuing PPOs, such divergences should be carefully considered to understand their effect on the accounts on differing bases.

Taxation

We understand that the Treasury / HMRC / ABI have broken down the key tax issues for review into several areas and there is a working group looking at each. It is anticipated that as a result of this review there may be some changes to the way in which certain types of life assurance business are taxed which may in turn affect general insurers with PPO exposure.

They are working towards an announcement in Spring 2011 with a view to amending the tax legislation in the Finance Bill 2012. Although this is late on in the Solvency II process we understand this represents the timing for changes which have been agreed with industry. Updates to the situation should be available between now and then that will make it possible to see the direction of travel much sooner.

13. Risk Mitigation

Overview

The logistic options regarding the way in which PPO claims are managed by an insurer are many and complicated.

The initial consideration is whether to make extra efforts to settle as a lump sum to avoid the risks of a PPO.

Once a PPO is awarded against an insurer, there are several options

- The liability could be retained by the insurer

- An annuity could be purchased to reduce the risks discussed previously

- If the insurer has a life arm, the liability could be passed to this

- If the PPO is retained then there is the possibility of capitalising the claims with any Non Proportional reinsurers

- A pooling arrangement could be agreed upon by market participants

Lastly in this section there is a study of the claims experience in the US, France and Australia

How much effort to expend seeking a lump sum

Before a PPO is accepted the insurer will have the opportunity to settle the claim as a traditional lump sum. The choice between the two will depend on the perceived costs and which is the cheaper for the insurer. The insurer may choose to vary the degree to which they push for a lump sum. Considerations would include discrepancy in life expectancy, perceived preference of the claimant, reinsurance conditions, capital charges, confidence in life expectancy, existence of contributory negligence, risk appetite, view of inflation, value versus reserve and investment income expectations.

Some companies may consider paying a lump sum in excess of comparable Ogden amount to avoid a PPO. Where this occurs there could be a knock on effect to claims that are unlikely to settle as a PPO. Discrepancy in life expectancy is important where there is a large discrepancy between claimant and defendant. If the insurer expects the claimant's life expectancy to be short it may be preferable to agree to a periodic payment, as if the claimant passes away earlier than they would expect, the cost to the insurer would be lower. Alternatively in the unlikely case that the claimant experts envisage a shorter life expectancy than that of the defendant, then a lump sum may be

more attractive to the insurer, as it could be settled on a lower life expectancy than would be expected under a PPO.

Running alongside this is the degree of confidence in the life expectancy, as advised by the medical experts. The greater the confidence, the more an insurer might push for a PPO.

The extra capital charge that would apply as the reserves are held for a longer period of time would need to be weighed up against whether any extra cost would be incurred in settling a PPO.

If the claimant's preference appears to be for a PPO, then it may only be possible to achieve a lump sum at a greater cost than a traditional lump sum payment. Claimants are likely to argue for a PPO, however, in order to negotiate a higher lump sum. Consideration would need to be given to whether this is the claimant's position as under this circumstance a PPO may be the better option.

Where the cedant has XoL reinsurance that has an indexation clause, then a lump sum would crystallise the recoveries sooner, and remove the increased retained proportion of a claim that occurs with deductible creep. If this is achieved by an increased lump sum, then the cost of reinsurance would be expected to rise. If capitalisation clauses are implemented, where a reinsurance treaty has such a clause, to settle as a PPO would result in a liability with an imperfect match on the balance sheet and consequently a lump sum may be preferable.

Where the insurer has fears of high future inflation then a lump sum may be more attractive to remove the risk. This is particularly important where an insurer has an indexed excess of loss attachment point. The increased retained proportion of a claim that occurs with deductible creep would be significant where inflation is high.

Management's risk appetite would be a factor in whether a lump sum is pursued or not. Where the management deem the extra longevity risk to be excessive then a lump sum would be more attractive.

If there is an element of contributory negligence then it may be less likely that a PPO would be awarded in court. If this is the case then the courts would likely award a settlement in line with Ogden rates.

If the expected settlement value is less than the reserves held, then the settlement under a lower lump sum would result in a profit to the company, where the reduction in loss is not offset by a reduction in reinsurance assets. Hence an insurer in this position may view PPOs as preferable. There is a danger that excessive reserves put up in the first instance, or realistic reserves for a PPO, which may be above traditional lump sum amounts if reserved at real yields, would encourage lump sum settlements at levels above those that could be achieved otherwise.

The level of expected investment income would affect the attractiveness of PPOs. Where investment income expected is higher than implied in a lump sum, then a PPO may be more attractive. Conversely, where investment income is expected to be lower

than implied by the lump sum, then the lump sum may be more favoured.

How much to effort to expend seeking a lump sum

Where a PPO is awarded, the insurer will take on a risk that would more naturally sit in a life insurance company. There may be extra capital charges; new expertise in reserving may be required; claims handling processes are likely to need to be adapted; management information schedules will be required; management will need to be educated about the extra risks they inherit; resources may be diverted away from the standard pricing and underwriting with a possible reduction in the profitability. The degree to which some of these risks can be mitigated and options for doing so, including comparison with other territories, is considered in the remainder of this section.

Retaining the Liability

Under this option then the insurer would continue to pay the PPO until the death of the claimant, or expiry of the order, this could be the case if for example the PPO was for earnings lost until retirement.

In deciding whether this approach should be adopted the following should be considered.

Difficulties regarding this approach include

- There would be a considerable increase in the claims management cost. Each year the insurer would need to check on the eligibility to claim

- The insurer would be accepting a significant longevity risk. This is a risk that is not currently on their balance sheet. However, this may be difficult to remove completely if a PPO is awarded against the insurer

- If the award is linked to an inflation index there is a risk that inflation is high. Given the very long term nature of the liabilities it is unlikely to be possible to match assets and liabilities completely. Very high levels of inflation would result in a very large increase in the cost of the claim

- As the insurer will retain the liability for a significant period of time the amount of capital held against it will be higher. It is likely that it will also have to be subject to annuity based capital charges, which may be higher Non life charges

- Reinsurance recoveries may be delayed depending on the level of the deductible. Consequently cedants will need to take care when choosing their reinsurers that they will be around to pay the claims for the next 50 years

- The reserve will need to be calculated every year, to reflect survivorship bias and changing assumptions around investment income

Purchase an Annuity

Rather than paying for the claim as the payments come due the insurer could purchase an annuity from a third party.

In deciding whether to adopt this approach the following should be considered.

Difficulties regarding this approach include

- Matching the timing of the annuity payments to the timing of the claim payments may be difficult. If a significant delay is necessary then inflation risk remains

- Current market annuities are normally based on RPI indexation or flat. Most PPO have been indexed to ASHE. Consequently there is a basis risk if purchasing an RPI linked annuity

- The life insurance company will include loadings in the annuity price, including capital charges and profit loadings. The extent of these may make the cost prohibitive.

- Unless the annuity was purchased on behalf of the claimant, with a contractual obligation on the annuity provider to pay the claimant directly, the annuity would be a wholesale transaction and as such the transaction would not be covered by the FSCS. Hence there would be a risk that the annuity provided becomes insolvent and is hence unable to pay.

- The cost of purchasing the annuity may be recoverable from reinsurers, depending on the wording of the contract terms. Where this is possible it is likely reinsurers would need to agree to the purchase before the transaction is finalised.

- The market availability is low and consequently the cost currently is high as the demand is greater than the supply. If this continues then the attractiveness of this as a solution would be diminished.

The advantages that should be considered are

- It may give finalisation of the claim for the insurer.

- Consequently there would be reduced capital costs and inflation and longevity risk as well as earlier crystallisation of reinsurance recoveries

Capitalisation

Capitalisation is the agreement between an insurer and a reinsurer whereby the reinsurer pays the insurer an amount as settlement of the reinsurance recovery under excess of loss reinsurance. It will consider the expected future life expectancy of the claimant, indexation of the claim and of the attachment point and investment income in the form of a discount.

It needs to be considered whether a capitalisation is calculated as the present value of gross payments, subsequently applied to the reinsurance conditions, or whether the gross claim is applied to the reinsurance conditions and then discounted. It is possible that there is a material difference in the methodology, the degree of which is discussed elsewhere in the paper.

Considerable difficulties which need to be considered include

- Life expectancy disagreements. For example, which mortality table to use and what adjustments to make for life impairment. One possibility is to use the expert witness report obtained by the insurer for discussions with the claimant, as this will remove bias and reduce cost

- What discount rate to be used will be important. One approach might be to use a risk free yield rate, however most companies would be likely to invest to achieve a return in excess of this and consequently a higher rate may be argued. This is also dependant on individual companies views on the future investment performance, which will vary from company to company and across different time periods

- Difficulties in a subscription market might mean that an insurer might not be able to secure agreement with all parties, leaving some residual risk. There might also need to be separate discussions with each reinsurer, increasing time and cost. This will be exacerbated if participants go into run off, as they may prefer a PPO to be recovered as a stream of payments, and not as a single payment

- Ideally some wording should be agreed in the market so that commutations can be performed with minimal cost, the terms of which are known at the outset of a treaty, and consequently can be adequately priced for, reducing risk premiums for uncertainty. There is an IUA working party looking into this which has developed a model which can be used as the basis of commutation discussions. At last sight it calculated the discounted value of a PPO and then applied the

reinsurance conditions, without considering applying the reinsurance conditions to the annuity payments before applying discounting

- As a capitalisation will be final agreement of the recoveries on a claim, with no course for a later adjustment, the reinsured company will either benefit or lose out from a claimant living longer or shorter than expected. (Re)insurers should consider that an individual will be unlikely to die at the expected time, consequently a reinsurer will either pay too much or too little. If a claimant dies earlier than average the insurer will receive more than they will have to pay out, however the insurer will be paying out more than they recover if the claimant exceeds average life expectancy. Some annuity products will have payments to the claimant upon very early death. It is unlikely such an agreement would be considered between insurers and reinsurers, as it is likely that it would be desired that if a reinsurer is compensated for a claimant dying early, an insurer is compensated for a claimant living much longer than expected, consequently there is not finality for either party and consequently reduces the key attractiveness for both parties

- As the insurer retains the full liability it is exposed to, changes in legislation affect the cost of the claim retrospectively. An example could be if the Primary care trusts no longer pay contributions. This risk would predominantly be borne by the reinsurer without capitalisation and any potential costs could be significant. As an example, in just over a decade there have been two changes in the Ogden discount rate, the implementation of PPOs and the indexing of PPOs to an index other than RPI, all of which have had resulted in an increased cost of claim

- Variability orders need careful consideration in the capitalisation agreement. Currently none have been awarded, but each would have to be treated on an individual basis, considering the specifics of the judgment

Advantages to the insurer include (other than discussed above)

- Removal of credit risk, as reinsurance recoveries which would otherwise be made many years in the future will no longer remain as an asset on the balance sheet

- Possibility to achieve greater investment income than assumed in the discounting due to less restrictive investment philosophy than risk free yields would apply

- Possibly higher recoveries than economically reasonable if losses are discounted before application of the deductible, rather than applying the deductible before discounting

- Reinsurers may be willing to pay a risk premium to remove the liability from their balance sheets

- Reduced costs of monitoring reinsurance recoveries, however, this could be done as part of the claim payment process

Disadvantages to the insurer include (other than discussed above)

- Removal of asset which very closely matches the liabilities

- Possibly higher capital charge as net balance sheet liabilities will be higher without the reinsurance recovery as an asset

Advantages and disadvantages to the reinsurer are generally the opposite of those for the insurer, an obvious difference will be the credit risk of the reinsurer. There is an additional consideration needing to ensure that consistent assumptions are used across different cedants, as not doing so could lead to over-compensation

Pass to Life Company

For insurers which have a life arm as well as a general insurance arm this may be an option. When an insurer has a PPO awarded against them they could agree to transfer the liabilities to their life arm. The responsibilities for handling the claim would be transferred, as well as for paying the liabilities. A transfer price would then be agreed between the two parties. This transfer price may be such that it may be applicable to trigger any excess of loss reinsurance.

The Key Considerations are:

There may be an advantage in gaining early access to the expertise available in the life insurance arm. Life insurance experts would be more familiar with this type of claim. This could enable better early estimates of the liability, in particular in relation to any reduced life expectancy.

The reserve would then be visible on a different side of the balance sheet. Depending on the company and its risk appetite this may be viewed as favourable or unfavourable.

Capital calculations may be different depending on whether the reserve is held on the life insurance side or the general insurance side. For example, the charge for reserves could be lower on one side than the other.

The life insurance company may have reinsurances in place that would not cover these losses. Whether they need to take out additional reinsurance would need to be considered.

Other considerations would be:

A particular advantage is that the claims systems and processes of the life insurance arm would be set up to deal with this type of claim far better than the general insurance system.

The approach is likely to be preferable to a company than buying an annuity with an external provider, as the annuity providers profit will not need to be paid for. This may also be a benefit to excess of loss reinsurers.

The difficulties that arise in pricing and reserving for these types of losses would also be applicable here, for example, the discount rate to use considering the difficulty in finding matching assets.

It could possibly affect the term of the life insurance liabilities. Most annuities are bought in retirement, whereas PPOs could be awarded to infants. The maximum expected term could change from around 40 to 80 or above. There would be a considerable reinvestment risk as there are no assets of this term other than equities and insurance companies are often reluctant to invest heavily in these. There may be a blending of the experience on the life insurance business and annuity experience, particularly as there would be less selection in PPOs than other products.

There may be the possibility of a "true up" from the GI arm to the life insurance arm if life expectancy is materially different to the expectations. This would be more attractive than with an external party.

Life insurance companies are increasingly using electronic means to assess the continued survival of annuitants. Most annuities of a life insurance company are of a much smaller size than PPOs, consequently they may instead obtain physical proof of continuing survival, perhaps by way of an annual review with the claimant (and or their advisors).

Pooling

Pooling of mortality risk is discussed in detail in the previous WP Paper and consequently we do not go into further detail here. The situation has not changed in that it remains to be seen whether there is the will within the UK insurance market for a mortality pooling scheme to be set up.

Case study of foreign experience

The purpose of this section is to examine other countries experience to see if there are any features that could assist in the UK market.

United States of America

Little can be taken from the claims environment in the United States, primarily due to the low levels of coverage in the primary market.

Purchase of direct motor insurance is normally bought with only limited levels of cover. Typical levels of third party coverage are of the order $0.5m and the statutory minimum, which vary by state, are in general $25k to $50k. Consequently insurers are only liable for small losses. Severe bodily injury claims therefore cost significantly in excess of the limits. Claims are generally settled much quicker than in the UK as limits are quickly exhausted for large claims. Where claims do go to court they will generally settled in 2-4 years, and the major disputes are over liability, rather than quantum. Where a case goes to court, they will refuse to allow a structured settlement. Structured settlements are normally only the result of claimants buying annuities from a third party.

The low levels of primary losses means that discount rates, life expectancy, indexation and reinsurance losses are a low priority or insignificant.

France

The French environment is very different to that in the US. In continental France all claims above a certain size that include compensation for loss of earnings and care costs have been settled through periodic payments for a number of years now.

The immediate difference is that French primary insurance (like the UK) is sold with unlimited coverage. Consequently the ability of the courts to award PPOs is greatly increased.

In contrast to the UK, however, any indexation of the annuity is paid for by the state, and not by the insurer. This is funded via a levy on insurance premiums and as such does not affect the relevant reinsurance treaties. Consequently the risks to the insurer are fewer.

After a PPO is awarded, the methodology of reserving the claim is defined by the state. They will define both the mortality table and the discount rate. There has been no change to the mortality table used in a number of years. Consequently the current life expectancy in the population of around 80 years from birth, is in excess of the expectancy in the table, which is around 72 years. Hence there is an element of life impairment included. To ensure continuing eligibility, claimants must provide a doctor's note yearly before the annuity payment is made.

Standard reinsurance clauses include a capitalisation provision. Thus there is more certainty over the cost to reinsurers. The clauses will normally define the life table and

specify "or whatever succeeds it". This results in a basis risk for the insurer, in that the mortality that they are exposed to may be different from the basis on which the reinsurance claim is capitalised. In addition the reinsurer is exposed to the risk that a new table may have lower mortality, thus increasing the capitalisation payment.

The claims were historically split between insurers and their reinsurers using 3 main types of annuity clauses:

a) Proportional follow-up: The value of expected future payments is added to the cash loss and after application of the treaty limit and deductible the reinsurer's share is calculated. The reinsurer will then pay this proportion of each annuity payment even if the total payments made has not reached the deductible of the treaty.

b) Additional follow-up: The annuity payments made by the insurer are added to all other claim payments and the reinsurer pays the annuity in full after the sum of all prior payments exceeds the treaty deductible.

c) Valuation or commutation basis: The reinsurers pay their share of the annuity reserve. This can happen at the time of the allocation or after a fixed period of time (typically 5 or 10 years)

At present, the later of the above three basis is by far the most common. Variations in the annuity amounts are allowed and when they occur they follow the original basis selected. The reinsurers would typically be entitled to ask for proof of life on all existing annuitants and in the event of death they would be entitled to get back an amount pro-rata to the relevant annuity values.

The valuation interest rates can either be linked to a proportion (60%) of the earnings inflation index subject to a max (currently 3.5%) or be fixed (currently at 3%). In terms of mortality, the latest population mortality table is used throughout and the business will be priced on the same basis.

Comparison of the allowance for deductible creep is difficult with the insurer not bearing the inflation risk, consequently motivations and impact differ between France and the UK. In simplistic terms a) allows for the insurer to retain an interest in the annuity going forward but would also bring forward the recoveries. Some reinsurers will no longer write treaties under clause a). For clauses b) and c), current clauses available in the market allow for indexation of the deductible to stop at agreement of the annuity and for indexation to increase after the annuity, the choice is up to the insurer how much risk they wish to retain versus the price they wish to pay.

It should be noted that in France, the bulk of the annuity is for the cost of care which is calculated based on an estimate of the expected number of hours of care needed at the prevailing rate at the time of allocation. Typically, there is a distinction between active care and passive (supervision) care. The hours of care needed may change during the life of the claims and the annuity payments will adjust accordingly. It should be noted that inflation on the cost of care after the annuity has started is borne by the State.

In France, the loss of income component is less significant that the UK. It is typically around 5%-7% of the total cost of a claim and includes only the loss of future salary increases (the loss of the opportunity to increase the level of income). The loss of income at the current level is borne by the State's Social Security system.

Australia

The standard level of cover for third party bodily injury is unlimited however the provider of the coverage varies by state. In some states the coverage is provided by the state themselves and funded by a levy on the insurers operating in the state. Although Australia does have legislation allowing for structured settlements, like previous structured settlements in the UK these are generally seldom used for generally similar reasons, and courts do not have the power to impose a PPO. One feature of the Australian claims environment that is particularly different is the concept of sharing. Insurers have an agreement that they will each contribute if one of their vehicles is involved in an accident with another insurer's vehicle regardless of fault. The losses are usually shared proportionally dependent on the number of vehicles involved and independent of fault.

One entity that does have a similar "product" to the PPOs is the Victorian Transport Accident Commission (TAC). The TAC is responsible for insuring Victorian cars against bodily injury claims, on a no-fault basis including the driver. Rather than making lump sum payments, the TAC covers all future medical costs directly and provides a weekly payment tied to the claimant's former salary, with certain maximum and minimum limits. The weekly payments are indexed annually with the Average Weekly Earnings (AWE) index published by the Australian Bureau of Statistics (ABS).

Although a statutory entity, claims are fully reserved on nearly the same basis as within the private insurance industry, and in 2008 had A$6.1bn of outstanding claims' liabilities that were fully funded and reserved for. The bulk of injuries are reserved by payment type and either a Payment Per Claim Incurred method for medical costs, or variations on the Payment per Active Claim method for weekly payments. Catastrophically injured claimants are reserved separately, with medical costs, care costs and renovation and support costs allowed for separately. All reserves are held on a discounted basis.

This does mean that the TAC has to handle the issues of inflation, real discount rates, and the impact of mortality on the future cash flows. Although the weekly payments are steady year to year, they are capped at retirement age. Medical payments are for life where necessary, but can vary year on year with the claimant's individual needs.

14. Suggested Reading

Here is a list of suggested reading on the subject:

- GIRO Working parties

  [Previous GIRO paper](#)

  [GIRO paper Bulmer and Chandaria from 34th, Newport](#)

- Court decisions

  [Bond Pearce article on Thompstone judgement](#)

  [Law Society gazette article following Thompstone](#)

- Journal of Personal Injury Law articles

- Ashcroft, S. (2009) 'From Kelly to Courts Act - the Development of Periodical Payments', *Journal of Personal Injury Law*, Issue 3 pp 191-196.

- Insurance Press

  [Post article 2009](#)

  [Ogden tables](#)

- Mortality tables

- Impaired life mortality studies

- Government papers/consultation/Acts/Hansard

- Solvency II consultation

- Life insurance treatment of annuities

- Academic papers

- Articles by legal firms

  [2005 Berrymans article](#)

- Periodic payments in other countries

- Transcript of Thompstone v Tameside

  http://www.bailii.org/ew/cases/EWCA/Civ/2008/5.html

- ASHE Statistics
  http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=13101