April 2019

Innovative Income Streams – Information Note

1 STATUS OF INFORMATION NOTE

This Information Note was prepared by the Life Insurance and Wealth Management Practice Committee ("LIWMPC") of the Actuaries Institute. It may also have relevance to areas of actuarial practice other than wealth management. It does not represent a Professional Standard or Practice Guideline of the Institute.

It has been prepared to inform members about innovative income streams and to raise some of the issues in developing and managing these products.

Feedback from Institute members is encouraged and should be forwarded to the Retirement Incomes Working Group that reports to the LIWMPC through:

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This is the first version of this Information Note. It is envisaged that it will be expanded as more issues emerge.

2 BACKGROUND

2.1 Legislative changes

Changes to the SIS Regulations permit a variety of new post-retirement products from 1 July 2017 to be entitled to tax free investment earnings on their backing assets. They include:

- "Deferred superannuation income streams" – these products pay an income that does not start immediately on purchase but at a specified later date, e.g. at age 80. The income is payable until death. It may be specified at the outset. Alternatively, it may be determined at a later date or it may vary with the performance of the pool, as below
- "Certain innovative superannuation income streams"[1], which are called Pooled Investment Pensions or Annuities[2] depending on whether they are offered by superannuation funds or life companies. The income they deliver lasts for life, but the income varies with the pool's mortality and investment experience.

See appendix 2 for a fuller description of the products and of the other types of pensions or annuities that can now be sold.

[1] See Superannuation Industry (Supervision) Regulations (SISR) Section 1.06A, paragraph (3) is reproduced in Appendix 1

[2] Income Tax Assessment Regulations 1997 – Regulations 307.205.02D and E respectively.

New means test rules for pooled lifetime income streams were announced in the 2018-19 Budget. From 1 July 2019, it is intended that new Age Pension means testing rules will be introduced for pooled lifetime income streams. The rules[3] - as currently drafted – will assess a fixed 60 per cent of all pooled lifetime product payments as income, and 60 per cent of the purchase price of the product as assets until their life expectancy at purchase, and then 30 per cent for the rest of the person's life.

Another development is that product providers may use a streamlined cross agency process for seeking initial "concept exploration" or "product review" from all four relevant agencies (ATO, APRA, ASIC and DSS).[4]

2.2 Potential advantages of the new products

The essential benefit of these new products, compared to conventional annuity or pension products, is that income stream recipients may obtain a degree of confidence that their longevity risk is addressed while retaining a measure of investment freedom.

- Conventional lifetime annuities provide guaranteed income for life but no investment freedom
- Conventional Account Based Pensions ("ABPs") provide investment freedom but no protection against investment and longevity risk
- Conventional deferred annuities provide a guaranteed income for life for someone who reaches the vesting age. They allow that person to choose how to invest the balance of their superannuation account in an ABP, and to manage it to last to the vesting age of the deferred annuity, or perhaps beyond.
- "Pooled investment annuities and pensions" supplement their investment return by redistributing to survivors the amounts retained after the death of members of the pool (referred to as 'survival credits'). They provide investment choice (and therefore investment risk), as does an ABP, but with survival credits to provide some level of income for life. Unlike a conventional lifetime annuity or deferred annuity, the income is not guaranteed. Pooled investment annuities and pensions may be preferred by retirees because they do not bear the cost of capital to back investment or mortality guarantees, and they are prepared to accept the risks. Companies may add some guarantees (of investments, mortality experience or actual payments) where they believe that retirees will be prepared to pay the costs.
- A deferred annuity could also be structured as a pooled product.

The Actuaries Institute has identified "the pressing need to develop a more vibrant annuities market" as one of its major policy objectives"[5]. Better retirement products have the potential to help Australia's ageing population to enjoy a comfortable retirement, as well as to reduce pressure on the Age Pension. However, at this point it is not clear whether there will be significant demand for these products because of a range of behavioural issues as well as widespread misconceptions about the value of annuities[6]. An earlier paper by the Retirement

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[3] As published by the DSS in January 2019, https://www.aph.gov.au/DocumentStore.ashx?id=81e28d83-ce5c-4948-bd02-00f3202f5f0d&subId=665500

[4] https://www.ato.gov.au/Super/APRA-regulated-funds/In-detail/APRA-resources/Cross-agency-process-for-innovative-retirement-income-stream-products/

[5] https://www.actuaries.asn.au/Library/Submissions/MediaRelease/2012/Press%20Release%20-%202012%20Federal%20Budget_FINAL.pdf

[6] Chomik, R. and Piggott, J., 2016. Australian superannuation: the current state of play. Australian Economic Review, 49(4), pp.483-493.

Income Working Group sets out some of the issues relating to demand for these products.[7] In addition, there is some evidence that Australians, including financial advisers, underestimate the age to which their retirement plan must last in order to have high confidence that their retirement income will last for life. [8] This leads some to make poor choices about their retirement income products. There is widespread support for a system of intelligent defaults for drawdown from superannuation for those who do not make a choice, as is the case for MySuper, although agreement on how this might proceed has yet to be reached.[9] .

2.3 Scope

This information note covers focussed on Pooled investment annuities and pensions (immediate and deferred). It looks at the considerations for actuaries in pricing and managing these products and the risks which they contain. These include the issues that arise for new products with uncertain mortality and investment returns that will vary.

3 BACK TO BASICS ON ANNUITIES

This section briefly describes how annuities work to aid consideration of how much to pay from a pooled annuity and how to change it. The examples are intended to be simplistic and in reality, there would be additional allowances for other factors such as inflation and expenses.

3.1 Level lifetime annuity

A lifetime annuity of \$1 pa is worth $a_x = (1 + a_{x+1}).(1 - q_x).v$ (1)

A survivor to the end of the year will be paid \$1 and will need assets of a_{x+1}. Someone who dies during the year will not receive any benefits.

$$a_{x+1} = \underbrace{a_x.(1+i) - 1}_{\text{Accumulation}} \quad \underbrace{+ a_x.(1+i).{}^{q_x}/_{1-q_x}}_{\text{Survival (or mortality) credit}} \qquad (2)$$

The assets needed by a survivor comprise the accumulation of their own start-of-year assets with interest, less their annuity payment of \$1, plus a survival credit. The survival credit is the accumulated amount $\{a_x . (1 + i)\}$ lost by the deaths $\{q_x\}$ shared equally amongst the survivors $\{1 - q_x\}$.

[7] http://www.actuaries.asn.au/Library/Events/SUM/2013/Sum2013Retirement%20Incomes%20Working%20Group.pdf

[8] John De Ravin, Paul Scully, Jim Hennington and David Orford (2018) "We asked how 2,500 planners formulate retirement income advice." https://www.actuaries.asn.au/Library/Events/FSF/2018/AdviceToPreRetireesPaper.pdf and O'Connell, A., 2011. How long do we expect to live? A review of the evidence. *Journal of Population Ageing*, *4*(3), pp.185-201.

[9] https://consult.treasury.gov.au/retirement-income-policy-division/comprehensive-income-products-for-retirement/

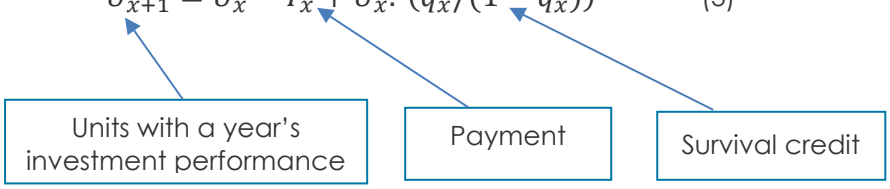
3.2 Pooled annuity

Now consider a pooled annuity invested in a unitised fund. The annuitant has U_x accumulation units at age x. The units of those who die will be redistributed amongst the survivors.

Annuity of P units = U_x / a_x , paid out at the prevailing unit price, with assumptions for future mortality and investment earnings to determine a_x.

A year later the annuitant's unit holding will be:

$$U_{x+1} = U_x - P_x + U_x.\ (q_x/(1-q_x)) \qquad (3)$$



The annuity can be re-determined as P' units = U_{x+1} / a_{x+1}. If mortality and investment earnings have followed the original assumptions and the assumptions have not changed, then the annuity will also not have changed.

3.3 Mortality uncertainty

4 POOLED INVESTMENT ANNUITIES AND PENSIONS

This section refers to pooled income stream recipients, who bear some or all of the investment and longevity risk. A variety of such products are available internationally – some of which are described in Appendix 3.

The design of a pooled income stream product incorporates rules for determining:

- How payments are to be determined
- How mortality and investment experiences are to be shared between members of the pool (distributing deviations from expectations) including across different cohorts of members
- The nature of any investment or mortality guarantees or other means of support to the mortality pool from the product provider
- Charges and rules for changing them
- Whether withdrawal or death benefits are available and how they are determined
- How benefits and risks are to be communicated
- How the pool is managed should it cease to be of a credible size (or fails to reach a credible size)
- Whether there is a need for reserves, and rules for their distribution.

The design may well need to trade off simplicity for administrative and marketing purposes with strict equity. Care should be taken to ensure that the implications of these trade-offs (particularly the risks that may cause benefits to change) are adequately understood by all stakeholders and in particular that they do not endanger solvency or reasonable benefit expectations.

4.1 Setting initial payment amounts for pooled annuities

Assumptions are needed for future mortality, investment earnings and inflation to set the starting annuity, i.e. to set a_x in the formula in section 3 above for the payout in units.

4.2 Distributing deviations from expectations

4.2.1 Investment profits and losses

Where a unit investment methodology is used (for pooled investment linked annuities for instance), there should be no specific unit pricing issues relative to other investment linked products and the principles of unit pricing are well understood. They include that the price of the units should only be dependent on changes in market, and not be affected by cash flows – whether new business, regular payments or surrenders. Some care may be necessary in policy wording to ensure that any overpayments (and related investment profit or losses) from late notification of death are recovered from the annuitant, and not deducted from the pool.

4.2.2 Mortality profits and losses

Section 3.2 showed that each survivor needs a Survival Credit of $S_x = U_x \cdot q_x / (1 - q_x)$ units to maintain their expected payout, in units, not $. In practice there will a shortfall or surplus of the balances forfeited by the deaths as they will not have occurred perfectly as expected.

To be fair, every survivor has to be credited their expected Survival Credit plus or minus a share of the mortality surplus or shortfall. A decision needs to be made as to whether to share that mortality shortfall or surplus according to (a) expected mortality credits i.e. in proportion to Sx) or (b) on unit balances in the pool (i.e. in proportion to U_x). If the former, it will be in the same proportion of expected Survival Credit for all. If the latter, profits/losses will lead to the same percentage increase/reduction in unit balance applying to all members.

A variety of other ways of determining the distribution of the mortality credits have been suggested in the academic literature. Some of these are listed in appendix 3.

Ignoring expenses, the method of distribution of mortality surpluses and shortfalls is "fair" for each person if the amount they expect to lose on death = the amount they expect to gain on survival. Otherwise, if this is not so, pools may, apart from being unfair, become unattractive to new members. Even structures that merely distribute mortality releases, may need to be differentiated on grounds of age, gender, duration, cohort or health. There should be provision in the contract to adapt these or again pools may be unattractive to new members.

4.3 Guarantees and smoothing

Although the main benefit of pooled investment annuities and pensions is to avoid the capital and other costs associated with guarantees, they may well be made more appealing by offering partial guarantees.

4.3.1 Smoothing

If investment returns are smoothed:

- Liabilities should, under MOS or IFRS17, incorporate the fair market value of investment guarantees that are implicit investment options.
- Smoothing methods should be tested under a variety of investment, interest and inflation scenarios. In particular they should be robust to long periods of underperformance, such as experienced in Japan since 1990.
- Discretions should be clearly described with the associated boundaries included, so that equity between cohorts is maintained.

Mortality smoothing introduces similar considerations, noting the mortality uncertainty discussed in section 4.6.4. Smaller and younger portfolios will be subject to greater uncertainty and random fluctuations. A portfolio might need a minimum of 400 deaths per year to get a confidence interval of 10% each way.[10] Given that mortality rates may average less than 2% per annum for a young portfolio, this would require a portfolio of 20,000 lives.

4.3.2 Dynamic hedging

Where dynamic hedging of investments is used for smoothing or guarantees, consideration must be given to charges and their variability, to the possibility that there may be liquidity problems in the reference portfolio, and that jumps in market prices will lead to unexpected losses.

4.3.3 Reinsurance

Even where it is planned for the pool of annuitants to take all the systemic mortality risk, it may be desirable to enter into short term reinsurance contracts designed to reduce the volatility of mortality payouts. This is especially true when pools are new or small and mortality experience is consequently unpredictable or variable.

4.4 Integration with deferred pooled annuities and the Age Pension

There is a risk that annuitants purchasing an ABP, to supplement a deferred pooled annuity by covering their income needs before vesting age, will run out of money prior to the vesting age. This risk needs to be communicated to annuitants and they need a plausible personal strategy to avoid it happening.

There is also a need to consider integration with the means tests for the Age Pension, but this applies to all superannuation benefits and is not covered by this information note.

4.5 Charges

Given the long-term nature of these products and the need to protect both product issuers and annuitants against changes in circumstances, charges for administration, investment and guarantees need to be carefully formulated - with potential changes to inflation and regulation particularly in mind.

Annuities are long term single premium contracts. If the pooled investment annuity or pension includes investment or mortality guarantees, they may require significant capital, with the charges for the cost of this capital making the product appear to be relatively expensive.

The same charges for investment management and guarantees may be perceived as more expensive than in the accumulation phase to the extent that they are compared to the annuity paid and not to the account balance or actuarial reserve. (e.g. a charge of 1% of the balance may be as much as 25% of the annuity paid.)

4.6 Cash flows to be paid to annuitants

Pooled annuities need rules to determine the amounts to be paid to annuitants. Depending on the investment strategy used, there will be volatility in the real income a member will receive each year, although this can be partially reduced by asset and liability matching, noting that this would be at the expense of potentially lower returns over time.

The requirement of SIS Regs 1.06A that cash flows are not unreasonably deferred may also need consideration. All material circumstances and contingencies that may lead to changes

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[10] If the deaths are approximately Poisson distributed, then the variance is equal to the mean and a 90 percent confidence interval will be θ +/- 2 θ. 400 +/- 40 gives 10% each way.

in the real level of total income will need careful communication. In the UK, problems about how the terminal bonus rules were communicated were a key reason why 'the world's oldest mutual life insurer', Equitable Life, collapsed.[11]

4.6.1 Inflationary expectations

Annuitants would probably expect a total cash flow that, more or less, maintains its real value over time. The total cash flow will often include an Age Pension, which is currently linked to wage inflation and, for those impacted by means testing, the Age Pension will also increase as assets decline. The annuitants' non-medical expenditure would be expected to eventually reduce with advancing age[12], However, out of pocket medical expenses are likely to increase, potentially faster than inflation, unless the pensioner is largely reliant on Medicare.

Inflation risk is often not fully appreciated[13], and indexation methods and modelling should be robust to potential changes in the more distant future. Indexation will not be meeting annuitants' needs if it leads to the risk of significant loss of real purchasing power over time. Such arrangements might include "70% of the annual CPI", or "CPI with a maximum of 5%". These could make inadequate provision for the negative impact of high rates of inflation on living standards. Three significant periods of high inflation occurred in the past century and may recur. Formulae that subject CPI to a maximum or minimum are also complicated to price and value (requiring inflation derivatives or equivalent) and harder to manage from a risk point of view.

If some reduction in total income is anticipated, it may be better formulated as a fixed percentage (say 2%) reduction in real terms each year rather than by (say) 30% of the CPI increase.

4.6.2 Investment Returns

The assumed investment return (AIR) used for setting the initial assumptions and thus the initial rate of payment of the annuity should not be overoptimistic. It could currently vary between 0% and 7% p.a. assuming a real return on government stock, currently about 1%, and places a maximum of 6% on the equity risk premium.[14] The actual assumption would depend on the proposed asset mix, allowance for inflation and the degree of conservatism in anticipating future returns. Overseas, companies often offer alternative AIR choices for annuitants.

The higher AIR, the more attractive the annuity would look initially but the more likely the annuitant will be disappointed in future increases. Therefore, the consequences of more aggressive assumptions and the potential range of outcomes need to be communicated carefully.

4.6.3 Mortality rates

The mortality assumptions should make a fair allowance for temporary and permanent selection effects – whether related to age, gender, health or occupation and a proxy for socio-economic status. "Fair" means at least that deliberate and adequately informed consideration has been given to whether such allowances are justified. Some (such as gender) may be ruled out based on considerations of law and community preference.

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[11] https://en.wikipedia.org/wiki/The_Equitable_Life_Assurance_Society

[12] Brancati, C.U., Beach, B., Franklin, B. and Jones, M., 2015. Understanding Retirement Journeys: Expectations vs. Reality. *London: International Longevity Centre UK*. Locally, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2850245

[13] Ranyard, R., Del Missier, F., Bonini, N., Duxbury, D. and Summers, B., 2008. Perceptions and expectations of price changes and inflation: A review and conceptual framework. *Journal of Economic Psychology*, *29*(4), pp.378-400.

[14] For discussion, see Damodaran, Aswath, Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2018 Edition (March 14, 2018). https://ssrn.com/abstract=3140837

For new portfolios, the assumptions will necessarily rely heavily on judgement. Recognised credibility methods should then be used to update the assumptions based on experience – while also noting deviations from the expected changes to population mortality.

Another mortality risk is a common complaint about annuities – and that is that the insurance company takes the money when the annuitant dies. This increases the need to ensure that potential annuitants understand what they are buying.

4.6.4 Mortality uncertainty and projections

The level of payment is informed by expectations of mortality over a long period in the future.

- If too much is paid early, future payments would be lower than anticipated and may not provide the income anticipated or needed in retirement.
- If too little is paid at early durations, the product will not appear to be giving value for money, or equity between participants in the pool, or generations of participants.

There are a few sources of mortality uncertainty that need consideration in product design:

- Permanent selection, in that there is no experience in Australia of the mortality of those who will make up any particular group of annuitants. Moreover, for deferred lifetime annuities (DLAs), it could be 15 years until payments are made and mortality rates become better known, unless the continued existence of annuitants is regularly confirmed throughout the deferred period or a death benefit is paid.
- Temporary initial selection in that healthy life effects could take many years before reaching ultimate rates.
- Changes in the trend of population rates of mortality improvement seem to be greater at older ages.
- There is also a greater measure of uncertainty at very advanced ages because data is sparse in all countries.

Experience from other countries and from Australian superannuation funds may be useful in making informed judgements as referred to in the Actuaries Institute recent paper, "Exploring Retiree Mortality"[15]Any mortality guarantees may well require capital backing. A conventional DLA will have the greatest capital requirement as it is fully guaranteed[16]. The weaker the guarantees, the lower the amount of capital needed.

It would be difficult to justify not projecting mortality improvements in an environment where mortality improvement has been the experience over a long period and is reasonably anticipated to continue. Actuaries should be aware of the Australian Government Actuary's projections of the Australian Life Table and of considerable professional and academic research into more robust projections – using cohort methods for instance.

4.6.5 Capitalising changes to assumptions

A decision needs to be made as to whether, and how, changes in the AIR and mortality assumptions should apply to annuities already being paid.

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[15] https://actuaries.asn.au/Library/Opinion/2018/AIExploringRetireeMortalityFINAL.pdf

[16] For further considerations see Gu, Kerwin (2018) "Coherent Capital Requirements for Longevity Risk" MPhil thesis, UNSW.
http://unsworks.unsw.edu.au/fapi/datastream/unsworks:51602/SOURCE02?view=true

Capitalising changes brings forward any gains or losses that would otherwise be felt more gently in the annuity payments – over a longer period. This increases the volatility of income, an effect which is exacerbated when the change is soon reversed. The choice of the assumptions is only ever an estimate, so regular changes could give an impression of spurious precision. However insufficient adjustment over time may lead to more severe consequences for the remaining members and potentially significantly reduced (or increased) payments.

If the new assumptions are less optimistic, then all members receive a significant reduction in annuities if the results are capitalised, while if the experience is allowed to emerge, the longer lived will experience a reduction at more advanced ages. The opposite occurs when the assumptions are relaxed.

Capitalizing the changes allows the same assumptions to be applied to both new and all existing annuitants so may be seen to be simpler administratively. Equity between new members and cohorts of existing members is a primary consideration, although this cannot be exact, and some leeway may be acceptable.

If the annuity payments are matched by cash flows of an equivalent term, then it would be appropriate to adjust the AIR with changes to the valuation rate of the assets in order to avoid spurious volatility.

4.6.6 Communicating greater uncertainty if not guaranteed

To the extent that the annuity is not fully guaranteed, and the annuitant bears some risks, then these risks need to be appropriately communicated.

4.6.7 Surrenders / Withdrawals / Commutations

For the new products, part or all of an annuitant's total balance of assets can be outside the mortality pool – at least for a fixed number of years after inception. These allow for withdrawal and death benefits to be paid. For example, Treasury's May 2018 Retirement Income Covenant Position Paper[17] anticipated that up to 85% of a 'Comprehensive Income Product for Retirement' (CIPRs) would be invested in an ABP.

Withdrawals or surrenders of amounts in a mortality pool should not be permitted without some evidence of health. Failure to implement this appropriately, unfairly advantages those who have the capability and opportunity to leave when their health deteriorates. If the withdrawal benefit exceeds the death benefit, there is a risk that the annuitant's heirs may seek compensation for failure to inform the annuitant that they could have preserved their benefit by withdrawing.

4.7 Policyholder protection

4.7.1 Viable pool sizes

For pooled funds that self-insure risk to operate well in spreading risks equitably and smoothly across members, the membership needs to be of a size that allows for experience to be sufficiently stable to meet members' expectations. Actuaries need to understand the membership size needed for acceptable stability, and the plans to achieve and maintain that level of membership (or plans to smooth these risks in other ways). There also need to be clear courses of action set out for the equitable treatment of members should that level of membership not be achieved within an acceptable time horizon, or if the membership drops below that level. The equitable treatment of members needs to be paramount and principles and rules clearly set out.

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[17] https://static.treasury.gov.au/uploads/sites/1/2018/05/c2018-t285219-position-paper-1.pdf

The problem may be more difficult to resolve if the annuities are offered by superannuation funds without capital reserves as they may lack the funds to subsidise non-economic pools.

4.7.2 Reasonable benefit expectations

Professional Standard 200: Actuarial Advice to a Life Insurance Company or Friendly Society refers to "reasonable benefits", which need to be considered in this context. Contractual rights of members of the pool may become modified by marketing material and practice that is not explicitly covered in the contracts or product disclosure statement (PDS) but could legitimately be inferred by a reasonable policyholder. Communication with members, particularly about how the product works, the risks and any changes that may be made, is therefore a critical issue.

Of particular concern in this respect are discretions that can be exercised – such as for charges or profit shares accruing to shareholders or other operators of the fund – where management (and their actuaries) may face a conflict of interest. These conflicts need to be managed or it may be preferable that such conflicts are avoided by not permitting discretions or involving independent third parties to advise on the discretion.

Other questions relate to the extent to which the investment returns are likely to match inflation and how volatile the mortality credits are likely to be. In managing a pool of risks over time, it is also important to understand the risk of being too conservative and actuaries should familiarize themselves with the effect referred to as the 'lucky hump' or 'tontine effect'[18].

4.7.3 Prevention of legacy products

In designing products, consideration should be given to how the product would be managed in run-off. This may arise after a sizable portfolio has developed but is perhaps more likely where the product fails to gain traction and a viable portfolio size is never reached.

4.7.4 Increases in expense charges

Annuitants in a pooled product may be exposed to the risk of increasing expenses or charges for insurers or other service providers. Additional risk arises wherever policyholders or annuitants cannot respond by transferring their interest easily and without loss, as they may be exposed to higher charges than could be obtained in other competitor pools. The following provisions could be considered:

- A product design where the provider of the product cannot change the charging structure and level. This creates certainty for the policyholder and is similar to the guarantees inherent in guaranteed annuities. This introduces additional costs relating to the capital required to support the guarantees. However, the additional cost is known at purchase so products can be compared.
- A product design where the administrative charges (except for statutory imposts and tax) will not increase by more than the inflation rate. This design may impose additional cost to cover the guarantee.
- That charges will not increase unless it is justified by an increase in the costs that relate to the product as certified by an independent expert.
- The provider will not make a profit more than 20% of the charges – as is the case with participating life insurance contracts. This could also potentially require certification to ensure that the policies are allocated no more than their fair share of overhead expenses.

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[18] https://www.business.unsw.edu.au/research-site/australianinstituteforpopulationageing research-site/Documents/Managing_Systematic_Mortality_Risk_with_Group_Self_Pooling_and_Annuitisation_Schemes.pdf (page 18 - 19)

4.7.5 Management of reserves

Innovative Lifetime Income Streams that rely on pooling and which do not include absolute guarantees will require actuarial management of reserves. These reserves may arise from a number of sources where outcomes differ from expectations, depending on the rules of the product e.g. investment performance, longevity experience, cost outcomes.

There need to be clear statements of intent about how these reserves will be managed. These rules would be expected to cover or at least consider:

- What experience profits (losses) accrue to the reserves, e.g. longevity, investment, expense?
- How big the reserves can be compared to the value of in force income streams (liabilities), e.g. max 15% of liabilities, before the excess must be distributed by increasing income streams?
- Should income streams be increased for their full term or just on an annual basis?
- How low can reserves be compared to liabilities before income streams are reduced, e.g. 0%?
- Can reserves be applied as profit distributions to shareholders? If so, how much and under what circumstances?
- How are liabilities determined and does the actuary opine on the appropriate level of reserves and/or the financial condition of the pool? How often (annually, triennially)?
- Is there a need based on equity to treat separate cohorts differently?
- The possibility of tontine situations needs to be recognised so that reserves are distributed in a timely and equitable way.

If a life insurer/reinsurer is involved to provide a level of smoothing around either longevity or investment risks, or both, this would allow for effective management of reserves. Consideration could be given to whether this may be classified by the Life Act as participating business. If so, the reserves would need to be distributed at least 80% to beneficiaries.

4.8 Risk management

The previous sections highlighted issues that are relevant to the risk management of these products. Actuaries and boards of the companies or funds issuing these contracts need to be comfortable with the risk exposure they are accepting. The most important risks to consider include:

- Significant improvements to longevity. (Section 4.6.4) The big risk is a sudden unexpected systemic improvement in mortality that never reverts.[19] This would cause policyholder payments to drop substantially and permanently or cause significant losses to insurers.
- The communication of all the uncertainties discussed above.
- The creation of reasonable benefit expectations that do not accord with the company's intentions, and their ongoing management (Section 4.7.2 above)
- Integration including a holistic view of the retirees' funds and income – (Section 4.4)
- Management of equity across cohorts and over time (Section4.7)

Not mentioned above, counterparty risks and a number of business risks may also need consideration.

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[19] For the extreme view, consider https://actuaries.asn.au/Library/Events/FSF/2018/KeynoteAubreydeGrey.pptx.pdf

APPENDIX 1

Superannuation Industry (Supervision) Regulations (SISR) Section 1.06A

(3) The governing conditions comply with this sub regulation if they ensure that:

(a) no payment of the benefit is made before the primary beneficiary satisfies a condition of release mentioned in item 101, 102, 102A, 103 or 106 of Schedule 1; and

(b) after payments of the benefit start, the benefit is payable throughout the life of the beneficiary (primary or reversionary); and

(c) the amount of benefit payments is determined using a method that ensures that those payments are not unreasonably deferred after they start, having regard to the following:

(i) to the extent that the payments depend on the returns on investment of the assets supporting the benefit--when the payments are made and when the returns are derived;

(ii) to the extent that the payments depend on the ages, life expectancies or other factors relevant to the mortality of other individuals who are beneficiaries of that kind of benefit--the age, life expectancy or other factors relevant to the mortality of each of those other individuals;

(iii) to the extent that the payments do not depend on the returns mentioned in subparagraph (i) or the ages, life expectancies or other factors relevant to mortality mentioned in subparagraph (ii)--the relative sizes of the annual totals of the payments from year to year;

(iv) any other relevant factors; and

(d) if the benefit is commuted on or after the retirement phase start day for the benefit--the commutation amount does not exceed the amount worked out for the benefit under regulation 1.06B; and

(e) if the benefit is commuted before the retirement phase start day for the benefit--the commutation happens only in accordance with the rules set out in regulations 6.16, 6.18, 6.19 and 6.22A, if those rules applied in relation to the benefit as if:

(i) the benefit were in a regulated superannuation fund; and

(ii) the beneficiary were a member of the fund; and

(iii) the provider of the benefit were a trustee of the fund; and

(f) the benefit is transferable to another person only on the death of the beneficiary (primary or reversionary, as applicable); and

(g) the capital value of the benefit and the income from it cannot be used as a security for a borrowing.

APPENDIX 2: TYPES OF ANNUITIES AND PENSIONS

Pooled annuities and Group Self-annuitisation (GSA) products. For the purpose of this paper, pooled/GSA annuities are taken in the broadest sense as lifetime income products which involve sharing of longevity experience within a pool. These include investment linked annuities (ILAs), with profit annuities (WPA's) and Group Self-annuitisation products, some forms of which are widely used internationally, but not in Australia. Pool members share longevity risk and so, if the pool is large enough, idiosyncratic (individual) risk can be almost eliminated although the members are still exposed to systematic changes in longevity. Some of the common forms are separately discussed below, but a wide variety of designs is possible:

- With longevity risk, providers can absorb some risks (particularly shorter-term risks when the pool is small), and there are different ways of sharing idiosyncratic and systematic risks between cohorts.
- Investment risk varies with the underlying investments, with some providers providing a variety of smoothing arrangements and guarantees.
- Under some structures, initial payments are based on assumptions as to expected mortality rates, fees and investment returns. Subsequent payments are adjusted to reflect actual investment returns and mortality. Providers use a variety of methods to vary payments as a consequence of changes to future expectations.

Variable annuities (Vas) or Investment Linked Annuities (ILAs). These products are a form of annuity and provide an income throughout life where the income is defined as the value of a particular number of investment units each payment period (e.g. month, quarter or year). The number of units does not have to be constant but is specified in advance. Just as with traditional lifetime annuities, the product provider can price the product based on estimates of future mortality. It can effectively fully insure the longevity risk, or alternatively pass some of the systemic risk back to the annuitants. Strictly speaking, investment risk remains with the individual not with the provider, although they are often sold with guarantees, of which one type is GMLWBs, described below.

Guaranteed Minimum Lifetime Withdrawal Benefits (GMLWBs). These are investment-linked products which offer protection against a combination of longevity and adverse investment experience. In retirement, the product is similar to an account-based pension with an optional guarantee that pays an annuity for life if the account balance has been exhausted. The GMLWB is typically expressed as a fixed percentage of the highest account balance achieved at a prior policy anniversary. In Australia several life insurers have launched GMLWBs but take up has been limited.

Participating (with-profit) Annuity (WPAs). These products share both investment and longevity risk between the retiree and product provider. They feature a guaranteed annuity at a rate that is less generous than the equivalent rate for a non-participating annuity supplemented by additional bonuses if investment and longevity experience is favourable. Some versions set the initial payments at a level that will reduce annually if bonuses are not earned. Recent versions use dynamic hedging to match the guarantees.

Deferred Lifetime Annuities (DLAs). These can take any of the forms set out above, but initial payments start after a set deferment period and are then payable for life. The benefit payments are typically large relative to the initial purchase price. This feature of a DLA would provide a way to protect retirees against the risk of outliving their retirement savings after an advanced age. GSA/mortality pool products can be structured to provide similar longevity protection but without a guaranteed level of income.

Enhanced or Impaired Life Annuities. Annuity rates that take no account of the annuitant's individual life expectancy do not provide good value to groups with lower life expectancy. Providers may offer enhanced annuities, under any of the above arrangements, which pay higher incomes to people with lower life expectancies. It is not expected that special rules are required for these. Payments would be higher and terms on average shorter, than for non-impaired lives. However, if these were products to be widely taken up it is possible that the mortality of those taking up non-impaired products could be lower (more select) than otherwise.

Contingent Annuities – These are deferred annuities where payments are made, or the annuity commences, on the occurrence of a contingent event. Such an event could be the death of another person, a defined decline in health or entry into care, or after a particular investment loss has occurred.

APPENDIX 3: ALTERNATIVE ANNUITY FORMULAE

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