



A Different Approach to Meeting Changing Needs in Retirement

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A Different Approach To Meeting Changing Needs in Retirement

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Abstract

Existing products designed to meet retirement needs have historically focused on the provision of income to meet those needs. In particular, it is assumed that longevity is addressed by guaranteeing that a pre-defined income will continue as long as the recipient is alive (and the needs continue).

However a pre-defined income stream may not address the current or future needs of retirees. This could occur through changes in health, lifestyle, dependants, etc.

The purpose of this paper is to suggest a different way in which longevity can be considered and addressed without providing an income stream (so that retirement needs may be better met). Under this structure income is provided from an allocated pension product, but this income is augmented by insurance benefits paid in the event of survival. Furthermore, it is suggested that this alternative approach may address some of the unpopular characteristics of many existing products.

Introduction

A range of products have been developed over the years to provide the income streams to meet the needs of retirees. Despite this, the recent Financial Systems Inquiry (FSI)¹ found that no simple default benchmark product exists within superannuation funds to meet the needs of retirees. To meet these needs the product needs to have:

- Income — the expected income during retirement from a given amount accumulated;
- Risk management — including protection from longevity, investment and inflation risks; and
- Flexibility — a range of characteristics, including access to one-off withdrawals during retirement, the ability to bequeath assets and control over investments.

The FSI has therefore recommended that superannuation trustees develop a comprehensive income product for members' retirement that addresses these needs more comprehensively.

This paper begins with considering the needs of retirees, and how these needs may change over time. We then consider how the cost of longevity can be quantified and whether this cost is significant. We conclude it is. The paper then considers the existing longevity products on the market and the possible reasons why the products providing longevity protection have not been overly successful, even though longevity risk appears significant. We also consider why account based pensions, which do not provide longevity protection, have been successful.

We then consider whether the problem of longevity can be thought of differently and whether this can help design a longevity product that better meets customer needs. Through this process we conclude that it is possible to provide protection against longevity in different ways. One such alternative involves using an insurance rider in conjunction with the already popular Account Based Pension. The rider provides a lump sum benefit on survival over a specified period. This benefit can then be used to augment retirement income in subsequent periods and provides protection against longevity.

¹ See Financial System Inquiry. (2015). *Final Report*.

The Need For Flexibility

For any one individual there is considerable uncertainty around timing and quantum of financial needs arising through retirement. There are the basic needs of:

- food;
- clothing; and
- shelter.

To these can be added other needs relating to:

- health – on average one can expect larger medical expenses as one gets older, but these can vary markedly depending on the health of the individual and the nature of illnesses/injuries they suffer;
- marital status – single people will have different expenses from couples;
- lifestyle – the lifestyle desired in retirement can vary markedly – at the moment lifestyle is largely limited by available resources, but it is likely that in many cases costs would increase if resources permitted;
- wealth – wealth in retirement is highly correlated with wealth pre-retirement – not only will it be maintained into retirement, but a higher wealth should produce higher resources – nevertheless, many in retirement are ‘asset rich, but cash flow poor’ (largely due to the family home) and this needs to be taken into account in assessing needs and resources;
- travel – many retirees desire to travel, but the costs thereof can vary significantly depending on the frequency, type of travel (air, land, sea, tour, self-drive, etc.) and destination chosen;
- dependents – the number and ages of any dependents will affect needs – indeed offspring do not need to be living at home to still be a cost – and there is also the cost of caring for older relatives;
- transport – retirees will still need to transport themselves, and the cost involved will depend on the nature of the transport (public transport or own vehicle) and the distance travelled;
- sport and entertainment – again, retirees will look to partake in these – as they did pre-retirement – and the costs will vary with the type, location and frequency of the sport or entertainment activity involved (e.g. frequent visits to the theatre, with dinner, are likely to cost much more than the occasional excursion to the movies); and
- bequests – many retirees would like to provide a bequest to their children or charity on their death, or prior to their death.

Past analysis and papers have looked at a number of issues relating to the above needs, including:

- the quantification (in monetary terms) of these needs;
- the interaction between private products to meet these needs (e.g. annuities and allocated pensions) and other sources of retirement income (e.g. age pension and family home);
- investment choices to best meet these needs;
- product choices to best meet these needs;
- the cost v benefits of guarantees;
- the impact of longevity risk (exhaustion of capital) and how it might be addressed (e.g. pooling); and
- psychological influences on decisions.

Typically, retirement needs are grouped or averaged, such that the retiree population is broken down into different segments with different primary needs. Within a segment, the needs are assumed to be homogeneous. But this is unlikely to be the case due to the variety of needs that a retiree might have (as noted above) – within a particular segment there may be a many needs and a range of a particular need.

Furthermore, as people age they will transition between different segments, with a person unlikely to remain in a single segment for the whole of their retirement. The amount of income required by the individual will also change over time as they transition between segments. Hence, needs in retirement are not static or predictable.

If there is one thing that is certain, it is that an individual’s needs will not remain constant for long, if at all.

How well do existing products adapt to this uncertainty? Arguably, not well, as traditional products either provide static income to meet non-static needs, or may be insufficient to continue to provide an income if the retiree survives. The preferred solution therefore needs to cope with unpredictability and variety – flexibility is needed, rather than locking people in based on an estimate of future needs which are assumed to be static.

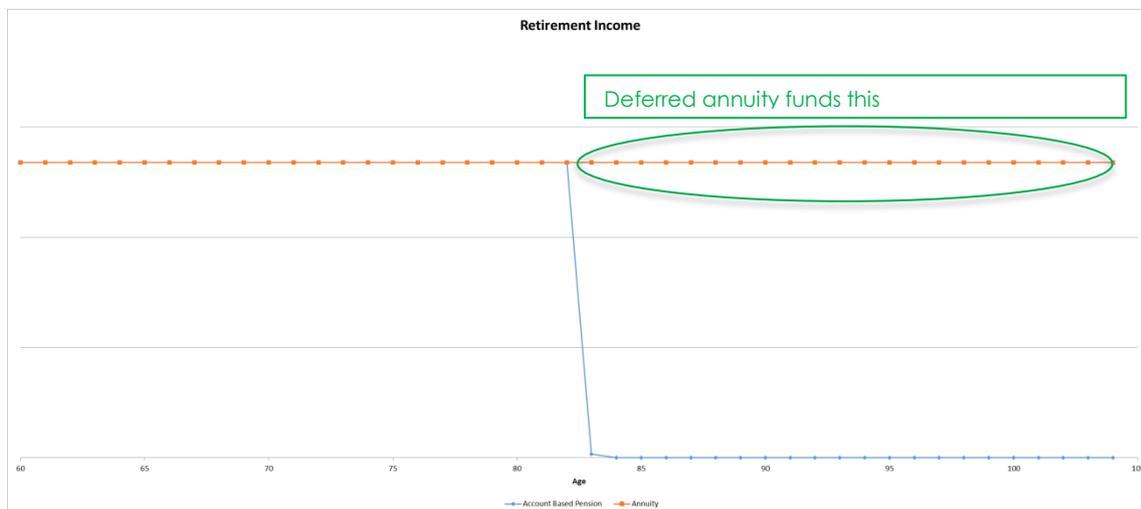
Cost of Longevity

Needs will continue as long as the retiree remains alive, which could be (much) longer than the average expectation of life. This is the **individual** longevity problem – that the individual might live longer than the population average. There is also the **portfolio** longevity problem – that the portfolio as a whole lives longer than initially assumed, not just the individual.

Once a retiree’s superannuation savings are exhausted the retiree will generally rely on the Age Pension (though other options exist like selling the home for cheaper accommodation, or releasing equity from the home). If they don’t wish to do so, it is important for longevity to be addressed so that superannuation savings are not exhausted.

The cost of longevity can be quantified as the proportion of superannuation savings that must be set aside for a deferred annuity to be purchased which provides an income stream once the person reaches their life expectancy. This can be explained by the following graph which shows the situation for a male 60 year old. (Note that this is just for illustration purposes. Mortality assumed is as per the Australian Life Tables 2011-13, but ignores future mortality improvement.)

In this example, the Account Based Pension runs out of money at around age 83 (the person’s original expectation of life), at which point the deferred annuity provides an income as long as the person survives. The cost of longevity is the amount that needs to be set aside to fund this continuation of income beyond age 83 – effectively it is the value of a deferred annuity at age 60, with a deferral period equal to approximately 23 years.



The cost of longevity on this basis, expressed as a percentage of superannuation savings, is therefore in accordance with the following table (using the latest population mortality statistics):

Age	Indicative Cost of Longevity			
	Males		Females	
	e_x	Longevity Cost	e_x	Longevity Cost
65	19.2	13.7%	22.1	11.2%
70	15.3	16.1%	17.9	13.2%
75	11.8	18.9%	13.9	15.9%
80	8.6	22.2%	10.2	19.4%
85	6.1	25.7%	7.1	23.3%
90	4.2	29.0%	4.8	26.4%
95	2.9	32.0%	3.3	26.3%

(Australian Bureau of Statistics, 2011-2013)

Australian Life Tables, Interest 2.00% p.a.

An interest rate of 2.00% p.a. is assumed, consistent with the current low interest rate environment. Note that these figures are conservative as they do not allow for mortality improvement which will increase further the cost of longevity.

Although the cost of longevity is frequently referred to, and many people are familiar with the concept, it does not seem to be commonly quantified in a simplistic fashion. The above provides some indication of:

- the minimum amount by which retirement income might be reduced; or
- the amount of superannuation savings that need to be set aside

for this risk to be addressed, assuming a given rate of future investment earnings that can be expected.

The above cost is potentially larger than assumed by the public – particularly at older ages – and so should be a significant consideration in the plans of retirees.

Existing Solutions

The pros and cons of the major existing (or potential) retirement income products are highlighted in the tables below. The products examined are Lifetime Annuities, Fixed Annuities, Deferred Annuities, With-Profit Annuities, Investment Linked Annuities, Account Based Pensions, Guaranteed Minimum Withdrawals, and the Longevity Pooling Investment Option. Briefly, the key characteristics of these products are:

*Lifetime Annuities*²:

- Lump sum is received by the insurer in return for income payments guaranteed to be payable for life.
- Income payments can be inflation linked.
- Can have some capital return or guaranteed minimum payment period if recipient dies early.

Fixed Annuities:

- Lump sum is received in return for income payments payable for a fixed term.
- Income payments can be inflation linked.
- Can have immediate return of outstanding capital if recipient dies.

Deferred Annuities:

- These are similar to traditional lifetime annuities, except that the receipt of income is deferred for several years.
- In theory, deferred annuities are held in conjunction with an account based pension, with the account based pension providing the income stream during the deferral period.

With Profit Annuities^{3,4}:

- These are similar to lifetime annuities except additional ‘bonus’ payments are made if experience (including both investment and mortality) is better than assumed. Guaranteed payments are usually lower than for an equivalent lifetime annuity to allow scope for such bonuses.

*Investment Linked Annuities*⁵:

- Lump sum is received by insurer in return for income payments guaranteed to be payable for life, but the income is denominated in a fixed number of units, with the amount of the payment received in any period dependent on the unit price.
- Income payments are often not inflation linked, as the likely increase in the value of units provides a natural hedge against inflation.
- The retiree is free to choose the investment mix of units.
- Like lifetime annuities can have some capital return or guaranteed minimum payment period if recipient dies early.

Account Based Pensions (ABP):

- These are similar to a superannuation account pre-retirement.
- The amount of income withdrawn in a period can vary within limits until the account balance is exhausted.
- The retiree can choose their own investment mix.

Guaranteed Minimum Withdrawals (GMWB):

- This product is typically sold as a rider to an ABP.

² An example is the Challenger Life Company product. (27 October 2014). *Challenger Guaranteed Annuity (Liquid Lifetime) – Product Disclosure Statement*.

³ See Qiao, C., & Minney, A. (2015). How to Make Group Self-Annuitisation a Popular Retirement Product. *Actuaries Summit*.

⁴ Although not exactly a With-Profits Annuity, a tontine is similar. See Newfield, P. (2014). New thinking on how to solve Australia’s post-retirement challenge. *Financial Services Forum*.

⁵ See Dunsford, G. (2014, April). Investment Linked Lifetime Annuity. *Actuary Australia*.

- It provides an income stream for life once the ABP falls to zero. This rider is therefore in some ways similar to a deferred annuity, although the deferral period is variable and varies with investment returns on the ABP.
- The amount of income received from the GMWB is reduced if the withdrawals from the ABP exceed certain limits.
- Investment guarantees that do not provide protection against longevity may also be provided.
- The guarantees are paid for through higher fees on the product.
- The retiree can choose their own investment mix within limits.

Longevity Pooling Investment Option⁶:

- This product is essentially an additional investment option under an ABP. In addition to the usual investment returns, this alternative provides a ‘living bonus’ funded by a proportion of the amount invested in the option being forfeited by investors who die or who make early lump sum withdrawals. In addition to payments from the investment returns and living bonus, the original investment is also released to the ABP by way of capital return payments, which are made in respect of older investors who have been in the fund for a number of years. The result is a higher account balance from which a higher income can be drawn if the retiree survives.
- Apart from this option (i.e. in the rest of the ABP), the retiree can choose their own investment mix.

A comparison of the products from the customer perspective is as follows:

	Lifetime Annuities	Fixed Annuities	Deferred Annuities	With-Profit Annuities	Investment Linked Annuities	Account Based Pensions	Guaranteed Minimum Withdrawals	Longevity Pooling Investment Option
Longevity Guarantee	✓	✗	✓ ⁷	✓	✓	✗	✓	✓
Flexible Payment	✗	✗	✗ ⁸	✗	✗	✓	✓ ⁹	✓ ¹⁰
Investment Choice	✗	✗	✓ ¹¹	✗ ¹²	✓	✓	✓	✓ ¹³
No Forfeiture	✗ ¹⁴	✓	✗ ¹⁵	✗	✗	✓	✓	✗ ¹⁶

⁶ See Mercer Super Trust. (1 September 2015). *Supplementary Disclosure Statement*.

⁷ A guarantee is not provided within the deferral period – i.e. there is still the possibility that the account based pension is exhausted before annuity payments start.

⁸ The income payments from the annuity are not flexible (just like an immediate lifetime annuity) but there is flexibility in the level of retirement income from remaining superannuation savings in the deferral period.

⁹ Withdrawals can reduce the income benefit paid by the GMWB, however there is access to capital invested.

¹⁰ Although there is flexibility for the account balance in the rest of the ABP, there are rules and constraints around how much can be withdrawn from the longevity pooling option.

¹¹ There is no investment choice for the deferred annuity itself, but there is choice for the ABP portion.

¹² While the pool can be invested more aggressively, it is the insurer who chooses the investment strategy for the pool, not the retiree.

¹³ There is choice for the remaining investment, but not for the amount invested in the longevity pooling investment option – the latter is invested conservatively by the provider to limit the likelihood of negative returns.

¹⁴ Lifetime annuities often entail the forfeiture by the retiree of the remaining investment in the event of death. The existence of guaranteed minimum payment periods seeks to lessen this risk, but the result is that the income produced by the product to meet needs is reduced.

¹⁵ The risk of forfeiture in respect of the deferred annuity is as for lifetime annuity, but the ABP portion not at risk.

¹⁶ Living bonuses are entirely funded from amounts forfeited by those who withdraw or die, however the proportion forfeited is not 100%, so the living bonus is unable to guarantee continuation of the full income payment that a lifetime annuity might.

The product provider has some additional perspectives (which may indirectly affect the customer):

	Lifetime Annuities	Fixed Annuities	Deferred Annuities	With-Profit Annuities	Investment Linked Annuities	Account Based Pensions	Guaranteed Minimum Withdrawals	Longevity Pooling Investment Option
Limited Capital Required	x	✓ ¹⁷	x ¹⁸	x	x	✓	x	✓
Currently Allowed by SIS Regulations ¹⁹	✓	✓	x	x ²⁰	x ²¹	✓	✓	✓

A few further points:

- In general, the longer and stronger the guarantee that insurers give to policyholders, the greater the uncertainty, and hence the greater the potential cost to the insurer – this in turn increases the price that the policyholder must pay for a given retirement income.
- Once a lump sum is converted to an income stream under a typical product the payment in future periods is fixed, and will not adjust to reflect the actual circumstances of the recipient going forward.
- Some products (With Profit Annuities and the Longevity Pooling Investment Option) do not significantly protect against portfolio longevity, and so may be cheaper. Others (Lifetime Annuities, Deferred Annuities and Investment Linked Annuities) protect against both individual longevity and portfolio longevity.
- A practice adopted by some is to invest more aggressively so that an income stream can be drawn for a longer period if the retiree survives. However, with greater aggression comes greater risk (i.e. that returns will be less than expected). An alternative practice is to rely on an income stream that is less than theoretically possible given the person’s savings and expectation of life, thus lessening the risk of the account balance being exhausted. A range of other strategies are also possible.
- For some products the sequencing risk of changing the asset mix at a disadvantageous time (e.g. moving from equities into fixed interest when the share market has just fallen) is crystallised if a retirement income product is purchased at that time. The potential loss may be exacerbated if the future income stream purchased is dependent on an estimation of future investment returns, and the return prevailing at the time of purchase is low.
- Lack of forfeiture²² can occur with some products (see ‘No Forfeiture’ in the first table). If the retiree dies early then a positive balance is left to their estate providing an inheritance for their dependents. Even if they live for their full expectation, but take less in annual withdrawals from their retirement savings in order to make them last, then, on average, a balance will be left to their estate when they die. This is arguably contrary to the purposes of superannuation in two ways - a lower income than might otherwise be the case is (often) received in retirement, and part of the superannuation savings is used for inheritance rather than income in retirement. That said, many retirees would like to provide a bequest. A ‘balancing act’ is therefore required to ensure that forfeiture on death – particularly in the early years – is not too great, while still allowing that something can be left as an inheritance.

¹⁷ There may be some capital requirements for providers of fixed annuities, but as payments are not linked to continuation of human life, there are no long term guarantees, and as the liability is usually matched with conservative assets, any capital requirements are likely to be small.

¹⁸ The deferred annuity will require capital against adverse experience, but capital is not required to be held for the remaining investment (e.g. in an ABP).

¹⁹ See Retirement Incomes Working Group. (2014). Tackling Longevity Risk: Removing barriers to innovation. *Insights Session*.

²⁰ Full flexibility in terms of bonus payments under the product is currently constrained by SIS regulations.

²¹ Full flexibility in terms of annual changes in the income amount is currently constrained by SIS regulations.

²² For a fuller explanation of this concept see Wakeling, A., & Yang, A. (2000). *Managing Longevity Risk: A wake up call for Australia's retirement savings system*.

- Some products may be used in combinations to give better outcomes for retirees – e.g. a lifetime annuity might provide a guaranteed minimum while income is augmented by withdrawals from an ABP (as long as the account balance lasts). Ultimately, though, the disadvantages of existing solutions remain – they are just ‘averaged’.

Problems with current approaches to managing longevity

Several papers have looked at longevity risk and why existing products with longevity guarantees, particularly lifetime annuities, have been relatively unsuccessful in the market^{23,24}, even though the risks of longevity appear significant. Potential reasons noted in those papers include:

- **complexity** – existing products may be too complex for the average person to understand, and hence buy. This especially applies to a number of products including GMWB, the Longevity Pooling Investment Option and With-Profit Annuities;
- **cost** – the cost of existing products is regarded as too high, particularly for the benefits received and therefore are not seen as providing good value for money – in many cases this may be a perception problem as people do not realise how big, or how costly, the longevity problem is (see above section on ‘Cost of Longevity’);
- **inflexibility** – existing products do not provide benefits that change as individual needs in retirement change – people do not like being locked into a position well in advance;
- **investments, not income** – existing products are seen by many retirees as investment vehicles for their superannuation savings, rather than income products to meet their retirement needs – they therefore don’t like their savings being forfeited, or their savings being subject to conservative investment choices by somebody else;
- **retirees want to leave an inheritance** – while this may not be consistent with the purpose of superannuation, retirees do look to do this, and so do not like forfeiting their savings if they die;
- **retirees want to control the investment strategy** – as previously noted, a number of existing products involve the life office or superannuation fund restricting or controlling the investment strategy underlying the product – furthermore, investment is usually conservative to reduce the cost of the guarantee – and may be locked in at the interest rate prevailing at the time of purchase;
- **self-reliance / self-confidence / distrust of insurers** – the size of the SMSF market highlights that consumers like to take control themselves, rather than rely on a third-party, like an insurer;
- **retirees value consumption now more than in the future** – customers have a form of ‘hyperbolic discounting’, such that benefits and risks that may arise well in the future are not highly valued or seen as significant – this contributes to the perception that existing products offer poor value for money;
- **potential regret** – people don’t like to feel like they made a ‘mistake’, and this is related to retirees not wanting to be locked in, feeling that they’re getting a bad return (which cannot be remedied), or not wanting to forfeit their savings if they die early;
- **not the default** – in certain jurisdictions, retirees have to take a particular product – retirees may only take such a product if compelled to – i.e. it is the default;
- **retirees see the Age Pension or family home as adequate for their needs** – many retirees understate their retirement needs and so see the Age Pension or the value of the family home as being sufficient to meet those needs; and
- **role of the advisor** – many existing products have no ongoing role for the advisor in giving advice, say, on investment mix – advisors are therefore less likely to recommend such products to their clients (all other things being equal).

Given all of the above, it is not surprising that existing products with longevity guarantees are unpopular, and no amount of analysis, or calculations that show that certain needs can be met by such products, is likely to change that. The popularity of the longevity pooling investment option remains to be seen.

²³ See Hemmings, G. (2014, November). The Annuity Puzzle. *Actuary Australia*.

²⁴ Also O’Meara, T., Sharma, A., & Bruhn, A. (2015). Australia’s piece of the puzzle - why don’t Australians buy annuities? *Australian Journal of Actuarial Practice*.

The Account Based Pension

By contrast with the above, the Account Based Pension (ABP) is popular. Ideally an alternative approach to addressing longevity risk needs to maintain those positive features and selling points.

Compared to other products, the ABP sells because of:

- **simplicity** – putting aside social security requirements, superannuation regulations and tax rules, the product is essentially an account (like a bank account) from which regular withdrawals (within a specified range) are made – the range within which withdrawals can be made is essentially to meet external rules;
- **familiarity** – the product is similar to what most retirees had pre-retirement – it is just de-accumulating rather than accumulating;
- **cheap** – apart from investment costs (asset fee) and basic administration (regular fixed fee) the product involves no additional costs to maintain;
- **flexibility** – withdrawals can be adjusted up or down to meet changing needs in retirement, subject to minimum drawdown rules – the investment mix can also be changed as the retiree’s attitude to future risk changes – retirees don’t have to feel that they are ‘locked-in’;
- **an inheritance can be left** – when the retiree dies the balance of their account remains to be passed to whomever the retiree specifies in their will;
- **retirees can do their own investment** – as noted above, the retiree chooses the investment mix, and may even choose particular assets (rather than the choice being made by the life office or superannuation fund) – the retiree can therefore maximise their return within their own risk tolerance, not that of somebody else;
- **fostering of self-reliance / self-confidence** – the product allows the retiree to take control;
- **value for money** - retirees feel that this product offers them the best value for money – allowing them to maximise their retirement income from the superannuation savings that they have accumulated;
- **tax treatment** – provided the tax rules are met (particularly the amount of withdrawal relative to the specified ranges) the product is concessionally taxed like some other products;
- **potential regret** – this is potentially less under this product – if the retiree outlives their superannuation savings the monetary impact is gradual (spread over a number of years) and many years in the future – by contrast, early death is more immediate, and the amount of forfeiture under alternative products can be quite large; and
- **role of the advisor** – as the amount of withdrawal and investment mix needs to be chosen, and can change over time, there is an ongoing role for the advisor in giving advice – advisors may therefore be more likely (all other things being equal) to recommend this product to their clients.

So, rather than offering an alternative product to meet longevity risk, it would be advantageous to meet longevity risk by an adjunct to this otherwise popular product. This is the strategy adopted by more recent product innovations, such as the Longevity Pooling Investment Option, the GMWB and the Deferred Annuity products noted above. In the following sections some alternative products that could be attached to an ABP are discussed.

An Alternative View of the Longevity Problem

Associated with some of the disadvantages with existing products is that longevity is seen as a long-term, rather than immediate, problem. The problem is assumed to really only manifest itself many years in the future, when the retiree lives long enough to exhaust their superannuation savings. Many people assume that the only way to protect against longevity risk is to provide some form of long-term guarantee on the provision of income. If the income stream is not guaranteed to continue then longevity risk is not seen to be addressed, even though the risk can be substantially reduced without the income stream being guaranteed.

Is there a way in which the problem (and solutions to the problem) can be made more immediate, and not dependent on provision of a long-term guaranteed income stream?

To live beyond a certain point a person has to first of all live through each period up to that point. i.e. they have to not die in that period. It follows that longevity risk is made up of a lot of smaller risks in each period.

Similarly, the benefit that is needed to offset the risk in the long term is essentially the accumulation of smaller benefits in each period. Longevity risk can therefore be met by providing a benefit on the risk materialising (i.e. not dying) in each intervening period.

This is the basis of providing a ‘living bonus’ under a with-profits annuity or the longevity pooling investment option. (While it is implicit in a lifetime annuity, it is not made explicit to the retiree.)

Alternatively, a lump sum benefit could be provided under an insurance rider as a boost to the account based pension balance for each year that an individual survives. The lump sum benefit payable each year would compensate the person for their life expectancy increasing, and additional income needs that increased life expectancy entails. This alternative provides greater flexibility to the retiree.

Administration of ABPs and insurance riders pre-retirement is already done. So this solution should be relatively straight-forward to provide.

One stumbling block is defining the cost of longevity (and hence the benefit to be provided) in each period. In fact, the cost was outlined by Chris Daykin in a 2004 paper entitled ‘Annuities and alternative ways of providing retirement income’²⁵. That paper referred to the concept of ‘mortality drag’, which is defined (fairly simply) in the paper. The cost to the individual of deferring annuitisation for a year is that they will not then share in the amount that would have been forfeited by those who die in the year – the amount that each survivor shares is given by the following formula.

$$\frac{q_x}{(1-q_x)} AB_{x+1}$$

where AB_{x+1} is the ABP balance at age $x+1$ (assuming no distorting extra withdrawals or contributions) and q_x is the mortality rate for age x . The derivation of this formula is outlined in the Appendix.



The difference between ‘mortality drag’ and compensation is one of timing. ‘Mortality drag’ is the potential cost for everybody who doesn’t annuitise at the start of the period. ‘Compensation’ is the amount needed at the end of the period for those who survived – hence the significant numerical difference between the two at advanced ages.

The chart (produced on the same assumptions as previously) highlights that the benefit payable as a percentage of the account balance is small at lower ages and increases significantly as the age of the retiree increases. The costs accumulate each year, and the required benefit is significant at older ages (i.e. at age 90, the ABP requires a 20% top up to protect against surviving 12 months). This is consistent with the quantification of the cost of longevity determined earlier.

Note that this compensation might be achieved (at least in the early years) by ‘more aggressive’ investment. But that entails taking on more investment risk. Compensation paid as a benefit avoids having to take on that risk.

²⁵ See Daykin, C. (2004). Annuities and alternative ways of providing retirement income. *PBSS Seminar*.

Funding the Benefit Payable

The annual benefit can be funded solely by an annual premium, where the insurance risk premium payable each year is equal to

$$P_x = q_x(AB_x - 1)$$

However the benefit payable on survival is not much greater than the risk premium – particularly at relatively ‘young’ ages where mortality rates are low. It is also noted that the formula assumes that the premium is funded from assets separate from those otherwise used within the ABP to provide retirement income for the retiree. This is similar to other products (like deferred annuities) where the total accumulated superannuation savings is firstly reduced by the amount invested in other products before the balance is invested in the ABP and retirement income deducted from it. Nonetheless, the implication of this is that the premium needs to be kept low so that the ABP balance is not reduced significantly.

One solution for improving the ratio of premium to benefit is to allow some forfeiture such that some of the benefit is funded by the forfeiture of some (or all) of the balance in the ABP by those who die. This then increases the margin between premium and benefit and reduces the adverse impacts noted above.

At the extreme, if the benefit is funded solely by forfeiture, then the amount forfeited by those who die (with probability q_x) is $(AB_x - 1)$ – the amount accumulated to pay the benefit is the same.

Excesses need to be avoided. Forfeiture of the entire account balance is akin to a lifetime annuity, but with the insurer exposed to the risk that poor investment returns prior to death deplete the amount potentially forfeited. Conversely, no forfeiture does not appear to be practical given the issue noted above.

Another way to alter the ratio of premium to benefit is alter the frequency of benefit payments. Instead of paying a benefit at the end of each year, a benefit could be paid for survival over multiple years. At the extreme, a single lump sum would be payable for survival over a single (long) period. This is similar to a deferred annuity where the benefit for survival over the deferral period is paid as a lump sum, rather than a guaranteed income stream. This has the advantage of flexibility for the retiree over a traditional deferred annuity, as the retiree is not then locked in to receiving an income stream (which may not be appropriate any more to meet their needs). Instead, the retiree receives a lump sum which they can then use as is most appropriate. (If desired, they could then use the lump sum to protect against longevity by purchasing a lifetime annuity at then prevailing rates.)

Should the product provided by the insurer allow for variations in the proportion of the benefit funded by forfeiture, or the frequency of the benefit payments, then advice on what is the most appropriate choice for the client is another way that the financial advisor can add value.

Anti-selection

This refers to the risk that the retiree ceases or reduces their cover in the event of their likely death, such that losses to the retiree are minimised. It is noted that the risk of anti-selection increases with the level of forfeiture involved – i.e. the bigger the forfeiture, the bigger the potential ‘loss’ in the event of death, and hence the greater the incentive to cease or reduce cover if death is likely. Even if there is no forfeiture there is still some risk of anti-selection from the ‘loss’ of any premiums paid in advance, and continuation of cover being unnecessary if ‘survival’ is unlikely.

Some rules and restrictions are therefore needed to address this risk. In doing so, some balance is needed between totally eliminating the risk of anti-selection and maintaining product flexibility and simplicity.

Potential options include:

- Extending the length of the period between benefits. Extending the length of the period from 1 year to (say) 5 years would limit the ability of the retiree to anti-select, but restricts flexibility.

- Apply a penalty, if the retiree cancels or reduces the cover under the rider. The penalty could be subject to ‘underwriting’ (just like any increase in insurance).

Designing New Longevity Products

A number of product design options are outlined above (e.g. income stream vs lump sum payment, single payment vs multiple payment, premium vs forfeiture, short benefit period vs long benefit period). Each option has pros and cons. Nonetheless, we think there is a place for products provided by way of an insurance rider attached to an ABP where the benefit is a lump sum rather than a guaranteed income stream.

Two examples of such products might be:

1. A deferred annuity style product providing a single lump sum benefit on surviving a period aligned with the remaining life expectancy of the person; and
2. A product providing an annual top-up payment to the ABP while the person remains alive, funded primarily via the forfeiture of the ABP balance on death.

Potential benefits of the single lump sum product from a customer’s perspective (relative to a traditional deferred annuity) are:

- **greater flexibility** - the retiree can use the lump sum in a way that is most appropriate for them at the time - if desired, they could then use the lump sum to continue to protect against longevity by purchasing a lifetime annuity at then prevailing rates. Greater flexibility for the retiree also provides greater ability for advisors to add value to the client;
- **transparency** – the benefit received is more certain (i.e. not dependent on subsequent survival) and therefore the cost vs benefit is easier for the retiree to assess; and
- **bring benefit forward** – the benefit paid is effectively brought forward which addresses some hyperbolic discounting issues.

From the insurer’s perspective it may also be attractive as:

- **the level of guarantee provided is less** – portfolio longevity is not insured, and there is less interest rate risk - therefore the capital requirements should be lower; and
- **simpler to administer** – administering a lump sum is much easier than an income stream.

Potential benefits of the annual top-up product from a customer’s perspective (relative to a traditional (indexed) annuity) are:

- **familiarity** – retirees are used to insurance riders on saving products pre-retirement – this is essentially doing the same thing post-retirement;
- **greater control over investment strategy** – retirees have greater control over the investment strategy;
- **transparency** – the product provides greater transparency over the different services being provided (i.e. investment management services and longevity protection services) and their associated costs and benefits - admittedly at the cost of introducing complexity to the product design;
- **greater flexibility over when insurance commences** – the retiree can start insurance at any time;
- **bring benefit forward** – the longevity benefit paid is effectively brought forward which addresses some of hyperbolic discounting issues; and
- **greater flexibility over the income to meet needs** – the product is better suited to providing some flexibility to meet individual circumstances – although it is noted that restrictions would need to apply to reduce the impact of anti-selection. Greater flexibility for the retiree also provides greater ability for advisors to add value to the client.

Conclusion

Existing products designed to meet retirement needs have (mostly) focused on the provision of income from the products to meet those needs. Longevity is addressed by guaranteeing that the income will continue as long as the recipient is alive.

However, there is an alternative way in which longevity can be addressed and retirement needs met. In particular, the provision of an income in retirement, and the investment of funds to provide that income, can be separated from protection against longevity risk. This better copes with unpredictability and variety in retirement, rather than locking people in based on an estimate of future needs which are assumed to be static.

One such alternative involves using an insurance rider in conjunction with the already popular Account Based Pension. The rider provides a lump sum benefit on survival over a specified period. This benefit can then be used to augment retirement income in subsequent periods.

This approach to looking at longevity can help the public better understand the costs of longevity, which are significant. No single product solution is appropriate in all circumstances – we are all unique individuals with unique needs.

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Appendix

Assume there is an individual aged x at time t who has an account balance that can provide a \$1 annuity for the rest of his or her life. In actuarial notation, this can be expressed as:

$$\ddot{a}_x = AB_x \quad (1)$$

We know the following identity:

$$\ddot{a}_x = 1 + \ddot{a}_{x+1} \times \frac{(1 - q_x)}{(1 + i)} \quad (2)$$

The identity states that the value of an annuity at age x is equivalent to receiving one dollar now, and the present value of an annuity in one year's time provided you survive to age $x+1$.

Suppose that instead of investing into an annuity product, the individual chose instead to invest in an allocated pension. The following equation then applies:

$$AB_{x+1} = (AB_x - 1) \times (1 + i) \quad (3)$$

This equation states that the account balance at the end of one year is equal to the account balance at the start of the year, less one drawdown but accumulated for investment earnings.

Rearranging (3), and replacing AB_x with \ddot{a}_x , we get:

$$\ddot{a}_x = \frac{AB_{x+1}}{(1 + i)} + 1 \quad (4)$$

Substituting (4) into (2), we can derive:

$$1 + \frac{(1 - q_x)}{(1 + i)} \ddot{a}_{x+1} = \frac{AB_{x+1}}{(1 + i)} + 1$$

$$(1 - q_x) \ddot{a}_{x+1} = AB_{x+1}$$

$$\ddot{a}_{x+1} = \frac{AB_{x+1}}{(1 - q_x)} \quad (5)$$

We also know:

$$AB_{x+1} = (1 - q_x) AB_{x+1} + q_x AB_{x+1} \quad (6)$$

Substituting (6) into (5), we can derive:

$$\ddot{a}_{x+1} = \frac{(1 - q_x)}{(1 - q_x)} AB_{x+1} + \frac{q_x}{(1 - q_x)} AB_{x+1}$$

$$\ddot{a}_{x+1} = AB_{x+1} + \frac{q_x}{(1 - q_x)} AB_{x+1} \quad (7)$$

Equation (7) tells us that for someone surviving 1 year, the difference between being able to purchase an annuity after one year, and having an account balance after one year is: $\frac{q_x}{(1 - q_x)} AB_{x+1}$. This amount represents the "insurance benefit" that needs to be paid by an individual, net of an insurance premium paid, to maintain their account balance at a level at which they can receive a permanent income for life.

i.e. the amount distributed to each surviving person, F , is:

$$F_x = \frac{q_x}{(1 - q_x)} AB_{x+1} \quad (8)$$

This equation demonstrates that an insurance product that involves customers receiving a benefit equal to F_x will immunise the person against longevity risk. This benefit could be funded by forfeiture of the account balance by those who die.

Or, by a premium at the start of the period from everybody, P , where:

$$P_x = q_x(AB_x - 1)$$

The premium is what Daykin called 'mortality drag', and the benefit is the compensation for it.

Daykin expressed the compensation as an additional return that is needed on the superannuation savings invested, just to stand still – but it is effectively the same thing.

From these formulae it is a simple matter to construct a basic insurance table:

- it can be seen that the premium 'rate' is a simple continuation of the premium rates applying to insurance pre-retirement (essentially the annual rate of mortality at each age); and
- the benefit per unit of 'sum insured' can be simply defined.