# LIVING VERSUS GUARANTEED ANNUITIES: IN SEARCH OF A SUSTAINABLE RETIREMENT INCOME

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**ABSTRACT**

Guaranteed annuities have become a less popular retirement solution in recent times, having lost traction to living annuities. The appeal of living annuities has hinged around several factors including flexible drawdown rates, control over underlying investments, the low interest rate environment, intermediary compensation structures and pensioner bequest motives. However, the dangers of living annuities have started to emerge, with increasing instances of retirees outliving their retirement capital. This paper compares the ability of living and guaranteed annuities to provide a minimum real income for life. The analysis highlights the impact of the cap on living annuity drawdowns and the often overlooked benefits of mortality pooling embedded in a guaranteed annuity. It also quantifies the implicit cost of life insurance that is embedded in a living annuity and the associated impact on retirement income. Consideration is given to cost structures and the regulatory framework. The overriding message is that while there is a place for both living and guaranteed solutions, sales of living annuities have arguably been driven by distorting factors such as skewed incentive structures and a lack of proper insight into the product design. This in turn has resulted in a threat to pensioners, the actuarial profession, the government and the financial industry as a whole.

**KEYWORDS**

Living annuity; guaranteed annuity; mortality pooling; drawdown cap; longevity risk

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> … annuities with annual increases guaranteed to match the official inflation rate… will better serve the vast majority of South African pensioners than do living annuities.
>
> Actuarial Society of South Africa, April 2000

## 1. INTRODUCTION

Living Annuities (LAs) are a popular choice for members seeking a retirement income. There are multiple reasons for their appeal including flexible drawdown rates, choice of underlying investments, intermediary remuneration structures and most commonly cited – bequest motives. However recent media and government attention has focused on the potential dangers of living annuities such as longevity, investment and drawdown risk which have come to the fore in the current low interest rate/low return environment.

The traditional alternative to LAs are Guaranteed Annuities (GAs) where the majority of the risks above are transferred to an insurance company that guarantees a pension for life, thereby insuring the member against outliving their savings. The main criticism of GAs has been their limited ability to provide a capital benefit upon death. This, together with intermediary incentives that favour LAs, has led to significantly less take-up of GAs – according to the Association for Savings & Investment SA (ASISA) almost 85%[1] of assets at retirement flow into LAs.

The benefits of LAs are evident when a pensioner dies soon after retirement – the remaining capital is preserved for dependants. LAs therefore present better value for impaired lives at retirement. However, the high take-up of LAs in South Africa implies that sales have not been limited to impaired lives and that many pensioners in average to above average health depend on an LA to provide a sustainable income for life. In addition, the low savings rate in South Africa implies that most retirees are fully dependent on their retirement savings for a post-retirement income, i.e. they have little other provision to rely on.

The overarching aim of the paper is to outline the ability of an LA to provide a minimum real income for life and to compare this to the income provided by an inflation-linked GA. For the remainder of this paper, 'income for life' refers to a constant level of real income, or a nominal income that increases at the rate of inflation each year. The main areas considered are:

1 ASISA website: www.asisa.co.za/index.php/industry-statistics/long-term-insurance.html

— Investment returns: One of the main reasons people opt for LAs is that they are confident that they will be able to achieve a better net investment return than that offered by insurers on the assets underlying a GA.
— Impact of the LA drawdown cap: Currently members are allowed to draw a maximum annual pension from an LA of 17.5% of the capital value at the anniversary. Whilst the intention of the cap is to preserve capital, the analysis that follows shows that the cap is in fact likely to have a negative impact on the LA's ability to provide an income for life.
— Interest rates: the current low level of interest rates is often cited as a reason for members to defer annuitisation. The paper illustrates the underlying interest rate view implied by deferment and compares this to the market view implied by the current yield curve.
— Mortality credits: An often overlooked advantage of GAs is the use of mortality pooling. This paper attempts to illustrate the benefit of mortality pooling by quantifying this benefit in different ways. This benefit is referred to as the 'mortality credit' that accrues to surviving members of GAs, in return for placing their capital at risk.
— Embedded life insurance within an LA: Retirees may fail to realise that an investment in an LA involves the implicit purchase of life insurance. The sum assured is equal to the outstanding capital profile of the LA, which is expected to decrease over time. This paper considers the implicit costs and implications of this embedded life insurance cover.

The paper is structured as follows. Section 2 provides the framework for and assumptions used in the analysis. Section 3 outlines the basic features of LAs and GAs. Section 4 presents a breakeven analysis which aims to compare LAs and GAs on a like for like basis. Section 5 quantifies the cost of embedded LA life insurance. Section 6 illustrates the time it takes for a member to recoup his initial capital investment from a GA. Section 7 provides an overview of costs associated with the different types of annuities. Section 8 considers the regulatory framework in South Africa and compares this to the United Kingdom. Finally, conclusions and recommendations for the industry are made in Section 9.

## 2. FRAMEWORK

This paper focuses on the merits of LAs and GAs for a member in average to above average health, since those with a shorter life expectancy than average are assumed to opt for an LA.

The calculations are based on a male without dependants, subject to PA(90) – 3 mortality, a retirement age of 65 and with R1m in retirement savings at the time of retirement. The modelling assumes a nominal interest rate of 8%, inflation of 5.5% and a real return of 2.5%. Costs are ignored in the modelling but are considered in Section 7.

There are various forms of GAs e.g. level annuities payable for life and with-profit annuities (the latter are discussed briefly in section 7). The GA considered in this paper is in its basic form, i.e. it provides annual payments in arrears which increase at the rate of inflation, and it excludes joint life options and guarantee periods. The level of initial income is a function of the annuity rate at age 65, which in turn depends on the interest rate and mortality assumptions outlined above.

Except for section 4.3 (where drawdown rates are variable), LA drawdown rates are set to provide an income equal to that payable by the GA, except where this is not possible (e.g. due to the effect of the 17.5% cap on LA income or erosion of LA capital).

Unless otherwise indicated, all figures presented are in nominal terms.

## 3. PRODUCT STRUCTURE

Before making a comparison it is necessary to understand the underlying structure of each product. This section outlines the main design features of LAs and GAs.

LAs provide members with a degree of control over their retirement savings in that (subject to certain requirements) they can choose the underlying asset allocation, manager selection and drawdown rate. At each anniversary date the member can select a drawdown rate of between 2.5% and 17.5% of capital to fund retirement spending over the next year, provided that there is sufficient capital remaining. Upon death any remaining capital is passed on to the nominated beneficiaries or the deceased's estate. The member takes on longevity risk in that should he outlive his retirement capital, there is no recourse to the LA provider. Similarly the member is fully exposed to all investment risk – poor investment decisions/performance will result in capital erosion, with an adverse impact on the LA's ability to sustain a real income for life. In the absence of other retirement provisions, a member is faced with significant financial hardship once LA capital has become insufficient to provide an inflation-proofed income.

The purchase of an LA means that a member is effectively choosing not to insure the risk of outliving his capital. By definition, a member in average health at retirement has a 50% chance of living longer than the average life expectancy (on a best estimate of future mortality), and a correspondingly high probability that he will outlive his retirement savings. The failure to insure this risk is somewhat at odds with members' typical levels of risk aversion evident in other areas of life. For example, most members choose to insure against theft or damage to homes and motor vehicles. In these areas, the probability of theft or damage is usually much lower than 50% and the financial impact of an incident is usually less than the financial ruin that results from outliving retirement capital. A likely explanation for this behaviour (for a person in moderate to good health) is that members (and arguably some service/product providers and advisers) do not fully understand the nature of an LA at the time of purchase, or that they overestimate their ability to outperform a GA.

With a GA (as described above), both longevity and investment risk are transferred to the insurer who promises to pay an inflation-linked income for life, irrespective

of actual mortality and investment experience. The insurer prices the product based on its (usually conservative) estimate of mortality for the pool and prevailing interest rates. The member is not exposed to any investment risk as the insurer is liable for the agreed income stream irrespective of underlying investment performance. There is a degree of interest rate risk in that the member is exposed to the level of interest rates at the time of annuitisation, unless a proper pre-retirement investment strategy was followed in the years leading up to retirement (e.g. moving gradually into matching inflation-linked assets over the last few years before retirement).

GAs are commonly criticised for not returning the remaining capital balance upon death of a member. Whilst true, critics may fail to appreciate the concept and benefit of mortality pooling. In essence, a GA provides members with insurance against living too long. Pooling of longevity risk means that members who die earlier than average subsidise those who live longer. The remaining capital balance (actuarial reserve) of those who die earlier than average is used to fund the retirement income of those who live longer than expected. So while there is no capital payable to beneficiaries upon death, those who live longer than expected benefit from mortality credits.

Critics may also underestimate the proportion of the initial investment that can be recouped via GA annuity payments over the annuitant's life. By design, a GA will return the member's initial investment, plus investment returns, less expenses, by the time the member reaches the expected age of death at retirement (80 in this case). Members living longer than this will recoup more than their initial investment, and those dying earlier will recoup less.

The table below summarises the key design features of each annuity.

Table 1 Key design features of LAs and GAs

| | Annuity | |
|---|---|---|
| | Guaranteed | Living |
| Longevity risk | Insured | Not insured |
| Value at death (life insurance) | No | Yes |
| Investment risk | No | Yes |
| Interest rate risk | At retirement | Within investments |
| Investments | Matched | Choice |
| Drawdown | $1/a_x$ | 2.5%–17.5% |

A common misconception is that the insurer profits when a member dies early. In practice, the insurer prices on the life expectancy of the entire pool, not on that of individual members. If the assumption is correct the insurer will be profit neutral, as proceeds from early deaths will perfectly offset the cost of the longer income stream payable to people who survive beyond the average life expectancy. The insurer only stands to profit if the average age at death is lower than the assumption used for the entire pool. Similarly, the insurer will experience losses if the average age at death

is higher than the assumption used in pricing. Given the high levels of uncertainty around mortality improvements, insurers tend to price conservatively. However fierce competition between insurers prevents the incorporation of excessive margins in the market price.

## 4. BREAKEVEN ANALYSIS

The factors which influence the ability of GAs and LAs to provide an income for life are the 17.5% cap on LAs; mortality credits in GAs; investment performance; drawdown rates; amount of retirement capital, interest rates and costs. Costs are considered in a later section, while the breakeven analysis focuses on the other factors, as illustrated below in Figure 1.

By holding all factors constant and varying each in turn, the analysis in this section compares the ability of an LA and a GA to provide an income for life, under the same circumstances.

Section 4.1 shows that the cap together with the exclusion of mortality credits results in the income provided by an LA falling short of that provided by a GA. Subsequent sections show to what extent the LA would need to outperform in other areas (e.g. investment performance) for the LA to break even with the GA.

Upon survival to a certain age x (x>65) a member with a GA would have received a certain amount of income to date, and would also be guaranteed a certain future income stream. Therefore for an LA to break even with the GA, the living annuitant must also be in the same position at age x as the member with the GA. In the context of this analysis, 'break even' means that a member who initially funds retirement with an LA and subsequently secures a future income stream by purchasing a GA at age x, should be in the same position as he would have been had he annuitised at age 65, i.e.:

| Guaranteed Annuity | | Living Annuity |
|---|---|---|
| Pooling | ? | Cap |
| Investment Returns | = | Investment Returns |
| Annuity Payment | = | Income Drawdown |
| Initial Capital | = | Initial Capital |
| Interest Rates | = | Interest Rates |

Figure 1 Breakeven framework

— he should not have suffered a shortfall in income (compared to the GA) at any point up to age x, and
— he needs to have sufficient capital available to purchase the income stream (from age x until death) that he would expect to receive under the GA.

In terms of actuarial notation, immediate annuitisation would secure a real income $P$ such that:

$$Pa^{i}_{65} = R1m$$

where:

$P$ = real pension (Rands p.a.)
$i$ = real investment return p.a.

However, someone deferring annuitisation 10 years to age 75 would need the following equation to hold in order to be in the same position as he would have been had he annuitised at age 65, i.e. to break even:

$$Pa_{\overline{10}|i} + Pa^{i'}_{75} v^{i}_{10} = R1m$$

where:

$P$ = real pension (Rands p.a.)
$i$ = real investment return p.a. during the deferment period
$i'$ = the future real investment return used by the insurer to calculate the cost of annuitising at age 75

The first term, $Pa_{\overline{10}|i}$ represents the cost of the pension certain payable for the first 10 years. Given that the pension is inflation-linked, real interest rates are used.

The second term, $Pa^{i}_{75} v^{i}_{10}$ represents the present value (PV) of the cost of annuitising at age 75, i.e. the cost of securing a future inflation-linked income from age 75 until death. The two terms need to add up to R1m in order to break even with a GA, which secures both income streams from the outset.

The variables in the equation are the level of real pension ($P$), the real investment return during the deferment period ($i$), the future real investment return ($i'$) and the amount of initial capital ($R1m$). This section varies each in turn to see what is required for the formula to hold, i.e. for the LA to break even with the GA.

### 4.1. Impact of the Cap and Pooling

Whilst not directly comparable, the cap on LA income and the use of pooling in GAs means that, other things being equal, the GA is better placed to provide a real income for life. This section shows that the cap distorts the income profile from an LA, since a

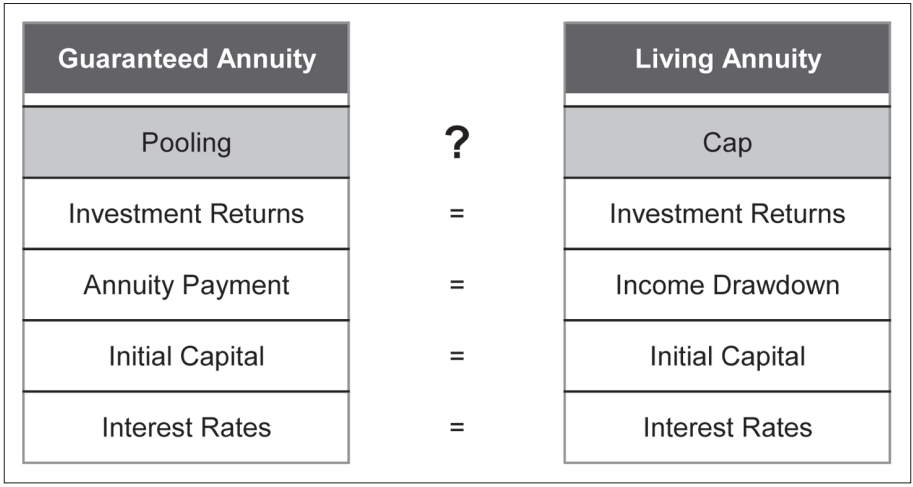


FIGURE 2 Breakeven framework: Impact of the drawdown cap and mortality pooling

member can never draw down all of his capital (Figure 2). By contrast, a GA does not have a cap and also benefits from mortality pooling, thereby enabling it to provide a more attractive expected income profile.

The income from an LA is subject to an annual maximum of 17.5% of the capital balance. This is imposed by South African legislation in an attempt to preserve capital and ensure a longer-lasting income. In practice the cap does tend to preserve capital, but at the expense of the LA's ability to provide an adequate retirement income for life. Once members reach the cap, they will experience a reduction in retirement income (unless subsequent net investment returns exceed the cap i.e. 17.5% p.a. or more).

Figure 3 shows the expected income profile for a living annuitant who invests R1m in an LA, starts with the same initial income as the GA and achieves the same 8% investment return as the GA. Initially, income from the LA increases as drawdown percentages are adjusted to keep pace with inflation (and the GA). However, as the income drawn increases, capital is eroded, leading to a larger percentage drawdown requirement in future years. Around age 75 in this example, the income requirement as a percentage of the LA capital balance exceeds the 17.5% cap. The member is subsequently limited to an income of 17.5% of a declining capital balance. This results in annual reductions in the income provided by the LA, compared to inflation-linked increases provided by the GA. Note that the income decreases in nominal terms, which makes matters worse in real terms and the member will not be able to maintain his standard of living.

By contrast, a GA is not subject to a cap and is therefore able to provide an income that consistently increases with inflation (Figure 4). Figure 5 (overleaf) combines the two preceding figures to enable a direct comparison.

For the same upfront investment and the same net investment returns, the

GA is able to provide a much more attractive income stream than the LA. The LA income profile is distorted by the cap on drawdowns. On the other hand, there is no such cap on a GA – as discussed earlier, the GA is designed to return all capital and investment returns, less expenses, by the expected age of death. A GA effectively allows a pensioner to 'drawdown' up to 100% of the actuarial reserve and more than 100% of the initial capital investment in later years, without the risk of running out of money. In addition, mortality credits enable the GA to provide higher incomes to those who survive longer, since fewer members are expected to survive until then. Therefore


FIGURE 3 Annual LA income by age

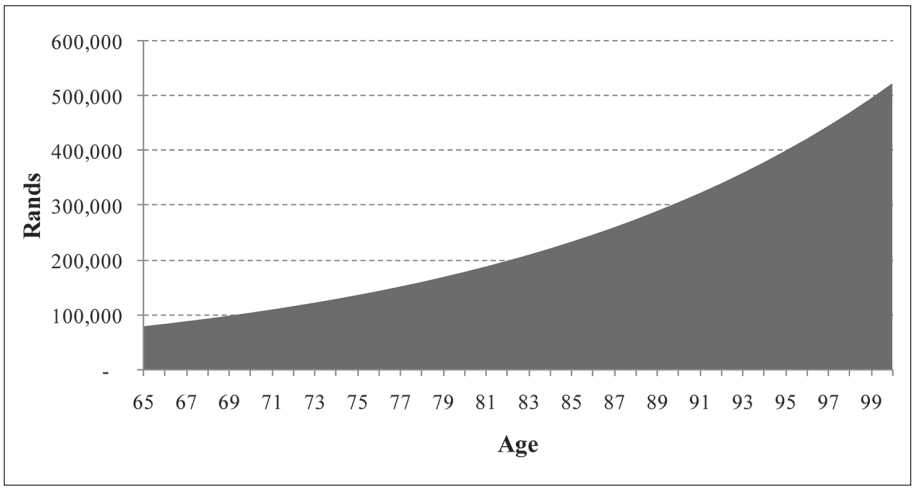


FIGURE 4 Annual GA income by age

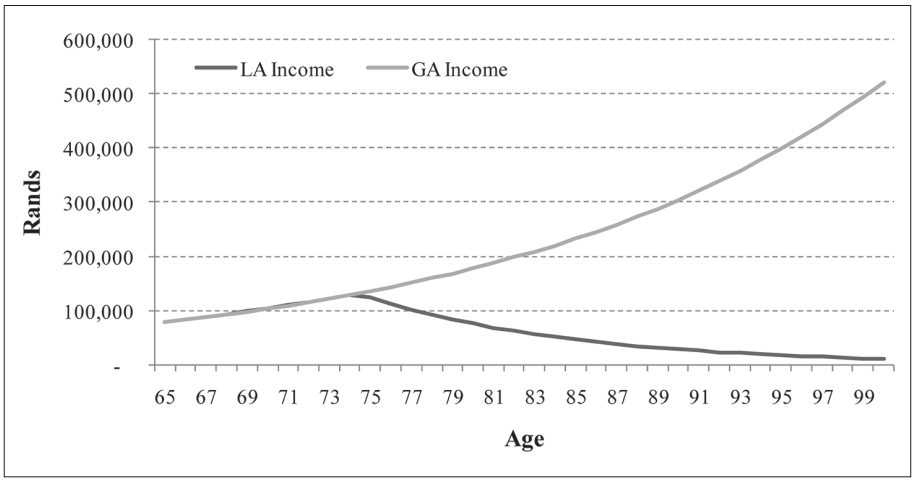


FIGURE 5 Annual LA versus GA income by age

members who live longer than expected effectively recoup more than 100% of their initial investment, whilst the maximum recouped from an LA is 100%.

### 4.2. Investment Performance

The preceding section showed that all things being equal, an LA is at a relative disadvantage compared to a GA in terms of its ability to provide a retirement income for life. This is for two reasons, namely, the 17.5% drawdown cap and the lack of mortality credits.

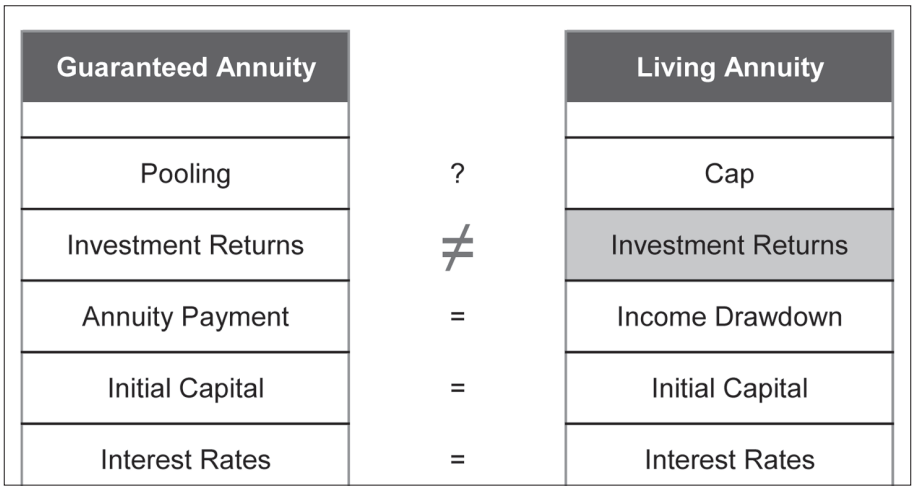


FIGURE 6 Breakeven framework : Variable LA investment returns

In practice, members often believe that they can easily outperform the net investment return achieved by insurers on the assets underlying a GA. For example, the underlying assets of an inflation-linked GA are typically invested in a low risk, cash-flow matched, inflation-linked strategy. Pensioners are easily persuaded by the argument that a well-constructed balanced portfolio, with a diversified equity component and managed by a well-known portfolio manager should outperform in the long run.

While this outperformance is possible, it is not without risk, and arguably members cannot afford to take such gambles with their retirement savings. This section shows what level of outperformance is required from the LA to enable it to provide the same income as a GA upon survival to different ages. Other factors are held constant (Figure 6).

In terms of the formula, the real investment return earned during the deferment period is varied to see what LA investment outperformance is required to break even upon deferment to different ages:

$$Pa_{\overline{10}|\tilde{i}} + Pa^{i}_{75}\, v^{\tilde{i}}_{10} = R1m$$

Note that the calculation ignores any interaction between $i$ and $i'$. In other words, there is no relationship between the pre- and post-annuitisation rates of return – investment performance in the deferment period ($i$) has no impact on the future investment return assumption used by the insurer when pricing annuities ($i'$).

The graph below (Figure 7) shows that someone who chooses to defer annuitisation by 10 years (to age 75) would need to generate investment outperformance of 3% p.a.

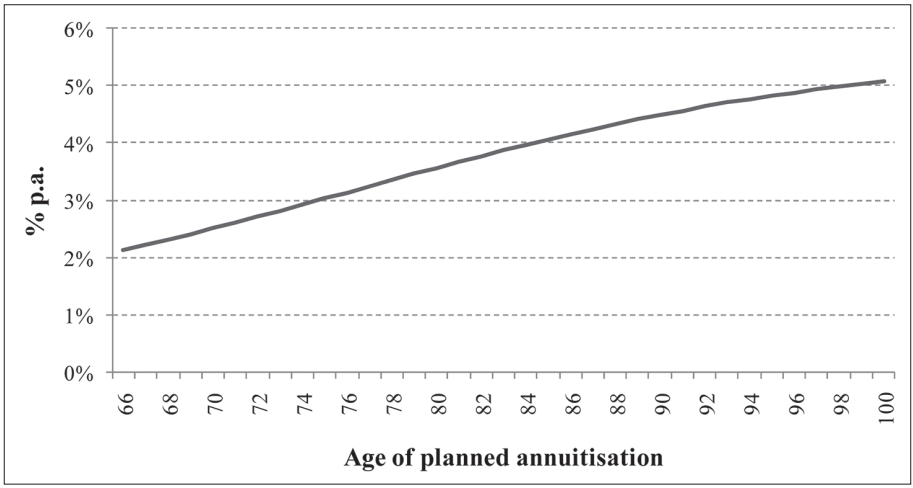


FIGURE 7 Annual LA investment outperformance required during deferment to break even at different ages

(c11% p.a. nominal) in each of those years, in order to break even with the GA. Given the real return assumption of 2.5% p.a., the LA will need to deliver CPI+5.5% p.a. for the average member in an LA who survives for 10 years after retirement. Over the very long term, equities have returned around CPI+7% p.a., with associated high levels of volatility. Arguably the recent financial crisis has caused a downward revision of future return expectations.

Note that the outperformance required must be achieved on a risk-free basis for the LA to truly break even with the GA. This is because the GA achieves this result without exposing the member to any investment risk (which is borne by the insurer). In reality this is not achievable – in a no-arbitrage world, risk-taking is a fundamental requirement for investment outperformance.

The living annuitant has the option to take on risk to generate the required outperformance. From the above it is clear that a member surviving for 10 years after retirement would need to take on almost the same level of risk as an 80% equity/20% cash portfolio.

The risk would carry an associated emotional burden. Retirees would need to take bets that place their financial wellbeing at risk, at an age where they are arguably less equipped to make such calls. All this to simply end up in the same position as they would have been had they annuitised at retirement.

The 3% can also be interpreted as the average value of the annual mortality credits that accrue to the holder of the GA over the 10-year period in the form of an additional 'investment return'. This additional 'return' is obviously only earned if the member survives.

Upon annuitisation at a later age, the member captures future mortality credits but has missed those of prior years. The longer the deferment, the greater the amount of mortality credits that are foregone. In addition mortality credits increase (in percentage terms) each year, reflecting the decreasing probability of survival in each year. As a result the graph above is upward sloping, reflecting the increase in the average outperformance required as higher and more mortality credits are foregone. The upward sloping shape means that there is no 'sweet spot' with regards to an optimal deferment period – it is best to annuitise at age 65.

### 4.3. Income Drawdown

Another way to ensure sufficient capital remaining at a future date to cover subsequent expected pension payments (equal to the cost of future annuitisation) is for the member to reduce the income drawn from the LA. This section holds the other variables constant while varying the LA drawdown to see what reduction in income is required to achieve this goal. The drawdown is also reduced to avoid hitting the 17.5% cap; however the effect of this was minimal with the cap only having an effect from age 96 and older (Figure 8).

In terms of the formula, the variable in this instance is the pension drawn during the deferment period (not the pension secured at the point of annuitisation, i.e. not the

| Guaranteed Annuity | | Living Annuity |
|---|---|---|
| Pooling | ? | Cap |
| Investment Returns | = | Investment Returns |
| Annuity Payment | ≠ | Income Drawdown |
| Initial Capital | = | Initial Capital |
| Interest Rates | = | Interest Rates |

FIGURE 8 Breakeven framework: Variable LA income drawdown

second $P$ in the formula, which is set to equal that due from an equivalent GA):

$$Pa_{\overline{10}|i} + Pa^{i}_{75}\, v^{i}_{10} = R1m$$

Figure 9 shows the reduction in initial income required (as a percentage of GA income) to achieve this.

With the same initial investment and investment returns, a member deferring annuitisation to age 75 would need to draw 68% of the GA income in every year

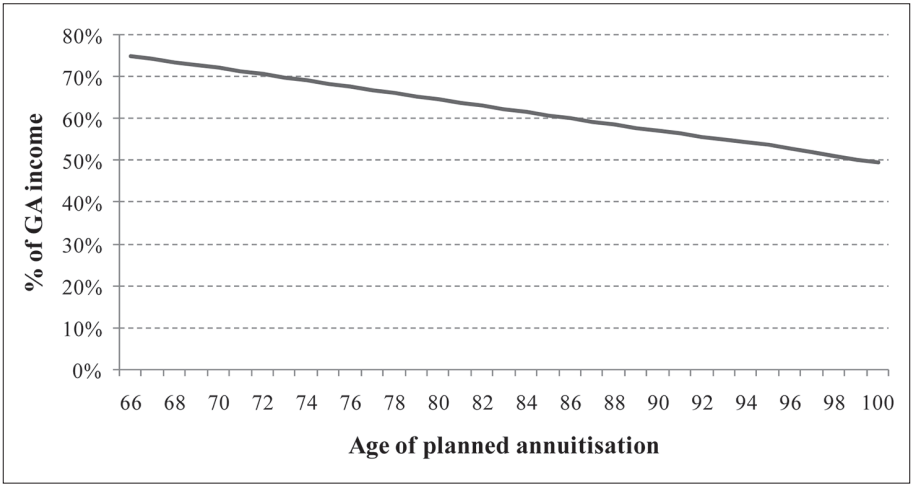


FIGURE 9 Pre-annuitisation LA income as a percentage of GA income

during the deferment period to ensure a sufficient capital balance in 10 years to secure the same subsequent income as is expected from a GA. Note that in this instance, the member is not truly breaking even as per the definition in section 4.1., since he has suffered an income shortfall in the deferment period. However, the 32% reduction in income is analogous to the 3% outperformance discussed in 4.2. above, in that it is another way a living annuitant can compensate for the loss of mortality credits.

### 4.4. Additional Capital Investment

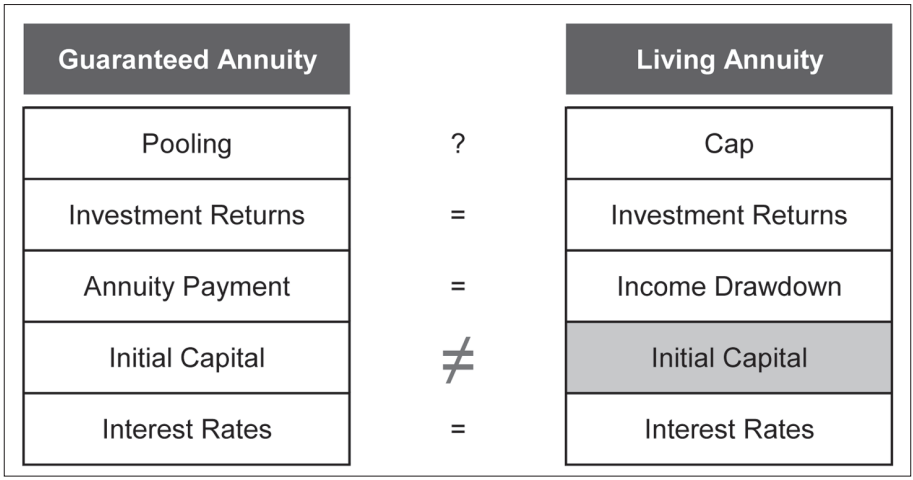


FIGURE 10 Breakeven framework: Variable LA capital investment

If investment outperformance or a reduction in income is not possible, another option to compensate for the loss of mortality credits is for the living annuitant to simply pay for it by way of an additional capital injection at retirement. This additional amount will be called on to top up income shortfalls in the deferment period as a result of hitting the LA drawdown cap. It will also be called on to subsidise any capital deficit at the time of annuitisation. Note that tax considerations have been ignored for the purposes of this illustration (Figure 10). The relevant variable being considered in the formula is the amount of initial capital, i.e.:

$$Pa_{\overline{10|}i} + Pa^{i'}_{75} v^{i}_{10} = R1m$$

The cap on LA income leads to an income shortfall compared to the GA at later ages. The graph below (Figure 11) shows the amount of extra capital (as a percentage of initial retirement savings) that would need to be held to subsidise the cumulative LA income deficit at each age. This can be thought of as the cost of 'cap insurance'.

Up to age 75, there is no income shortfall since the LA income is able to keep up

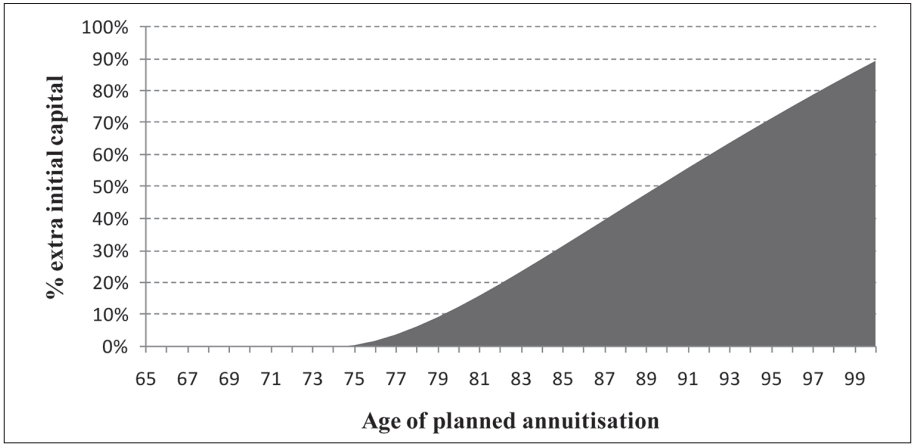


FIGURE 11 Percentage additional initial retirement saving required to compensate for the effect of the cap on cumulative LA income

with the GA income, by drawing an increasing percentage of capital. However, once the cap hits, LA income is limited to 17.5% of the (declining) capital balance. This results in an increasing and cumulative income shortfall over time. Figure 11 shows that if a living annuitant survives to age 80, he would have needed an additional 12% of capital upfront (at age 65) to fund the cumulative income deficit up until age 80.

This additional capital (cap insurance) enables the investor to compensate for the income that was lost to date as a result of the cap on LAs compared to the income received from a GA. However, during the deferment period the investor also loses out on mortality credits, which is reflected in the increasing cost of annuitisation, i.e. purchasing, at an older age, the same future income stream that is expected from a GA. Additional capital is therefore required to fund for the lost mortality credits. The cost of annuitising at each age is equal to the actuarial reserve at that age.

Figure 12 (overleaf) illustrates the PV of the GA actuarial reserve, which represents the cost of purchasing a future real income stream ($P$) at each age. It also shows the PV of the LA capital balance. The actuarial reserve initially runs down more slowly than the LA capital, since GA payments are only made to those members who survive (so, if there were 100 members at the start and 5 died, the average payment would be $0.95P$). If a living annuitant survives, however, his capital balance will initially run down by the full annuity payment ($P$). The difference of $0.05P$ represents the mortality credit 'earned' by the GA (foregone by the LA) over the period.

Once the drawdown cap kicks in, the LA payments will be forced to decrease to less than $P$, so the rate of LA capital erosion will reduce. This is represented by a flattening out of the black line from age 75.

The grey line represents how much a member needs to annuitise at each age, and the black line shows how much he actually has. The difference is the capital shortfall,

which is a function of mortality credits lost during deferment and the effect of the drawdown cap. This shortfall is represented below in Figure 13.

Combining the capital required to fund both, the income and capital shortfalls yield the result shown in Figure 14.

Someone deferring annuitisation to age 75 would need 20% more capital upfront, i.e. R1.2m in retirement savings instead of R1m. Note that there would be

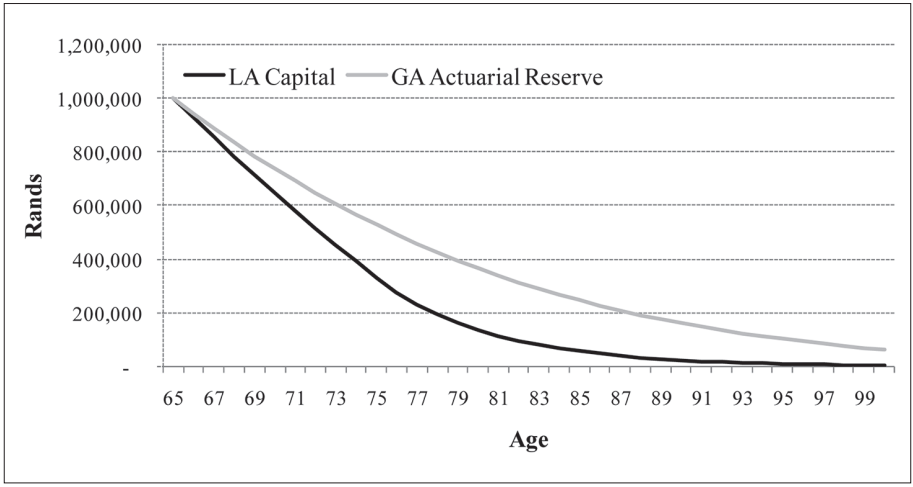


FIGURE 12 PV of actuarial reserve and LA capital by age

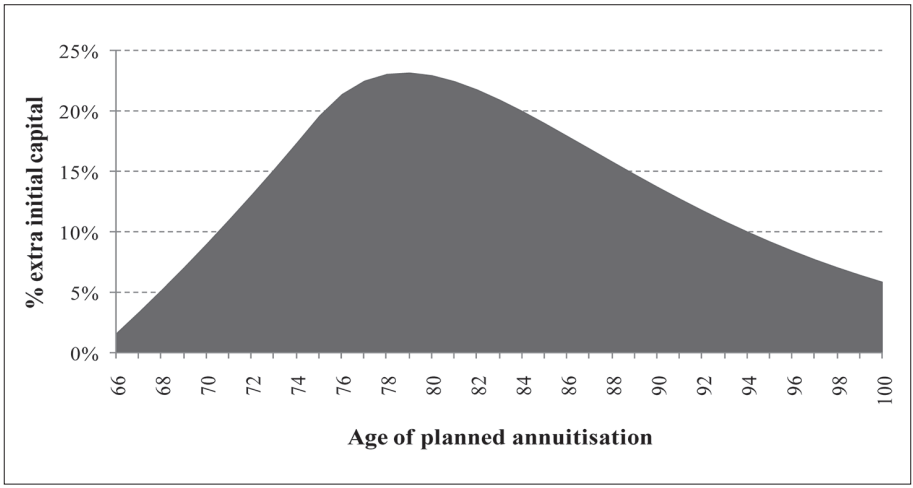


FIGURE 13 Percentage additional initial retirement saving required to compensate for the loss of mortality credits and the effect of the drawdown cap during deferment to different ages

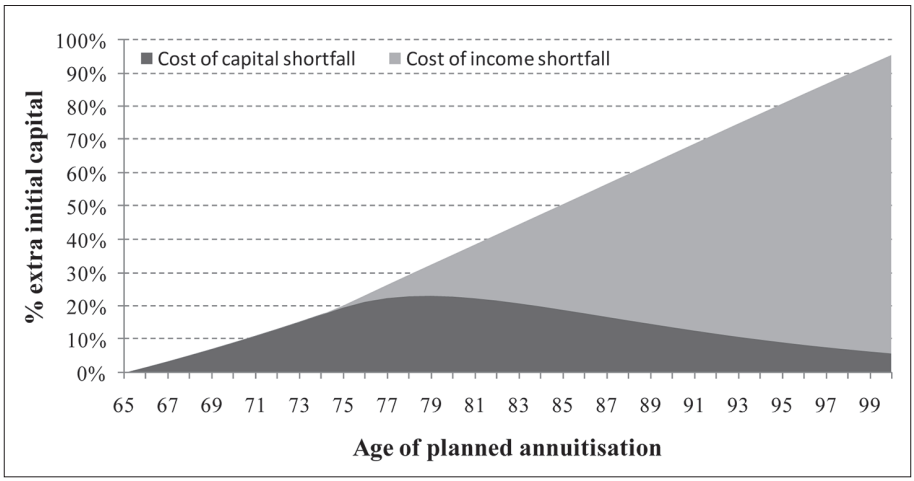


FIGURE 14 Total additional initial LA capital required to break even upon deferment of annuitisation to different ages

a benefit from the additional capital allocation upon death of the member, i.e. an amount payable to beneficiaries, which the GA does not provide.

### 4.5. Changes in Interest Rates

Some members delay annuitisation in the hope that interest rates will increase in future, thereby making it cheaper to annuitise. However, the member loses out on mortality credits in the interim. Holding other variables constant, this section considers the

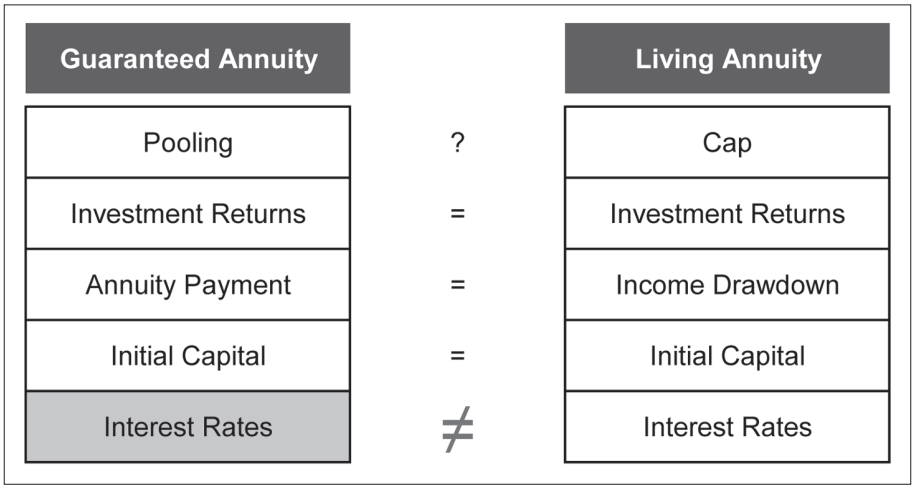


FIGURE 15 Breakeven framework: Variable future interest rates

extent to which interest rates need to increase in order for the LA to break even with the GA.

In terms of the formula (Figure 15):

$$Pa_{\overline{10}|i} + Pa_{75}^{i'} v_{10}^{i} = R1m$$

The calculation makes the simplifying assumption that interest rates increase instantaneously at the point of annuitisation, i.e. returns prior to annuitisation ($i$) are not affected by the increase in $i'$.

Figure 16 shows the increase in real interest rates required to break even upon deferred annuitisation to different ages, and compares this to the market view implied by the current risk-free yield curve.

The graph is exponential, with a 2% increase required for a 5-year deferment, while an 87% increase is required to break even over a 14-year deferment. For periods longer than this, no change in real interest rates is able to compensate for the mortality credits that have been lost. Other things being equal, a member who defers annuitisation by more than 14 years cannot rely on an increase in interest rates to break even.

Continuing the example of the member who defers annuitisation to age 75, real rates would need to increase from 2.5% to 13.2% in order for him to break even.

The graph in Figure 17 zooms in on the first six years.

This shows that the annuitant could potentially break even by deferring annuitisation two to three years. However, this is only if interest rates move as expected. In other words the annuitant must bear the risk of adverse movements in interest rates. Indeed, recent trends overseas indicate that not only can the low interest rate

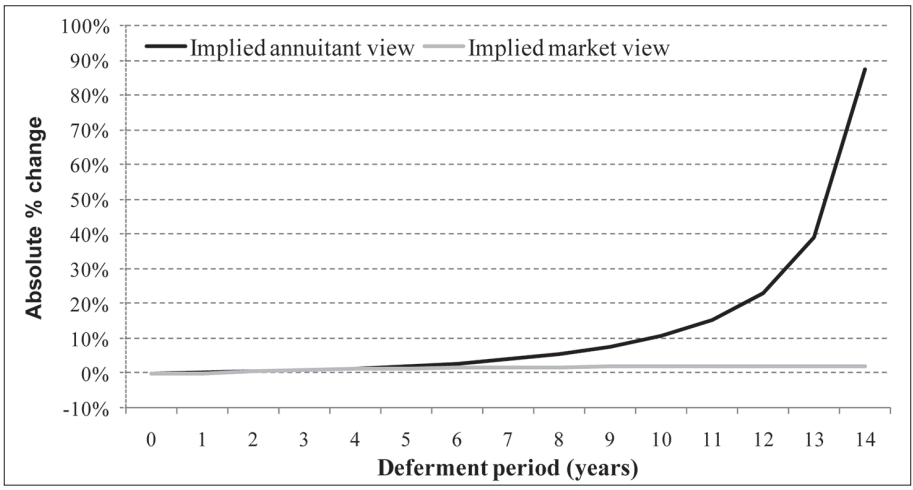


FIGURE 16 Absolute increase in real interest rates required to break even

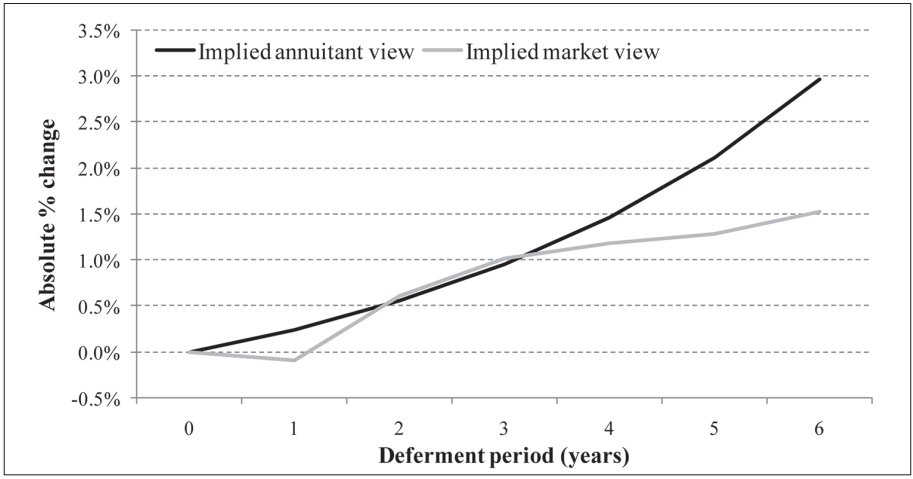


FIGURE 17 Absolute increase in real interest rates required to break even for periods up to six years

environment persist, but real yields can in fact decrease to levels previously thought unimaginable.

### 4.6. Summary of Breakeven Analysis

The breakeven analysis shows that by design a GA is better equipped to provide an income for life than an LA. In addition, the sooner the GA is purchased the greater the total mortality credit that is captured, with the benefit flowing through to the annuitant. For example, someone who defers the purchase of a GA by 10 years would need any one of the following in order to break even:

— 3% p.a. investment outperformance in each of the 10 years, on a risk-free basis;
— a 32% reduction in income for 10 years;
— 20% additional retirement savings; or
— an increase in real interest rates from 2.5% to 13%.

## 5. LIVING ANNUITY LIFE INSURANCE

An LA can be broken down into two underlying components, one that provides retirement income whilst the member is alive, and another that pays a life insurance benefit at death. Upon survival to a certain age a member will receive an income benefit in the form of a drawdown. Upon death at a certain age, beneficiaries receive the remaining capital balance. The latter in fact represents life insurance with a sum assured that (typically) decreases as capital is drawn down to fund retirement spending (Figure 18 overleaf).

Note that the sum assured decreases in both nominal and real terms. There are limited instances in which a decreasing sum assured profile is economically justifiable

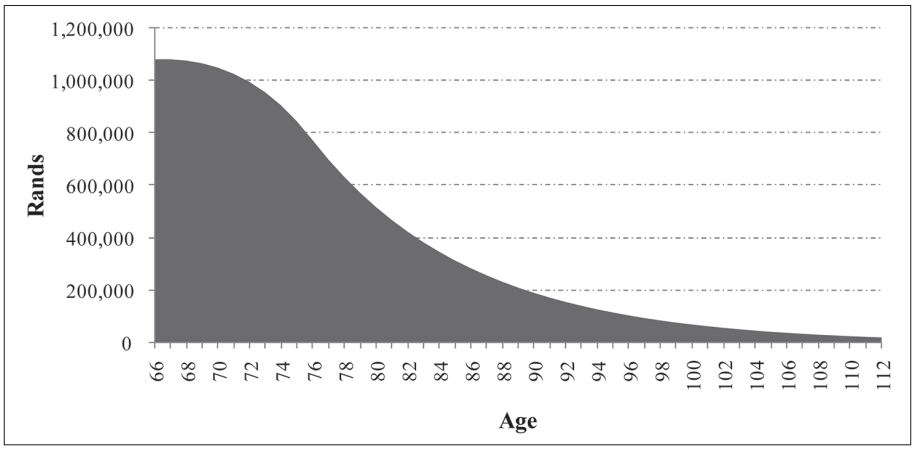


FIGURE 18 Sum assured profile of LA life insurance

e.g. in practice members are likely to prefer a sum assured which increases in line with inflation. As discussed earlier, the life insurance cover tapers off around the same time as when a member can expect income to start decreasing, thereby rendering him financially dependent on the very beneficiaries he hoped to provide for.

Arguably, a member's bequest motive can be more suitably addressed by purchasing separate life insurance cover, the profile of which can be tailored to his specific requirements. In practice this is seldom done as members of retirement age find the explicit cost of life insurance too expensive. However, by purchasing an LA, members are implicitly paying the same life insurance premium.

The implicit cost of the life insurance is equal to the expected PV of the future death benefits illustrated in Figure 18. This cost is funded by a reduction in expected future income. For the member in question and under the assumptions outlined in Section 2, approximately 24% of his retirement savings will be used to pay for the life insurance component of the LA (Figure 19). In other words, it would cost R241k to buy life insurance with a sum assured profile shown in Figure 18 and R759k to purchase the income profile in Figure 3, i.e. see Figure 20.

Assuming that the R759k/R241k split reflects the member's relative preference for retirement income and a capital bequest, an alternative is to buy the retirement income and life insurance components separately, for the same respective costs. Any combination of the two components can be purchased (subject to the cost constraint). One example would be to spend R759k on an inflation-linked GA with an initial income of R60.8k p.a. and R241k on life insurance cover for an amount of R371k, which also increases with inflation (Figure 21).

The problem with this approach is that to avoid hitting the cap, an explicit reduction in initial income is required – from R80k p.a. to R60.8k p.a. – a reduction of 24% which reflects the 24% spent on life insurance.

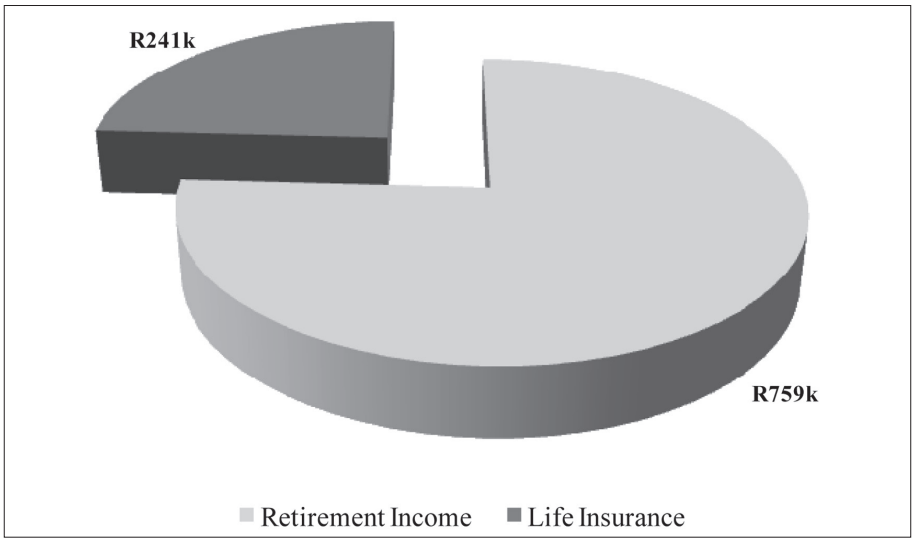


FIGURE 19 Cost of LA life insurance

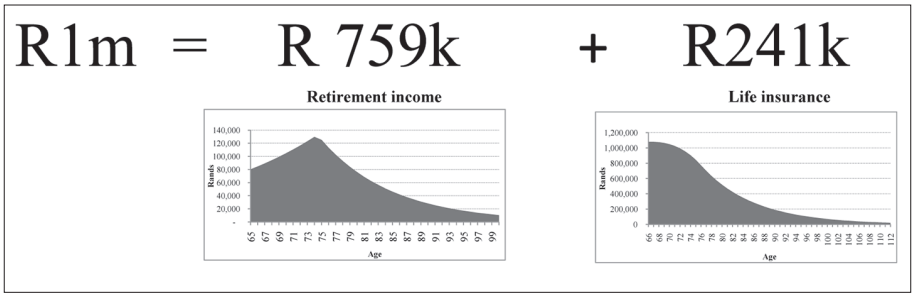


FIGURE 20 Profile of retirement income and life insurance embedded in the purchase of an LA

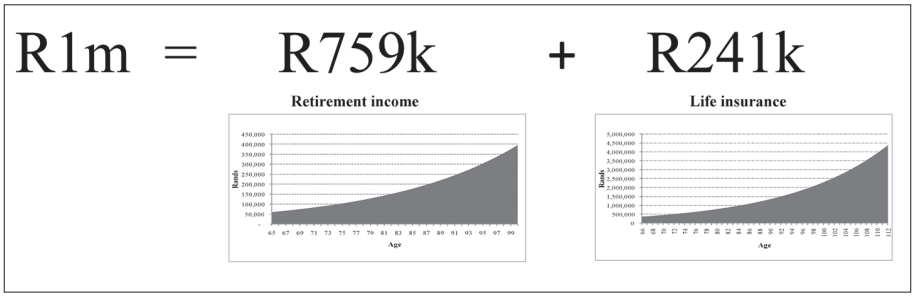


FIGURE 21 Alternative retirement income and life insurance profiles that can be purchased for the same relative split as implied by an LA

In other words, the effect of the life insurance component is to reduce the amount available to provide for retirement income, which is why the LA is less able to pay the income profile expected from a GA. With the GA, the entire R1m is used to fund retirement income. In terms of the above framework:

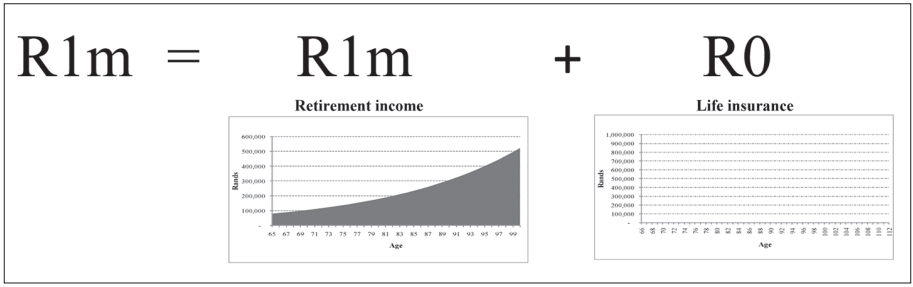


FIGURE 22 Profile of retirement income that can be purchased upon exclusion of life insurance

Overlaying the retirement income elements of Figures 21 and 22 yields the retirement income profiles illustrated in Figure 23. The grey line reflects the higher retirement income that can be obtained if the retiree is willing to forego the purchase of life insurance. It is 32% higher than the black line at all ages and equivalently the black line represents 76% of the grey line. In other words, the R241k of retirement savings spent on life insurance equates to a 24% reduction in annual retirement income.

The popularity of LAs hinges around the fact that residual capital is available

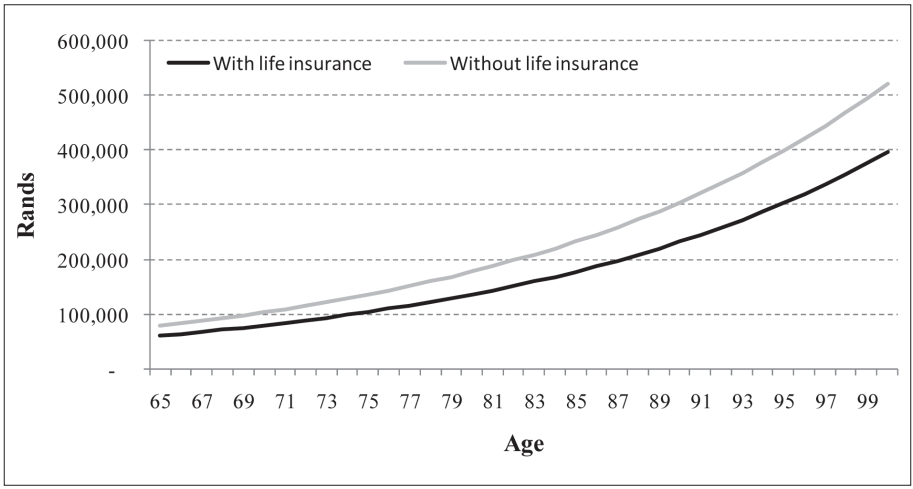


FIGURE 23 Retirement income profiles obtainable with and without the purchase of life insurance

upon death. However, this section has shown that members might not appreciate that there is an associated cost of this life cover, albeit implicit, which is paid for by way of a sacrifice in expected retirement income.

## 6. RECOUPING CAPITAL AND RETURNS FROM A GUARANTEED ANNUITY

A key fear that is cited with GAs is that the member loses his capital upon early death. There is a common misunderstanding that the life insurer profits from this, instead of using the capital to provide for those who survive longer than average. As explained earlier, the insurer's profits are only affected if it gets the average mortality assumption for the entire pool incorrect. While insurers do price conservatively to allow for margins of error in assumptions, fierce competition in the guaranteed space means that pricing is efficient.

Figure 24 below shows that a member can expect to recoup 100% of his capital investment and returns thereon within the first 15 years of a GA.

A member who dies before the average life expectancy from retirement (i.e. 15 years to age 80) will secure a better return from an LA, as he (and his beneficiaries) will recoup the entire initial investment together with investment returns. This is achieved through a combination of income drawdowns during the member's lifetime and a capital payment at the time of his death. A living annuitant is guaranteed a return of 100% of capital plus returns less fees. The age at death determines the split of this recovery between retirement income and capital death benefit.

On the other hand the LA becomes problematic for members surviving beyond age 80. The increased number of drawdowns means that capital is eroded. This in turn means that the LA is able to provide neither an ongoing real income stream nor

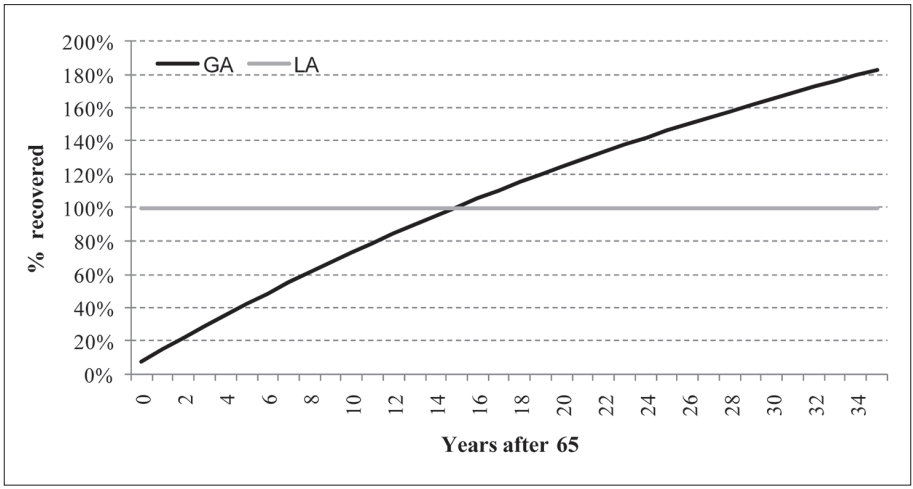


FIGURE 24 Percentage of capital recovered from an LA and a GA at each age

a meaningful death benefit upon survival past a certain age. This could quite possibly leave the member facing destitution.

Compared to an LA, a member with GA needs to survive to each age to recoup his investment. A GA is designed to return 100% of capital and investment returns less fees upon survival to the average life expectancy. In this example the annuitant will recoup 50% of capital and returns after 6.5 years, and 100% after 15 years. Upon survival beyond this point, the merits of a GA become clear, as annuity payments continue such that the member in fact gets more than 100% of his capital and investment returns back. This is possible because of mortality pooling.

In practice, members tend to give significant weight to the LA capital balance at death. However, an equal weight should be awarded to the GA's ability to provide a higher expected income, since the two are actuarially equivalent.

## 7. COSTS

This section provides a brief overview of fee considerations in LAs and GAs. However it is not exhaustive and annuity fee structures are recommended as an area for further research.

The cost structure of LAs and GAs can be broken down into multiple underlying components. Both involve upfront commission to the adviser (capped at 1.5% plus VAT), a charge for administration and a fee for asset management (typically higher for LAs as they are subject to retail fee scales). In addition GAs include a charge for the guarantees provided, and LAs involve fees payable to intermediaries for ongoing financial advice.

The bulk of GA fees are in respect of the investment and mortality guarantees provided by the insurer. The onerous nature of these guarantees (especially mortality) means that the insurer has to hold capital to back them. The cost of servicing this capital is high. In addition, the insurer is likely to price conservatively, for example reflecting the uncertainty around mortality improvements. Finally, low current yields on inflation-linked bonds and the recent inclusion of South African bonds in the Citibank index have reduced their yields. Together, the cost of the guarantees, conservative pricing and low yields achievable on matching assets mean that GAs can be expensive.

On the other hand, LAs do not provide investment or mortality guarantees so therefore avoid these charges. This saving is countered by the fact that LAs typically involve an ongoing fee payable to intermediaries for financial advice, e.g. asset allocation, drawdown rates and manager selection. This fee is negotiated with the intermediary, but can be up to 1% p.a. plus VAT. The advice fee is not relevant in a GA where the insurer takes responsibility for management of the assets. The existence of an ongoing advice fee makes the sale of an LA more profitable for an intermediary than the sale of GAs. At the extreme this could encourage unethical behaviour, e.g. where an intermediary convinces an investor to buy an LA even though it is not the most appropriate solution.

A reasonable compromise between GAs and LAs can be found in With-Profit Annuities (WPAs), which are a type of GA in that they guarantee an income for life. However they target, but do not guarantee increases equal to a proportion of inflation, depending on the category of WPA selected. Mortality is pooled in that the mortality experience is shared amongst members of the pool. The insurer's risk is significantly reduced, in that the provider is only exposed to mortality to the extent that adverse experience cannot be clawed back from future investment returns. The less onerous nature of the guarantees means that less capital is required to service them and that the insurer is able to price on a less conservative basis. The benefits of reduced capital requirements and less conservative pricing flow back to policyholders in terms of reduced charges. In addition, WPAs overcome the need for an ongoing advice fee since the insurer manages the underlying assets.

While WPAs do not guarantee inflationary increases, members are guaranteed that the nominal pension will not reduce. Moreover, the nature of WPAs facilitates investment in more aggressive investment strategies. This provides scope for upside member participation in strong investment returns that can translate into increases in excess of inflation over the long term.

## 8. REGULATION

### 8.1 South Africa

The old Life Offices' Association of SA (LOA) Code on Living Annuities (CLA) was introduced in June 2008 and aimed to ensure 'a meaningful income that is sustainable for life'. It explicitly recommended drawdown rates for LAs, based on the average compulsory single life annuity with no guarantee terms and a 5% escalation rate.

Table 2 Old LOA Code on Living Annuities – recommended drawdowns[2]

| | Indicative linked annuity rates | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 55 | 60 | 65 | 70 | 75 | 80 | 85 |
| Male | 5.5% | 6.2% | 7.3% | 8.7% | 10.7% | 13.5% | 17.5% |
| Female | 4.8% | 5.4% | 6.2% | 7.3% | 8.9% | 11.2% | 14.6% |

Subsequent to CLA, there were multiple complaints of financial hardship from LA pensioners to various adjudicators and ombuds. In addition ASSA research papers suggested it was usually unwise to withdraw more than 5% of capital. In response, ASISA issued new regulations – the ASISA Standard on Living Annuities (SLA) – effective March 2012 with lower indicative drawdown rates as the guiding principle.

2 Source: LOA Code of Conduct. Chapter 21: Code on Living Annuities

Table 3 New ASISA regulation[3]

| Years before your income will start to reduce | | | | | | |
|---|---|---|---|---|---|---|
| | | Investment return per annum (before inflation and after all fees) | | | | |
| Annual income rate selected at inception | | 2.5% | 5% | 7.5% | 10% | 12.5% |
| | 2.5% | 21 | 30 | 50+ | 50+ | 50+ |
| | 5.0% | 11 | 14 | 19 | 33 | 50+ |
| | 7.5% | 6 | 8 | 10 | 13 | 22 |
| | 10.0% | 4 | 5 | 6 | 7 | 9 |
| | 12.5% | 2 | 3 | 3 | 4 | 5 |
| | 15.0% | 1 | 1 | 2 | 2 | 2 |
| | 17.5% | 1 | 1 | 1 | 1 | 1 |

The SLA is arguably quite confusing to the average member, and the former approach which directly recommended an appropriate drawdown is preferable. The maximum drawdown percentage is capped at 17.5% for all ages and investment returns.

### 8.2 United Kingdom

The UK Government Actuary's Department (UK GAD) specifies the maximum drawdown percentage as a function of age and returns.

Table 4 2011 UK GAD pension drawdown tables[4]

| GILT INDEX YIELD | 6.00% | 6.25% | 6.50% | 6.75% | 7.00% | 7.25% | 7.50% | 7.75% | 8.00% |
|---|---|---|---|---|---|---|---|---|---|
| 65 | 8.0% | 8.2% | 8.4% | 8.6% | 8.8% | 8.9% | 9.1% | 9.3% | 9.5% |
| 66 | 8.2% | 8.4% | 8.5% | 8.7% | 8.9% | 9.1% | 9.3% | 9.5% | 9.7% |
| 67 | 8.3% | 8.5% | 8.7% | 8.9% | 9.1% | 9.3% | 9.5% | 9.6% | 9.8% |
| 68 | 8.5% | 8.7% | 8.9% | 9.1% | 9.3% | 9.4% | 9.6% | 9.8% | 10.0% |
| 69 | 8.7% | 8.9% | 9.1% | 9.3% | 9.5% | 9.6% | 9.8% | 10.0% | 10.2% |
| 70 | 8.9% | 9.1% | 9.3% | 9.5% | 9.7% | 9.9% | 10.0% | 10.2% | 10.4% |
| 71 | 9.2% | 9.4% | 9.5% | 9.7% | 9.9% | 10.1% | 10.3% | 10.5% | 10.6% |
| 72 | 9.4% | 9.6% | 9.8% | 10.0% | 10.2% | 10.3% | 10.5% | 10.7% | 10.9% |
| 73 | 9.7% | 9.9% | 10.1% | 10.3% | 10.4% | 10.6% | 10.8% | 11.0% | 11.2% |
| 74 | 10.0% | 10.2% | 10.4% | 10.6% | 10.8% | 10.9% | 11.1% | 11.3% | 11.5% |
| 75 | 10.4% | 10.6% | 10.8% | 10.9% | 11.1% | 11.3% | 11.5% | 11.7% | 11.9% |
| 76 | 10.8% | 11.0% | 11.2% | 11.3% | 11.5% | 11.7% | 11.9% | 12.1% | 12.3% |
| 77 | 11.3% | 11.4% | 11.6% | 11.8% | 12.0% | 12.2% | 12.3% | 12.5% | 12.7% |
| 78 | 11.8% | 11.9% | 12.1% | 12.3% | 12.5% | 12.7% | 12.8% | 13.0% | 13.2% |
| 79 | 12.3% | 12.5% | 12.7% | 12.9% | 13.0% | 13.2% | 13.4% | 13.6% | 13.8% |
| 80 | 12.9% | 13.1% | 13.3% | 13.5% | 13.6% | 13.8% | 14.0% | 14.2% | 14.4% |
| 81 | 13.6% | 13.8% | 14.0% | 14.1% | 14.3% | 14.5% | 14.7% | 14.9% | 15.1% |
| 82 | 14.3% | 14.5% | 14.7% | 14.9% | 15.0% | 15.2% | 15.4% | 15.6% | 15.8% |
| 83 | 15.1% | 15.3% | 15.5% | 15.6% | 15.8% | 16.0% | 16.2% | 16.4% | 16.6% |
| 84 | 15.9% | 16.1% | 16.3% | 16.5% | 16.7% | 16.9% | 17.0% | 17.2% | 17.4% |
| 85 or over | 16.9% | 17.0% | 17.2% | 17.4% | 17.6% | 17.8% | 18.0% | 18.1% | 18.3% |

3 Source: ASISA Standard on Living Annuities. www.asisa.org.za/index.php/members/standards.html
4 Source: www.hmrc.gov.uk/pensionschemes/gad-tables.htm. 2011 Drawdown pension tables

### 8.3 Regulations compared: UK versus South Africa

Figure 25 below compares the maximum permissible drawdown percentage in the UK and South Africa at an 8% return.

The graph shows that the UK is much stricter than South Africa in that the maximum permissible UK drawdown is significantly lower than in South Africa at younger ages. In addition, the UK cap is a function of both, age and investment returns. The lower cap slows down the rate at which capital can be eroded, thereby making the UK approach better placed to achieve the objective of ensuring a sustainable income for life.

The more lenient South African approach is compounded by the fact that there is minimal pensioner support from the government in South Africa, compared to the UK which has a comprehensive social security programme.

It is therefore recommended that South African legislation be revisited with a view to providing more prescriptive guidance on recommended drawdown rates. Consideration should be given to lowering the level of the cap, however this needs to be balanced with the distortions associated with the cap that were outlined in earlier sections. In addition, the recommended and maximum drawdown rates should be a function of both interest rates and age, as is the case in the UK. Finally, the merits of full or partial compulsory annuitisation should be explored as a way to ensure a sustainable income for life.

## 9. CONCLUSION

The analysis above shows that, subject to the framework outlined in Section 2, and for members in average to above average health, a GA is better equipped to provide

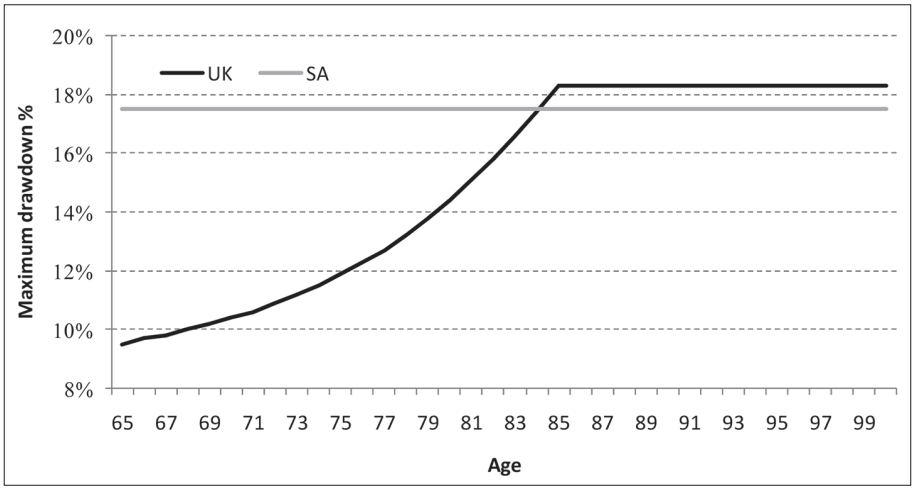


FIGURE 25 UK versus SA maximum LA drawdown percentages at each age for an 8% yield

a real income for life. LAs are still a suitable choice for impaired lives who expect to die early and for extremely wealthy retirees with access to other retirement savings. However, sales of LAs indicate that they have been sold to the majority of retirees, the implication being that they are sold to members outside of these two groups. Arguably, many consumers opting for LAs have done so without full insight to the underlying nature of the product. For example, the bequest motive can be more appropriately addressed through the use of explicit life insurance.

The evidence points to a significant risk facing living annuitants, the actuarial profession, regulators and the financial services industry as a whole. The threat to living annuitants is that they outlive their retirement capital and are faced with destitution. The matter is compounded in South Africa where there is limited state support for pensioners. The government is at risk of a heavier burden in terms of increasing pressure for pensioner support. There is a reputational risk to the financial services industry which will come under pressure e.g. through claims of mis-selling.

It is therefore a matter of urgency that industry participants be proactive by acknowledging this threat and developing and implementing practical risk mitigation strategies. These should include proper disclosure, improved regulation, product development and sound advice.

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