


RETIREMENT GUARANTEES— ARE THEY WORTH IT?

WHITE PAPER

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EXECUTIVE SUMMARY

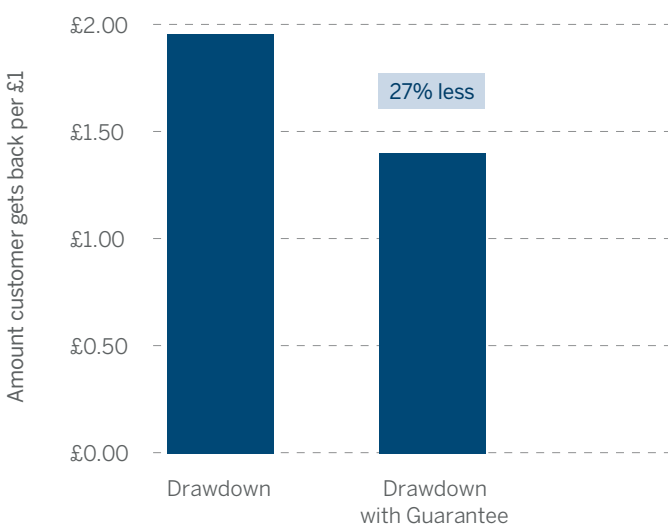
Freed from the constraints of compulsory annuity purchase, customers in the UK retirement market have entered a brave new world of choosing for themselves which retirement product is best for them. However, this is no easy task. The UK retirement market is now home to a diverse and growing range of products. These products provide different benefits, different levels of financial freedom and security, and they come at a wide range of prices.

Faced with an uncertain future and a desire to enjoy a worry-free retirement, many customers are drawn to the peace of mind that a guarantee provides. But is it really a case of ‘better safe than sorry’?

To answer this fundamental question, Milliman’s actuarial and financial risk management teams have carried out a unique quantitative review of retirement guarantees under an extensive set of different economic and market conditions. We modelled the main types of income guarantee currently offered in the UK retirement market to find out how much customers really stand to benefit from the guarantees that they are paying for. The results of our analysis were clear.

A product with only a modest guarantee could return around 30% less over the average retiree’s lifetime than a similar product with no guarantees

Average results over example customers



THERE’S NO SUCH THING AS A FREE LUNCH

Many customers intend to have an active retirement with aspirations requiring an income beyond just meeting the cost of basic living expenses. However, customers are at risk of making themselves unnecessarily poorer and need to consider carefully whether a guarantee offers them good value for money.

- **Guarantees can make customers poorer –**
The higher charges and more conservative investment strategies associated with retirement guarantees could significantly reduce the amount of money the retiree will receive.

We found that a product with only a modest guarantee could return around 30% less over the average retiree’s lifetime than a similar product with no guarantees. This can significantly reduce the extent to which customers can spend money on ‘extras’ above their basic living expenses.

- **Guarantees don’t always provide a benefit –**
For some products, investment performance has to deteriorate considerably and stay that way for some time for the guarantees to actually provide more income than a product without a guarantee.

Our analysis showed, for example, that for a retiree twenty years into their retirement (age 85), there is roughly a 1-in-7 chance that a typical index-linked annuity (which offers a very high level of protection) will be providing the same or a higher level of income than a drawdown product with no guarantee. Before age 85 the chance of benefiting financially from the guarantee is lower but after age 85 it increases quickly.

The benefit of the guarantee also depends on the customer’s spending patterns. We found that guarantees provide the greatest benefit to customers who spend their savings pot relatively evenly across their retirement.

Guaranteed products tend to provide customers with a steady income, therefore customers who intend to spend the majority of their savings early in retirement receive very little benefit from a guarantee. Those who intend to spend less in early retirement to allow for increased expenses associated with later life may unfortunately find that the level of income provided by a guaranteed product provides only a fraction of the income they need.

NO 'ONE SIZE FITS ALL'

There is no single retirement product (or combination of products) currently available that will satisfactorily meet all customers' preferences for income, security, flexibility and value for money. Every retiree will have different priorities, concerns and income requirements. Furthermore, these factors are not fixed and will shift over the course of retirement.

Our example customers, against whom the retirement products were assessed, each had different priorities for retirement spending, whether that was wanting to treat themselves to a cruise or to be more frugal in anticipation of potential care costs in later life. Our analysis showed that there was no single product in our review that met each of our example customer's requirements.

RETAINING FLEXIBILITY CAN BE KEY

Retirement guarantees can significantly constrain the degree to which the customer's income can be varied in retirement. And yet retaining flexibility to vary both the level of income and the level of protection (its type, timing and extent) can be crucial to effectively managing the ups and the downs that come with retirement.

We found that the products with the greatest guarantees also had the least amount of freedom. These products are therefore less suited to coping readily with the changing needs of real life. By purchasing such products, customers could be in danger of locking themselves into something that might not meet their needs later in retirement.

HANDLE WITH CARE

Under adverse market conditions, guarantees can offer valuable protection, but this comes at a cost which has both financial and non-financial aspects. Customers need to be careful not to over insure themselves with guarantees. It is important to consider that the average 'middle-Britain' retirement customer will typically have a full state pension and some defined benefit income alongside their defined contribution pot. The state pension alone currently amounts to approximately £8,000 a year, so with some defined benefit income this should provide enough retirement income to cover basic needs. Therefore, before purchasing guarantees customers should consider carefully how much of their income they really need to protect, when and for how long they will need protection. Also important is how the guarantees could affect the level of income they receive along with their ability to vary it.

On average the products with the highest guarantees provided a significantly lower return

The likelihood of guaranteed products providing a benefit to consumers in the form of a higher income can be smaller than many perceive

Customers need to be careful not to over insure themselves

Products with the greatest guarantees also had the least amount of freedom

There was no single product that met each of our example customer's requirements

INTRODUCTION

THE RETIREMENT PROBLEM

When it comes to planning for retirement, the stakes are high. For most customers, their pension pot will be a major source of income for the rest of their lives and so making poor decisions could have irreversible consequences.

But not only is retirement planning important, it is also complex. Customers need to consider a long time horizon with many unknowns when making their retirement planning decisions, for example:

- **Customers do not know how long they are going to live** – This makes it much harder to know how much money they can afford to spend each year.
- **Future inflation might have an effect on retirement income** – A retirement income that is adequate today may not be able to buy anywhere near as much in the future.
- **Investment returns can be highly uncertain** – Asset values can rise or fall and this can significantly affect how much money a customer has to spend.
- **Customers do not know how their lives will unfold** – This makes it harder to predict how much money they will actually need at any given point of their retirement.

Before the ‘Freedom and Choice’ reforms to pensions in the UK, choosing a retirement product was a single and often an irreversible decision, but now customers have the opportunity to change their product to adapt to their own experience of retirement.

TYPES OF PRODUCTS AVAILABLE

Customers can choose between many types of retirement products and providers to serve them in this financially crucial period of their lives. Customers can buy one individual product or use several in combination to create the ideal solution for them. A key difference between the retirement products available is the level of guarantees that they provide.

It is helpful to view the products on offer as points on a 'guarantee spectrum'. At one end of the scale are annuities; at the other end of the scale are fully flexible drawdown products.

Between these two extremes, a range of guarantees and different product designs are available, each of which offers a different trade-off between security, level of income and flexibility.

In this review we highlight and compare some of the most prevalent types of guarantee offered in the UK market. These products are superimposed onto the illustrative guarantee spectrum shown in Figure 1.

The following products were studied in our review, and each represents a different point on the guarantee spectrum. They are all based on real products available in the market.

Index-linked annuity: This is an annuity which is linked to an index (an RPI index in our review, so the customer's income level will increase with retail price inflation). These products offer a lower initial income than an equivalent fixed lifetime annuity due to the 'cost' of offering the inflation protection. There is no return of fund on death. This product is the most heavily guaranteed product that is commonly offered in the UK market as it protects against both longevity and inflation risk.

- **Fixed term annuity with guaranteed maturity value:**

These products provide income to the customer for a fixed term (25 years for the product that we modelled in our review). The income for the modelled product increases at 3% each year for the term. After 25 years the customer receives a maturity payment. In our review, we have assumed that the customer would then use this to purchase a traditional fixed lifetime annuity. The cost of the guarantee means that customer's initial income is less than for non-guaranteed products. There is no return of fund on death for the product in our review.

- **With-profits annuity with guaranteed minimum income:**

The annual income the customer receives can increase or decrease with the smoothed investment returns earned on a with-profits fund. The customer benefits from a minimum income floor below which their income will never fall, but like traditional annuities there is no return of any residual fund to the customer's estate on their death.

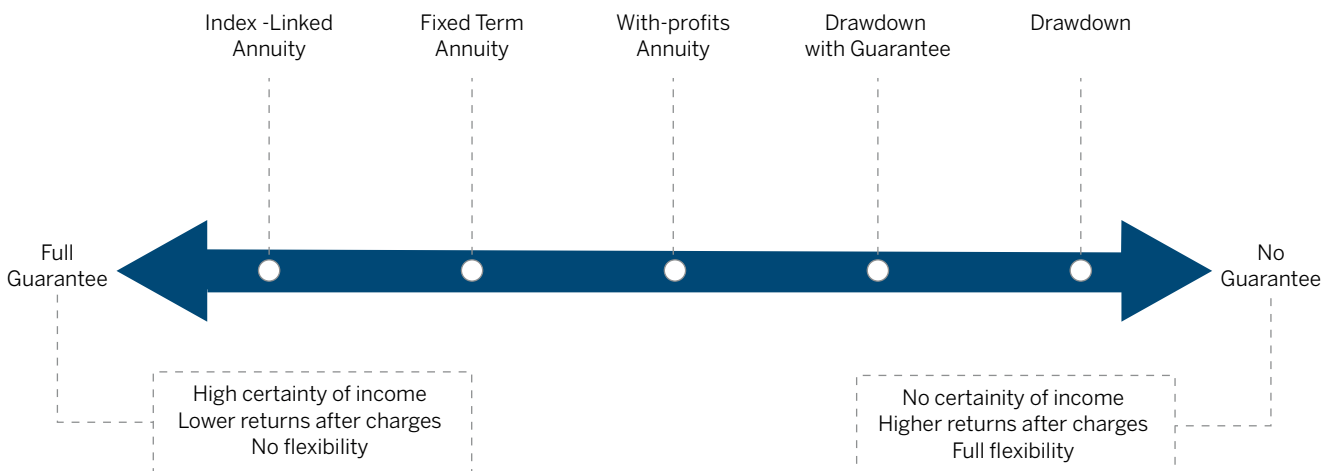
- **Drawdown with guarantee:**

This is a drawdown that provides a minimum income to the customer. For the product that we modelled in this category the minimum income level is reviewed each year. This minimum income level can increase if investment returns are sufficiently positive but it cannot decrease.

- **Drawdown:**

This is a fully flexible drawdown product which has no embedded guarantees. A customer with this product will simply draw an income from their fund, until it runs out or they die and the residual fund is returned to their estate. With drawdown products, the customer faces a risk that their fund could be exhausted before they die, and so leave them without an income.

Figure 1: Illustrative Guarantee Spectrum



CHOOSING AN APPROPRIATE SOLUTION

When it comes to picking which product or combination of products is most suitable for them, customers and advisors must decide where they wish to be along the guarantee spectrum. Therefore it is important for both customers and advisors to fully comprehend the type and level of protection that the product is providing to them and how it compares to the protection that they require. This choice is not straightforward and the answer will differ between individuals and even for a particular individual at different points during their retirement.

Such decisions bring into sharp focus the role of guarantees and raise fundamental questions such as:

- Are guarantees good value for money?
- Will buying a guarantee affect my financial freedom?
- So... should I buy a guarantee?

HOW WE TRIED TO ANSWER THESE QUESTIONS

We performed a unique and comprehensive review of the retirement guarantee market. We modelled the main types of income guarantees currently offered in the UK retirement market to see how they would perform under 1,000 potential future investment scenarios across all ages of retirement. However, the right course of action will largely depend on the customer. Because every customer is different, we studied the retirement problem through the eyes of three example customers. Appendix B contains further details of the modelling assumptions used in our review.

THE CUSTOMERS

For the purposes of this study, we focused on the 'middle-Britain' section of the market, in which retirees are characterised by:

- Having sufficient income provided by a combination of the state pension and a defined benefit (DB) pension scheme to cover their essential spending needs, e.g., food, day-to-day travel and utility bills
- Having a defined contribution (DC) retirement pot into which they have saved over their working lives in order to be able to spend a little more and make the most of their retirement

We have assumed that our example customers will each receive a full state pension of £8,000 a year as well as an additional £2,000 from a DB pension scheme. This is assumed to be sufficient to cover their basic needs and will not vary across the scenarios modelled. Assuming state provision does not decrease, this provides a baseline level of income security and so any source of income above this may not need the same level of protection. Their DC pension pot is £100,000 which they will use to purchase a retirement product to fund their discretionary spending, paying for non-essentials that improve their quality of life. Each of our three example customers is then differentiated by their discretionary spending intentions in retirement and their attitude towards risk.

It is important for both customers and advisors to fully comprehend the type and level of protection that the product is providing to them and how it compares to the protection that they require

A key difference between the retirement products available is the level of guarantees that they provide

Unique and comprehensive review of the retirement guarantee market

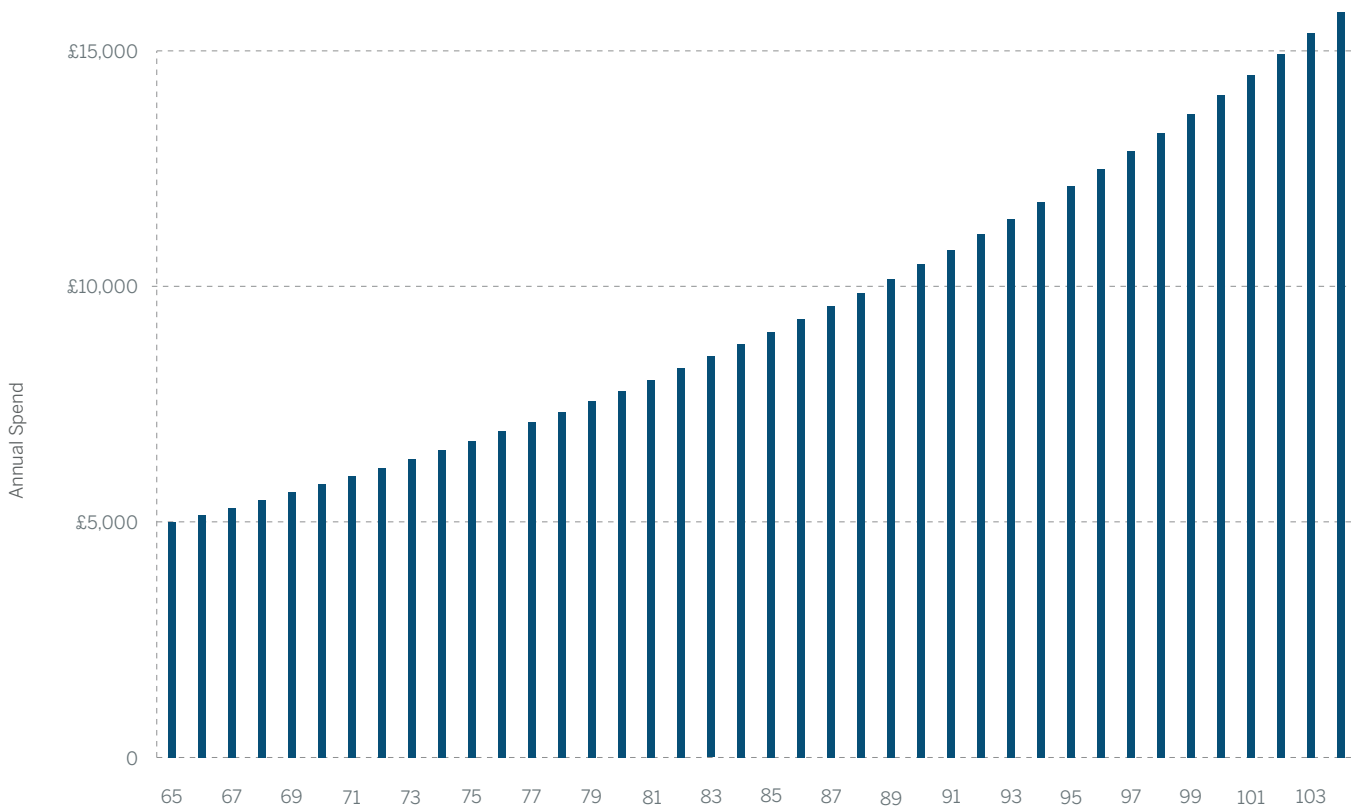
“I don’t want to have to worry about running out of money...”

Meet Rachel

Rachel wants to enjoy her savings over the full duration of her retirement and accepts that she will have to start off at a modest level of discretionary spending to be able to keep this up. She wants to enjoy a consistent level of discretionary spending which means that her income will ideally need to keep pace with inflation.

Rachel is also fairly risk averse as she remembers past recessions all too well and worries about what impact another might have in the future. She has told her advisor that she wants peace of mind that she will be able to get by during both the good times and the bad.

Figure 2: Rachel’s Target Spending Pattern



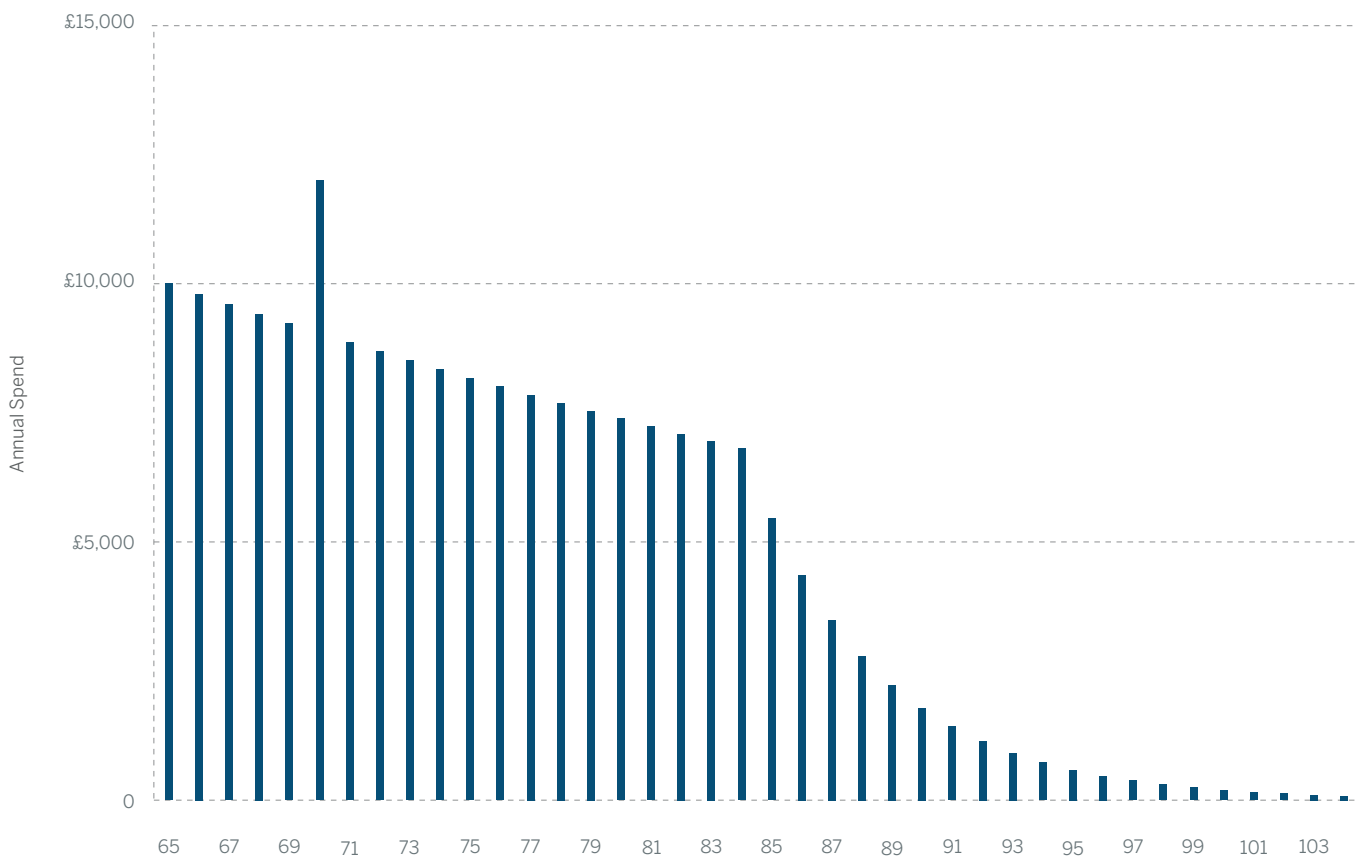
“You can’t take it with you...”

Meet Frank

Frank is looking forward to retiring so that he can enjoy himself and make the most of his retirement savings. Frank does not view retirement as a time to be frugal and is already planning how he will spend his time, including the ‘once in a lifetime’ holiday that he has always dreamed about for his 70th birthday.

Frank anticipates that his discretionary spending will be greatest during the earlier part of his retirement whilst he is more active, and so is looking for a retirement product that can provide this, along with the flexibility to take a bit extra when the time comes for his big holiday. He accepts that later on in retirement he might not be able to afford much more than providing for his basic needs.

Figure 3: Frank’s Target Spending Pattern



“Now it’s time for my money to look after me...”

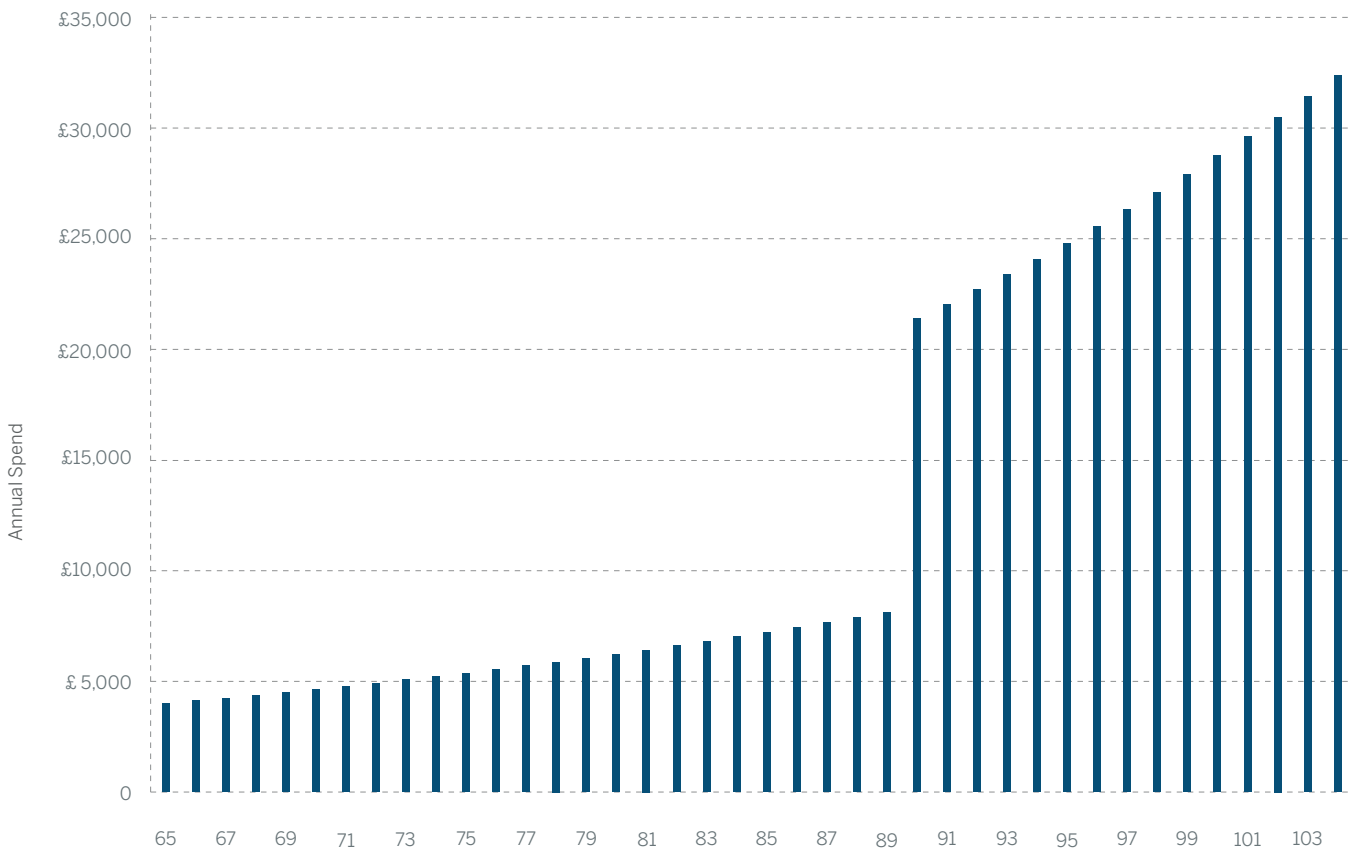
Meet Christine

Christine knows that she will not always be as active or as healthy as she is today, and that as she gets older she might need a little extra help around the home. She is happy to spend a little less today so that she can look after herself tomorrow. But she also wants a retirement product that can cope with an increase in spending which might accompany old age.

Christine is planning her retirement on the basis that she will need a few hours of ‘at home’ care each day when she gets to around age 90. After discussions with her advisor, Christine realises that making the right product decision now will be key to being able to pay for this.

Even if things get a little tougher later on, Christine still anticipates enjoying a long and rewarding retirement and wants to make sure that the product she chooses gives her good value for money.

Figure 4: Christine's Target Spending Pattern



ARE GUARANTEES GOOD VALUE FOR MONEY?

To decide whether guarantees offer good value for money on a purely financial basis, the financial benefits of a guarantee (how effective it is) need to be compared against its financial cost (how expensive it is). In our review, we have analysed both of these components:

- **The financial cost** – To analyse the average financial cost of each product's guarantees, we calculated the amount of money each customer gets back per £1 they invested across 1,000 different investment scenarios.
- **The financial benefit** – To analyse the benefit of each product's guarantees, we analysed how the customer's income would be affected if their investments performed very poorly.

Appendix B contains further details on how we calculated all of these items.

FINANCIAL COST

We will first look at the financial cost. For drawdown products with a guarantee, the cost of a guarantee comes from two sources. Firstly, the customer that chooses a guarantee will typically pay an explicit guarantee charge which is deducted from the fund.

These charges will cover the additional costs that insurers must cover in order to offer the guarantee:

- **Direct cost of the guarantee** – This is a charge to cover any future shortfall between the income guaranteed and the income actually supportable by the customers' investments.
- **Cost of capital** – An insurance company must hold capital against the guarantees they've made. This means the company has to sacrifice the returns that they would have earned if they were able to invest the money freely.
- **Higher investment management costs** – Insurers will have to carefully manage the investments in order to ensure the guarantee can be met. This is likely to result in higher management costs.

Secondly, the product provider will manage the risk of the guarantee with an appropriate investment strategy which is usually relatively conservative¹. Over a long investment period, such as retirement, this would be expected to lead to lower investment returns being achieved on customer funds.

For annuity products, the customer locks-in to an income stream from outset. The 'cost' of the guarantee for an annuity product is the potential for higher investment returns that has been foregone.

When analysing the return on each customer's investment, we have included any death benefit that the product includes. Often products with a high level of guarantee do not return any remaining fund on death; this can also be viewed as a further cost associated with the guarantee.

¹ To ensure as fair a comparison as product choices available in the market would allow, we have selected actual product variants with the most comparable fund options, in terms of the level of 'risk-rating' and level of expected future investment returns, where there was a choice available. Further details are set out in Appendix B.

Rachel

In order to understand the cost of the guarantees, we looked at the total amount that the customer is expected to receive (in today's money) across their retirement for each pound invested. For Rachel, the average values of this metric across our 1,000 investment scenarios are shown in Figure 5 below.

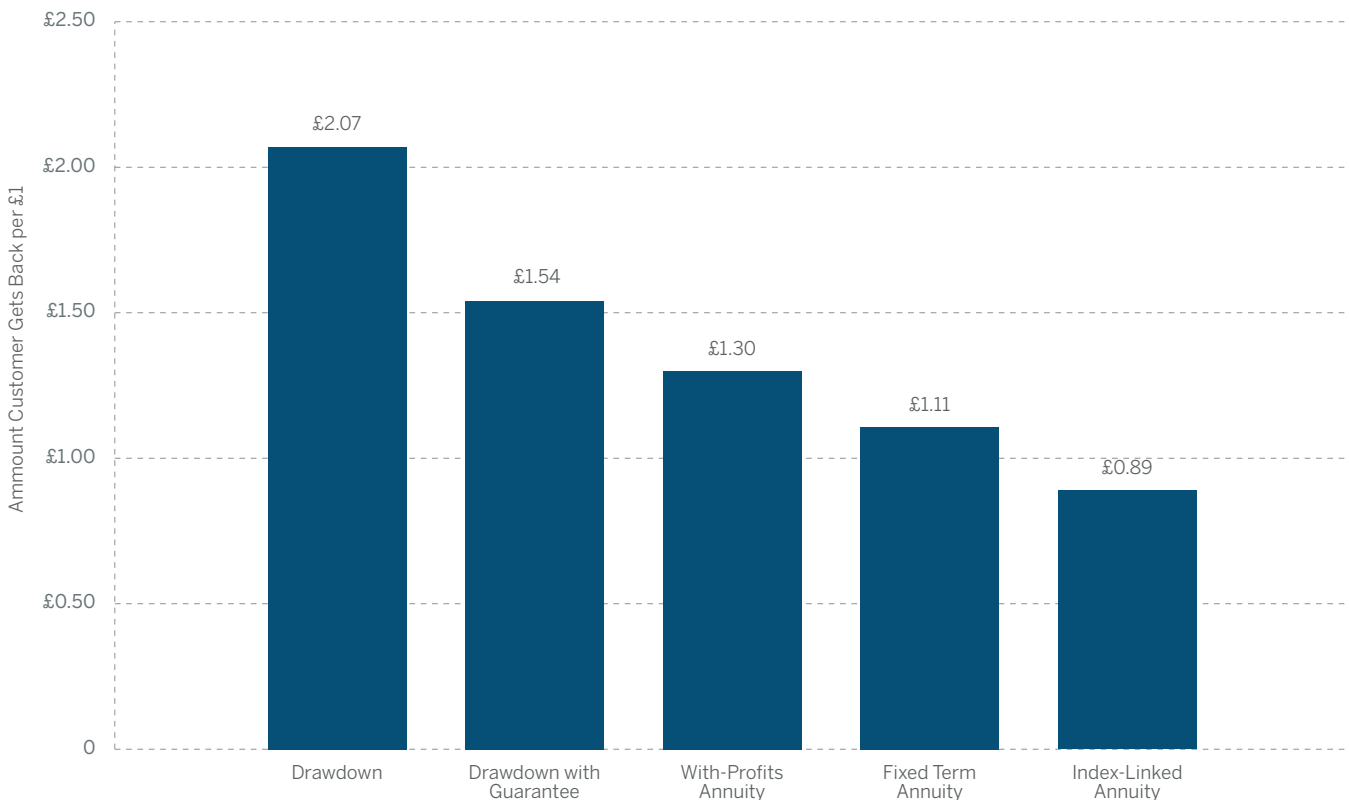
For the results below, we have allowed for the income Rachel is expected to receive throughout retirement, as well as the return of any funds that her beneficiaries are expected to receive when she dies.

Figure 5 shows that the annuities provide particularly poor value as there is no return of fund on death. So if Rachel were to die early on in retirement her beneficiaries would not receive any money.

The results also show that a drawdown approach without guarantees is expected to provide a total benefit value to Rachel of more than double her initial retirement pot. Assessing these results along our guarantee spectrum highlights the relationship between the level of returns and the level of guarantees offered. The fixed term annuity and the index-linked annuity offer the lowest returns and these are the products which have the highest level of guarantees. Indeed, the index-linked annuity actually returns less money than Rachel's initial investment so it is clear that Rachel would pay a very high cost for that level of protection.

Even a product with a modest guarantee has a substantial effect on the income Rachel will receive. The drawdown with guarantee provides 25% less value (both expected income to Rachel and capital to her beneficiaries) than the drawdown.

Figure 5: Amount Rachel Gets Back per £1 of Retirement Pot

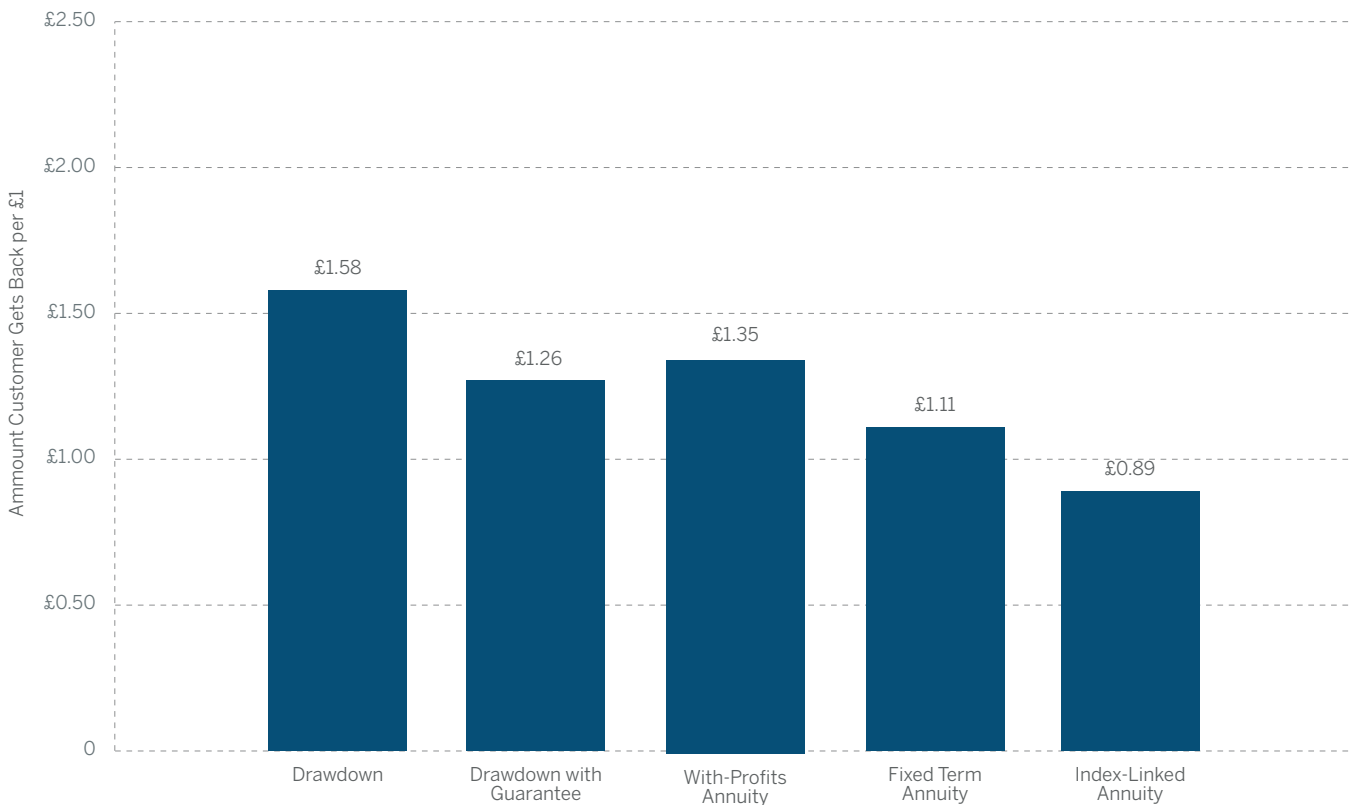


Frank

Frank knows how hard he worked for his money and he wants to make sure that he enjoys his hard-earned pension in his early years, when he can make the most of retirement.

The drawdown product without guarantees also returns the most for Frank, providing nearly 160% of his initial investment in overall benefit value. The advantage versus the other products is much less marked for Frank because he withdraws far more in the early stages of his retirement. Frank therefore depletes his retirement fund much faster than Rachel and consequently does not see as much cumulative benefit from the higher investment returns and lower charges.

Figure 6: Amount Frank Gets Back per £1 of Retirement Pot



Christine

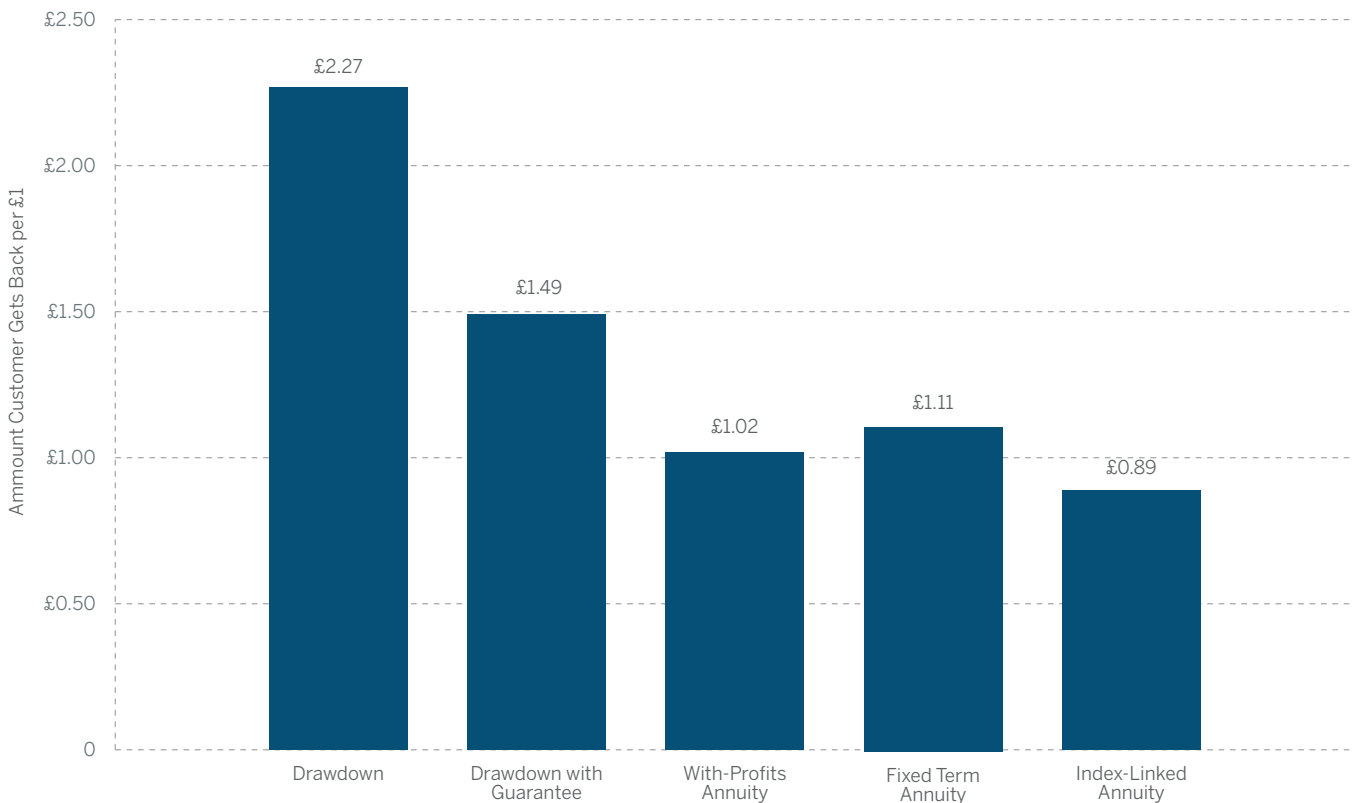
Christine realises that how she invests her money now is key to whether she will have sufficient income to meet her increased needs in later life. Therefore, ensuring that she is getting a good return on her investment is very important to her.

The returns for Christine follow a similar pattern to Rachel, though the advantage of the drawdown product without guarantees is slightly greater, returning almost 230% of the initial investment. Christine takes less income in the early part of her retirement which allows her to build up a greater retirement fund. This increases the benefit of the higher investment returns and lower charges provided by the drawdown product option.

The results illustrate that a drawdown approach without any guarantee delivers the highest overall return on investment for all three of our example customers, although the level of return varies according to the customers' individual spending patterns.

The index-linked annuity provides the poorest outcome on this measure, returning 89% of the initial investment for all customers. The index-linked annuity returns the same amount for each customer because there is no flexibility and so no variation in how much income our customers can withdraw.

Figure 7: Amount Christine Gets Back per £1 of Retirement Pot



FINANCIAL BENEFIT

The cost of guarantees is an important factor in the decision-making process, but the customer also needs to consider the benefits that guarantees have the potential to deliver. To address this we looked to see which products provided the best income in the bad times, analysing how our customers' incomes would be affected by a significant adverse future investment scenario.

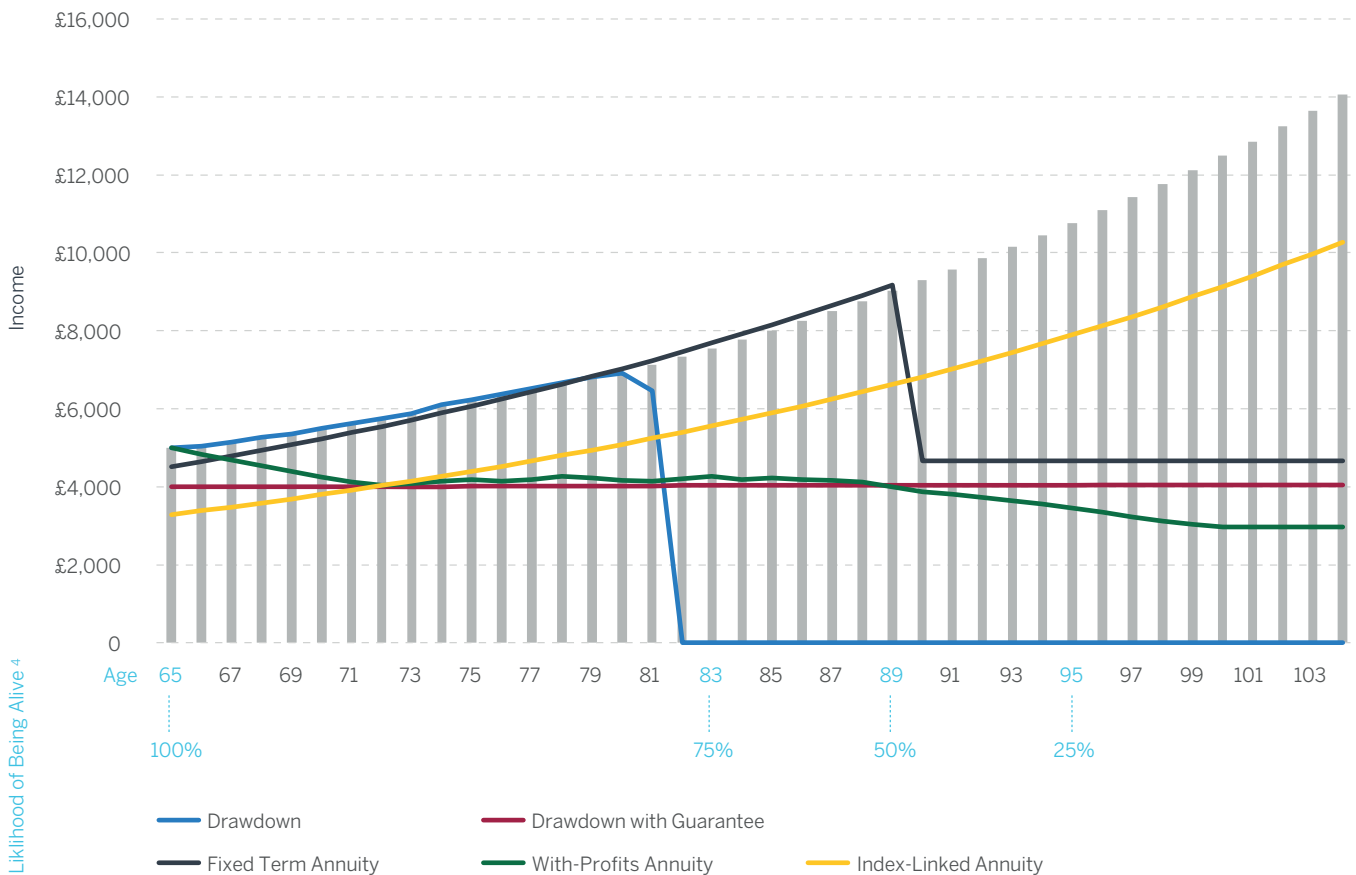
Rachel

For a future scenario in which investment markets perform poorly during Rachel's retirement (we selected a scenario that could happen with a 1-in-20 chance)², Figure 8 below shows the income she would receive from the different products in each year. For comparison purposes, the amount of income that she wants to receive in order to fund her discretionary spending has been superimposed onto the graph using grey bars³.

Figure 8 shows that the fixed term annuity and index-linked annuity perform the best across Rachel's retirement in this situation. However the results also show that drawdown and the with-profits annuity provide Rachel with her target starting income, as for the other products her £100,000 pension pot is not large enough to secure her initial level of target income.

The drawdown with guarantee product provides a level income throughout retirement because the investment performance is not sufficient to increase the income above the initial guaranteed amount.

Figure 8: Rachel's Retirement Income in a Poor Investment Scenario (1-in-20 Chance)



In this scenario, had Rachel chosen the drawdown product, then in her early 80s her investment fund would have been exhausted and her discretionary income would have ceased. As expected, it is in scenarios such as this one that the products which include guarantees demonstrate their value, providing some level of income throughout retirement.

Table 1 compares Rachel's return on investment in a poor investment scenario against the average figures we saw earlier in Figure 5. We can see a different product ranking emerge.

This is not a surprise – if Rachel knew investment returns would be poor then the insurance provided by the guarantee becomes a much better value. Of course Rachel does not know the future and so must make a judgement which will be influenced by a wide range of factors. If, for Rachel, a 1-in-20 risk of her discretionary spending capacity falling to zero in her early 80s is acceptable, then the higher average returns provided by the drawdown product are likely to be very attractive. On the other hand, if she could not contemplate such an outcome, then it makes sense for her to consider a product offering some level of guarantee protection.

For a single possible investment scenario at a particular probability level, the results clearly illustrate that under adverse circumstances a product such as an index-linked annuity can provide a better income throughout retirement. However, in order to better inform the assessment of whether the protection provided represents good 'value for money' relative to the price that is being paid, it is also useful to consider how likely it is that guarantee products will end up providing an income equal to or greater than a product without a guarantee.

Table 1: How Rachel's return may differ between average and poor investment scenarios

PRODUCT	AMOUNT RACHEL GETS BACK PER £1 OF RETIREMENT POT	
	On Average	Poor Investment Scenario ⁵
Drawdown	£2.07	£0.99
Drawdown with guarantee	£1.54	£0.89
With-Profits annuity	£1.30	£0.84
Fixed Term annuity	£1.11	£0.96
Index Linked annuity	£0.89	£0.89

² The annual income profiles shown are taken from the scenario results for each product at the 5th percentile (in each year) or, equivalently, the 1-in-20 probability level (in each year). Put another way, if we have 1,000 results, the outcome shown is the 50th worst.

³ The target level of discretionary spending included in this graph is illustrative and is provided for comparison purposes only. Rachel's target income is inflation dependant and so varies with each scenario being modelled

⁴ A best-estimate assumption of mortality rates was used to calculate the 'Likelihood of being alive' statistics, using an industry-standard assumption basis, which also allowed for industry-standard assumptions about mortality improvements beyond 2015.

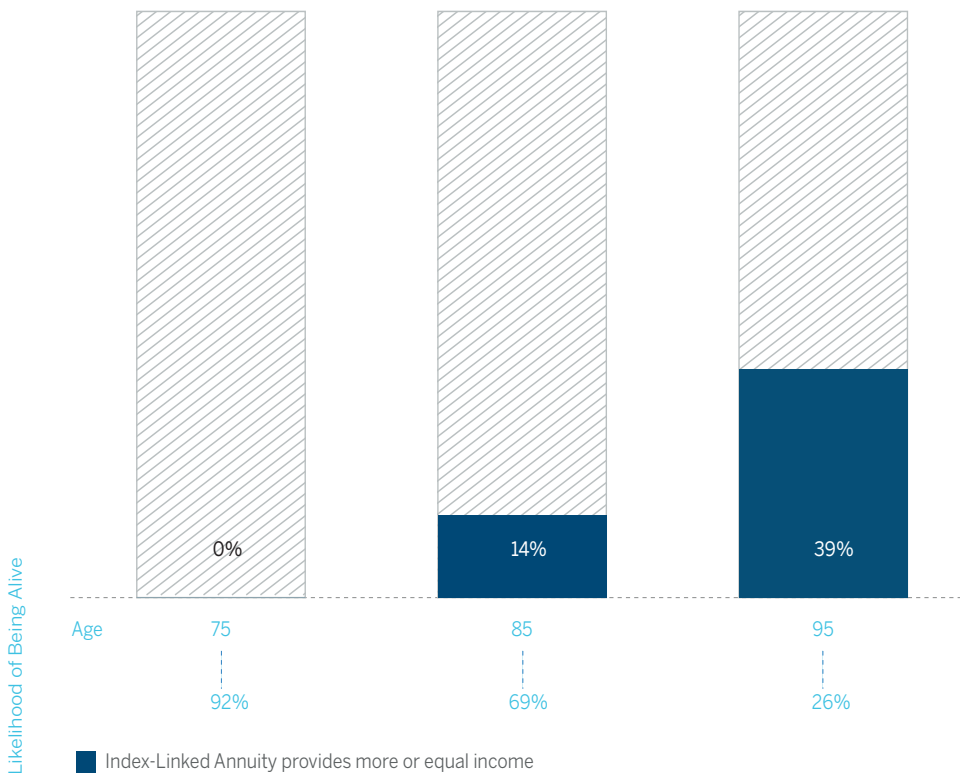
⁵ In contrast to Figure 8, the poor investment scenario used to determine the figures in Table 1 is based on a single scenario per product. The returns presented include death benefit as well as income.

Figure 9 shows the percentage of the 1,000 potential investment scenarios tested in which the index-linked annuity will provide Rachel with the same or a higher level of income than the drawdown (without guarantees) at various ages. For reference, we have also overlaid the likelihood of being alive at each age.

Guaranteed products, in general, would be expected to provide better income in later retirement when there is a greater risk of the drawdown already being depleted. However the results show that even when the customer is 95, the drawdown is more likely to provide a higher income than the annuity.

If we view the scenario percentages as ‘likelihoods’ of one product providing a better income compared to another, then the results show that for a long period of retirement, heavily guaranteed products are unlikely to outperform a drawdown product. At age 85, we found a 15% (or roughly a 1-in-7) chance that the index-linked annuity will provide a higher income than the drawdown. Put differently, we see only a 15% chance that the protection provided by the guarantee will be of value to Rachel.

Figure 9: Percentage of future investment scenarios in which the index-linked annuity provides more or equal income to the drawdown product



Frank

For equivalent adverse investment scenarios, Figure 10 below shows the income that Frank would receive from the different products in each year compared to his target spending level.

The results show that none of the products tested will allow Frank to take the full income he wants, irrespective of whether we consider his entire retirement or only the first 20 years where he prioritised his spending.

When modelling Frank’s behaviour we assumed that he would prioritise meeting his target income in early years. Therefore for the drawdown with guarantee, we assume that he spends more than the guaranteed income level which will reduce his guarantee ultimately to zero. Similarly for the with-profits annuity, there is an option to increase the level of income in early years, and we assumed that Frank would make use of this option to try and meet his target income.

Looking at the drawdown products, in this adverse scenario, the fully flexible (i.e., non-guaranteed) and guaranteed products both no longer provide any income by the time Frank reaches his mid-70s. However, they do allow Frank to fully cover his target discretionary spending in the early part of his retirement including that all-important holiday.

The guarantees in the annuity products ensure that the income provided does not fall to zero. However, the shape of the income delivered is a poor fit to Frank’s requirements.

So for a customer like Frank, who has a preference for enjoying their retirement savings early rather than more evenly over retirement, the drawdown approach may still be the most attractive.

Figure 10: Frank’s Retirement Income in a Poor Investment Scenario (1-in-20 Chance)



Christine

Finally, Figure 11 provides the same information for Christine.

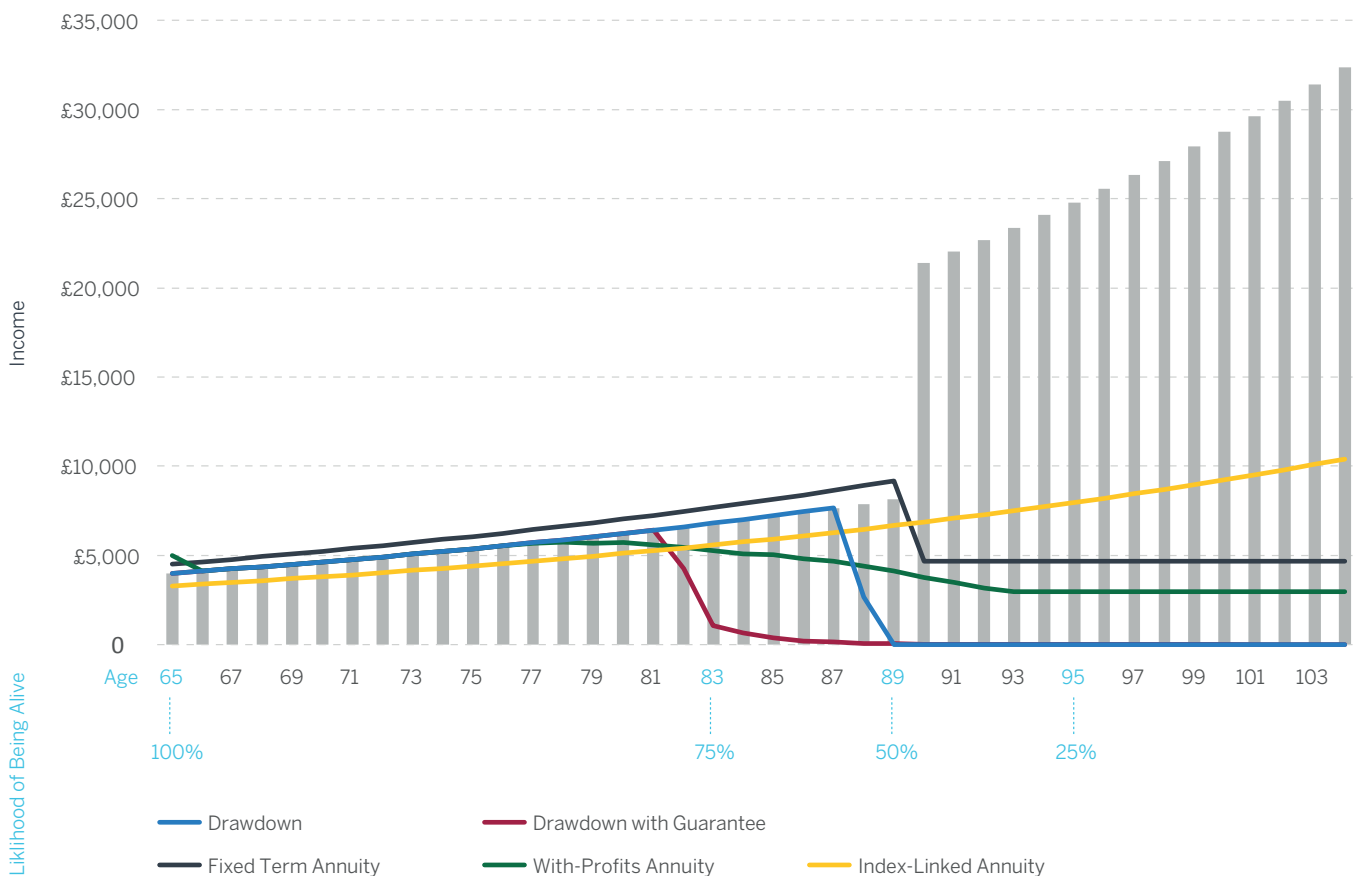
The results in Figure 11 show that none of the products can meet Christine’s target income under this adverse scenario.

Although Christine has decided to have a lower level of discretionary spending in early years, there is a limit to how much she will sacrifice. Therefore, for the drawdown with guarantee product in this poor investment scenario, she sacrifices the lifetime guarantee offered by the product in later years by taking more than the guaranteed income in early years. For the with-profits annuity, there is an option to decrease the level of income taken in early years, and we assumed that Christine would make use of this option to ensure that the income she receives is in line with her target income to save money for later years.

The funds under both drawdown products have been exhausted before Christine reaches the period in which she requires increased income to cover the additional costs associated with the in-home care she thinks she will need.

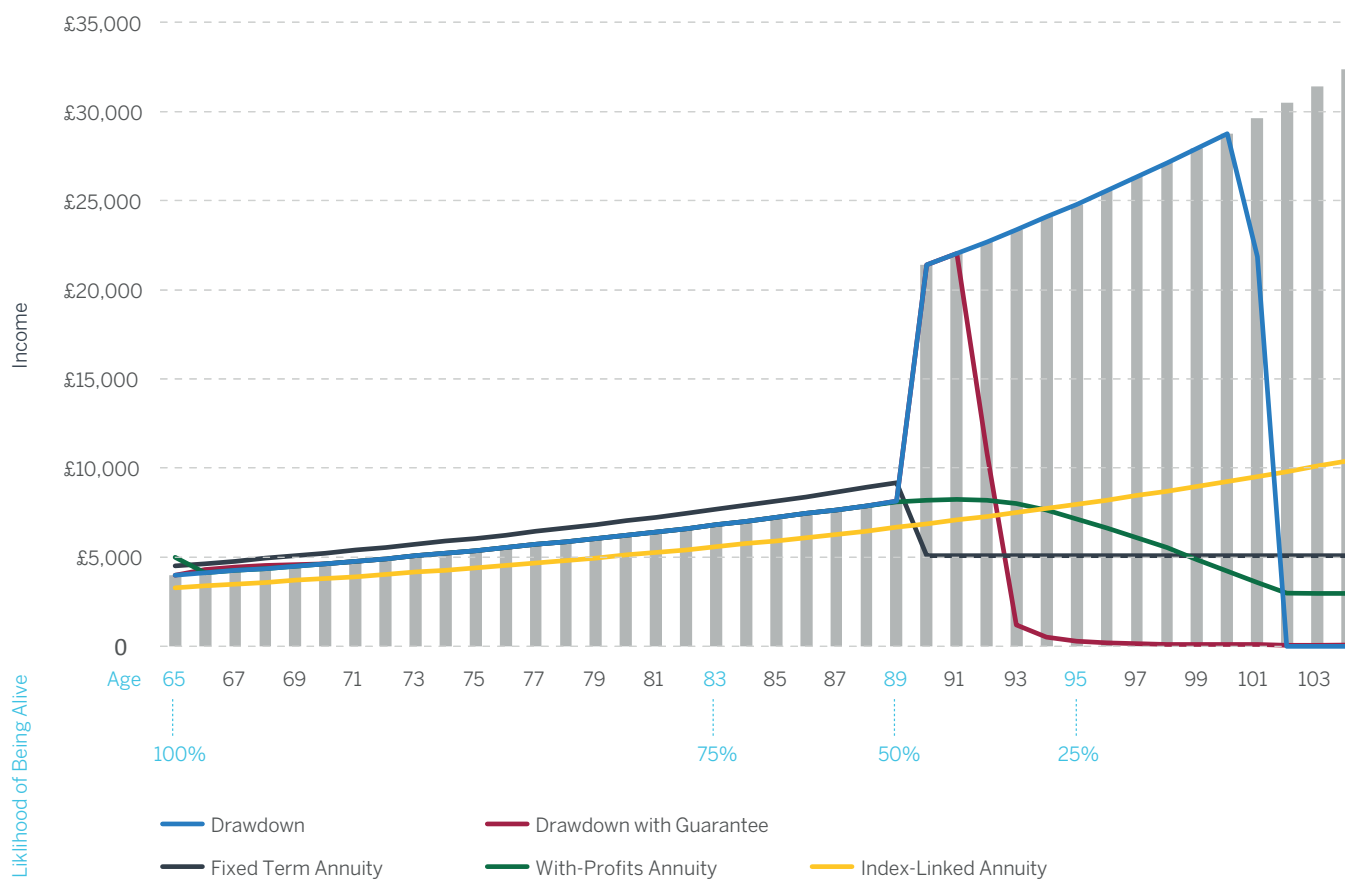
The annuity products fare better, sustaining at least some level of income throughout Christine’s retirement. The index-linked annuity provides the highest level of income in the later years, but this is still less than one-third of the income Christine is looking for. A critical question for Christine is whether it is worth purchasing a guarantee where the outcome, even in circumstances in which the guarantee pays off, does not meet her needs.

Figure 11: Christine’s Retirement Income in a Poor Investment Scenario (1-in-20 Chance)



Accepting that there may well be scenarios in which she receives no income to fund her discretionary spending later in retirement, Christine's best chance of receiving an income which meets her desire for increased spending later in retirement is to choose a product which offers the best potential investment returns. Figure 12 below demonstrates that when considering the average outcome across all scenarios, the drawdown product is the best match for her later spending needs.

Figure 12: Christine's Average Retirement Income



WILL BUYING A GUARANTEE AFFECT MY FINANCIAL FREEDOM?

Whilst the financial costs and benefits of a retirement product are very important factors for a customer to consider, they should also consider any limitations that the products may place on their financial freedom. Customers' circumstances can change during their retirement, and being locked into an inflexible retirement product may restrict their ability to spend their money when and how they want to.

All of the products with a guarantee placed constraints on the degree to which income can be varied:

- **Drawdown** – Customers can vary the income taken according to their needs, however there is no guarantee that any particular income level can be sustained. The higher the income they take now, the greater the risk that income will reduce (or even cease altogether) in the future.
- **Drawdown with guarantee** – The guaranteed income can increase over time with positive investment performance but cannot fall. However, if a customer takes income above the guaranteed level set, then that can reduce the guaranteed income available in future years.
- **With-profits annuity** – The income that can be taken in any one year can only be chosen from within a limited range.
- **Fixed term annuity** – The income cannot be varied at all over the fixed term period.
- **Index-linked annuity** – The income cannot be varied at any point during the customer's life.

Product guarantees can affect different customers in different ways and, to demonstrate this, we will revisit our example customers.

Whilst Rachel, Frank and Christine have very different spending patterns, the drawdown product is flexible enough to allow all three to take their income as they wish providing they have sufficient funds available. At the other end of the scale, by purchasing an annuity, Christine wouldn't be able to take the desired sharp increase in income in later life and Frank couldn't fulfil his wish to take a large lump sum for his dream holiday. The lock-in to a stable income profile does however better suit Rachel, particular via an index-linked annuity. However the cost of obtaining a guaranteed income for life as well as protection against inflation results in Rachel having less income than she would like throughout her retirement. She would not be able to easily adapt her income to any lifestyle or situation changes that may arise.

Whilst the with-profits annuity provides some scope for increasing the income he receives each year, the product is still too restrictive to allow Frank to fully meet his spending plans. Christine could face a quite different problem if the minimum level of income paid on the with-profits annuity exceeds her spending needs in the early years. There are various approaches she could take, for example investing the 'excess' income to save for the future spending increase, but this introduces an additional (potentially undesirable) level of complexity.

The drawdown with guarantee does provide Frank with the flexibility to take an additional amount in one year as a 'one off', however in doing so he should bear in mind that his future guaranteed income will be reduced.

Overall, it is clear that the products with the highest level of guarantees place the most significant restrictions on the financial flexibility of a customer. This is important because customers at age 65 cannot be expected to know how the rest of their lives will unfold. Changes in family circumstances, their personal health and their desire or ability to pursue leisure interests, as well as cost increases from inflation, will all affect the income a customer needs during their retirement. Given this uncertainty, retaining flexibility is important to allow customers to adapt to their evolving lives.

The drawdown product is flexible enough to allow all three to take their income as they wish providing they have sufficient funds available

SO...SHOULD I BUY A GUARANTEE?

Encouragingly, our analysis showed that ‘middle-Britain’ retirees who have saved for their retirement can expect to enjoy some level of discretionary spending for a good number of years whichever product they choose. However, none of the products modelled met our example customers’ needs under all future investment scenarios considered.

The attitudes and behaviour of the customer is a crucial factor in determining the worth of a guarantee for them. The results showed that, on average, the products with the highest guarantees provided a significantly lower return on the pension pot invested. The analysis also revealed that the likelihood of guaranteed products providing a benefit to consumers in the form of a higher income can be smaller than many perceive.

Some customers will attach a high value to having peace of mind and so be comfortable to trade the possibility of significantly more income for the enhanced security a guarantee provides. However, for others this might seem too high a price to pay. The results also showed that both the potential costs and benefits of guarantees can vary significantly depending on the manner in which customers choose to spend their retirement pot.

Even in our sample of products and customers, the analysis shows that the level and stability of income can vary widely from product to product. There is no ‘one size fits all’ option and so consumers need to choose which product is best for them. Unfortunately, the typical consumer is unlikely to be able to run their own personalised modelling study, so our research reinforces the value of obtaining expert advice both at the point of retirement and on an on-going basis as circumstances inevitably change in the future.

So, are guarantees worth it? Unfortunately, there isn’t a one word answer – it really does depend. Guarantees are essentially a trade-off; on one hand there is financial flexibility and the potential for increased investment rewards, and on the other there is security. The point at which this trade-off becomes worthwhile, if it does at all, will depend on the customer and the guarantee itself. The key lies, firstly, in making an informed and considered decision that reflects the balance of one’s ambitions and concerns for retirement. Secondly, maintain, for as long as possible, the flexibility to respond to changing circumstances. Retirement is a long and uncertain period to plan for, and however right a product looks today there is no assurance that it will always remain that way.

Guarantees are essentially a trade-off; on one hand there is financial flexibility and the potential for increased investment rewards, and on the other there is security

The point at which this trade-off becomes worthwhile, if it does at all, will depend on the customer and the guarantee itself

The flexibility to respond to changing circumstances should be maintained for as long as possible; however right a product looks today there is no assurance that it will always remain that way

APPENDIX A – ABOUT MILLIMAN

Milliman is among the world's largest providers of actuarial and related products and services. The firm has consulting practices in healthcare, property & casualty insurance, life insurance and financial services and employee benefits.

Our Life Insurance and Financial Risk Management practices provide consulting, advisory, risk management and investment advisory services to a large range of clients from insurance companies and investment banks to governments, regulators and ratings bureaus. In particular, we are a global leader in the retirement savings market and have assisted a large proportion of the industry to develop, manage and optimise the types of products featured in this analysis.

Founded in 1947, Milliman is an independent firm with offices in major cities around the globe. We are owned and managed by our principals—senior consultants whose selection is based on their technical, professional and business achievements.

Despite our impressive growth over the past six decades, we still operate according to the guiding principles of our founders, Wendell Milliman and Stuart Robertson. We retain their rigorous standards of professional excellence, peer review and objectivity. We remain committed to developing innovative tools and products and providing expert solutions. And we continue to earn our clients' trust by keeping our focus fixed on their business objectives.

Experts: One of the leading life actuarial practice in Europe and Asia and the largest life actuarial practice in the United States. Our financial risk management practice is a global leader in the retirement savings industry. Established in 1998, it pioneered hedging and risk management techniques for the US life insurance industry, and now provides investment advisory, hedging and consulting services on more than \$164 billion in global assets (as of March 31, 2016), through its hedging operations in Chicago, London and Sydney. The majority of our clients use these services to support the types of retirement guarantee products discussed in this paper.

Trusted: Advisors to over 80% of the world's leading insurers and engaged by 44 of the top 50 insurers globally. Milliman are well established (founded in 1947) and the majority of our clients are long-term (some clients having engaged with us for over 35 years).

Independent: Owned and managed by our principals, meaning we are committed and independent. We are beholden to no corporate parent or point of view.

Everywhere: With more than 62 offices and 3,000 employees worldwide, we have a strong presence throughout North America, Latin America, Europe, Asia Pacific, Middle East and Africa. Full geographical coverage available by drawing upon our worldwide pool of consultants.

APPENDIX B – MODELLING ASSUMPTIONS

The modelling that underpins this paper provides an objective assessment of the future income that each product would provide in a range of economic conditions for our three example customers. This appendix explains our approach to these in further detail. For further information on exact model parameters, please contact Milliman.

Future economic conditions

To capture the uncertainty of future economic conditions in the stochastic model we set up the model as follows:

- We modelled the products' performances under 1,000 potential future economic scenarios to capture the uncertainty regarding future investment returns on assets, interest rates and inflation.
- To determine how much a 'risk-free' asset earns on average, we used a view of the market defined by the interest rate curve at 31 December 2015.
- We modelled the interest rates implied by the UK government bond curve as at 31 December 2015. We also modelled variability in interest rates using an internally developed stochastic model (based upon 3 factors).
- In Figure 13 to the right, we show the output from the interest rate model for the projected 1-year risk-free interest rate. The average across all 1,000 scenarios, 1-in-20 lowest and 1-in-20 highest interest rates are illustrated.

- To determine how much risky assets (equity, property, high-yield bonds and corporate bonds) earn in excess of this on average, and how variable this difference is, we used an objective approach and based our calibration upon all the historical data available for each individual asset class. This information was used to project investment returns on each specific fund modelled.
- The model's inflation is calibrated assuming that the Bank of England will maintain their current inflation policy which began in 1997. We have modelled inflation uncertainty based on data from the post-1997 period. We have assumed an average expected future RPI inflation of 3.0%. Inflation varies in each future year, in each of the 1,000 scenarios modelled, with an assumed volatility of 1.5%.

We have validated our economic model against an independent, widely-used industry benchmark to ensure it exhibits broadly consistent features.

OUR EXAMPLE CUSTOMERS: RACHEL, FRANK AND CHRISTINE

We defined three customer target income profiles for our example customers (Rachel, Frank and Christine) to reflect different tastes for retirement spending that retirees may have.

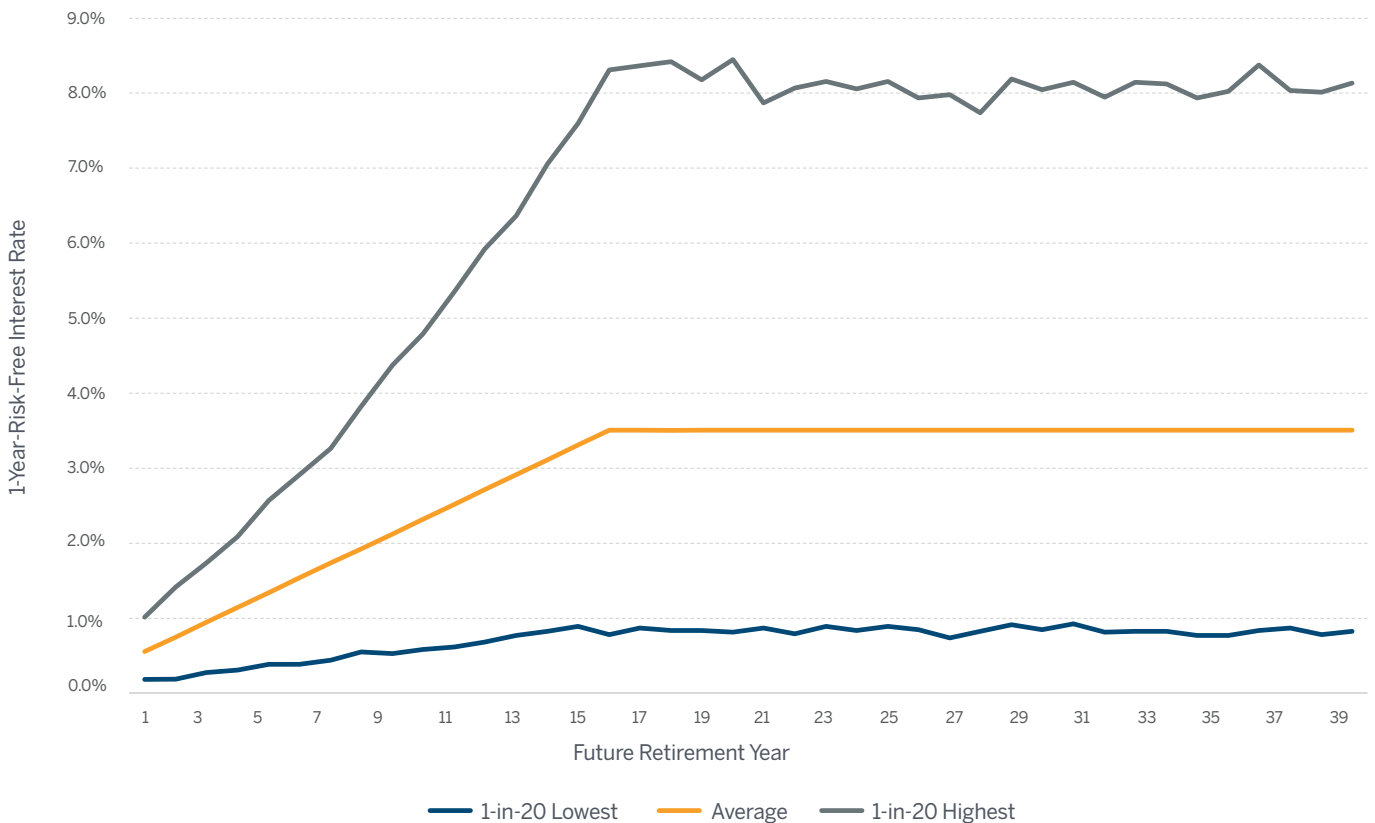
All three example customers are age 65 and, given the 40-year projection period we have used, we have assumed that their retirement could last up to 40 years. We modelled the customers' mortality and if they were to survive the full 40 year modelling period then any remaining pension fund was modelled as being paid in a single one-off income payment. Where relevant, we used a best-estimate assumption of the probability of death, using an industry-standard assumption basis, which also allowed for industry-standard assumptions about mortality improvements beyond 2015.

Behavioural assumptions

There were also some important assumptions made around the example customers' spending intentions:

- We assume that, unless there are any product restrictions, the customer will always prioritise meeting their current target spending intentions, instead of saving money back to fund future spending.

Figure 13: Key statistics on the assumed 1-year risk-free interest rates



- Where a product provides a prescribed guaranteed income level, and this guarantee exceeds their current spending needs, we assume the customer takes this guaranteed income level.
- Where a product provides a recommended income level we assume that the customer takes this income level. In practice, some products let the customer amend this level through a conversation with their advisor. In the case of Rachel, where her real spending patterns are fairly stable, we have not allowed for this. In the case of Frank and Christine, who have fairly specific spending patterns, we assume they take advantage of this.
- For Rachel, we assume that her preference is to spread her spending evenly across retirement and as such that she is willing to adopt lower initial spending to preserve her lifetime guarantee with the drawdown with guarantee product. However, with Frank we assume his highest priority is to have elevated spending in early years – therefore with the drawdown with guarantee we assume that he spends at a higher level than the guaranteed income level and as a result foregoes his guarantee in later years. Similarly with the with-profits annuity, there is an option to increase the level of income in early years, and we assume that Frank makes use of this option to attempt to meet his elevated level of spending in early years.
- We assume that whilst Christine has suppressed her target level of discretionary spending in early years compared to Rachel, there is a limit to how much she will sacrifice before age 90. Therefore, with the drawdown with guarantee product in the poor investment scenario, where inflation takes her target spending levels above the guaranteed level of income, she spends at the higher level. This means that ultimately she sacrifices the lifetime guarantee offered by the product in later years. For the with-profits annuity, there is an option to decrease the level of income taken in early years, and we assume that Christine makes use of this option (as much as possible) to match her lower level of spending compared to Rachel.
- For Rachel we assumed that her future spending needs increase with RPI inflation. RPI inflation is modelled stochastically and so varies in each future year of each of the 1,000 scenarios modelled. On average her spending needs increase at 3% per year, as illustrated in Figure 2. For Frank and Christine we have assumed their specific spending patterns are the same in all scenarios, as illustrated in Figures 3 and 4.

Retirement products in our review

All of the products modelled in this paper are based upon actual product and fund choices available to the UK retirement customer. We picked key market-leading providers for each particular product type and a fund choice as follows:

- For the with-profits annuity product we assumed that premiums are invested in the company's main with-profits fund. This fund is governed by an investment policy that is more adventurous than any of the fund choices available under the drawdown with guarantee products.
- For the drawdown with guarantee product a range of risk-rated funds were available. We selected the fund option with the highest risk-rating and therefore the closest possible comparison to the risk-rating of the with-profits fund, as well as the closest possible level of expected future investment returns.
- The drawdown product had the widest range of risk-rated funds available, and we selected a fund that has an investment strategy in between that of the with-profits and drawdown with guarantee funds, in terms of the level of risk-rating and level of expected future investment returns.
- For the fixed term annuity product no choice of fund is required as the product's benefits are fixed.

Overall, this choice of products and funds was intended to provide a broadly fair comparison given the actual choices available to UK retirement customers, the variations in how these different products are structured, and the limitations of some product ranges. Table 2 opposite provides a summary of the average expected investment returns over retirement modelled for each product after allowing for each fund's asset allocation and management approach, **but before any charges are applied**. The analysis was produced using a stochastic model, and so investment returns modelled in each future year of each of the 1,000 scenarios vary around these averages. Table 2 provides a summary of the average volatility in investment returns for each fund to give an indication of this variability. These have been derived by explicitly modelling each fund's constituent asset allocations, as well as the dynamic management of these allocations over time.

Charges vary by fund choice for the drawdown with guarantee product, and so the choice of fund resulted in the highest level of guarantee charge, but also highest level of expected investment performance. Table 3 opposite provides a summary of the total charges at outset for the products modelled, the way in which these charges vary across the product lifetime, and what these charges cover.

Table 2: Return⁶ and volatility assumptions for funds and selected asset classes

Fund Type	Average Expected Return over Retirement (per year)	Average Volatility of Return over Retirement (per year)
With-profits fund	7.3%	11.1%
Drawdown fund with guarantee	6.7%	9.3%
Drawdown fund	7.3%	9.7%
Global equity	6.4%	21.2%
UK equity	6.0%	18.4%
Corporate Bonds (5 Year)	5.4%	4.6%
Government Bonds (10 Year)	3.5%	9.0%
Cash	2.9%	2.2%

Table 3: Product charge assumptions

Product Type	Total Product Charge at purchase (as % of fund value)	Charge Variability	Charge Components
With-profits annuity	1.72%	Fixed and variable components (based upon investment return)	- Guarantee charge - Smoothing charge - Administration expense charge
Drawdown with guarantee	1.70%	Components levied on fund value and components levied on guarantee base	- Guarantee charge - Fund management charge - Product charge
Drawdown	0.45%	Levied on fund value only	- Fund management charge - Product charge
Fixed term annuity; Index linked annuity	No fund investment	Not applicable	- Not applicable

For all products, we used actual product pricing as at (or close to) 31 March 2016. This was either based on publicly available information, or advisor quotes. The index-linked annuity pricing was based on quotes from an annuity comparison website.

For products where premiums are invested in a fund, where a broad investment strategy was stated for a product – such as specific allocations to each broad asset class or strategies on how allocations should change over time – this was modelled explicitly. To compare the investment returns of each product in a consistent manner we assumed that the investment returns on each broad asset class were the same for each product, and did not allow for any variation in performance due to the skill of an individual asset manager.

Some of the guaranteed products employed sophisticated risk management techniques with the customer assets. These were modelled as follows:

- A couple of products apply ‘managed volatility’ risk management techniques on a proportion of the funds invested, to dynamically adjust allocations between equities and cash. Milliman FRM are a provider of managed-volatility and other dynamic fund risk management strategies, and have used their own methodology to model this technique on a daily frequency.
- One of the products is underpinned by an ‘individual Constant Proportion Portfolio Insurance’ (‘iCPPI’) risk management technique to dynamically adjust allocations between equities and bonds. This technique is bespoke to the particular product offering. Milliman have adapted an internally developed iCPPI model to estimate this product’s iCPPI technique on a daily frequency, using a number of underlying technical assumptions and modelling simplifications where public information was not available.
- For the with-profits product, Milliman modelled a monthly dynamic equity-backing ratio technique using information from the provider’s document on Principles and Practices of Financial Management of the with-profits fund. A few technical assumptions were made on how the with-profits product and fund are managed, where public information was not available.

⁶ Average fund returns are calculated as a geometric average across the full scenario period.

- For the fixed term annuity product, the underlying behavioural assumption modelled was that any maturity amount received at the end of the fixed term was used by the customer to purchase a fixed level annuity. We therefore needed to model future annuity prices for each future scenario. Milliman developed a 'stochastic pricing grid' whereby a prevailing future interest rate was used as a reference to read from the pricing grid. The pricing grid was constructed using an internally developed annuity pricing model, benchmarked to typical industry assumptions, which also allowed for future improvements in mortality and likely Solvency II capital costs.

RESULTS METRICS

A number of metrics were considered to evaluate the modelling results, and further information on some of the metrics presented in this paper is given below:

Amount Customer Gets Back per £1 of Retirement Pot

For each of the 1,000 modelled scenarios, the amount the customer gets back per £1 of retirement pot is calculated as the sum of the following components:

- The discounted value of all income receipts, allowing for the probability of surviving to the year of payments.⁷
- The discounted value of any death benefit each year, allowing for the probability of dying in each given year.
- The discounted value of the residual fund at the end of 40 years, allowing for the probability of surviving to that point in time.

This is then divided by the customer's original £100,000 pension pot size. For the average results shown in Figures 5, 6 and 7, this is the average of this calculation over all 1,000 modelled scenarios.

For the result in a poor investment scenario shown in Table 1, this result is ranked across all scenarios. The 50th lowest value then defines the result in the poor investment scenario – i.e. the 1-in-20 worst case result.

All of the results presented throughout this white paper are based on simulated or hypothetical performance results that have certain inherent limitations. Unlike the results shown in an actual performance record, these results do not represent actual products. Also, because trades for these products have not actually been executed, these results may have under- or over-compensated for the impact, if any, of certain market factors. Simulated programs are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account will or is likely to achieve profits or losses similar to these being shown.

⁷ In all cases, the discounting is calculated using the prevailing level of short-term interest rates in each year, of year scenario.

APPENDIX C – THE MILLIMAN TEAM

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IMPORTANT INFORMATION

This paper is intended solely for educational purposes and presents information of a general nature.

The information herein shall not constitute specific advice about any investment and shall not be relied on. Nothing in this paper is intended to represent a professional opinion or be an interpretation of actuarial standards of practice. Its contents are not intended by Milliman to be constructed as the provision of investment, legal, accounting, tax or other professional advice or recommendations of any kind, or to form the basis of any decision to do or to refrain from doing anything.

This paper has been commissioned by Royal London. Milliman provide general actuarial services for compensation to the Royal London Mutual Insurance Society Limited (part of the Royal London Group) – specifically, Milliman received compensation for this report.

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This document is based on information available to Milliman at the date of issue, and takes no account of subsequent developments after that date. Where public information was not available, assumptions were made. If the assumptions underlying the projections were inaccurate, the actual results achieved may vary significantly from the projected results, and the variations may be material.

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