Demographic changes and constantly increasing life expectancy becomes a major issue for insurance companies and pension providers worldwide.

Longevity risk

Longevity is the result of a complex interaction of various factors such as increased prosperity, healthier lifestyle, better education and progress in disease diagnostics and medical treatment, to mention a few.

The risk that individuals live longer than expected creates challenges, not only for the individual who needs an income for a period longer than expected after retirement, but also for the government, defined benefit retirement funds and life insurers who face retirement-related liabilities that increase as a result of improved life expectancy.

In this issue we focus on some developments in the risk management of the longevity risk faced by insurers and Defined Benefit pension funds.

What is the current UK retirement framework?

The UK retirement framework is a good example for the common features of retirement plans all over the world and therefore other countries retirement funds and life insurers tend to keep a close eye on developments in the UK retirement market and risk-mitigating products offered there.

Common features are:

- Prevalence of employer-provided retirement funds: historically retirement funds were mainly Defined Benefit funds whereas recent times have seen a significant shift towards Defined Contribution funds;
- Members of Defined Contribution funds can choose between a lump sum and the purchase of an annuity at retirement, with the choice of annuities, essentially, being:
  - Guaranteed Annuities
  - Income Drawdown/Lump Sums
  - With Profit Annuities

Providers of guaranteed and with profit annuities are faced with the uncertainty of the longevity of the pool of lives insured and are thus exposed to the risk of these lives living longer than had been expected. The guaranteed annuity market has seen the development of enhanced/impaired annuities in the UK, where the monthly benefit is adjusted based on a combination of one or more factors such as the annuitant's health status, smoker status, geographical location and occupation prior to retirement.

Hannover Re is not only a leading reinsurer of enhanced/impaired annuities, but is also a provider of longevity solutions to employer-provided retirement funds, especially for Defined Benefit funds.

Information as of August 2018

Defined Benefit fund
An employer, via a retirement fund, promises the employee a formula-based benefit in retirement.

The longevity and investment risk and reward reside with the employer/retirement fund.

Defined Contribution fund
An employer, via a retirement fund, promises to make contributions on behalf of the employee and the employee receives whatever this "pot of money" has grown to at retirement.

The longevity and investment risk and reward reside with the employee.

Guaranteed Annuities
A purchased annuity providing a guaranteed monthly benefit for the lifetime of the annuitant, with the investment and longevity risk residing with the life insurer.

Income Drawdown
Essentially a pot of money with some degree of equity investment from which the annuitant draws an annual income.

Since April 2015 there are no restrictions as to what amount can be withdrawn in the UK. The investment and longevity risk and reward reside with the annuitant.

With-Profit Annuities
A purchased annuity providing a non-guaranteed monthly benefit for the lifetime of the annuitant.

It features an annual increase in income that is dependent on a future declared bonus rate, which is related to the performance of the underlying assets.

The longevity risk resides with the life insurer, while the investment risk mostly resides with the annuitant.

Defined Benefit funds

With the widespread switching to Defined Contribution funds, most Defined Benefit funds in the UK are closed to new members, however, there are still enormous liabilities sitting in these funds for current pensioners as well as members who have yet to reach retirement age.

In the UK, the JLT Pension Capital index of private sector Defined Benefit schemes' funding position as at 28 February 2018 showed total Defined Benefit assets of GBP 1,524 billion and total Defined Benefit liabilities of GBP 1,629 billion, resulting in a deficit of GBP 105 billion.[1]

UK Defined Benefit schemes not able to fund the scheme are facing to be taken over by the Pension Protection Fund (PFF). Since its foundation in 2005 894 schemes have transferred to the PPF and the PPF has GBP 28.7 billion assets under management.[2]

This shows the significant pressure in the UK on employers to fund Defined Benefit liabilities and the need for employers to either reduce pension fund liabilities or bring more certainty to pension fund liabilities.

The UK takes up a leading role in the transfer of longevity risk.

Defined Benefit longevity solutions

Various solutions have been developed in the UK to allow Defined Benefit schemes to transfer all or part of the longevity and investment risk from the Defined Benefit scheme to an insurer.

The need for solutions in the UK has been exacerbated by two trends that have increased the liabilities of Defined Benefit schemes:

1. increasing longevity (longer life expectancy than allowed for) and
2. lower investment yields from bonds and equities

The UK retirement framework is a good example for the common features of retirement plans all over the world.

These trends have been placing strain on employers to meet projected liabilities, but more importantly, they also highlight the risk to Defined Benefit schemes of further future mortality improvements and/or reductions in investment yields.

Thus the products available to Defined Benefit schemes in the UK to mitigate longevity and investment risk have seen considerable growth.

The graph on the next page shows the improvement in life expectancy in the UK for males and females from 1960 to 2010.[3]

Over the past 50 years life expectancy has increased by up to 10 years.

The complete transfer of risk from a Defined Benefit scheme is generally called a pension buy-out.

Pension buy-out

In this transaction an insurer takes over the responsibility for the payment of all pension benefits to the members of the Defined Benefit scheme.

All liability is thus transferred to the insurer along with the assets to meet the expected liabilities, plus a margin for the insurer. No liability remains in the Defined Benefit scheme and the scheme can be wound up, with the potential return of any surplus to the employer.

The relationship following this transaction is between the insurer and the members of the Defined Benefit scheme and an advantage for members is that the insurer is required to hold defined surplus assets, potentially providing better security than the Defined Benefit scheme.

Another similar solution is the pension buy-in.

Pension buy-in

The main difference is that the Defined Benefit scheme is not wound up; rather the members of the scheme retain their relationship with the scheme.

The trustees buy a policy from an insurer that provides the pension benefits promised to members.

The value of the liabilities plus a margin is transferred to the insurer, which pays the defined pension benefits to the trustees of the scheme for distribution to the members (unlike a pension buy-out where the insurer pays the defined pension benefits directly to the members).

Similarly to a pension buy-out, the security of the benefits is enhanced through the excess assets the insurer is required to keep.

A third option available to Defined Benefit schemes that only want to transfer longevity risk, but not investment yield risk, is the regular premium annuity treaty. This is described in more detail in the next section.

The various risk transfer options available to Defined Benefit schemes have generated significant business volumes.

According to the 2018 LCP Pensions Buyout report[4], nearly GBP 150 billion of pension buy-outs/buy-ins and longevity swaps (including regular premium annuity treaties) have been written since 2007.

In 2015 volumes totalled GBP 21.7 billion (down from GBP 35.1 billion in 2014, this year was exceptional due to a GBP 16 billion longevity swap by British Telecom) including a GBP 2.4 billion regular premium annuity treaty concluded by the Philips UK Pension Fund (discussed in more detail later).

Buy-ins remained the most common solution as schemes that are not fully funded struggle to transfer all liabilities to an insurer in a low yield environment, an environment which serves to increase the size of the scheme's liabilities.

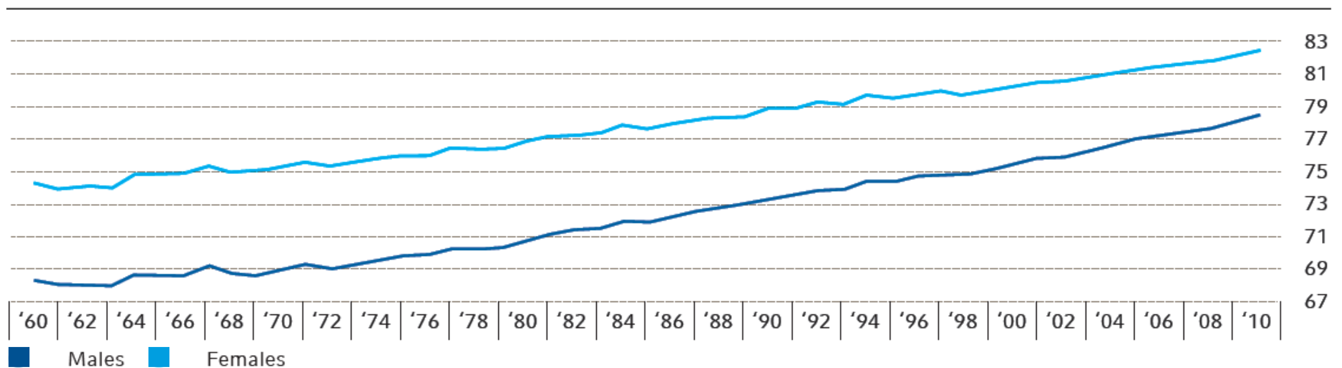
The market nowadays provides a favourable environment for pension schemes wishing to offload this risk and they have a wider choice of longevity solutions at attractive terms. Unsurprisingly, the market in 2017 has seen risk transfer deals of GBP 18 billion, with pension buy-ins and buy-outs remaining the most popular product due to the relative affordability of this solution.[5]

The outlook for 2018 is quite optimistic, with the view that 2017 volumes can be reached or even excel these numbers. Still sufficient capacity is available in the market to back these deals.

All of the above solutions provide Defined Benefit schemes (and the employers who fund them) with more certainty of the cost of the scheme, with the full pension buy-out providing 100% certainty of the cost.

The demand from well-funded Defined Benefit schemes for these products is mainly driven by this crystallisation of the cost of the scheme for the employer.

UK life expectancy at birth



Case Study:
Philips UK Pension Fund

In November 2015 a longevity transaction was agreed allowing Philips UK Pension Fund to transfer longevity risk associated with its Defined Benefit pension scheme. The Philips UK Pension fund offloaded this risk in a buyout transaction to Pension Insurance Corporation (PIC). Simultaneously Hannover Re and PIC completed the reinsurance transaction. The buyout covers pension benefits of around 26,000 UK pension scheme members worth GBP 2.4 billion.

This longevity transaction is an example of our strength to complete the reinsurance at the same time the buyout is transacted and our flexibility to enclose the innovative feature of including non-retried members into the transaction.

As described above, Hannover Re reinsures a portion of the actual annuities while the Philips pensioners and their spouses are alive and receives a pre-agreed premium plus a fee. The risks Hannover Re has taken over are the longevity risk (i.e. the risk that annuitants live longer than expected) and the proportion married risk. The latter is a typical pension scheme risk, as pension schemes usually guarantee an annuity including a spouse annuity. In contrast to an individual annuity, however, where the presence and details of a spouse are known, in pension scheme arrangements a spouse annuity is guaranteed to any spouse who is alive at the time of the death of the pensioner. Thus assumptions with regard to the probability of a spouse being alive at any point in time and even of the age and gender of the spouse have to be made.

In addition, Hannover Re also assumes the risk of non-retired members, the so-called "deferred" members, i.e. those members who have not yet retired and are entitled to a pension once they retire. This is also a typical pension scheme risk, as an assumption who will survive the time up to retirement has to be made.

Regular premium annuity treaty

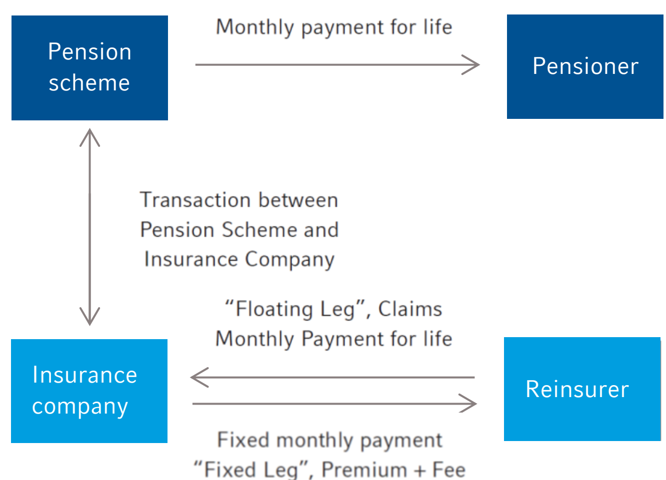
The main solution available to retirement schemes or for insurance companies only wanting to transfer longevity risk, but not investment risk, is the regular premium annuity treaty.

A regular premium annuity treaty is an insurance/reinsurance structure which involves the scheme paying a pre-agreed, fixed premium cash flow (the fixed leg, representing the expected annuity payments) plus an additional fee to the insurer/reinsurer, who then funds annuity payments for the remainder of the pensioners' lives (the uncertain, floating leg, exposed to actual changes in life expectancy, representing the actual annuity payments).

The pre-agreed fixed premium cash flow received by the insurer/reinsurer is usually based on an agreed base mortality table with agreed expected future mortality improvements.

The following diagram outlines the basic dynamics of a regular premium annuity treaty.

Regular premium annuity treaty overview



The typical structure of the regular premium annuity treaty is best illustrated by means of an example:

The Defined Benefit scheme has to pay Mr X (pensioner) a guaranteed amount of GBP 50,000 pa for as long as he is alive. Let us assume he is 65 years old and is expected to live another 17 years. As a result of the considerable uncertainty around future mortality improvements, there is a very real possibility that Mr X will live for a longer period than the expected 17 years. In this case, the scheme is likely to have underestimated the assets required to match this liability, which may result in an eventual deficit in respect of this member.

Of course, Mr X may die sooner than expected, in which case the scheme will realise a surplus. It is this uncertainty and potential for downside that is a source of risk for the scheme. Under a regular premium annuity treaty, the pension scheme can exchange (swap) this uncertain series of cash flows for a pre-determined, certain set of cash flows.

Under such an arrangement, the insurer/reinsurer commits to paying the actual annuity payments as and when they become due, which will be for as long as the annuitant is alive. In return the scheme pays a pre-determined series of cash flows to the insurer/reinsurer that represents the expected payments that would be made (based on a base mortality table and expected future mortality improvements). This is typically a decreasing series of cash flows and is payable up to an age beyond the expected life expectancy of the lives covered, for example up to age 100.

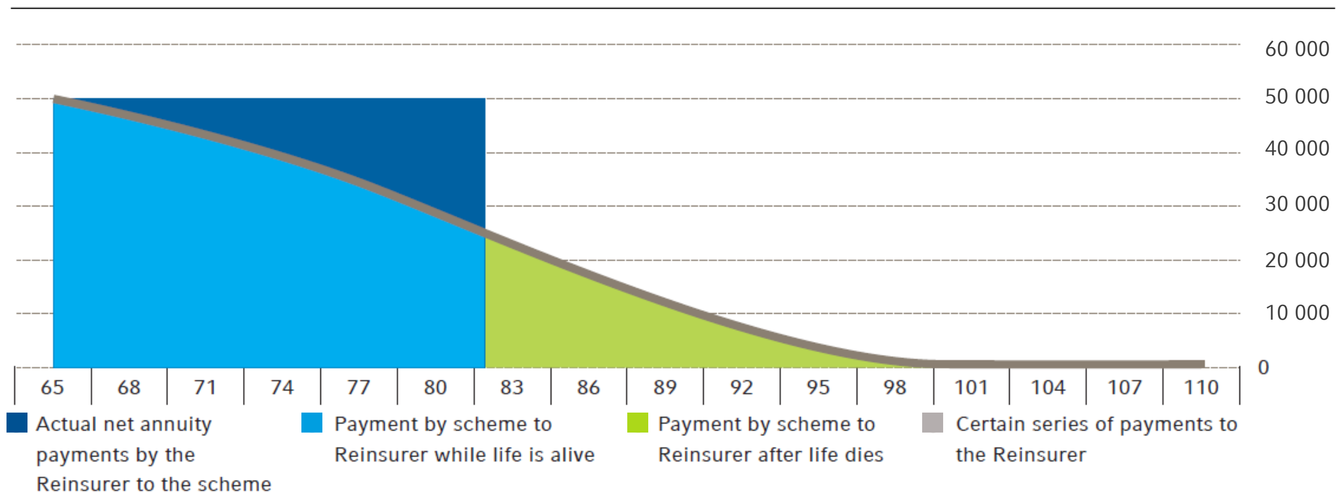
Longevity risk transfer will play an even more important role in the years to come.

Assuming Mr X lives up to age 82, the graph below illustrates the cash flow components.

The sum of the light blue and dark blue sections represents the actual annuity paid, by the reinsurer, up to the death of the annuitant. The light blue and grey sections together represent the premiums payable by the scheme to the reinsurer. This portion is guaranteed and agreed upfront. If Mr X lives exactly as long as expected, one will see the dark blue and green sections being approximately equal.

Under this arrangement, the scheme still retains the investment risk and reward, but the size and duration of payments to pensioners are now known at the outset. The result is a transfer of the longevity risk inherent in the scheme.

Cash flow component illustration in GBP



Our longevity solutions

Hannover Re has been the market-leading reinsurer in the UK longevity market for many years. Having entered the market in 1995 with the launch of enhanced annuities, we have written over GBP 5 billion single premium of enhanced annuities. Using our expertise built up in reinsuring enhanced annuitants, we entered the emerging area of pension buyouts for UK Defined Benefit pension funds and regular premium annuity treaties in the early days'.

Our longevity solutions are highly tailored and customised to our clients' needs, drawing on global experience and capacity.

With the rapid expansion of the pension buy-out market we have concluded transactions (in terms of net present value of premium) in the order of GBP 18 billion in the UK pension fund buyout market. We believe that there is significant potential for reducing the longevity risks faced by Defined Benefit retirement schemes in non-UK markets.

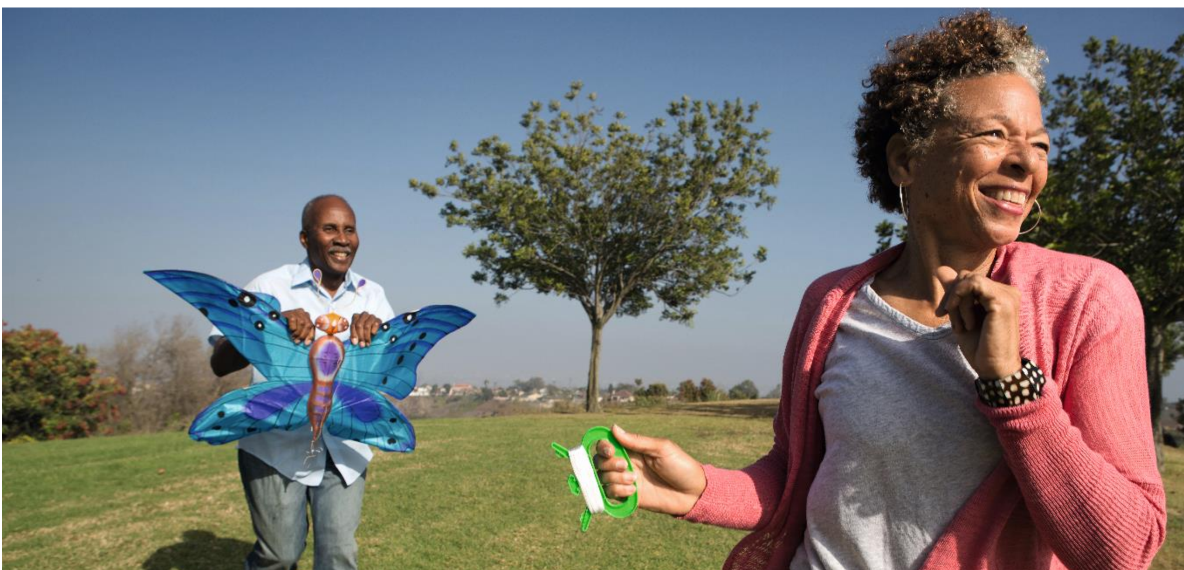
With our expertise build in the UK we now focus on worldwide developments. Enhanced annuities are also sold in South Africa and we are evaluating the opportunities for enhanced annuities in Australia where currently regulatory changes offer great chances for enhanced annuities.

Solutions for other markets are flexible annuity concepts, such as a combination of drawdown and a deferred guaranteed lifelong annuity. Here the clients can flexibly withdraw their money say from age 65 to 85 and from age 85 a lifelong annuity will be paid.

Another concept offers flexibility with regard to the investment options. The reassurance is based on so-called units where the fund value is converted to an amount of units. The guaranteed income is based on units and the actual annuity payments depend on the unit value.

Concepts range from solutions for long-term care, equity release to index solutions.

These concepts are not exhaustive and we look into each and every market and the specific customer need to develop tailor made solutions. We are well placed to discuss options and present ideas.



Hannover Re is a market leader in the longevity market.

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