

AVIVA TRANSFERS LONGEVITY RISK TO THE CAPITAL MARKETS

Recently, Aviva transferred a total of £475m in annuity and pension liabilities into the capital markets through a longevity swap. This transaction was arranged by the Royal Bank of Scotland which syndicated the risk to Partner Re and a number of other institutional and private investors.

In this *Update* we look at the motivations, structure and benefits that this longevity swap transaction brings to Aviva, as well as the wider implications for risk transfer to the capital markets in the future.

INTRODUCTION

Although the ability to transfer longevity risk to the capital markets has been widely talked about, only a handful of transactions have been completed globally despite the demand for these solutions. Most of the major transactions have been executed in the traditional pension or bulk annuity buyout sector. Such transactions, however, have not been done to solely address longevity risk in isolation, but in conjunction with asset and investment risks.

Longevity swaps are therefore a welcome development for pension fund sponsors and trustees, especially at a time when historically low bond yields have significantly increased the cost of buyout solutions. These also provide an attractive and valuable alternative to insurers and companies seeking a more limited form of longevity protection without the need for a large cash payment or asset transfers upfront. This is typically required in pension or annuity buyouts as well as by investors seeking low market correlation assets.

Longevity swaps can be applied to insurance annuity liabilities, pension liabilities or based on a mortality index. In a similar fashion to JP Morgan's

LifeMetrics mortality derivatives, these longevity swaps provide an alternative format to hedge longevity risk on a more bespoke basis. As the Aviva-RBS swap references an actual portfolio of liabilities instead of a customized population index, this removes basis risk during the life of the swaps.

While pension buyouts are generally aimed at transferring the pension scheme's risks (usually in respect of current pensioners), the longevity swap entered into by Aviva focuses specifically on addressing the longevity risk. Unlike a pension or annuity buyout, longevity swaps do not require a transfer of assets to a counterparty or the ultimate risk holder, and the original liabilities and scheme administration remain with the sponsoring life insurance company or pension fund. As such, Aviva's longevity swap retains a number of risks, notably asset, operational and reputational risks on its own balance sheet. In return, Aviva can still benefit from any upside through any investment outperformance on its underlying asset portfolio.

While the tenor of pension or annuity buyouts are often undated (ie, until the last liability of the risks transferred has been extinguished), longevity swaps, in

comparison, are typically structured with a finite term. The longevity swaps already transacted to date, (eg, JPMorgan-Canada Life UK swap) have also been relatively small in size compared to annuity buyouts, although there is the potential for larger transactions to be done as these swaps become more common in the future. In particular, the Aviva-RBS swap may be followed by subsequent transactions to increase the amount of risk transferred to the capital markets.

LONGEVITY SWAPS – KEY MOTIVATIONS FOR AVIVA

The Aviva-RBS longevity swap:

- Reduces exposure to “at-the-money” longevity risk and allows Aviva to write more annuity business in the future;
- Introduces price tension between the capital and reinsurance markets that can be used to price annuity products;
- Develops a platform for future transactions and demonstrate financial flexibility and innovation to Aviva's stakeholders; and
- Allows Aviva to report improvements to its capital position as well as reported IFRS and MCEV figures (although we understand the impact to be small).

UPDATE

THE AVIVA-RBS LONGEVITY SWAP TRANSACTION

In March 2009 £475m of longevity linked liabilities originated by Aviva were placed into the capital markets through a longevity swap transaction arranged and syndicated by Royal Bank of Scotland (RBS).

Aviva's transaction allows it to transfer the longevity risk arising from a part of its UK annuity business to capital markets investors in the form of a 10-year swap. The swap allows Aviva to make the expected annuity payments that are pre-determined at the outset in respect of a portfolio of 70,000 male and female annuitants aged 80 to 100. In return, investors will make the actual payments to Aviva. After 10 years, the swap terminates using a commutation mechanism so that Aviva is at least partially hedged against longevity risk after the life of the swap.

It is understood that the amount of risk transferred in relation to the overall annuity liabilities is relatively small. The risk notional is £50 million and represents the undiscounted present value of the maximum possible loss to all investors over the life of the swap.

As arranger and bookrunner, RBS has syndicated the transaction to a small number of end investors, with Partner Re as the lead investor in the transaction. The cost of the longevity swap is not disclosed.

TRANSACTION OVERVIEW

The transaction shown in Figure 1 has been structured with the following features:

- Aviva enters into a 10 year reinsurance agreement with a Guernsey Incorporated Cell Company (which is similar to an Insurance Special Purpose Vehicle) that reinsures the reference portfolio of annuitants. This portfolio of annuitants is fixed at the outset and there is no scope for any new business to be included.

- The holding company for the Guernsey Incorporated Cell Company is owned by RBS via an equity holding, and is capitalised adequately to ensure that it can meet its obligations under the reinsurance agreement with Aviva.

- The Guernsey Incorporated Cell Company enters into a mirroring swap with RBS that reflects the terms of the reinsurance agreement with Aviva. This transforms the original longevity exposure acquired from Aviva through reinsurance into a swap format.

- RBS syndicates the longevity exposure to investors by entering into a total return swap (TRS) with each investor. The longevity risk is now ultimately borne by the investors.

The use of a Guernsey Incorporated Cell Company structure has a number of advantages:

- It allows all parties to transact in their preferred legal formats.

- For Aviva, it enters into a reinsurance agreement with the Guernsey Incorporated Cell Company and benefits from achieving the necessary treatment as a reinsurance contract. This should enable Aviva to offset any changes in the liabilities of the reference portfolio directly against the value of the swap. By transacting as a reinsurance contract rather than a swap, Aviva is not required to reflect the ongoing mark-to-model value of the swap on its balance sheet.

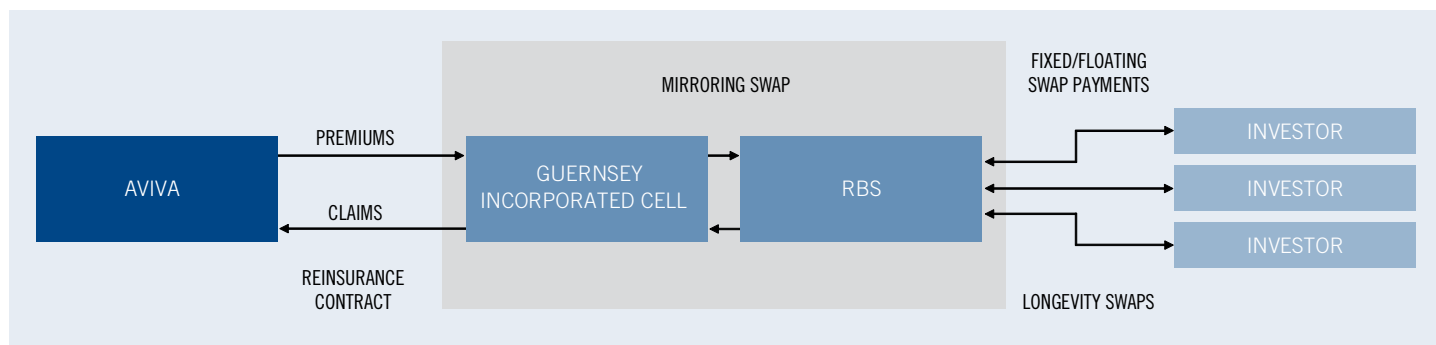
- For investors, an ISDA-based swap contract presents a familiar legal structure, and it is effected with a recognised counterparty.

- In other words, the Guernsey entity acts as a 'transformer' entity to convert the longevity exposure from a reinsurance contract into a TRS.

- The Guernsey entity has a legal structure that is attractive to risk cedants, sponsoring banks and investors. As each cell (within the Incorporated Cell Company structure) is separately incorporated and are legally distinct entities, new cells can be created to transact similar swap transactions in the future with the benefit of legal separation from previous transactions.

- It puts in place the necessary infrastructure designed to enable Aviva to "upscale" their longevity risk transfer in the future. This provides Aviva the flexibility and the option to enter into repeat transactions in the future opportunistically and secure longevity protection when market prices are favourable as well as spreading the initial set-up cost of the structure over time.

FIGURE 1 Transaction overview – General structure



Recourse under the reinsurance contract

In the event the Guernsey entity is unable to meet its reinsurance obligations to Aviva, that the structure of the swap allows Aviva to “look through” to RBS via the Guernsey entity’s mirroring swap with RBS. This effectively provides Aviva with legal recourse to a major counterparty in RBS. As such, Aviva ultimately faces the counterparty credit risk of RBS, although this is largely mitigated by the margining requirements in place between Aviva and the Guernsey entity (as discussed below under Collateral arrangements).

Swap mechanics

The longevity swap is structured similarly to a TRS although it differs from a traditional TRS in that there is no ‘swap notional’ on which the value of cashflows in each period is based. Instead the ‘fixed payments’ are specified in advance based on expected annuity payments arising from the reference portfolio. Meanwhile, the ‘floating payments’ are determined by Aviva’s payment obligations that are linked to its actual mortality experience.

Swap calculations in respect of marking the swap positions and determination of the value of collateral required are performed on a monthly basis.

Aviva pays premiums to the Guernsey entity for assuming the longevity risk of the underlying annuity portfolio similar to the ‘fixed payments’ of the swap. In return it receives the actual annuity payments from the Guernsey entity similar to the ‘floating payments’ of a swap. This exchange of payments effectively protects it from any deviations in the longevity experience of the underlying portfolio.

In each calculation period, the Guernsey entity pays the ‘fixed payments’ to and receives the ‘floating payments’ from RBS via the swap. Similarly RBS passes these payments directly to and from the investors via each TRS arrangement.

If mortality is lighter than expected in a particular calculation period, Aviva will expect to receive a net payment from the Guernsey entity. This payment obligation is subsequently passed through the structure via RBS onto the investors, who will make a loss for that calculation

period. Conversely if mortality is heavier than expected, the flow of funds will move in the opposite direction from Aviva to the investors, who make a gain for that period.

Each combination of fixed-floating payments between the TRS and the mirroring swap is expected to occur simultaneously, which reduces the level of liquidity risk associated with a mismatch in timing for RBS. We understand that since the payments under the reinsurance contract (with Aviva) are structured very similarly to those under the TRS (with investors), the basis risk exposure to the Guernsey entity and RBS is expected to be very small.

Commutation and final termination

The transaction features a commutation mechanism at the end of the 10 years, which is also the final swap termination date. This places a final date on the liabilities and limits the investors’ exposure at the end of the 10-year tenor, which is an attractive feature for many capital markets investors.

The commutation feature is designed to put a final settlement value of the swap at the swap's 10 year termination date. The commutation payment captures the mortality experience over the 10 year life of the swap and applies this experience to expected future payments from the termination date onwards. This ensures that Aviva remains partially protected against longevity risk to the degree that has been allowed for in the commutation formulae after the swap has matured, and increases the overall effectiveness of the swap as a hedge for Aviva's longevity risk.

This is achieved by using a formulaic basis to calculate the commuted value by using a mix of current assumptions of future mortality (after the 10-year tenor) and the actual mortality experience over the life of the swap:

- The level of protection that Aviva has against such deviations will depend on updated expectations of future mortality experience against the assumptions used in the commutation formula.

- The longevity experience in the period after the 10-year period may be different from that assumed in the final commutation of the swap. Aviva is therefore exposed to a degree of longevity basis risk after the life of the swap. This deferred exposure would need to be taken into account when considering capital requirements under Pillar II and on an ICA basis (discussed below).

- This expectation of future mortality is calculated using a formula specified at the outset of the transaction. The commutation formula takes account of mortality experience in the previous years of the transaction and volume of annuities in force at the time that swap is marked to model.

It is worth noting that the majority of the longevity risk lies at the tail, ie, corresponding to the extreme older ages where there is usually less reliable information on mortality rates or trends. Nevertheless, given the fixed and relatively short maturity date of the swap, the risk of duration mismatch is minimized by including only older lives aged 80 or more under the transaction. This is so that the bulk of the longevity risk, (represented by the older lives) will be well covered within the 10-year life of the swap.

Collateral arrangements

The recent collapse of Lehman Brothers has demonstrated the importance of counterparty risk and benefits of adequate collateralisation. Similar to many swap transactions, the counterparty credit risk exposure between parties under the Aviva-RBS transaction is mitigated by posting collateral, determined using a proprietary 'mark-to-model' method on a monthly basis.

Similar (although not identical) margining requirements are in place across all structural parts of the transaction, ie, between Aviva and the Guernsey entity, between the Guernsey entity and RBS, and between RBS and individual investors. Any changes in the mark-to-model value of the swap over time will require collateral to be moved between Aviva and individual investors (and vice versa) through RBS and the Guernsey entity.

In addition to the customary downgrade provisions, it is likely that the amount of collateral posted will be determined by a number of factors that reflect the level of credit exposure under the transaction:

- Experience data observed in respect of the reference portfolio
- The expected future mortality of those lives (and the extent to which future expectations have changed over time)
- The discount rate used to calculate a present value
- Certain events eg, rating agency downgrades, cross-default provisions, breach of certain conditions, representations or warranties

The collateral to be posted by either side is calculated by RBS as calculation agent. The collateral arrangements between RBS and the investors have been individually negotiated depending on the level of counterparty credit risk of each investor. The criterion of eligible collateral is also understood to be restricted to high-grade securities of appropriate maturity.

Notwithstanding the collateral provisions, RBS is still exposed to the credit risk of the investors under more extreme scenarios (and vice versa). This could occur, for example, in the event of a sudden and substantial increase in expected longevity of the reference portfolio. If an investor were to default before the longevity swap can be recalculated to determine the increase in collateral required for the next calculation period, RBS would be faced with a shortfall in funds. This is because the existing collateral would be insufficient to cover the defaulted payment due from the investor, and RBS would be obliged to cover any difference owing to Aviva (via the Guernsey entity) out of its own resources.

AVIVA-RBS LONGEVITY SWAP – SUMMARY OF KEY FEATURES FOR AVIVA, INVESTORS AND RBS

Aviva

- Aviva mitigates its longevity risk exposure through transferring the “at-the-money” risk in respect of a fixed reference portfolio of male and female annuitants aged 80 and above.
- Aviva enters into a reinsurance agreement, which is the legal format preferred by Aviva, with an RBS-sponsored Guernsey Incorporated Cell (under a Guernsey Incorporated Cell Company structure) in a way that is similar to transacting with an Insurance Special Purpose Vehicle in the UK.
- Aviva also benefits from margining provisions with the Guernsey entity, which reduces any credit exposure it has under the transaction.
- The Guernsey Incorporated Cell Company structure provides Aviva with a more efficient platform to follow up with further swap transactions in the future.
- The reference portfolio is based on actual annuities in existence leading to an indemnification transaction as opposed to an index based payout.

Investors

- Investors enter into an OTC swap contract with a recognised counterparty, RBS. As a swap format does not require upfront payment of the swap notional, the structure has built-in internal leverage that enhances the expected returns for investors.
- The swap transfers only longevity risk without any asset or investment risk, bringing the benefits of diversification.
- The deal features a finite term and commutation which places a final date on investors' exposure to the underlying longevity risk.
- The reference portfolio is fixed and the longevity exposure is known from the outset.
- The undiscounted present value of the notional at risk placed with several investors is £50m. The notional at risk is limited thereby allowing investors to enter the longevity risk market with limited downside.

Royal Bank of Scotland

- Specific mark-to-model collateral arrangements with individual investors are used to manage RBS's credit exposure to each counterparty on a monthly basis. This arrangement provides RBS and investors with a measure of protection against counterparty exposure on an ongoing basis.
- The intermediate payments with investors and the Guernsey Incorporated Cell Company are structured so as to minimise liquidity and timing risk of swap payments.

Swap termination provisions

In common with many other “over-the-counter” derivatives, there are no provisions for investors to terminate the swap. Each investor may only transfer their rights and obligations by mutual consent to a third party. Given the private nature of the transaction and the small number of investors involved, the secondary liquidity of this swap is expected to be limited.

IMPACT ON REGULATORY, IFRS AND EV REPORTING

A longevity swap will affect a number of separate reporting metrics: Pillar I, Pillar II, IFRS, Solvency II and Embedded Value. Overall the impact on these metrics is expected to be small given the small amount of risk transferred to investors relative to the size of the liabilities. However, should this change in future swap transactions, this would have a more significant impact on Aviva's capital position.

Pillar I

Aviva was able to release an amount of Pillar I reserves as a result of this longevity swap. The release of Pillar I reserves is driven by the difference between the best estimate level “plus risk margin” at which the swap was struck compared to the longevity assumptions used for the Pillar I reserves. As the capital held under Pillar I is simply a proportion of reserve, there will be a corresponding reduction in capital held in proportion to the reduction in reserve.

Pillar II/ICA

It is likely that the swap has been written well inside an ICA longevity stress level. Therefore, the amount of longevity risk capital should reduce under a Pillar II/ICA basis, although some of this benefit is likely to be offset against an allowance for additional capital that is needed to be held against credit risk. The increase in credit risk capital, however, is likely to be mitigated through the margining requirements when the swap position moves in favour of Aviva.

On day one of the transaction, it is expected that the key impact of the swap is to reduce Aviva's longevity risk component, and as such, Aviva's net capital position should be positive on an ICA basis. Going forward, the capital impact can be expected to be determined by a number of factors:

- The extent of any change in the credit risk of RBS, eg, market perceptions that are reflected by CDS (credit default swap) prices or corporate credit spreads.
- Any change in longevity experience over the life of the swap.

IFRS

The longevity swap has benefited Aviva's IFRS position.

To the extent that Aviva's IFRS reserves are similar to its Pillar I reserves we would expect a similar reserve release under IFRS.

However, IFRS allows for a more fair value type approach when setting reserves which would reduce the IFRS reserve release compared to Pillar I.

Solvency II

This transaction should also affect Aviva's Solvency II SCR requirement in respect of longevity risk. The SCR for a longevity linked liability is calculated using the formula in Figure 2.

Given a fixed percentage decrease in mortality at all ages, the change in NAV will be the greatest (as a proportion of the original liability) for older ages. As such, by including only the older lives, the swap will have the biggest impact in reducing Aviva's Solvency II capital requirement. In a similar fashion to the ICA, the Solvency II SCR requirement will also need to allow for counterparty risk.

Embedded value

This transaction has allowed Aviva to report an increase in its Embedded Value on a market consistent basis.

The impact on Embedded Value depends upon the level at which the swap is struck. This impact (after allowing for the cost of capital) will be positive if the best estimate level "plus a risk margin" (at which the swap is struck) is less prudent than the reserving basis. Given that the transaction has been accretive to Aviva's MCEV, it suggests that the swap has been struck at more favourable terms than the reserving basis.

To the extent that capital held is reduced by the transaction, Embedded Value should increase on both a traditional and a market consistent basis, although the increase is likely to be small in overall terms given the size of the swap relative to Aviva's total business.

FIGURE 2 The SCR for a longevity linked liability is calculated using the following formula

$$\text{Life}_{\text{long}} = \sum_i (\text{Change in NAV} / \text{longevity shock})$$

Change in NAV = Change in value of assets less liabilities for business

Longevity shock = Permanent 25% decrease in the mortality rate for each age

TOWERS PERRIN OPINION

Investor market and appeal

For investors, the Aviva longevity swap allow investors to gain exposure to a risk that should, in theory, exhibit lower correlation with market risk on a transaction-by-transaction basis, in an investor-friendly format of an over-the-counter (OTC) swap.

At present the investor market for longevity is still small relative to the more established insurance risks. For capital markets investors already familiar with longevity risk, these swaps represent an opportunity for them to gain exposure to a diversifying risk in a format that they are familiar with. Given the current imbalance between the supply and demand for longevity solutions, the yields are likely to be attractive (on both an absolute and relative basis) to such investors looking to maximize the 'alpha' component of their investment returns. Compared to longevity bonds, longevity swaps do not need a formal rating and are much more efficient to execute. Longevity swaps also have an element of built-in leverage within the structure to enhance expected returns that would have been highly appealing to investors, particularly under the current environment where acquiring external leverage is difficult, if not impossible.

Given the relative illiquidity of the Aviva longevity swaps, it is likely that the investors have adopted a "hold-to-maturity" approach to their investments. These investors may also reap some additional benefits to the extent that there are novelty (and illiquidity) premiums for bearing longevity risk this way. The private nature of the transaction allowing certain investors to remain anonymous may also be an attraction of these longevity swaps.

Longevity risk transfer

The growing demand for longevity risk bearing capital has led to the use of longevity swaps as a solution to address the ever growing concerns of both insurance companies and pension funds. Given its size, Aviva is probably better placed than other smaller entities to make use of these alternatives at its disposal: it has a large portfolio of annuities and is therefore more likely to have sufficient mortality experience to make a better estimate of future mortality trends.

Aviva has reported that achieving capital benefits has not been the main objective of their first longevity swap transaction. On a forward-looking basis, it is likely that transactions will be done by sponsors with the aim of reducing their regulatory capital requirements. As such, the degree of risk transferred in these swaps is expected to increase, particularly under Solvency II.

In entering into the swap, Aviva also gains some limited access to pricing levels for longevity risk in the capital markets. It also demonstrates its intention to use both capital markets and traditional reinsurance channels to optimise the cost it pays for longevity cover, and factoring into its annuity prices. Aviva's swap structure gives it the option to enter into repeat transactions on an opportunistic basis to secure longevity protection when market prices are favourable, and signals to capital markets investors further potential transactions to come in the future.

CONCLUSION

Although the market for longevity swaps is still in its infancy, Aviva's example is likely to move life insurance companies and occupational pension funds – the largest net holders of longevity risk in the UK – to consider the range of options available to mitigate some of their own longevity risk. Market participants have reported that a number of entities are already actively working on similar transactions. Insurance companies will be keen to look towards looking at alternatives outside reinsurance to hedge their longevity risk. Corporations, meanwhile, will seek a cost efficient way to protect their balance sheets and financial performance from any unexpected liabilities associated with their pension funds.

To date only a small number of investors have participated in these swaps. Given the private nature of these transactions, market participants across the longevity risk transfer sector – both traditional and non-traditional – have yet to benefit from increased liquidity and greater price transparency, and there may still be some way to go for the market to develop before this can be achieved. This will only start to come about if more transactions of a similar nature are completed in the future as expected, in the light of the demand for longevity solutions.

ABOUT TOWERS PERRIN

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