

Longevity and mortality risk transfer in the capital markets through the LifeMetrics platform

Abstract

Longevity and mortality risks respectively reflect the financial consequences of groups of individuals living longer or dying more quickly than expected. For example, an insurer with an annuity portfolio making payments to policyholders until their death is financially exposed to those individuals living longer than expected. Conversely a life insurer writing life insurance business that pays out on the death of policyholders is financially exposed to increases in mortality levels.

Until recently longevity and mortality risks had only ever been transferred through insurance and re-insurance transactions. Recently, however, a capital market for the transfer of these risks has emerged and transactions in this new market have now been completed. As a result life insurers can now hedge their longevity and mortality risks using capital markets instruments that offer additional risk bearing capacity, diversification of sources of capital and a level liquidity that cannot be matched in the insurance markets. The key players in this market are hedgers (pension plans and insurance companies), intermediaries (investment banks and broker-dealers) and investors (insurers, re-insurers, insurance linked securities (ILS) funds, hedge funds, endowments, etc.).

Historically a lack of familiarity and poor understanding of longevity and mortality risks, together with a lack of standardised risk-transfer instruments, have hampered the development of this market. But the introduction of longevity and mortality toolkits, indices and standardised instruments have addressed these issues and served to foster the emergence of this market. For liquidity to develop further requires broader acceptance of longevity indices and of standardised instruments to transfer this risk.

Until now, hedgers of longevity risk have almost exclusively approached the subject from the perspective of indemnification (100% risk transfer). While this is an effective approach, we wish to describe an alternative approach based on a risk management paradigm that does not require 100% risk transfer and is consistent with the way in which other pension-related risks are managed. This alternative approach consists of a framework for longevity hedging based on standardised longevity index-based hedges. It uses standardised hedge "building blocks" that can be combined to provide a longevity or mortality hedge tailored to the specific profile of demographic risk in the portfolio. The effectiveness of this hedge is maximised by calibration of the mix of building blocks and then verified in hedge effectiveness tests. Hedge effectiveness measure the residual longevity/mortality risk remaining after the hedge is executed and reflects the basis risk between the portfolio longevity and the index longevity. This residual basis risk can be minimised in the calibration of the hedge.

These standardised index-based hedges can be targeted to stabilise either liability cashflow or value. Cashflow hedges are typically structured so that the insurer pays a fixed pre-defined cashflow and receives payments that match the cashflows paid out to policyholders. These latter payments will vary with mortality and longevity experience and a cash flow hedge removes this variation in the net amounts paid by the insurer. On the other hand, value hedges are based around protecting the insurer against changes in the value of the liabilities due to changes mortality and longevity experience or expectations. For example, if mortality rates fall faster than expected (corresponding to unexpected increases in life expectancy), a value hedge would provide a payoff designed to match the associated increase in reserves.

We also discuss customised longevity hedges designed to effectively provide indemnification by hedging the longevity risk associated with the actual portfolio of policyholders. Because there is no residual basis risk, these will be preferred by some hedgers who are unconcerned by the lower liquidity and onerous requirements for data disclosure associated with such hedges, and who are prepared to pay the additional premium above the cost of a standardised hedge.

Notable capital markets longevity transactions that have been announced publicly include:

1. a LifeMetrics longevity index hedge executed with Lucida plc, a UK regulated insurance company, to hedge longevity risk in an underlying annuity portfolio and
2. a customised longevity swap hedge covering GBP 500 million worth of UK retirement pensions with Canada Life.

We also describe the current state of the market, the forces influencing longevity supply and demand and the potential for market growth in the coming years.