MORTALITY ASSUMPTIONS AND LONGEVITY RISK

Pablo Antolin
OECD Financial Affairs Division

BETTER POLICIES FOR BETTER LIVES

Purpose: Policy questions

- How important longevity risk (LR) is or could be?
- What can be done: How to manage LR?
- OECD work tries to assess longevity risk on pension funds and annuity providers in several OECD and non-OECD countries

Why LR is important?

- Many ways of defining longevity risk
  - For individuals LR is the risk of exhausting their own resources to finance retirement and fall into poverty
  - For pension funds, with a pension promise, and annuity providers (e.g. insurance companies) is the risk that future payments may turn out higher than expected
- Focus on impact of LR on pension funds and annuity providers.
- LR can bankrupt them or lead them to insolvency: payment commitments can turn out to be much higher than what they planned and reserved for.

Why LR is important?

- Pension funds and annuity providers use mortality assumptions (age-specific probabilities of dying or surviving) to determine how much they can pay to pensioners or annuitants given their contributions and/or assets accumulated.
- Those mortality assumptions are about future probabilities of dying, which by definition are unknown or uncertain
- The deviation between those assumptions and the future realisations of those mortality rates could lead pension funds and annuity providers to have bigger liabilities that provisioned for.

What do we do in the OECD project?

1. Assess how important LR is

- Look at the mortality assumptions used by pension funds and annuity providers.
  - Mortality tables required by the pension and insurance regulators (regulatory tables)
  - The most common tables used by the industry, which can be different (more conservative) than those required by the regulatory framework
- Project future improvements in mortality and life expectancy using standard mortality projections models (LC, CBD, P-Splines, CMI)

What do we do in the OECD project?

- Measure the potential amount of LR: the difference between what is accounted or provision for (given by the mortality tables used) and what it may turn out to be (given by the mortality models).

2. Policy discussion on how to manage LR
   - Internal management
   - Policy options to develop capital market solutions
   - What are the market failures requiring government interventions
   - Reasons why governments should issue LIB

Regulatory and market practice mortality tables

- The regulatory framework requires in some countries that pension funds and/or annuity providers use specific mortality tables.
- These tables may or may not include future improvements in mortality
- In some countries (e.g. Canada, Netherlands and UK) there are not specific mortality tables required by the regulator. Yet, the regulatory framework establishes that the tables to be used should include improvements in mortality.

- The analysis shows that pension funds and annuity providers provision inadequately for future improvements in mortality.
- Mortality tables used by insurance companies account for future improvements in more countries than those used by pension funds.

Are pension funds and annuity providers exposed to longevity risk?

- In practice, annuity providers and, to lesser extend, pension funds provision for future improvements in mortality (future improvements are taken into account when calculating liabilities and/or determining contributions, premiums and payments)
- Are they therefore free from longevity risk? Those who do not provision are not. Those who provision depend on whether their provisioning is enough.
- Do those that provision for future improvements provision or account fully for future improvements? Is it enough?

How do we go about assessing whether they are exposed to LR?

- Measure LR by comparing life expectancy and annuity premiums resulting from using the mortality rates in the regulatory and commonly used mortality tables
- With life expectancy and annuity premiums resulting from stochastic modelling of future improvements in mortality and life expectancy (BCD, LC, Splines, CMI): proxy for the future.
- Any deviation is a proxy for the amount of longevity risk they may be exposed to, which may increase their liabilities and even bankrupt them.

Results

- Longevity risk is important for pension funds and annuity providers because inappropriate provisioning for future improvements in mortality can lead them to insolvency and bankruptcy
- Despite of the use of mortality tables that incorporate improvements, LR is still a serious and large problem for pension funds and annuity providers in most countries.
- How to manage LR?

POLICY OPTIONS TO MANAGE LONGEVITY RISK

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Policy analysis: How to manage LR?

How to manage longevity risk?

- In house: actuarial valuation process
- Asset liability management
- Transfer LR to a third party: capital market solutions for LR

Potential role of government

- What are the market failures requiring government interventions?
- Reasons why governments should issue longevity-indexed bonds

Managing LR in house

- In house as part of internal risk management systems: retain risk and hold enough capital to withstand fluctuations. Actuarial valuation process. Hence
  - 1st step recognise its existence,
  - incorporate it in the actuarial valuation process,
  - use stochastic modelling,
  - update tables regularly and
  - allow for long enough periods.

Asset liability management (LDI)

- Asset liability management (LDI): link asset allocation strategies to liabilities so that returns can at least match liability streams.
- Bond-heavy allocation?
- Risk sharing via innovative products that link payments to changes in life expectancy so all stake holders share LR.

Capital market solutions for LR

- Existing arrangements to manage LR focus almost exclusively on transferring longevity risk from one party to another.
- It is reasonable to ask whether support should be given instead for instruments to hedge longevity risk.
- Distinction btw transferring all the LR or hedging (partially covering) the LR

Financial instruments to hedge LR

- Buy-outs (passing the entire scheme to a specialist insurer) and buy-outs (insuring the liabilities): Only for closed DB plans, not a general solution
- Longevity hedges
  - Forwards contracts (payments at maturity, no up-front disbursements): Q- and S-forwards
  - Longevity bonds (regular payments, coupons, up-front disbursement)
  - Longevity swaps (regular payments, no up-front disbursements)

Ranking of instruments for hedging LR

- Forward contracts & longevity swaps relatively more attractive than longevity bonds because they do not require upfront funding (but higher counterparty risk, OTC)
- Longevity swaps more useful than forward contracts in managing LR as they provide for regular payments, compared with only a single payment at maturity for forward contracts; and

Ranking of instruments for hedging LR

- Longevity swaps based on survival rates are more attractive than similar contracts based on mortality rates because the former are more closely linked to the actual longevity experience of pension funds and insurers

Misalignment of incentives

- Longevity hedges can be:
  - Individualised (bespoke longevity hedges)
  - Standardised (indexed-based hedges)
- Misalignment of incentives between pension funds and annuity providers on the one side and private investors on the other.

Requirements development capital market solutions for managing LR

- Legislation and regulation
- Market capacity and structure
- Standardisation, liquidity and transparency

Legislation and regulation

- In some countries, legislation may (dis)-encourage the use of longevity hedges by affecting the requirements for capital reserving
- Accounting rules and standards in different countries may (not) allow for adequate valuation of longevity hedging instruments
- Having hedges does not affect capital requirements

Market capacity and structure

- There are big questions about how to increase the capacity of the market for longevity hedging products: there are not natural hedgers
- It is suggested that insurance companies and reinsurers could act as intermediaries between pension funds and private investors by bundling individualised hedges and selling standardised hedges to private investors and thus taking on board the basis risk

Questions on standardisation …

- How standardisation, liquidity and transparency could be achieved in the market for longevity hedging instruments?
- Are there other viable alternatives to the issuance of longevity indexed bonds by governments for the purpose of providing publicly available reference points for pricing longevity risk?

Role governments in encouraging …

- Regulate mortality tables to include stochastic forecasts of future improvements in mortality and life expectancy.
- Government could encourage the development of a market for longevity hedging products by developing a reliable longevity index.
- Governments with small liabilities from PAYG pension should consider issuing longevity-indexed bonds.
- Governments issuing LIBs will not be taking onboard all LR, just some to encourage development capital markets (standardization, liquidity, transparency)

Other policy issues to address

- What are the market failures requiring government interventions?
  - No price to clear markets
  - Misalignment of incentives
  - Maturity mismatch
- Why governments should issue longevity-indexed bonds?
  - Systematic (cohort, aggregate) LR

Conclusions

- Longevity risk is important for pension funds and annuity providers because inappropriate provisioning for future improvements in mortality can lead them to insolvency and bankruptcy
- Despite of the use of mortality tables that incorporate improvements, LR is still a serious and large problem for pension funds and annuity providers in most countries.
- There are various approaches to manage LR. The best is a combination: internal, hedges, and LIBs

THANK YOU VERY MUCH

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