

The Impact of Ageing on Insurance: Longevity Risk

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Background

- Ageing is the result of
 - low fertility rates
 - increases in life expectancy
- Temporary vs permanent impact: baby boom (fertility) vs longevity (life expectancy).
- Unexpected changes in life expectancy (longevity risk) affects insurance companies: annuities, health care insurance, ...

Health care

- OECD Economic Department WP 477
- Gains in longevity translate into healthy ageing?
- Compressed (+), expanded (-) or balanced morbidity (occurrence of disease) or disability.

Annuities

- According to the nature of pay-out commitment
 - Fixed period annuities pay an income for a specified period of time (e.g. 10 years).
 - Lifetime annuities provide income for the remaining life of the annuitant.
- Longevity risk (unexpected changes in life expectancy) clearly affects life-time annuities.

Longevity Risk: Is it important?

- Life expectancy at birth has increased an average of 2.2 years per decade over the last century in OECD countries (OECD Economic Department WP 420).
- Projections of life expectancy have tended to under represent improvements in life expectancy.
- Unexpected changes in life expectancy of only one year can increase the net present value of annuity payments by almost 8 percent.

- Funding regulations of pension funds suggest that a deviation in liabilities calculations of more than 5% is over the acceptable margin of risk.

Under-representation of longevity gains (A)

Comparing past projections with realized gains in life expectancy

	UN	Eurostat
<i>OECD Average</i>	0.8	
<i>EU15 Average</i>	0.7	0.4
Canada	0.2	
France	0.6	-0.3
Germany	0.6	0.3
Italy	1.1	0.7
Japan	1.5	
Mexico	1.9	
United Kingdom	0.5	-0.1
United States	-0.2	

Source: UN (1999), Eurostat (2000), OECD 2005 Health Data

- A positive sign means that life expectancy in 2003 has already bypassed projected life expectancy for the average 2000-2005 (UN) and 2005 (Eurostat).

Under-representation of longevity gains (B)

Comparing past with projected gains in life expectancy
In number of years per decade

	(A) average gains 1960-2000	(B) projected gains 2000-2050 ¹	Difference (B)-(A)
<i>EU15 Average</i>	2.0	1.2	-0.8
<i>OECD Average</i>	2.2	1.2	-0.9
Canada	2.0	0.9	-1.1
France	2.2	1.8	-0.4
Germany	2.0	1.2	-0.8
Italy	2.4	1.8	-0.6
Mexico	4.1	1.2	-2.9
United Kingdom	1.8	1.6	-0.2
United States	1.7	1.4	-0.3

Source: OECD/DELSA Population database, OECD Health Data and Eurostat EUROPOP2004.

The impact of unexpected gains in LEx

- Increase in the NPV of annuity payments to an individual aged 70, 65, 55 and 35 in 2005.
- The payment is 10.000€ in 2005. Wages grow at 1.75%, inflation 1.75% and the discount rate is 3.5%
- Base case: using current life tables.
- Case 1: using projections of improvements in life expectancy at birth of only 1.2 years per decade.
- Case 2: life expectancy at birth increases a 2.2 years per decade.

Increase in annuity payments (%)		
Age in 2005	Case 1	Case 2
70	2.3%	4.4%
65	2.4%	5.7%
55	3.7%	7.2%
35	12.3%	23.5%

A fund (membership structure 2.5, 10, 25 and 52.5%)

Case 1	Case 2
7.7%	14.8%

How different market players account for future improvements in longevity?

- A big problem with tracking longevity risk is the fact that there is not a standard methodology for producing longevity forecasts (mortality calculations can be arbitrary).
- Governmental agencies project mortality and/or longevity by a mix of expert advice and extending past trends. It is a deterministic approach.
- Actuaries and insurance companies tend to use the latest available mortality tables and update only after several years (e.g. every 10 years).

How pension funds account for future improvement in longevity?

- Some pension funds tend to use current mortality tables without adjusting for future improvements in longevity.
- Others partially adjust for improvements in longevity, but they use different approaches as there is not a standard approach to account for improvement in life expectancy.
- A study by Cass Business School (2005) shows that using Danish mortality assumptions, UK pension fund liabilities turn into surplus, but using French ones liabilities increase further.

A way forward (A)

- Produce projections on mortality and life expectancy using a common methodology.
- Use a stochastic approach.
 - The CMI suggests using LC and S-splines methodologies.
- Allows the use of probabilities to assess uncertainty surrounding improvements in life expectancy. Assess risks adequately.

A way forward (B)

- Governmental agencies (National statistical institutes) have technical capability to produce them.
 - However, assumptions about overall population rather than specific populations of a certain scheme.
- Produce them for the entire population and different subgroups. Pension funds can adjust them given their current membership structure wrt the overall population structure.
- Change the regulatory framework requiring market players to account for future improvements in life expectancy.

THANK YOU!