Longevity risk: new solutions for an age old problem

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Agenda

1. **Longevity risk**
2. Retirement landscape in SA
3. Enhanced annuities
4. Institutional longevity risk management
5. Conclusion

Longevity risk – complex interaction of various factors

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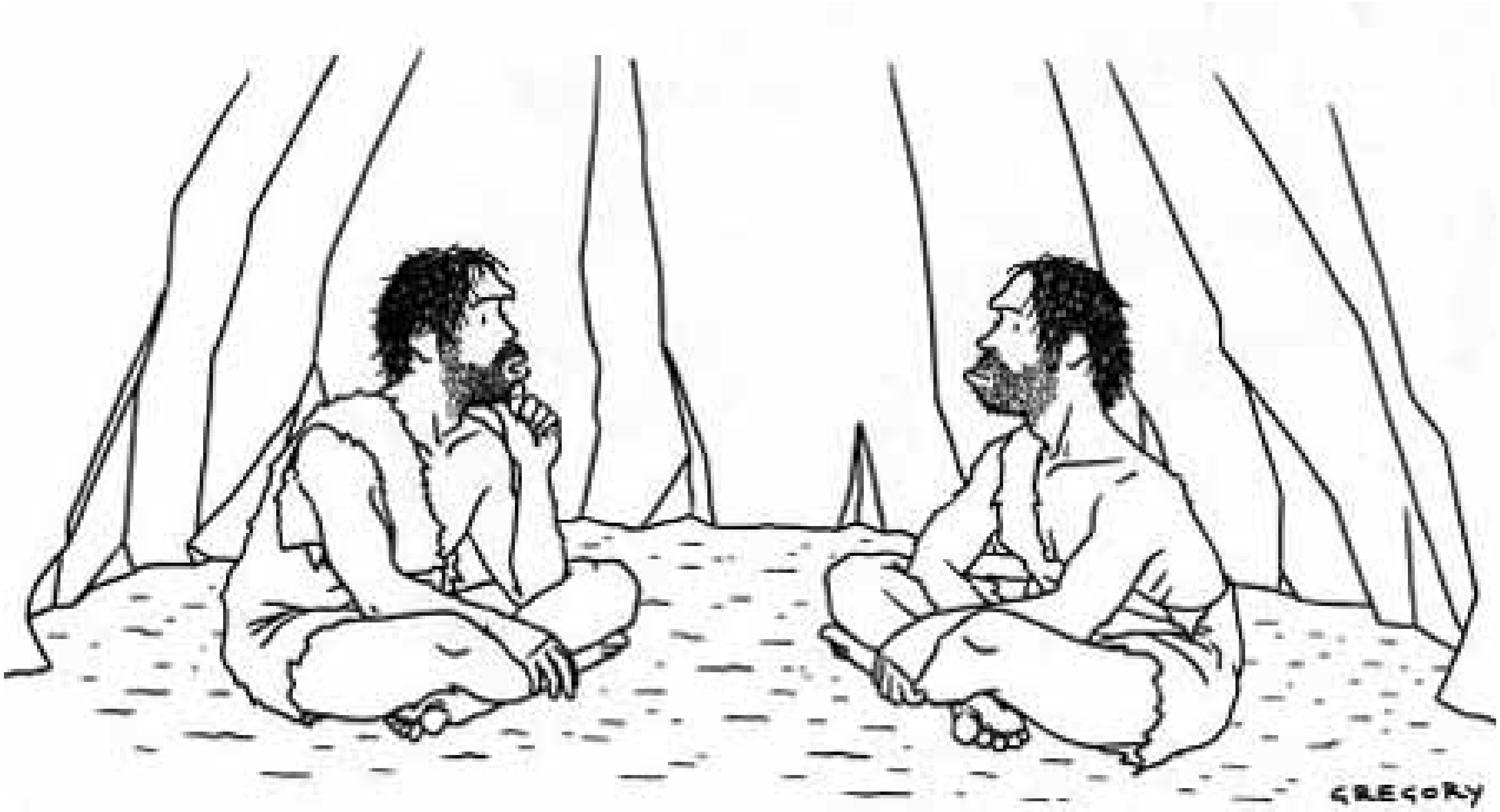
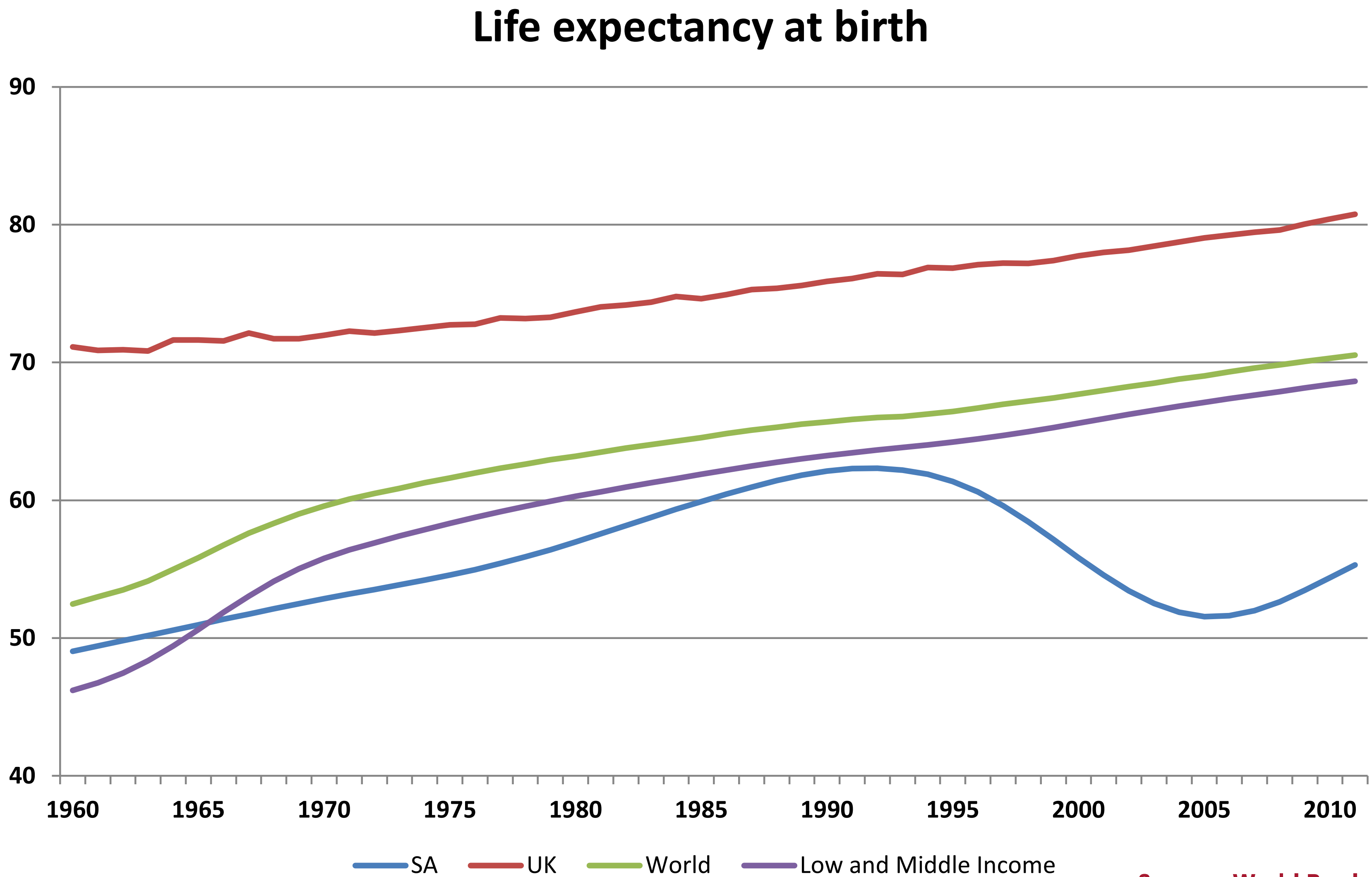


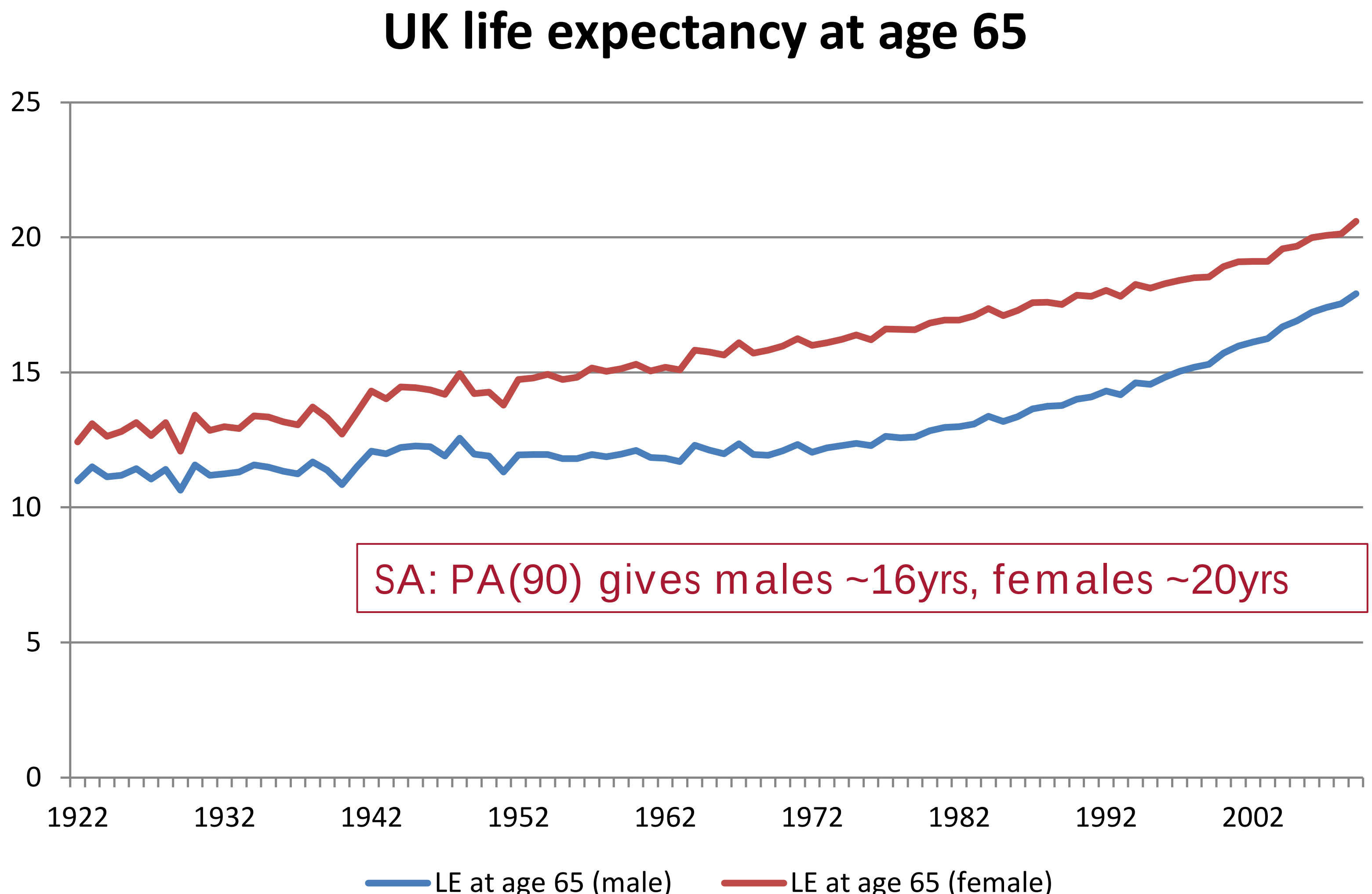
"Something's just not right—our air is clean, our water is pure, we all get plenty of exercise, everything we eat is organic and free-range, and yet nobody lives past thirty."

Increasing life expectancy



Source: World Bank

Pensioner life expectancy

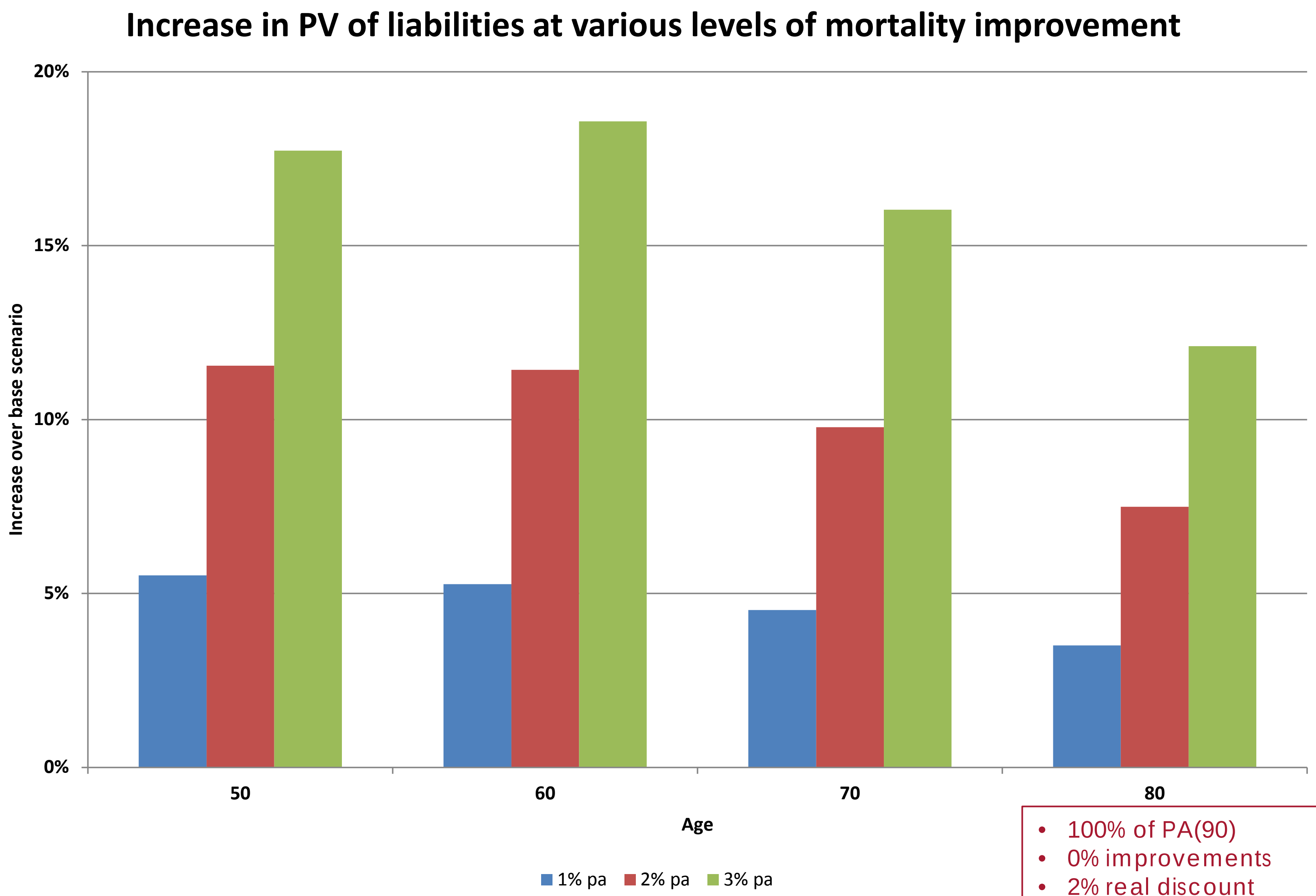


Source: Hannover Re

Longevity risk

- More than just the risk of "living too long"
  - Healthy life: Living longer than expected = risk of running out of savings
  - Sick life: risk of poor value for money in guaranteed annuity + risk of living too long if living off savings
- Compression and expansion of morbidity
  - future years that are going to be spent dependent on care
- Institutions' existing liabilities potentially uncertain:
  - Uncertainty of level of future mortality & improvements

Longevity risk



- 100% of PA(90)
- 0% improvements
- 2% real discount

Longevity risk in the news

‘Americans living longer and healthier lives’ (www. worldhealth.net 17/10/2013)

University pensions black hole 'even worse than thought’ (www.bbc.co.uk 24/10/2013)

Serco pays £17m to fund deficit, close defined benefit pension fund (www.ipe.com 30/8/2013) (www.ipe.com 13/5/2013)

UK DB pension scheme deficits up to £257bn (www.theactuary.com 13/5/2013)

Pension deficits still widening at top UK companies – report (Reuters 6/8/2013)

Pension scheme deficits up 'at worst time’ (www.bbc.co.uk 9/4/2013)

Pension deficits: An inescapable problem (www.financialdirector.co.uk 17/9/2013)

BDP offloads 'unaffordable' £88.3m pension deficit (www.architectsjournal.co.uk 9/8/2013)

Deficit widens at BT Pension Scheme as liabilities grow (www.ipe.com 13/5/2013)

Warning over final salary schemes as combined pension fund deficit grows (www.theguardian.com 14/5/2013)

Cadbury blames scheme deficit for cutting pensioner hampers (www.professional pensions.com 16/8/2013)

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SA landscape

- Typical 3 pillar system found in many countries
- Mandatory annuity purchase for pension funds and RAs
  - 2011: ~R31bn market (2003: R8bn)
- Options fairly simple:
  - Guaranteed/conventional annuity
  - Living annuity ("ILLAs")
  - % of single premiums used to buy guaranteed annuities:
    - 2003: 50% of single premiums
    - 2011: 14% of single premiums used to buy guaranteed annuities
      - Source: Treasury – Technical Discussion Paper B, Sept 2012

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Introduction to enhanced annuities

- Underwriting for traditional life cover is well established
  - Medical history, education, income, occupation all used to categorise and rate risks.
- Traditionally different approach for prospective annuitants
  - Annuity rate will be a function of lump sum amount, age, gender, prevailing interest rate term structure
  - Puts individuals in poor health (relative to the annuitant basis) at a disadvantage

Introduction to enhanced annuities

- How big is the difference in mortality?

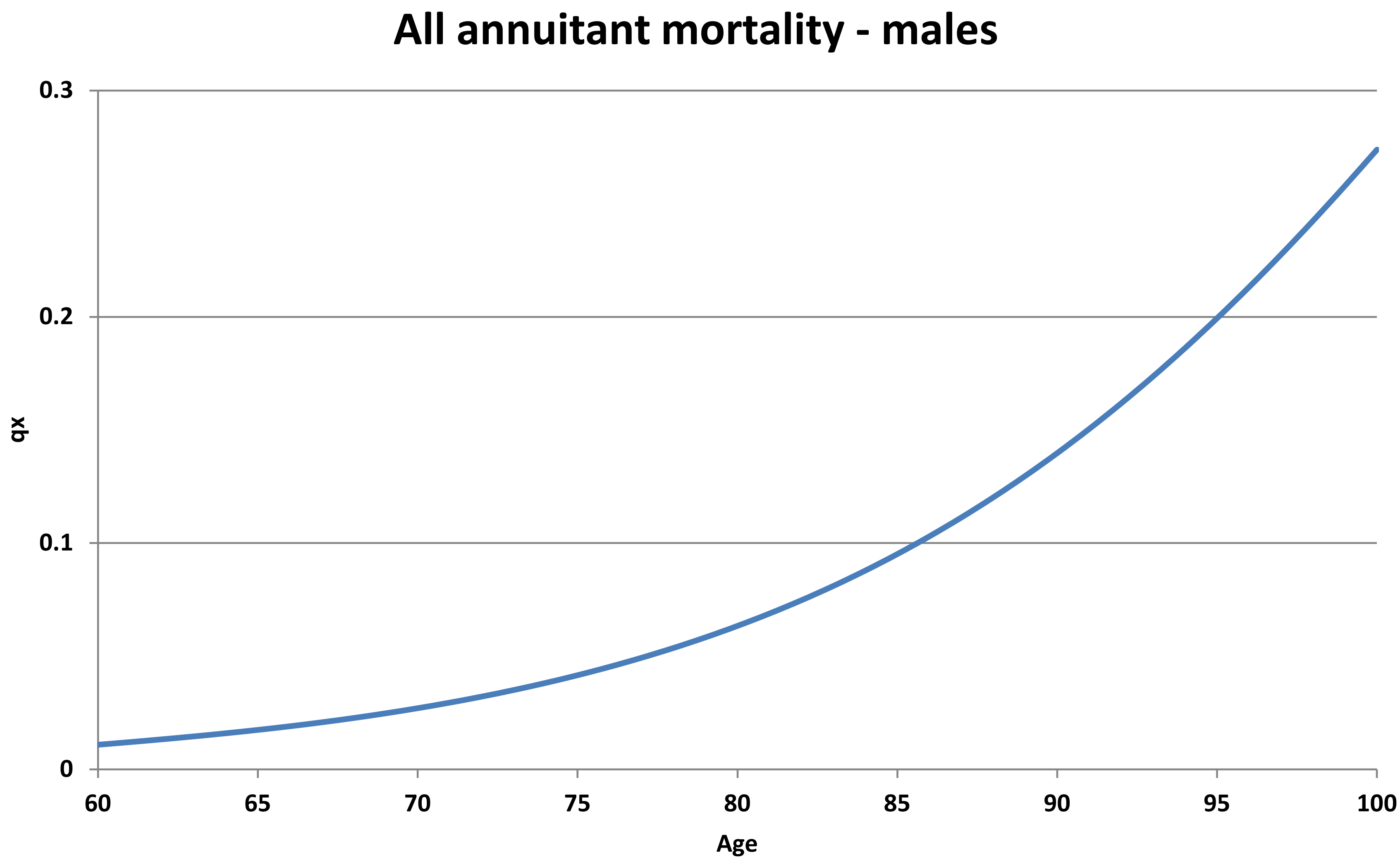
vs.

(Bob, aka Mr. Whisky)

(John & Joan the joggers)

- We can attempt to decompose the basis:

Components of the annuitant basis



Components of the annuitant basis

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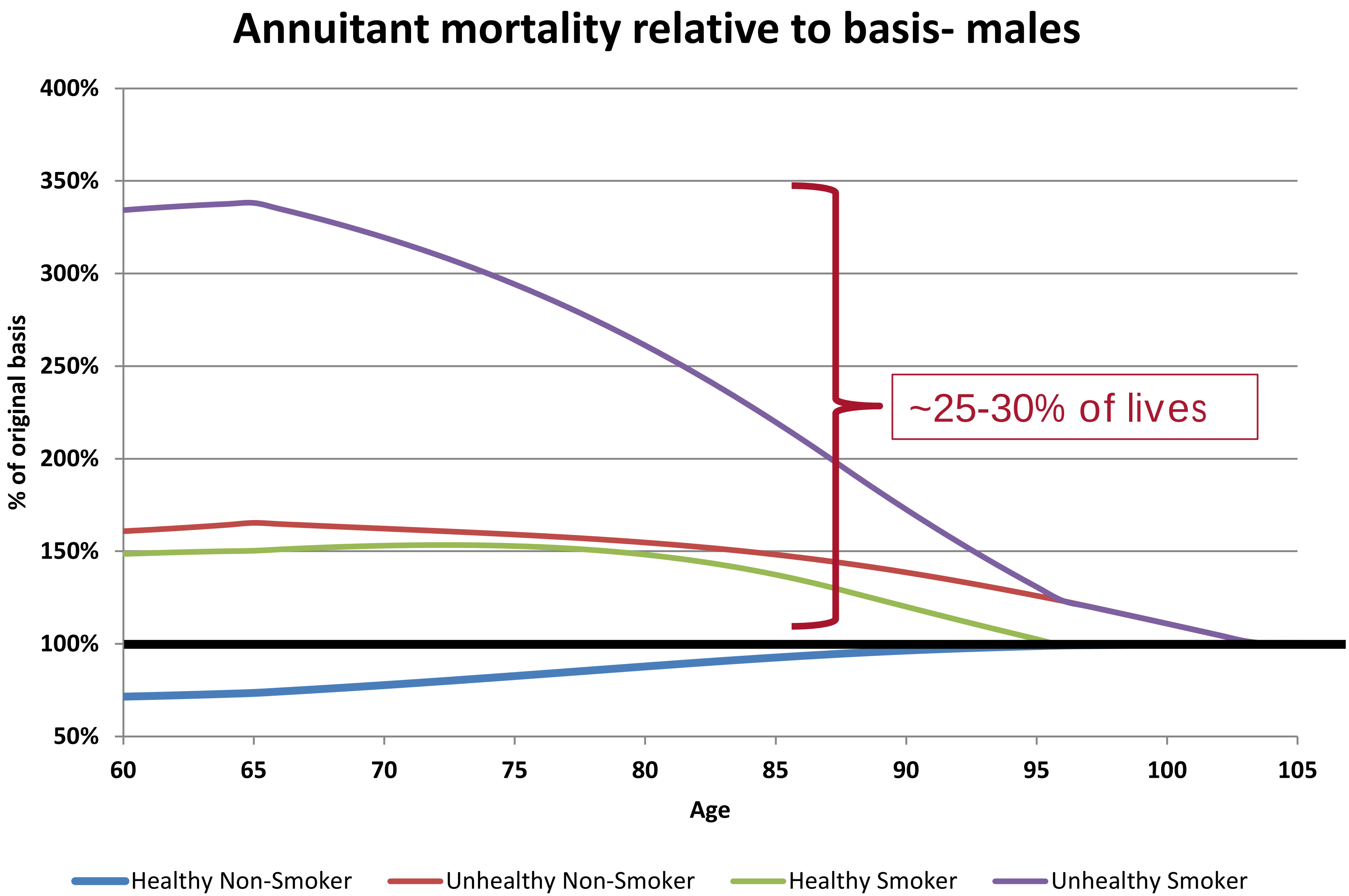
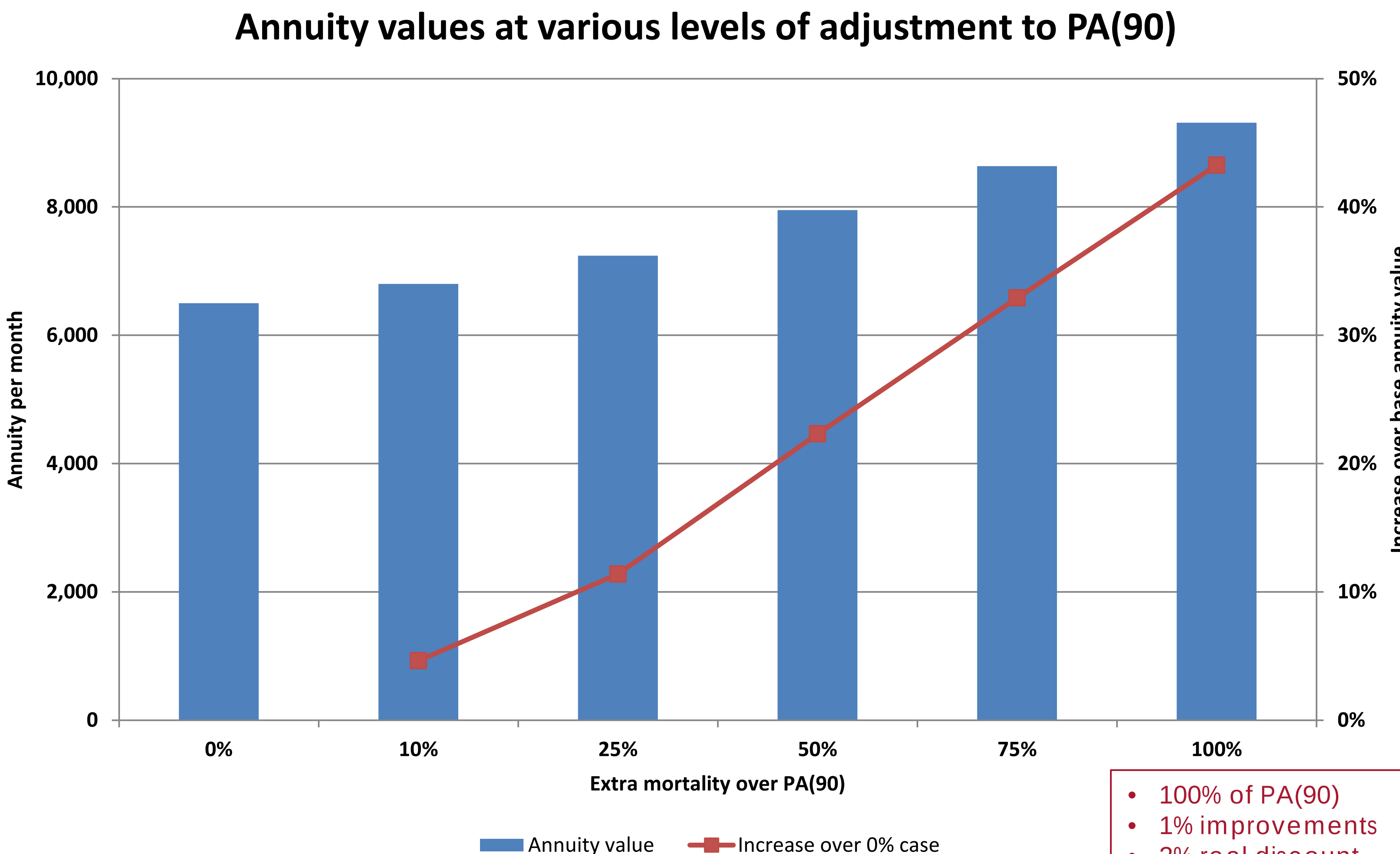


Potential for enhanced income

- What does this mean? Show me the money:



- 100% of PA(90)
- 1% improvements
- 2% real discount

Development of EA market

Impaired Annuities:
- Initial target market were individuals with significantly reduced life expectancy
- Detailed and high underwriting costs

Select Annuities:
- Based on occupation and postcode
- No medical underwriting
- Yes / no decision

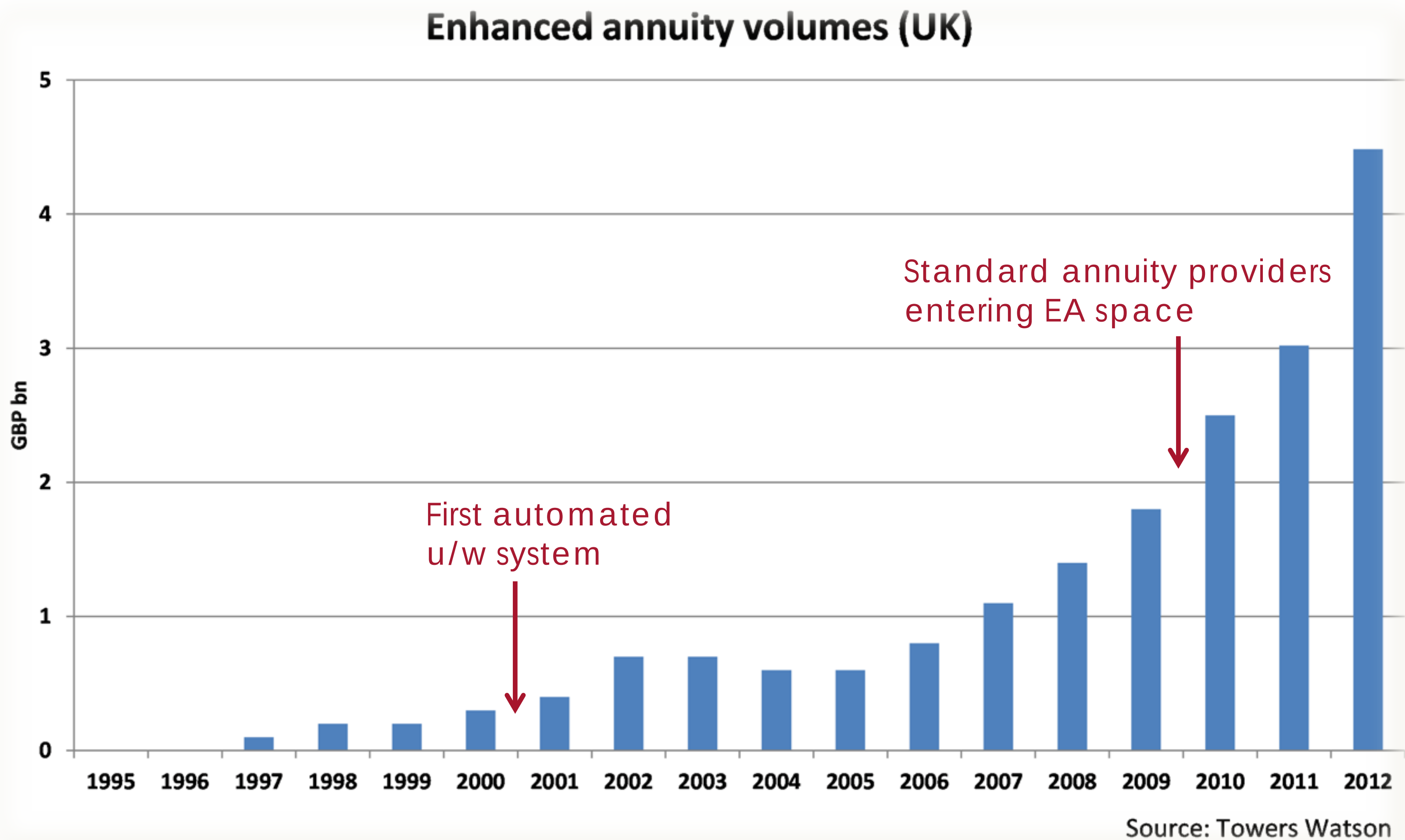
Progressed to almost full individual consideration now
- Common quotation form (www.commonquotation.co.uk)

UK: 1995 → **1997** → **2000** → **2012**

ALSO **Smoker and Health Indicator Annuities:**
- Limited number of simple questions + simplified underwriting
- Yes / no decision

Level Concept Annuities:
- Easy to answer medical questionnaire
- Automated underwriting systems
- Guaranteed quotes provided in short time
- Increase in annuity depends on impairment type and severity level

Introduction to enhanced annuities



- 2012: EAs of 4.48bn GBP = 20% of annuity market

Underwriting of enhanced annuities

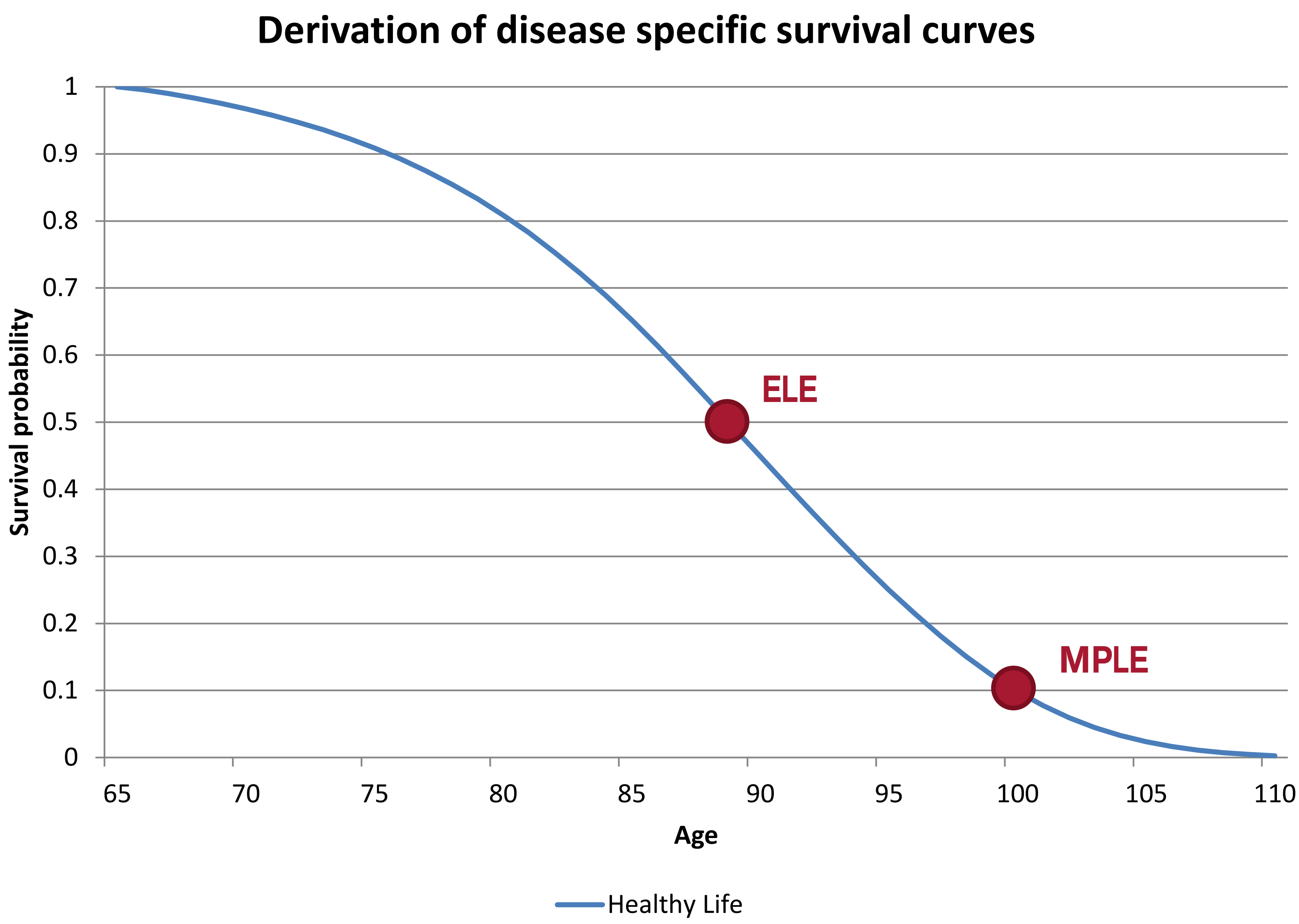
- Underwriting revolves around establishing:
  - the ***severity*** and ***permanence*** of current conditions
-

Framework	Example 1	Example 2
What happened?	Heart Attack	
When?	Twice: 1 year ago and 6 years ago	Once, 8 years ago
Any procedures?	Triple bypass	None
Recently hospitalised?	Yes	No
Current symptoms	Weekly chest pains	No pain
Related issues	Stroke (5 years ago) and high cholesterol	Normal cholesterol
Other info	Heart EF < 30%	Heart EF > 40%

Underwriting follow up

- Risk of misrepresentation
- Design allows for recalculation of annuity
- Experience has shown trend of *understatement* of health
- Underwriting follow-up may be random, e.g. 20% of cases
- Obtaining all the medical information can be challenging

Actuarial considerations



Actuarial considerations

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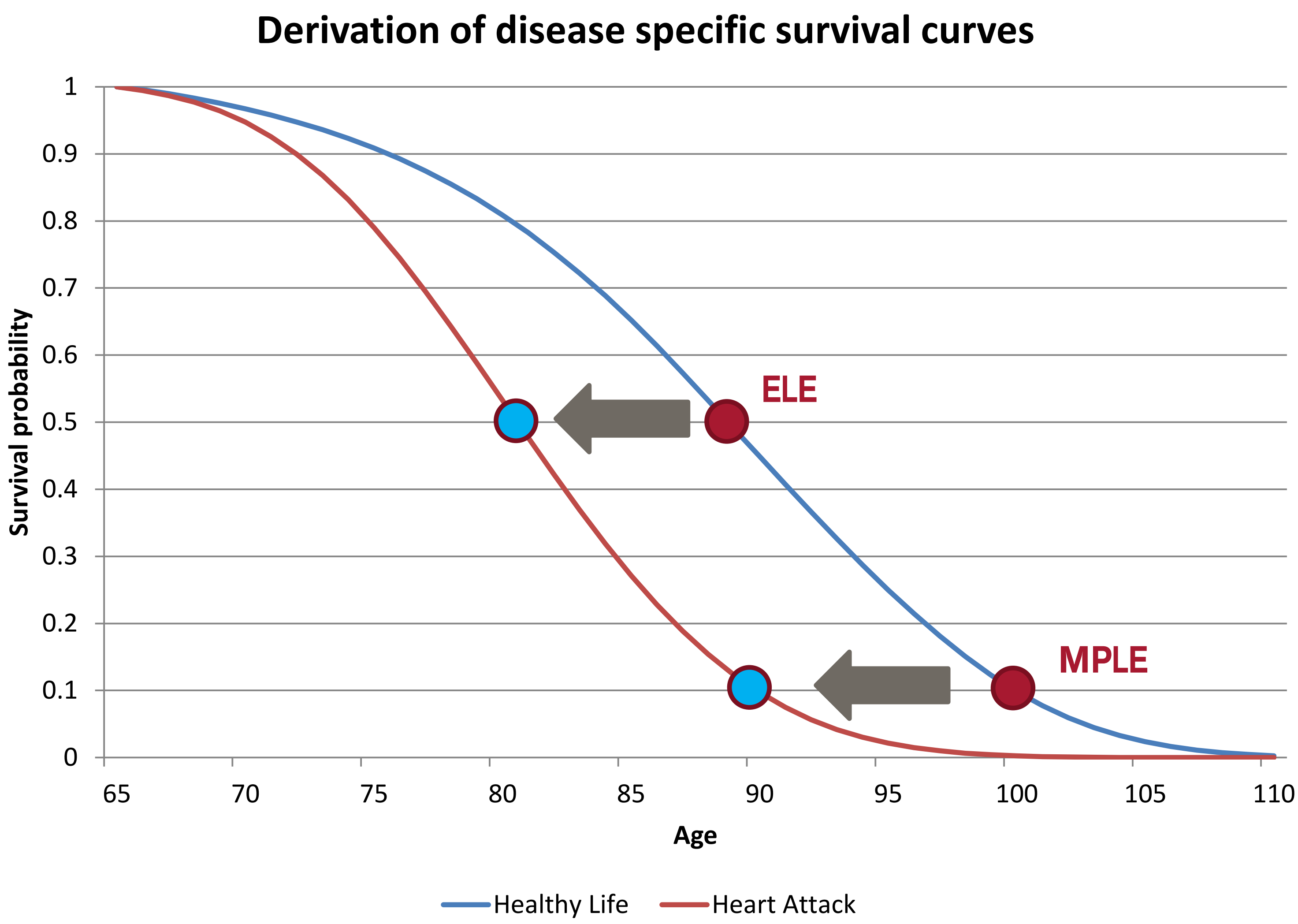
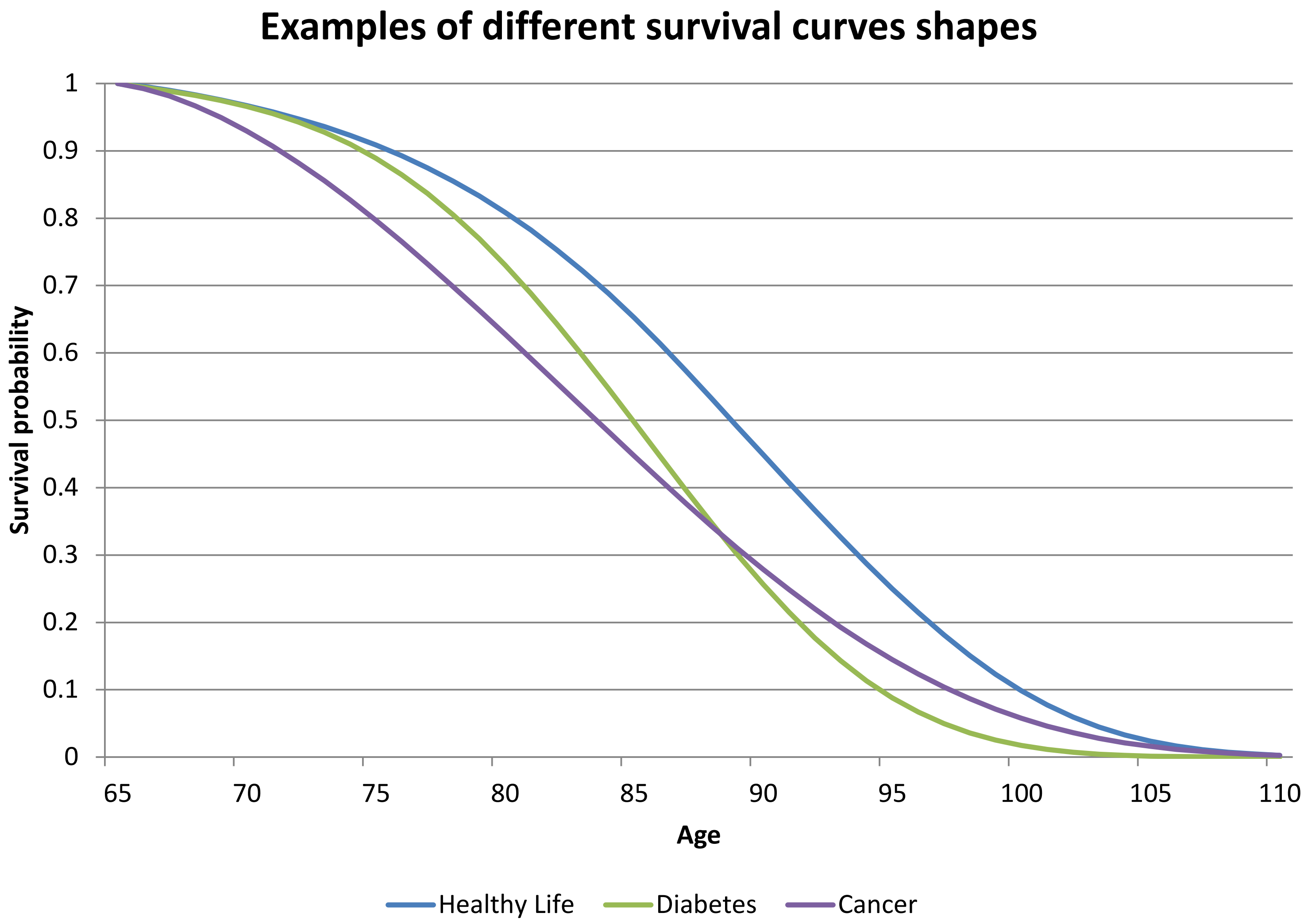


Actuarial considerations



Sample improvements (UK)

- Comparison of some recent enhancements in amounts, relative to a market (all lives) basis:

Condition	Healthy	Market Basis	25/day heavy smoker and overweight	Diabetes (15yrs), insulin dependent, retinopathy	Lung cancer, lymph node metastases, on chemo
Increase relative to base	-3%	--	5%	16%	71%

Future of enhanced annuities in SA

- South Africa already has an enhanced annuity provider
- Long-term interest rates in SA still much higher than UK
- Possible market fears to introducing product:
  - Effect on existing book
  - Complicated bases for valuation
- Will the default options referred to in the pension reform present an opportunity?
- Immediate needs annuities

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Holders of longevity risks

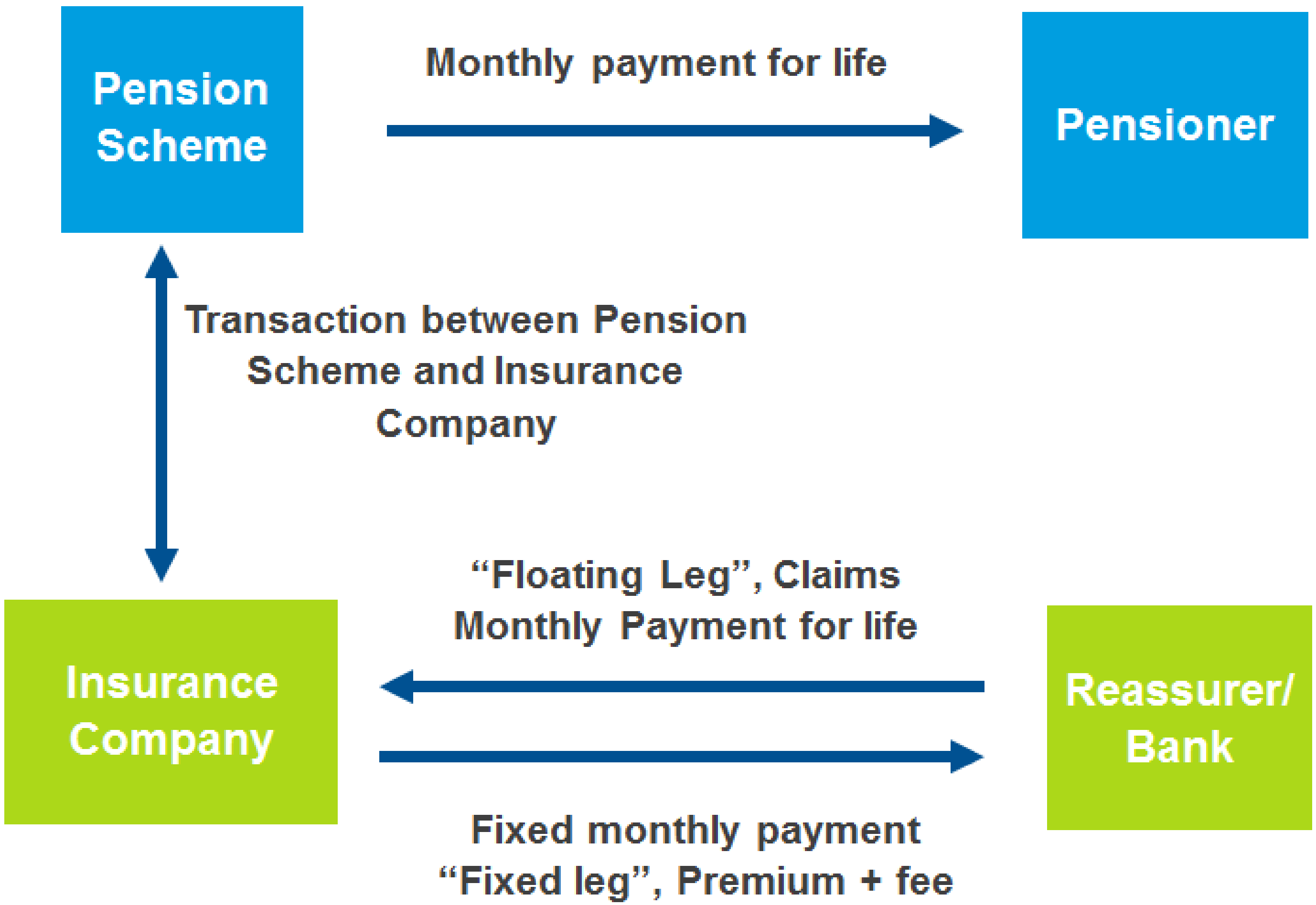
- Pension liabilities held by pension funds, corporates or insurance companies
- Substantial longevity risks can be held outside of the insurance industry
- Corporates and pension funds often seek to lay off parts of the risks inherent in the liabilities

Pension fund options

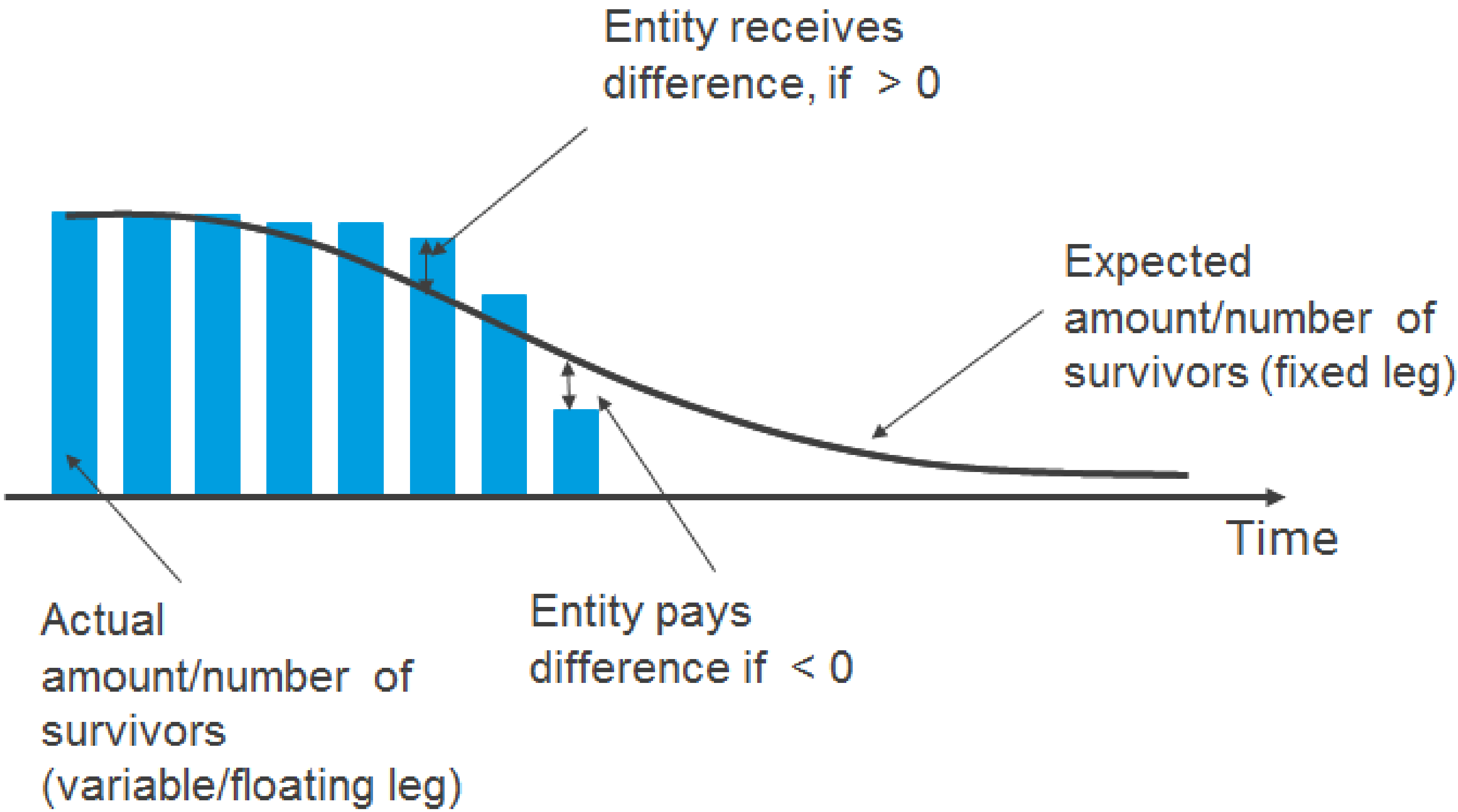
- Buy-out
  - Assets and liabilities are transferred to an insurer
  - Insurer responsible for transferred risks
  - Scheme wound up
- Buy-in
  - Assets are used to buy an insurance policy
  - Longevity risk is transferred to the insurer
- Longevity swap
  - Regular exchange of premium and claims
  - Pension fund retains the assets

Longevity swaps – the model

- Swaps often sit at the back end of another deal:



Swap mechanics



- The cost/spread is a % of the expected amount

Swap mechanics

- Swap provider will conduct an analysis of the mortality experience of the group of lives in question
- Set a mortality basis with reference to:
  - Socio-economic class
  - Industry (blue vs white collar)
  - Anticipated mortality improvements
- Produce survival probabilities (${}_{t}P_{x}$) for each life in fund at each future duration

Other considerations

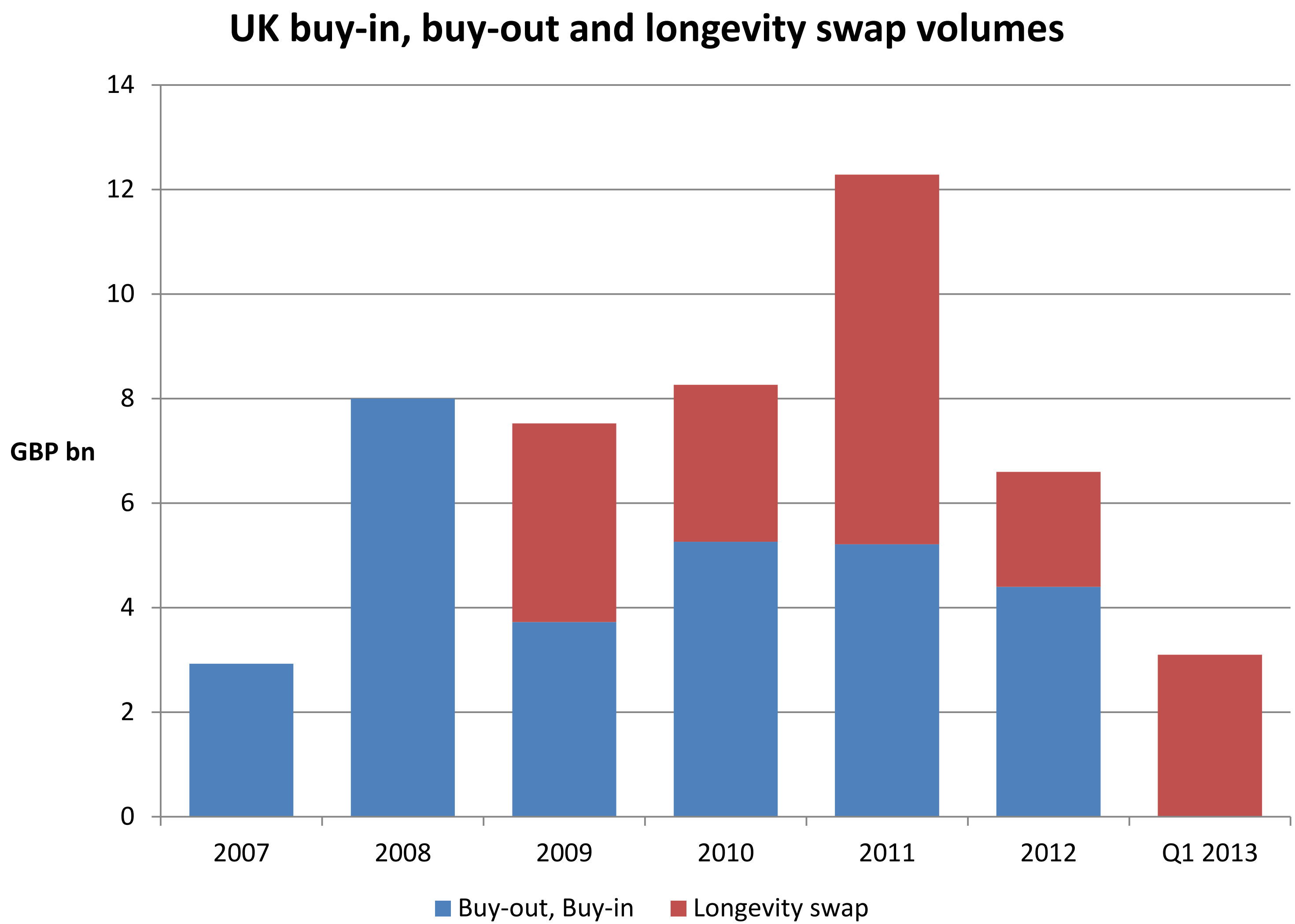
- Historically only an option for the bigger funds, but recent deal sizes are decreasing
- Attractive for schemes that do not wish to hand over all their assets as with a full outsourcing/buy-out
- Deal durations can be long → security required
  - Often collateral is posted with expected net recipient of cash flow

Features of transactions

- Asset, inflation and deferred risks not covered
- Structure can deal with payments that are not level
  - e.g. CPI-linked or fixed benefit increases.
  - Both legs of the swap adjusted at the same time
- Profile of spouse/proportion married typically deemed a

  "biometric" risk that will be assumed
- Recapture at long durations
- Debates around mortality improvements

UK volumes



UK buy-in, buy-out and longevity swap volumes
14
12
10
8
6
4
2
0
GBP bn
2007
2008
2009
2010
2011
2012
Q1 2013
Buy-out, Buy-in
Longevity swap

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Conclusion

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- Increasing life expectancy presents both risk and opportunity
- We believe there are some products available to give better value and more certainty to policyholders and funds:
  - Enhanced annuities & Longevity swaps
- Expertise and capacity exists in SA to bring these solutions to market