Pension Liability Risks: Manage or Sell?

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Pension liability risks

The risk process

- Risk identification:
  - Threats
  - Opportunities
- Risk evaluation
- Risk prioritisation
- Risk treatment:
  - Accept
  - Mitigate
  - Exploit
  - Avoid or sell off
- Risk monitoring

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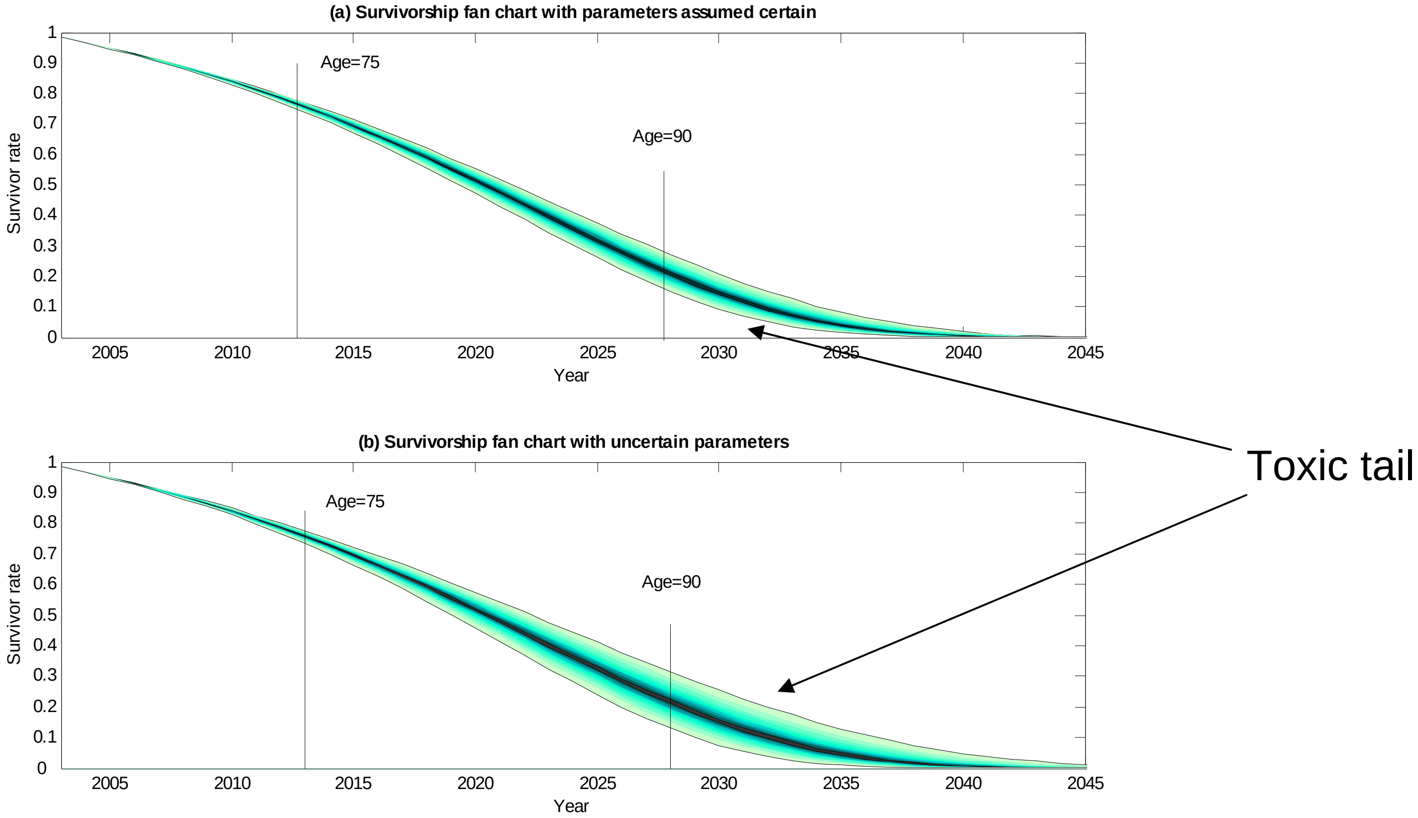
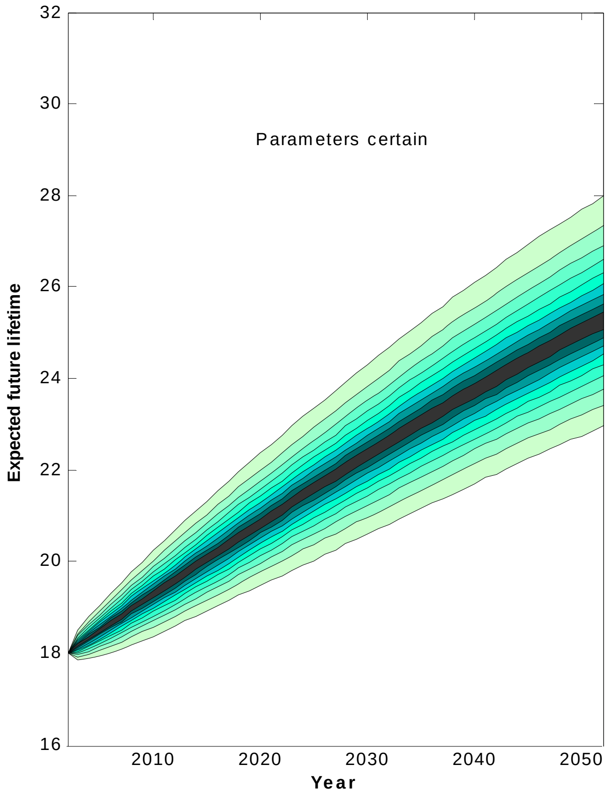
The pension liability risk process

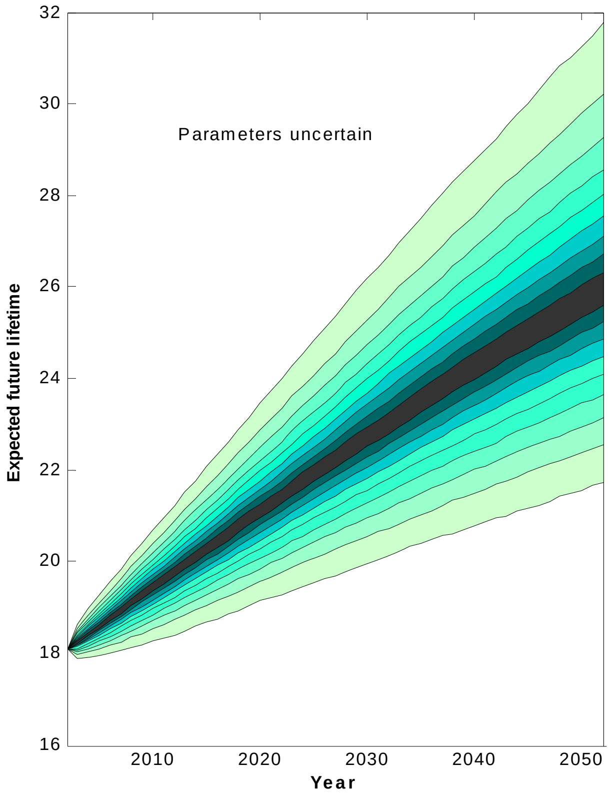
- Risk identification:
  - Price (& wage) inflation risk
  - Interest rate risk
  - Longevity risk
- Risk evaluation:
  - Price (& wage) inflation risk:
    - not rewarded
  - Interest rate risk
    - not rewarded
  - Longevity risk
    - Concentrated and underestimated

Survivorship fan chart for 65-year old males using Cairns-Blake-Dowd stochastic mortality model



Longevity fan chart for 65-year old males using Cairns-Blake-Dowd stochastic mortality model





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Longevity risk in UK pension provision, £billion of total liabilities: end 2003

	Pre-retirement? Still in employment	Post-retirement? Already in payment
Insurance companies	10?	70?
Pension funds	400?	400?
Unfunded public employee pensions	260	190
State pensions ■ Earnings-related	190	100
Total Earnings-related	860	760
State pensions ■ Basic	510	390
Total	1370	1150

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Pensions Commission (2005, Figure 5.17 p181)

The pension liability risk process

- Risk prioritisation
  - Interest rate risk
  - Price (& wage) inflation risk
  - Longevity risk
- Risk treatment:
  - Avoid:
    - Interest rate & inflation risks
  - Accept, mitigate or exploit?:
    - Longevity risk: a missing market

Managing pension liability risks using ALM

Pension liability modelling

- Pension liability cash flows depend on
  - Certainties:
    - composition of pension membership
    - plan rules
  - Uncertainties:
    - price (inflation) risk,
    - interest rate risk
    - longevity risk
- With closed books, longevity risk is by far biggest risk

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Managing pension liability risks through asset-liability management

- ALM seeks assets whose cash flows are highly correlated with:
  - Wage growth in accumulation phase:
    - Index-linked bonds
    - Property
    - Equity ?
  - Longevity and inflation in decumulation phase:
    - Index-linked annuities
    - Longevity/survivor bonds
- Missing market:
  - Currently no market in longevity bonds or derivatives

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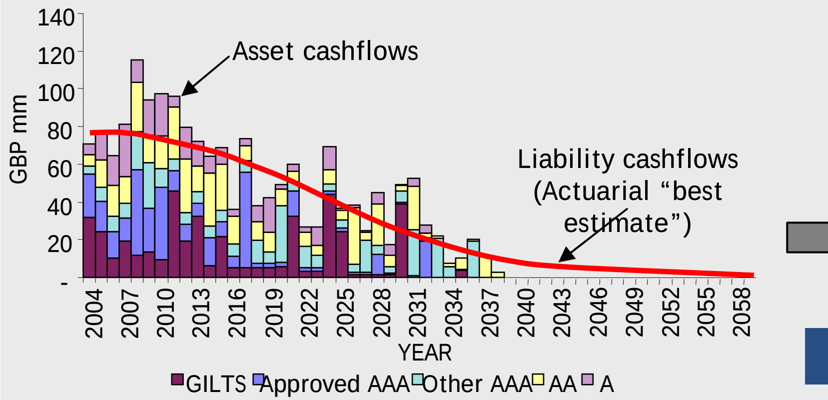
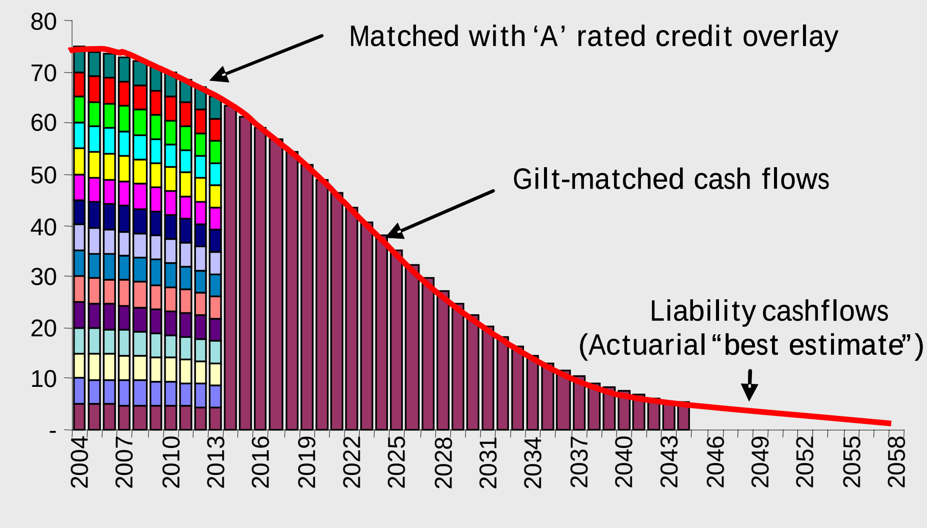
Even good ALM cannot currently hedge longevity risk



Poor matching of asset and liability cash flows

(very common)

Cashflow profile of assets and liabilities after hedging (£m)



Very efficient matching of

asset and liability cash flows,

but 'toxic tail' remains

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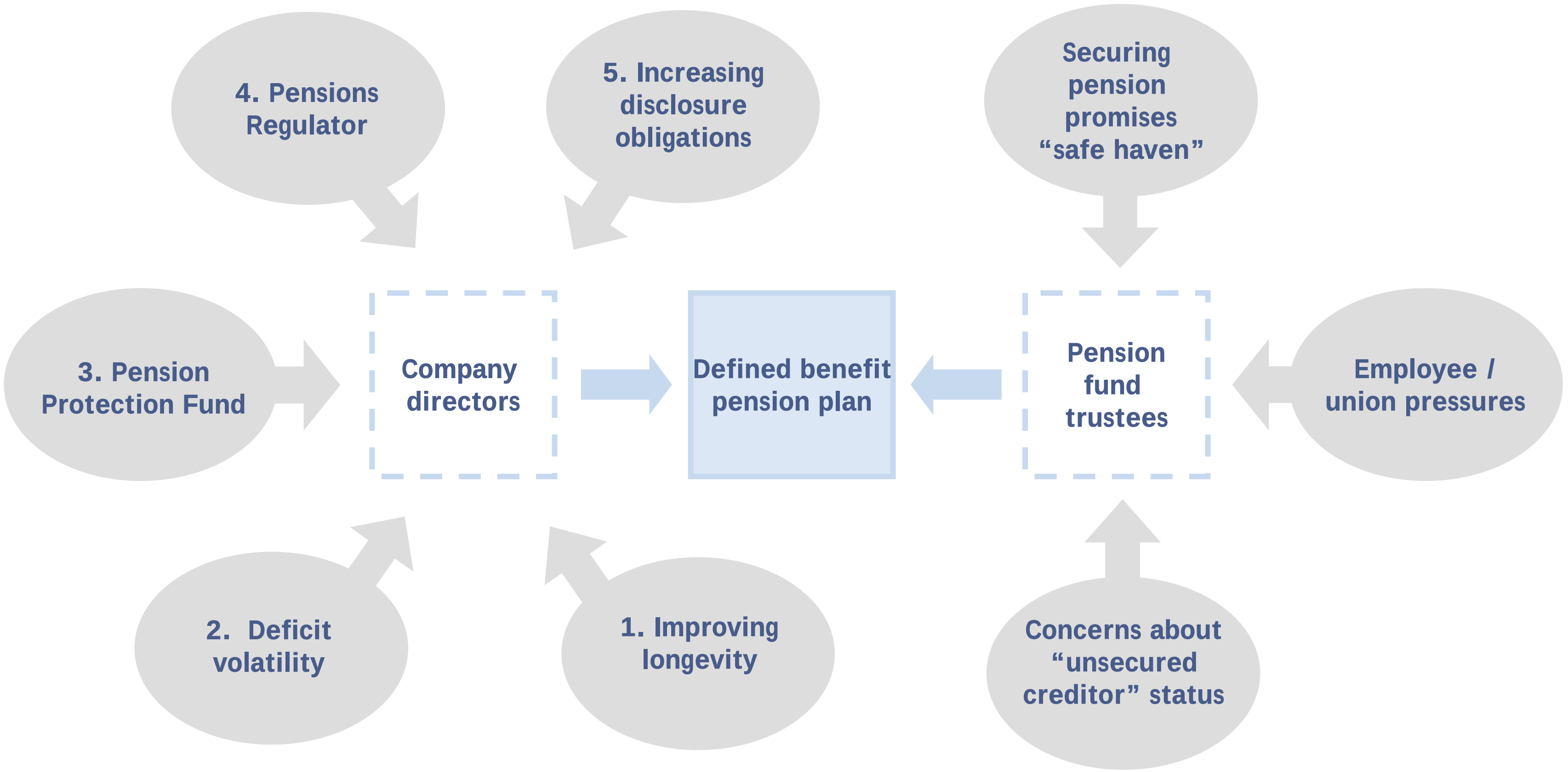
Summary

- Managing pension scheme assets and liabilities is a process involving:
  - Liability modelling and valuation:
    - Mortality modelling critical
  - Implementing asset allocation strategy that
    - Matches cash flows
    - Manages risks, especially longevity risk

Selling pension risks:
The new pension fund buy-out market

Key drivers of growth in the DB scheme risk transfer market



...for many companies the uncertain future cost of providing deferred benefit pensions has become a major risk

CHANGES IN FTSE100 PENSION DEFICIT

Full buy-outs

How?

- Bulk annuities using FSA-regulated insurer:
  - If sufficient funds to meet UK regulations
- Bulk annuities using Bermuda-based reinsurer:
  - If funding inadequate and lower solvency needed
  - Requires continuation of employer covenant
- Special purpose vehicle:
  - E.g., structured buy-out:
  - Offered by Prudential
  - Also known as leveraged buy-out bond

Structured buy-out

- Example: Company ABC
- Value of scheme assets (A) = 100
- Scheme actuary’s valuation of liabilities (L) = 120
- Deficit = 20

Structured buy-out

- What to do?
- Approach insurer XYZ
  - Or buy-out fund set up as insurer
- XYZ's valuation of ABC's liabilities = 160
- XYZ's valuation of ABC's deficit = 60
- XYZ's valuation even worse than scheme actuary's valuation of deficit = 20!!

Structured buy-out

- XYZ, subject to due diligence, offers to take on both A & L at XYZ's valuation

- XYZ lends 60 to ABC to cover deficit:
  - At bank base rate + 1,2 or 3%
  - Must be paid off over 10 years

- XYZ exchanges A into gilts
  - Alternatively use duration & inflation swaps

Structured buy-out

- Advantages to company:
- Pension liabilities off its balance sheet:
  - Replaced by loan which everyone understands
  - Can pay off loan over 10 years
- Escapes:
  - FRS17 volatility to company profits
  - PPF levies
  - Asset management fees on pension assets
- Can reduce liabilities by revising scheme rules on indexation to statutory min. prior to wind up:
  - revaluation of deferred pensions
  - uprating of pensions in payment

Structured buy-out

- Advantages to trustees and pension scheme members:

- Pensions secured in full:
  - Cf Marconi deal with Ericsson in 2005
  - Ericsson injected £185m into Marconi's pension plan to protect the members' rights
  - Plus additional £490m retained in escrow account for potential benefit of plan.

Structured buy-out

- Advantages to insurer:
- Gets bank base rate + 1,2 or 3% on loan
- Buys new gilts at discount up to 4.5%
  - Due to its size in new issues market
- Gains difference of 40 (i.e. 160 – 120) in valuation of liabilities
- Better manager of mortality pool
- NOT necessarily better asset manager

Partial buy-outs

Partial buy-outs or ‘de-risking’ strategies

- Pension plan might use LDI to manage liabilities out, say, 15 years…
- ..and buy-out liabilities above 15 years
- Or buy-out all members over 70
- Or buy-out spouses’ pensions
- Or buy-out deferred pensions
- Or buy-out level pensions in payment
- Also refundable buy-out plan:
  - With refunds if reserving basis too conservative
- Underlying rationale is ‘ongoing risk management of the business’
  - Even large solvent employers will consider these de-risking strategies as part of normal pension risk management

The future:
New solutions for transferring longevity risks

Alternative risk transfer

- At intersection between banking and insurance
- Banks help insurers transfer longevity risk to third party
  - Typically to hedge funds
  - Longevity risk is uncorrelated with other (e.g., financial) risks
- Currently limited by:
  - Hedge fund concerns that reinsurers are not assuming more of this risk themselves?
    - What are they worried about?
  - Hedge funds demanding 18% return on capital when insurers only get 9%

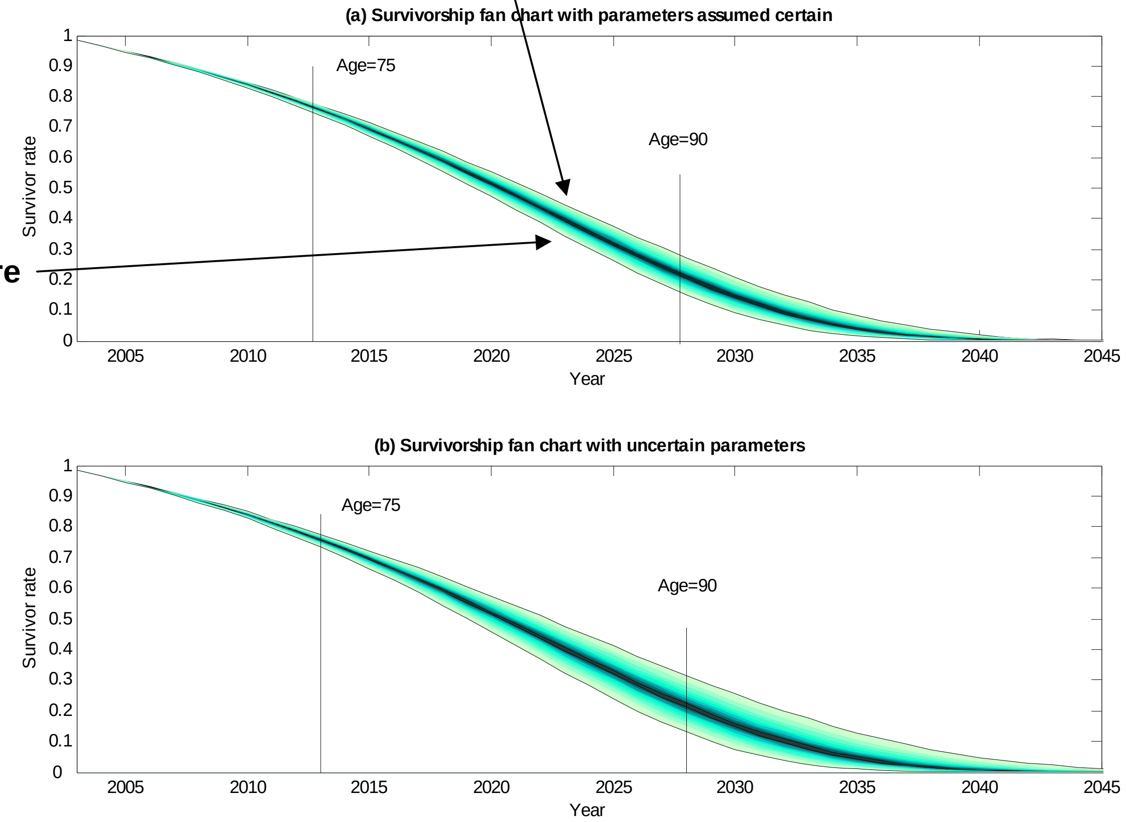
The first step in developing a new capital market: Longevity swaps

- Fixed for floating swap
- Fixed leg based on forecast of mortality
- Need good mortality forecasting model
- Market still in infancy:
  - An early example: Aegon and Munich Re
- Divide longevity risk into ‘vertical tranches’
- ….and need to hedge extremes…..

….using caps and floors

Cap longevity risk here

Floor longevity risk here



Role for government: Deferred annuities from 90

- Recommendation of Tom Boardman (Pru)
- Remove ‘toxic tail’ risk by buying deferred annuities from age 90 issued by government
- Capital markets left to design better annuity products up to age 90
- But government’s contribution to hedging aggregate longevity risk is to issue these instruments
- Or to issue longevity bonds for the over 90s
  - As recommended by the Pensions Commission (2005)

And finally….

- A full global market in longevity bonds and derivatives

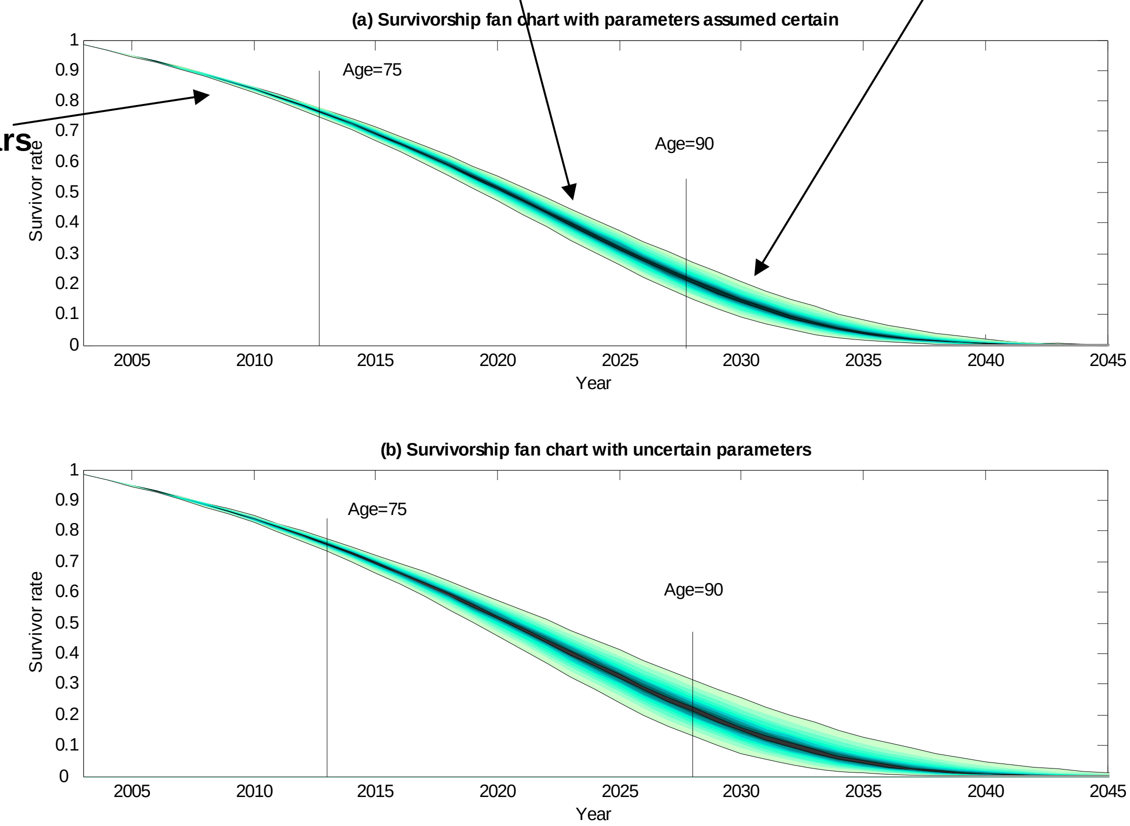
- Needs:
  - Good mortality forecasting model:
    - Cairns-Blake-Dowd stochastic mortality forecasting model
    - *Journal of Risk & Insurance*, December 2006
      - http://www.pensions-institute.org/workingpapers/wp0611.pdf
  - Good longevity indices to:
    - provide benchmarks for designing and pricing longevity-linked instruments
    - design basis risk hedge
  - To learn lessons from previous failures to start the market:
    - EIB/BNP/PartnerRe bond of 2004

EIB/BNP/PartnerRe bond of 2004

Cost of longevity risk greatest here

Toxic tail unhedged

Little risk for first 10 years



Governments could help....

- ... the establishment of markets in longevity bonds
- ... buy issuing bonds evenly along the age spectrum
- ... in order set the risk-free longevity term premium