

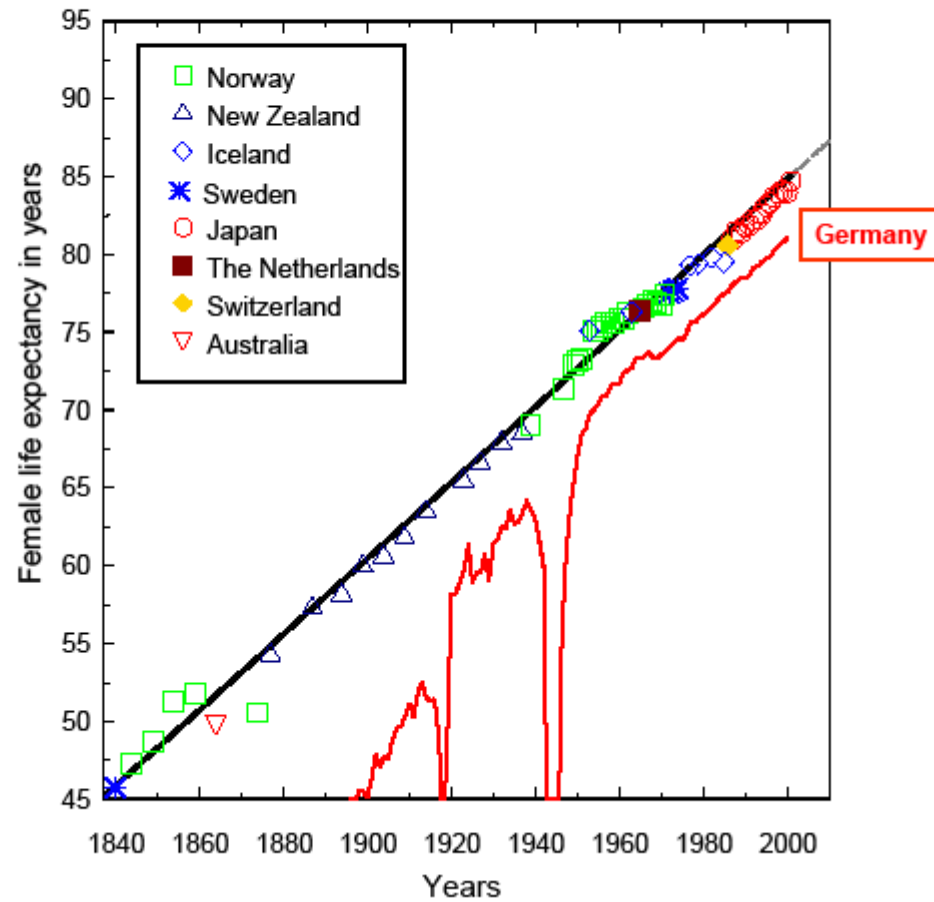
No Country for Old Men &  
Women (But lots of \$\$??)

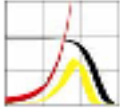
- Observations on Longevity Risk US & Elsewhere
- Options for Transferring Risk
- Impact of Mitigation Options to Address Longevity Risk

- Economic Forum recently listed 26 global risks
  - Terrorism, Middle East instability
  - Asset Price Collapse, Fall in US \$, Oil Price Spike
  - Global Climate issues & Natural Catastrophes
  - Pandemic, Diseases
  - Nanotechnology Risks, etc.
  
- BUT, longevity is not there

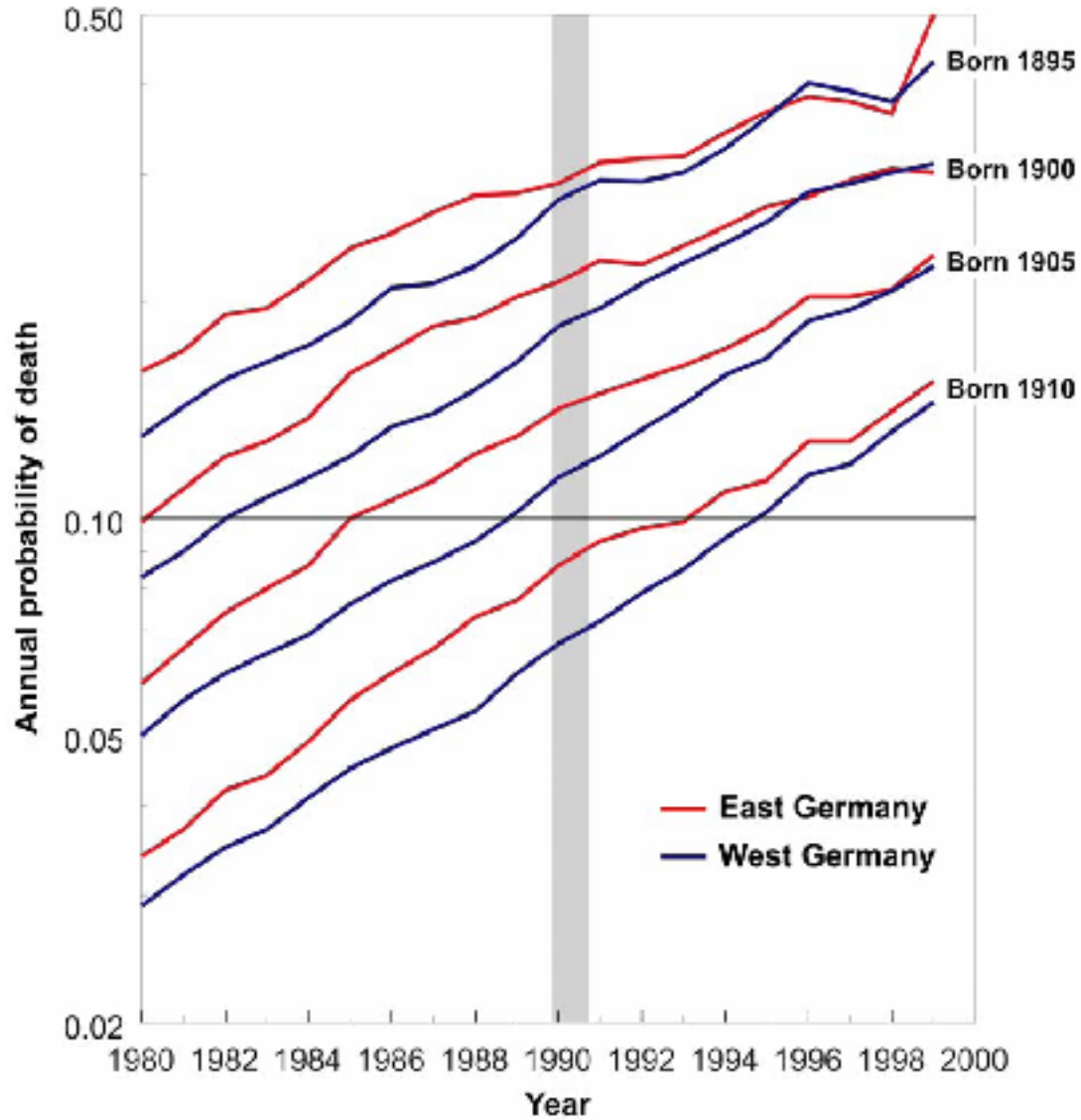


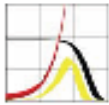
## Plasticity of Life Expectancy





## It's never too late

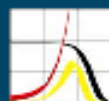




## Centenarian Disability in Denmark

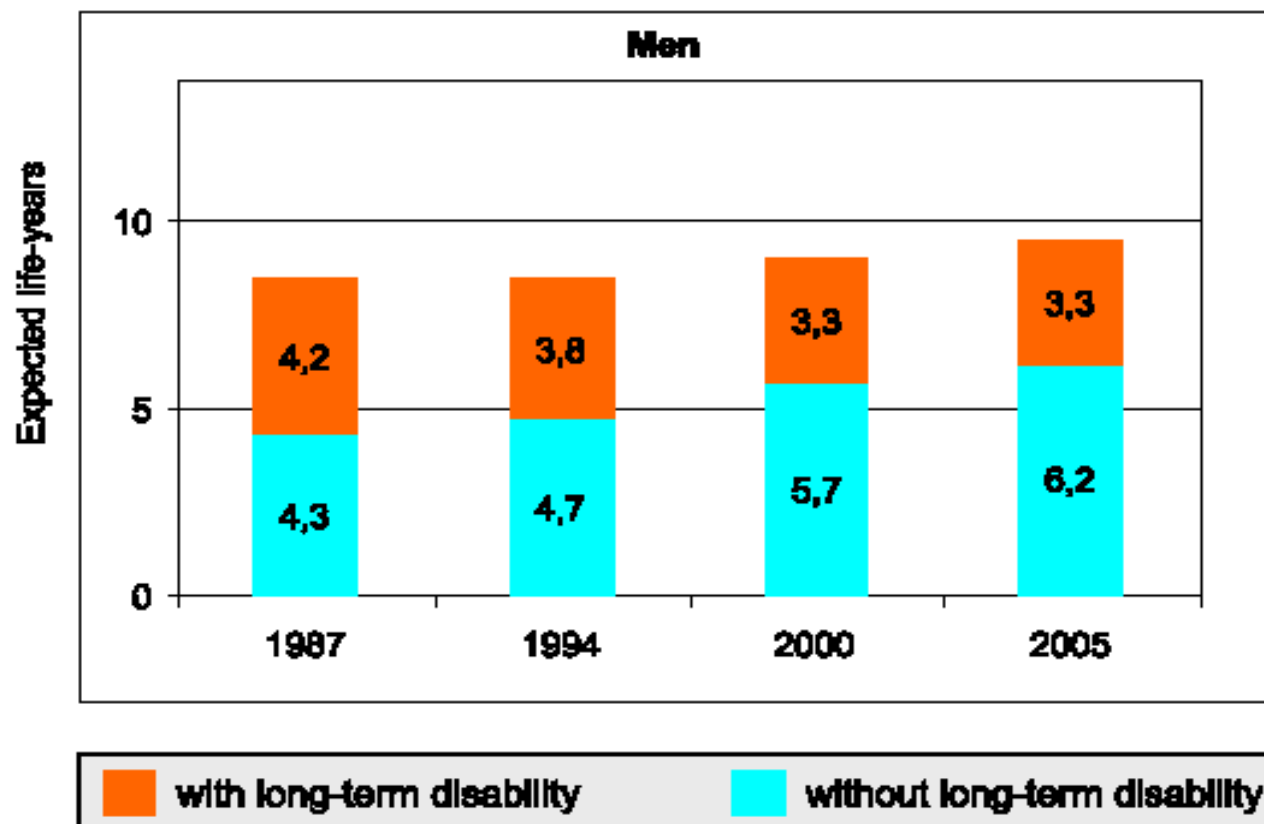
**50% more made it to 100 years  
in the 1905 cohort  
compared to the 1895 cohort**

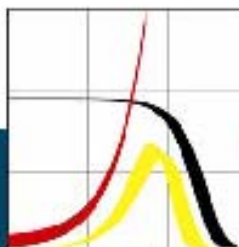
**- but no increase in physical or  
cognitive disability level**



## Long-term disability

Life expectancy without and with long-term disability at age 75 in Denmark in 1987, 1994, 2000 and 2005.





# Max-Planck-Institut für demografische Forschung

[www.demogr.mpg.de](http://www.demogr.mpg.de)

# US Issues

- US - Not seeing explosive growth in longevity occurring in England and Northern Europe.
  - Why?
    - Measuring Methodology? Going up the diagonal via cohorts vs. annual snapshots of all ages
    - US Women improvements are flat. In fact poor women are worsening, while others are getting better

# US Issues

- Culture is different. England public is much more aware of the value of a guaranteed stream of benefits. US has “irrational” bias toward lump sums.
  - Gulf War Settlements
  - Lottery Winnings
- UK norm is inflation indexed benefits

# What is the Value of

- A guaranteed income stream?
- A lump sum? (The illusion of liquidity)
- There are three reasons for the generally broad hesitation to using payout annuities.
  - People are risk averse and highly value “keeping their options (meaning cash liquidity) open”
  - The seduction of presuming to earn the equity risk premium has made an annuity (or pension) backed by bonds seem unattractive
  - The fear of “losing” if you die early

# How to approach the risk of longevity & future promises?

- Risk transfer systems come in many forms. These systems consist of social institutions, laws, processes and products designed to facilitate the sharing, distribution and mitigation or hedging of risk between various buyers and sellers.

# Examples

- Insurance (for individuals or groups, with protection related to life, property, health, longevity, etc.)
- Banking (facilitating exchanges between savers and borrowers)
- Government and private programs for retirement and health risks
- Securitization of risk-taking agreements or enterprises
- Raising capital (equity and/or debt) for corporations
- Use of exchanges (CBOT)

# Risk Transfer Systems

- Effect on all the participants is often not well understood (e.g. moral hazard)
- Are rarely analyzed in a manner that looks at the ability of the system itself to survive extreme risk events and still carry out its function of creating an ongoing “market” for the exchange of risk.
- Typically, the analysis done at the individual participant level at events that ruin an individual participant.

# Dealing with longevity risk

- Longevity risk needs to be quantified and managed
- Tools are now being developed to do both:
  - In insurance and reinsurance companies
  - In the capital markets
- Academics are also interested in analyzing longevity risk and capital market solutions
- But growth has been slowed by the Credit Crunch and the political dimension has been missing

# Capital Market Solution?

- Capital markets likely more efficient than insurance industry in:
  - reducing concentration risk
  - facilitating price discovery
- **But how to develop a price for longevity risk premium?**

# Role of Government

- Just like Govt bonds define the risk free and inflation rate prices (TIPS)
- Add a new function – long term price of longevity
- Sell Longevity Govt Bonds – risk free less x basis points

# Private sector role

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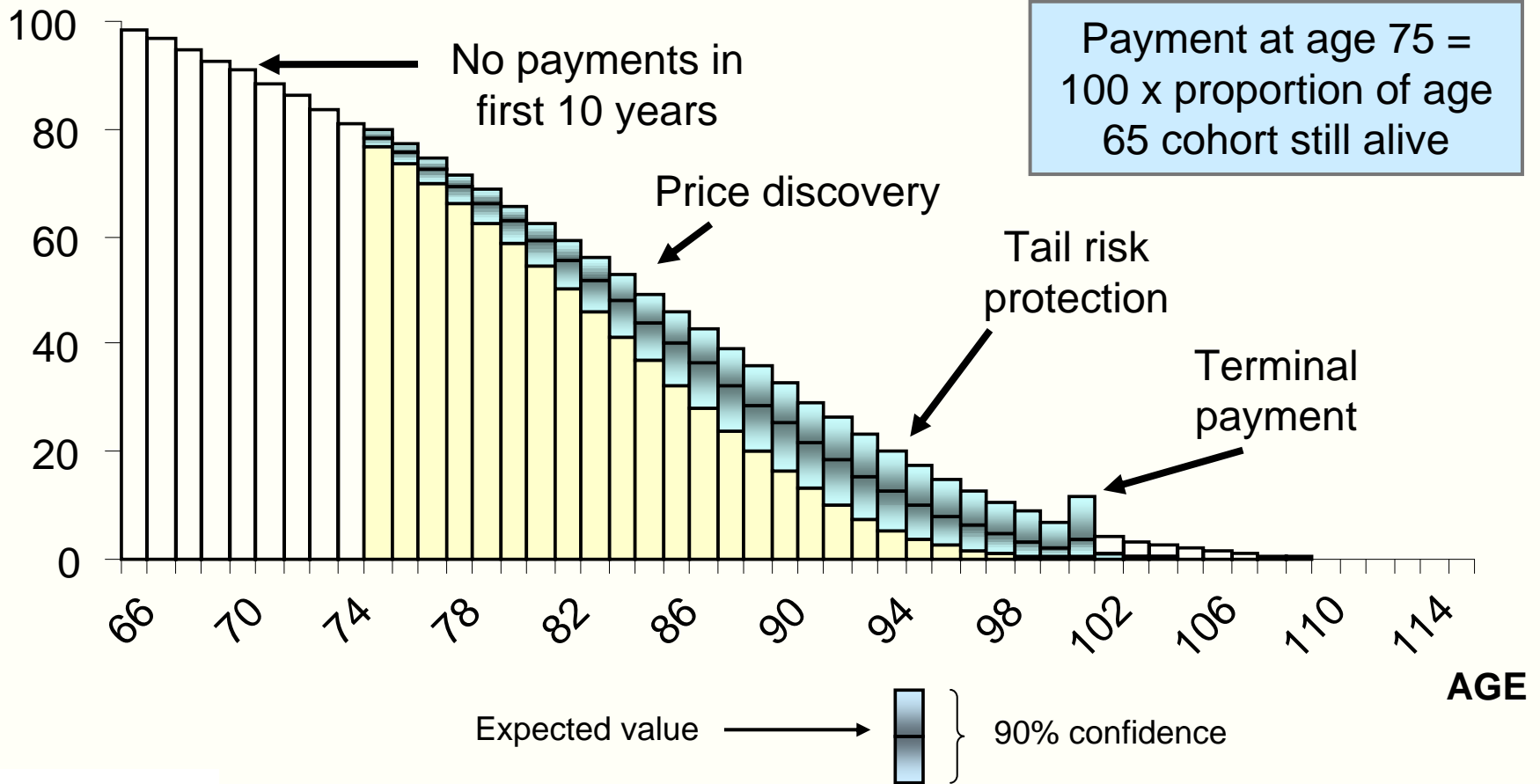
- Insurers
  - annuities, aggregators, indemnifiers etc
- Investment banks:
  - act as intermediaries
  - establish indices (e.g. LifeMetrics Index)
- General investors seeking uncorrelated securities for diversified portfolios:
  - hedge funds
  - ILS investors
  - sovereign wealth funds
  - endowment and family funds
- Traders and market makers:
  - essential for providing liquidity
- Arbitrageurs:
  - need well-defined pricing relationships between related securities

To transfer longevity risk, a longevity risk premium must be paid

# Initial longevity bonds based on experience of age 65 cohort

## Longevity bond payable from age 75 with terminal payment at 100 to cover post-100 longevity risk

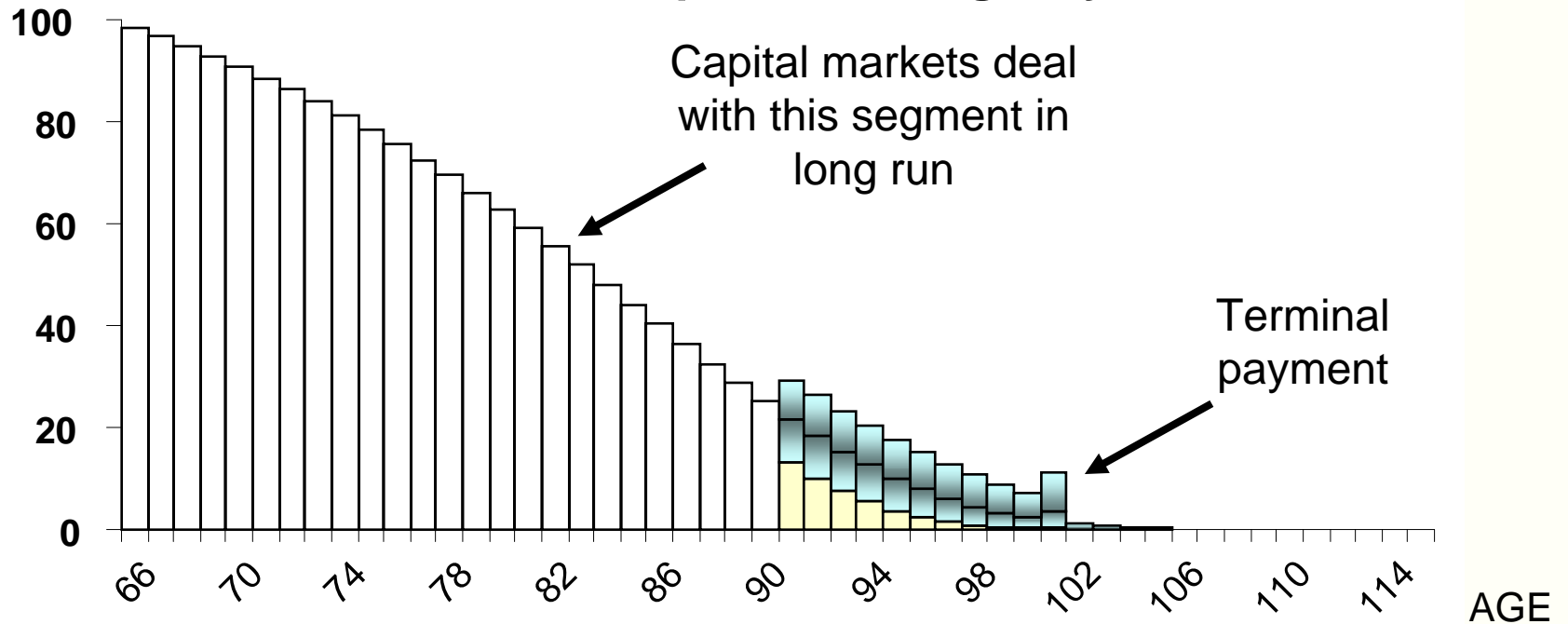
PAYMENT



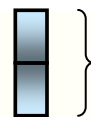
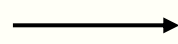
# Only deferred tail longevity bonds needed from Government in long run

Longevity bond based on age 65 cohort with payments from age 90 with terminal payment at 100 to cover post-100 longevity risk

PAYMENT

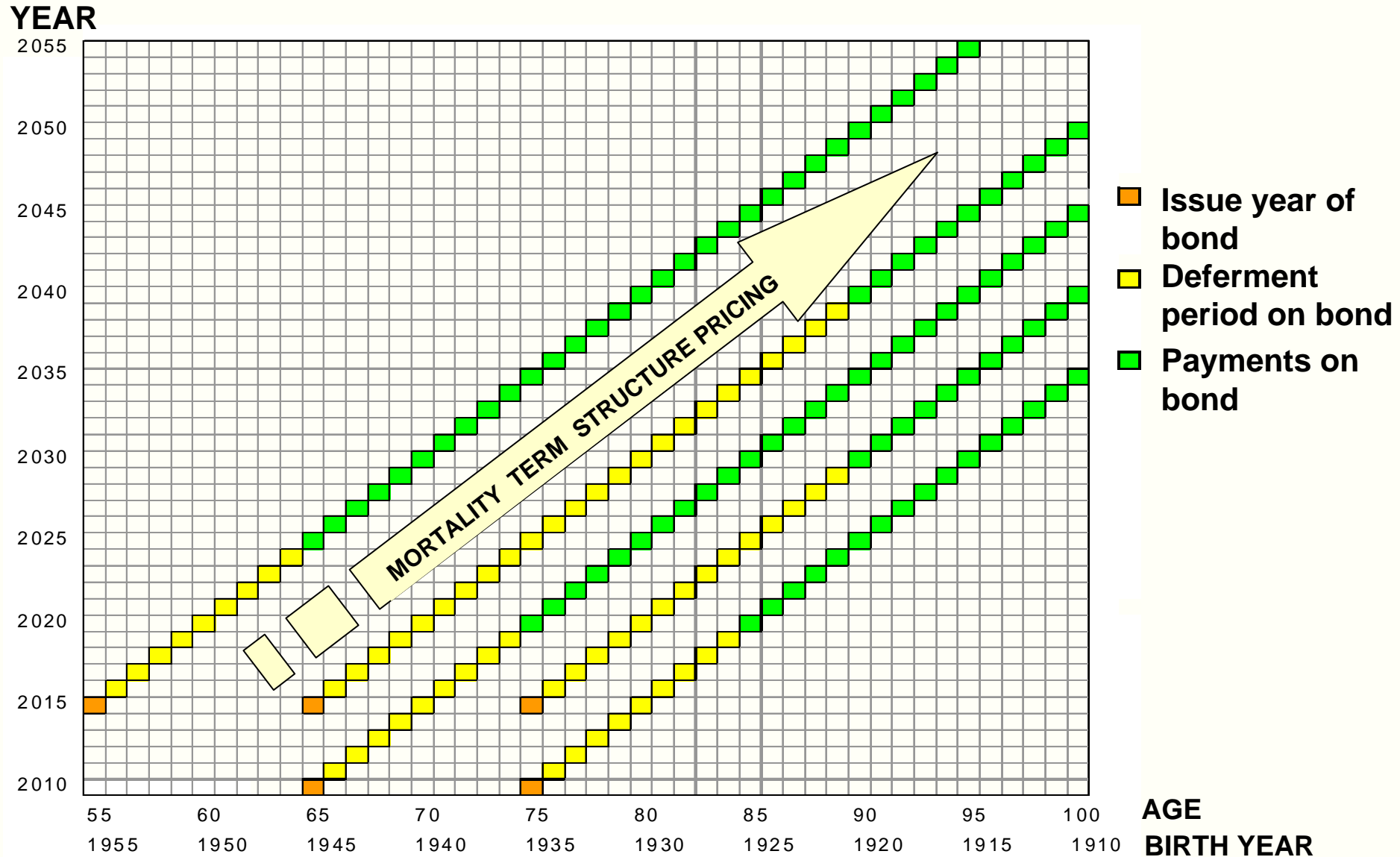


Expected value



90% confidence

# Government can increase coverage over time and move to focusing on tail risk



# Conclusions

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- Gov't earns a longevity risk premium for hedging aggregate longevity risk:
  - so can finance long-term national debt at lower expected cost than with conventional bonds
- Gov't needs to help set price points along the mortality term structure:
  - Similar to risk-free nominal and real term structures
- On-going role for Gov't to provide deferred longevity bonds with payments commencing at age 90 to ensure an efficient annuity market
- Public policy benefits:
  - help complete a 'missing market' by providing aggregate longevity risk hedge
  - encourage market stability:
    - need for orderly/ efficient/ complete markets
  - insurer of last resort:
    - will pick up the pieces if things go wrong!

# Next steps

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- UK and US Treasury recommended to establish a working party to work through the practicalities of Government issuing longevity bonds:
  - Reference index
  - Pricing
  - Demand
  - Liquidity
  - Stripping cash flows
  - Analysis of how well Government will be hedged against longevity improvements

# Concluding Issue

- Key Systemic Issue is if Public or Private Issuers “earn” their risk premium up front as happened in mortgage market.