
Living longer: products, problems and possibilities

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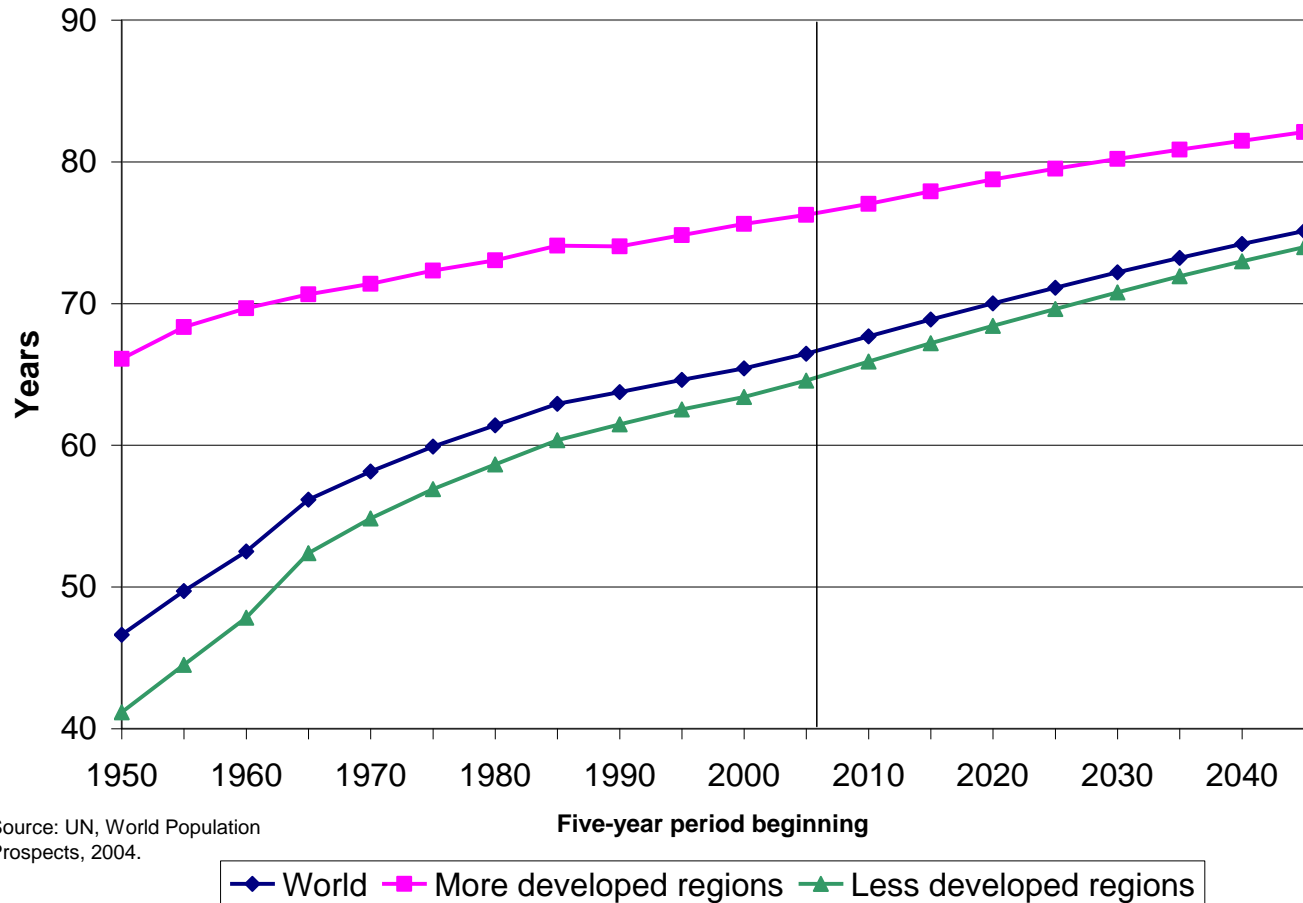
Outline

- What do we know of life expectancy?
 - How do we presently deal with it?
 - Problems in the market
 - Possible solutions
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What do we know of life expectancy?

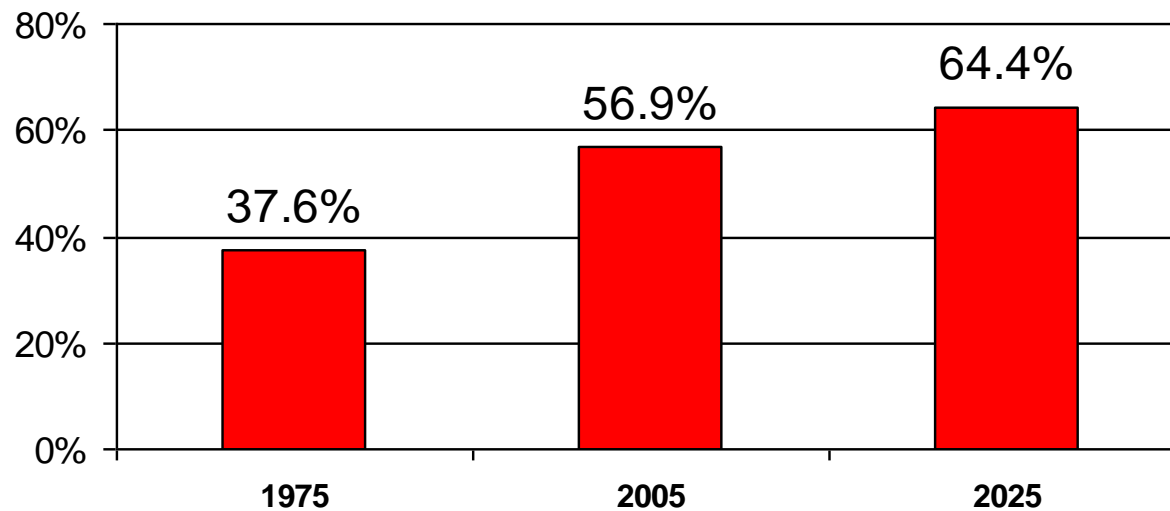
- Developed economies:
 - Male life expectancy over 75 in most OECD countries, an overall increase of 12% since 1960
 - Combined with a drop in fertility rates, aged dependency ratios set to increase from 23% today to 42% in 2030!
- Asia: Life Expectancy has moved from 41 (1950) to 61 (1980)
- China:
 - Male: 39 (1950) to 64 (1980)
 - Female: 42 (1950) to 67 (1980)

Increasing longevity

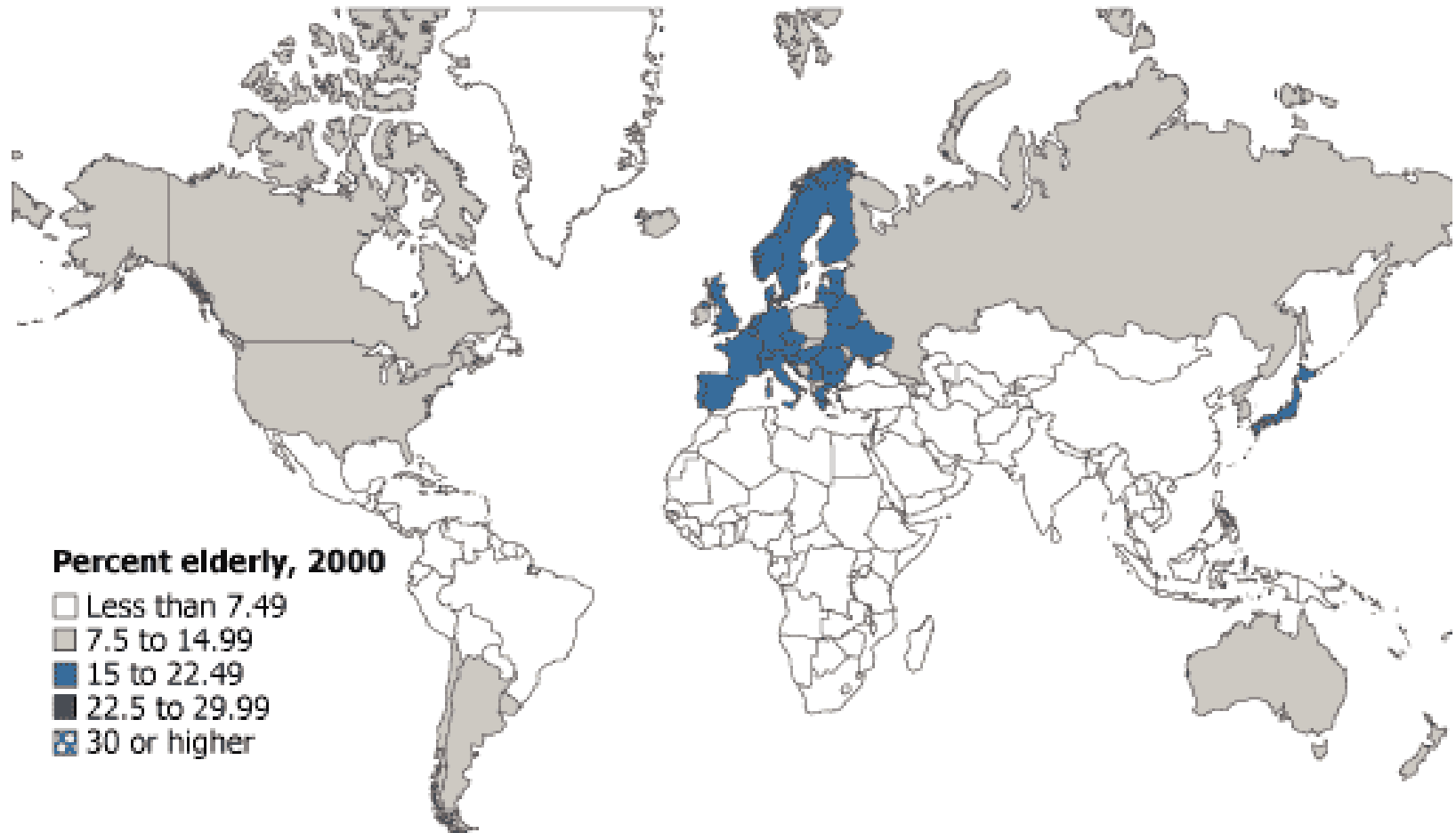


Statistics on survival probability

Survival Probability to age 90 for at least one member of couple:
Male 65/Female 60

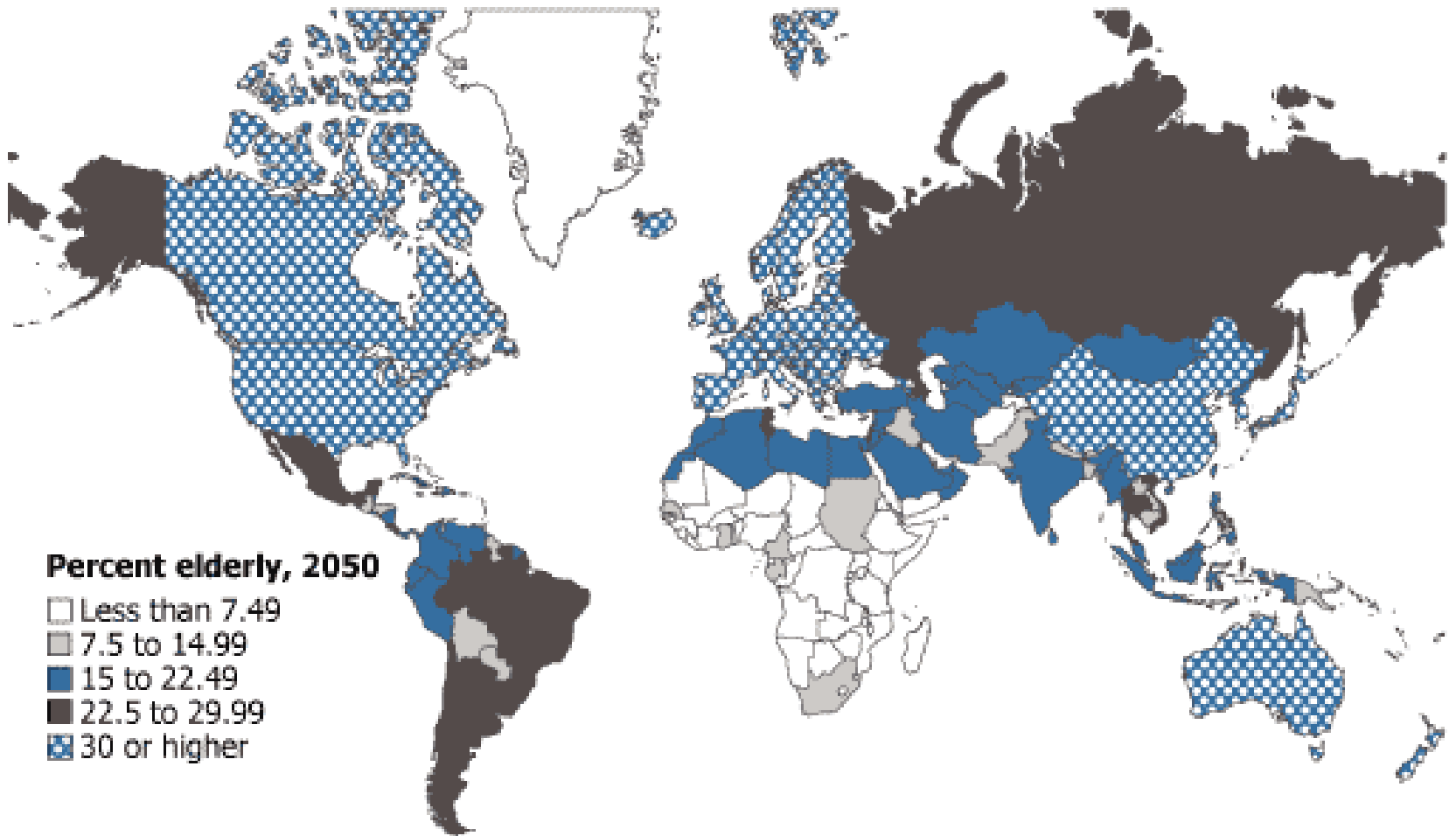


Percent 65+, 2000



Toshiko Kaneda <http://www.prb.org/images3/PercentElderly2050.gif>

Percent elderly, 2050



What we do not know: life-expectancy uncertainty

	<u>Baseline</u>	<u>5%</u>	<u>25%</u>	<u>Median</u>	<u>75%</u>	<u>95%</u>
Life expectancy (years)						
Men	15.1	20.1	19.1	18.5	18.0	17.1
Women	18.7	23.7	22.8	22.2	21.7	20.9
Change (years)						
Men	0.0	+5.0	+4.0	+3.4	+2.9	+2.0
Women	0.0	+5.0	+4.1	+3.5	+3.0	+2.2

Note: OECD average.

Source: Baseline mortality rates from UN/World Bank database, projections by OECD

Dealing with it: traditional response

- **Personal resources:** fail to save, early retirement, no insurance, most wealth locked in the **family home**.
 - **Family resources:** the child as your pension.
 - **Working longer:** a “natural” solution, but institutional and maybe health status constraints
 - **Social security:** usually defined benefit schemes. Many are under-funded, implying fiscal stress.
 - **Occupational pension plans:** Many are insolvent and sometimes lack the annuity payout.
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Dealing with it: Government response: Switch to DC

- 1981 – Chile
 - 1985 – Switzerland; Netherlands
 - 1986-92 – Australia
 - 1993 – Argentina; Columbia, Denmark, Peru
 - 1996 – Uruguay
 - 1998 – Hungary; Kazakhstan; Bolivia; Mexico
 - 1999 – El Salvador; Poland
 - 2000 – Hong Kong; Sweden
 - 2001 – Latvia
 - 2003 – Dominican Republic
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But what after retirement: designing payouts

- Life annuities
 - Health and aged care provision
 - Phased withdrawals
 - Other products:
 - LTC insurance
 - Reverse mortgages
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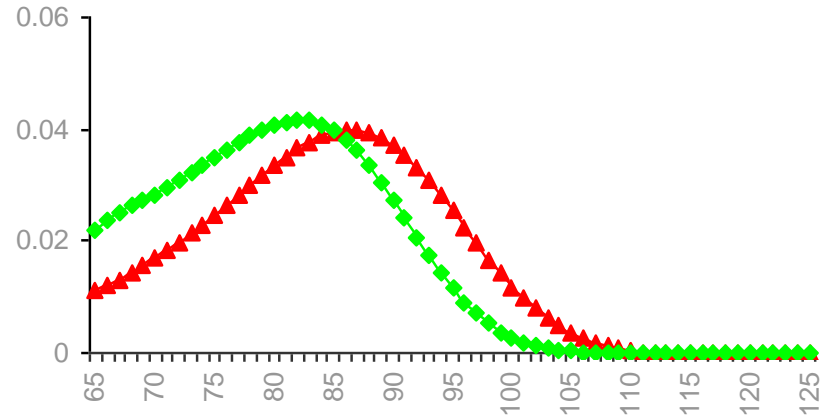
Annuities

Reasons for annuities being a small market are standard

- Asymmetric information => adverse selection
 - Bequests
 - “Crowding out” by age pension/safety net
 - Myopia
 - Other supply side issues
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Example of adverse selection

Annuity purchasers live LONGER → asymmetric information.
Insurers price accordingly: Money's worth



	<u>UK</u>	<u>US</u>	<u>Australia</u>	<u>Italy</u>
Pop	.90	.81	.91	NA
Ann	.97	.93	.99	.96

Phased withdrawals

- Allow intermittent access to capital within preset maximum and minimum limits based on life expectancy at retirement
 - However little or no flexibility when near the exhaustion of resources
 - Half of the retiree cohort may live longer than that predicted by the life expectancy at retirement
 - No *insurance* involved
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Unlocking home wealth

What is a reverse mortgage?

- Non-recourse loan, repaid with interest when home surrendered (e.g., at death)
 - Costs: Loan origination, inspection to set home equity value
 - Lender needs liquidity
 - Reinsurance: risks include:
 - House price risk
 - Interest rate risk
 - Mortality risk
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Comparing conventional and RM annuities: RM like a “family” annuity

	<i>Conventional Annuity</i>	<i>RM Annuity</i>
<i>Premium</i>	Premium due up front	Premium due on closure
<i>Bequest</i>	Once for all reduction	Gradual reduction
<i>Payment</i>	Higher	Lower

What is still missing?

- Most longevity insurance products under-produced
 - Stronger longevity protection markets
 - Opportunities for accessing home equity
 - Evidence based regulation
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Popn Ageing and Financial Integrity

- Financial integrity challenged by increasing longevity in several markets
 - Annuity, life insurance, reverse mortgage, health insurance, aged care insurance, liability, auto
 - Popn Aging means more longevity risk around:
 - which eventually markets and new products will move to insure, increasing risk management issues
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Global picture

- Intl awareness of longevity as a risk issue
 - But little adequate modeling
 - Not up to the task of providing input to calibrate solvency criteria
 - Not up to the intent and motivation behind Basel II
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A major problem: projecting life expectancy risk

- Idiosyncratic life-expectancy risk
- The average length of life of a *cohort* is uncertain



Future mortality

- Two views
 - Continuous improvement: mortality will decline at all ages
 - Compression view: life expectancy, fundamentally biologically fixed at some very advanced age. Yet mortality will continue to decline over a wide range of ages.
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Diversifying the mortality risk

- Reinsurance
 - Cost of reinsurance has been high
 - *Just too toxic and dangerous* (Wadsworth 2005)
 - Immunization
 - Survivor bonds
 - Securitization
 - Heavy information requirements
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Bond market

- Current stock of government and corporate bonds too small and ill-suited to this market.
 - However, long-dated corporate bond issuance has overtaken that of government long-dated bonds in the UK
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To summarise:

- Most products cover only a fixed number of years – tail risk still remains
 - Well specified, robust stochastic mortality models and well defined mortality indices still not available
 - Active market for appropriate hedges to longevity risk not yet developed
 - Cost of government guarantee on longevity insurance products unknown
 - No real solution to longevity insurance provision yet.
 - But
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Possibility 1: Reverse mortgages

- Programs like Home Equity Conversion Mortgage (HECM) in the US, could be encouraged elsewhere.
 - Innovations by Bluestone ('protected equity option') and Xcapital (incorporates eventual accommodation in a retirement home and long term health care) in Australia.
 - Securitisation of RMs. Two so far: Lehman Brothers (1999) and Citibank (2001)
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Possibility 2: Risk sharing

- Assign idiosyncratic risk to the insurance company and leave the systematic risk with the annuitant.
 - Example: TIAA-CREF
 - New cohorts to be admitted into the insurance pool.
 - Payout formula must guarantee that new entrants face an ex ante expectation of an actuarially fair payout
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Possibility 3: Mortality based securities

- Swiss Re mortality bond issued in December 2003
 - Based on a mortality index selected on the mortality experience of the US, UK, France, Italy and Switzerland.
 - Another example: EIB/BNP survivor bond launched in November 2004.
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What is the fundamental problem?

- Lack of knowledge on life expectancy
 - If we could agree on longevity projections, then instruments and products allowing diversification could be marketed
 - Ignorance generates over-regulation or bankruptcy
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Modeling Challenges

- Current state of the art:
 - The Lee Carter approach
 - Scenario analysis

→ This is not adequate for an issue of this magnitude
 - We see modeling in two stages:
 - Stochastic longevity risk modeling
 - Mapping these risks into sensible decisions about solvency criteria
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Modeling Longevity Risks

- Modeling changes in longevity involves:
 - Coping with extreme value risk
 - Structural breaks
 - Research on stochastic errors around forecasts of mortality
 - Longevity index construction to help price survivor bonds
 - Annuitant experience data to be published as a public good
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A way forward?

- And then apply the outcomes:
 - Build consensus around methodology
 - Feed the modeling into affordable mortality based financial products to diversify institutional risk
 - Use these findings to generate more realistic regulatory reserve requirements
 - Provide more confidence around outcomes to encourage devt of mechanisms to spread systematic mortality risk
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- Thank you

- Questions?
