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Understanding and managing longevity risk

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Introductions

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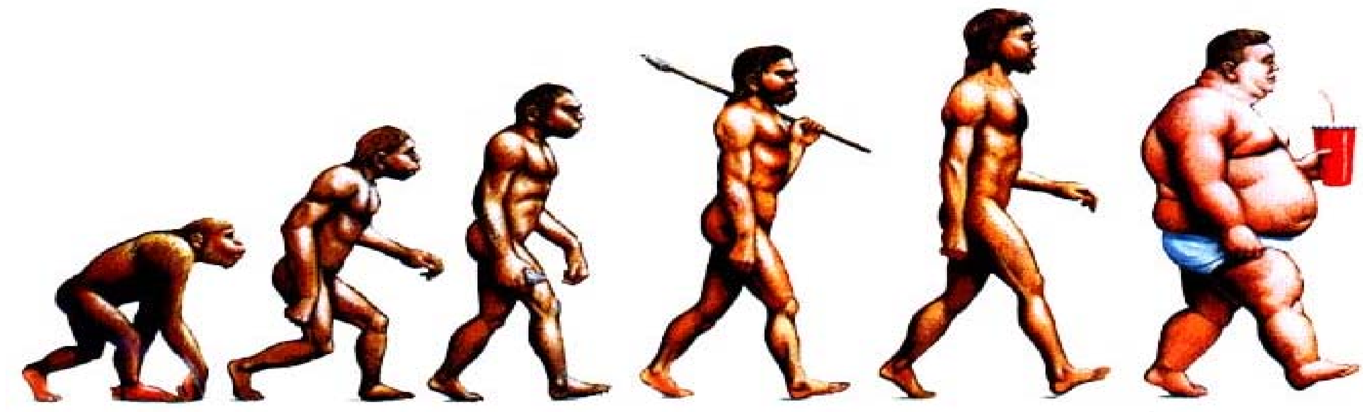
Agenda

- Longevity modelling
- Measuring longevity risk
- Longevity risk transfer solutions
- Practicalities of a longevity hedge
- Market outlook

Evolution of mortality modelling



- Standard tables
  No cohort analysis
  Immature schemes + high net interest rates = defer thinking
- Mortality improvements analysed by cohort
  Fading mortality improvements still the norm
- Mortality treated as base + improvement
  Continued future mortality improvement taken seriously
- Mortality rating by address (initially only bulk annuities, now individuals)
- Per person mortality rating is standard
  Longevity risk understood, routinely priced, even traded
- ?

But what if experience is different? → LONGEVITY RISK

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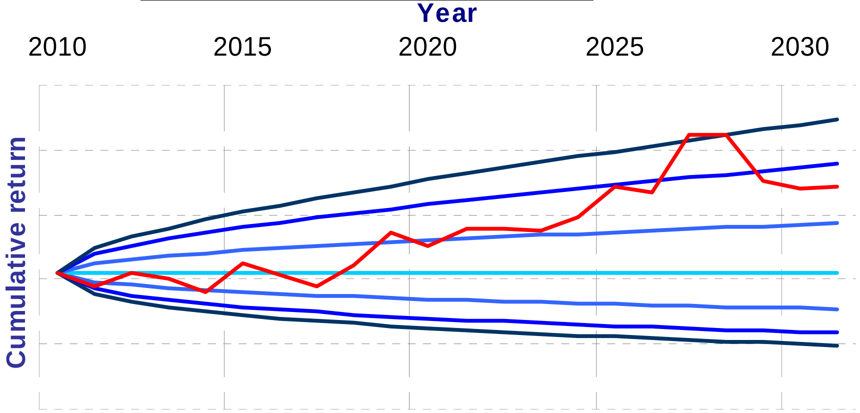
Longevity risk vs economic risk

Mortality and most other economic risks are fundamentally different:

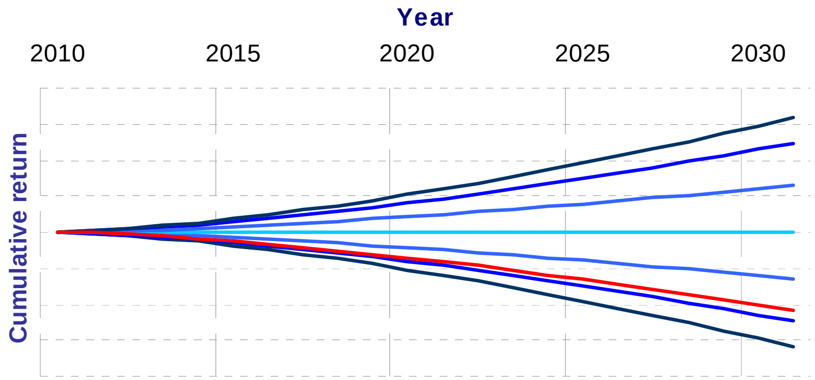
Economic risks	Longevity risk

• The longer I run the risk, the more predictable (in relative terms) the outcome
• "Funnel of doubt" expands at a lower rate further into the future.
  • *"in the long term, risky assets outperform"*
	• The longer I run the risk, the more extreme the outcome could be
	• "Funnel of doubt" diverges
	  • *"once longevity starts to move against me, it will probably get even worse"*

Economic risk over time



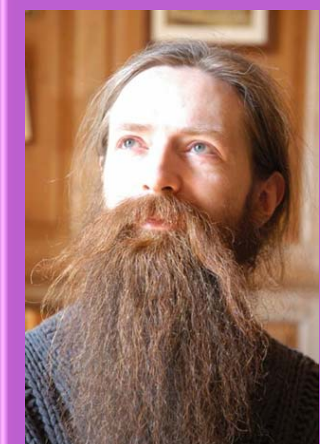
Longevity risk over time



The components of longevity risk

Trend Risk

Changes in a general longevity for a big population (e.g. England and Wales, insured lives, or SAPS)



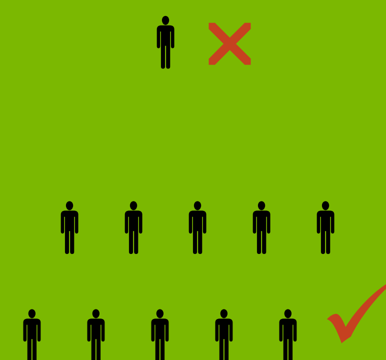
"First person to live to 1,000 might be 60 already"

Basis Risk

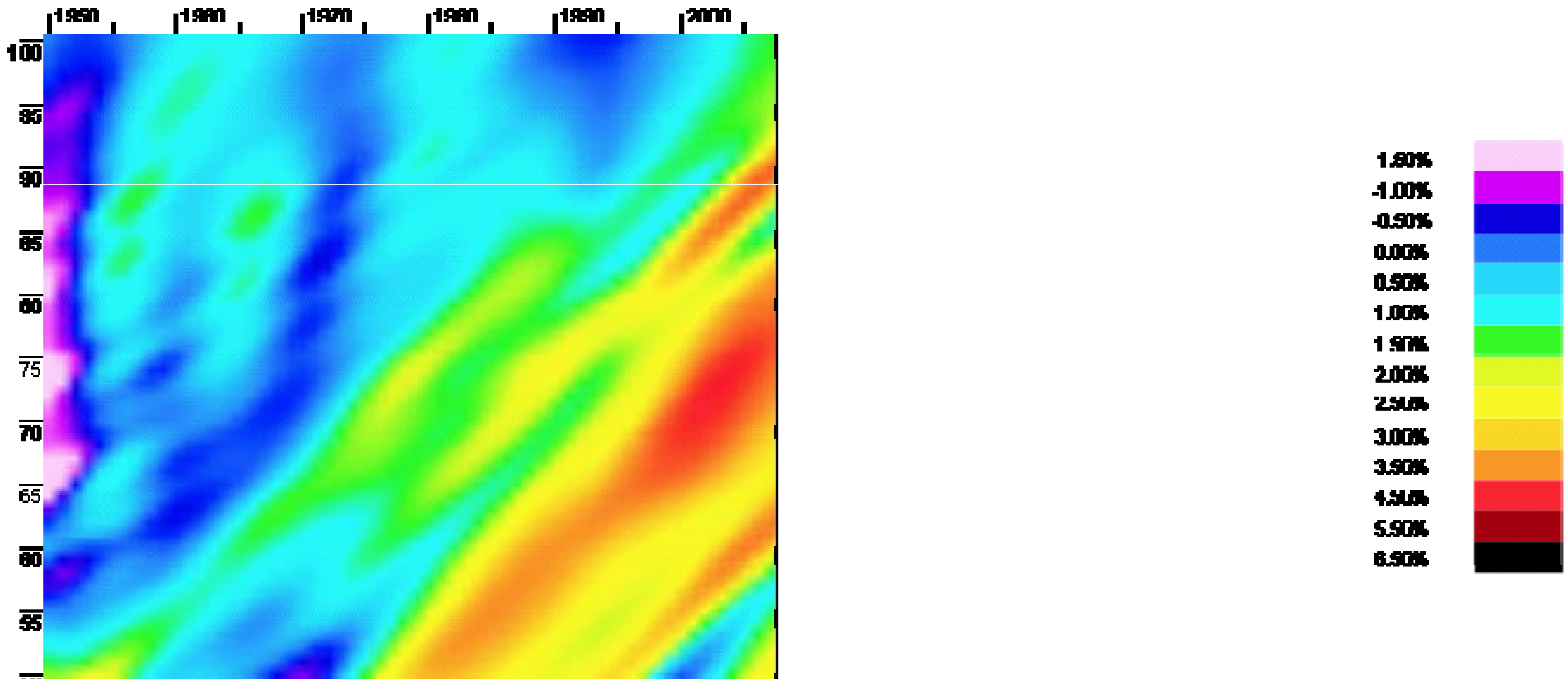
How your scheme differs from the big population, and the difficulty of measuring this and its implications

Idiosyncratic Risk

Even if you knew the "correct" mortality rate, experience will differ, particularly in small schemes

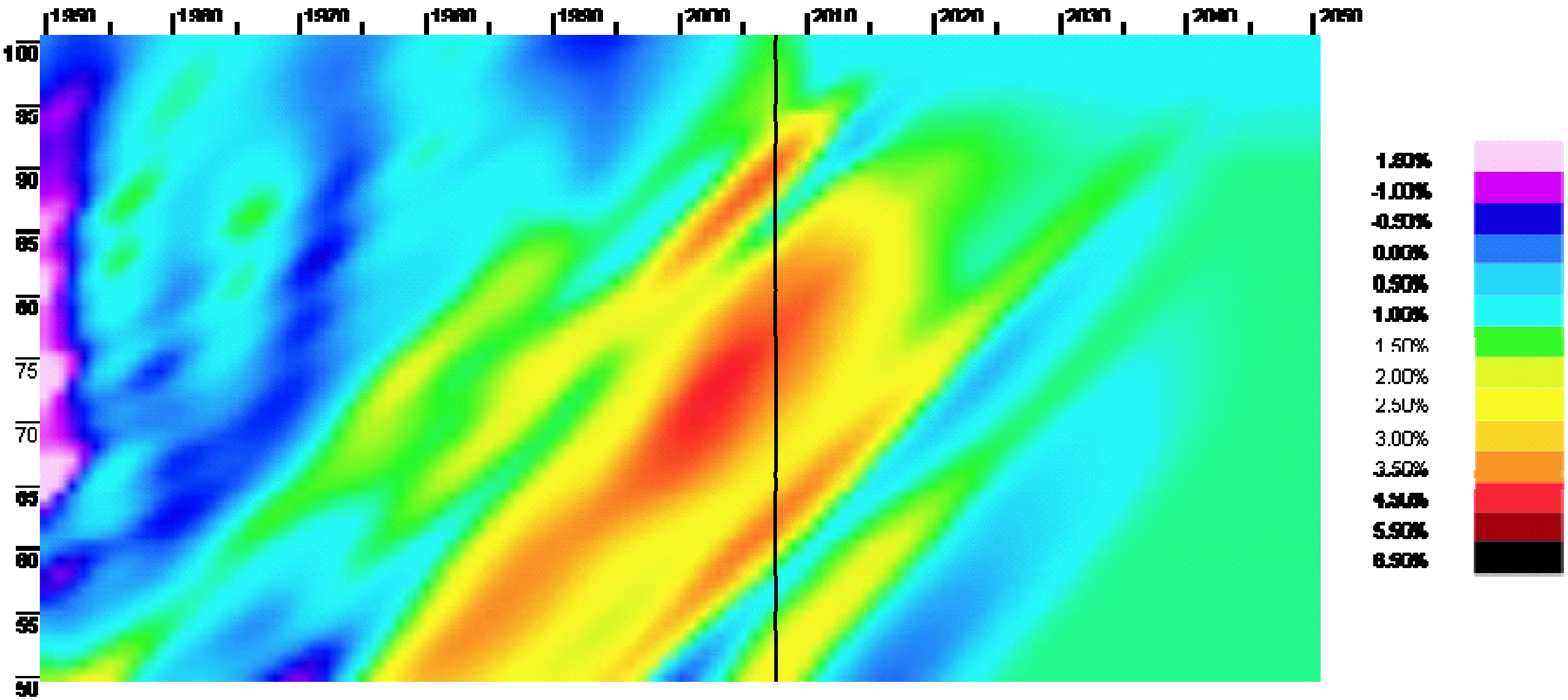


A look to the past - UK



P-spline smoothed improvement rates for Males

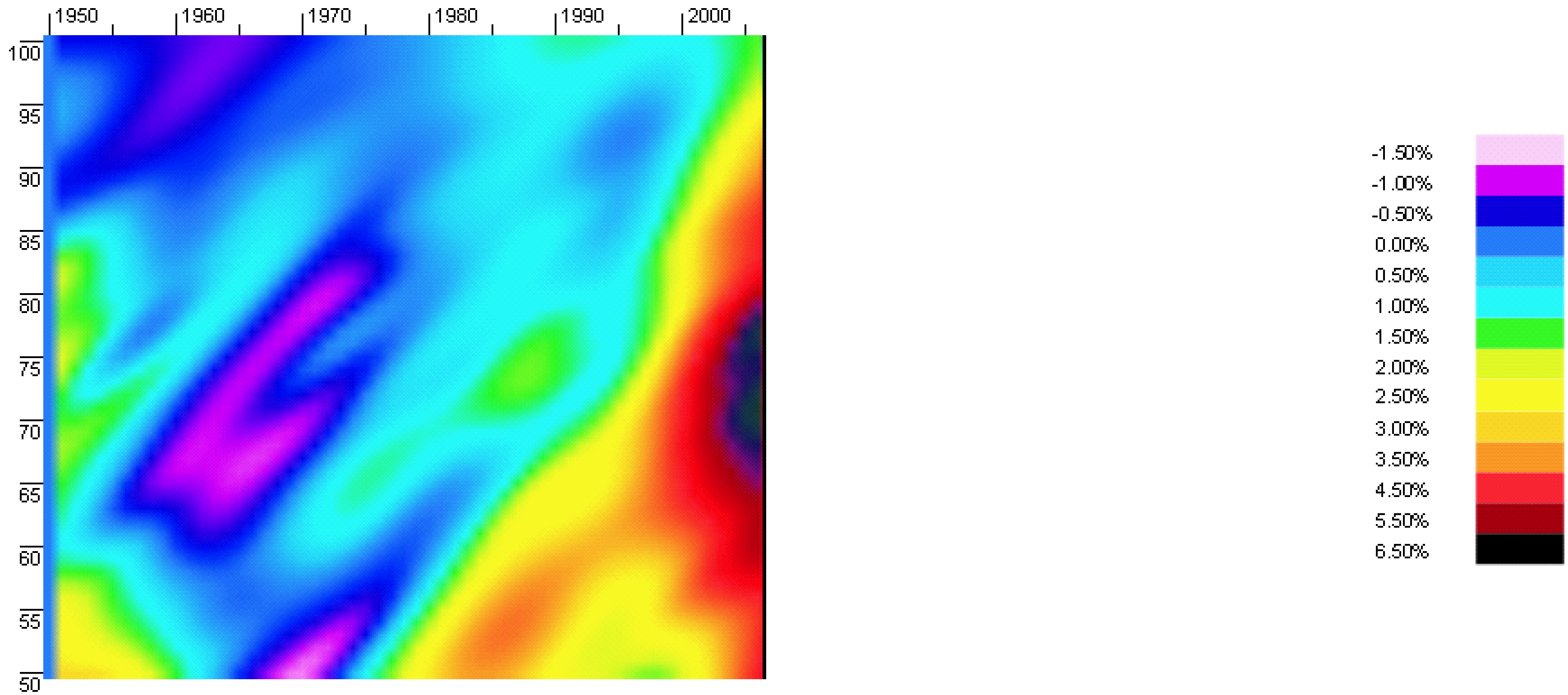
UK Projection



P-spline smoothed improvement rates for Males

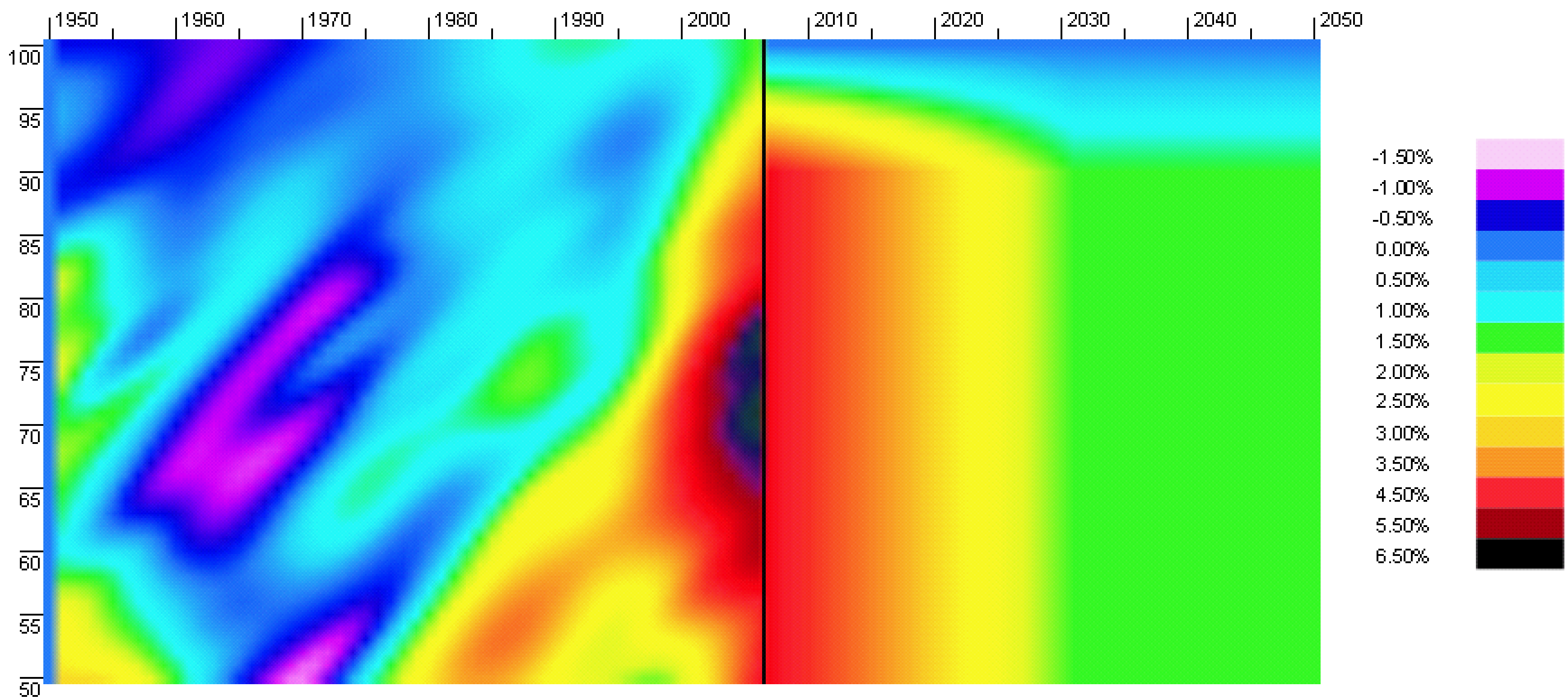
CMI 2010 model with a long term rate of improvement of 1.25%

Irish experience



P-spline smoothed improvement rates for Ireland males (from HMD)

Typical Irish projections



P-spline smoothed improvement rates for Ireland males (from HMD)

0.00% p.a. with an overlay of 100% of cso irish population projections

Outlook for Irish mortality

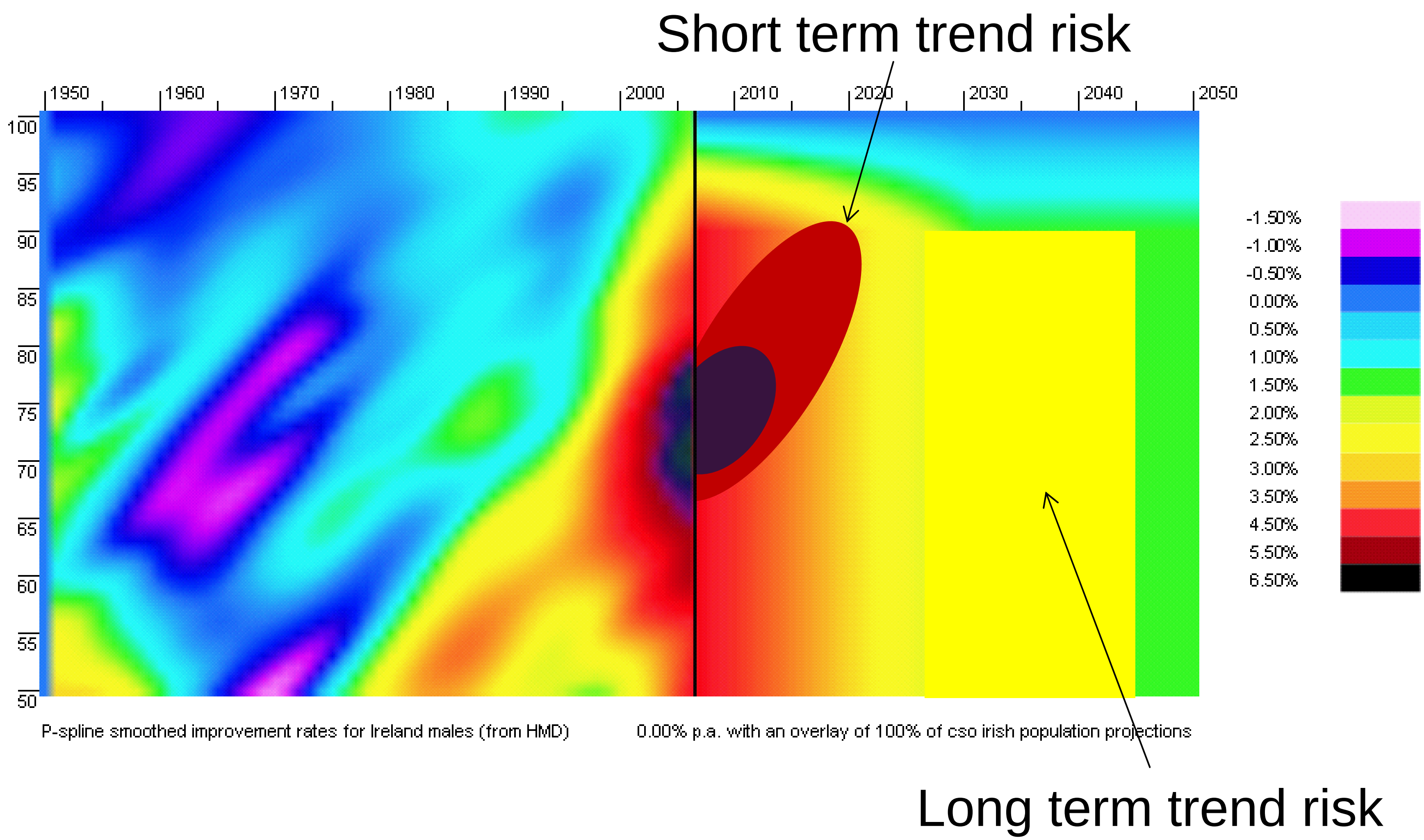
Irish mortality experience is heavier than many European countries with similar economic status

Recent improvements in life expectancy in Ireland have been faster than those in many other countries

There remains scope for further improvements in Irish life expectancy based on data from other European countries

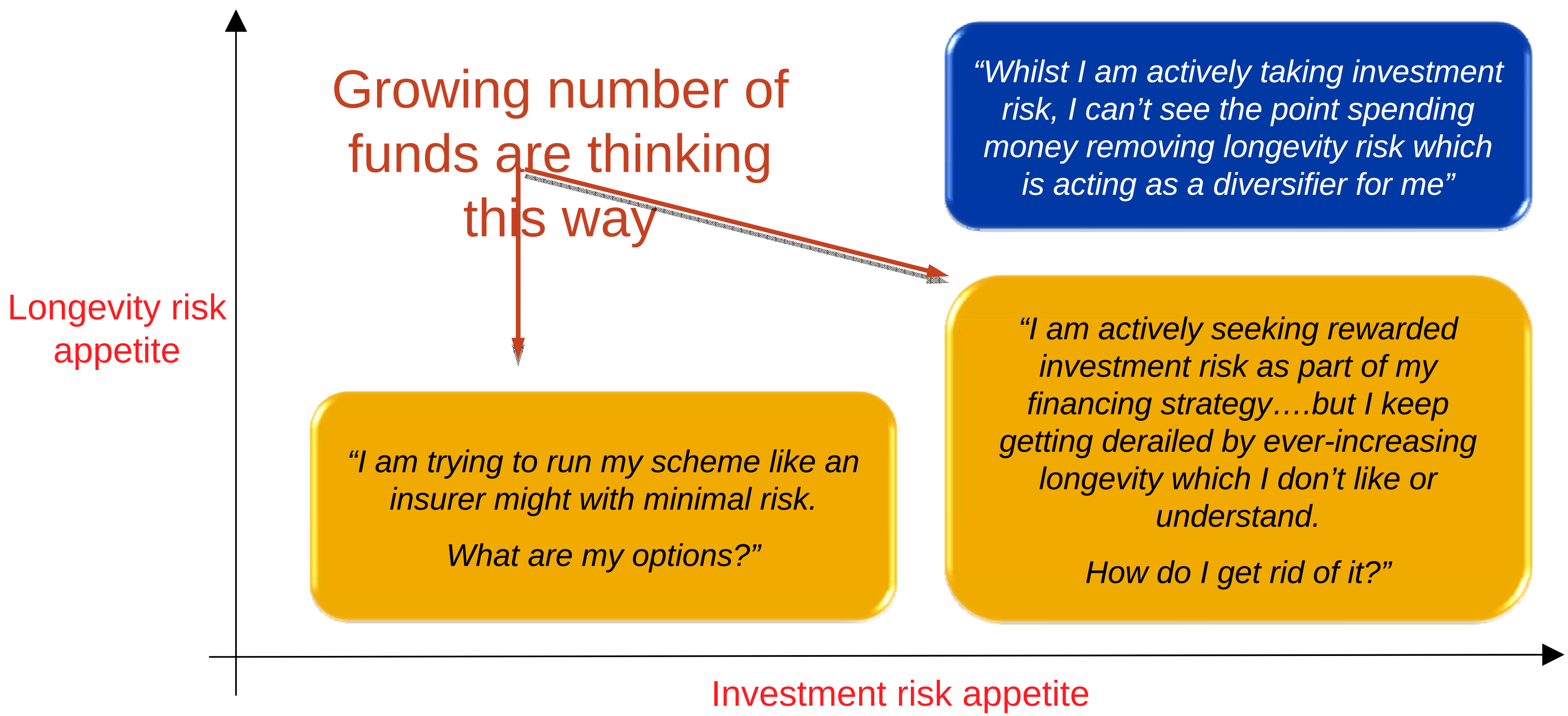
In summary – we expect people to live longer!

Possible shape of things to come



Decision to retain longevity risk

- Attitude towards longevity risk between pension funds is divided:



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Managing pension liability risks – the broad options

Buy-out
- Transfer all liabilities to an insurance company
- Limited risk remains with the Fund

Buy-in
- Purchase bulk annuity contract held as an asset of the scheme in respect of some or all of the members of the scheme
- Fund retains Insurer credit risk

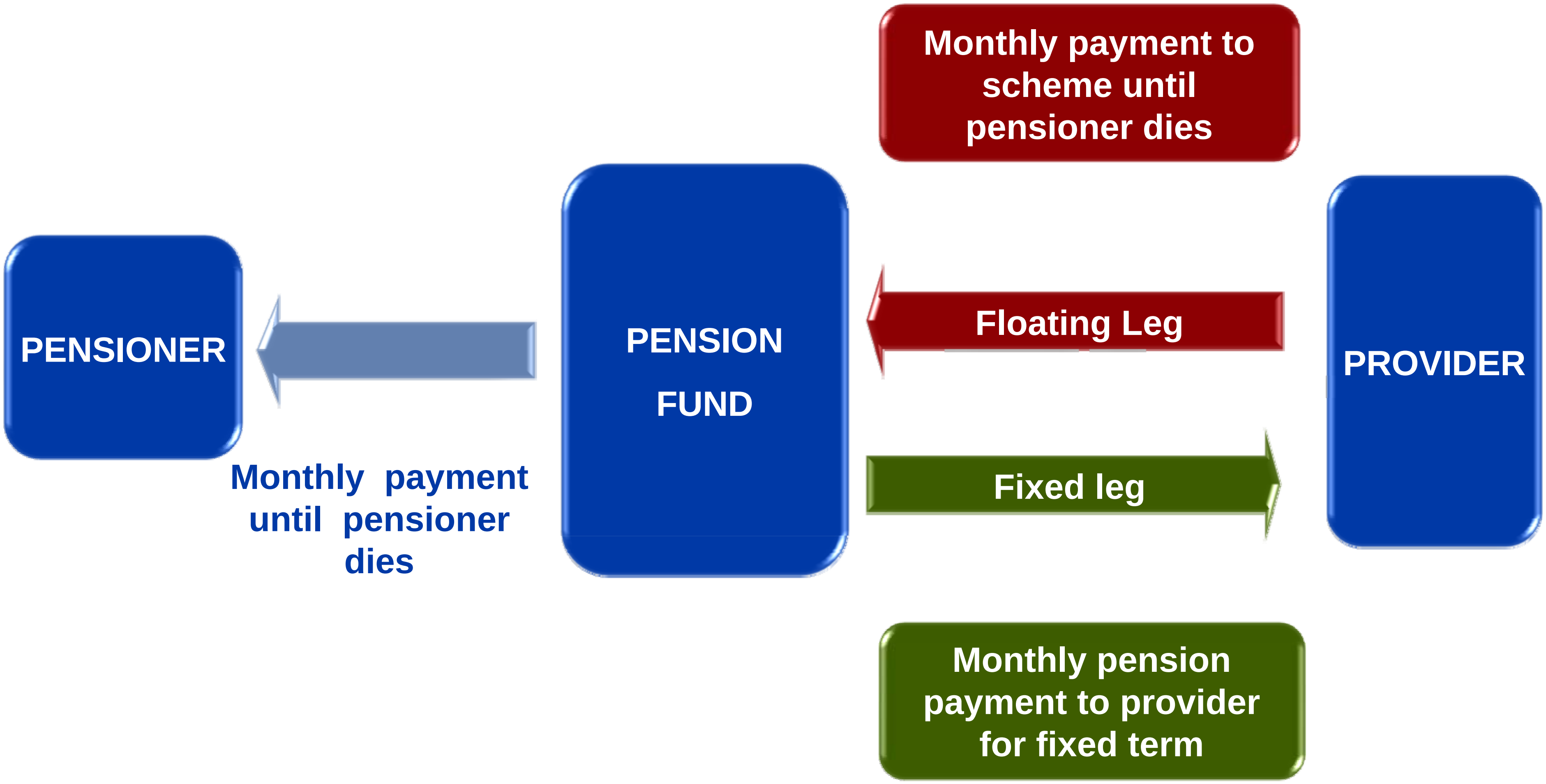
Longevity insurance plus LDI
- LDI plus longevity hedging
- Some investment, inflation and credit risk

Optimised flightpath
- Remove unrewarded risks
- Moderate(targeted) asset risk

Traditional pension scheme investment
- Mixture of equities and bonds

Longevity risk hedged

Longevity swaps



Providers

Investment Banks	Insurers
Provide longevity swaps or "synthetic" buy-in	Provide buy-in / buy-out or longevity swaps
Will provide "derivative" solutions	Will provide "insurance solutions"
Distribute risk to both reinsurers and capital markets	Will keep some risk and reinsure some (the majority, usually)
Hedge typically for 50 years	Hedge typically for "whole of life"
Subject to aggregate bank solvency capital	Subject to FSA reserving requirements

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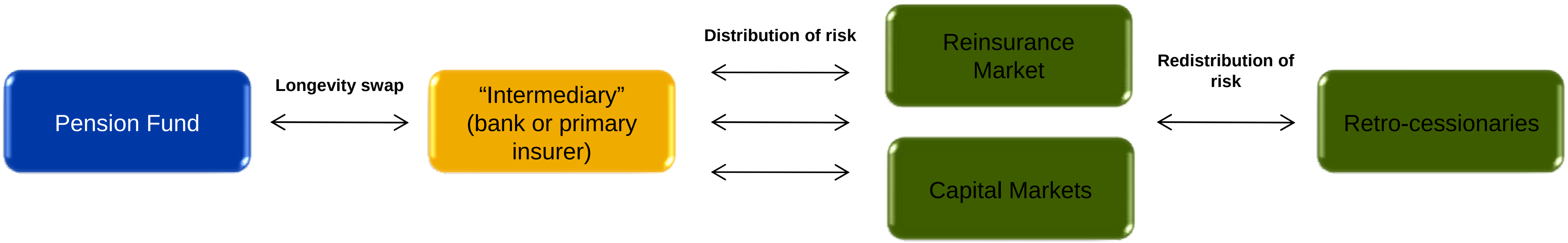
The longevity risk transfer chain



- **Reinsurance markets:**
  - Are "long" on mortality risk
  - Can use longevity risk to diversify
  - Freeing up capital to write new business
  - Capacity limited to ~€30bn p.a
- **Capital markets:**
  - Have no existing life exposure
  - Seeking return earning, diversified portfolios

Anatomy of a longevity hedge

Commercial Proposition / Decision making

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Assets and collateral

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Benefits

↓

Data

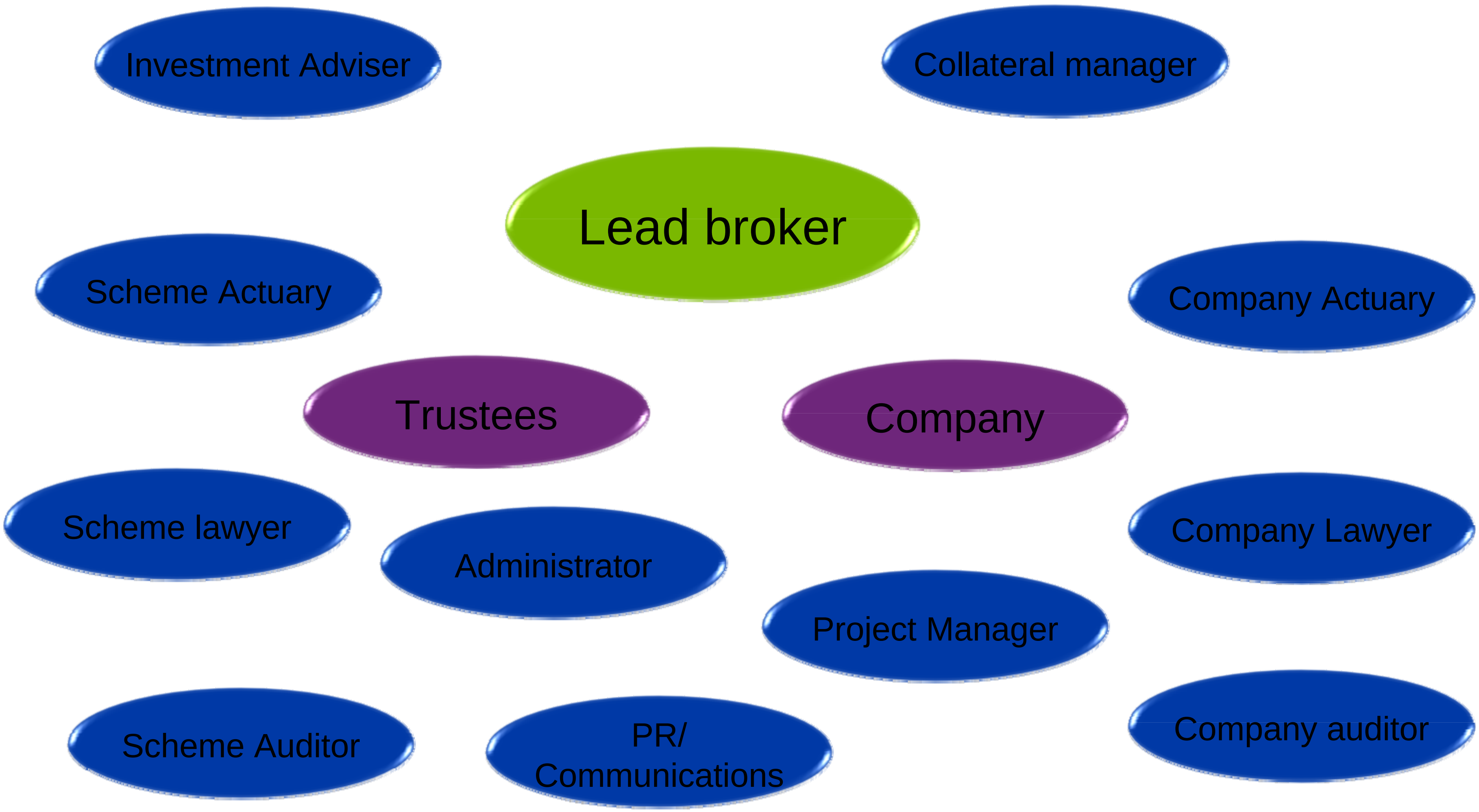
↓

Legal

↓

Communication

The cast


Investment Adviser
Collateral manager
Lead broker
Scheme Actuary
Company Actuary
Trustees
Company
Scheme lawyer
Administrator
Company Lawyer
Project Manager
Scheme Auditor
PR/ Communications
Company auditor

Irish appetite

Providers

- Analogous market to UK
- Benefits understood
- Demographics understood
- "Politics" familiar
- Attractive market to enter – subject to enough volume

Funds

- Interested in your views
- Ours:
  - Mortality tables represent reasonable best estimate
  - Pricing likely to be attractive for funds to consider
  - However, is the focus elsewhere (funding)
  - Has the risk been understood?

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