“Longevity Risk: To Bear or to Share”

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Motivation

• Question: who should bear longevity risk?

  1. Individuals - collective arrangements

  2. Investors - equity holders in annuity providers

• Answer: individuals! Under baseline parameters:

  1. Individuals have a marginal preference for collective arrangements

  2. Investors will walk away from capital contributions to annuity providers
Annuity products

- Buy at age 25 to receive payment after age 65

  1. Variable Annuity - payments are a fixed fraction of reference portfolio (investment risk/return) unless provider defaults (funding ratio less than 1) in which case fixed payment until maximum age 95

  2. Collective Annuity - payments are a fixed fraction of reference portfolio (investment risk/return) and of funding ratio (longevity risk)

- Role of Equity

  1. Bear longevity of variable annuity up to invested capital (limited liability)

  2. In exchange for residual claim in reference portfolio at T=95
Comment 1

• Why default when funding ratio less than 1?
  1. Could be imposed when cash is not enough for next payment
  2. How would results - impact on annuitants and investors

• Resolution mechanism - If the funding ratio of DVA is less than 1 the annuity provider’s assets are liquidated and individuals are forced to buy zero coupon bonds for maturities up to age 95
  1. Mortality credit is lost
  2. This imposes a substantial penalty on DVA contracts
    • it would be interesting to quantify this deadweight loss
  3. Maybe consider a softer approach
    • allow individuals to buy annuities from another provider
Comment 2

- Longevity risk model - Lee and Carter model when estimated using historical data does not match longevity projections going forward

1. realised changes in longevity happened at a very smooth rate therefore the implied volatility of shocks is very small

2. to be consistent with SSA projection volatility should to be 2-3 times higher than the estimated parameters
Comment 3

• Why buy annuity at age 25 for payment starting 40 years later?

• Example:
  • 1970 a 65 year old male expected to live to 78
  • 2010 a 65 year old male expected to live to 82.5
  • present value of annuity at age 65 increased by 30% (from 10.5 to 13.5)

1. Changes in life expectancy have substantial impact over 40 years

2. Individuals will see this coming and will adjust over the life cycle - save more or work for longer
Comment 4

• Sensitivity analysis for different levels of equity contribution for higher longevity risk

• Same shock on longevity has asymmetric impact on collective payments, this should also benefit equity holders if default wasn’t triggered so quickly?

• Rationale for using AIR to find book value of liabilities