

“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