THE INCREASING LONGEVITY GAP AND THE PENSION SYSTEM

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Life expectancy is increasing with economic status: wage, different measures of annual and lifetime income, or accumulated wealth
  - Kitagawa and Hauser (1973), Lleras-Muney (2005), Chetty et al. (2016)

Earnings-related heterogeneity in life expectancy can make a pension system less progressive or even regressive

Importance likely increases: Increasing lifetime earnings inequality
  - Kopczuk, Saez, and Song (2010) for the US, Boenke, Corneo, and Lüthen (2015) for Germany
Contribution

- Evolution of heterogenous mortality by lifetime earnings across cohorts 1926-1949, West German men
- Exploit universe of retirees and use pension entitlements as proxy for lifetime earnings
- Women (household context): life expectancy of widows
- Distributional implications of increasing longevity gap through the pension system
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Pension insurance in Germany

- Mandatory for employees; Bismarckian system: pensions strongly linked to prior contributions

- Pension level based on pension type (disability, long-term workers), retirement age (early retirees get deductions) and accumulated earnings points (EP)

- 1 EP is awarded for average contributions in a year; translates in pension of about 30 € in 2016

- Accumulated EP represent ranks of lifetime earnings for employees (here: at least 30 EP; 25 EP give similar results)
Redistribution through the pension system

Two counteracting effects, similar to most pension systems:

- **Progressive component:** insurance against disability ⇒ disability pension or early retirement

- **Regressive component:** insurance against longevity ⇒ heterogeneous mortality: high earners have prolonged benefit period
Two different datasets

Dataset 1: mortality (SK90, waves 1992-2015):

- stock of pensions of West German men:
  \( \sim 66.5 \) million obs with \( \sim 3.4 \) million cases of death

- stock of survivor pensions of West German widows:
  \( \sim 29.5 \) million obs with \( \sim 2 \) million cases of death


- biography data from the pension insurance (\( \sim 13,500 \) West German men), monthly contributions from ages 14 to 66 and pension prospects
Descriptives: Observed survival rates

(a) By decile

(b) By cohort group
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Estimation

- Logit:

\[
\log \frac{\Pr(\text{death}_{itcd} | \text{survival until age } t)}{1 - \Pr(\text{death}_{itcd} | \text{survival until age } t)} = \\
\beta_0 + \sum_{p=1}^{4} \beta_p t^p + \sum_{p=1}^{4} \beta_{pd} t^p + \mu_d + \eta_c + \nu_{cd}
\]

- Cohorts grouped into 3-year cohorts; lifetime earnings into deciles at age 65; age: 4th order polynomial

- Mortality rates predicted for a grid of age × cohort group × decile

- Age range: 65-99
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Life expectancy of West German men at 65
Life expectancy of widows if husband dies at 65

Cohort group

1st  2nd  3rd  4th  5th

26-31 32-37 38-43 44-49
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Distributional implications

- Calculate pension wealth, pension contributions and generosity
- Generosity: average individual internal rates of return (IRR) on contributions given expected benefits
- Compare generosity under homogeneous and heterogeneous mortality by deciles and cohorts
Pension wealth

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<thead>
<tr>
<th>Cohort 35-37</th>
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<th>Cohort 44-46</th>
<th>Cohort 47-49</th>
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Difference: PW with and without differential mort.
Ginis of pension wealth with and without differential mortality

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<td>Heterogenous mortality</td>
<td>0.162</td>
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<td>Homogenous mortality</td>
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IRR; homogeneous mortality

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IRR; heterogeneous mortality

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Extensions

1. **Survivor benefits**
   - Additional returns $\Rightarrow$ insures living standard of survivors
   - We know likelihood and level from the data

2. **Mortality before 65**
   - Extrapolation of mortality at age 65 to ages prior to 65
   - Rates calibrated to meet average of official mortality statistics by cohort and sex
Pension wealth including survivor pensions

![Graph showing pension wealth for different cohorts](image)

- **Cohort 35-37**
- **Cohort 38-40**
- **Cohort 41-43**
- **Cohort 44-46**
- **Cohort 47-49**

All values are in Euro, 2015 real values.
IRR including survivor pensions

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<thead>
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<th>Cohort</th>
<th>IRR</th>
<th>2</th>
<th>4</th>
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PW accounting for mortality before age 65

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<td>Euro, 2015 real values</td>
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The graph shows the relationship between PW accounting for mortality and age before age 65 across different cohorts.
IRR accounting for mortality before age 65
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- Longevity gap by lifetime earnings is growing
- Drivers: large increases in life expectancy for high earners versus small increases for low earners
- Heterogeneous mortality turns otherwise progressive system regressive $\Rightarrow$ regressive longevity dominates progressive disability
- Survivor pensions mitigate regressive effect but do not suppress it
- Mortality before age 65 likely to amplify regressive effect