

# THE INCREASING LONGEVITY GAP AND THE PENSION SYSTEM

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- **Analyze evolution of differential mortality** by lifetime earnings across cohorts 1903-1947 in Germany
  - Use acquired pension entitlements as proxy for lifetime earnings to form deciles (for men)
- **Decompose gap increase:** (1) inequality change and (2) change of differential mortality gradient (e.g. behavioral changes)
- **Show distributional implications** for the pension system
- To do: differentiate by health status and identify profiteers of survivor pensions

## Negative correlation of socio-economic status and mortality:

- Relationship known for a long time
  - Antonovski, 1968
- Documented for all causes of death
  - Feinstein, 1993
- Documented internationally e.g. USA, GB, Scandinavia or Italy
  - Mackenbach et al., 2003 and Feinstein, 1993
- Documented for Germany
  - Gaudecker and Scholz, 2007

**Income** linked to drivers (Cutler et al., 2006; Lleras-Muney, 2005):

- **Selection:** better career options for healthy individuals
  - Macintyre, 1986
- **Conditions:** better working and living conditions, better access to healthcare and food
  - Klein, 1999; Klein, Unger, 2001
- **Behavior:** positively correlated with education and a healthy behavior
  - Diderichsen, 1990, Lehmann et al., 1990, Luy, 2006

### Importance of income is likely to rise:

- Cross-sectional earnings inequality for most advanced economies in the last 3 decades
  - Atkinson, Piketty, 2010; Autor et al., 2006; Card, DiNardo, 2002; Goos et al., 2009; Lemieux, 2007
- Lifetime earnings inequality
  - Kopczuk, Saez, Song, 2010: US; Bönke, Corneo, Lüthen, 2015: Germany
- Earnings related lifetime gap
  - Chetty et al., 2016: difference in LE at age 40 in US is 14 years between highest and lowest percentile and increased between 2001 and 2014

Heterogeneous mortality and distributional effects of pension system:

- **Regressive component:** insurance against longevity; pensions paid until death, high income earners live longer and have higher pensions
- **Progressive component:** insurance against disabilities by giving individuals who are unable to work access to special pensions



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Data to estimate mortality differences:

- Dataset 1: stock of pensions, 1992-2012, 1% sample (1.5 Mio Men West)
- Dataset 2: cessation of pensions, 1993-2013, 10% sample (0.5 Mio Men West)

Data to estimate the distribution of pension wealth and the pension system's generosity (internal rates of return):

- Dataset 3: VSKT, biography data from the pension insurance (3000 Men West); includes monthly contributions from ages 14 to 66 and pension prospects

- Mandatory insurance for employees; Bismarckian system: pensions strongly linked to prior contributions
- Pension level based on earnings points (EP); 1 EP is given for average contributions in a year; worth about €30 in 2016
- Other factors: type of pension, retirement age (early retirees get disincentives)
- Special pensions depending on retirees individual situation (e.g. disabled, unemployment, women, long-term insured)

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- Logit-Model:

$$\text{Prob}(\text{death}_{itcd}) = \Lambda \left( \beta_0 + \sum_{p=1}^4 \beta_p t^p + \eta_c + \mu_d + \nu_{cd} \right)$$

- Cohorts grouped into 5-year cohorts; EP into deciles
- Mortality rates predicted for a grid of age  $\times$  cohort group  $\times$  earnings point decile
- Age range: 65-99

Disentangle distributional changes from gradient changes:

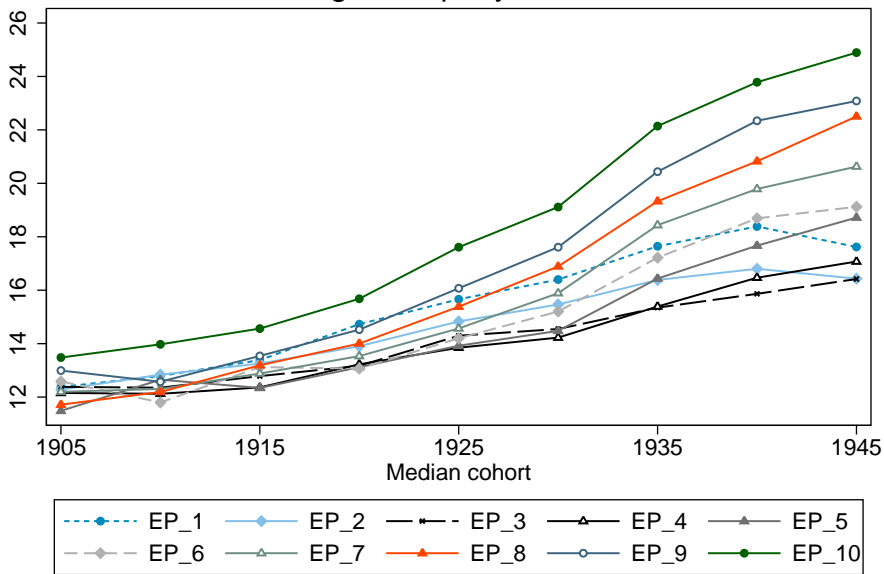
- Gradient estimation: fixed EP-categories for all cohorts
- Distributional effect estimation: re-weight estimation results based on empirical distribution of EP
- Difference between re-weighted and first results: distributional change

- Aim: calculate pension wealth, contributions and generosity
- NPVs of pensions and contributions in 2015 real values for both average and heterogeneous mortality
- Generosity: internal rates of return (to be done)

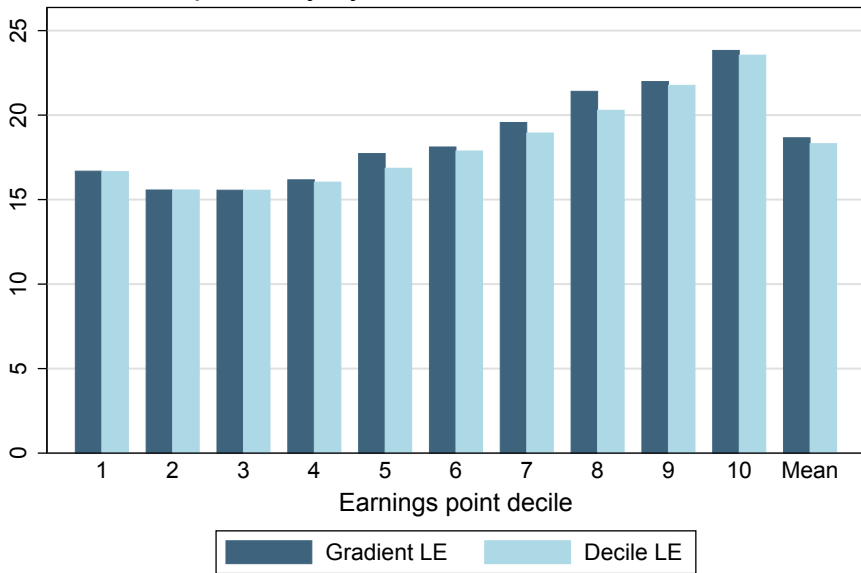
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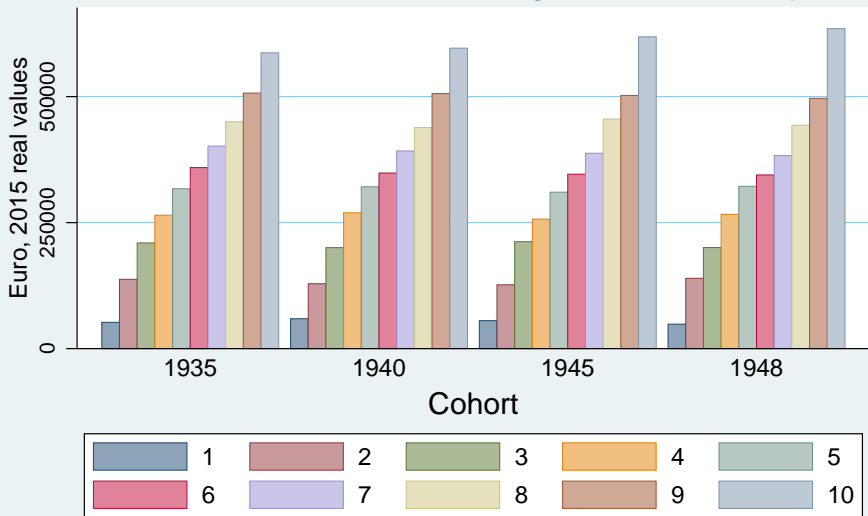
# Remaining life exp. by cohort and EP



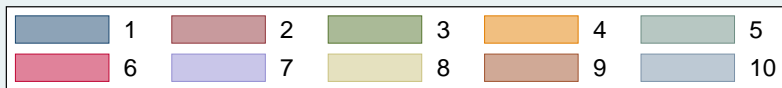
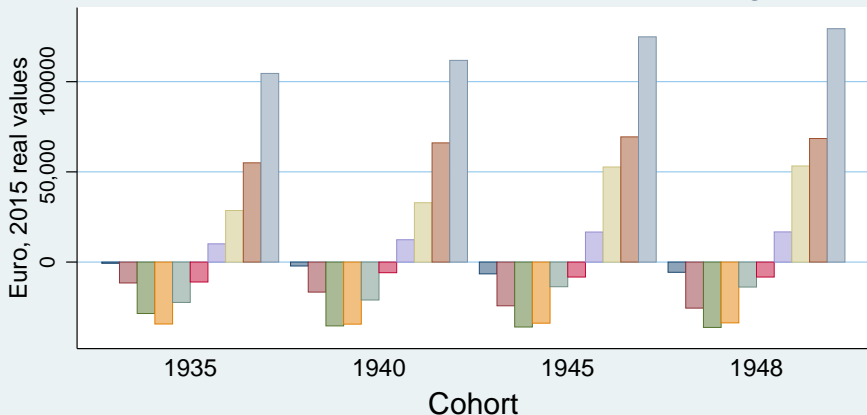
## Life expectancy by EP-decile, median cohort 1945



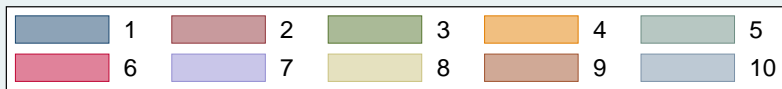
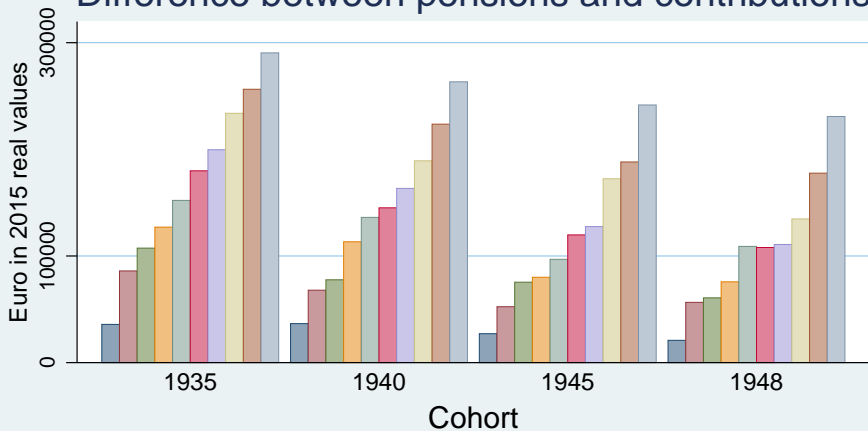
# Pension wealth, heterogenous mortality



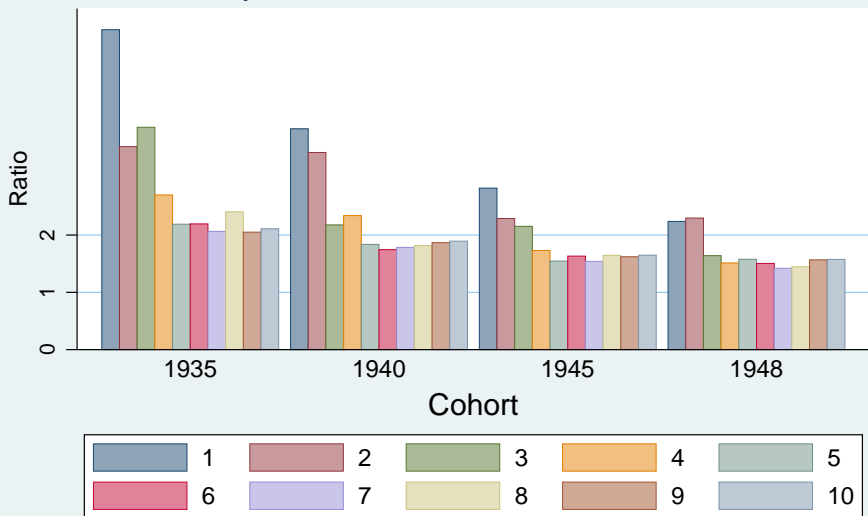
## Pension wealth, difference het/avg



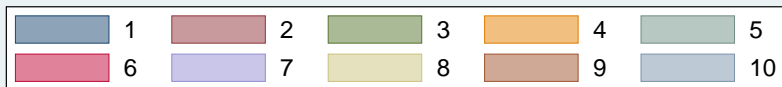
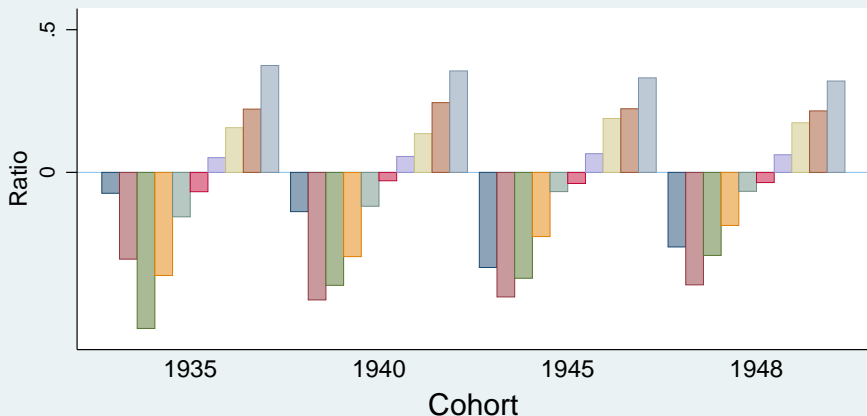
# Difference between pensions and contributions



# Ratio pensions/contributions, het. mort.



# Ratio difference



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- Life expectancy is growing in Germany, especially in upper deciles
- Main reason: gradient increase (e.g. rich people smoke less)
- Regressive effect, but overall pension system still not regressive: insurance against disability / unemployment (lower deciles) and longevity (higher deciles)
- Returns expected to become somewhat u-shaped; at some point in the distribution: longevity dominates disability insurance
- Outlook: increasing longevity gap, disincentives for early retirees, early path for stable earners and abolishment of unemployment / women paths make pension system more regressive