The Increasing Longevity Gap and the Pension System

Peter Haan Daniel Kemptner Holger Lüthen

21.11.2017

Table of Contents

Table of Contents

Motivation

- 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
  - Gustman and Steinmeier (2001), Feldstein and Liebman (2002), Breyer and Hupfeld (2010), Auerbach et al. (2017)
- 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

Table of Contents

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 $\Rightarrow$ disability pension or early retirement
- **Regressive component:** insurance against longevity $\Rightarrow$ 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

Dataset 2: distributional effects (**VSKT**, waves 2002, 2004-2015):

- 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

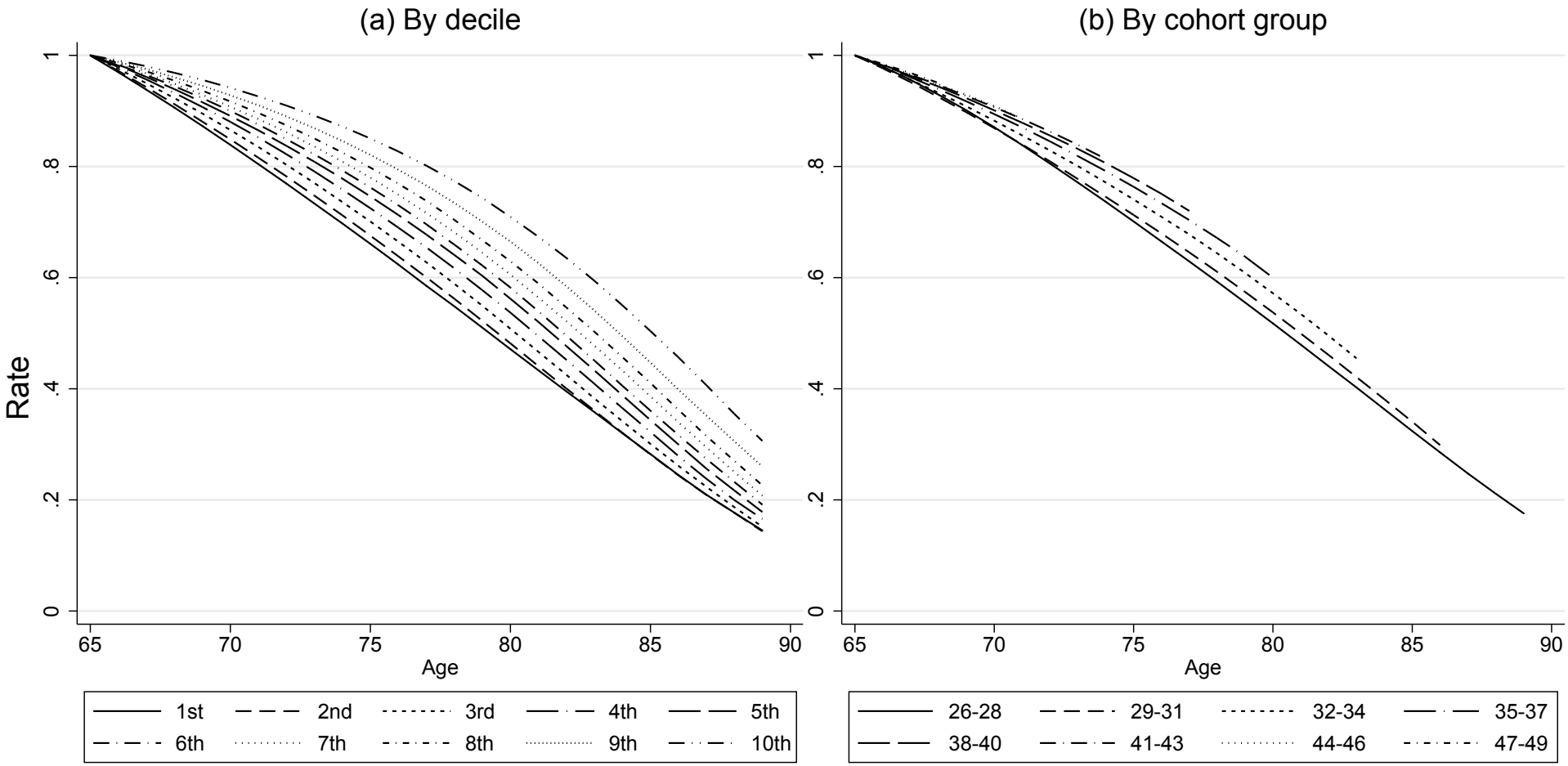


Table of Contents

Estimation

- Logit:

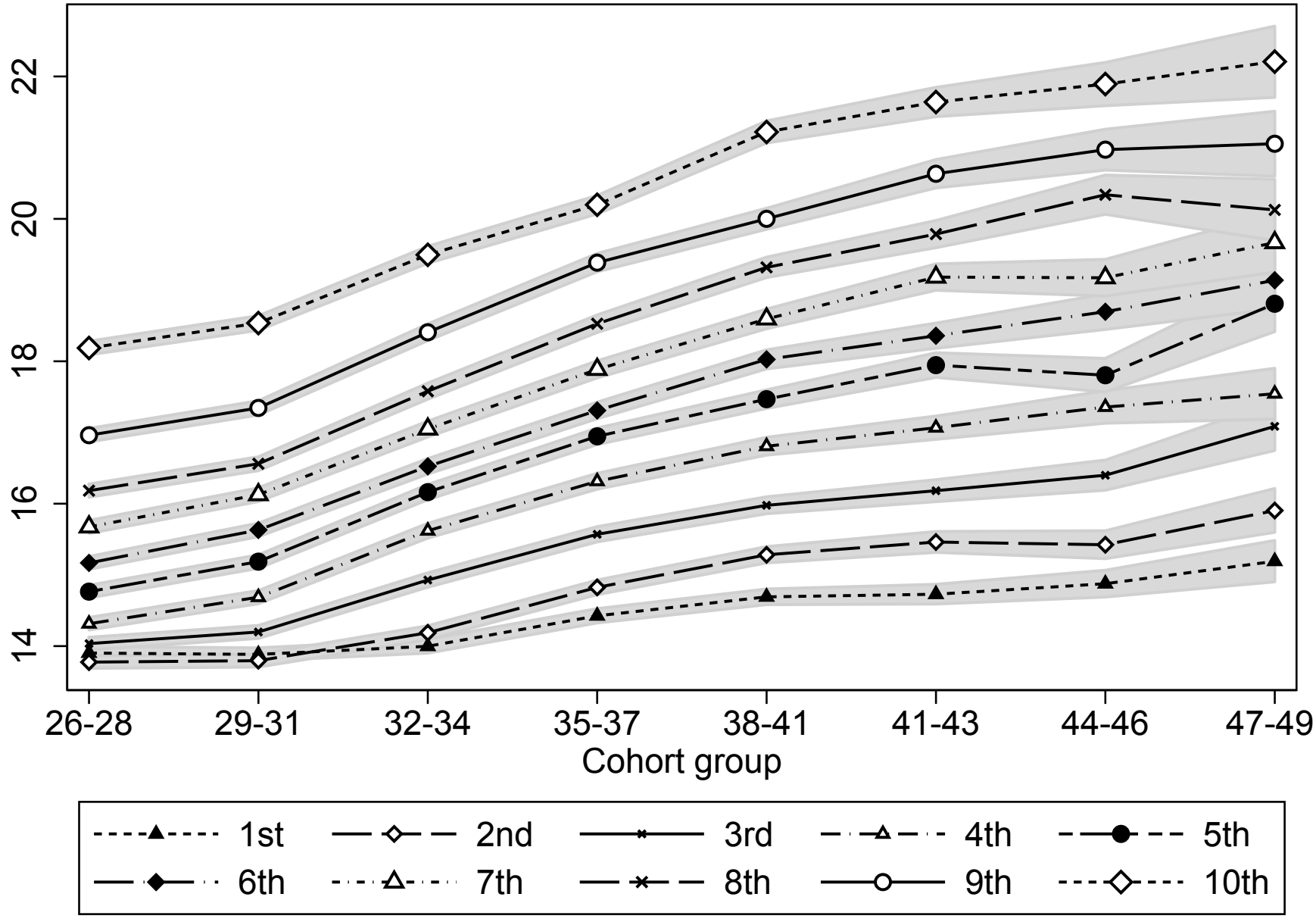
$$\log \frac{\Pr(\text{death}_{itcd} | \text{survival until age t})}{1 - \Pr(\text{death}_{itcd} | \text{survival until age t})} =$$

$$\beta_0 + \sum_{p=1}^{4} \beta_p t^p + \sum_{p=1}^{4} \beta_{pd} t^p + \mu_d + \eta_c + \nu_{cd}$$

- 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$\times$cohort group$\times$decile
- Age range: 65-99

Table of Contents

Life expectancy of West German men at 65



Life expectancy of widows if husband dies at 65

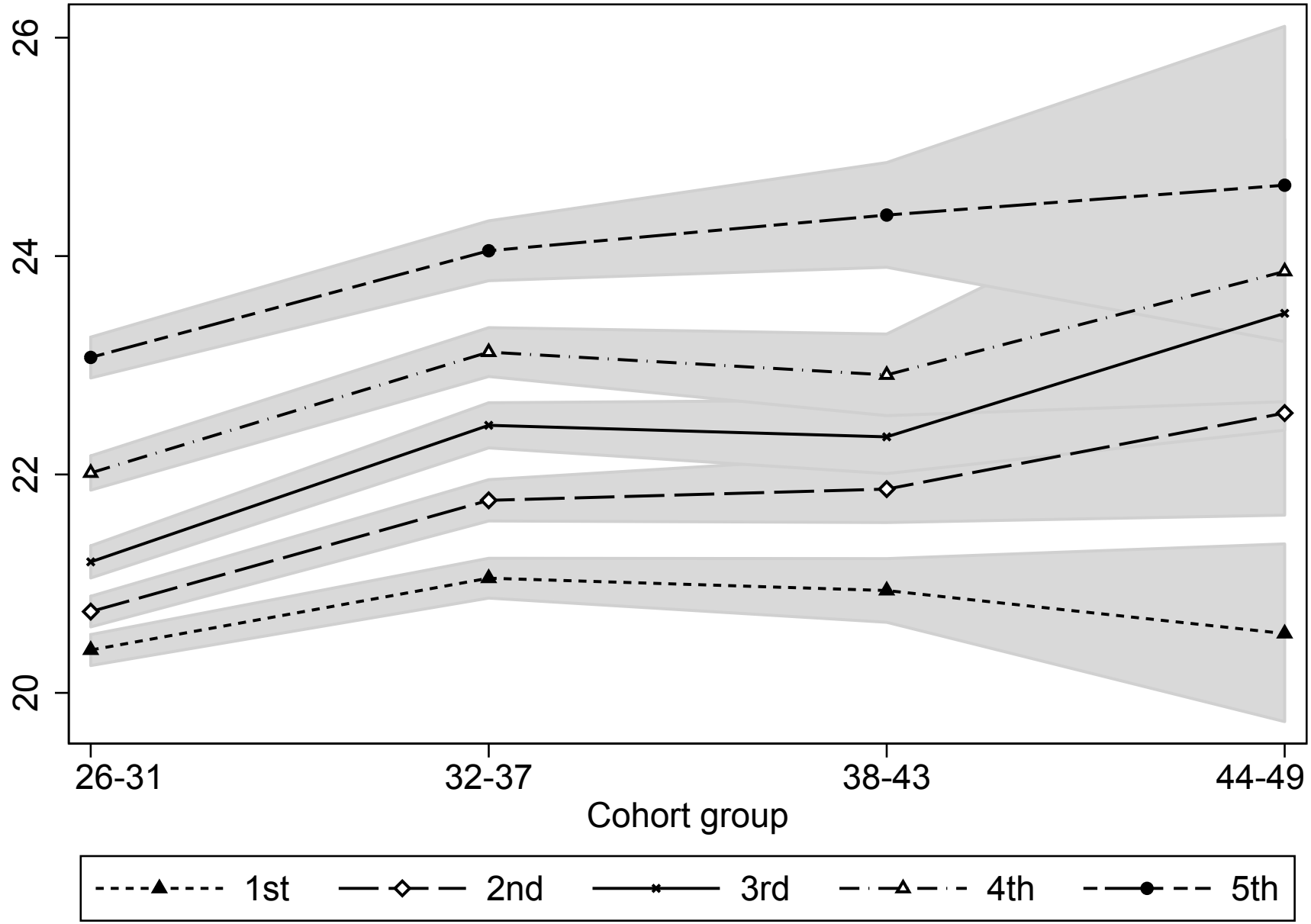
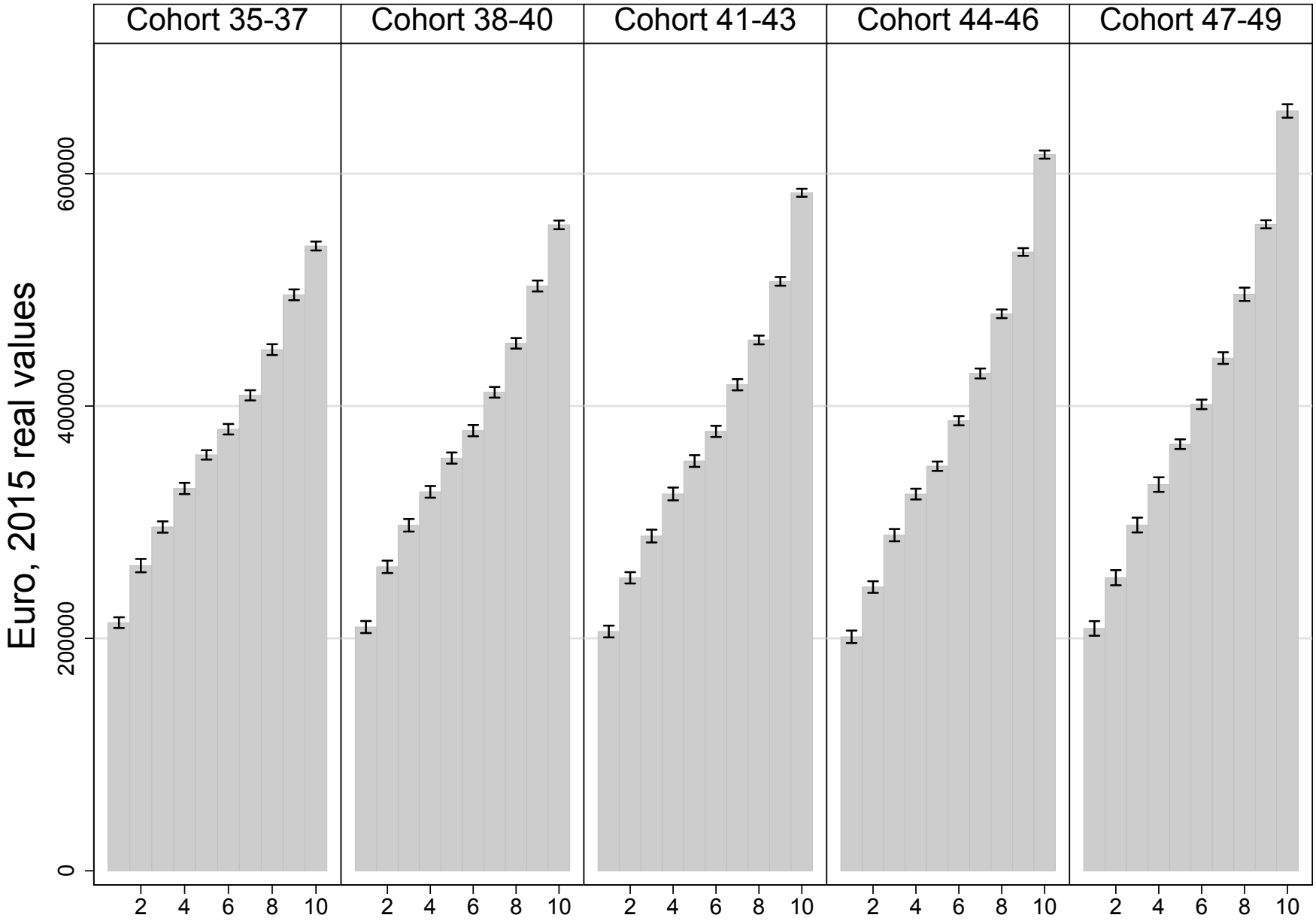


Table of Contents

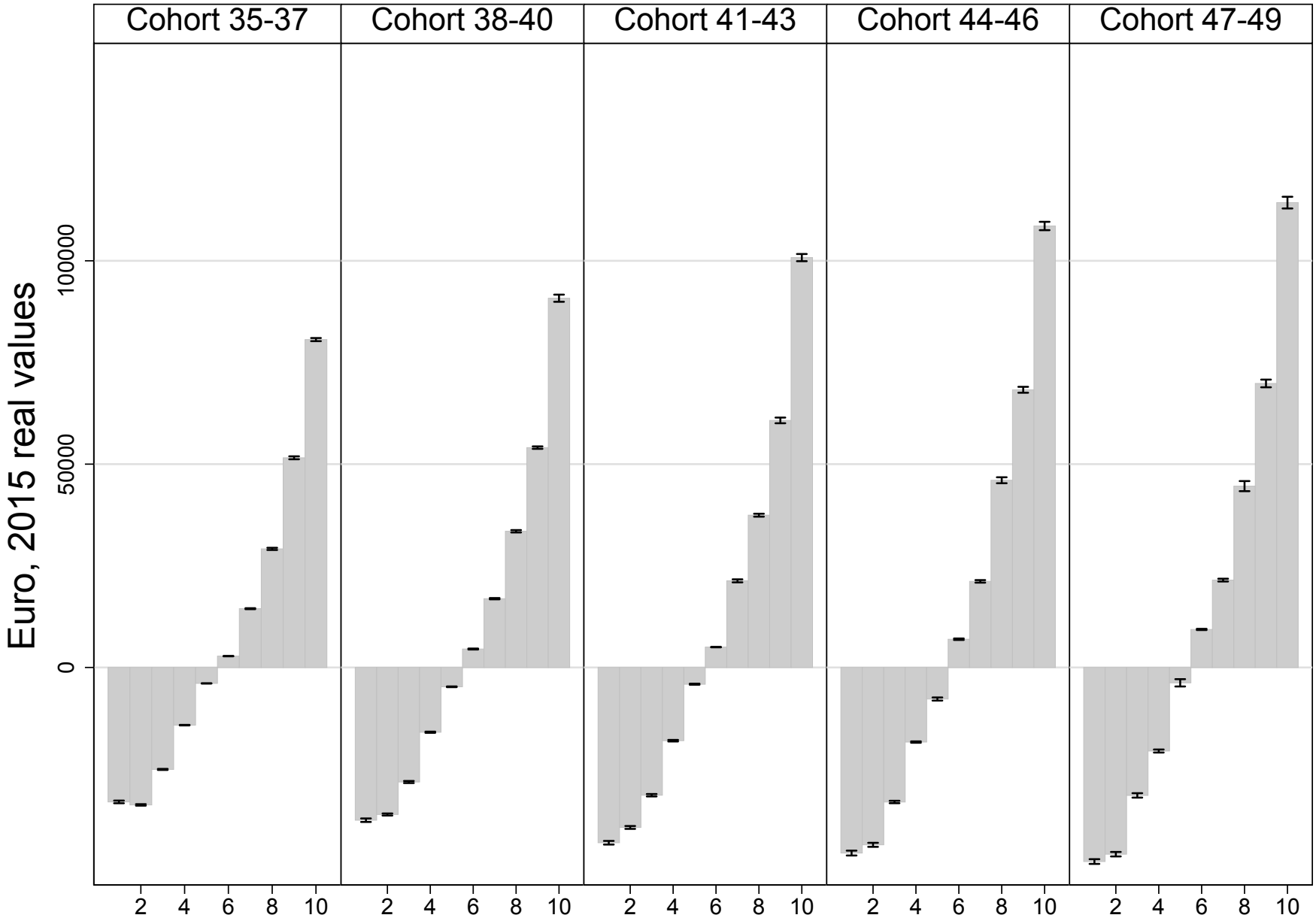
Distributional implications

- 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



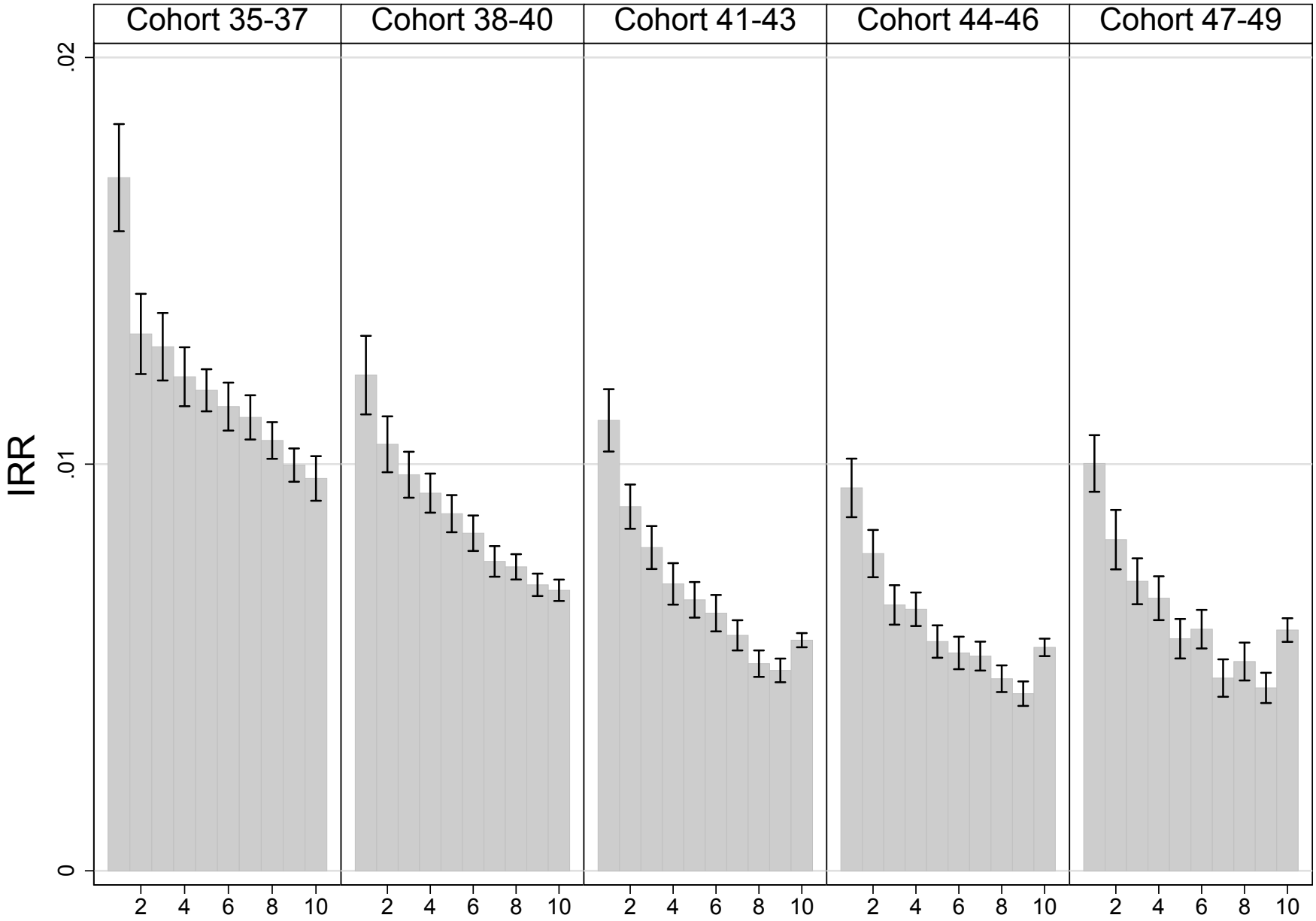
Difference: PW with and without differential mort.



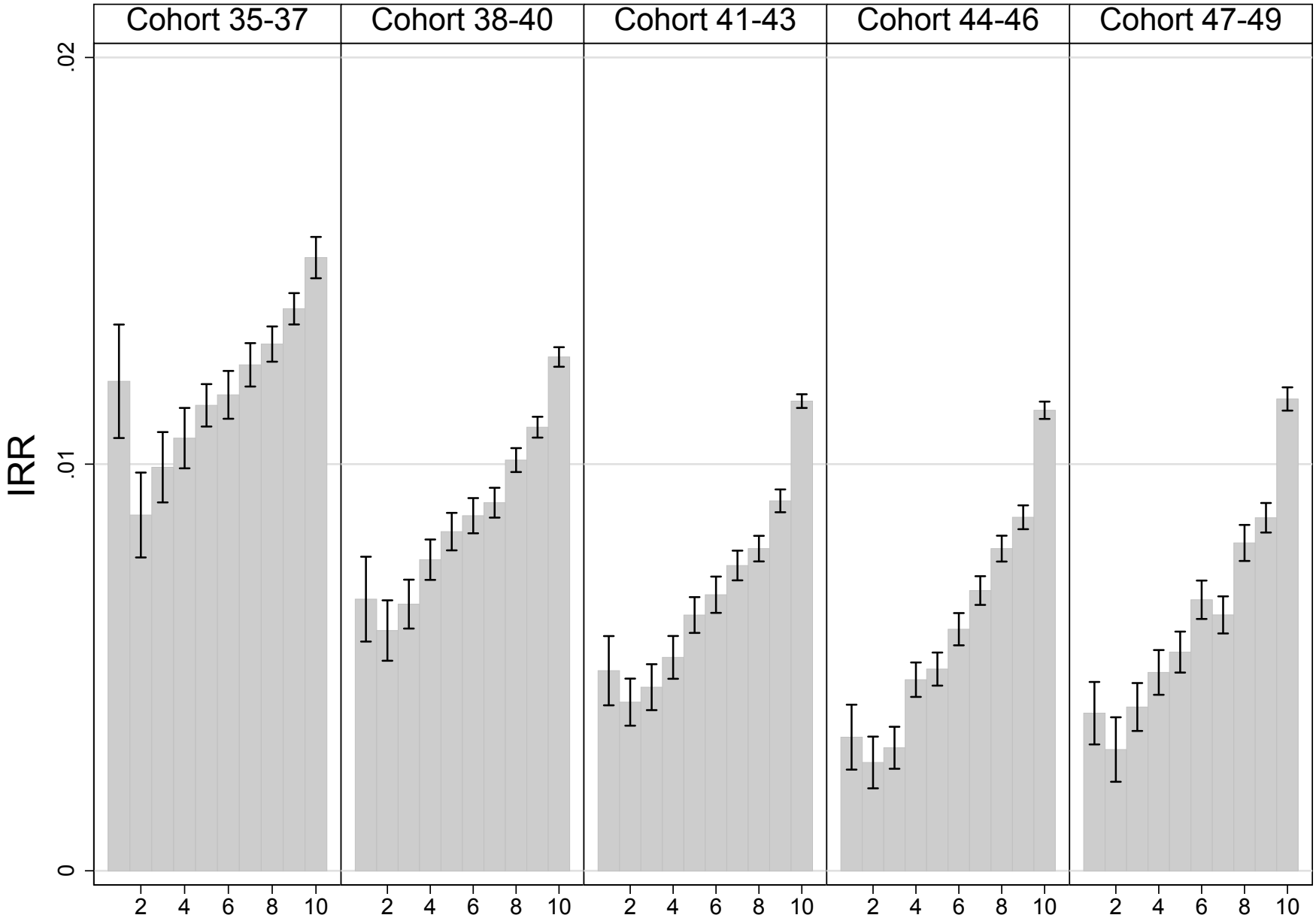
Ginis of pension wealth with and without differential mortality

Cohort	35-37	38-40	41-43	44-46	47-49
Heterogenous mortality	0.162	0.166	0.180	0.188	0.193
Homogenous mortality	0.117	0.116	0.122	0.126	0.131
Difference	0.045	0.05	0.058	0.062	0.062

IRR; homogeneous mortality



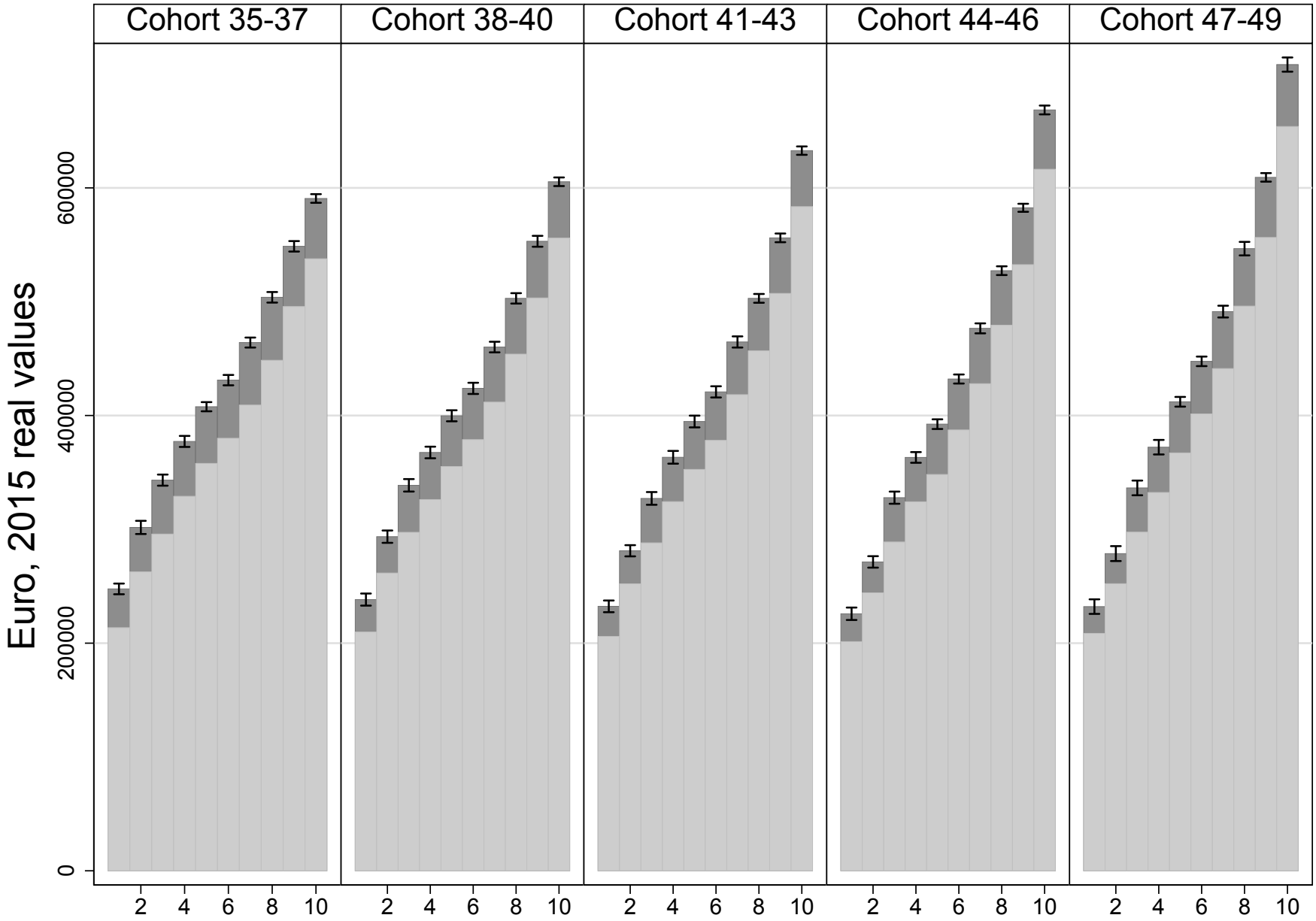
IRR; heterogeneous mortality



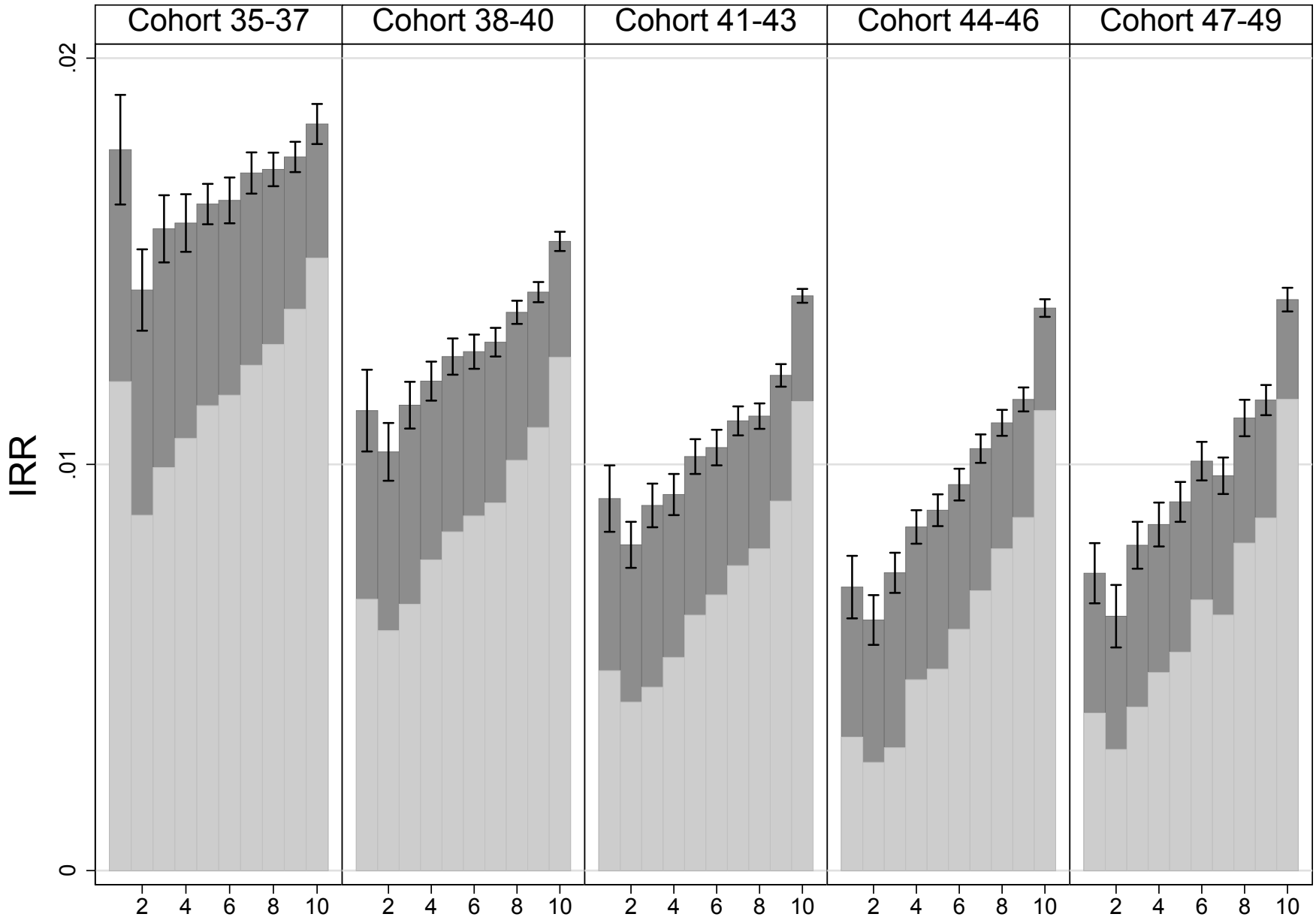
Extensions

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

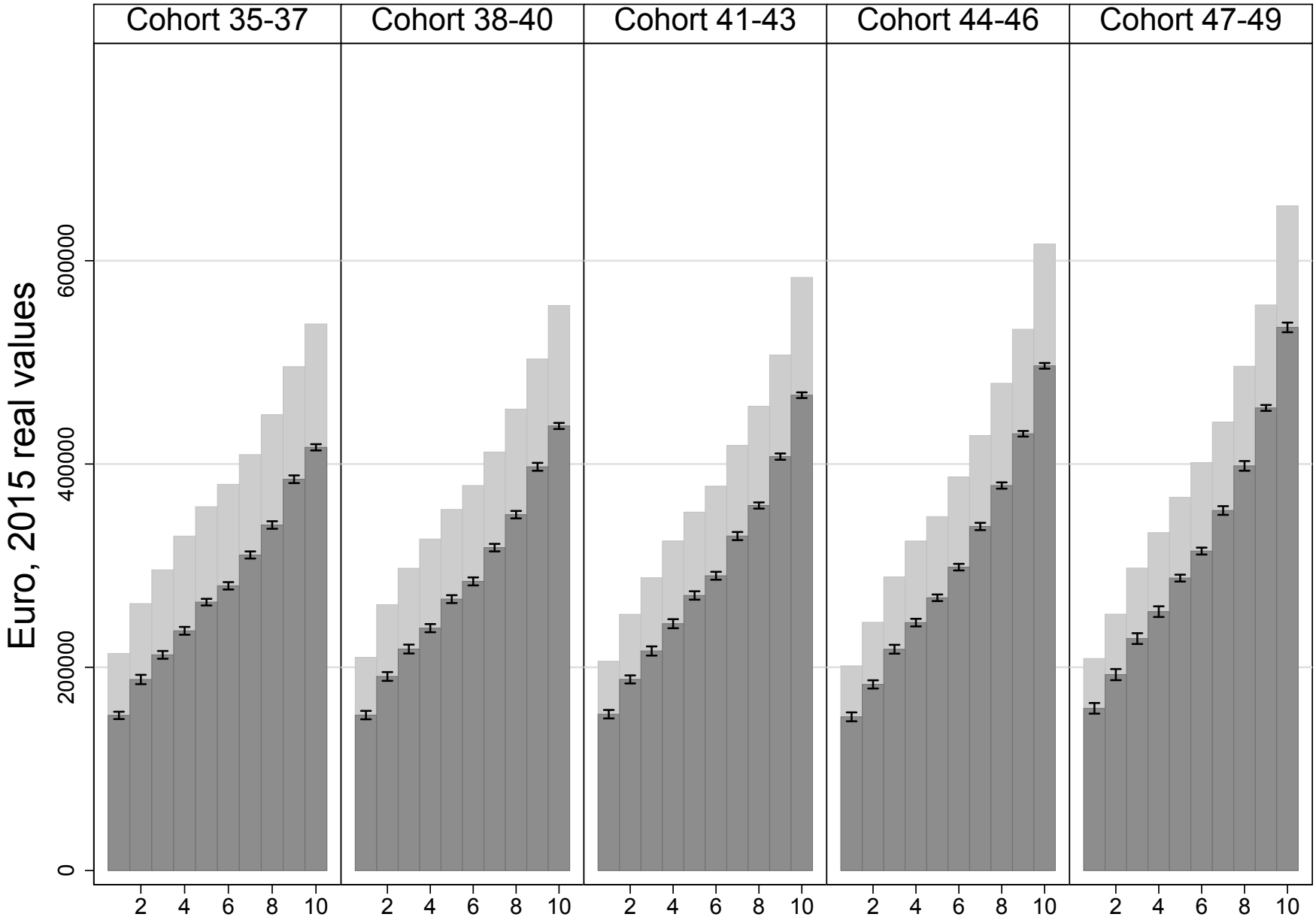
Pension wealth including survivor pensions



IRR including survivor pensions



PW accounting for mortality before age 65



IRR accounting for mortality before age 65

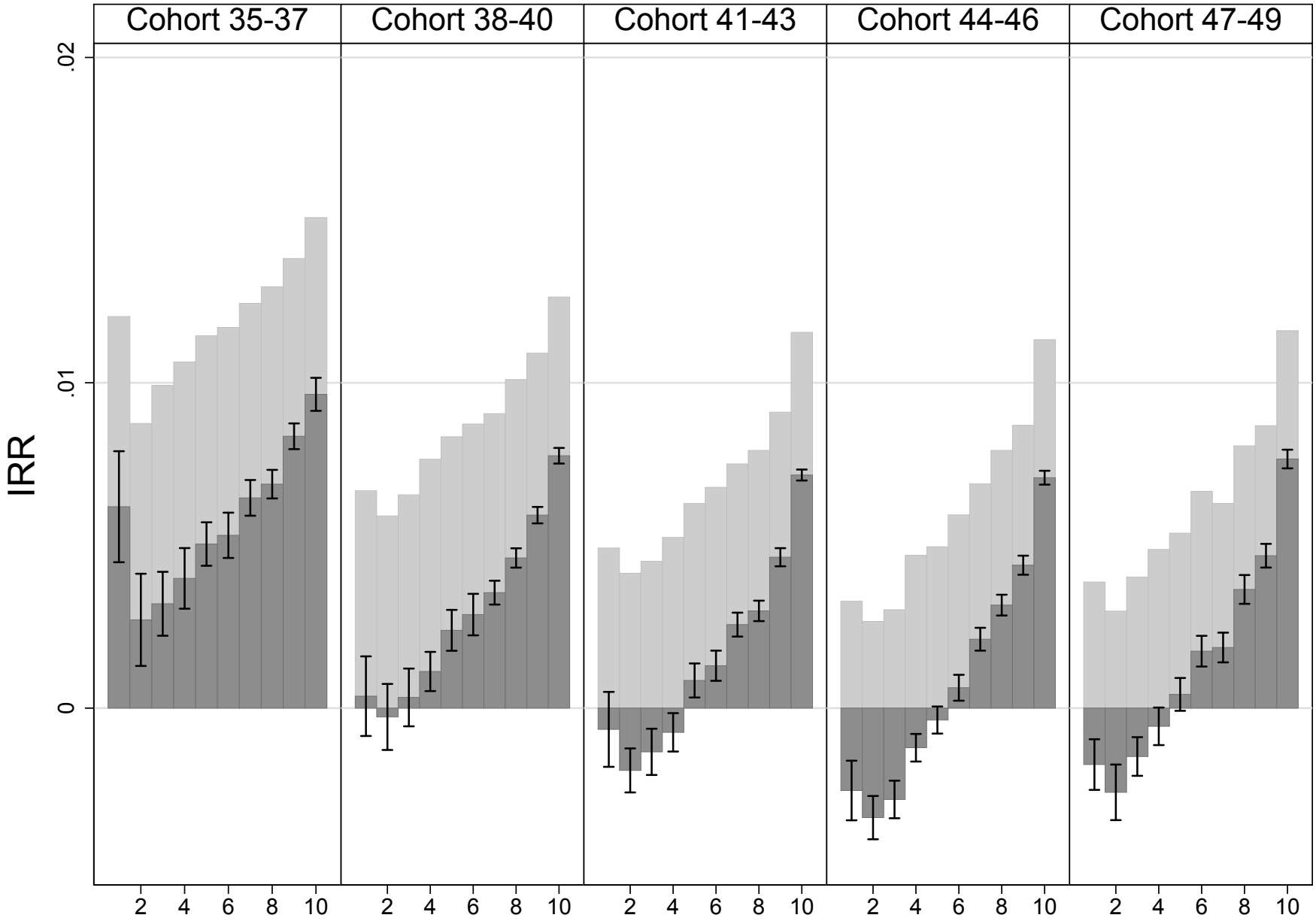


Table of Contents

Conclusion

- 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