The Increasing Longevity Gap and the Pension System

Peter Haan Daniel Kemptner Holger Lüthen
(FU Berlin and DIW Berlin)

6.6.2018

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 over a long period:
  - we focus on West German men born between 1926-1949
- Exploit universe of retirees and use pension entitlements as proxy for lifetime earnings
- Focus on the individual and the household context: life expectancy of widows
- Distributional implications of increasing longevity gap through the pension system (Old age pensions and disability insurance)
  - **How do the distributional implications of the German pension system change when accounting for heterogeneity in life expectancy?**

Table of Contents

Pension insurance in Germany

- Mandatory for employees; Defined benefit system: pensions strongly linked to prior contributions
- Pension level depends on 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

Redistribution through the pension system

Two counteracting effects in the German pension system:

- **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
- In the analysis we focus only on individuals with at least 30 EP (25 EP give similar results)

Descriptives: Observed survival rates

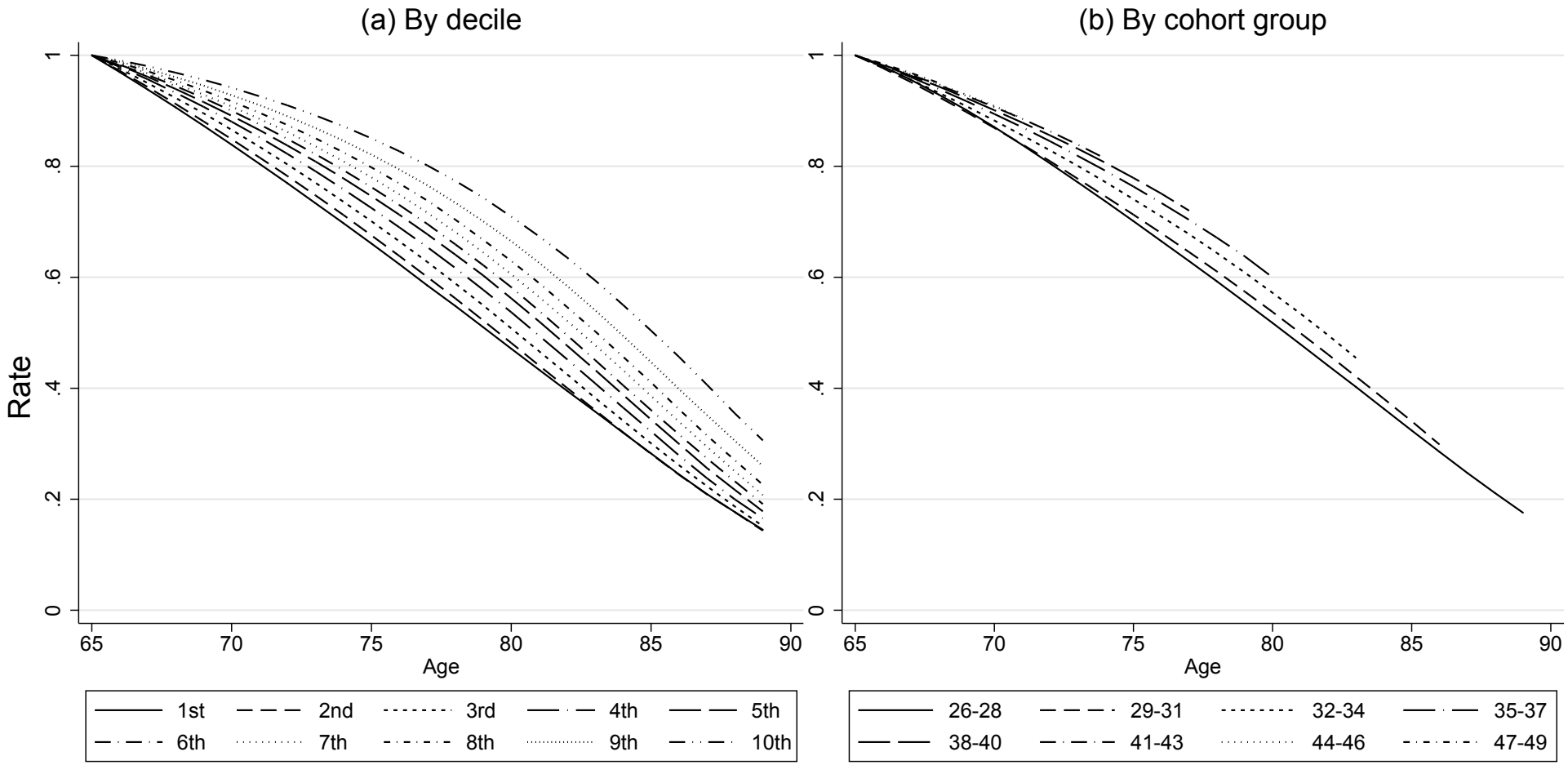


Table of Contents

Estimation

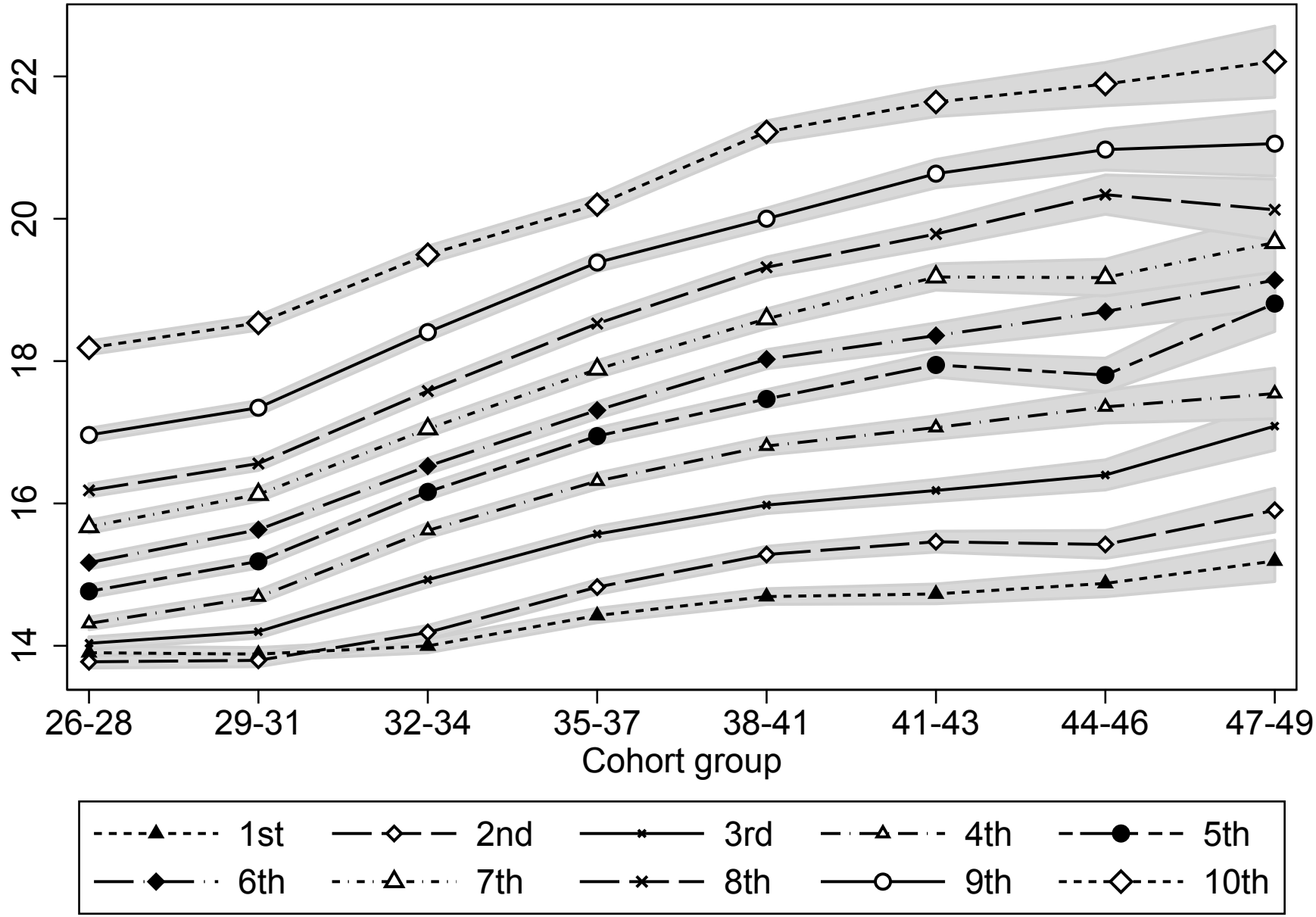
- Logit:

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

- 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

- So far the literature has only concentrated on the relationship between earnings inequality and individual life expectancy.
- Implications for the household context are also important.
  - This is particularly true for female spouses, who often have lower lifetime earnings and pension entitlements and rely on their husband's entitlements.
- We use the same method and estimate the effect of husband's pension entitlements on life expectancy of widows

Life expectancy of widows if husband dies at 65

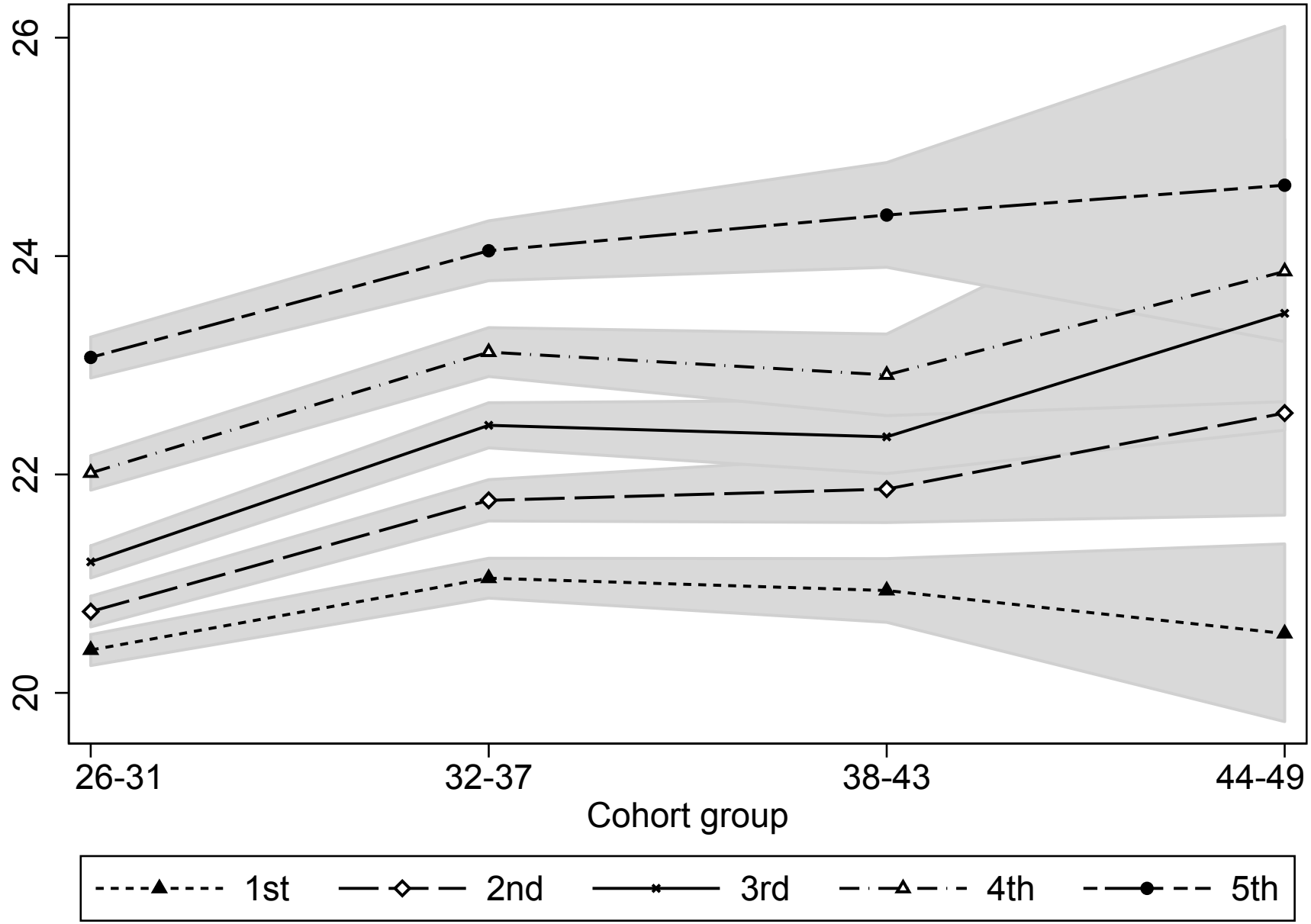
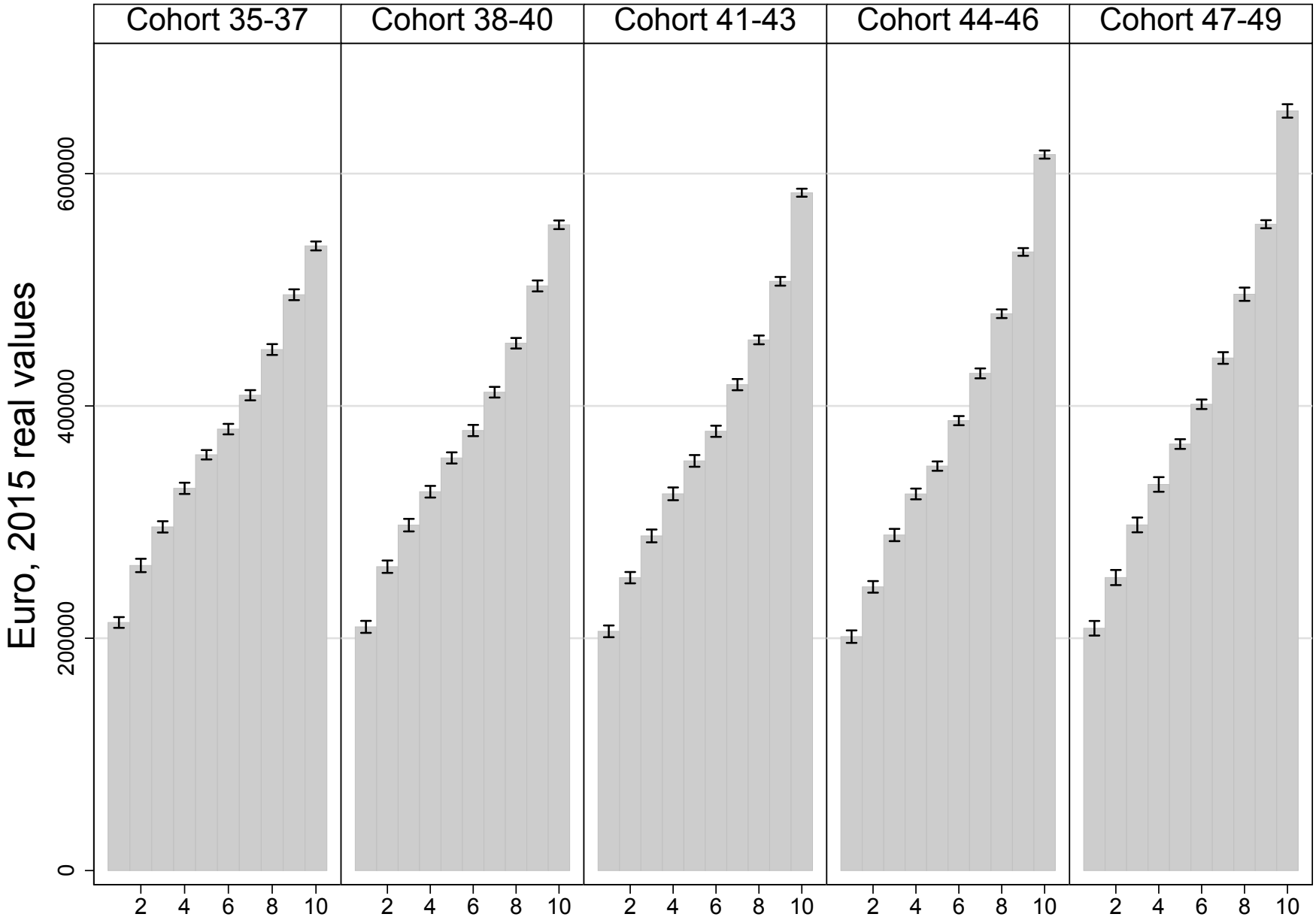


Table of Contents

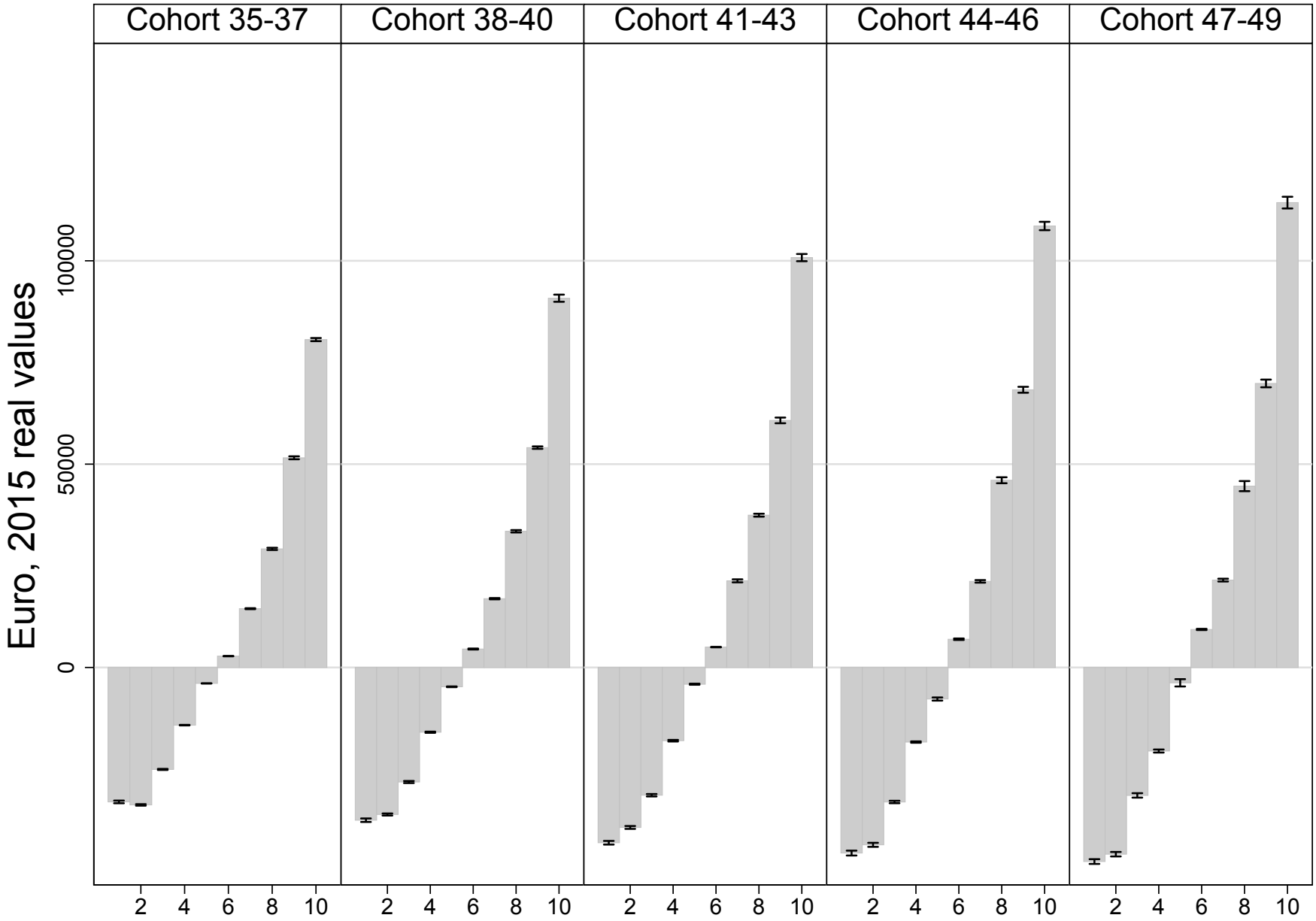
Distributional implications

- **Pension wealth:**
  - Pension wealth is calculated as 2015 real present value of expected pensions at age 65.
- **Internal rates of return (IRR):**
  - The IRR is the average individual interest rate that needs to be paid on pension contributions to yield the expected stream of pensions.
  - The distribution of IRR provides direct information about the distributional effects of the pension system.
- Compare pension wealth and IRR assuming homogeneous and heterogeneous mortality by deciles and cohorts

Pension wealth with heterogeneous mortality



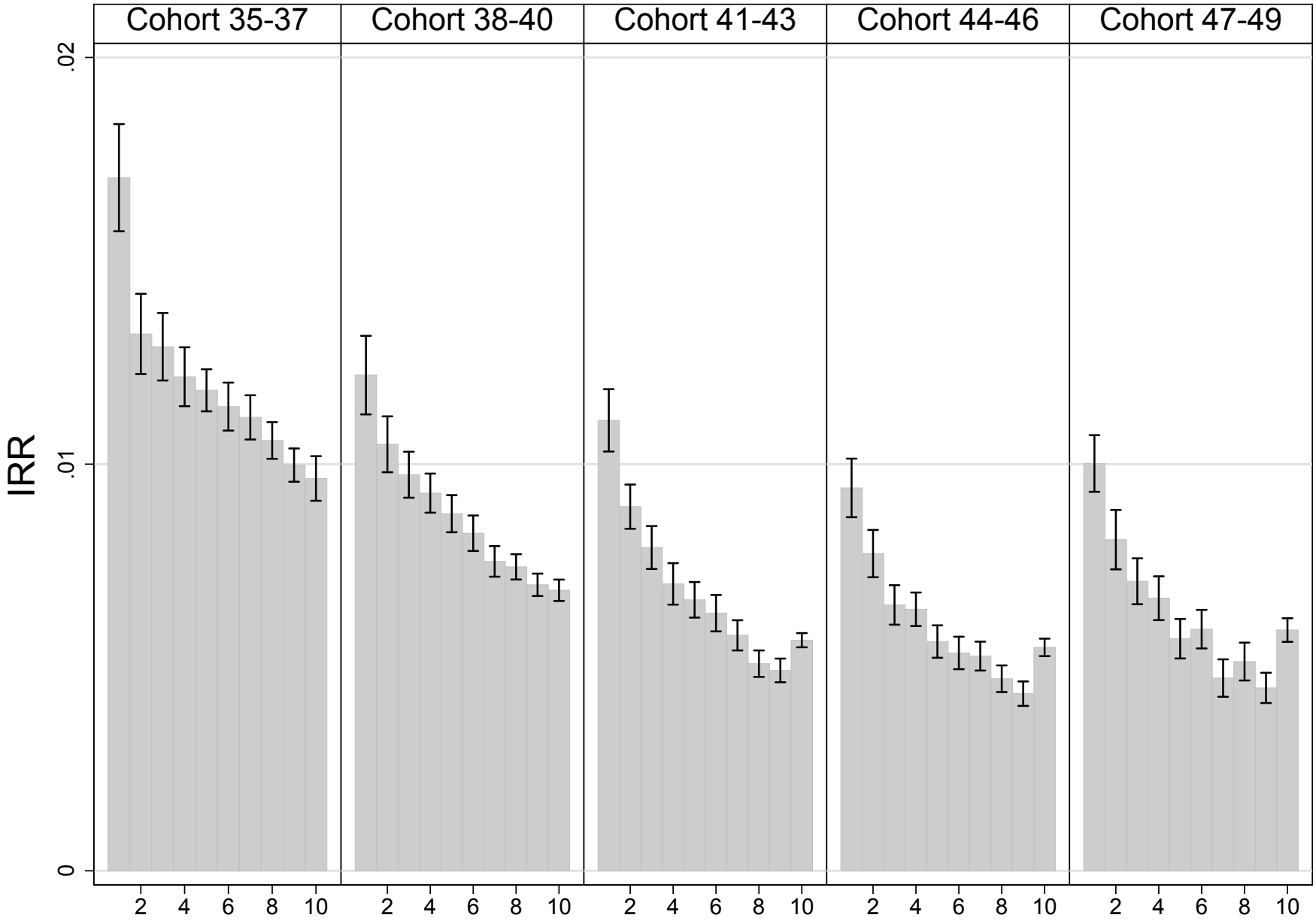
Difference: PW with and without differential mort.



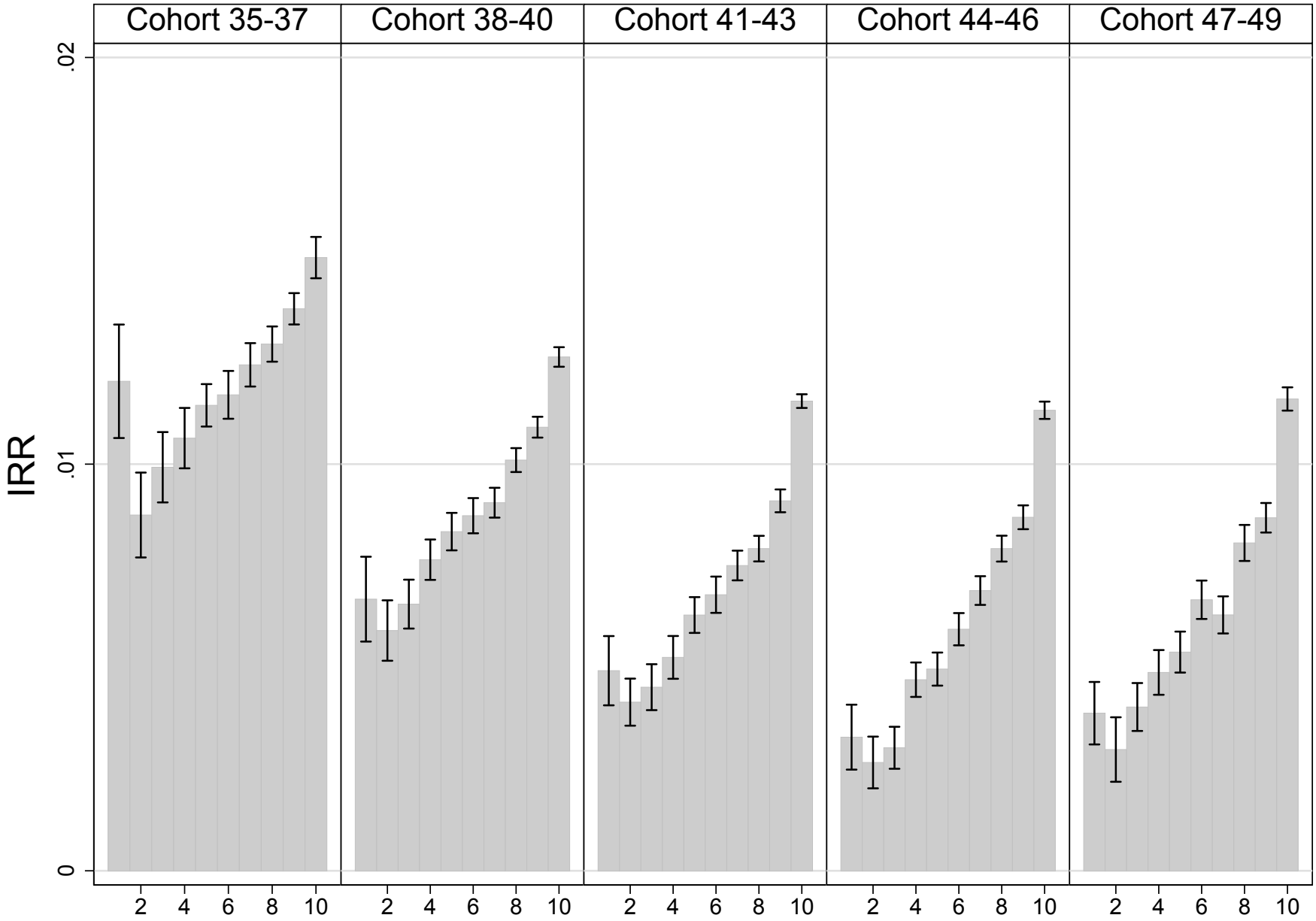
Ginis of pension wealth with and without differential mortality

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



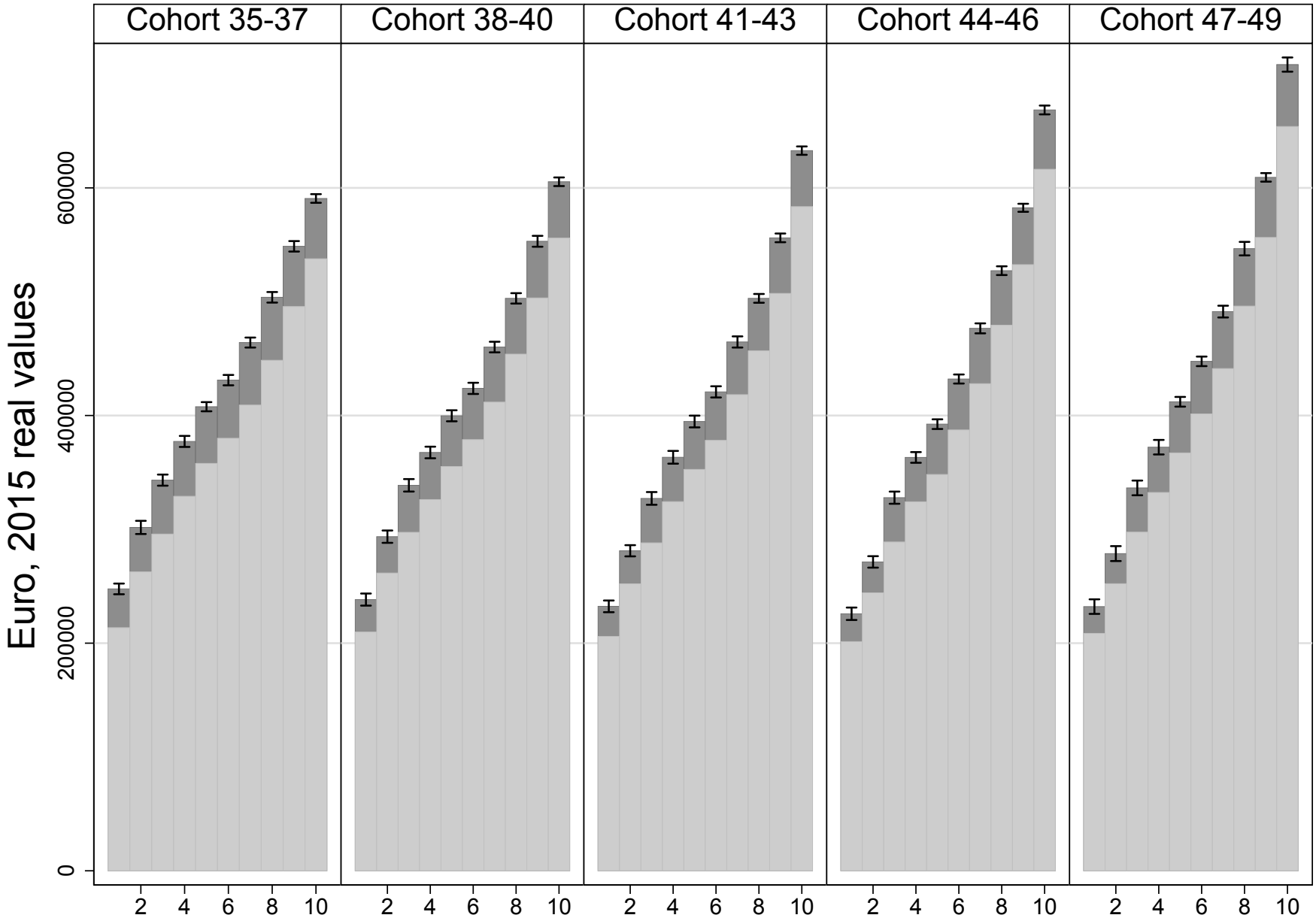
IRR: Heterogeneous mortality



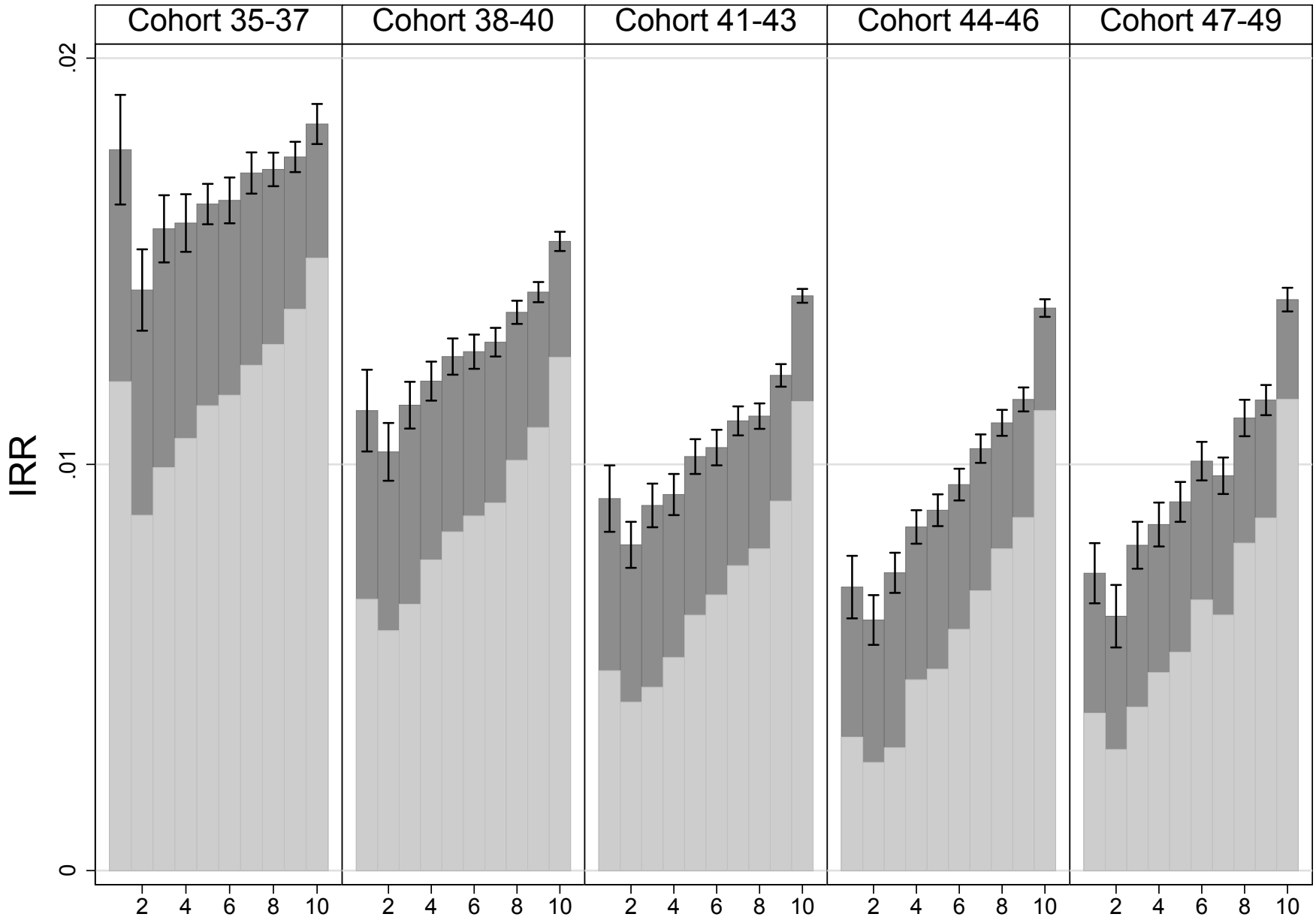
Extensions

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

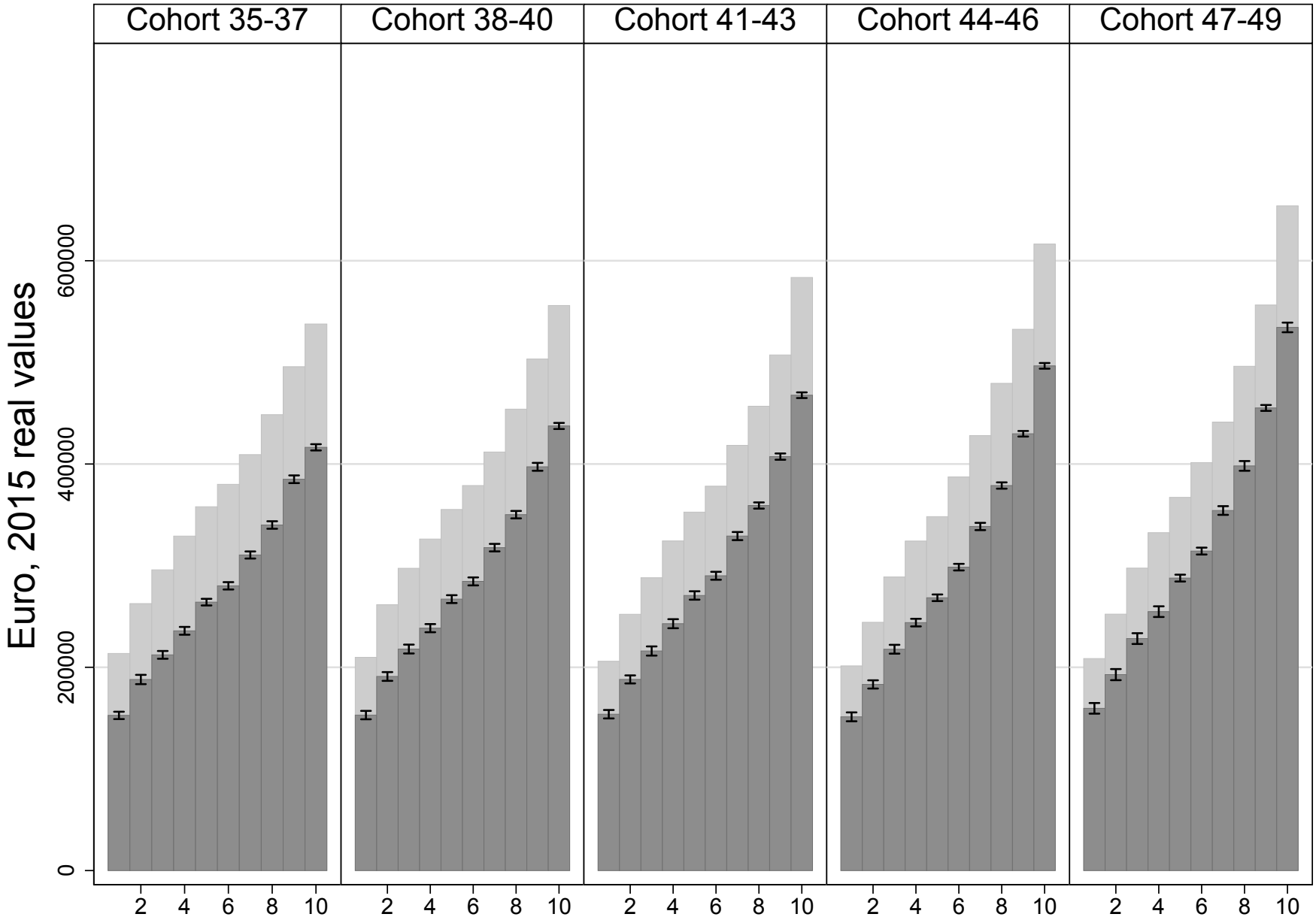
Pension wealth including survivor pensions



IRR including survivor pensions



PW accounting for mortality before age 65



IRR accounting for mortality before age 65

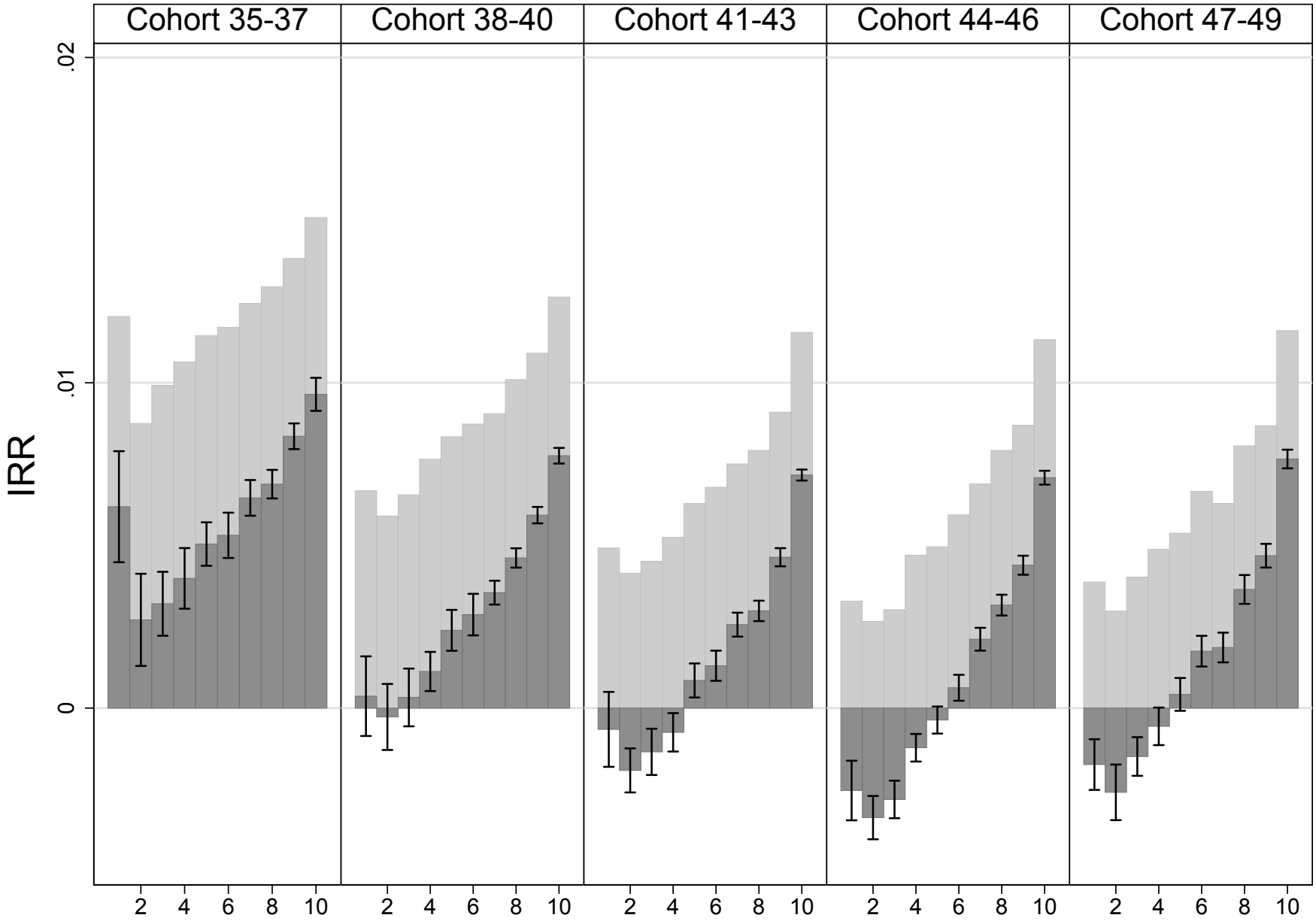


Table of Contents

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