Lifetime Income Inequality: quantile treatment effect of retirement on the distribution of lifetime income.

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Life cycle, social security and inequality

- Human Capital Earnings Function (HCEF)
  - Fanning out of earnings profiles across education groups as the cohort ages.
- Permanent Income Hypothesis (PIH)
  - Within cohort inequality evolves over life-cycle, reaching the highest levels in the old age.
  - Disparities in earnings between groups with different schooling levels grow in retirement age.
  - Reducing the share of income that is transferred through Social Security Systems increases life cycle inequality.
- Social Welfare Theory (SW)
  - By Pigou-Dalton Principal of Transfers any (mean-preserving) progressive transfer decreases inequality.

Research questions

- What is the impact of staying longer in labor force on distribution of lifetime income ?
- What is the impact of postponing retirement age on lifetime income inequality ?

Survey of Health Aging and Retirement

- Multidisciplinary cross-country longitudinal survey that collects micro data on individuals aged 50+.
- The data used in this study consists of five regular panel waves followed by two life history questionnaires of which the data were collected accordingly in 2004-2005, 2006-2007 , 2010, 2013, 2015, and 2008-2009 and 2017.
- This study covers 16 European countries: Austria, Germany, Sweden, The Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Finland, Luxembourg, Portugal, Malta and Cyprus.
- The sample is constrained to males who at the moment of the interview are retired.

Lifetime income

- Measure of lifetime income

$$Y_i = \sum_{j=1}^{R_i} \omega_j W_{ij} + \sum_{R_i+1}^{110} s_{j+1} \omega_j P_{ij}$$

where:

Y_i - total lifetime income

W_{ij} - lifetime earnings from work at age j

P_{ij} - lifetime retirement pension at age j

R_i - retirement age

s_{j+1} - probability of surviving to age j+1, predicted based on Lee-Carter model

ω_j - discount rate (2% to age 50)

Deriving lifetime earnings from SHARE

Earnings model:

$$\ln w_{it} = \alpha_0 + \rho S_i + \beta_1 E_{it} + \beta_2 E_{it}^2 + \beta_3 E_{it}^3 + \beta_4 E_{it}^4 + \varepsilon_{it}$$

where:

$\ln w_{it}$ - log of earnings

S_i - years of schooling

E_{it} - number of years of experience

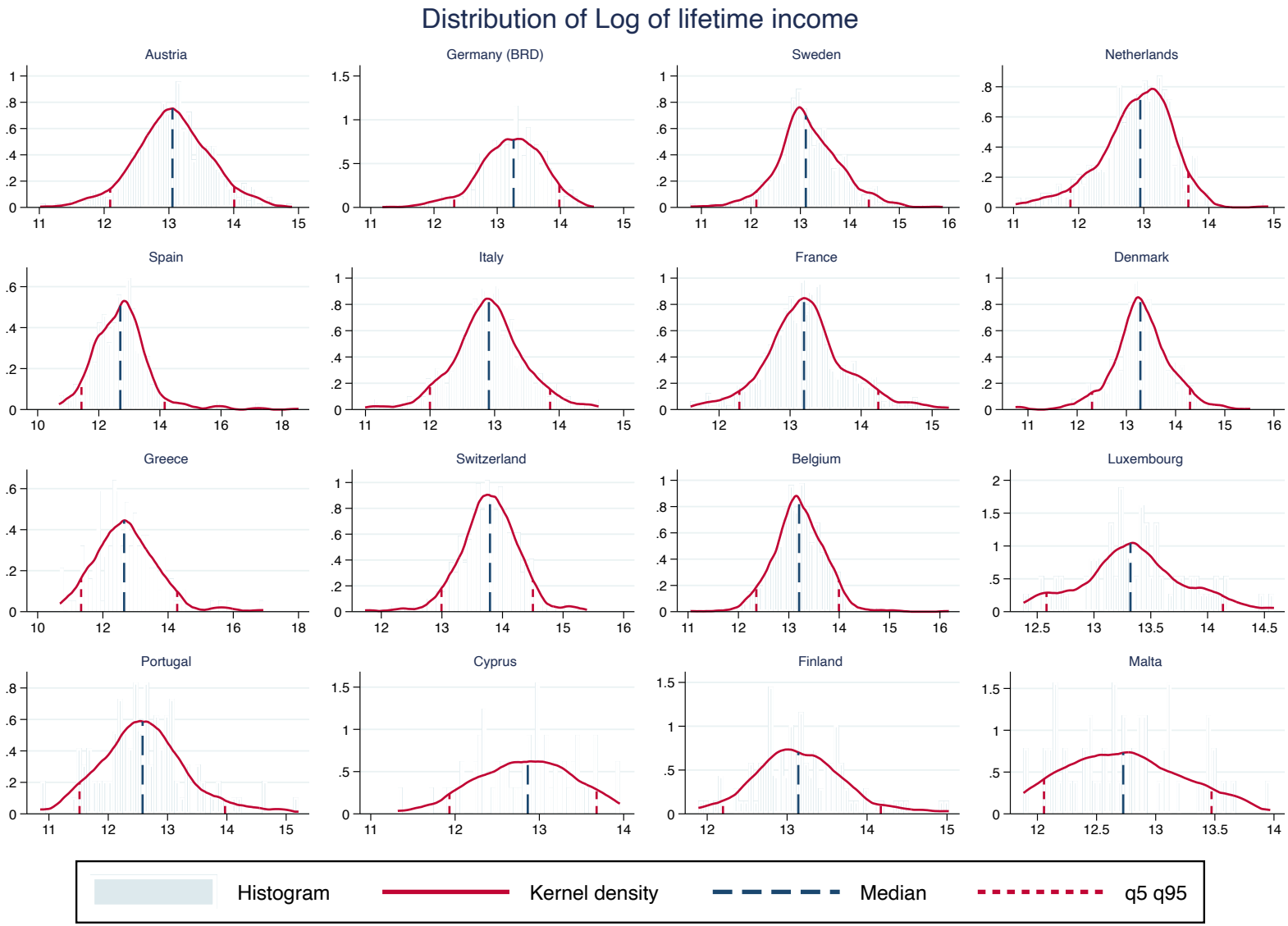
Prediction equation:

$$\widehat{\ln w}_{it+1} = lnw_{it} + b_1(E_{it+1} - E_{it}) + b_2(E_{it+1}^2 - E_{it}^2) + b_3(E_{it+1}^3 - E_{it}^3) + b_4(E_{it+1}^4 - E_{it}^4)$$

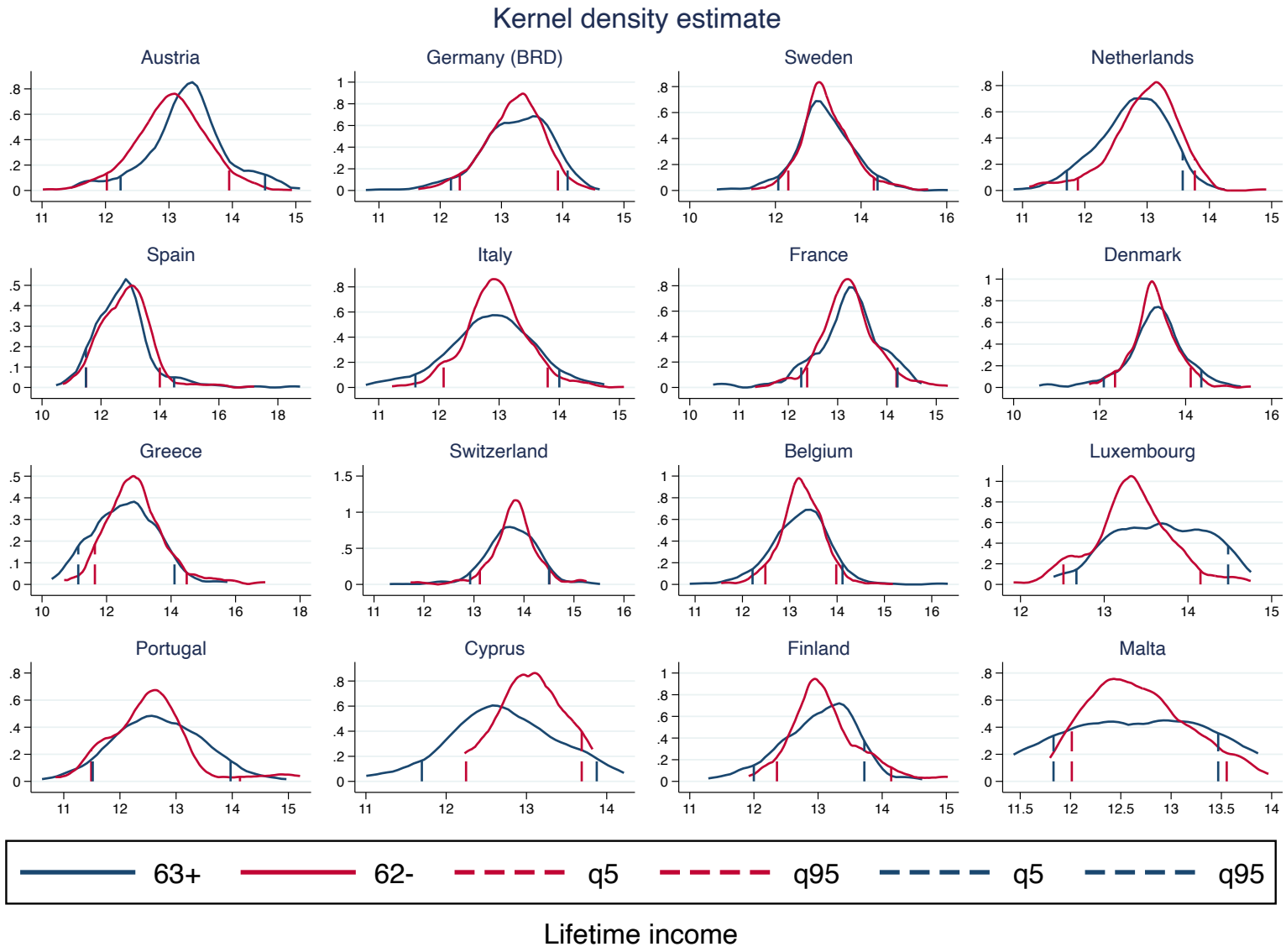
Retransformation of predictions of earnings in logarithm to predictions in levels:

$$Q^{(p)}(y|x) = exp\{Q^{(p)}[log(y)|x]\}$$

Kernel density estimates



Kernel density estimates by retirement age



Model specification

Specification of the model in a cross-country setting:

$$Y_i = \alpha_0 + \alpha_1 R_i + \beta^\top X + \varepsilon_i$$

$$Q_\tau(Y_i) = \alpha_{0\tau} + \alpha_{1\tau} R_i + \beta_\tau^\top X$$

where:

Y_i - personal lifetime income

R_i - binary indicator taking value 1 if an individual retired exactly at age 63 or later, and 0 if an individual retired by age 62

X - set of country and cohort dummies and education.

Estimation and identification

- Issues : Endogenity
- Identification: Quantile Instrumental Variables techniques
  - Abadie, Angrist & Imbens (2002)
  - Chernozukov & Hansen (2005)
- Instruments: legislated early and normal retirement ages differenced with age:

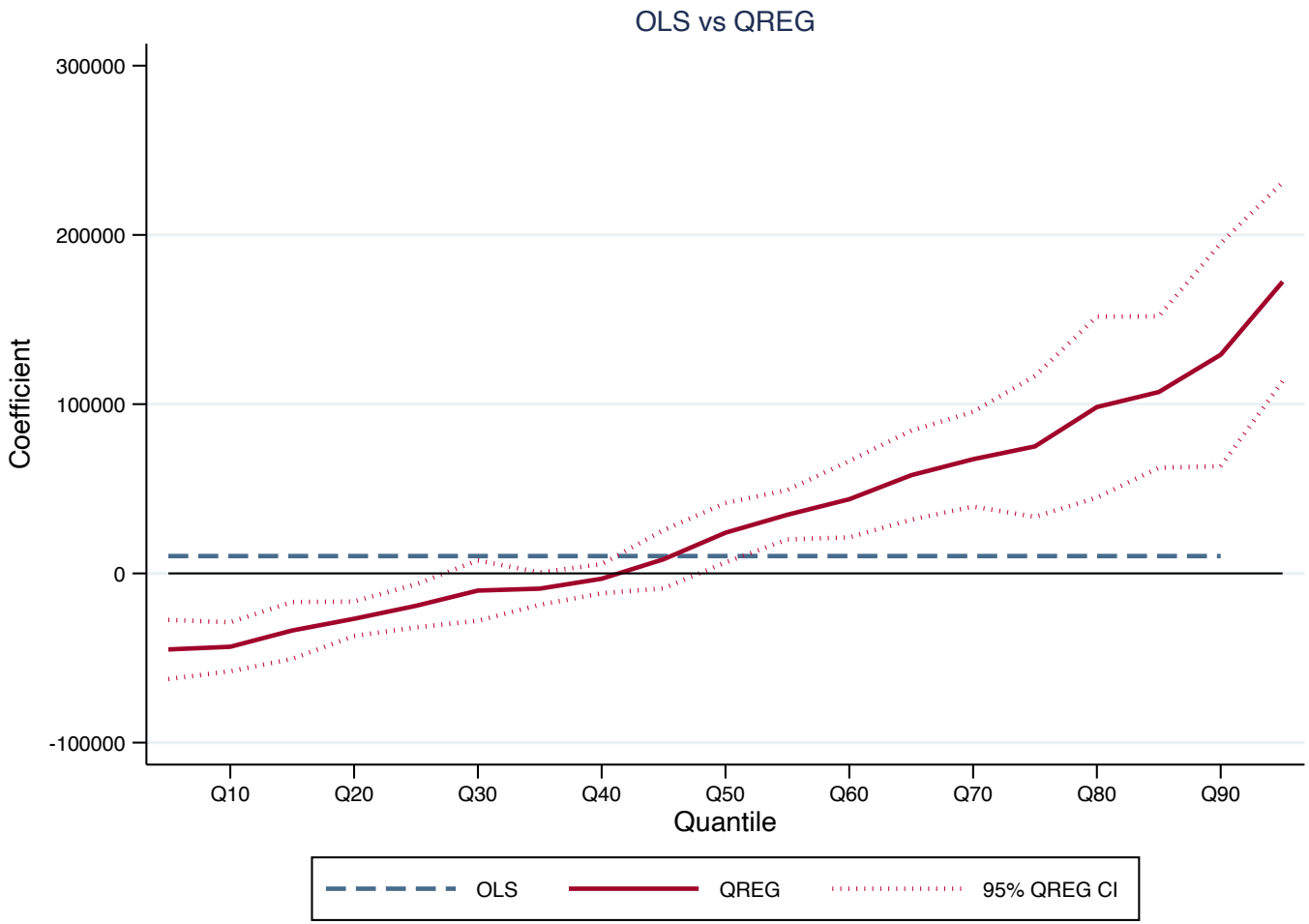
$$\begin{cases} \text{Z=1}, & \text{if } \text{A}_i - leg_{ER} \geq 3 \\ \text{Z=0}, & \text{if } \text{A}_i - leg_{ER} < 3 \end{cases}$$

where:

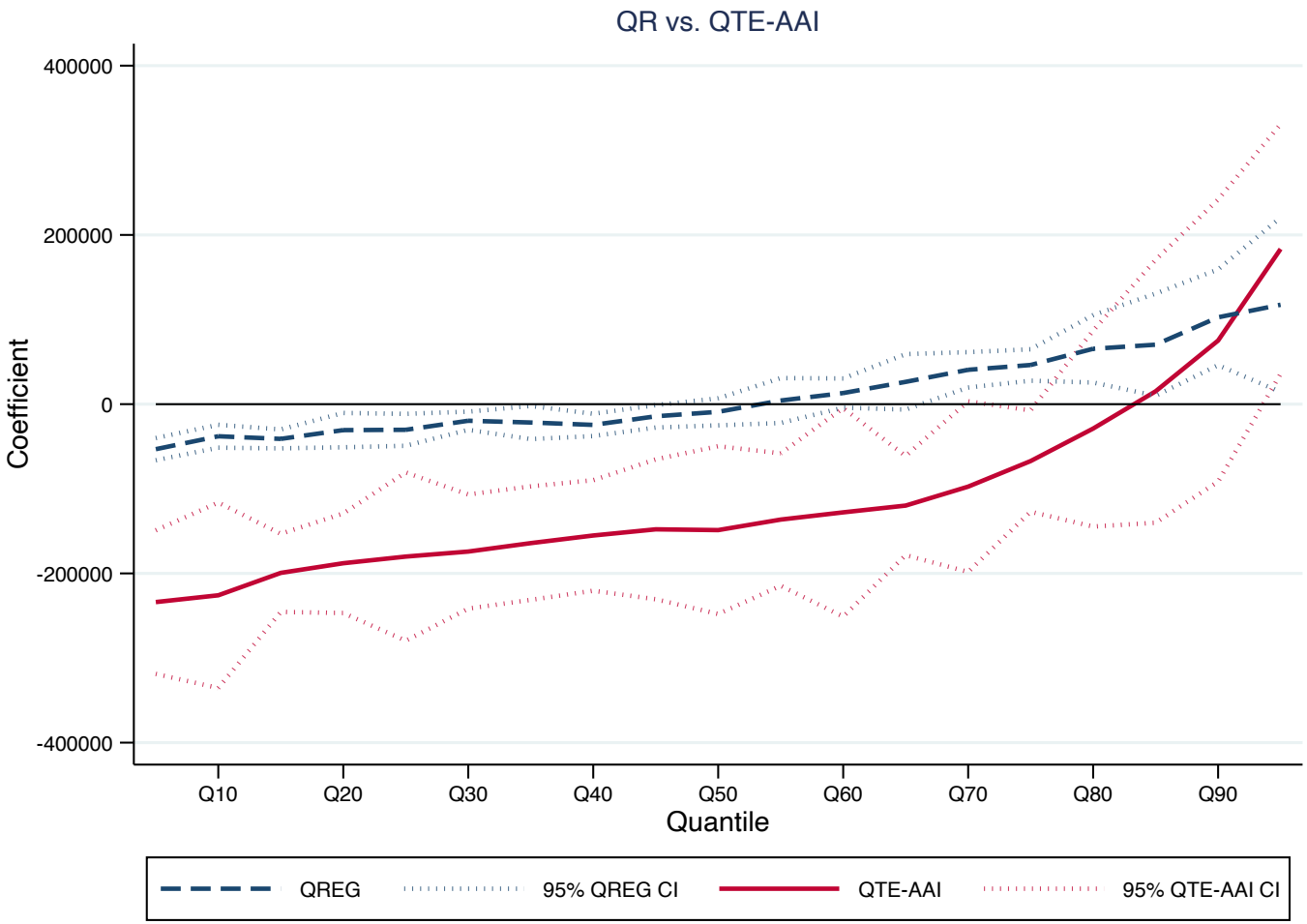
A_i is the actual age of an individual in the year of the interview,

leg_{ER} is the earliest legal retirement age that an individual is eligible for.

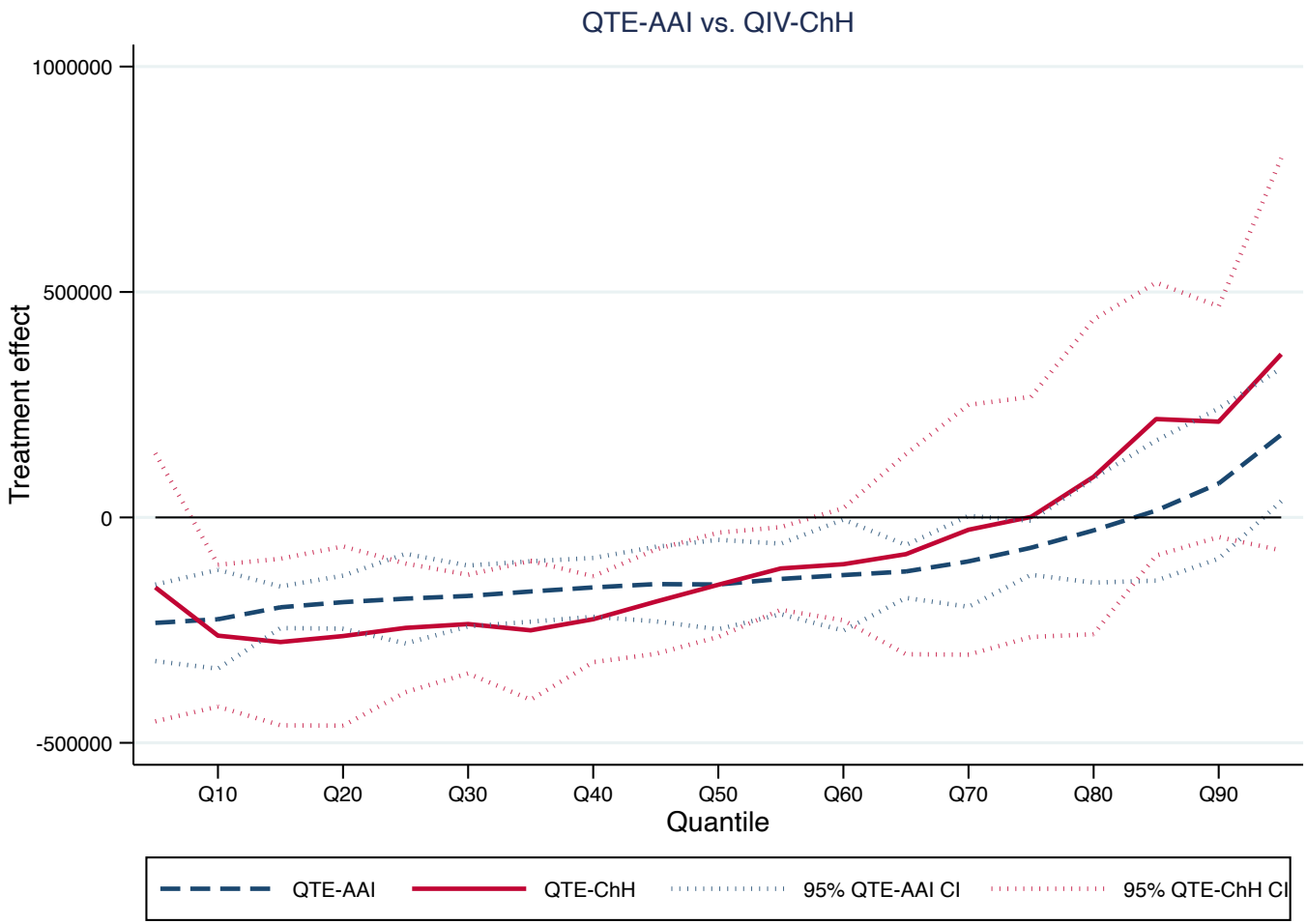
Ordinary Least Squares Estimates vs. Ordinary Quantile Regression



Quantile Regression vs. Quantile Treatment Effect (AAI)



Quantile Treatment Effect by the two estimators QTE-AAI and QIV-ChH



Conclusions

- Clearly heterogenous, redistributive effect of postponing retirement to later ages across the quantiles of lifetime income in the overall sample.
- Extending working lives spreads out inequality in lifetime resources.