



DEPARTMENT OF ECONOMICS
AND BUSINESS ECONOMICS
AARHUS UNIVERSITY



The Long-Term Effects of an Earlier (State Pension) Retirement Age on Mental Health

Anne Katrine Borghjerg · Nabanita Datta Gupta

Aarhus University, Department of Economics and Business Economics

NBER Summer Institute 2026 — Aging Workshop

Boston, July 27th, 2026

Does Retirement Affect Mental Health?

- Job loss and unemployment found to harm mental health — (Kuhn, Lalive & Zweimüller 2009; Browning & Heinesen 2012; Sullivan & von Wachter 2009). Whether retirement does same is theoretically ambiguous — the sign depends on how the marginal value of time and the time-intensity of health production change post-retirement (Grossman, 1972)
- Stimulating, white-collar jobs → earlier retirement could hurt (loss of purpose, structure, social contact) if similar time-intensive health inputs go unpurchased after retiring. But reverse for “greedy” jobs. Stressful, high-demand jobs → earlier retirement could help (relief from job strain — lower health depreciation).
- Mixed results in literature e.g. (-) Heller-Sahlgren (2017); Bauer & Eichenberger (2021); Dave, Rashad & Spasojevic (2008), (+) e.g. Eibich (2015); Kuusi, Martikainen & Valkonen (2020); Chen, Wakabayashi & Yuda (2024)
- Policy stakes are high: state pension ages are rising across OECD countries — is the current path optimal? Literature suggests heterogeneous effects exist

CONTRIBUTION

This Paper

Exogenous variation

1999 Danish reform lowered the state pension age by 2 years for one half of the 1939 birth cohort

Full-population design

Not a selected occupation/window-offer sample — applies to entire eligible Danish workforce

Long horizon

Track individuals up to ~20 years post-retirement, to age 79

Objective outcome

Antidepressant prescription fills (National Prescription Registry), not self-reported health

Rich heterogeneity

By sex, education, marital status, and job status (executive vs. non-executive)

Extends Nielsen (2019)

Same reform strategy, independently developed — mental-health focus vs. Nielsen's physical-health (CCI)/mortality, over 15 vs. ~5 post-reform years

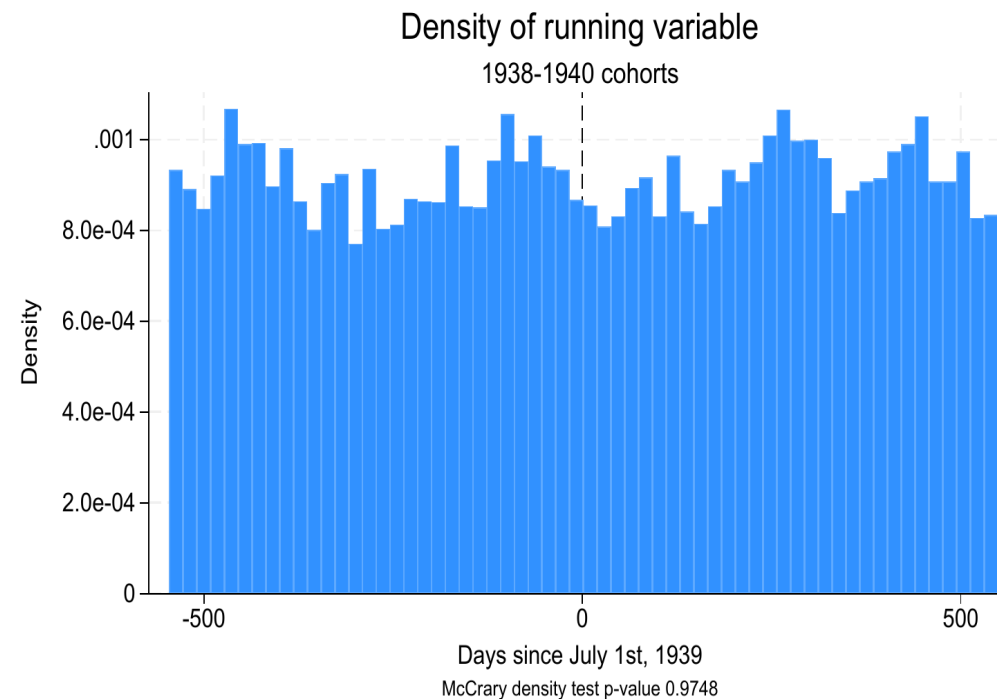
Identification: The 1999 Reform

- State pension (SP) age lowered from 67 to 65 for those born on/after July 1, 1939
- Reform announced in 1999, phased in 2004–2006 — anticipated ~5 years ahead
- Running variable = birth date — centrally registered, cannot be manipulated
- Estimation sample excludes early-retirement-program (ERP) eligible individuals to isolate the SP-age discontinuity



Data, Sample & Manipulation Check

- Danish administrative registers: prescriptions, diagnoses, labor market, education, wealth
- Selectivity (age 55, males): tertiary +22.5pp, earnings +50,866 DKK, wealth +274,317 DKK vs. population
- Selectivity (age 55, females): tertiary +11.5pp, earnings –12,588 DKK, wealth +75,528 DKK vs. population
- No evidence of sorting at the cutoff (McCrary density test, $p = 0.97$)



Density of running variable, estimation sample (age 79)

No Sorting on Predetermined Characteristics

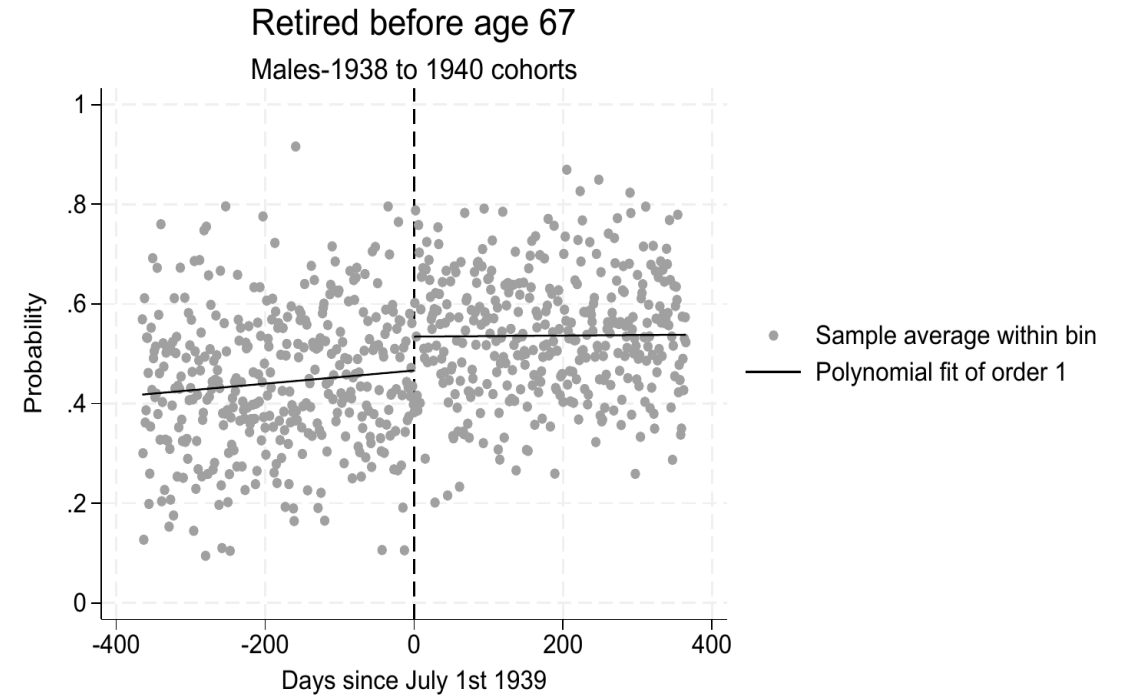
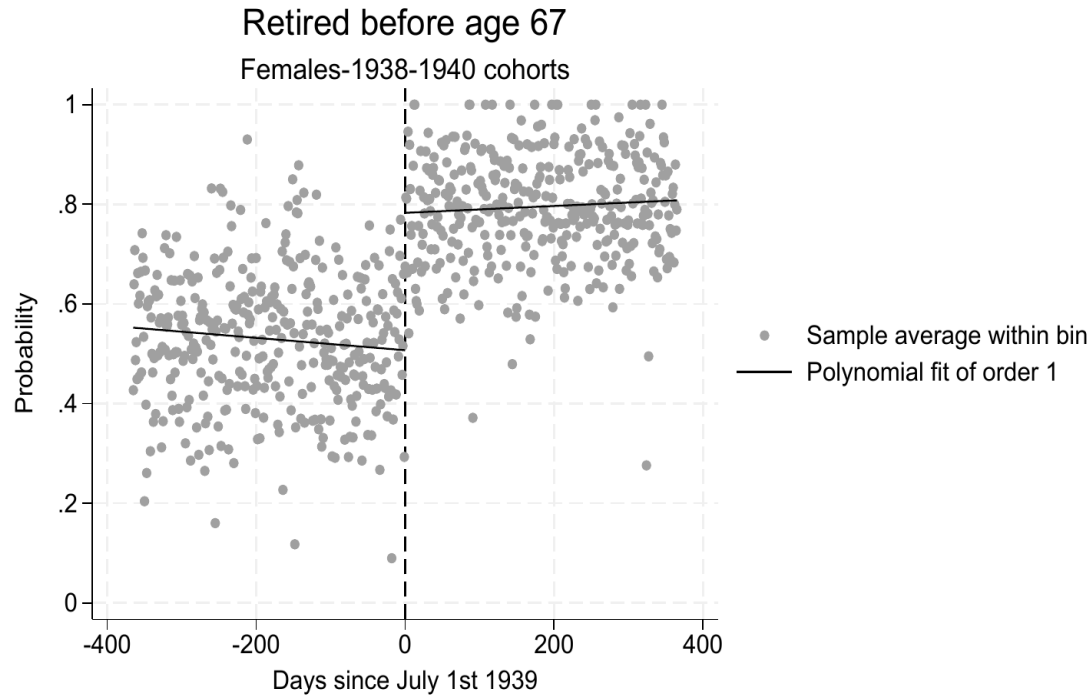
Sharp RD estimates of the July 1st, 1939 birthdate discontinuity on predetermined characteristics (age 55) — Robust specification

	Tertiary % (M)	Tertiary % (F)	Married (M)	Married (F)	Wealth (M)	Wealth (F)	Earnings (M)	Earnings (F)
Coefficient	0.0563	0.0349	-0.0142	-0.0498	-318,736	258,245	74,060	23,169
(p-value)	(0.103)	(0.356)	(0.619)	(0.160)	(0.155)	(0.132)	(0.348)	(0.239)

*No characteristic is significant at conventional levels (all $p > 0.10$) — consistent with no sorting around the cutoff.
p-values in parentheses, clustered by cohort-month; N = 14,793–17,266 depending on outcome*

FIRST STAGE

Does the Reform Move Retirement Behavior?

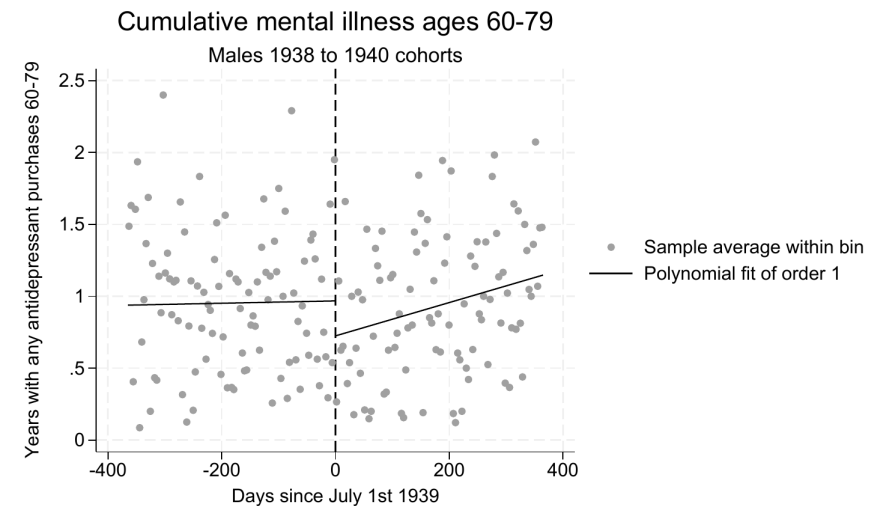


Females: +27pp; +20–25 pp using optimal bw Males: +7pp; 15–16 pp using optimal bw
(both $p < 0.01$)

MAIN RESULT

Earlier Retirement and Mental Health: Males

- Ages 60–79: **0.94 fewer years** of antidepressant use ($p=0.011$)
- Strengthens with age: **1.19 fewer years** (66–79, $p<0.001$); **0.84 fewer years** (71–79, $p=0.001$)
- Corresponds to 19% (60-79), 25%(66-79), 21% (71-79) of the control group's conditional mean antidepressant use given use>0
- First stage: reform raises the probability of retiring before 67 by 15–16 pp for men ($p<0.01$)
- No controls included — by design, the sample is balanced across the cutoff; driven by prescription fills, not the rarer hospital-diagnosis outcome

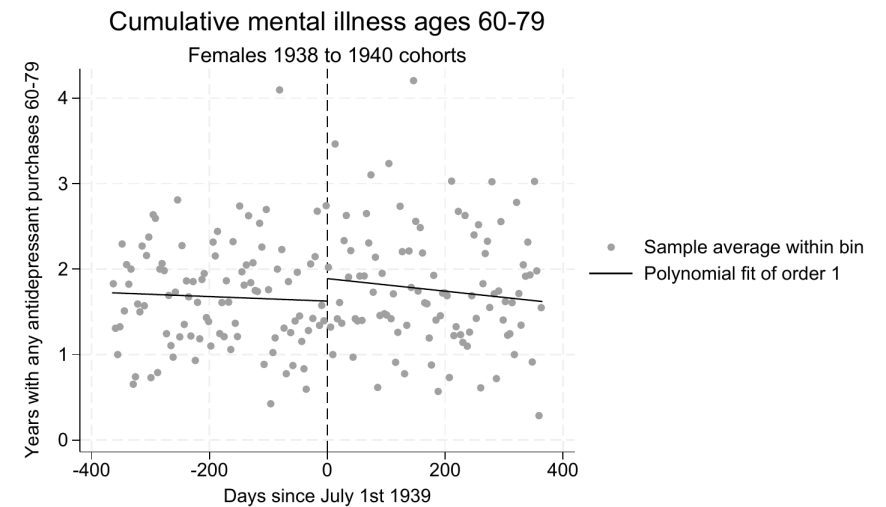


Cumulative antidepressant use, males, ages 60–79

MAIN RESULT

Females: No Detectable Effect

- No effect in any window: 60–79: 0.24 ($p=0.86$); 66–79: 0.11 ($p=0.92$); 71–79: 0.53 ($p=0.50$) — despite a strong first stage (20–25 pp)

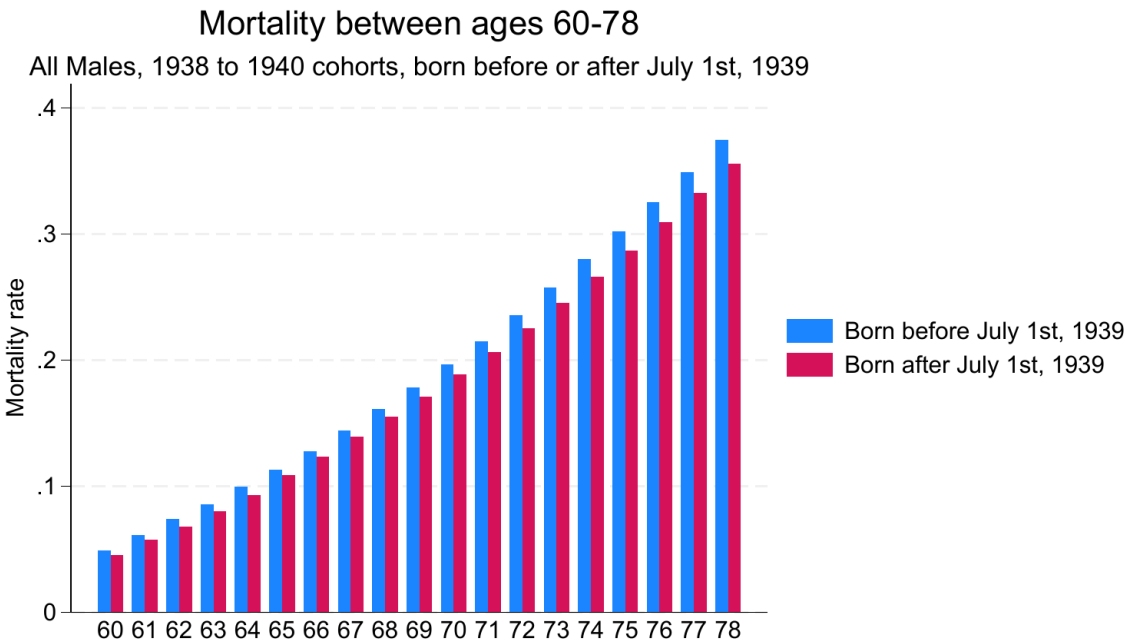
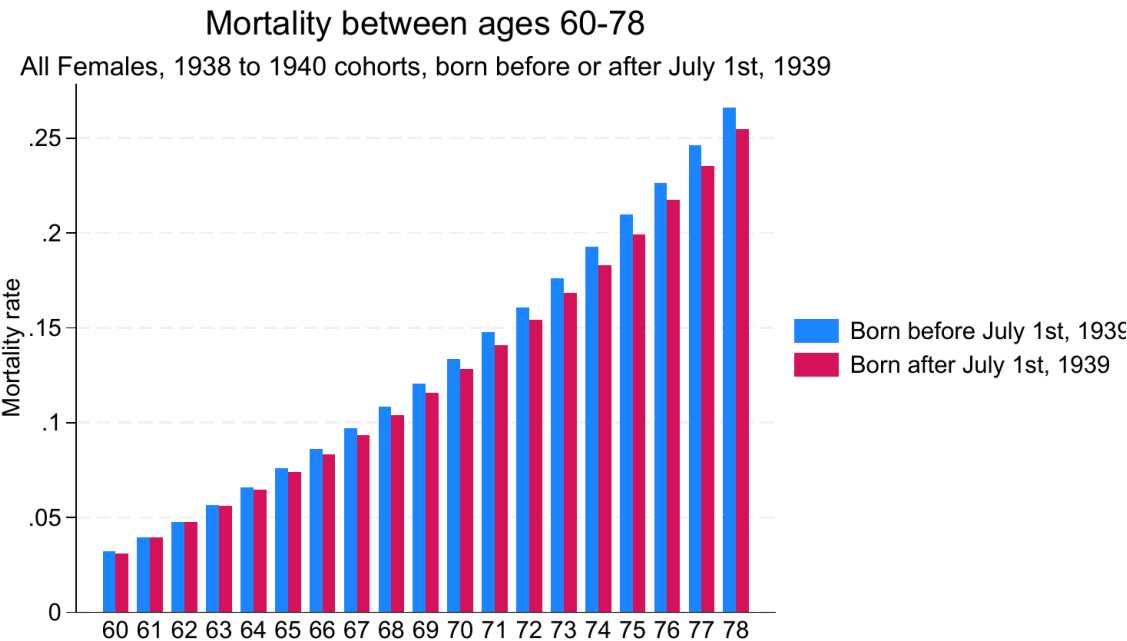


Cumulative antidepressant use, females, ages 60–79

Robustness of the Main Result

- Placebo cutoffs (July 1938 / 1940): first stage is insignificant for males at both cutoffs and only marginal (5%) for females at 1938 — with no reliable instrument at either fake cutoff, none of these RD estimates reflect real discontinuities
- Small-cluster robustness (36 cohort × month cells) on the main male estimate: RI $p=0.10$ vs. $p<0.01$ from `rdrobust` — reconciling with higher replications and a wild-cluster bootstrap

Mortality Looks Balanced Across the Cutoff



Raw mortality rates by age, split by born before/after July 1, 1939

Mechanisms (Tertiary-Educated Males)

- Concentrated among tertiary-educated men (RD -4.3 , $p=0.07$; reduced form -0.60^{**} , $p=0.01$); no effect for non-tertiary men
- GP visits: $+21$ visits ages 66–79 ($p=0.05$, marginal)
- Comorbidity index (CCI): re-estimated at age 78, $+0.424$, not significant ($p=0.124$)
- Dementia (ever diagnosed before 70): large significant for men overall, of lowered dementia diagnosis, concentrated in non-tertiary men —reported effect size seems large relative to the group's 1.5% base rate
- Accidents: -0.65 , not statistically significant ($p=0.15$)
- Wealth accumulation 2000-2003: no statistically significant effects ($p=0.73$)
- Executive vs. non-executive: point estimate larger for non-executive men, but imprecise ($p=0.48$)
- Marital status: married men -1.92^{***} ($p<0.001$) drive the effect; no significant effect for non-married men (positive but imprecise)

Conclusion & Policy Implications

- Earlier retirement improves men's mental health — driven by tertiary-educated, non-executive, married men
- No detectable effect for women
- No effect on physical health (CCI) or mortality — consistent with Nielsen (2019)
- Caution on external validity: sample skews toward higher-earning, better-educated, more attached to the labor market than the general population
- Future work: reconcile small-cluster inference (RI and wild-cluster-bootstrap p-values) vs. conventional rdrobust p-values and perform mortality analysis