The Effects of Reduced Working Hours at the End of Working Life on Prescription Drug Use and Hospitalizations

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Health and work in aging society

- Population aging challenges the financing of welfare states
  - In particular, the increasing share of older people raises health care costs due to their higher demand for care.
- Policies aim to prolong working careers:
  - Flexible working arrangements (such as gradual retirement) are promoted to increase labor supply and well-being (OECD, 2019)
  - Empirical evidence on older workers labor supply + flexible arrangement mixed (but generally effects small)
- What implications does gradual retirement have for health care demand and health outcomes?
  - Understanding health impacts of working hours reduction important as they shape both individual well-being and labor market participation

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Work hours and health

- How does work (amount) affect our health?
  - Theoretical motivation: health as a form of capital (Grossman model)
  - Less work & more leisure
    - → decelerate the wear and tear on the body and mind?
    - → increase investments in one's own health?
    - → lead to worse health habits?

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This paper

Exploit rich administrative dataset and part-time pension program that

- substantially reduced working hours (around 40% reduction) in the career job
- was very generous (in terms of current income and future pension income) Details

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Research questions

- What is the link between part-time employment & health care demand/health capital?
- How does extending part-time work (by two years) affect health outcomes?

This paper, cont'd

Research design:

- Moving to PT work: matched control group of workers in the same gender–birth cohort, with PP decisions instrumented by eligibility age
- ELIG age reform: compare outcomes in same ages between cohorts with eligibility age in 56 or 58

Preview of results:

- Moving to PT work: decreases drug purchases by approx. 2–6% in the short term, especially for respiratory drugs, with stronger effects for women.
- ELIG age reform: permanent reduction for musculoskeletal related drugs (on average 2% in retirement ages) while in retirement heart-related drugs are used more (no differences in mortality by age 72)

Contribution to Literature

Work Hour Reduction and Health

- Cygan-Rehm and Wunder (2018), Ahn (2016), Berniell and Bietenbeck (2020), Lepinteur (2019), Bratberg et al. (2020), Prodromidis et al. (2025)
- → Estimate the health effects of substantial reduction in working hours

Older Workers and Health Effects

- Hagen (2016), Hallberg et al. (2015), Hernaes et al. (2013), Bloemen et al. (2017), Blake and Garrouste (2019)
- → Late-career effects: increased leisure without the full retirement income effect.

Evaluation of Part-Time / Gradual Retirement Programs

- Kyyrä (2015), Albanese et al. (2019), Graf et al. (2011), Huber et al. (2016), Berg et al. (2020)
- → Limited evidence on health effects of phased retirement schemes

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Outline

1. Institutional setting and data
2. Empirical strategy
3. Results
4. Conclusions

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Institutional setting and data

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Part-time pension program

Eligibility conditions:

- **age condition:** 58 before 1998, temporarily lowered to 56 until end of 2002
  - The reform is likely exogenous; the government framed it as a trial to observe outcomes
- **work condition**: 12 months of full-time work during the preceding 18 months (private), 6 months of full-time work during the preceding 18 months (public)
- **pension accrual**: accruing pension rights for 5 years during the preceding 15 years (private), 3 years during the past 5 years (public)
- agreement between employer and employee

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During part-time pension program

- Wages and hours needed to decrease by 30-75 percent; at least 16 hours and maximum 28 weekly hours
- Pension (paid by pension insurer): 0.5*(full time wages - part time wages) but max 0.75* pension accrued
- In general, taxation was lower than that for full-time employees or full-time pensioners
- Pension accrual also for the lost income (1.5% before 2003, 0.75% after 2002)

Take-up around 13% of the Finnish workforce aged 55-64 (during early 2000s)

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Health care provision in Finland

- Universal coverage & public system
  - Low user charges (means-tested)
  - Drug purchases heavily subsidized
- Public + private + occupational health care mix
  - Public health care provides primary care and specialized care (hospitals)
  - Employers typically provide occupational health services for employees which cover primary care

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Data

- Total population administrative data
  - Hospital visits from the National Hospital Discharge Register and Specialist Care held by the Finnish National Institute for Health and Welfare
  - Purchases of prescription medication from retail pharmacies from the Finnish National Prescription Register held by the National Social Insurance Institution (from 1995 $\rightarrow$)
  - Cause of Death Registers (year of death)
  - Statistics Finland's data on labor market outcomes and background characteristics
- Sample: cohorts 1944-1949 working at age 55 (cohorts 1944-1946 in treatment group (ELIGage $= 56$))

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Empirical strategy

Hypothesis and outcomes

Why do we expect changes in health care utilization and subsequent health outcomes after reduced working hours?

- Immediate decrease in allostatic load, so demand for health care decreases in the short term
- Lower opportunity costs of time for health investments change long-term health outcomes
- Increased leisure changes health-related consumption (lifestyle habits)

How to measure?

- Immediate effects on drug purchases for different disease categories
- Hospital visits
- Mortality (observed up to age 72)

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Identification

- The ideal empirical setting would have randomization of workers into treatment (part-time work/part-time work earlier) and control
- In the absence of randomization, we compare outcomes between:
  - Individuals with part-time pension vs. those without
  - Across cohorts with eligibility at 56 vs. 58
- Identification: in the absence of PP, trends in outcomes would have been the same across groups and there would be no health-related selection into ELIG56 vs. ELIG58.
  - Coarsened exact matching based on observable differences (by birth cohort, gender, tertiary, manual, public, earnings group)
- Eligibility age as IV
  - Eligibility age is a strong predictor of take-up and is unlikely to affect health directly

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Local effect of PT transition (FE-IV)

First stage: Eligibility shifts take-up of part-time pension

$$PP_{i,t} = \gamma\, 1[age_{i,t} \geq e_i] + \theta(age_{i,t}) + \rho_i + \epsilon_{i,t} \tag{1}$$

Second stage: Effect of part-time pension on outcomes

$$Y_{i,t+k} = \beta\, \widehat{PP}_{i,t} + \theta(age_{i,t}) + \rho_i + \nu_{i,t+k} \tag{2}$$

- $PP_{i,t}$: part-time pension take-up
- $Y_{i,t+k}$: outcomes k periods after take-up
- Individual FE ρ_i
- Standard errors clustered at the individual level

Policy effect of earlier eligibility (ITT))

Treatment cohorts: Cohorts ELIG for PP at age 56: 1944–1946
Control cohorts: Cohorts ELIG at age 58: 1947-1949
Comparing outcomes at the same age across cohorts and PP-Non PP sample [with cem weights]

$$Y_{ia} = \delta\left(\text{Post}_{ia} \times \text{TreatedCoh}_i \times \text{PP}_i\right) + \beta_1\left(\text{Post}_{ia} \times \text{TreatedCoh}_i\right) + \beta_2\left(\text{Post}_{ia} \times \text{PP}_i\right) + \beta_3\,\text{Post}_{ia} + \alpha_i + \lambda_a + \varepsilon_{ia}, \tag{3}$$

- Y_{ia}: Outcome for individual i in age a
- TreatedCoh_i: Indicator for being in a treatment cohort (1944–1946)
- PP_i: Indicator for being a part-time pensioner
- Post_{ia}: Indicator for being above 56 (two post periods: ages 56-62 and ages 63-70)

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Descriptives, measured at age 55

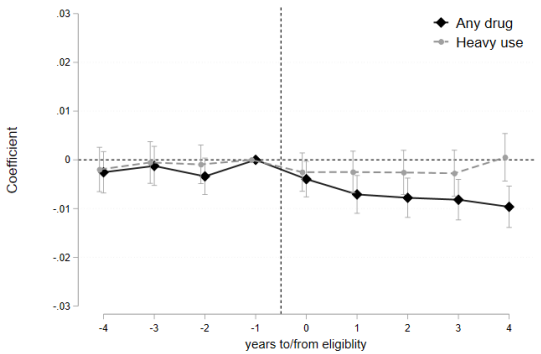
Income trajectory for matched

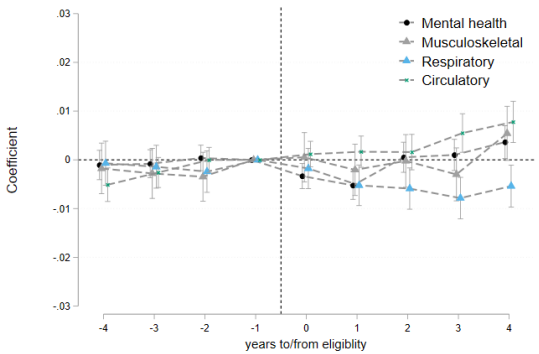
	1944–1946 Cohorts				1947–1949 Cohorts			
	Non-PP	PP	Non-PP (matched)	PP (matched)	Non-PP	PP	Non-PP (matched)	PP (matched)
Female	0.50 (0.50)	0.56 (0.50)	0.56 (0.50)	0.56 (0.50)	0.50 (0.50)	0.53 (0.50)	0.53 (0.50)	0.53 (0.50)
Tertiary edu.	0.22 (0.41)	0.29 (0.45)	0.29 (0.45)	0.29 (0.45)	0.25 (0.43)	0.29 (0.46)	0.29 (0.46)	0.29 (0.46)
Earnings	28215.8 (26338.8)	32626.0 (20419.9)	32772.8 (25810.1)	32624.8 (20419.9)	26929.0 (40982.3)	31879.3 (31040.7)	31903.6 (39398.4)	31871.8 (31037.9)
Disposable income	25130.4 (44927.4)	28114.2 (34574.6)	26787.0 (43017.1)	28113.4 (34576.0)	23576.1 (42201.8)	26626.1 (33082.5)	25258.0 (43533.1)	26622.5 (33084.5)
Public sector	0.31 (0.46)	0.40 (0.49)	0.40 (0.49)	0.40 (0.49)	0.32 (0.47)	0.36 (0.48)	0.36 (0.48)	0.36 (0.48)
Manual occupations	0.40 (0.49)	0.28 (0.45)	0.28 (0.45)	0.28 (0.45)	0.40 (0.49)	0.31 (0.46)	0.31 (0.46)	0.31 (0.46)
Health:								
Any drug	0.71 (0.45)	0.75 (0.43)	0.73 (0.44)	0.75 (0.43)	0.70 (0.46)	0.75 (0.43)	0.71 (0.45)	0.75 (0.43)
Any sickness benefits	0.069 (0.25)	0.036 (0.19)	0.055 (0.23)	0.036 (0.19)	0.066 (0.25)	0.044 (0.21)	0.052 (0.22)	0.044 (0.20)
Obs.	159021	23480	157448	23478	122481	34190	121653	34182

Results

Local effect of PT transition

Event-Study by Eligibility (Reduced form), drug purchases





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FE-IV Estimates of Part-time Pension on Drug Purchases

	(1) PP	(2) Any drug	(3) Drug: mental	(4) Drug: musculo	(5) Drug: resp.	(6) Drug: heart
Outcomes at t+3						
First stage						
Elig.	0.448***					
	(0.002)					
Kleibergen–Paap F	62,275					
Second stage:						
PP		-0.019***	0.005**	-0.009**	-0.009***	0.008***
		(0.003)	(0.002)	(0.004)	(0.003)	(0.003)
Mean of Y		0.78	0.13	0.30	0.18	0.41
N		1,990,112	1,990,112	1,990,112	1,990,112	1,990,112
Individuals		334,403	334,403	334,403	334,403	334,403

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Relative effects, channels and heterogeneity

- Compared to baseline (-1); coefficients translate into small relative effects (2,5%-5%)
- Compared to Hagen (2019) for full-retirement and similar data/institutional design these effects are larger (as Hagen finds precise null results)
- Potential channels: respiratory diseases decline when exposure to the workplace decreases
- Heterogeneity: larger reduction for women (for any drug 5%) while no difference between manual and non-manual occupations

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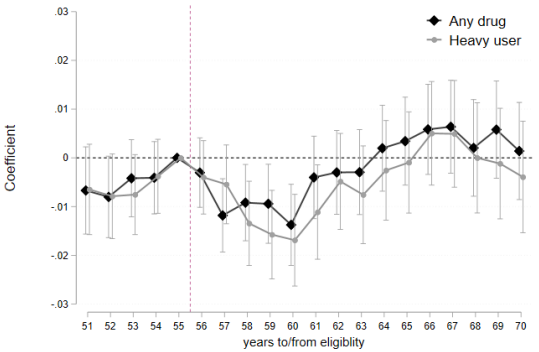
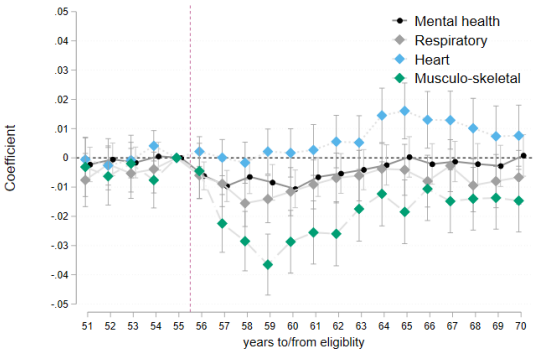
Policy effect of earlier eligibility (ITT)

Event study: drug use





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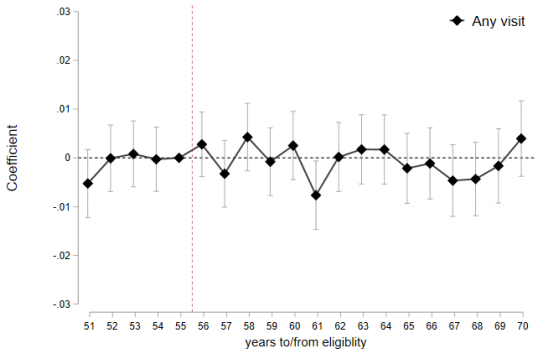
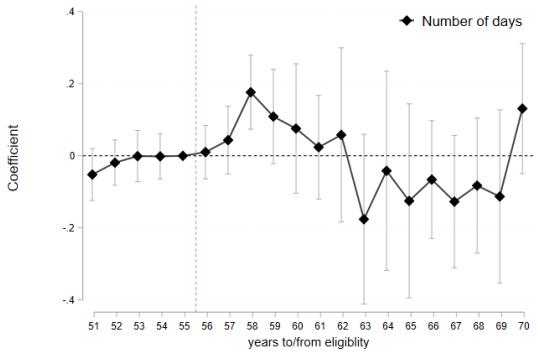
Event study: hospitalizations





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Regression table ELIG age reform

			Drug outcomes				Hospital outcomes	
	Any drug	Heavy user	Mental	Respiratory	Heart	Musculoskeletal	Any visit	Duration
Treatment effect	-0.000	0.003	-0.006***	-0.002	0.002	-0.014***	0.005***	0.114***
in ages 56-62	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.034)
Treatment effect	0.011***	0.013***	0.000	0.002	0.011***	-0.004*	0.004***	0.017
in ages 63-70	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.047)
Baseline	0.72	0.45	0.10	0.18	0.30	0.25	0.08	0.51
Observations	9,083,360	9,083,360	9,083,360	9,083,360	9,083,360	9,083,360	9,083,360	9,083,360

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Summary of key results

- At the end of working life, purchases of mental health and musculoskeletal-related drugs decrease by 6% in the treatment cohorts (relative to control cohorts).
  - Less exposure to common workplace hazards (chronic stress, wear and tear on the body)
- Intensity of hospitalizations increases approximately 22%
- In retirement ages, small relative *increase* in heart-related drugs
  - Linked to poor nutrition and little exercise
- Evidence on heterogeneous effects by gender and type of work (manual/non-manual) is less clear.

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Conclusions

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Conclusions & Policy Implications

- **Modest health benefits from gradual retirement:**
  - Part-time work transitions in older age associated with small decreases in prescription drug use
- **Earlier eligibility matters:**
  - The policy reform reducing eligibility age by 2 years led to persistent declines in some drug purchases compared to the ELIG58 group (ITT effects)
  - There are also increases in heart-related drug purchases, indicating worse lifestyle habits, yet no differences in mortality
- **Policy takeaway:**
  - Gradual retirement options may yield modest but measurable health benefits.
  - Targeting policy interventions toward certain groups could reduce health inequalities

APPENDIX

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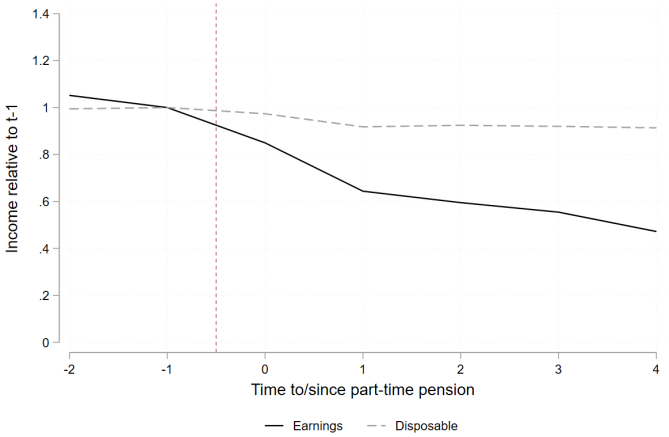
Earnings and disposable income relative to year before PP



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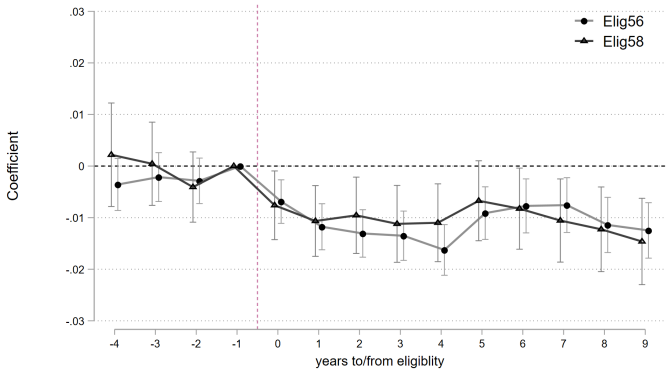
Event-study by ELIG group



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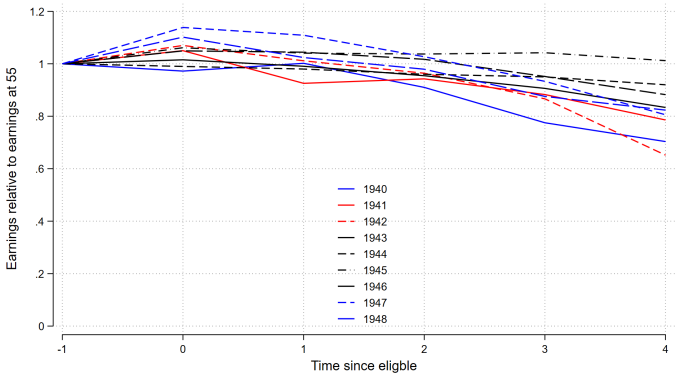
Earnings relative to -1 of cohort eligibility age, matched non-PP



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