THE ROLE OF PHYSICAL AND MENTAL JOB REQUIREMENTS ON RETIREMENT

Italo Lopez Garcia, USC
Kathleen J. Mullen, USC
Jeffrey Wenger, RAND

24th Annual Meeting of the Retirement and Disability Research Consortium
August 5, 2022

Funding gratefully acknowledged from the U.S. Social Security Administration (SSA) through the Michigan Retirement and Disability Research Center (UM22-04).

Can we encourage individuals to delay retirement? What is the role of occupational requirements?

- Increases in life expectancy have increased the time spent in retirement.
  - Slowed labor force growth (Maestas, Mullen and Powell 2016);
  - Challenges to the sustainability of the Social Security (Gruber and Wise 2004)
- Job demands appear important drivers of retirement and disability
  - Delays in retirement could be encouraged by improving working conditions related to physical workload, job control and job stress (Blekesaune and Solem 2005; Lahelma et al. 2012)
  - More than half of workers are exposed to hazardous working conditions (Maestas et al 2017).
- However, the current evidence is conflicting
  - Self-reported physical strain (Angrisani et al., 2013; Aaron and Callan, 2011)
  - Self-reported vs. objective measures (Helppie-Mcfall et al.,2015; Angrisani et al, 2016)
- **Understanding how job demands drive retirement and disability is key to project the long-run sustainability of Social Security programs!**

Our Contribution

With MRDRC funding (UM21-05) and using ORS Wave 1 data we showed:

- A 1 SD increase in a physical job demand index → 14 p.p. increase in the probability of being retired and 6 p.p. increase in the probability of transitioning into full retirement.
- Similar effects for physical work environment (hazardous working conditions)
- Effects concentrated among men, and larger for older and less educated workers.

<u>2022 Expansion (UM22-04):</u>

1. Analyze data from ORS Wave 2 data which also includes Mental job requirements
2. Examine concurrent validity of job requirements from ORS with O*NET
3. Construct indices of physical and mental job demands, and physical work environment
4. Merge indices to HRS data to study the role of job demands on retirement

The Occupational Requirements Survey (ORS)

- Conducted by the Bureau of Labor Statistics in agreement with SSA.
- Field economists interview human resources specialists, occupational safety managers, or supervisors at selected companies.
- Public Version with aggregated occupation level data: Wave 2
  - Data collection: 2018/2019 (sample 1), 2019/2020 (sample 2), 2020/2021 (sample 3)
- Three types of job requirements:
  - physical demands (32)
  - environmental conditions (10)
  - cognitive/mental requirements (11)

Total number of observations:

- Wave 2: 50,770 (390 occupations at 6-digit level SOC 2018)

Types of variables

1. Mean and percentiles
   - Hours of standing, mean
   - Hours of standing (10^{th}, 25^{th}, 50^{th} 75^{th} and 90^{th} Percentiles)

2. Binary
   - Percent of workers, reaching overhead is required
   - Percent of workers, reaching overhead is not required

3. Frequency/duration
   - Percent of workers, exposed to wetness
   - Percent of workers, not exposed to wetness (additive)
   - Percent of workers, exposed to wetness, constantly (additive)
   - Percent of workers, exposed to wetness, seldom (additive)
   - Percent of workers, exposed to wetness, occasionally (additive)
   - Percent of workers, exposed to wetness, frequently (additive)

Missing Data Issues

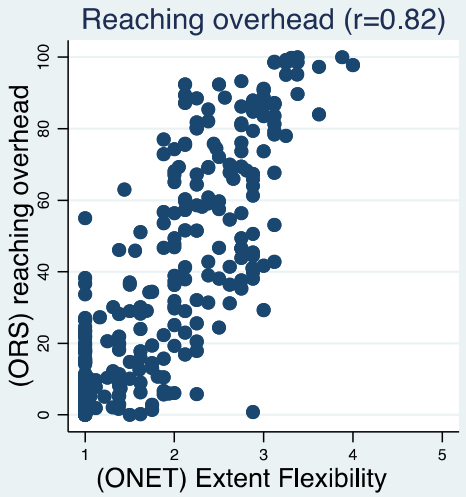
- Missing Variable Estimates:
  - E.g., respondents assert the requirement is present, but duration is “unknown”
  - Suppressed estimates that are part of an “additive group”
- Missing Job Traits for some occupations:
  - Too few observations available of a job requirement for a particular occupation
  - Big problem for some cognitive requirements
- Our strategy:
  - Use Means (standardized) AND use single continuous variable “percentage of workers that trait X is ”required or exposed to X working condition”.
  - Select traits reported for at least 70% of occupations (drop 4 cognitive job traits)
  - Impute remaining missing traits for 6-digit level occupations using the average job trait at the 2-digit occupation level.

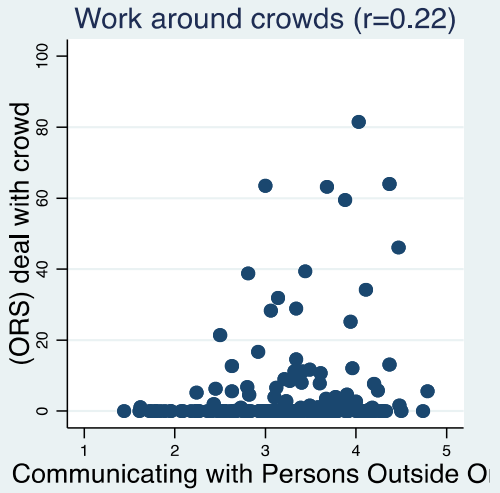
Occupational Requirements and Sample size

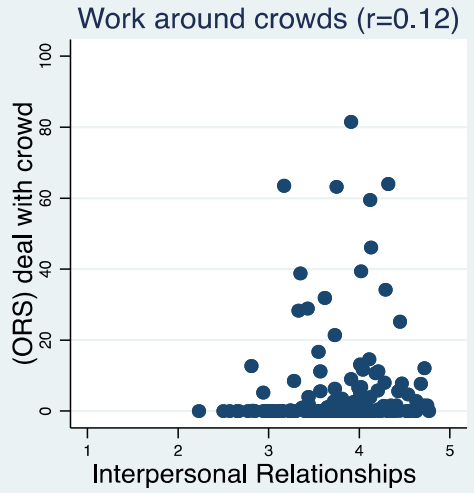
Occupational Requirement	Examples	% Occup.
Physical Job Demands (32)	Climbing ladders, ramps, stairs, Driving, Vision (near, far), Hearing, Pushing/Pulling, Reaching, Low Postures, Sitting, Standing, Fine and Gross Manipulation, etc.	75%-99%
Hazardous Environmental Conditions (10)	Extreme cold and heat, Hazardous Contaminants, Heavy Vibrations, Humidity, Outdoors, Wetness, Noise, Proximity to mechanical parts, High exposed places.	96%-99%
Mental Requirements (11)	Supervisory duties, Telework available, Ability to pause work, Interaction with Public, Working around crowds, Supervisor is present	77%-98%
	Communicating Verbally, Work reviewed by supservisor, Problem solving, Work pace	< 50% in most cases

Comparing ORS with O*NET: what can we learn?

- Compared individual ORS with ONET job requirements that we could match
  - ONET: used Importance scale 1-5
- Best way is to examine how they match graphically
- We find a high-degree of consistency across the two databases, except for:
  - Little variation in some of the ORS physical requirements (near vision, hearing)
  - No good match for some mental requirements (working around crowds, being supervised)







Constructing Indexes for Job Demands

1. Dropped items:
   - High level of missingness in 4 cognitive requirements
   - Sitting perfectly collinear with standing/walking
   - Speaking/keyboarding negative correlation with other physical variables
   - Hearing/vision: mixed correlations plus little variation

2. Four indices:
   - Physical (11 requirements)
   - Environmental Conditions (10 requirements)
   - Job Autonomy/ Flexibility (4 requirements)
   - Supervised/ Work w/Public (3 requirements)

Final list of job traits

	Physical	Obs.
1	Standing	320
2	Weightlifting	317
3	Strength	195
4	Climb ladder	370
5	Low posture	361
6	Drive	309
7	Footleg	358
8	Push/pulll	358
9	Reaching	361
10	Fine motor/hands	359
11	Gross motor/hands	376

	Environmental	Obs.
1	Cold	386
2	Heat	385
3	Hazcam	375
4	Vibration	382
5	High	379
6	Humid	384
7	Outdoor	378
8	Wet	373
9	Proxmech	375
10	Noise	361

	Supervised/ Work w/Public	Obs.
1	General public	309
2	Crowd	299
3	Supervision	317

	Job Autonomy/ Flexibility	Obs
4	Supervision	381
5	Telework	317
6	Pause work	311
7	Self paced	188

Merging ORS to HRS: What is the right occupation?

- In Year 1 project, we used the occupation the individual held in wave 7
  - Better strategy: use job demands from most important job held during prime years.
- Occupational history data from the Life History Mail Survey(LHMS) to find that job.
- Most important occupation between ages 30-40 available for only 51% of HRS respondents.

Strategy	Data	Sample Size (PN)
1) Use most important occupation between age 30 and 40	LHMS	3,411 (51%)
2) Supplement with longest tenure occupation between age 25 and 50	LHMS	481 (7.2%)
3) Supplement with first occupation observed in the panel (at the entering wave)	HRS	2,819 (42%)

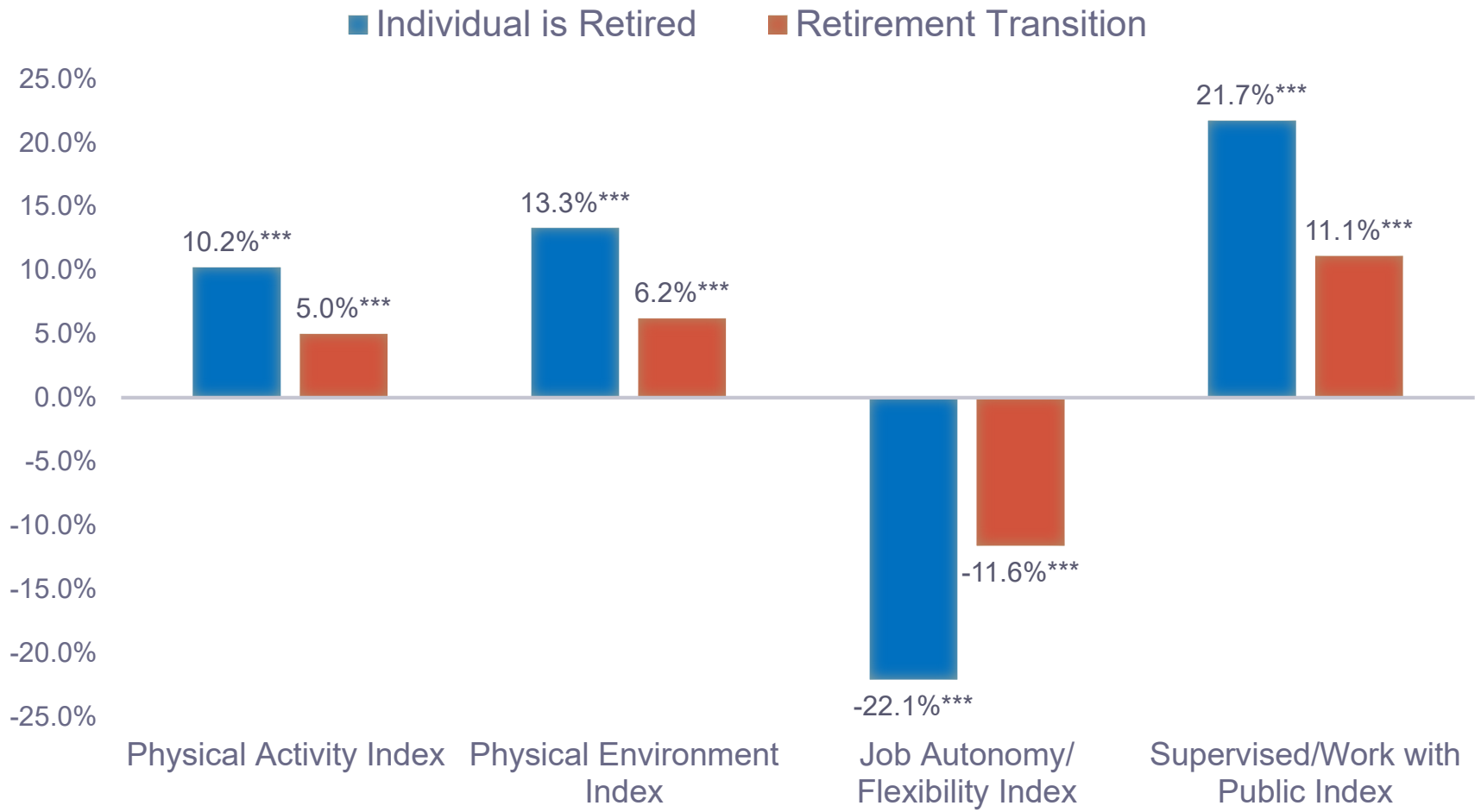
Estimating associations between job demands and retirement status and transitions

- Sample: N=6,982 respondents aged 51-70 in 2004 followed across waves 7-12.
- Labor Supply Outcomes (based on self-reported labor force status):
  1. Retirement status: the individual is "fully retired" (part-time and unemployed are considered not retired)
  2. Transitions from "working" in t to "fully retired" in $t+1$ (part-time and unemployed considered as working; multiple transitions allowed).
- Research Strategy

$$R_{it} = \alpha_0 + \alpha_1 JD_i + X_{it}{}'\delta + \mu_t + \varepsilon_{it}$$

  - α_1: how much a 1 SD increase in occupational job demands change the probability to be retired or to transition into retirement.
  - X: age, gender, education, marital status, health status, cognition status, availability of DB/DC pension plans, availability of health insurance, spouse's age and work status

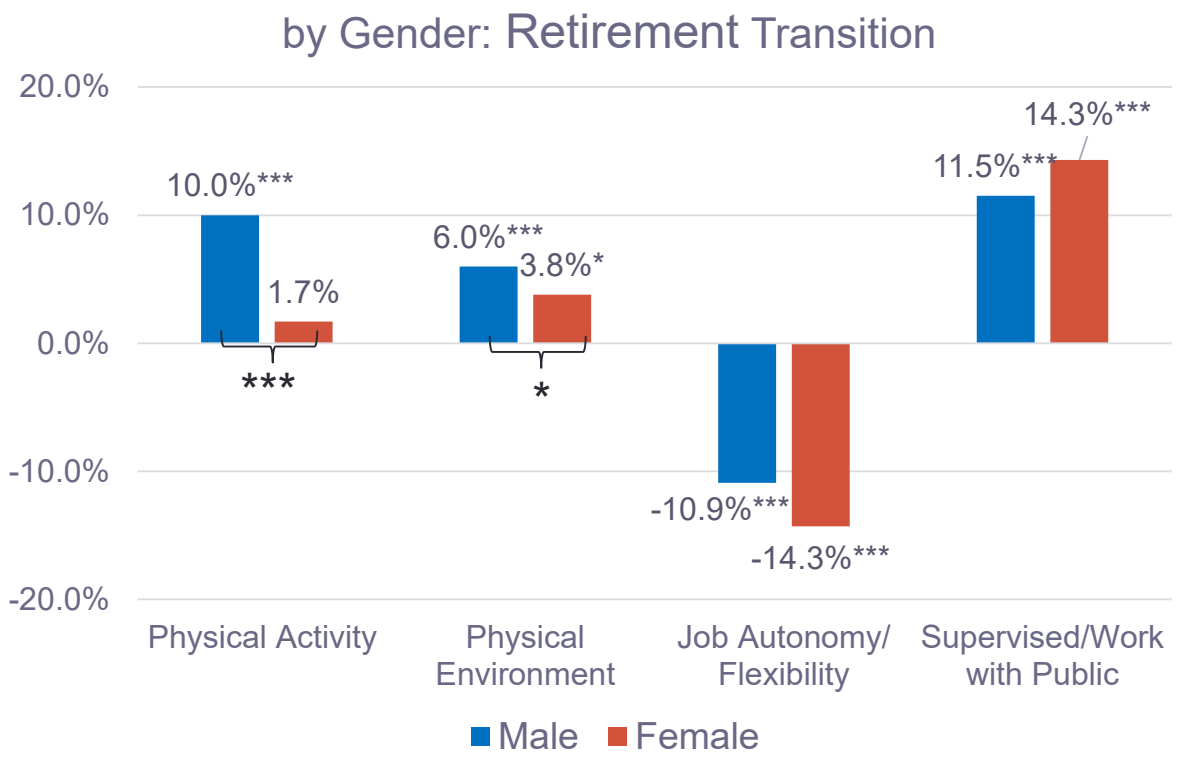
Mental and physical job demands, and the physical work environment predict retirement in the expected directions

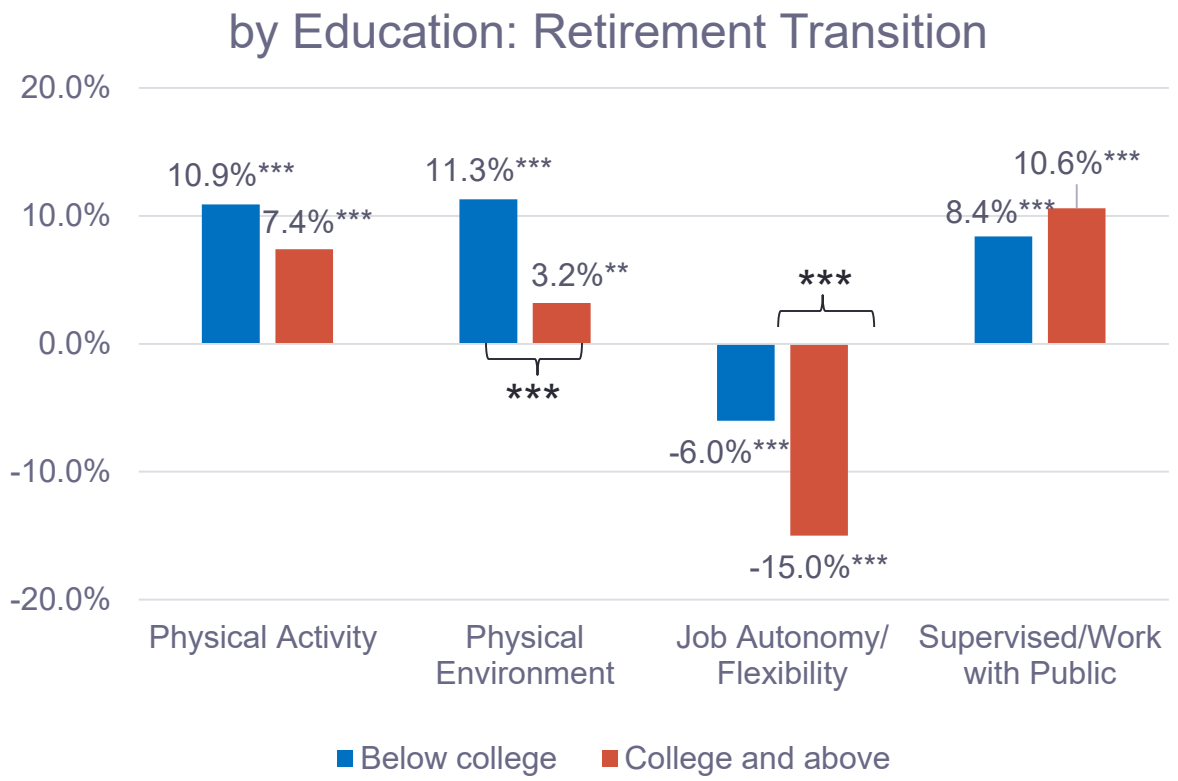


- E.g.,: A 1 SD increase in the job autonomy decreases the probability of being retired by 22%,

Highly heterogeneous effects!

- High physical jobs demands and hazardous conditions induce all workers to retire earlier, but much more those who are men, without a college degree and in worse health.
- High job autonomy delays retirement for all workers, but more so for college graduates





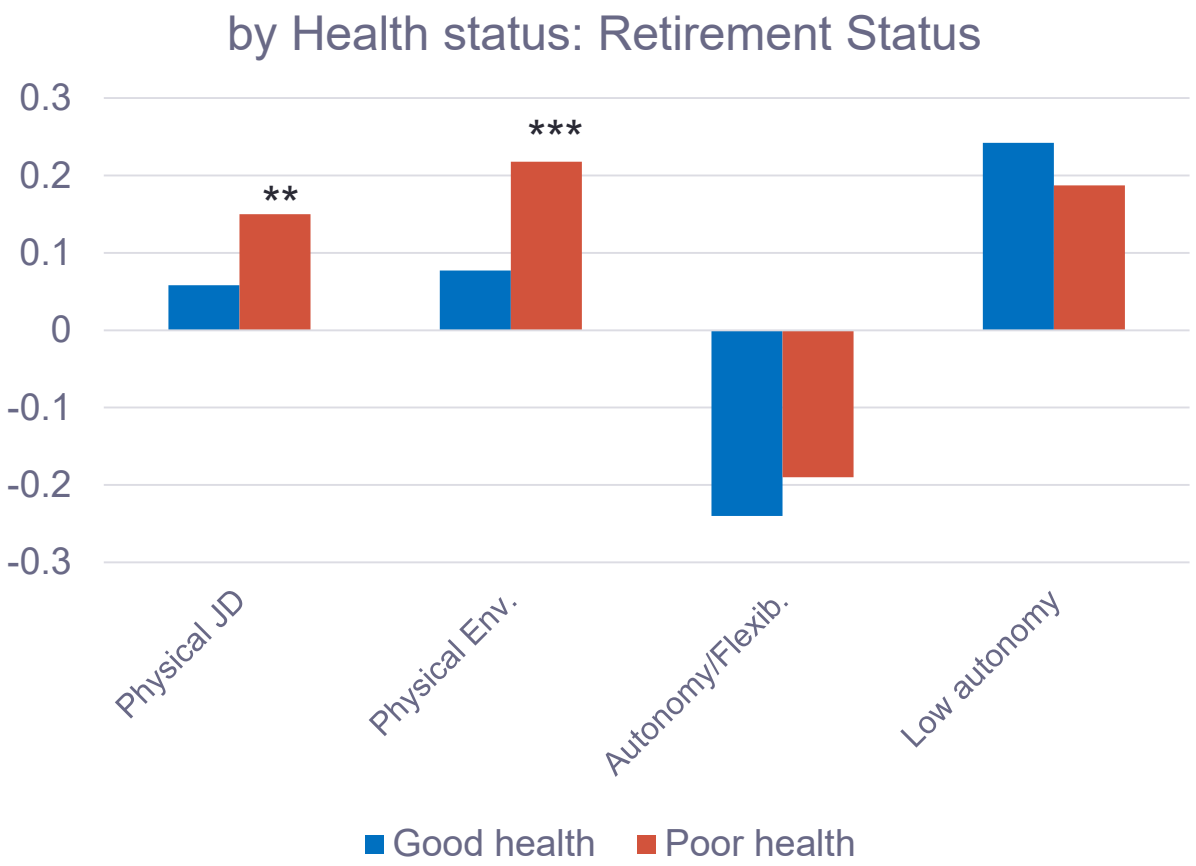
* p<0.1; ** p<0.05; *** p<0.01

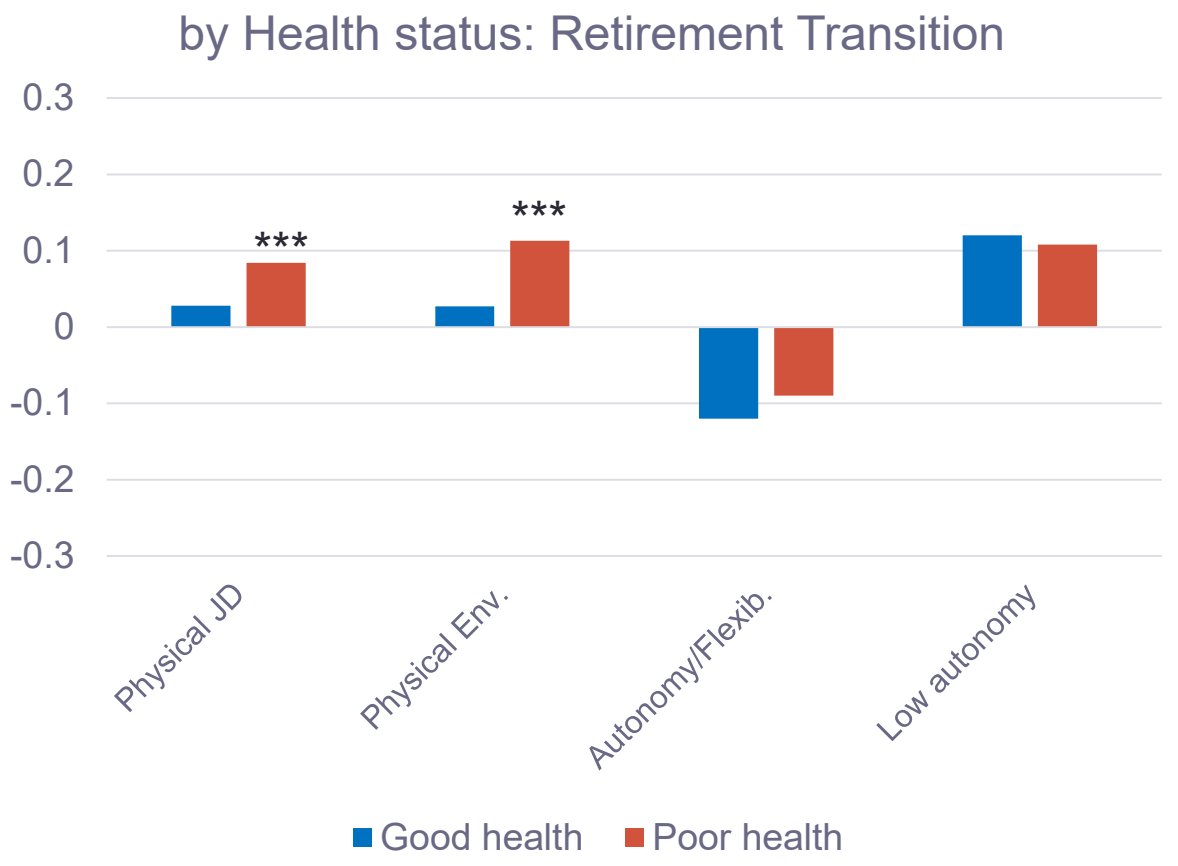
Conclusions

- Like our previous findings using Wave 1 data, workers in physically demanding and hazardous jobs are likely to retire significantly earlier
- Workers in occupations offering little autonomy and requiring working with public tend to retire even earlier
- Workers in more autonomous and flexible occupations significantly delay retirement
- There is significant heterogeneity in how job demands affect retirement: males, low-educated and workers with poor health in physically demanding and hazardous jobs retire earlier than their counterparts.
- Higher job autonomy and flexibility help delay retirement for all groups, but much more among college-educated workers.
- Next Step: Disability!!

THANK YOU

Workers with worse self-reported health status likely to retire earlier from physically demanding and hazardous jobs





* p<0.1; ** p<0.05; *** p<0.01