Longevity and Occupational Choice

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Motivation

- Key question in economics: How do economic decisions affect health outcomes?
- "Ultimate" health outcome: longevity
  - Human life one of the highest societal values
  - Implications for retirement planning, social security, health insurance, etc.

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- "Ultimate" health outcome: longevity
  - Human life one of the highest societal values
  - Implications for retirement planning, social security, health insurance, etc.
- **Heterogeneity in longevity** across socioeconomic strata
  - Existing work: disparities in life expectancy by income, gender, race, location
- **This paper:** How does life expectancy vary with occupation, controlling for correlates?
  - Typical adult dedicates half of waking hours to work (Krueger and Mueller 2012)

Empirical Setting

- Universe of administrative vital records for approx. 15% of the U.S. population
  - From economically important states (CT, FL, MA, OH), over multiple decades
  - Detailed personal data:
    - Usual (pre-retirement) occupation
    - Demographics
    - Dates of birth and death
    - Medical death reason
    - etc.
- BLS Occupational Requirements Survey (ORS), American Time Use Survey (ATUS)

Preview of Findings

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   - Sedentary vs. active
   - Indoor vs. outdoor
   - Physical and mental burden
   - Job meaningfulness
   - Social interactions

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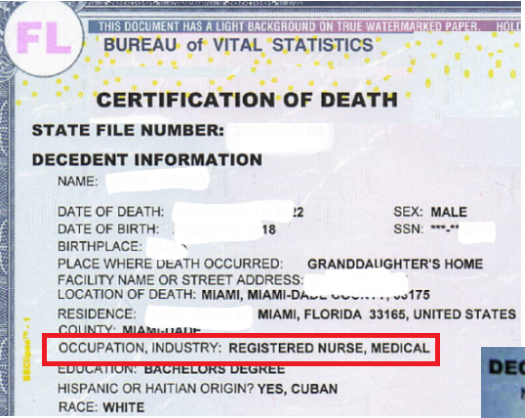
- Key contribution:
  Large-scale evidence on the association between life expectancy and occupation Lit.

Data on Occupations from State Vital Records


THIS DOCUMENT HAS A LIGHT BACKGROUND ON TRUE WATERMARKED PAPER

BUREAU of VITAL STATISTICS

CERTIFICATION OF DEATH

STATE FILE NUMBER:

DECEDENT INFORMATION

NAME:

DATE OF DEATH: 12 SEX: MALE

DATE OF BIRTH: 18 SSN: ***-**

BIRTHPLACE:

PLACE WHERE DEATH OCCURRED: GRANDDAUGHTER'S HOME

FACILITY NAME OR STREET ADDRESS:

LOCATION OF DEATH: MIAMI, MIAMI-DADE 33175

RESIDENCE: MIAMI, FLORIDA 33165, UNITED STATES

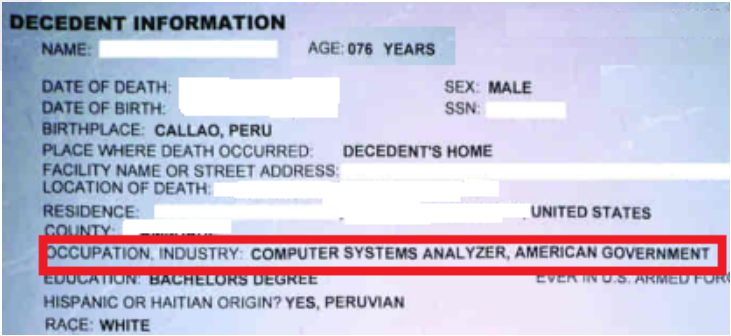
COUNTY: MIAMI-DADE

OCCUPATION, INDUSTRY: REGISTERED NURSE, MEDICAL

EDUCATION: BACHELORS DEGREE

HISPANIC OR HAITIAN ORIGIN? YES, CUBAN

RACE: WHITE


DECEDENT INFORMATION

NAME: AGE: 076 YEARS

DATE OF DEATH: SEX: MALE

DATE OF BIRTH: SSN:

BIRTHPLACE: CALLAO, PERU

PLACE WHERE DEATH OCCURRED: DECEDENT'S HOME

FACILITY NAME OR STREET ADDRESS:

LOCATION OF DEATH:

RESIDENCE: UNITED STATES

COUNTY:

OCCUPATION, INDUSTRY: COMPUTER SYSTEMS ANALYZER, AMERICAN GOVERNMENT

EDUCATION: BACHELORS DEGREE

HISPANIC OR HAITIAN ORIGIN? YES, PERUVIAN

RACE: WHITE

Occupation Mapping

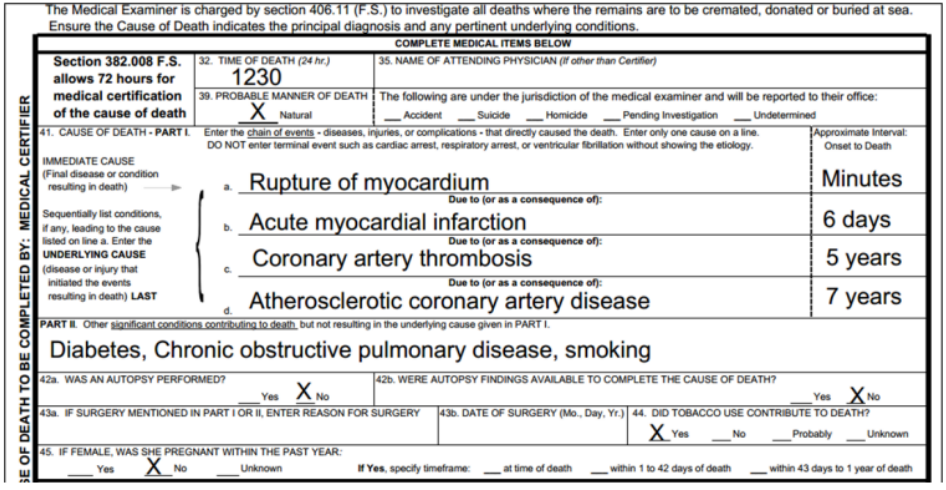
- Universe of administrative vital records from CT, FL, MA, OH (1990–2020)
- Map occupations to **minor** six-digit SOC categories

Reported Occupation	Mapped SOC Category
Elementary School Te	Elementary School Teachers, Except Special Education
Ret Clerk Typist	Word Processors and Typists
Hairdreser	Hairdressers, Hairstylists, and Cosmetologists
Babysitter	Childcare Workers
CNA	Nursing Assistants
Executive Chef	Chefs and Head Cooks

Based on the O*NET-SOC AutoCoder software developed by R. M. Wilson Consulting for the DoL. Abbreviations and typographical errors included on purpose.

- Aggregate further into **major** occupation groups
  - E. g.: Educational Instruction and Library Occupations

Medical Conclusion on the Primary and Secondary Death Cause



The Medical Examiner is charged by section 406.11 (F.S.) to investigate all deaths where the remains are to be cremated, donated or buried at sea. Ensure the Cause of Death indicates the principal diagnosis and any pertinent underlying conditions.

COMPLETE MEDICAL ITEMS BELOW

Section 382.008 F.S. allows 72 hours for medical certification of the cause of death

32. TIME OF DEATH *(24 hr.)*: 1230

35. NAME OF ATTENDING PHYSICIAN *(If other than Certifier)*

39. PROBABLE MANNER OF DEATH: X Natural

The following are under the jurisdiction of the medical examiner and will be reported to their office: ___ Accident ___ Suicide ___ Homicide ___ Pending Investigation ___ Undetermined

41. CAUSE OF DEATH - **PART I.** Enter the chain of events - diseases, injuries, or complications - that directly caused the death. Enter only one cause on a line. DO NOT enter terminal event such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology.

		Approximate Interval: Onset to Death
IMMEDIATE CAUSE (Final disease or condition resulting in death) a.	Rupture of myocardium	Minutes
Due to (or as a consequence of):		
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the **UNDERLYING CAUSE** (disease or injury that initiated the events resulting in death) **LAST** b.	Acute myocardial infarction	6 days
Due to (or as a consequence of):		
c.	Coronary artery thrombosis	5 years
Due to (or as a consequence of):		
d.	Atherosclerotic coronary artery disease	7 years

PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in PART I.

Diabetes, Chronic obstructive pulmonary disease, smoking

42a. WAS AN AUTOPSY PERFORMED? ___ Yes X No

42b. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? ___ Yes X No

43a. IF SURGERY MENTIONED IN PART I OR II, ENTER REASON FOR SURGERY

43b. DATE OF SURGERY (Mo., Day, Yr.)

44. DID TOBACCO USE CONTRIBUTE TO DEATH? X Yes ___ No ___ Probably ___ Unknown

45. IF FEMALE, WAS SHE PREGNANT WITHIN THE PAST YEAR: ___ Yes X No ___ Unknown **If Yes**, specify timeframe: ___ at time of death ___ within 1 to 42 days of death ___ within 43 days to 1 year of death

E OF DEATH TO BE COMPLETED BY: MEDICAL CERTIFIER

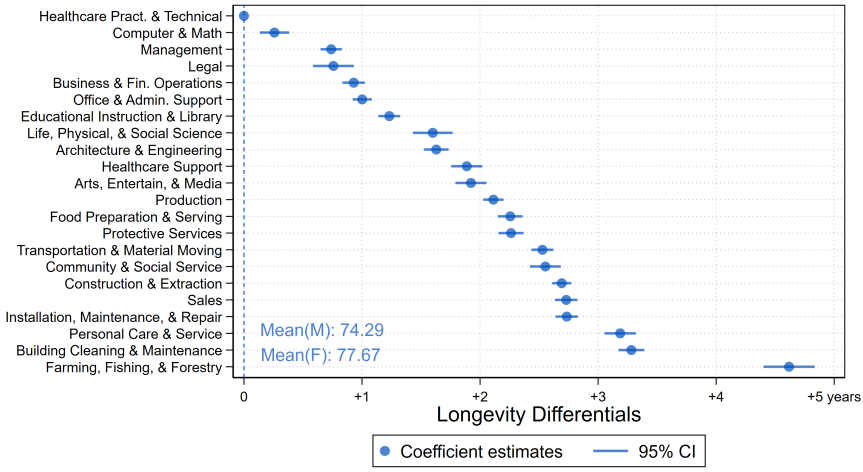
Map death causes and aggravating factors >>> unified **medical codes**

Empirical Approach

$$AgeAtDeath_i = \alpha + \boldsymbol{\beta'} \boldsymbol{Occ_i} + \gamma' \boldsymbol{X_i} + \varepsilon_i \quad (1)$$

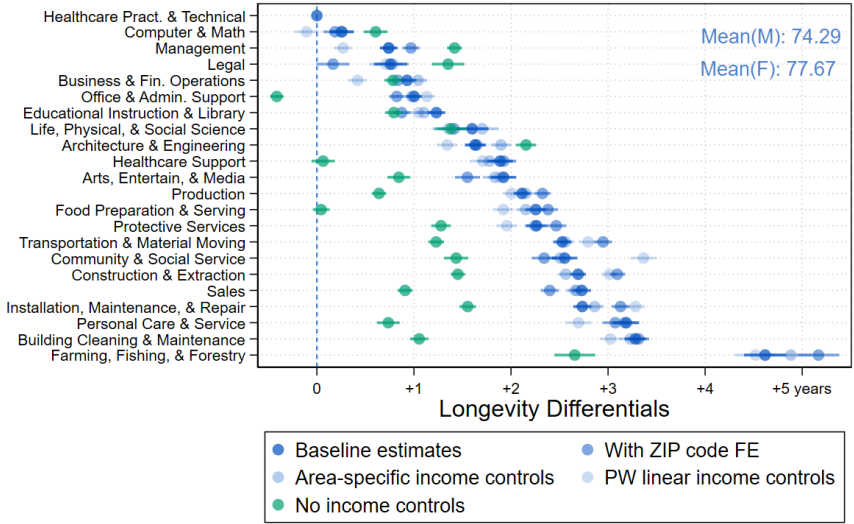
- $AgeAtDeath_i$ is the difference between the exact dates of birth and death
- $\boldsymbol{Occ_i}$ is a vector of indicators for SOC (22 major or 794 minor) occupation categories
- $\boldsymbol{X_i}$ is a vector of controls
  - Sex
  - Race
  - Ethnicity
  - Minor-occupation group income profile (mean, $p10$, $p25$, $p50$); 794 occup. groups

Occupation predicts large differences in longevity

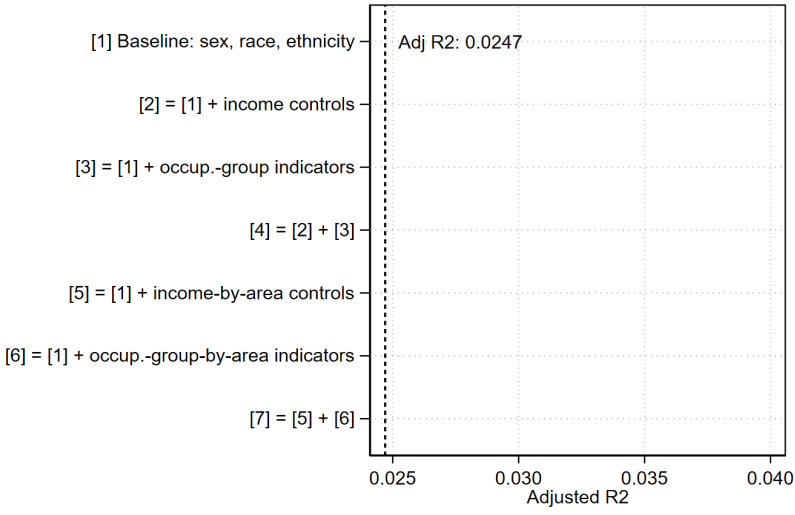


Notes: Controls include sex, race, ethnicity, and 794 minor-occupation group income profiles (mean, $p10$, $p25$, $p50$). $N = 4,027,011$.

Accounting for income is important



Broad occupation matters for R^2 1–5x as much as income



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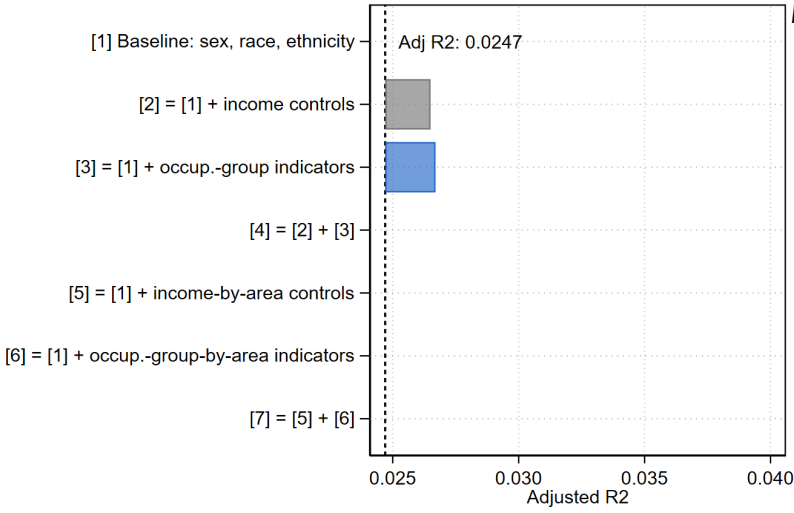

Notes:

- Income controls: 794 **minor** occupations (mean, *p*10, *p*25, *p*50)
- Occupation groups: 22 **major** occupation groups

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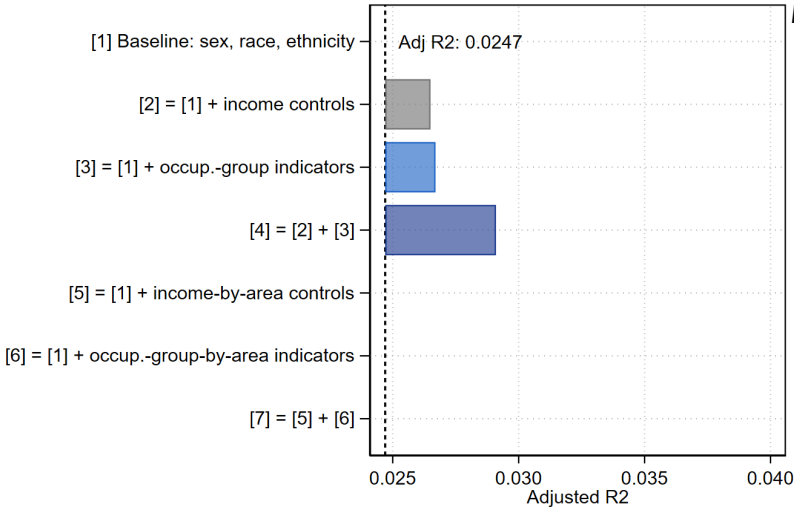

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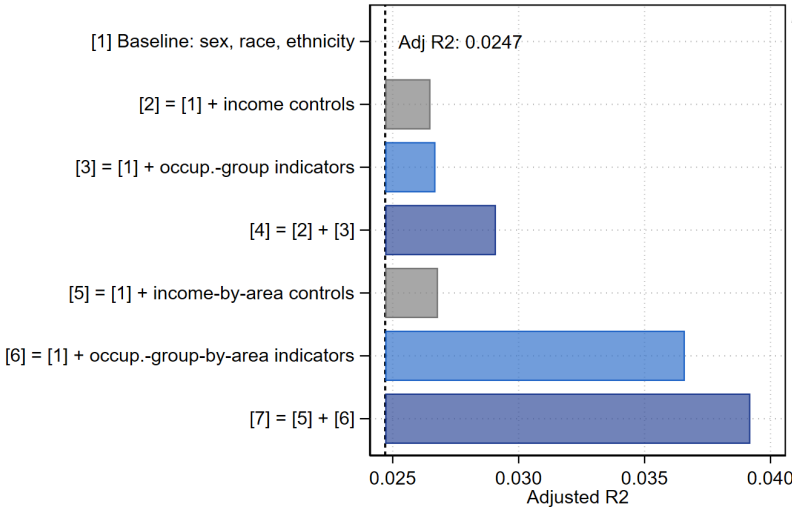


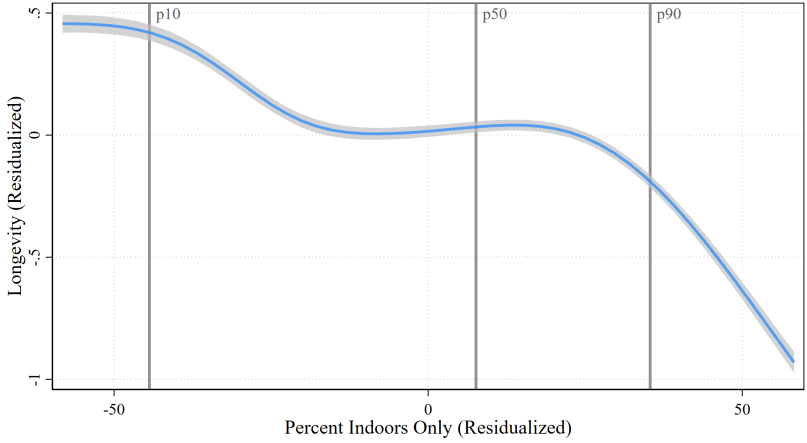
Notes:

- Income controls: 794 **minor** occupations (mean, *p*10, *p*25, *p*50)
- Occupation groups: 22 **major** occupation groups
- Area: 47 MSAs

Detailed occupation (794 groups) matters for R^2 1.2x as much as income + location (13,413 ZIP codes)

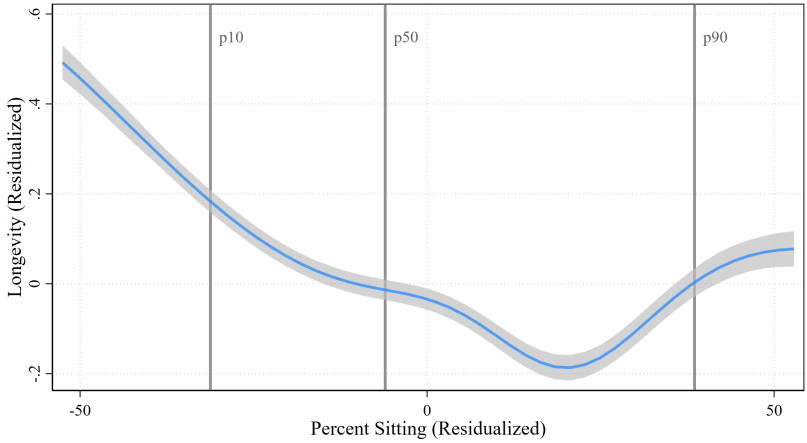
Mechanisms

Indoor jobs are associated with lower longevity



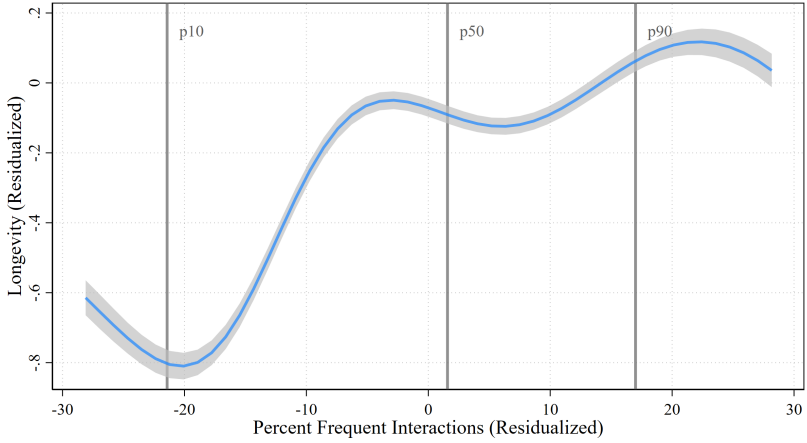
Notes: Figure plots obs. within 2 SD of the mean of residualized *percent indoors only* (ORS).
Representative occupations: Maintenance and Repair Workers ($p10$), General and Operations Managers ($p50$), Industrial Engineers ($p90$).

Sedentary jobs are associated with lower longevity



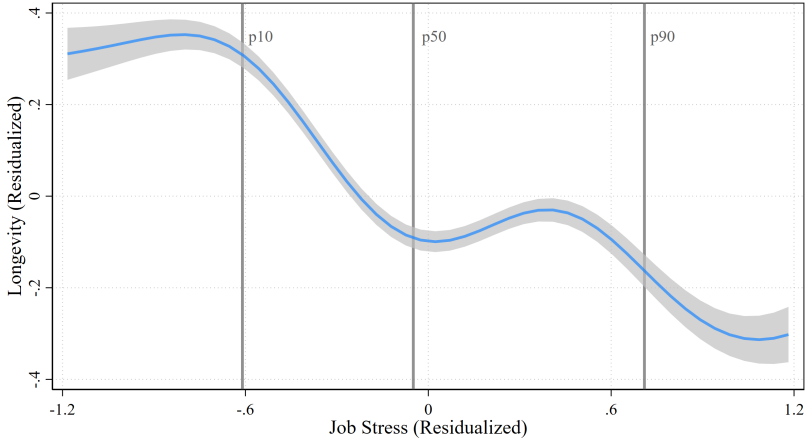
Notes: Figure plots obs. within 2 SD of the mean of residualized *percent sitting* (ORS).
Representative occupations: Carpenters (*p*10), Retail Salespersons (*p*50), Office Clerks (*p*90).

Social jobs are associated with higher longevity



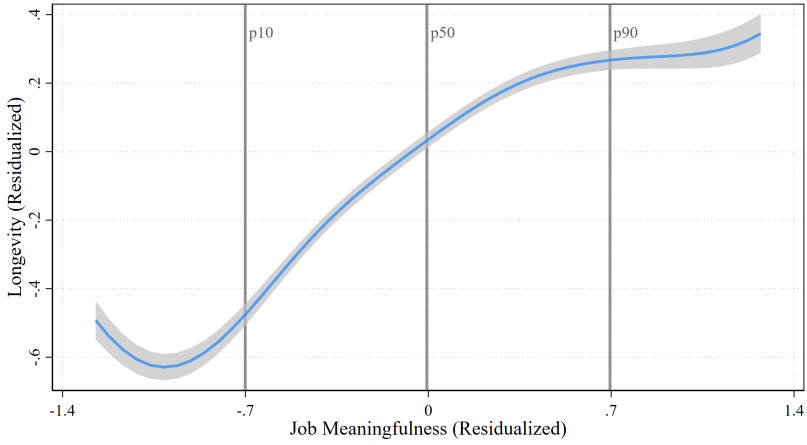
Notes: Figure plots obs. within 2 SD of the mean of residualized *percent frequent interactions* (ORS).
Representative occupations: Heavy and Tractor-Trailer Truck Drivers ($p10$), Construction Laborers ($p50$), Secretaries and Administrative Assistants ($p90$).

Stressful jobs are associated with lower longevity



Notes: Figure plots obs. within 2 SD of the mean of residualized *job stress* (ATUS).
Representative occupations: Automotive Service Technicians and Mechanics ($p10$), Retail Salespersons ($p50$), Construction Laborers ($p90$).

Meaningful jobs are associated with higher longevity



Notes: Figure plots obs. within 2 SD of the mean of residualized *job meaningfulness* (ATUS).
Representative occupations: Construction Laborers ($p10$), Cooks, Restaurant ($p50$), Clergy ($p90$).

Next Steps

- **Expand sample** using matched historical Census records with occupation info
  - Large-sample analysis using the 'core' of the longevity distribution (e.g., aged 65–95 years), eliminating influence of 'outlier cohorts'

- Additional detail on deceased individuals from millions of **web-scraped obituaries**
  - Validation of occupation information
  - Subsample of single-career individuals
  - Within-employer analysis

- **Within-family** analysis (twins)

Conclusion

Main Findings:

- Large-scale evidence on the association between life expectancy and occupation
- Large occupation-related disparities in longevity, controlling for correlates
- Occupational requirements as underlying mechanisms

Implications and Questions:

1. **Job choice:** Do people account for job-related health risks in career choices?
2. **Job design:** Which job aspects would need to change to reduce health strains?
3. **Policy design:** How to design retirement savings and social security programs that account for occupation-driven differences in life expectancy?

Appendix

Results:

- R^2 based on detailed occupation groups Details

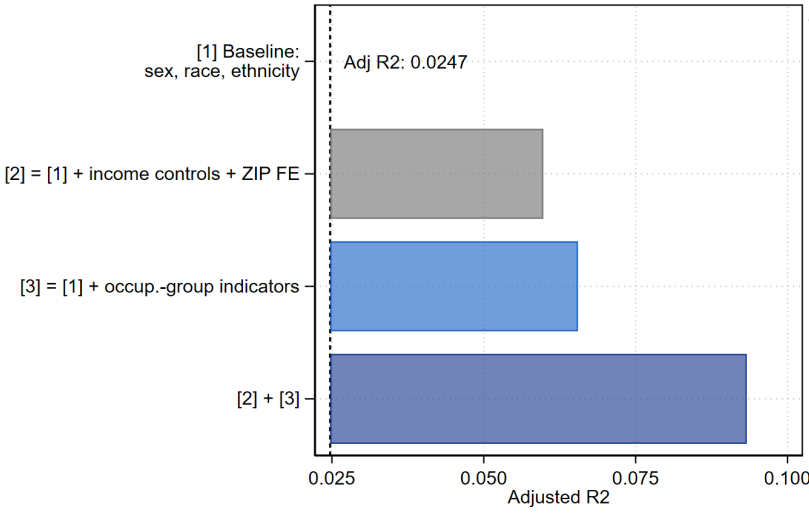
Empirical Approach:

- Accounting for occupation time trends Details
- Simulation exercise Details

Contribution:

- Literature Details

Detailed occupation matters for R^2 1.2x as much as income + location



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- 13,413 ZIP codes
- Occupation groups: 794 **minor** occupation groups

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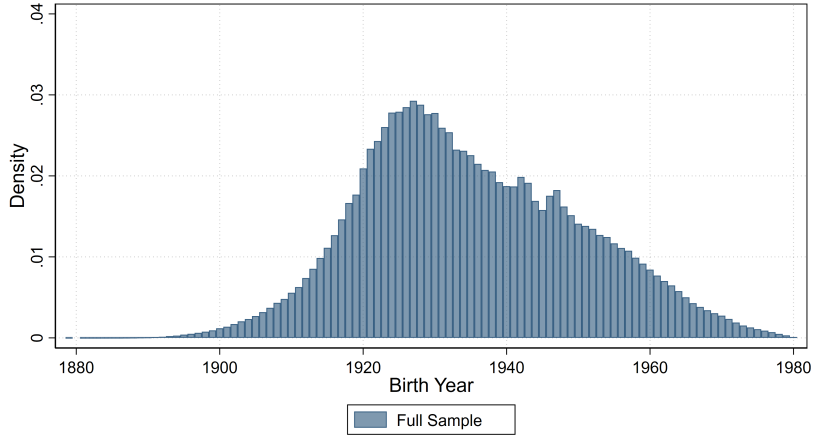
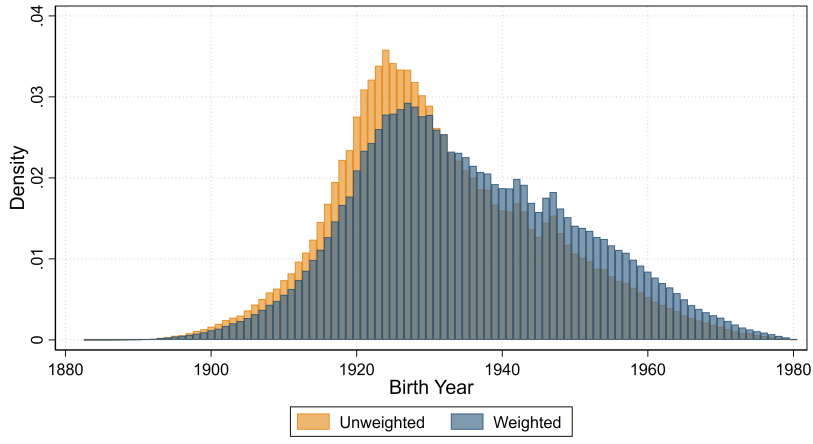
Empirical Approach—Reweighting

- Correct for occupation time trends
- Intuition: *observed* deaths in emerging (declining) occupations from relatively younger (older) individuals
  - Introduces bias when ignoring mechanical age-at-death differences across occupation groups
- Solution: Reweighting
  - Assign larger weight when occupation class is “underrepresented” in a given birth year compared to full-sample distribution

Empirical Approach—Reweighting

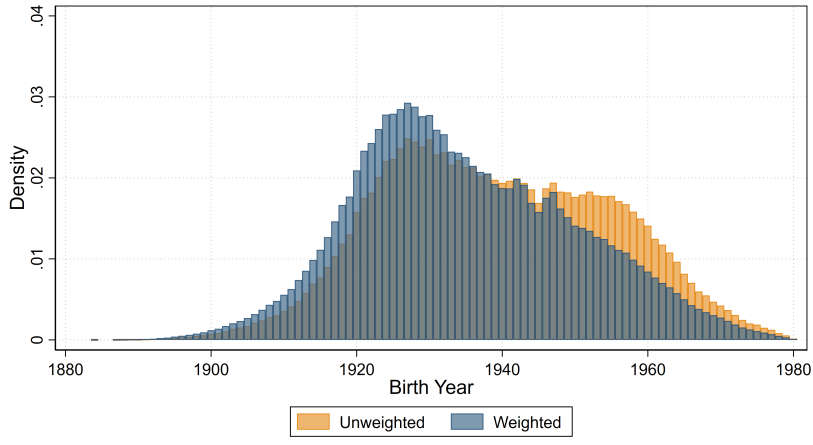


Empirical Approach—Reweighting



Office and Administration Workers

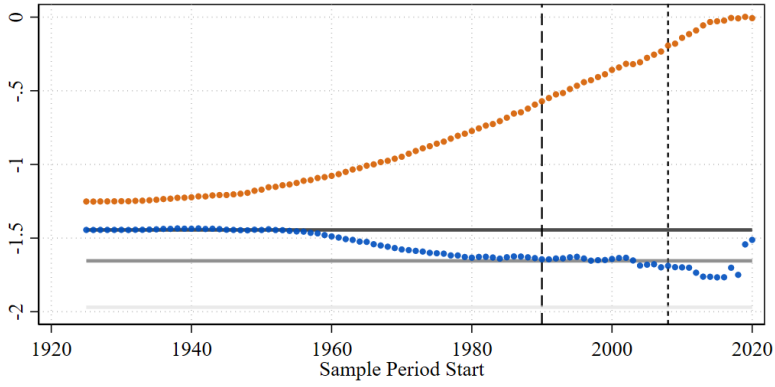
Empirical Approach—Reweighting



Construction Workers

Appendix

Simulation Results



Appendix

Related Literature I

- Disparities in life expectancy / longevity:
  - Income (e. g., Chetty et al. 2016)
  - Location (e. g., Couillard et al. 2021)
  - Job demands (Borgschulte, Guenzel, Liu, and Malmendier 2024)
  - State of the economy (e. g., Sullivan and Von Wachter 2009, Ruhm 2000, Finkelstein et al. 2023)
  - Intergenerational transmission (Black et al. 2024)
- Origins and consequences of inequality more broadly:
  - Income and wealth inequality (e. g., Saez and Zucman 2016, Smith, Zidar, and Zwick 2021)
- Longevity and occupation:
  - UK and Scandinavia

Related Literature II

- E.g., Brønnum-Hansen et al. 2020 (Denmark), Katikireddi et al. 2017 (UK), Mackenbach et al. 2008 (UK), Marmot et al. 2003, 2013 (UK), Roman et al. 1985 (UK)

- Other non-U.S.
  - E.g., Aronson et al. 1999 (Canada), Paglione et al. 2020 (Rome, Italy), Tanaka et al. 2019 (East Asia and Europe)
- U.S.
  - Johnson et al. 1999 ($N = 380$k, aged 25-64), Moore and Hayward 1990 ($N = 3,080$, male only)

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