

# Occupations, Disability Insurance, and Career Choices

Annica Gehlen

agehlen@diw.de

German Institute for Economic Research (DIW Berlin)

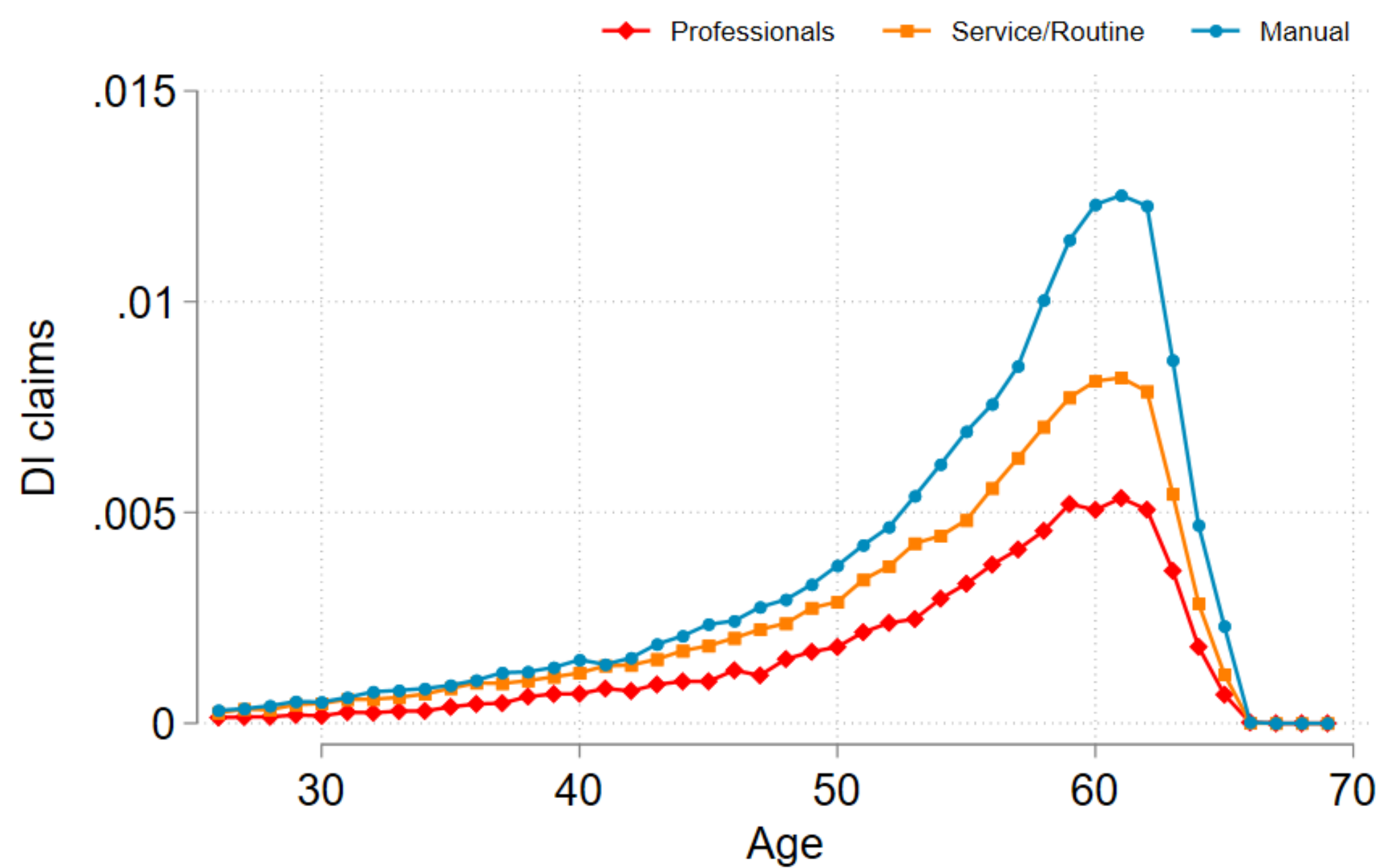
Freie Universität Berlin

Berlin School of Economics (BSoE)

## Motivation

- Disability poses major risk to individual life-time income : **1 in 4 workers** develop a disability before age 65.
- Around 5% of the working age population in OECD countries receives public disability insurance (DI) benefits, making it one of the major social insurance programs in many welfare systems.
- Substantial variation in lifetime disability risk across [occupations](#).

Figure 1. DI Claims Shares by Occupational Group



Note – Figure shows share of new DI claims by age and occupation group of all employees in Germany subject to social security contributions. Data Source: 10% sample of Active Insurance Accounts 2012-2022 (AKVS), FDZ-RV

## Research Questions & Contributions

### Research Questions

- How does DI generosity affect **long-run labor market behavior and career choices**?
- What are the **welfare implications of changes in DI and the retirement system** for different occupational groups?

### Contributions

- Optimal design of DI systems balancing generosity and eligibility criteria
  - Labor supply responses and welfare trade-offs of sick workers [6, 3]
  - General equilibrium frameworks for optimal DI [10]
  - [Estimate long-term elasticities to changes in DI generosity](#).
- Dynamics of wage risks over the life-cycle
  - Labor supply responses to the DI application process and false rejections [9, 5, 1, 8]
  - Interaction of public system with private insurance [11, 4]
  - [Analyze occupational choice as a driver of health and earnings dynamics in the context of DI](#).

## Institution & Data

### German Disability Insurance

- Administered by the German Pension Insurance (DRV) and covers around **80-90%** of the German workforce.
- Insures against the risk of developing a *work limiting* disability, benefits depend on past contributions.
- High uptake**: around 15-20% of newly awarded pension benefits are DI benefits.
- Currently around **1.8 million recipients** (5% of workers).

### Data

**Employment Data**: 2% Sample of integrated employment biographies (SIAB) for information on occupations, employment, earnings, and unemployment between 1975 - 2021.

**Public Pension Data**: Universe of [newly awarded pensions and DI benefits](#) for the years 1992-2021.

**German Socio-Economic Panel (GSOEP)**: Representative survey data set of the German population.

## Policy Reform

### Reform to German DI system 2001

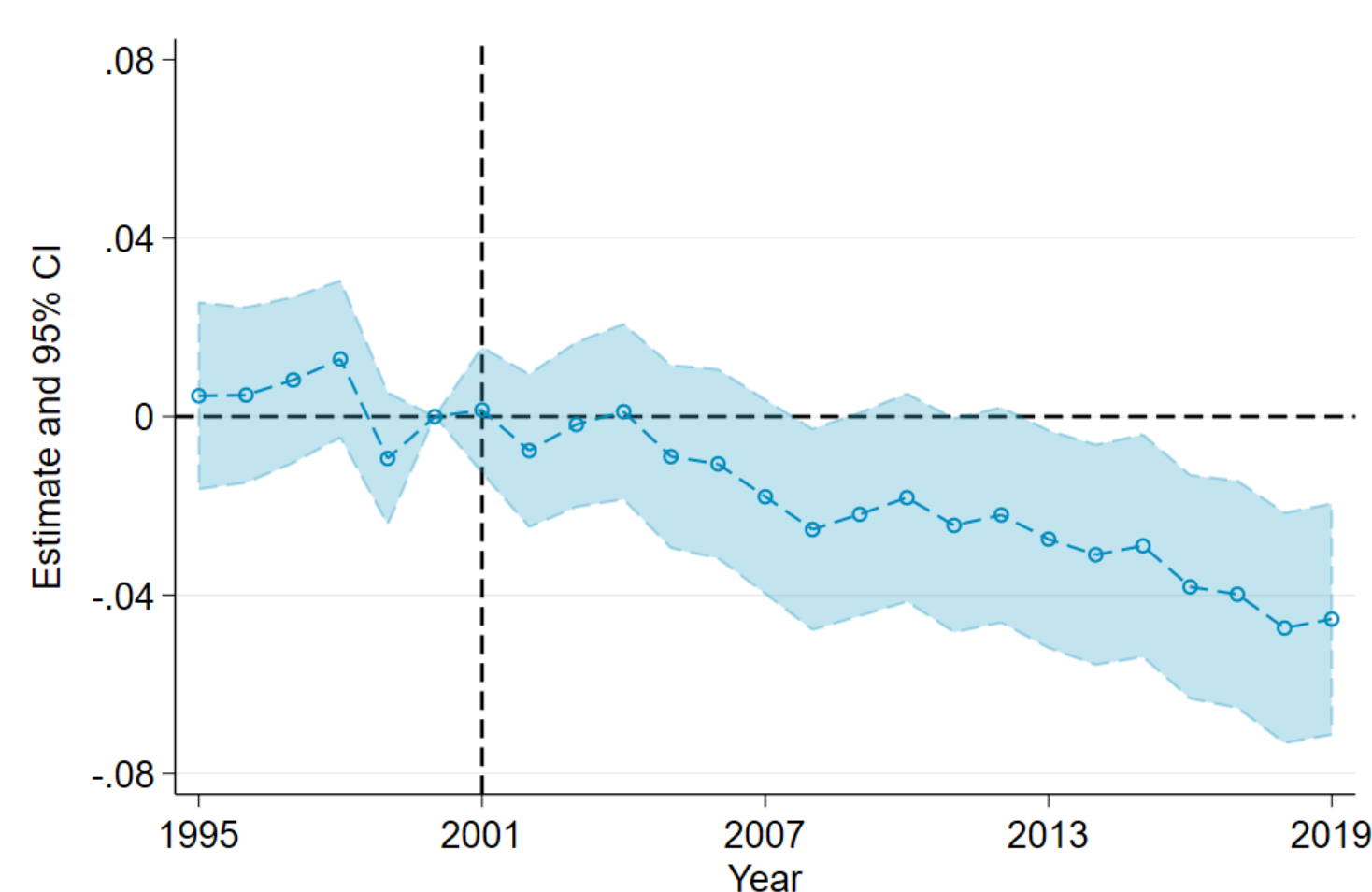
- Eligibility**: Eliminated branch of DI insurance from the system: [own-occupation disability insurance \(ODI\)](#).
- Generosity**: Benefits reductions for claims before age 60 and introduction of temporary benefits as default.

### Triple DiD Design

Relies on a grandfathering clause and institutional aspects of the ODI award process.

$$y_{it} = \alpha + \beta_0(\text{Post}_t \times \text{Young}_i \times 1[\theta_i = \theta_H]) + \beta_1 \text{Post}_t \times \text{Young}_i + \beta_2 \text{Post}_t \times 1[\theta_i = \theta_H] + \beta_3 \text{Post}_t + \lambda_i + \delta_t + X_{it}\gamma + \epsilon_{it} \quad (1)$$

Figure 2. Effect of Reform on Employment in Manual Occupations



## Model

### Model features

- Model tracks men who have completed their education starting at age 30 until age 70.
- Analyze the incentive-insurance tradeoff of disability insurance over the life-cycle.
- Endogenize the linkage between **employment** (occupational choice), **health**, and **wage growth**.
- Savings and **wealth** to capture self-insurance channels.
- Uncertainty** from health transitions and job offer probabilities.
- Captures the incentive structure of German tax and **social insurance system**.

Implementation as a discrete-continuous decision model where individuals make decisions to maximize the discounted expected utilities from future periods [7, 2]:

$$V(x_t) = \max_{0 \leq c_t \leq a_t, d_t} \{u(c_t, d_t, x_t) + \beta \mathbb{E}[V(x_{t+1} | c_t, d_t, x_t)]\} \quad (2)$$

### Choice Structure

- Discrete choices**: Individuals choose between employment in different occupations ( $d_t \in \{0, 1, 2\}$ ), unemployment ( $d_t = 3$ ), disability take-up, and retirement ( $d_t = 4$ )
- Continuous choice**: Savings determine wealth accumulation

## Estimation

Estimate structural parameters  $\theta$  using a simulated method of moments approach which minimizes the weighted difference between data moments  $\hat{m}_j^{\text{data}}$  and simulated model moments  $\hat{m}_j^{\text{sim}}(\theta)$ .

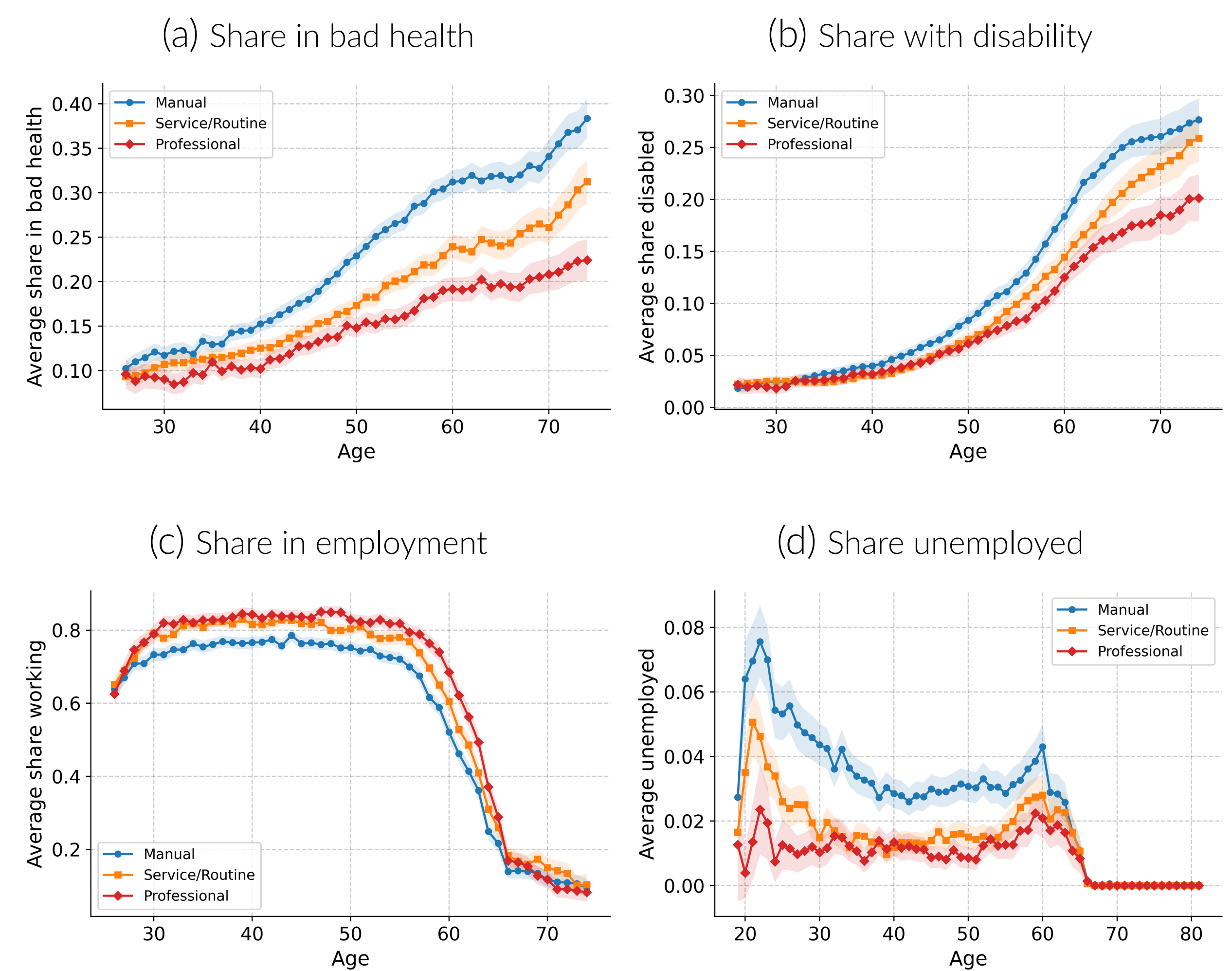
### Criterion Function:

$$\arg \min_{\theta} Q(\theta) = \left( \hat{m}^{\text{sim}}(\theta) - \hat{m}^{\text{data}} \right)^T W \left( \hat{m}^{\text{sim}}(\theta) - \hat{m}^{\text{data}} \right) \quad (3)$$

Estimate model on data moments and information from policy reform.

## Data Moments

Figure 3. Life-cycle Profiles by Occupational Group



## Conclusions

- This study documents large differences in **DI claims across occupational groups** and associated health and income dynamics.
- I develop a **structural life-cycle model** to derive implications of changes in DI generosity and retirement policy for individual labor supply and welfare in the presence of **occupational selection**.
- The model is estimated using **German administrative and survey data**, as well as labor supply responses from a **policy reform** that eliminated a major branch of the German DI system.

## References

- David Autor. Disability Benefits, Consumption Insurance, and Household Labor Supply. *The American Economic Review*, 109(7):42, 2019.
- Max Blesch and Bruno Veltri. Policy uncertainty, misinformation, and statutory retirement age reform. Technical report, Working Paper, 2025.
- Manasi Deshpande and Lee M Lockwood. Beyond health: Nonhealth risk and the value of disability insurance. *Econometrica*, 90(4):1781–1810, 2022.
- Bjoern Fischer, Johannes Micha Geyer, and Nicolas R Ziebarth. Fundamentally reforming the di system: Evidence from german notch cohorts. Technical report, National Bureau of Economic Research, 2023.
- Eric French and Jae Song. The Effect of Disability Insurance Receipt on Labor Supply. *American Economic Journal: Economic Policy*, 6(2):291–337, May 2014.
- Andreas Haller, Stefan Staubli, and Josef Zweimüller. Designing disability insurance reforms: Tightening eligibility rules or reducing benefits? *Econometrica*, 92(1):79–110, 2024.
- Fedor Iskhakov, Thomas H. Jørgensen, John Rust, and Bertel Schjerning. The endogenous grid method for discrete-continuous dynamic choice models with (or without) taste shocks: DC-EGM method for dynamic choice models. *Quantitative Economics*, 8(2):317–365, July 2017.
- Lindsay Jacobs. Occupations, retirement, and the value of disability insurance. *Journal of Public Economics*, 225:104976, September 2023.
- Hamish Low and Luigi Pistaferri. Disability Insurance and the Dynamics of the Incentive Insurance Trade-Off. *The American Economic Review*, 105(10):45, 2015.
- Amanda Michaud and David Wiczer. Occupational hazards and social disability insurance. *Journal of Monetary Economics*, 96:77–92, 2018.
- Arthur Seibold, Sebastian Seitz, and Sebastian Sieglösch. Privatizing disability insurance. *Econometrica*, 93(5):1697–1737, 2025.

