

Occupations, Disability Insurance, and Career Choices

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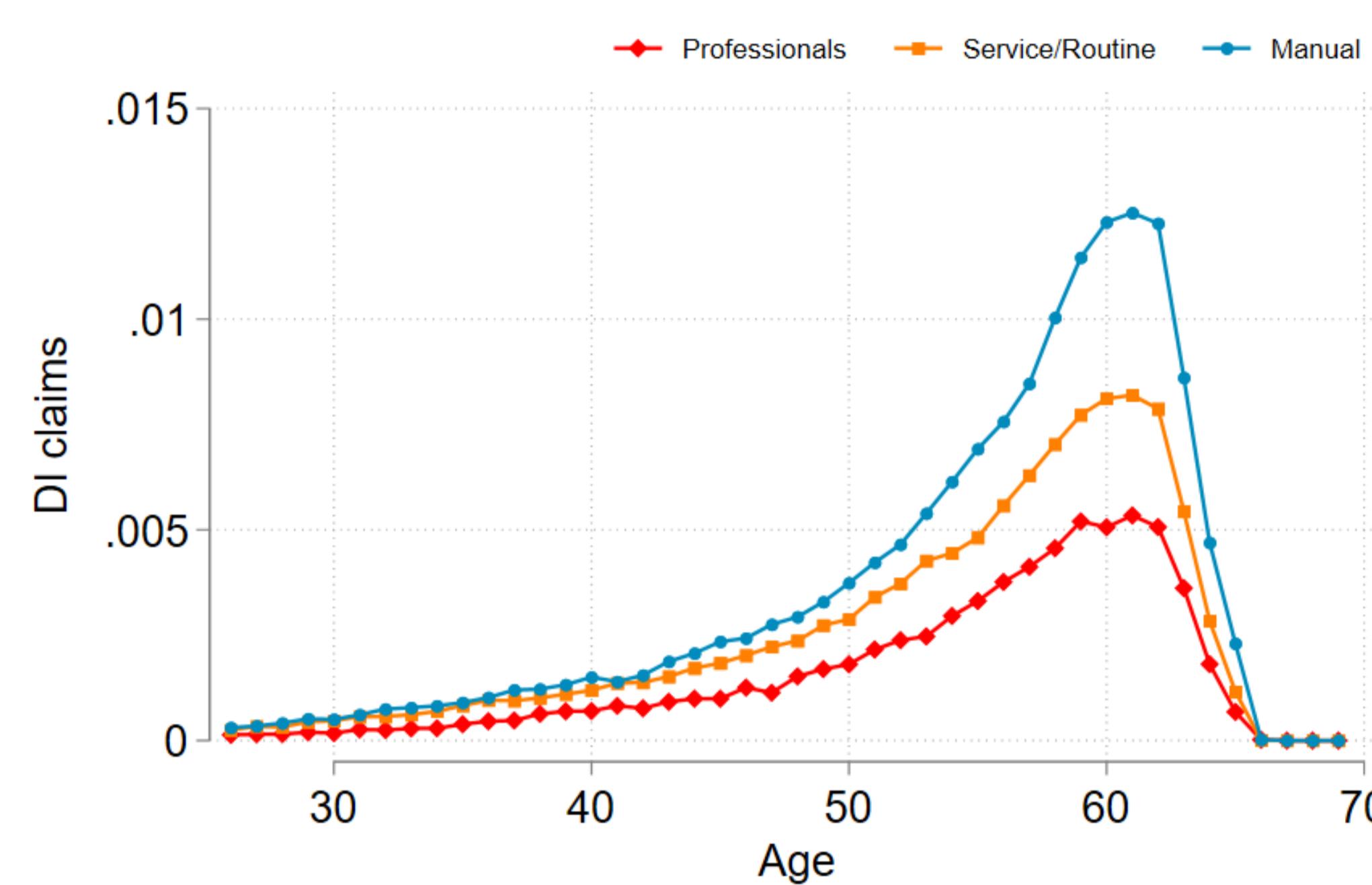
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Motivation

- 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

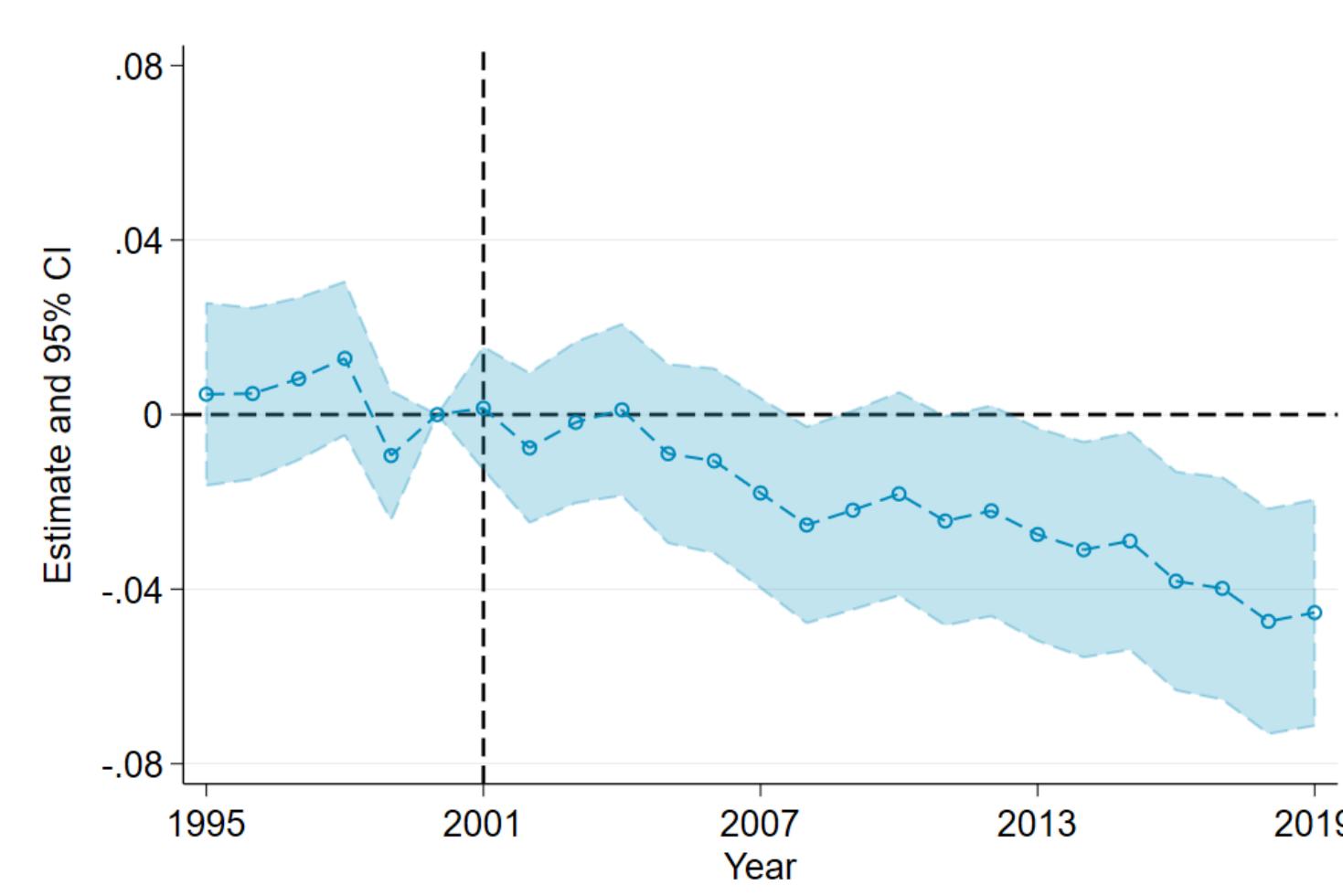
- Eligibility:** Eliminated branch of DI insurance from the system: **own-occupation disability insurance (ODI)**.
- Generosity:** Benefits reductions for claims before age 60 and introduction of temporary benefits as default.

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

Criterion Function:

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

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.

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