The Place-Based Redistribution of Disability Insurance

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Introduction

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Social insurance programs generally insure individuals/households with policies that are uniform across space

- E.g., nationally for Social Security; at state level for UI

Yet many programs have large geographic differences in take-up

Reasons for differences have important policy and welfare implications

- Frequency or severity of adverse events could vary by place
- Value of social insurance may vary (separate to adverse events)
  - Eligibility/benefit rules can interact with place-based characteristics
  - Place may affect purchasing power of cash benefits, outside options

Geographic variation in DI

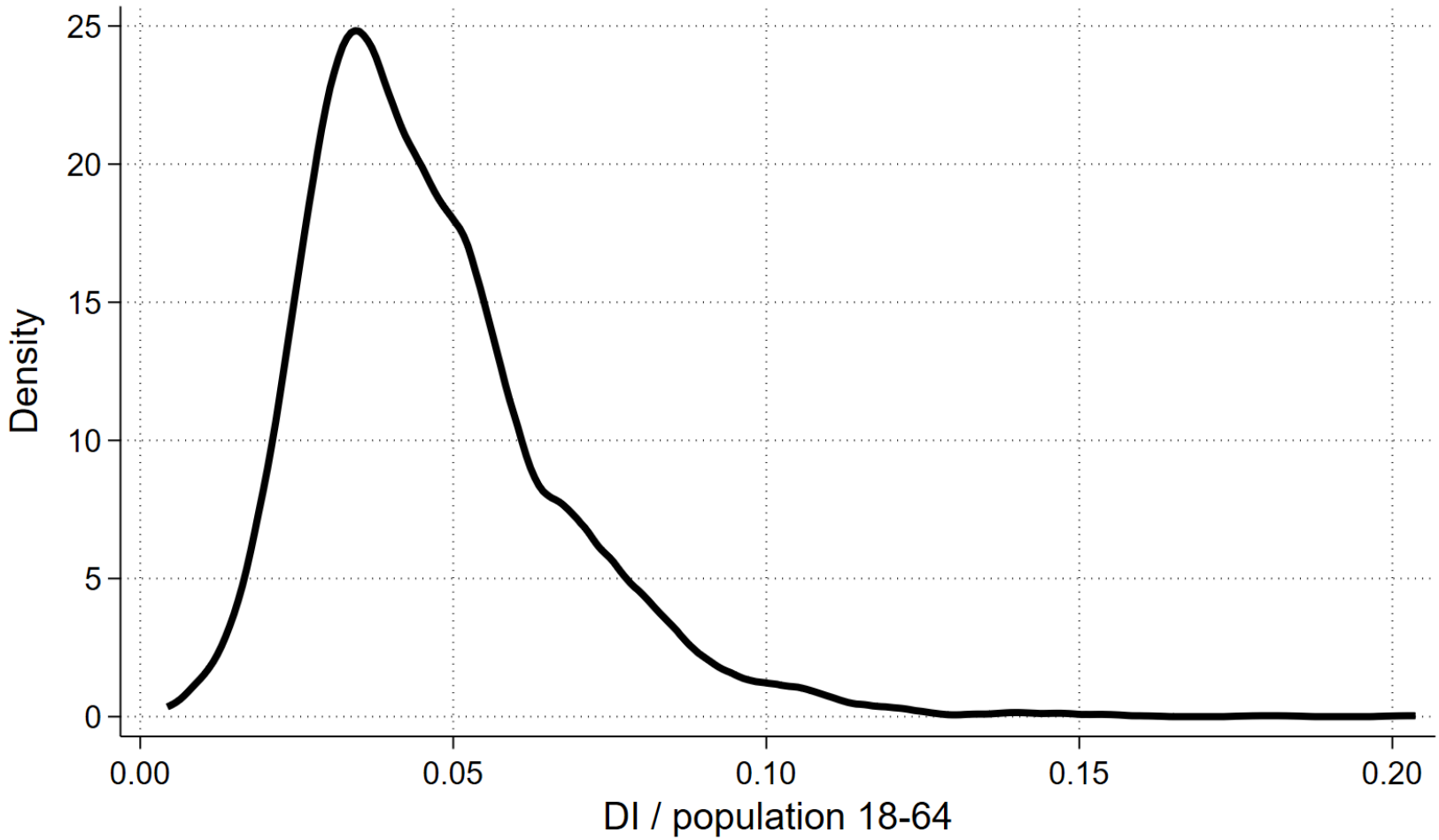
We focus on U.S. Social Security Disability Insurance (DI)

- Insures workers against disabilities that limit work
- Close to one-tenth of federal budget

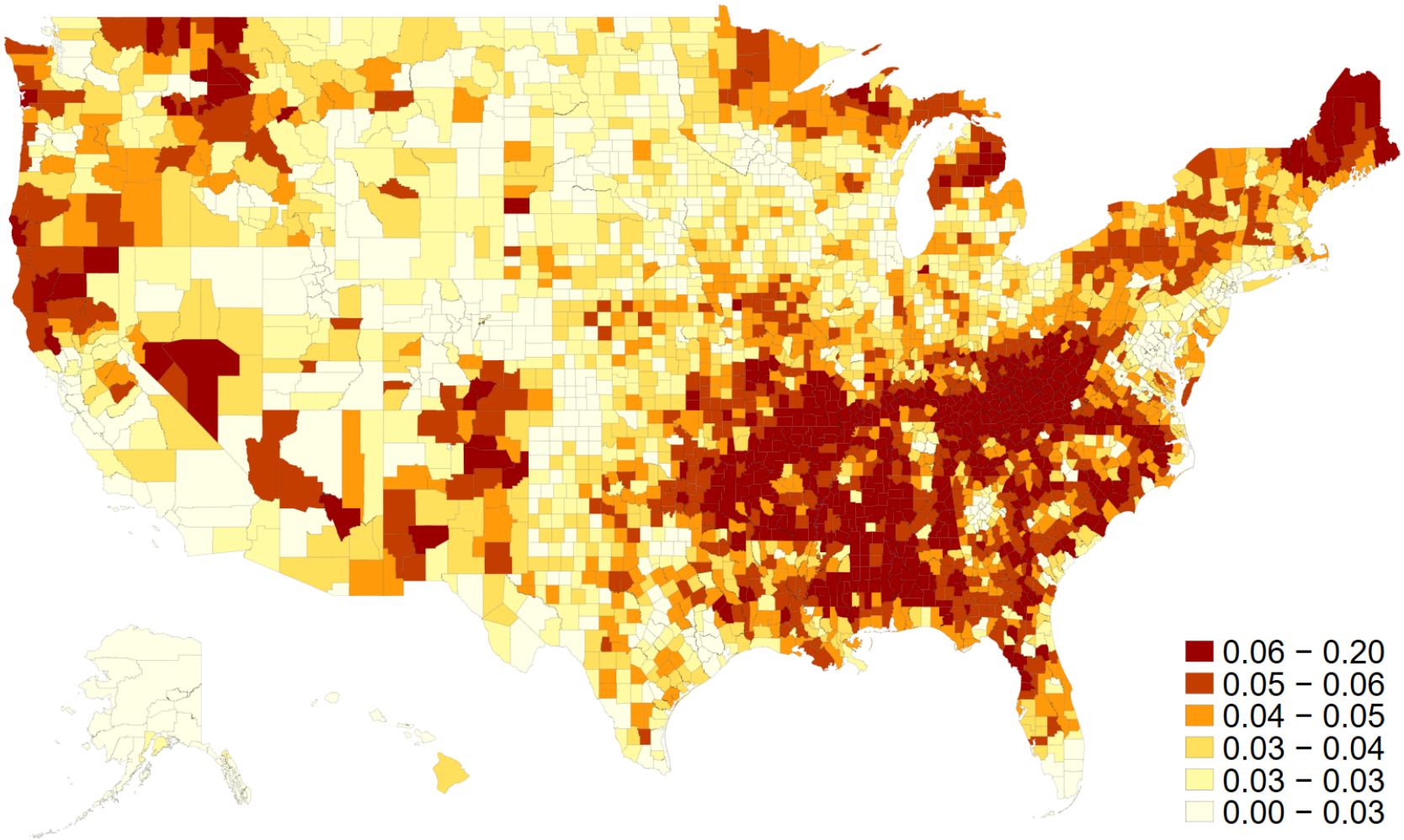
Large geographic differences in DI beneficiary rates

- One third of working-age adults live in counties that account for more than half of DI beneficiaries
- Large differences in tails of distribution
  - 6m Americans in counties where >10% of working-age pop. on DI
  - 7m Americans in counties where < 2% of working-age pop. on DI
- DI payments can equal up to 20% of local labor income

Distribution of DI beneficiary rates across counties

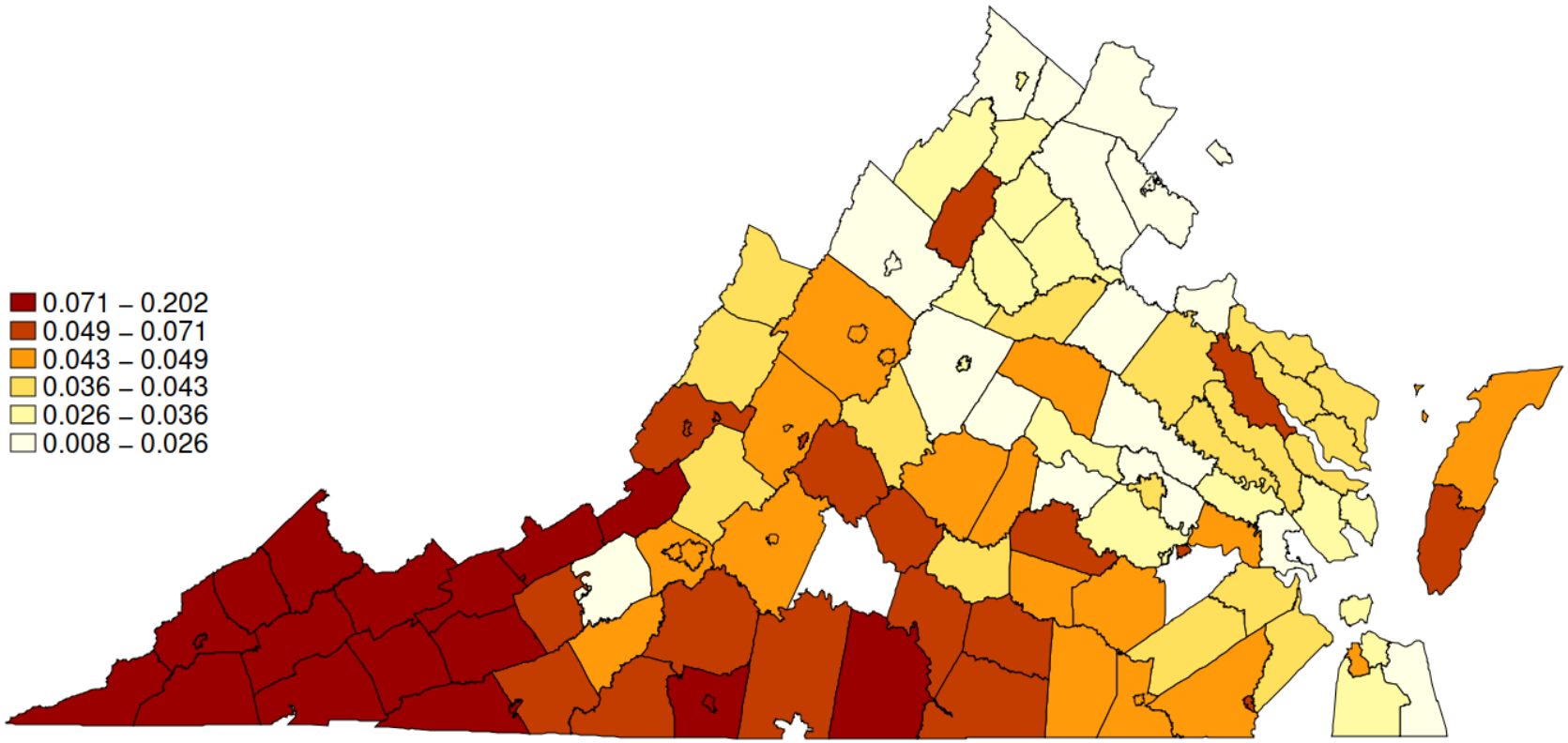


DI beneficiary rates across the US



Substantial within-state differences, e.g., Virginia

Across US counties, within-state variation provides 60% of total variation



Our paper

Examine county differences in DI applications & allowances

- Assemble SSA administrative data for 1995-2015
- Combine with county-level information on earnings, employment, poverty, mortality, and local price levels

Develop an economic model to understand application choice & value

- Latent selection into applying for DI
- Role of place-based features

Estimate place-based differences in welfare from DI

- What drives award variation? 45% from health
- Is it efficiently distributed? No
  - Counties w. high DI rates currently get lots of *ex ante* redistribution
  - Distribution of optimal place-based payments is flatter in real terms

Related literature

Evidence DI affected by benefits and other factors differ by place

- E.g., Autor & Duggan 2003, 2006; Black, Daniel & Sanders 2002; Charles, Li & Stephen 2018; Deshpande & Li 2019; Foote, Grosz & Rennane 2018; Gruber, 2000; Liebman 2015; Maestas, Mullen & Strand 2018, 2021

Research focused on welfare gains provided by DI

- E.g., Cabral & Cullen 2019; Chandra & Samwick 2009; Deshpande, Gross & Su 2021, Deshpande & Lockwood 2022, Gelber, Moore, Pei & Strand 2023, Low & Pistaferri 2015, Meyer & Mok 2019

Research on place-based effects and policies, especially redistribution

- E.g., Bilal 2023; Fu & Gregory 2019; Gaubert, Kline, Vergara & Yagan 2020; Hershbein & Stuart 2023

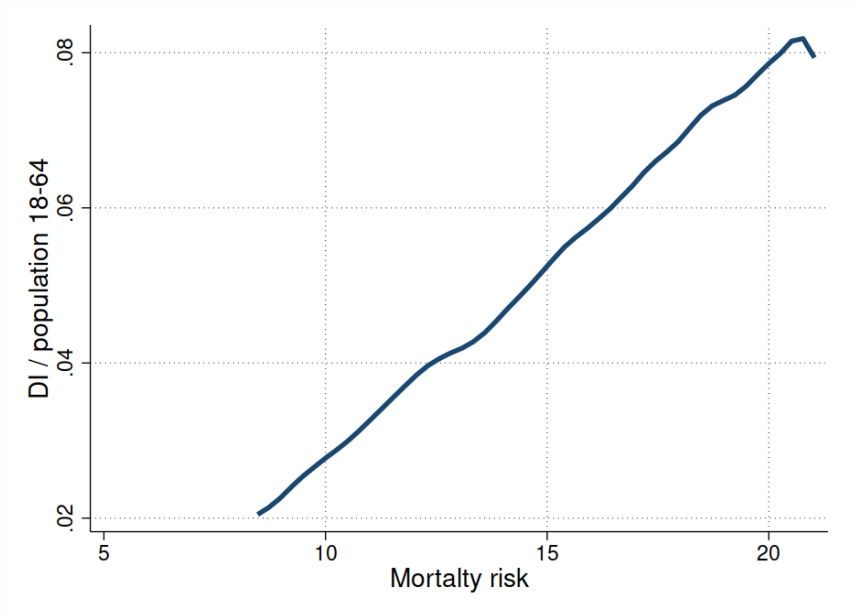
Data

Main data sources

County-level data, primarily for 1995-2015

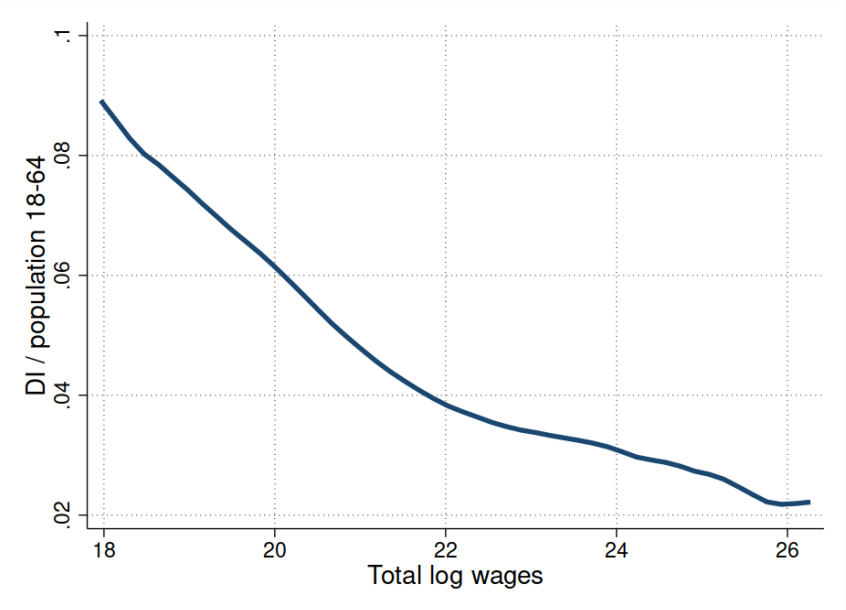
- DI applications & allowances from SSA Disability Research File
  - Info by age (21-49 & 50-64) for 1,140 counties (81% of DI awards)
- Mortality: National Center for Health Statistics
- Employment & wages: Quarterly Census of Employment & Wages
- Poverty: Census Small Area Income Poverty Estimates
- Population & demographics: Intercensal Population Estimates
- Prices: Constructed from state/density BEA & USDA indexes
- Medical prices: Indexes from Dartmouth (Austin et al. 2018)

Correlates with DI beneficiary rates

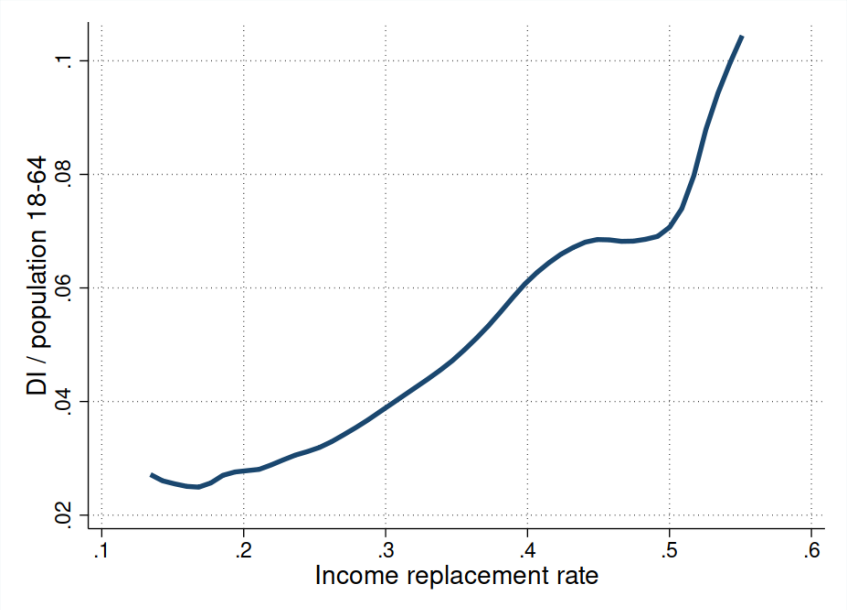


(a) Mortality

Correlates with DI beneficiary rates



(b) Log Wages



(c) Replacement Rate

Model

Model of individuals' DI application decision

Goal: Measure how individuals' DI application decision & welfare value depend on:

- Individual characteristics: disability, age, & income
- Local characteristics: prices, DI allowance process, other factors

DI insures against lost consumption from disability, which results in:

- Higher medical costs & lower potential earnings
- Lower marginal utility of consumption

Incidence of disability depends on place

Main choices:

- Whether to apply for DI
- Whether to work or not

Preferences

Preferences do not depend on place

$$\sum_{t=0}^{T} \beta^t \mathbf{E} \left(\frac{c_t^{1-\sigma}}{1-\sigma} + \lambda_t t \mathbb{I}_{Emp} + \lambda_d d \mathbb{I}_{Emp} + \phi \mathbb{I}_{Apply_t} \right)$$

- Costs of working (λ_t, λ_d) and applying ($\phi \mathbb{I}_{Apply}$)
- Welfare is defined as the ability to apply or not.

Constraints & risks

(1) Net consumption value of DI payment depends on place ℓ

Expenditures $=$ $\underbrace{p_\ell c_t}_{\textit{consump.}} - \underbrace{\mathbb{I}_{\neq DI} m_\ell(d_t)}_{\textit{medical}}$

Income

- Labor income $y(\ell, z)$
- DI payment b_ℓ
- Non-employment T_ℓ

(2) State and access depend on place

- Disability processes (d)
- Level of income and poverty risk (z)
- Probability of allowance is a logit:

$$\xi(d,t,\ell) = \frac{\exp\left(\xi_d \frac{(d-\bar{d})}{\bar{d}} + \xi_t \frac{t-50}{65-40} + \xi_{DDS(\ell)}\right)}{1 + \exp\left(\xi_d \frac{(d-\bar{d})}{\bar{d}} + \xi_t \frac{t-50}{65-40} + \xi_{DDS(\ell)}\right)}$$

Calibration and model fit

Mapping model to data

What drives county differences?

- (A) Value for the same individual differs by place
  - Medical and goods prices: observed
  - Resources in non-employ: unobserved (infer as residual)
  - DDS process unobserved (infer as residual)
- (B) Needs: health and income differs by county
  - Age, income: observable
  - Disability county distribution: map with mortality process
  - Individual disability of applicants: unobserved

Calibrating the model

Minimum-distance national level:

- Working rate by age Census
- Age structure of DI allowances County-level SSA rates

County features are fit exactly:

- Claim rates: SSA data
- Allowances per claim (by DDS): SSA data
- Age-specific mortality: Vital Statistics

Directly calibrated: preference parameters, map from disability to mortality & out-of-pocket medical costs (national); prices, DI payment structure, income (local)

▸ Remaining variation in DI rate not strongly connect to place

Parameter values

Parameter	Value	Target
ξ_d	5.55	$corr(\xi^{\text{model}}(d,t,\ell), \xi^{\text{data}}(d,t,\ell))$
ξ_t	4.53	
λ_0	-2.58	Age profile of employment
λ_t	-0.44	
λ_d	0.02	Pr[death | worked last year] = 0.371
τ_{ss}	0.0207	balanced budget
σ	2.0	Standard IES
β	0.996	Annual discount rate of 5%
Application cost	-35.39	Average application rate

Table: Country-wide parameters and their targets, though all are fit jointly

Determinants and implications

Accounting for allowance differences across counties

Turning off county-level dispersion in each reduces IQR:

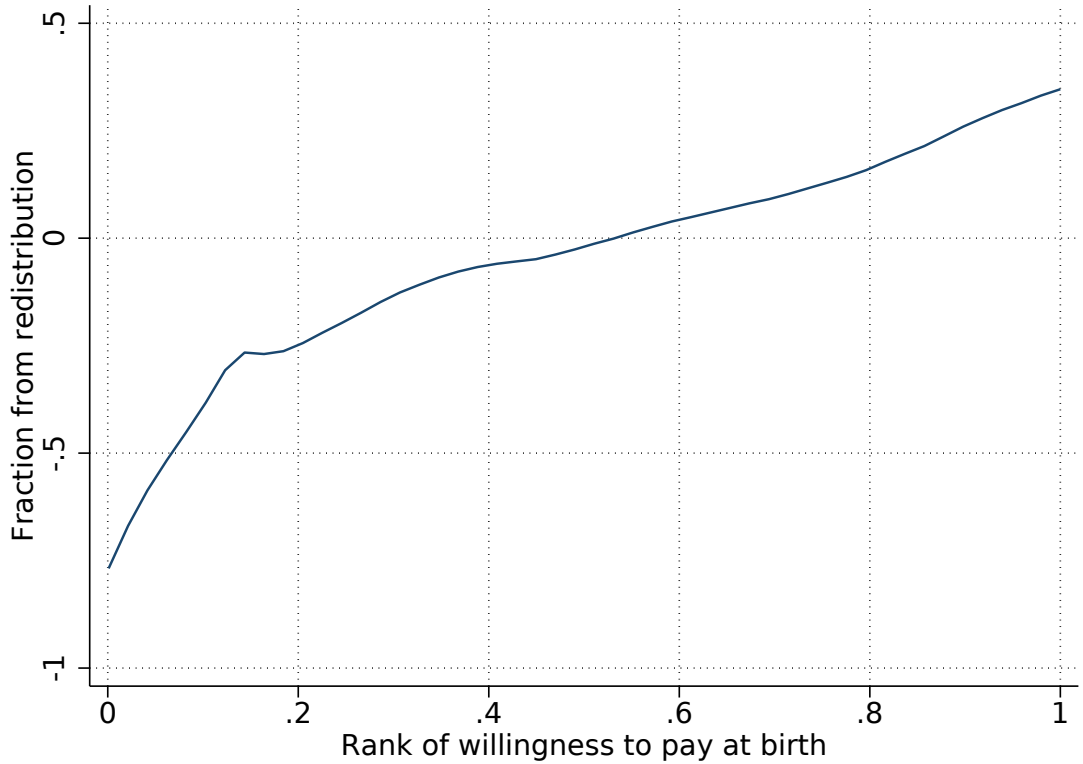
	Health	Income	Prices
Contribution to normalized IQR			
Awards	29.1	23.3	12.3
Applications	36.1	39.4	15.9
Elasticity			
Awards	6.63	2.99	3.15
Applications	5.31	4.25	4.09
Normalized IQR			
	4.9	28.0	14.0

Table: Effect of county-level characteristics on DI outcomes

- Health contributes most to variation in awards
- Income contributes most to variation in applications
- The elasticity of income & prices are about the same

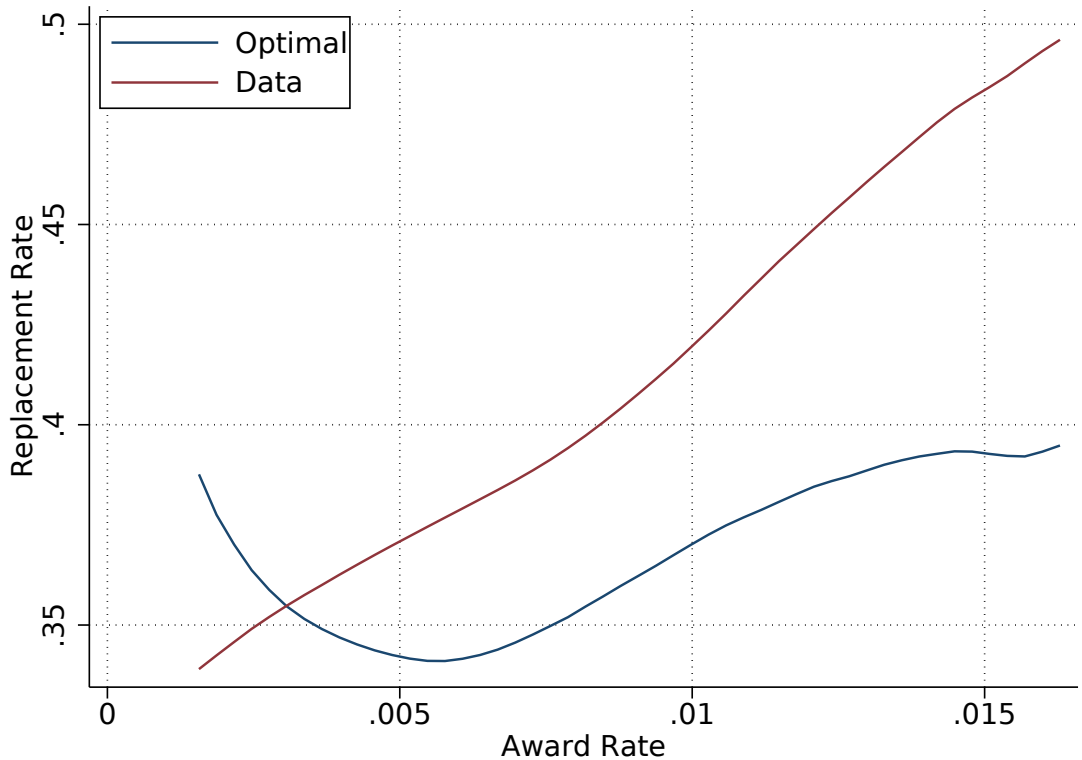
Ex ante redistribution

Insurance program with equal "premiums"–not actuarially fair



- Below median county welfare values driven by getting relatively low value from program
- Above median county welfare values driven by high DI rates—bad health/low income means most value from the insurance

Optimal place-based replacement rate



- Distribution of optimal payments flatter, still rising in marginal utility
- Redistributes towards high cost-of-living counties with under-served disabled households
- 39% of counties get more DI income, represents 69% of pop.

Conclusion

What we've done

- Document large differences in DI outcomes across counties
- With a structural model we
  - Quantify drivers of spatial variation in claims
  - Estimate place-based disparities in welfare value of DI

Main Findings

- Spatial variation in health is $\sim \frac{1}{2}$ variation in DI
- Optimal place-based program has flatter replacement rate

Policy applications of our model

- How do changes in DI features (progressivity, "real" payments) or other programs (medicaid) affect spatial redistribution from DI?

Appendix

Risks and technologies

Income y takes two levels:

- Level 1: average for the county. Level 2: Poverty
  - 42% exit per year in all counties
  - Entry differs such that cross-section matches
- $\mathcal{Y}_\ell(2,2) = (1-0.42)^{1/4}$, is the average duration of poverty. To get the cross-section:

$$\mathcal{Y}_\ell(1,2) = \Pr[y=2|\ell]\frac{(1-\mathcal{Y}_\ell(2,2))}{1-\Pr[y=2|\ell]}$$

Medical spending shocks as expenditure shocks

- County-specific size
- Full insurance when employed and uninsured when non-employed

Health risks

Health d is measured by mortality risk

- County-specific fit to mortality at ages 40 and 70
- Depreciation such that the county-specific survival rate is $S_\ell(t) = 1 - e^{-\varsigma_{0,\ell} + t\varsigma_{1,\ell}}$

Health effects

- Disutility of work
- Mortality
- DI probability

Labor force status and the DI system

- Employed $\leftrightarrow$ non-employed is voluntary
- Non-employed $\rightarrow$ DI:
  - County-specific utility cost ϕ_l
  - Once application ($q = 1$) is made

$$Pr_{q=1} = \xi_\ell(d,t) = \frac{\exp(\xi_d(d-\bar{d}) + \xi_t \frac{t-50}{65-40} + \xi_{DDS(\ell)})}{1 + \exp(\xi_d(d-\bar{d}) + \xi_t \frac{t-50}{65-40} + \xi_{DDS(\ell)})}$$

- DI is absorbing
- Rejected from DI is absorbing (apply once)

Households' state/choices

- Age t
- Location ℓ
- Health/mortality risk d
- Poverty status y
- Medical spending x
- Labor force status s
- Application history e

They choose:

- To work
- To apply for DI

Role of unobserved factors

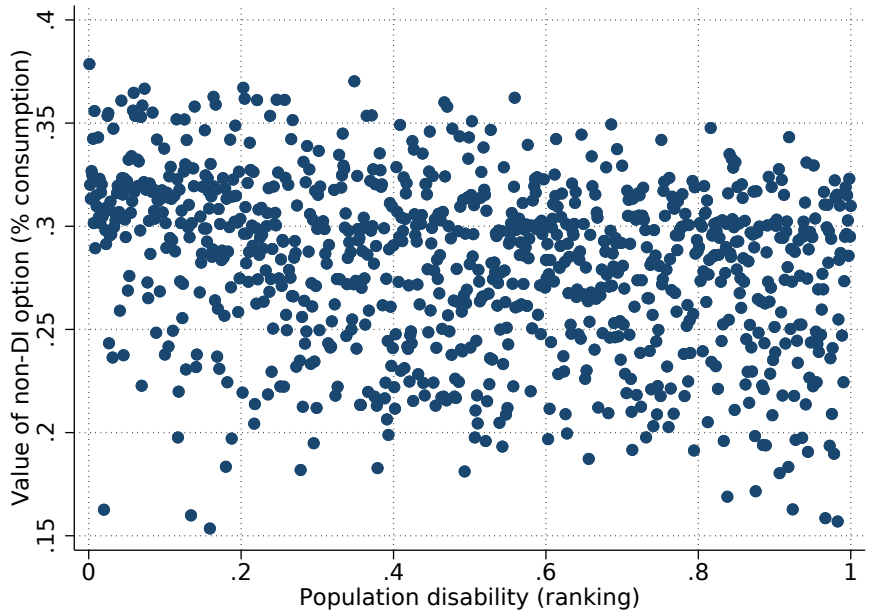


Figure: Non-emp consumption value T_ℓ and disability prevalence (rank).

- Inferred variation in DDS & value of non-employed consumption is about 30% of model's variation in allowances
- Std. dev. of T_ℓ is $\sim$ 10% of consumption
- Estimated unobserved factors not correlated w/ fundamentals