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

Source of these differences have important welfare implications

- May be due to need —frequency/severity of adverse events
- Other reasons may change the value of social insurance
  - Access — eligibility/benefit rules can interact with place
  - Value — how far the benefits go and other resources available

Disability insurance

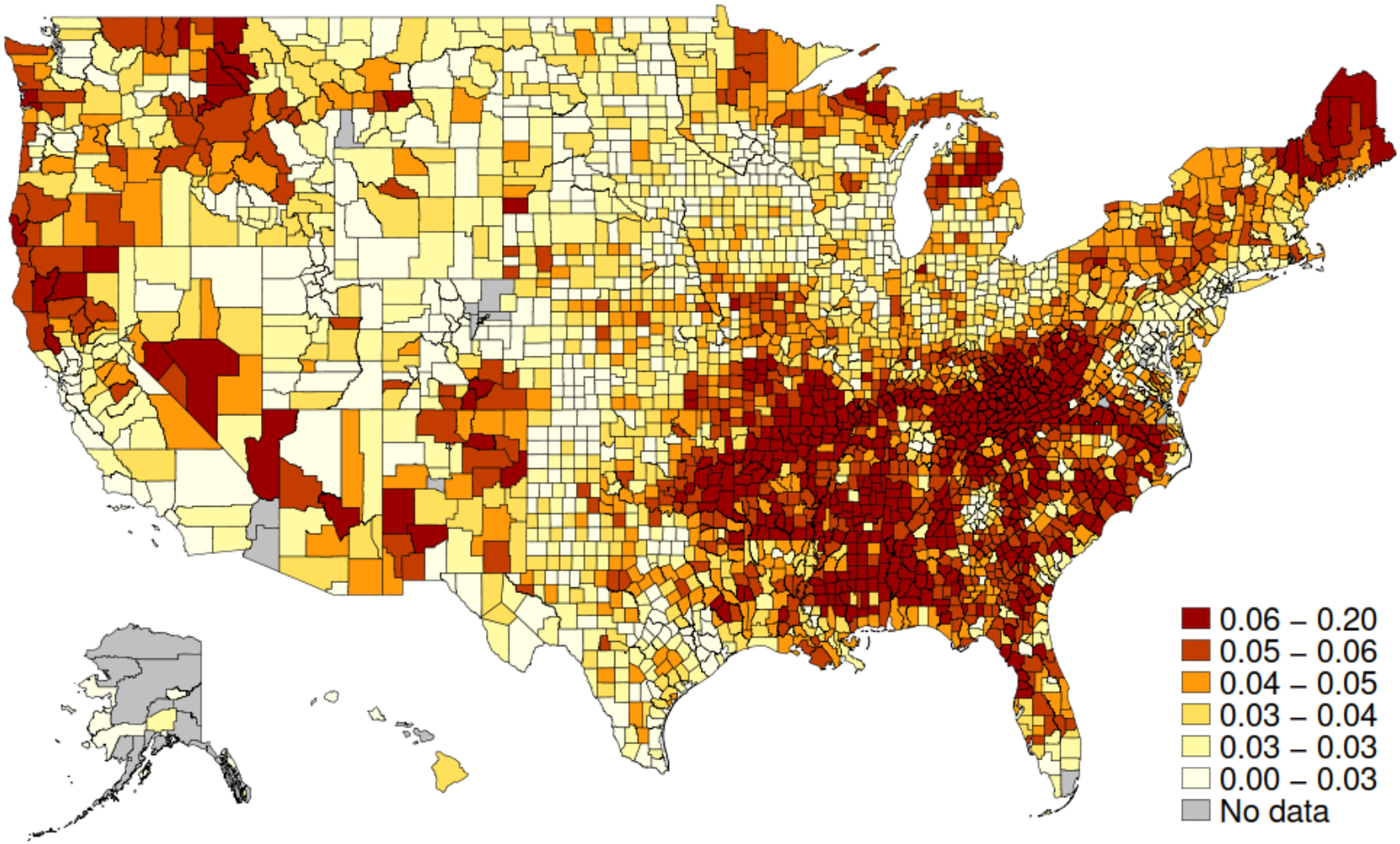
We focus on U.S. Social Security Disability Insurance (DI)

- Key part of social safety net
  - Insured 175m workers & paid 10m DI beneficiaries in 2019
  - Cash benefits $145bn cash & Medicare payments $66bn
- Can equal up to 20% of local labor income.

Large geographic differences in DI beneficiary rates, e.g.,

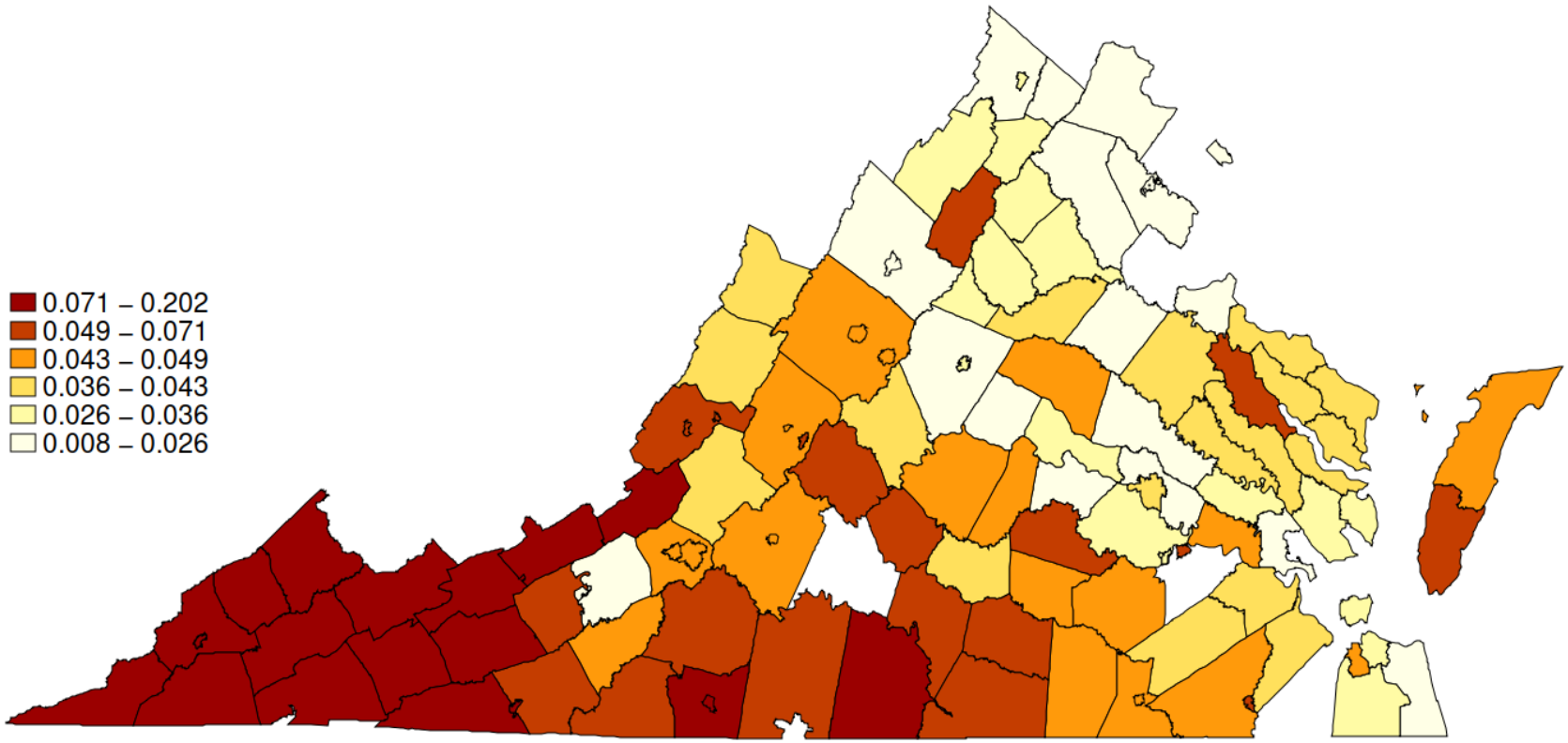
- 6m Americans in counties where >10% of working-age pop. on DI
- 7m Americans in counties where < 2% of working-age pop. on DI

DI 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 1996-2014
- Combine with county-level information on earnings, employment, poverty, mortality, housing costs and medical prices

Use macroeconomic 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

- "Willingness to pay" at age 40
  - Value: how much DI receipt increases consumption
  - Need: local incidence of disability and income distribution

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., Fu & Gregory 2019; Gaubert, Kline, Vergara & Yagan 2020; Hershbein & Stuart 2023

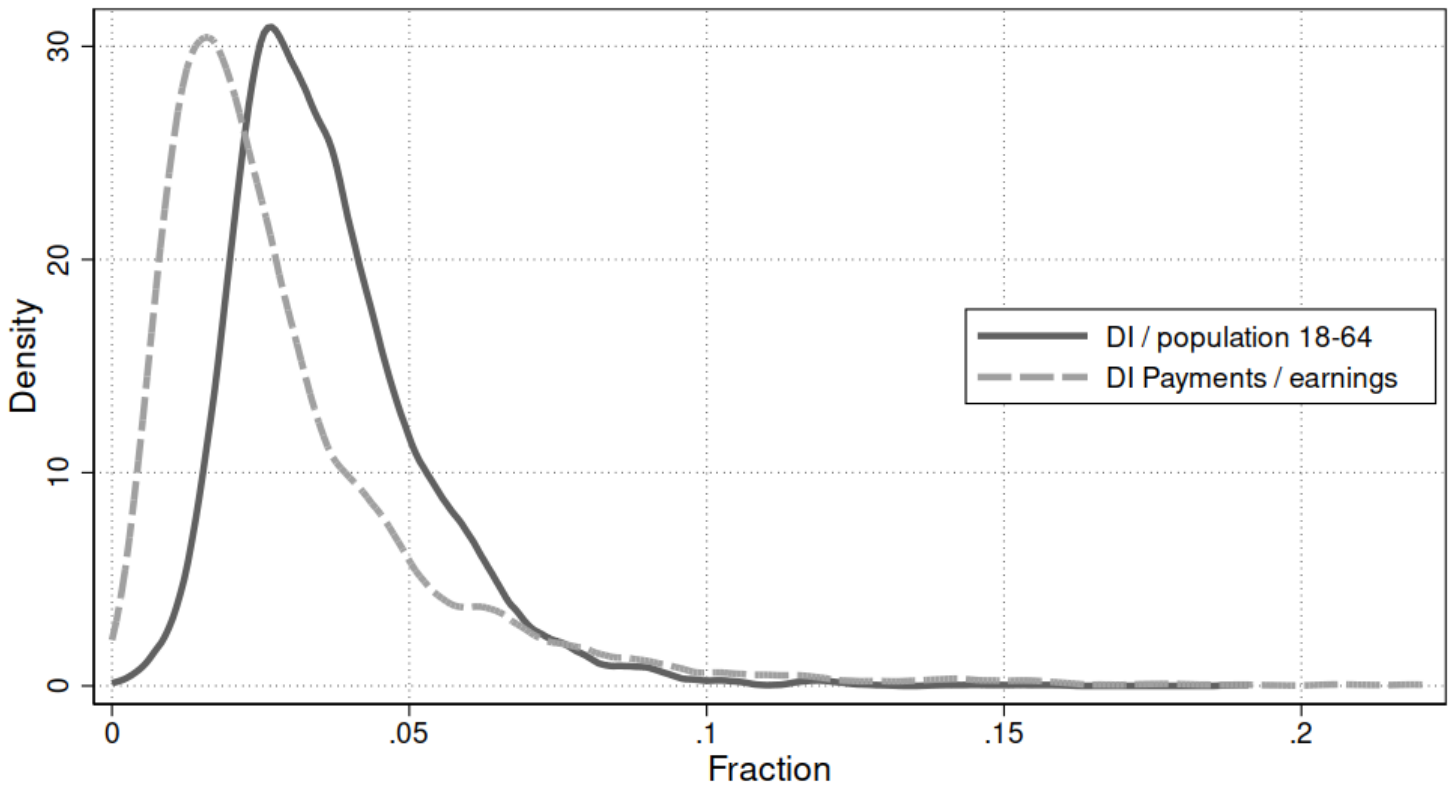
Data

Main data sources

County-level data for 1996-2014

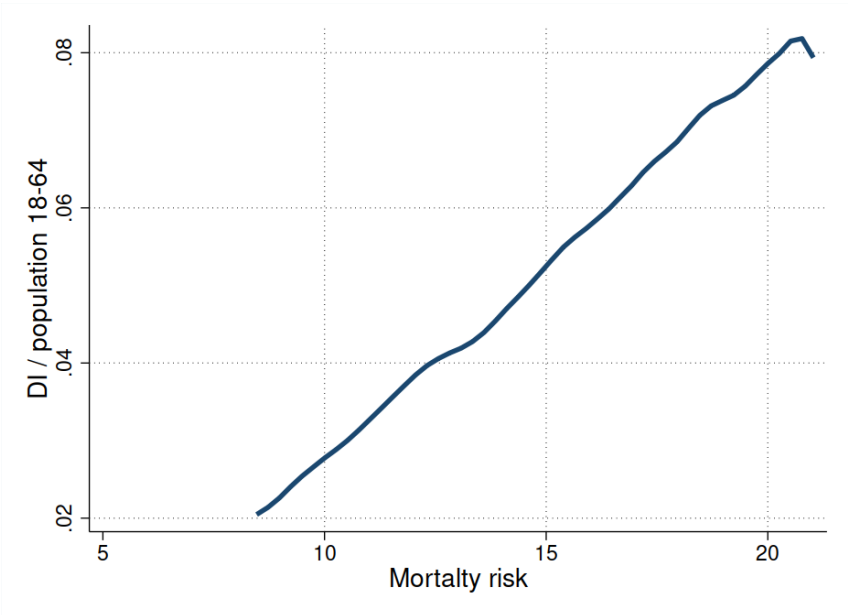
- DI applications & allowances from SSA Disability Research File
  - Info by age (21-49 & 50-64) for 1,140 counties (81% of allowances)
  - Rest suppressed for confidentiality — fill in with state residuals
- Mortality: National Center for Health Statistics
- Employment & wages: Quarterly Census of Employment & Wages
- Poverty: Census Small Area Income Poverty Estimates
- Population and demographics: Census county estimates
- Prices: constructed from state/density BEA & USDA indexes
- Medical prices: indexes from Dartmouth (Austin et al. 2018)

Dispersion of DI across across counties

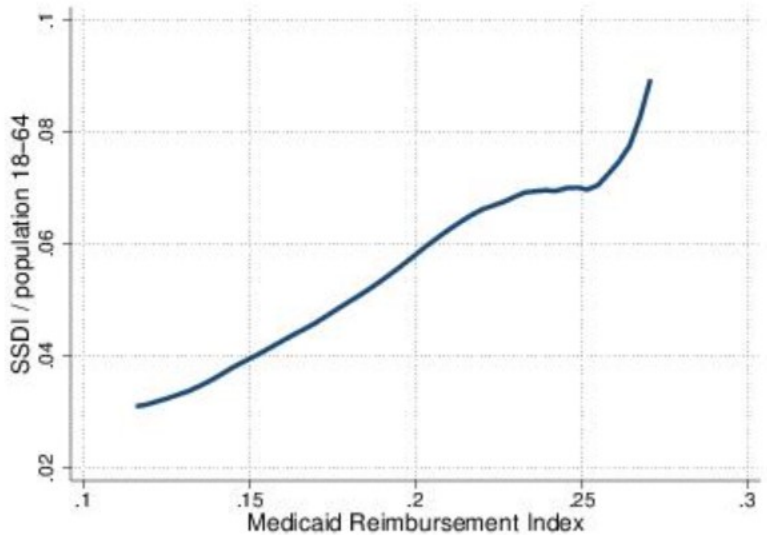


Persistent: 96% year-year rank correlation in allowances & payments

Correlates with DI beneficiary rates

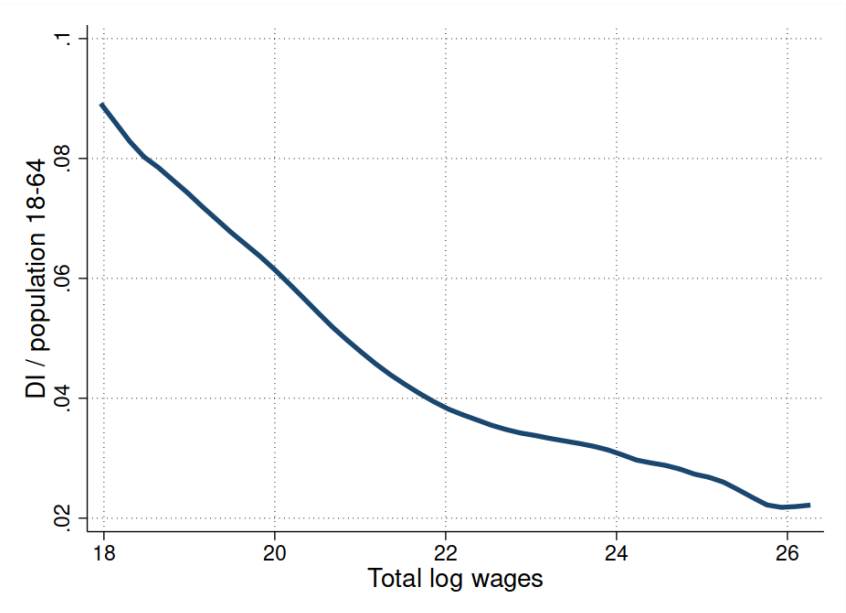


(a) Mortality

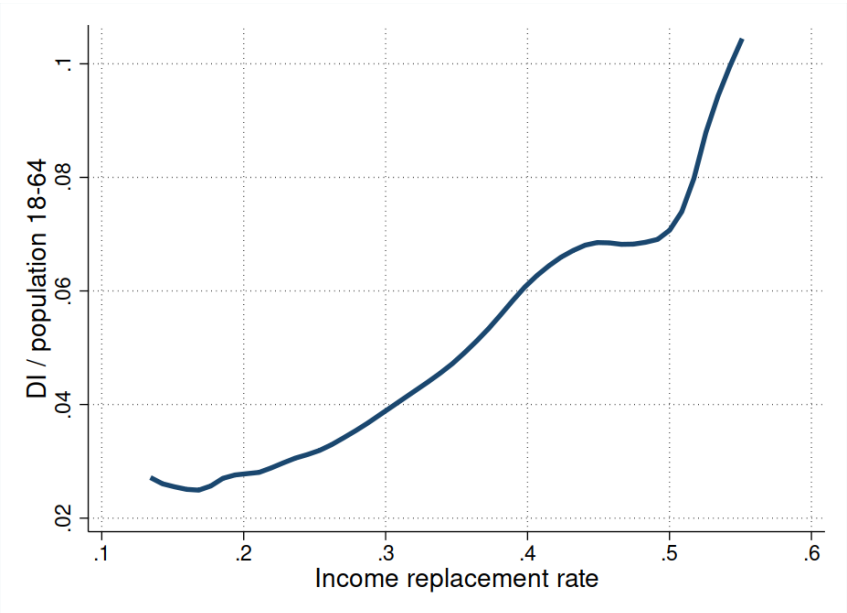


(b) Medical Price Index

Correlates with DI beneficiary rates



(c) Log Wages



(d) 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, allowance process & other factors

DI insures against lost consumption from disability.

- Higher medical costs & lower potential earnings
- but: 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

$$\sum_{t=0}^{T} \beta^t \mathbf{E} \left(\frac{\left(c_t \cdot e^{\nu d_t}\right)^{1-\sigma}}{1-\sigma} - \lambda \mathbb{I}_{Emp_t} - \phi \mathbb{I}_{Apply_t} \right)$$

- Disability (high d) decreases marginal value of cons. if $\nu < 0$
  - Full insurance would equate MU_c across states
  - How much consumption do individuals need for full insurance?
- Fixed costs of working ($\lambda \mathbb{I}_{Emp}$) and applying ($\phi \mathbb{I}_{Apply}$)

Constraints & risks

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

Expenditures

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

Income

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

(2) "State" and access depend on place

- Disability processes (d)
- Transitory income risk (z)
- Probability of allowance $\sim$ logit($\xi_d \textit{disability} + \xi_t \textit{age} + \xi_{\ell \in \text{DDS}}$)

Spatial redistribution metrics

Willingness to pay (χ_ℓ)

- Are allowances going where insurance is valued more?
- Let $\check{x}$ be the optimal choices and values in world with DI

$$\chi_\ell \ : \ \underbrace{u(\chi_\ell \check{c}) - \check{\mathbb{I}}_{\check{s}=0}\lambda + \beta\delta_t \mathbf{E}[\check{V}_{t+1,\ell}(\cdot)]}_{\text{Value in world WITH DI}} = \underbrace{V_\ell(\cdot)}_{\text{Value in world WITHOUT DI}}$$

1. "Value" (Redistribution)
   - Metric: Percent of willingness to pay because percent change in real consumption of local claimants differs from that of the average similar DI claimant nationally.
2. "Need" (Local disability and income processes)
   - Metric: Percent of willingness to pay because local evolution of disability and income differ from the national average processes

Calibration and model fit

Mapping model to data

What drives county differences?

- NOT preferences!
- (A) Value for the same individual differs by place
  - Medical and goods prices: observed
  - Resources in non-employ: unobserved (infer as residual: apps)
  - DDS process unobserved (infer as residual: apps $\rightarrow$ allowances)
- (B) Need: distribution of individuals across health and income states differs by county
  - Age, income: observable
  - Disability county distribution: map with mortality process
  - Individual disability of applicants: unobserved

Bringing aggregate data to individual decisions

Our main targets are *shares*

- *Shares* of population who claim (by age)

Estimation

- Claim decision monotone in disability (conditional on other states)
  - Similar to distribution of preferences in I/O
  - Allows us to estimate over 2,000 parameters quickly
- Variance in disability and observed inputs across place not enough to generate variance in claims
  - Don't allow preferences to be place specific- take estimates from studies using micro data on consumption and diability.
  - Estimate place-specific resources in non-employment as residual

Fitting at local level

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 & oop medical costs (national); prices, DI payment structure, income (local)

Role of unobserved factors

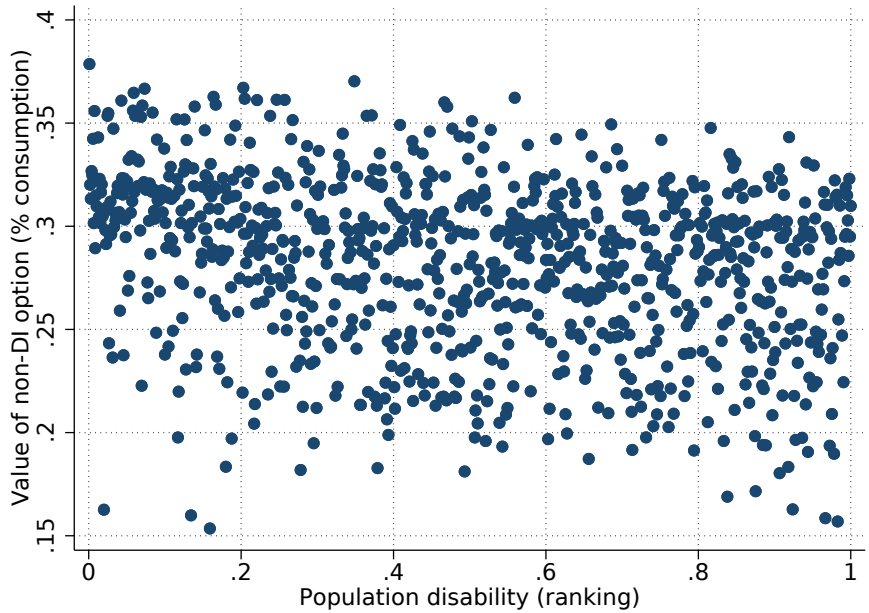


Figure: Non-emp consumption value T_ℓ and disability prevalence (rank).

- 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

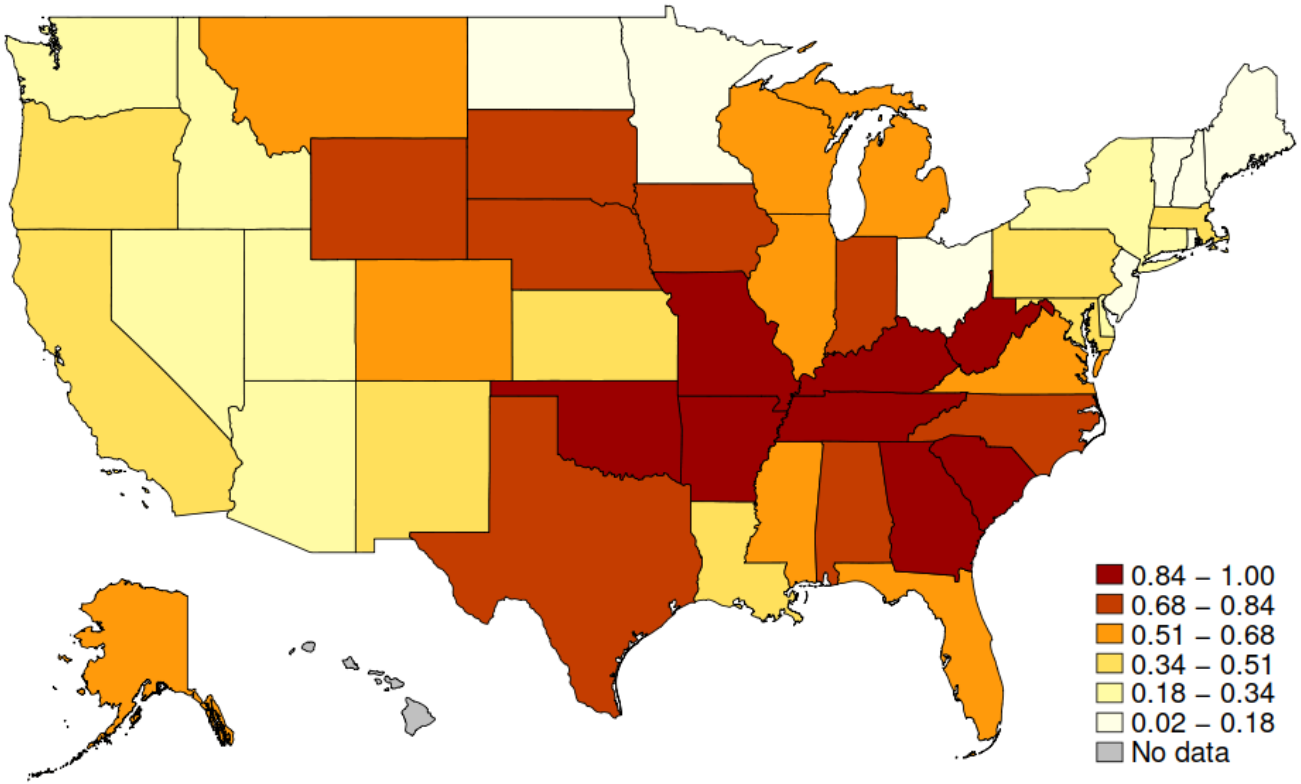
Determinants and implications

Accounting for allowance differences across counties

	Disability	Earnings	Medical Prices	Local cost-of-living
Contribution to variance, % of total				
Applications	57.8	19.5	8.1	16.8
Allowances	52.0	6.7	16.9	22.1
Elasticity- one st.dev. pertubation				
Applications	0.70	0.30	0.64	-0.30
Allowances	0.64	0.06	1.03	-0.26
Coefficient of variation				
	0.27	0.38	0.11	0.11

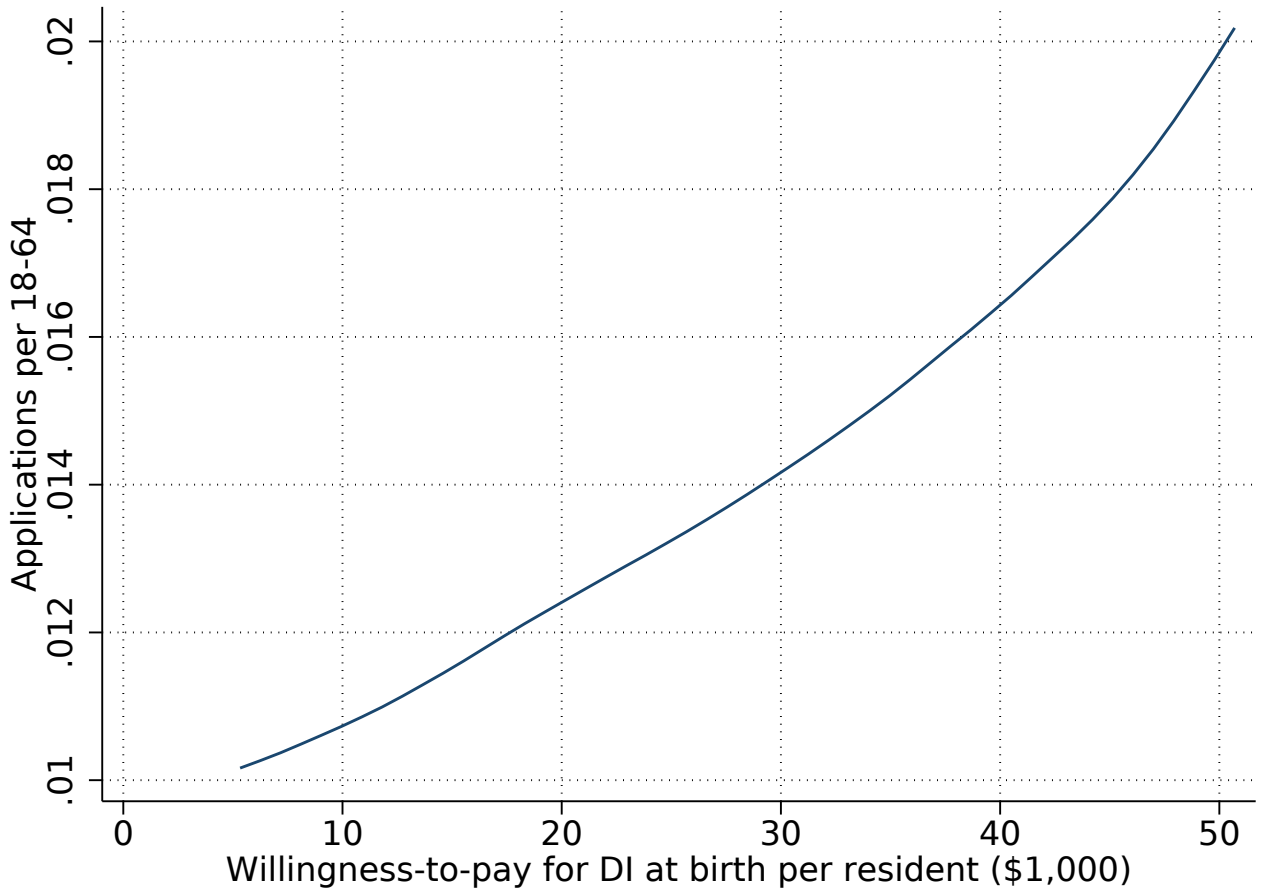
Spatial distribution of welfare value of DI

Metric: "Willingness to pay" at age 40

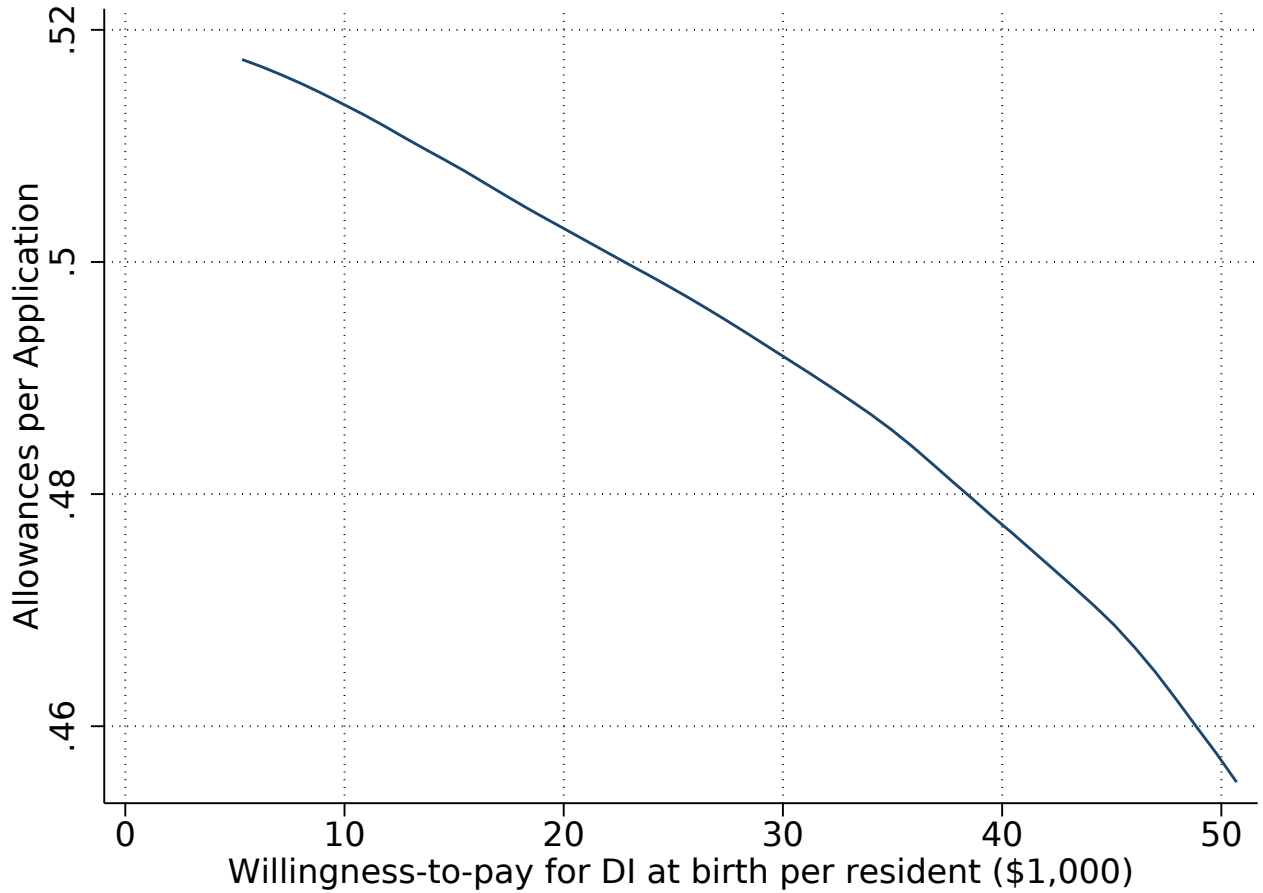


- Median = 9.5% of future consumption
- Interquartile range: 6.4-12.1%

DI applications higher where welfare gains are largest



DI allowances per application lower where welfare gains are largest

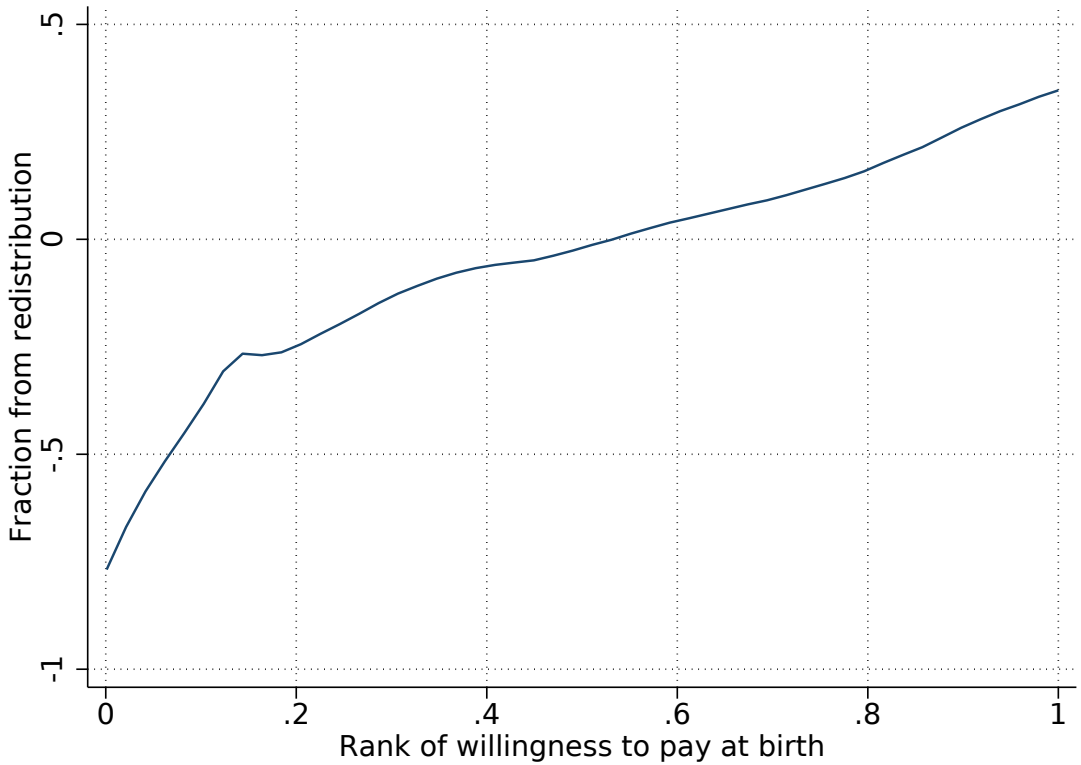


Accounting for welfare differences across counties

	Disability	Earnings	Medical prices	Local cost-of-living
Contribution to variance, % of total				
Allowances	52.0	6.7	16.9	22.1
Welfare				
At age 40	43.4	24.3	15.6	16.7
Beneficiaries	47.9	15.4	2.9	33.7

- Local earnings differences provide more variance in welfare than in allowances. Two factors:
  1. Replacement rate higher for lower income beneficiaries
  2. Composition of claimants more disperse on income

Redistribution of value vs need



- Below median county welfare values driven by redistribution of value—low change in consumption from DI payments
- Above median county welfare values driven by differences in need—prevalence of high disability & low income

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 disability accounts for half the variation in DI
- Welfare: large variance in willingness to pay (6-12%) of income
  - Above median county welfare values driven by prevalence of need— of high disability & low income
  - Below median county welfare values driven by redistribution of value — low change in consumption from DI payments

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