Topic 12: Disability Insurance

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Disability insurance in the US is one of the largest government expenditures
- Fixing market failure from adverse selection?

This lecture:
- Models of DI
- Trends in DI Spending
- Impact of DI on outcomes and welfare analysis
1. Modeling DI

2. Trends in DI spending

3. Causal Impact of DI on Outcomes
Discuss three models of DI:

   - Disability unobserved and no ability to conduct informative assessment

   - Disability assessment as imperfect signal of disutility of labor

3. Structural model: Low and Pistaferri (2016, AER)
   - Disability modeled in dynamic life-cycle model as impacting the budget constraint
“New Dynamic Public Finance” Approach

- Productivity / disutility of labor evolves over time, \( y = \theta l \).
- Additively separable utility over consumption and labor supply:
  \[
  u(c) + v(l)
  \]
- Leads to inverse Euler equation:
  \[
  \frac{1}{u'(c_t)} = E \left[ \frac{1}{u'(c_{t+1})} \right]
  \]
- Implies savings distortion!
  - Jensen’s inequality.
Logic of the inverse Euler equation:

- Suppose no distortion in savings
- Then, types that expect to claim disability in future will choose to save more to help increase future consumption
- Taxing this savings helps prevent this “double deviation”

Provides rationale for requiring asset test for disability insurance?

- Similar to asset test for Medicaid?
Merging Social Insurance and Optimal Taxation

- Traditional distinction between optimal tax and social insurance
- Dynamically evolving type distribution merges these two forces
  - Demand for insurance against evolving abilities
    - e.g. disability/unemployment/health shock as special case of productivity shock?
- “New Dynamic Public Finance: A User’s Guide” in 2006 Macro Annual provides nice treatment of this literature
  - But optimal tax often difficult to derive (e.g. depends on full history of shocks); what about MVPF of policy changes?
Setup:
- Disutility of working, $\theta$
- Can provide screen that says “DISABLED” with probability $p(\theta)$, where $p' > 0$
- Binary labor supply choice
- Decision for whether to apply for disability

Main result: Consumption smoothing benefits weighed against the moral hazard costs
- Baily-Chetty logic
- Key difference: can rely on imperfect tag (“Disability”)
- Still want welfare benefits for those who are rejected
- Welfare benefits are larger if screen is less informative
  - DI benefits larger if screen is more informative
- How is this different w.r.t. UI?
  - Same issues in UI?
  - Unemployment an imperfect measure of true shock?
Key distinction with disability insurance is the dynamic

Suppose we observed consumption upon exiting labor force from shock
   Would this summarize welfare impact?

Additionally: Decision to apply for DI is dynamic
   Value of dynamic model

Low and Pistaferri (2015, AER)
Low and Pistaferri (2015, AER) set up dynamic life cycle model to evaluate DI

Why estimate a structural model?
- Incorporate dynamic responses generally not observed
- Simulate policies not observed

Key aspect of Low and Pistaferri model:
- Dynamic labor supply decisions with stochastically evolving productivity/wage/disability shocks
Setup: Utility

- Maximize

\[
\max_{c,P,Dl^{app}} V_{it} = E_t \sum_{s=t}^{T} \beta^{s-t} U (c_{is}, P_{is}; L_{is})
\]

- where
  
  - \(\beta\) is the discount factor
  - \(E_t\) is the expectations operator conditional on info available in period \(t\)
  - \(P \in \{0, 1\}\) is an indicator for labor force participation
  - \(c_t\) is consumption
  - \(L_{it} \in \{0, 1, 2\}\) is a discrete work limitation status (no limitation, partial limitation, full limitation)
Setup: Budget Constraint

- **Budget constraint**

\[ A_{i,t+1} = R [A_{it} + (w_i h (1 - \tau_w) - F (L_{it})) P_{it} + (B_{it} Z_{it}^{UI} (1 - Z_{it}^{DI}) + D_{it} Z_{it}^{DI} + SSI_{it} Z_{it}^{DI} Z_{it}^{W}) (1 - P_{it}) + W_{it} Z_{it}^{W} - c_{it}] \]

- **where**
  - \( A \) is assets
  - \( R \) is rate of interest
  - \( w \) is the hourly wage rate
  - \( h \) is a fixed number of hours (500 per quarter)
  - \( \tau_w \) is a proportional tax financing social security programs
  - \( F \) is a fixed cost of work that depends on disability status
  - \( B \) is unemployment benefits
  - \( W \) is the monetary value of a means-tested welfare payment
  - \( D \) is the amount of disability insurance payments
  - \( SSI \) is the amount of SSI benefits
  - \( Z_j \) are indicators for participation in program \( j \)
Decisions

- Individuals choose:
  1. Whether to work
     - If unemployed, choose whether to accept/reject job offers
  2. Savings vs. consumption
     - No borrowing, $A \geq 0$ constraint imposed
     - No other insurance beyond government
  3. Whether to apply for DI
     - Can only apply for DI if unemployed

- No choice of intensive margin labor earnings
Implementation as follows:

1. Specify and parameterize a utility function
2. Specify and parameterize a wage process
3. Specify the tax/transfer/insurance programs
Utility Function

- Utility given by

\[ u(c, P; L) = \frac{(c (e^{\theta L}) (e^{\eta P}))^{1-\gamma}}{1-\gamma} \]

where \( \theta < 0 \) and \( \eta < 0 \)

- Allows for complementarity between \( L \) and the marginal utility of consumption
Budget Constraint Specification

- Wages given by

\[ \ln(w_{it}) = X'_{it} \mu + \sum_{j=1}^{2} \phi L^j_{it} + f_i + \epsilon_{it} \]

where
- \( \epsilon_{it} = \epsilon_{it-1} + \zeta_{it} \)
- \( \zeta_{it} \) is iid so that there is a random walk component
- \( f_i \) is an individual-specific heterogeneity term
- \( X_{it} \) are characteristics like education
- \( L^j_{it} = 1 \{ L_{it} = j \} \) is a work-limitation status variable
  - Follows Markov process

- Tax/Transfer/Insurance Program fit to align with existing system (see paper)
Results

- Implementation
  - Use data from the PSID
  - Use computer to solve model given parameter choices to match the data
    - Repeat iterations until model closely matches the data
  - Main result: Optimal DI is higher if tax/transfer/welfare system is more generous
    - Prevents desire to claim UI for low-income workers
    - What is the reduced-form test of this?
1. Modeling DI

2. Trends in DI spending

3. Causal Impact of DI on Outcomes
Greater Share of Govt Expenditure

- Dramatic recent increases in government expenditures
  - See also Autor and Duggan (2006, JEP)
Rising Costs in SSDI

Figure 1: Real Annual Expenditures Cash Transfer and In-Kind Medicare Expenditures for SSDI Recipients, 1979-2009 (Millions $)

- SSDI Expenditures
- Medicare Expenditures

Source: Autor (2015)
Nathaniel Hendren (Harvard)
Figure 2: SSDI Expenditures as a Share of Total OASDI Expenditures, 1979-2009
Driven by Greater Enrollment

Figure 3: Percentage of Individuals Receiving SSDI Disabled Worker Benefits, Ages 25-64, 1957-2009

Source: Author (2015)
Correlated with Unemployment Rate...

**Figure 5: SSDI Applications per 1,000 Adults and U.S. Unemployment Rate, Ages 25-64, 1985-2010**

The graph shows the correlation between SSDI applications per 1,000 people and the unemployment rate in the United States for individuals aged 25-64 from 1985 to 2010. The data indicates a noticeable increase in SSDI applications coinciding with rises in the unemployment rate during this period.

Source: Author (2015)
Not by Increases in Measured Disabilities

Figure 6: Percentage of People Reporting a Work-Limiting Health Condition or Disability, Ages 40-59

Source: Autor (2015)
Increases for Both Men and Women

Figure 7: Fraction of Individuals Receiving SSDI Benefits
Ages 40-59, 1988-2008

- Source: Autor (2015)
Fewer People Leaving SSDI

Figure 9: Percentage of SSDI Recipients Leaving Program for not Meeting Medical Criteria, 1964-2009

Source: Autor (2015)
1 Modeling DI

2 Trends in DI spending

3 Causal Impact of DI on Outcomes
Large debate: to what extent does disability insurance deter labor supply?

“Can’t these people work anyway”?

Research begins with the “Bound-Parsons” debate
Early estimates of impact of DI on labor supply ran regressions of the form:

\[ L = \beta DI\% + \gamma X + \epsilon \]

- \( X \) is a set of control variables
- \( L \) is labor force participation
- \( DI\% \) is the fraction of earnings that DI system replaces
  - DI replacement rate is higher for low-income workers

Finds \( \beta < 0 \)

Conclusion (Parsons 1980, 1982) : DI reduces labor supply
Problem: disabled may have lower historical income

- Implies higher DI replacement rate
- National program implies only variation in income generates variation in $DI\%$
- Omitted variable bias generates $\beta < 0$?

Solution?: look at rejected DI applicants (Bound, 1989)
Bound (1989, AER)

Data from 1971 and 1977 surveys

Shows that less than 50% of rejected DI applicants work

- Argument: lower LFP can’t be explained by DI
## Table 2—Employment, Earnings, and Other Characteristics of Rejected Disability Insurance Applicants

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<tr>
<td>Percent Employed</td>
<td>77.7</td>
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<td>69.3</td>
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<td>Percent Worked 71/77</td>
<td>91.9</td>
<td>45.0</td>
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<td>86.7</td>
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<td>Percent Full Year</td>
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<td>(≥ 50 Weeks)*</td>
<td>76.8</td>
<td>47.4</td>
<td>31.4</td>
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<td>Percent Full Time</td>
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<td>(≥ 35 Hours)*</td>
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<td><strong>Earnings Among Positive Earners</strong></td>
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<td>Median Annual Earnings, 71/77*</td>
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<td>$4000</td>
<td>$700</td>
<td>$14000</td>
<td>$5300</td>
<td>$1000</td>
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<td>Median Weekly Earnings*</td>
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<td>120</td>
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<td>300</td>
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<td>Median Age</td>
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<td>58.1</td>
<td>53.8</td>
<td>55.6</td>
<td>58.3</td>
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<td>Median Education</td>
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<td>8.1</td>
<td>11.7</td>
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<td>Percent Nonwhite</td>
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<td>Percent Married</td>
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<td>Work Limitations</td>
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<td>Percent Severely Disabled</td>
<td>12.0</td>
<td>50.5</td>
<td>92.7</td>
<td>14.3</td>
<td>64.0</td>
<td>97.0</td>
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<td>Percent Partially Disabled</td>
<td>14.8</td>
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<td>Percent Capable of the Same Kind of Work as Before Health Limitation</td>
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<td>14.5</td>
<td>0.7</td>
<td>–</td>
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**Table 3—Final Determinations of Disability and the Clinical Team Evaluations of Work Capacity of Applicants**

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<th>Allowance</th>
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<th>Final Determinations</th>
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<th>Total</th>
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<td>Percent</td>
<td>No.</td>
<td>Percent</td>
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<td>Percent</td>
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<td>–</td>
<td>9</td>
<td>1.0</td>
<td>9</td>
<td>0.4</td>
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<td>Fit for Specific Jobs, Including Former Job, Under Normal Conditions</td>
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<td>1.5</td>
<td>142</td>
<td>15.0</td>
<td>165</td>
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<td>Fit for Specific Jobs, Excluding Former Job, Under Normal Conditions</td>
<td>94</td>
<td>6.2</td>
<td>167</td>
<td>17.7</td>
<td>261</td>
<td>10.6</td>
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<td>Fit for Work Under Special Conditions</td>
<td>92</td>
<td>6.1</td>
<td>90</td>
<td>9.5</td>
<td>182</td>
<td>7.4</td>
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<td>Can Work Part-Time Under Normal Conditions</td>
<td>82</td>
<td>5.4</td>
<td>84</td>
<td>8.9</td>
<td>166</td>
<td>6.8</td>
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<td>Can Work Under Sheltered Conditions</td>
<td>134</td>
<td>8.9</td>
<td>87</td>
<td>9.2</td>
<td>221</td>
<td>9.0</td>
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<td>Can Work at Home Only</td>
<td>66</td>
<td>4.4</td>
<td>29</td>
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<td>95</td>
<td>3.1</td>
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<td>Not Fit for Work</td>
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<td>Total</td>
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<td>Total Family Income</td>
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<td>Unemployment Insurance</td>
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<td>Private Pensions, etc.</td>
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<td>149</td>
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### 1977

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<th>Rejected Applicants</th>
<th>Benfellaries</th>
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<td></td>
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<td>Mean</td>
<td>Percent</td>
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<td>Total Family Income</td>
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<td>5.6</td>
</tr>
<tr>
<td>AFDC</td>
<td>0.9</td>
<td>1734</td>
<td>7.4</td>
</tr>
<tr>
<td>Other Welfare</td>
<td>1.2</td>
<td>1188</td>
<td>0.0</td>
</tr>
<tr>
<td>Government Disability</td>
<td>2.3</td>
<td>6784</td>
<td>0.0</td>
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<tr>
<td>Unemployment Insurance</td>
<td>9.7</td>
<td>1241</td>
<td>14.8</td>
</tr>
<tr>
<td>Other Benefits</td>
<td>2.8</td>
<td>4332</td>
<td>1.9</td>
</tr>
<tr>
<td>Private Pensions, etc.</td>
<td>21.8</td>
<td>2976</td>
<td>23.6</td>
</tr>
<tr>
<td>Asset Income</td>
<td>53.9</td>
<td>942</td>
<td>30.9</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>1272</td>
<td>55</td>
<td>81</td>
</tr>
</tbody>
</table>
Bound-Parsons Debate

- Bound (1989) shows low LFP for rejected applicants

- Clearly illustrates violation of orthogonality condition in previous regressions

- Parsons responds:
  - DI applicants may reduce their labor supply in order to become eligible
    - Have a hard time of coming back into the labor force
    - Therefore, they are not a good counterfactual for no DI

- Large literature follows: general consensus that generosity of DI reduces labor supply but not as much as suggested in cross-sectional regressions
Autor, Kostol, and Mogstad (2015)

- Study impact of DI using administrative data in Norway

- Study impacts on:
  - Earnings
  - Income (benefit substitution)
  - Spousal labor supply
  - Consumption proxies

- Key lesson: spousal labor supply can help mitigate disability shock
Figure 1: DI Application and Appeals Process

Notes: This figure summarizes the description of the application and appeal process in the Norwegian DI system.
Exploit random assignment of applicants to judges in the appeals process for DI

Model:

\[ A_i = \gamma Z_{ij} + X_i' \delta + \epsilon_{ij} \]
\[ Y_{it} = \beta_t A_i + X_i' \theta_t + \eta_{it} \]

where

- \( A_i \) is an indicator for allowing DI after appeal
- \( Z_{ij} \) is the leniency measure of judge \( j \) to whom \( i \) is assigned
  - Based on previous case outcomes from the judge
- \( X_i \) is vector of controls
- \( Y_{it} \) is a dependent variable (e.g. consumption, earnings, spousal labor supply)
Figure 4: Effect of Judge Leniency on DI Allowance
Figure 2: Earnings Trajectories of Allowed and Denied DI Applicants and Appellants

Notes: This figure displays mean real earnings for denied and allowed DI applicants (left-hand panel) and DI appellants (right-hand panel) in the nine years surrounding the initial DI determination (left-hand panel) and the initial outcome at appeal (right-hand panel). The applicant sample consists of all claims made during the period 1992-2003 by individuals who are at most 61 years of age. The appellant sample filed an appeal during the period 1994-2005 (see Section 3 for further details). Nominal values are deflated to 2005 and represented in US dollars using the average exchange rate NOK/$ = 6.
### Table 7: Effect of DI Allowance on Spousal Earnings and Transfer Payments

<table>
<thead>
<tr>
<th></th>
<th>Years after decision</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Panel A.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married appellant labor earnings ($1000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowed DI</td>
<td></td>
<td>-4.924</td>
<td>-0.917</td>
<td>-4.686</td>
</tr>
<tr>
<td>(3.503)</td>
<td></td>
<td></td>
<td>(4.132)</td>
<td>(4.042)</td>
</tr>
<tr>
<td>Dependent mean</td>
<td></td>
<td>15.006</td>
<td>14.800</td>
<td>14.201</td>
</tr>
<tr>
<td><strong>Panel B.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married appellant total transfers ($1000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowed DI</td>
<td></td>
<td>9.478**</td>
<td>6.896</td>
<td>5.392</td>
</tr>
<tr>
<td>(3.868)</td>
<td></td>
<td></td>
<td>(4.265)</td>
<td>(3.561)</td>
</tr>
<tr>
<td>Dependent mean</td>
<td></td>
<td>16.614</td>
<td>17.342</td>
<td>17.905</td>
</tr>
<tr>
<td><strong>Panel C.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appellant spouse labor earnings ($1000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowed DI</td>
<td></td>
<td>-5.963</td>
<td>-18.305**</td>
<td>-16.166*</td>
</tr>
<tr>
<td>(8.627)</td>
<td></td>
<td></td>
<td>(8.777)</td>
<td>(8.290)</td>
</tr>
<tr>
<td>Dependent mean</td>
<td></td>
<td>40.927</td>
<td>39.472</td>
<td>38.751</td>
</tr>
<tr>
<td><strong>Panel D.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appellant spouse total transfers ($1000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowed DI</td>
<td></td>
<td>0.170</td>
<td>6.241*</td>
<td>6.307</td>
</tr>
<tr>
<td>(3.292)</td>
<td></td>
<td></td>
<td>(3.601)</td>
<td>(4.178)</td>
</tr>
<tr>
<td>Dependent mean</td>
<td></td>
<td>11.212</td>
<td>11.958</td>
<td>12.654</td>
</tr>
<tr>
<td>Observations</td>
<td></td>
<td>7,813</td>
<td>7,699</td>
<td>7,594</td>
</tr>
</tbody>
</table>

***p<.01, **p<.05, *p<.10. Standard errors (in parentheses) are clustered at the judge level.
Table 10: Effects of DI allowance on Household Disposable Income and Consumption

<table>
<thead>
<tr>
<th></th>
<th>A. Unmarried and single</th>
<th>B. Married</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly disp. income (per capita)</td>
<td>Yearly consumption (per capita)</td>
</tr>
<tr>
<td>Allowed DI</td>
<td>9.086***</td>
<td>9.835*</td>
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<tr>
<td></td>
<td>(3.132)</td>
<td>(5.340)</td>
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<tr>
<td>Dependent mean</td>
<td>24.857</td>
<td>25.934</td>
</tr>
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<td>Observations</td>
<td>4,993</td>
<td>4,993</td>
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</table>

***p<.01, **p<.05, *p<.10. Standard errors (in parentheses) are clustered at the judge level.
Table 9: Effects of DI Allowance on Fiscal Costs

<table>
<thead>
<tr>
<th></th>
<th>A. Full sample</th>
<th>B. Restricted sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly fiscal costs (per allowed)</td>
<td>Benefit-to-cost ratio: ΔHH income/ΔFiscal cost</td>
</tr>
<tr>
<td>Allowed DI</td>
<td>16.475*** (4.408)</td>
<td>0.44</td>
</tr>
<tr>
<td>Dependent mean</td>
<td>19.611</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>14,077</td>
<td>14,077</td>
</tr>
</tbody>
</table>

***p<.01, **p<.05, *p<.10. Standard errors (in parentheses) are clustered at the judge level.
Key lessons:

- In Norway, benefit substitution is huge (many transfers to low-income)
- Spousal labor earnings offset much of the reduction in earnings
- Paper goes on to simulate welfare impacts
  - Key: depends on spousal labor supply elasticity
- Larger welfare impact of DI for singles?

Study intergenerational persistence in welfare participation in Norway

Main question: does DI receipt by parents cause children to be on welfare

Empirical strategy: exploit random assignment to judges
Figure 3: Effect of Judge Leniency on Parents (First Stage) and Children (Reduced Form).
### Table 3: Estimates of Intergenerational Welfare Transmission

<table>
<thead>
<tr>
<th></th>
<th>First stage</th>
<th>Reduced form</th>
<th>IV</th>
<th>Reduced form</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. No additional controls</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent’s judge leniency</td>
<td>0.909***</td>
<td>0.055***</td>
<td>0.107***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.112)</td>
<td>(0.020)</td>
<td>(0.030)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent allowed DI</td>
<td></td>
<td>0.061***</td>
<td></td>
<td>0.118***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.022)</td>
<td></td>
<td>(0.033)</td>
<td></td>
</tr>
<tr>
<td><strong>B. With additional controls</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent’s judge leniency</td>
<td>0.869***</td>
<td>0.052**</td>
<td>0.101***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.108)</td>
<td>(0.020)</td>
<td>(0.027)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent allowed DI</td>
<td></td>
<td>0.060***</td>
<td></td>
<td>0.116***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.023)</td>
<td></td>
<td>(0.032)</td>
<td></td>
</tr>
<tr>
<td>Dependent mean</td>
<td>0.12</td>
<td>0.03</td>
<td>0.08</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***p<.01, **p<.05, *p<.10. Standard errors (in parentheses) are clustered at the judge level.
Dahl, Kostol, and Mogstad (2014)

- Fairly large impact of obtaining DI on children obtaining DI

- Why?
  - Welfare culture?
  - Reduction of earnings?
  - Decision to apply?
Table 5: Effect of Parent’s DI Allowance on Child Labor and Educational Outcomes.

5 years after parent’s appeal decision

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Reduced form</th>
<th>IV</th>
<th>Dep. mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. DI</td>
<td>0.052**</td>
<td>0.060***</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.023)</td>
<td></td>
</tr>
<tr>
<td>B. Any employment</td>
<td>-0.119**</td>
<td>-0.137**</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>(0.055)</td>
<td>(0.065)</td>
<td></td>
</tr>
<tr>
<td>C. Full-time work</td>
<td>-0.065</td>
<td>-0.075</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td>(0.079)</td>
<td>(0.090)</td>
<td></td>
</tr>
<tr>
<td>D. College degree</td>
<td>-0.079</td>
<td>-0.091</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td>(0.069)</td>
<td></td>
</tr>
</tbody>
</table>

***p<.01, **p<.05, *p<.10. Standard errors (in parentheses) are clustered at the judge level.
• Results suggest large intergenerational persistence in DI (12pp after 10 years)

• Behavioral response by children (lower earnings)
  - Income effects vs. welfare culture?
  - What’s the difference?
Now, turn to the US – Key question in the US context: How difficult should it be to apply for DI?

- Depends on who the marginal applicant is.


- Exploits closing of field offices for DI

Compare applications from people zip codes that did vs. did not experience closure of nearest office

- Control group: ZIPs with closures in future years
Figure 2: Timing of Field Office Closings

Field office closings

Number of closings

Year
Field Office Closures (Deshpande, 2016)

SSA Field Offices
- Open
- Closed

Zip code areas
- Closing zips
- Neighboring zips
- Unaffected zips
Compare to Control ZIPs with Closures in Future Years

Figure 4: Raw Plots of Number of Applications in Control and Treatment ZIPs
Figure 5: Effect of Closings on Number of Disability Applications and Allowances
Figure 6: Effect of Closings on Number of Disability Applications, by Subgroup

- Number of applicants by severity (log)
- Number of applicants by disability type (log)
- Number of applicants by education (log)
- Number of applicants by pre-application earnings
Imperfect Take Up (Deshpande, 2016)

- Results suggest significant decline of DI applications when a field office closes

- Welfare implications?
  - Least severe applications suggests those on the margin are not highly disabled?
  - But, reduction in accepted applications suggests many of those who are missed are actually disabled?

- Ideally: measure consumption smoothing impacts (or marginal utilities!)
Deshpande (2016, AER): Impact of SSI

- Now, turn to US and focus on Supplementary Social Security Income (SSI)

- SSI provides cash payments and Medicaid eligibility to low-income children and adults with disabilities
  - Imposes high marginal tax rates on parents of these children and the children themselves

- 1996 welfare reform: increased strictness of medical review to remain on SSI at age 18

- Empirical strategy: compare children who turn 18 on either side of the August 22, 1996 cutoff
Figure 2. Empirical Strategy Using Variation in Eligibility for Medical Reviews
Leads to Semi-Persistent Drop in Enrollment

**Figure 3. Change in First Stage for SSI Enrollment Over Time**
Slight Increase in Earnings

Nathaniel Hendren (Harvard)

Annual earnings

Review less likely

Review more likely

Annual average earnings after age 18

Week of 18th birthday relative to cutoff

- 1996 cohort
- Comparison cohorts
# Impacts on Parents too (Substitution)

Figure 5. IV Estimates of the Effect of Age 18 Removal
Figure 7. Earnings of Removed SSI Youth versus Broader Disadvantaged Population
Deshpande (2016, AER): Impact of SSI

- Results: SSI lowers earnings

- But earnings response is minimal for those who are removed from the program
  - Far from recovering the lost SSI income

- Suggests those who are enrolled in SSI on the margin do not have strong outside work options

- Thoughts:
  - What if un-enrolled earlier? Or, what if they knew they’d lose SSI at age 18 – maybe work harder in school?
  - Welfare implications?
Deshpande and Mueller-Smith (2022, QJE): Impact of SSI

- Deshpande and Mueller-Smith study impacts on criminal justice outcomes
Impact of SSI on Crime

Figure III: Reduced form: Criminal justice outcomes across cutoff

Number of charges, ages 18-38

Annual likelihood of incarceration, ages 18-38

Number of income-generating charges, ages 18-38

Number of NON-income-generating charges, ages 18-38
## Impact of SSI on Crime

**Nathaniel Hendren (Harvard)**

**Disability Insurance**

### Table I: RD and IV estimates of effects on criminal justice outcomes

<table>
<thead>
<tr>
<th></th>
<th>Extensive</th>
<th></th>
<th>Intensive</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RD Pt Est (SE)</td>
<td>IV Pt Est (SE)</td>
<td>Mean</td>
<td>RD Pt Est (SE)</td>
</tr>
<tr>
<td><strong>First stage (N = 28,843)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 18 medical review</td>
<td>0.853***</td>
<td>0.002</td>
<td></td>
<td>0.171*</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.032)</td>
<td></td>
<td>(0.092)</td>
</tr>
<tr>
<td>Unfavorable review</td>
<td>0.36***</td>
<td>0.0004</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On SSI from ages 19-22</td>
<td>-0.152***</td>
<td>0.822</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>All crime (N = 21,768)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any charge</td>
<td>0.023**</td>
<td>0.062**</td>
<td>0.387</td>
<td>0.171*</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.010)</td>
<td></td>
<td>(0.092)</td>
</tr>
<tr>
<td>Incarcerated (annual likelihood/days) (N = 26,991)</td>
<td>0.011***</td>
<td>0.029***</td>
<td>0.047</td>
<td>3.222***</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.010)</td>
<td></td>
<td>(1.133)</td>
</tr>
<tr>
<td>Ever incarcerated (N = 26,991)</td>
<td>0.016**</td>
<td>0.043**</td>
<td>0.133</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.021)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incarceration/parole/probation (ann likelihood/days) (N = 22,705)</td>
<td>0.011</td>
<td>0.029</td>
<td>0.229</td>
<td>4.671**</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.027)</td>
<td></td>
<td>(2.328)</td>
</tr>
<tr>
<td><strong>Charges related to income-generating activity (N = 21,768)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.034***</td>
<td>0.093***</td>
<td>0.240</td>
<td>0.140***</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.03)</td>
<td></td>
<td>(0.039)</td>
</tr>
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<td>Burglary</td>
<td>0.005</td>
<td>0.014</td>
<td>0.068</td>
<td>0.023</td>
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<td></td>
<td>(0.007)</td>
<td>(0.018)</td>
<td></td>
<td>(0.015)</td>
</tr>
<tr>
<td>Theft</td>
<td>0.029***</td>
<td>0.080***</td>
<td>0.121</td>
<td>0.088***</td>
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<td></td>
<td>(0.009)</td>
<td>(0.023)</td>
<td></td>
<td>(0.024)</td>
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<tr>
<td>Fraud/forgery</td>
<td>0.007</td>
<td>0.018</td>
<td>0.076</td>
<td>0.006</td>
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<td></td>
<td>(0.007)</td>
<td>(0.020)</td>
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<td>(0.016)</td>
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<tr>
<td>Robbery</td>
<td>0.008*</td>
<td>0.021*</td>
<td>0.030</td>
<td>0.006</td>
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<td></td>
<td>(0.005)</td>
<td>(0.012)</td>
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<td>(0.008)</td>
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<tr>
<td>Drug distribution</td>
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<td>0.013</td>
<td>0.071</td>
<td>0.019</td>
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<td></td>
<td>(0.007)</td>
<td>(0.019)</td>
<td></td>
<td>(0.015)</td>
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<tr>
<td>Prostitution</td>
<td>0.005***</td>
<td>0.012***</td>
<td>0.004</td>
<td>0.014***</td>
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<td></td>
<td>(0.002)</td>
<td>(0.005)</td>
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<td>(0.005)</td>
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<tr>
<td><strong>Charges unrelated to income-generating activity (N = 21,768)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.005</td>
<td>0.014</td>
<td>0.357</td>
<td>0.036</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.031)</td>
<td></td>
<td>(0.076)</td>
</tr>
<tr>
<td>Non-robbery violent</td>
<td>0.013</td>
<td>0.036</td>
<td>0.182</td>
<td>0.031</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.027)</td>
<td></td>
<td>(0.026)</td>
</tr>
<tr>
<td>Disorderly conduct/obstruction/resisting arrest</td>
<td>0.016*</td>
<td>0.043*</td>
<td>0.128</td>
<td>0.049**</td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.024)</td>
<td></td>
<td>(0.023)</td>
</tr>
</tbody>
</table>
Disability insurance expenditures are large and growing

Significant evidence that DI reduces labor earnings (not surprising)
- Some people that apply can work
- But many do not even without DI!
- Intergenerational impacts

Various approaches to measuring welfare and thinking about optimal DI
- Structural approach: DI is additional factor affecting budget constraint
- Static welfare analysis: Income taxation with a tag (disability assessment)
  - Dynamic screening: savings as a tag
Thoughts on “Is it worth pursuing”?  

- Some things you’ll hear that limit upside of knowledge generation:  
  - One-sided projects  
  - Same variation of previous paper  
  - Program not large enough to be of ’general interest’
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- My take:
  - Start with a puzzle (and sometimes you have to find your puzzle)
  - Don’t require massive data acquisition before first-analysis (unless it’s a two-sided question and you care)
  - If you’re genuinely interested in a project – there’s no substitute for this!
  - One-sided projects can still be ok
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- As you go, your project idea always evolves...let it! Iterate between empirics, theory, and ideas
  - Idea ←→ Theory ←→ Empirics
  - Papers never follow a linear path (e.g. ask me about my JMP / Movers paper w Raj / etc).
    - The “scientific method” is not about testing hypotheses in data, but rather a series of learning opportunities as you explore data.
General Advice for Grad School

- Stay curious
  - Professors always joke that undergrads come up with better ideas than grad students
  - Don’t be afraid to be creative – crazy questions are ok
  - Don’t get caught up in the literature / what's been done
    - But once you have a “good” idea, read deeply in that literature and figure out what has been done, then iterate with your idea

- Choose topics that you are passionate about
  - Researching those topics isn’t work!
  - Will be easier to convince others its interesting if you think it is
After classes end in 2nd year, fewer opportunities for “discipline” – here’s how I wish I’d applied mine:

- Write good code and document your exploratory results in comments in your code
- When getting a dataset, first thing to do is open it up and look at it
  - Spend an hour to make sure the data looks reasonable
- It’s always worth writing out a model to explain your patterns / derive your regression equations
  - Not always clear it goes in the paper but still useful regardless
Most common question I am asked: How can I get access to US Tax / Census data?

My response:

- Can your question be asked without tax data? e.g. can you use less-restricted census data / FSRDC
- Do you have power? If you’re using cross-state variation, you’re ruining most of the value of population data
- Can you do preliminary analysis using public data to have a sense of whether your pattern is there?

If you have a project worth pushing for census / tax data, here are the paths:

- If you can only use Census data, submit an FSRDC application
- Submit to the SOI call for proposals (coming this summer)
- Collaborate with a researcher at the Office of Tax Analysis at Treasury or the Joint Committee for Taxation (both of whom have access to the data).

Ask for advice from folks with access, but remember many (like me) may be prevented from working on your project idea because it requires formal approval.
Other countries’ admin data is often less restrictive:
  - Norway, Denmark, Sweden, Germany, Italy, France...

Firms have an enormous amount of information
  - Generally under-explored in research:
    - Transactions / sales information
    - HR information
    - Search / website info

Other good sources for merging to gain new outcomes:
  - Voterfiles (contains race/demographics)
  - credit reports / court records
Presentations

- Graduate school has far too few opportunities to present
  - Take each presentation seriously, not just as feedback on your work but as an opportunity to improve your skills at presenting
  - But don’t let the stress overwhelm you – everyone gets stressed in presentations (including me) but the hope is you can translate it into productive energy
- Practice your presentations (I have never given a seminar that I have not practiced at least 10 times through)
  - Think through how you want to make your arguments to the listener
  - Practice transitions between slides
  - Know your slides and the details
  - Put some effort into slide construction – often one graph (or one number) can “make” a paper
  - More practice ex-ante can also reduce stress
- Appreciate feedback
  - You are not your paper
Some Topics I Find Interesting

Public Economics provides the toolkit to ask and answer the most pressing policy issues of our time:

- How should we fight growing inequality?
- How can we expand economic opportunity for kids?
- How should we fight climate change?
- How should we design choice architectures to help people overcome their behavioral biases?

Public economics helps us relate positive and normative analysis

- Main advice: Find a topic area for you to explore both positively and normatively
Some Topics I Find Interesting

Questions I like:

1. Should we tax firms versus people (e.g. firm owners), and if so how and why?
2. Desirability of place-based versus national policy
3. Endogeneity of public policies (i.e. political economy) – what are we missing by not thinking about political economy constraints?
4. Why don’t people take up social benefits? (and should we incentivize them to?)
5. What other markets are missing because of private information and what are the welfare implications? (Credit? Reclassification risk? Income insurance?)
6. Career trajectories within the firm - are they ‘efficient’ or burdened by problems of information asymmetries - and if so, should the govt intervene?
7. Competition in insurance markets – what’s the equilibrium? [Note: I’ve given up trying to think this can be solved…]
8. Endogenous preferences and impact on PF / role of policy (MVPF of being a jerk? Altruism? Endogenous altruism? Endogenous reductions in gender bias or racism?)