The Value of Unemployment Insurance

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September, 2018
Motivation: Value of Insurance

- Key for social insurance design:
  - Large literature on labour supply responses = cost of social insurance
  - Much less work on corresponding value of social insurance

- Conceptually easy; value of transferring dollar from good to bad state

- Challenge: how to evaluate in practice - especially when social insurance is mandated?
Unemployment and Consumption Drops

- Large literature studies consumption response to income shock and tests for presence of (partial) insurance
- “Consumption-Based Implementation” (Baily-Chetty, Gruber ’97)
  - Consumption response to U sufficient for value of UI
  - Overcomes challenge to observe means used to smooth consumption
  - But conditional on knowing preferences
- How well do consumption responses capture value of insurance?
  - Can we simply translate $\Delta$ consumption in $\Delta$ marginal utility?
  - Lack of smoothing: low value? or price high?
  - Huge debate $\Rightarrow$ Unresolved
This Paper:

We have a unique setting in Sweden:

1. **rich admin data** on income, wealth, unemployment, etc
2. **voluntary** UI coverage

We implement three alternative approaches in same setting/sample:

1. Revisit **CB approach** using admin data
   - Study different margins and heterogeneity in consumption responses
2. Propose novel **MPC approach**
   - State-specific MPCs reveal price of smoothing consumption
3. Implement **RP approach** based on UI choices
   - Study heterogeneity in valuations (conditional on unemployment risk)
We have a unique setting in Sweden:

1. **rich admin data** on income, wealth, unemployment, etc
2. **voluntary** UI coverage

We implement three alternative approaches in same setting/sample:

1. Revisit **CB approach** using admin data
   - CB indicates low value of UI ($< \text{MH costs}$)
2. Propose novel **MPC approach**
   - MPCs indicate high value of UI ($\gtrsim \text{MH costs}$)
3. Implement **RP approach** based on UI choices
   - RP confirms high value of UI and reveals large dispersion
Recent literature on value of UI:

- CB approach using admin data (Ganong and Noel ’16, Gerard and Naritomi ’18) rather than surveyed consumption (Browning and Crossley ’01, Stephens ’01)
- ‘optimization methods’ (Chetty ’08, Landais ’15, Hendren ’17)
- other social insurance settings (Finkelstein et al. ’15,'17, Low and Pistaferri ’15, Cabral ’16, Autor et al. ’17, Fadlon and Nielsen ’17)

Our new approaches relate to:

- heterogeneity in MPCs (e.g., Kreiner et al ’16, Kekre ’17, ...)
- RP vs. choice frictions (e.g., Abaluck and Gruber ’11, Handel ’13, Handel and Kolstad ’15, ...)

Building on own previous work:

- use CB approach to study optimal dynamics of UI (Kolsrud et al. ’18)
- use UI choices to study adverse selection in UI (Landais et al. ’18)
Outline

1. Introduction

2. Context & Data

3. Consumption-Based Approach

4. MPC Approach

5. Revealed Preference Approach
Data from tax registers on all earnings/income, transfers/taxes, debt & assets (balance & transactions), some durables

- Consumption as a residual expenditure measure (Kolsrud et al. ’17)

\[ consumption_t = income_t - \Delta assets_t \]

- Sources of income variation (UI benefits, transfers, asset price shocks)

Data on UI coverage choices [2002-2008]

- workers can opt for comprehensive coverage (\( \sim 80\% \) replacement rate)
- alternative is a flat minimum benefit level
- uniform price (subsidized): 4 out of 5 take comprehensive coverage

Data on unemployment outcomes:

- On unemployment spells & benefit receipt
- On determinants of U risk
- On elicited unemployment risk (surveys)
Introduction

Context & Data

Consumption-Based Approach

MPC Approach

Revealed Preference Approach
Approach I: Consumption-Based Approach

CB Approach

MRS is determined by consumption drop and risk aversion:

\[
\frac{u'_u(c_u)}{u'_e(c_e)} \approx 1 + \gamma \times \frac{c_e - c_u}{c_e}
\]

where \( \gamma = c_e \cdot u''(c_e) / u'(c_e) \)

- Approximation ignores state-dependent preferences and relies on Taylor expansion

\[
u'(c_u) \approx u'(c_e) + u''(c_e)[c_e - c_u]
\]

- Remarkably easy to implement if preferences are known...
Yearly Consumption Relative to Year of Displacement

Consumption relative to event time -1

Years from/to layoff

Identification
From Annual C to Flow Drops
NN Matching

Landais & Spinnewijn (LSE)  Value of UI  September, 2018
Drop in consumption at U
\[ \Delta C / C = -12.9\% \ (0.028) \]
Comparing Value vs. Cost of UI

Landais & Spinnewijn (LSE) Value of UI September, 2018
Comparing Value vs. Cost of UI

\[ \gamma = 1 \quad \gamma = 4 \quad 1 + \varepsilon \]

Moral hazard bounds

Krusger Meyer '02

KLNS '18

\[ \text{Marginal Rate of Substitution} \]

CI

MH bounds

Landais & Spinnewijn (LSE)
Decomposition of Cons. Responses: HH Consumption

Estimated change at U, relative to year -1 consumption

Consumption

Estimated change at U, relative to year -1 consumption

-.5 -.25 0 .25 .5

Details

Landais & Spinnewijn (LSE) Value of UI September, 2018
<table>
<thead>
<tr>
<th>Consumption (laid-off worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated change at $U$, relative to year -1 consumption</td>
</tr>
<tr>
<td>-0.5</td>
</tr>
</tbody>
</table>

Details

Landais & Spinnewijn (LSE)

Value of UI

September, 2018
Decomposition of Cons. Responses: Transfers

Estimated change at U, relative to year -1 consumption

<table>
<thead>
<tr>
<th>Consumption</th>
<th>Earnings (laid-off worker)</th>
<th>Transfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.5</td>
<td>-.25</td>
<td>0</td>
</tr>
<tr>
<td>.25</td>
<td>.5</td>
<td></td>
</tr>
</tbody>
</table>

Landais & Spinnewijn (LSE)
Decomposition of Cons. Responses: $-\Delta$ Assets

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landais &amp; Spinnewijn (LSE)</td>
</tr>
</tbody>
</table>
Decomposition of Cons. Responses: $\Delta$ Debt

- Consumption
- Earnings (laid-off worker)
- Transfers
- Consumption out of assets
- Consumption out of debts

Estimated change at $U$, relative to year -1 consumption

Details

Landais & Spinnewijn (LSE)
Decomposition of Cons. Responses: Spousal Earnings

<table>
<thead>
<tr>
<th>Consumption</th>
<th>Earnings (laid-off worker)</th>
<th>Transfers</th>
<th>Consumption out of debts</th>
<th>Consumption out of assets</th>
<th>Spousal earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.5</td>
<td>-.25</td>
<td>0</td>
<td>.25</td>
<td>.5</td>
<td></td>
</tr>
</tbody>
</table>

Estimated change at U, relative to year -1 consumption

Details

Landais & Spinnewijn (LSE) | Value of UI | September, 2018
**Heterogeneity in Consumption Responses**

<table>
<thead>
<tr>
<th>Age</th>
<th>35 to 44</th>
<th>45 to 55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital status</td>
<td>Not married</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>3rd quartile</td>
<td>2nd quartile</td>
</tr>
<tr>
<td>Wealth</td>
<td>3rd quartile</td>
<td>2nd quartile</td>
</tr>
<tr>
<td>Liquid assets</td>
<td>Some positive assets</td>
<td>Top 10%</td>
</tr>
<tr>
<td>Debt</td>
<td>3rd quartile</td>
<td>2nd quartile</td>
</tr>
<tr>
<td>Benefits</td>
<td>Less than 80% of wage</td>
<td></td>
</tr>
</tbody>
</table>

**Marginal monthly drop in consumption in year 0**

<table>
<thead>
<tr>
<th>Less severe drop</th>
<th>More severe drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.2</td>
<td>0.05</td>
</tr>
<tr>
<td>-0.15</td>
<td>0.05</td>
</tr>
<tr>
<td>-0.1</td>
<td>0.05</td>
</tr>
<tr>
<td>-0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>0</td>
<td>0.05</td>
</tr>
<tr>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>0.1</td>
<td>0.05</td>
</tr>
</tbody>
</table>
Can we translate $\Delta$ consumption in $\Delta$ marginal utility?

- Large $\Delta C$ relative to $\Delta Y$ at displacement $\Rightarrow$ high $p_u/p_e$? or low $\gamma$?
- Large $\Delta C$ for liquidity or debt-constrained $\Rightarrow$ high $p_u/p_e$?

Other challenges:

1. State-dependent Expenditures
2. State dependent utility
3. Anticipation (e.g. Hendren [2017, 2018])
4. Heterogeneity (e.g. Andrews & Miller [2013])
Can we translate $\Delta$ consumption in $\Delta$ marginal utility?

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Other challenges:

1. **State-dependent Expenditures**

   Using consumption surveys, we find:
   
   - committed expenditures (e.g., rent) drop very little
   - durable good consumption (e.g., furniture) drops early on in the spell
   - employment-related, but also leisure expenditures drop substantially
   - increase in home production

2. **State dependent utility**

3. **Anticipation** (e.g. Hendren [2017, 2018])

4. **Heterogeneity** (e.g. Andrews & Miller [2013])
Can we translate $\Delta$ consumption in $\Delta$ marginal utility?

- Large $\Delta C$ relative to $\Delta Y$ at displacement $\Rightarrow$ high $p_u/p_e$? or low $\gamma$?
- Large $\Delta C$ for liquidity or debt-constrained $\Rightarrow$ high $p_u/p_e$?

Other challenges:

1. State-dependent Expenditures

2. State dependent utility
   - Complementarities btw C & L, reference-dependence, etc.
   \[
   \frac{u'_u(c_u)}{u'_e(c_e)} \approx 1 + \gamma e \times \frac{c_e - c_u}{c_e} + \theta
   \]
   \[
   \theta = \frac{u'_u(c_u) - u'_e(c_u)}{u'_e(c_e)}
   \]

3. Anticipation (e.g. Hendren [2017, 2018])

4. Heterogeneity (e.g. Andrews & Miller [2013])
Can we translate $\Delta$ consumption in $\Delta$ marginal utility?

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Other challenges:

1. State-dependent Expenditures
2. State dependent utility
3. Anticipation (e.g. Hendren [2017, 2018])
   - Drop at $U = \text{drop conditional on } U \text{ risk already revealed at } U$
   - Individuals who end up unemployed were also more risky
   - Anticipation reduces drop in $C$ at $U$
   - **Solution:** Rescale changes in $C$ at job loss by risk revealed
     Or rescale change in $C$ before $U$ by amount of risk revealed before $U$

4. Heterogeneity (e.g. Andrews & Miller [2013])
Can we translate $\Delta$ consumption in $\Delta$ marginal utility?

- Large $\Delta C$ relative to $\Delta Y$ at displacement $\Rightarrow$ high $p_u/p_e$? or low $\gamma$?
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Other challenges:

1. State-dependent Expenditures
2. State dependent utility
3. Anticipation (e.g. Hendren [2017, 2018])
4. Heterogeneity (e.g. Andrews & Miller [2013])
   - Heterogeneity in MRS important for policy design
   - Mapping btw heterogeneity in $\Delta c$ & in MRS is tricky!
   - Need to account for $Cov(\gamma, \Delta c)$
### Approach II: State-Specific MPC’s

#### MPC approach

Under ‘regularity conditions’, MRS is bounded by:

\[
\frac{u_u'(c_u)}{u_e'(c_e)} \geq \frac{MPC_u/(1 - MPC_u)}{MPC_e/(1 - MPC_e)}
\]

with  \( MPC_s \equiv dc_s/dy_s \).

- **Idea:** smoothing behavior depends on state-specific price of increasing consumption, \( p_s \):
  - intertemporal savings \( \rightarrow p_s = R_s \)
  - household labour supply \( \rightarrow p_s = 1/w_s \)
  - insurance \( \rightarrow p_s = \text{Arrow-Debreu price} \)

- **Challenge:** what is \( p_u/p_e \)? what is binding margin of adjustment?

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Details on Framework
**Solution:** state-specific $MPC_s$ reveals state-specific price $p_s$

- MPC is higher when price of increasing consumption is higher

$$\frac{dc_s}{dy_s} = \frac{p_s \times \frac{\sigma_x}{\sigma_c}}{1 + p_s \times \frac{\sigma_x}{\sigma_c}}$$

- Mitigated by curvature over consumption $c$ vs. used resource $x$

**‘Trick’:** rescaling of $MPC_u$ vs. $MPC_e$

- Takes out impact of relative curvature (e.g., CARA prefs)
- Overcomes challenges to CB approach (e.g., work exps, home prodn)

**Builds on ‘optimization approaches’:**

- Choices (e.g., spousal labor, precautionary savings) reveal value of UI...
- ... but requires the studied margin of adjustment to be binding
**Challenge:** need comparable exogenous variation in income when employed vs. unemployed

- Use variation in local transfers
  - Local transfers = large fraction of HH transfers
    - Means-tested/categorical transfers, housing benefits, ...
    - Regulated at national level, large discretion at municipality level
  - Large variation across municipalities / over time / across HH types
    - Use interaction of sources of transfer variation in FD approach
      \[ C_{ijt} = \alpha_i + \eta_j + \delta_t + \gamma h_{ijt} + X'_{it} \beta \]
    - \( X \): rich vector of characteristics determining transfers
  - Estimate on sample of individuals who become unemployed
    - Compare them when employed vs unemployed
MPC: Transfer

MPC Unemployed: 0.421 (0.033)
MPC Employed: 0.238 (0.022)

Additional Evidence - UI benefit kink
Additional Evidence - K income shock

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Value of UI
September, 2018
Variation in Local Transfers:

Mean residualised social aid by Kommun SEK '000s

- (.5, 8]
- (-1.6, .5]
- (-2.9, -1.6]
- (-4.4, -2.9]
- [-11.1, -4.4]

Back

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Variation in Local Transfers:

Single parent household, difference in social aid b/w bottom and 2nd quintile, SEK '000s

-5.7, 15.2
-4.4, 5.7
-3.4, 4.4
-1.9, 3.4
-3.5, 1.9
N.D.

Change in residualised social aid, 2000-2007

SEK '000s

-8.3, 21.1
-4.3, 8.3
-2, 4.3
-1.2, 2
-14.9, -1.2
N.D.
Estimates of MRS: CB vs. MPCs

\[ \gamma = 1 \quad \gamma = 4 \quad 1 + \varepsilon \]

KM '02
KLNS '18

MPC transfer shock

Marginal Rate of Substitution

CI
MH bounds
**Approach III: Revealed Preference Approach**

**RP approach**

When offered insurance, choice reveals MRS given *expected* price per unit of coverage:

\[
\frac{u_u'(c_u)}{u_e'(c_e)} \geq \frac{p_u}{p_e} \times \frac{[1 - \pi]}{\pi}
\]

- Most direct approach?
  - When prices are known, could infer value from insurance choice
  - But ex-ante choice: need to account for unemployment risk \( \pi \)!

- Challenges:
  1. Requires data on choices and unemployment risk
  2. Need variation in ‘expected’ price to tighten bounds
  3. Tackle potential choice frictions: e.g., risk misperception, inertia
RP Approach: Implementation

- **Swedish Context:**
  - Basic plan \((b_0, \tau_0)\) vs comprehensive plan \((b_1, \tau_1)\)
  - Expected price \(E[P] = \frac{(1-\pi_i) \times (\tau_1-\tau_0)}{\pi_i \times (b_1-b_0)}\)

- Use non-parametric approach to put bounds on MRS

- Use parametric approach to estimate MRS distribution:
  - Estimate random effect logit model:
    - ‘insured’ if \(\text{MRS} - E[P]_{it} + \varepsilon_{it} \geq 0\)
    - \(\alpha_i + X'\beta\)
    - \(X\): vector of observables affecting MRS (age, education, income, etc.)
  - Predict unemployment risk \(\pi_i\) based on \(X + Z\):
    - \(Z\): risk shifters \(\perp X\) (relative tenure rank, layoff notifications)
    - account for MH: estimate separately on ‘insured’ and ‘uninsured’
    - account for frictions: (i) salient risk shifters, (ii) elicited beliefs
RP Parametric: MRS distributions

Marginal Rate of Substitution

MPC transfer shock

MH bounds

CI

RP parametric (lower bound)

RP parametric (upper bound)
Revisited consumption-implementation using registry-based measure
- find ‘small’ consumption drops which translate in low value of UI for standard preferences
- limited consumption smoothing beyond (generous) social transfers

Alternative approaches suggest high mean and variance in the value of UI
- high mean: generous UI is desirable
- high variance: allow for choice or differentiate UI policy
- need caution when using CB approach to guide policy

State-specific MPCs seem robust alternative to CB approach & extendible to other social insurance settings when no choice is available