Optimal Welfare Programs with Search, Work, and Training

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Introduction

- Government expenditures on labor market policies in OECD countries amount to 3% of GDP (growing)

- Large variety of policy instruments targeting the unemployed

- Most governments use a mix of policy instruments
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• Large variety of policy instruments targeting the unemployed

• Most governments use a mix of policy instruments

• A welfare program is a government expenditure program that combines different policies

• A policy is a prescription of an activity (search, work, train, or rest) to the unemployed, with associated transfer
What we do

1. We develop a dynamic contracting framework to study welfare programs from a normative perspective

- An *optimal welfare program* maximizes the unemployed agent *ex-ante utility, for a given level of government expenditures*

⇒ Efficient choice of activity (use of available technologies) and transfers (incentive compatible provision of insurance)
What we do

1. We develop a dynamic contracting framework to study welfare programs from a normative perspective

   • An optimal welfare program maximizes the unemployed agent ex-ante utility, for a given level of government expenditures

   \[\Rightarrow\] Efficient choice of activity (use of available technologies) and transfers (incentive compatible provision of insurance)

2. We characterize:

   • optimal sequence of policies

   • optimal level and time-path of consumption (benefits during unemployment, taxes/subsidies upon re-employment)

3. We compare existing (U.S.) to efficient program: evaluation based on National Evaluation of Welfare-to-Work Strategies (NEWWS)
Preferences, endowments, markets

• Agent is infinitely lived, discounts future at rate $\beta = q$

• Intra-period utility $u(c) - a$

  ▶ Separable in consumption $c$ and effort $a \in \{0, e\}$

  ▶ $u(\cdot)$ increasing, strictly concave, smooth, and $u^{-1}$ has convex first derivative (Newman, 1995)

• Agent endowed with human capital $h$

• No access to either storage or borrowing
Production technologies

• Work activity requires effort $e$ to be productive

• Effort during work $a \in \{0, e\}$ fully observable and contractible
Production technologies

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- Effort during work $a \in \{0, e\}$ fully observable and contractible
- Primary production technology
  - Output is $\omega(h)$, $\omega(\cdot)$ increasing in $h$
  - Access to this technology is frictional
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• Secondary production technology
  ▶ Output is $\omega$, independent of $h$
  ▶ Access to this technology is frictionless, i.e. readily available
Search technology

- Search activity yields at most one contact per period
- **Stock-flow approach** (Coles-Smith, 1999) in three stages:
  1. **Application**: number of job opportunities $\eta(h, a)$, where $\eta(h, e) > \eta(h, 0) \equiv 0$, $\eta(\cdot, e)$ increasing in $h$
  2. **Contact**: probability of being recontacted by firm $\mu$
  3. **Hire**: upon contact, prob. of being retained by firm $\lambda(r)$, where worker’s action $r \in \{0, 1\}$ and $\lambda(1) = \lambda > \lambda(0) = 0$

$\Rightarrow$ **Job finding probability**: $\pi(h, e, r) = \lambda(r)[1 - (1 - \mu)\eta(h, e)]$

- Both search effort $a$ and retention action $r$ are **private information** to the agent (and under her control)
Matching technology

- Matching is superior technology to search, but costly

- It allows to skip the first two steps of the search process i.e., application & re-contact

- Upon payment of $\kappa^M$, a contact is created without search effort

  - $\mu^M = 1 \Rightarrow$ job finding rate is $\lambda(r)$

  - Hire still subject to worker’s retention action
Human capital depreciation

• Except during primary employment, human capital depreciates deterministically at rate $\delta$
  
  ▶ wage depreciation, since $\omega(h)$
  
  ▶ duration dependence in hazard rate, since $\pi(h, \cdot)$
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• Training technology offsets depreciation and rebuilds human capital
Principal-Agent relationship

• The risk-neutral principal offers a contract that specifies:

  1. use of technology: search, matching, secondary production
  2. recommendations on the effort level $a$ and retention action $r$
  3. consumption (benefits and wage tax/subsidies) for agent
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• Recursive formulation: three state variables
  1. (primary) employment status $s \in \{0, 1\}$ (with $s = 1$ absorbing)
  2. human capital $h \leftrightarrow$ duration $d$
  3. continuation utility $U$ promised by the contract
Options of contract as policies of welfare program

• Combination of recommendations on effort, retention action \( r = 1 \), and use of search, matching and work technologies leads to five policy instruments:

  ▶ **UI** : Unemployment Insurance (search, high effort)
  ▶ **JA** : Job-search Aid (matching, low effort)
  ▶ **SA** : Social Assistance (no use of technologies, low effort)
  ▶ **MW** : Mandatory Work (work, high effort)
  ▶ **TW** : Transitory Work (matching+work, high effort)
Unemployment Insurance (UI)

\[ V^{UI}(U, h) = \max_{c, U^s, U^f} -c + \beta \left[ \pi(h, e) W(U^s, h') + (1 - \pi(h, e)) V(U^f, h') \right] \]

subject to

\[ u(c) - e + \beta \left[ \pi(h) U^s + (1 - \pi(h)) U^f \right] \geq u(c) + \beta U^f \quad (IC - S) \]

\[ U = u(c) - e + \beta \left[ \pi(h) U^s + (1 - \pi(h)) U^f \right] \quad (PK) \]

\[ h' = (1 - \delta) h \]

where

\[ V(U, h) = \max \{ V^{UI}(U, h), V^{JA}(U, h), V^{SA}(U, h), V^{MW}(U, h), V^{TW}(U, h) \} \]
Economic forces in the choice of policies

- Effort compensation cost (UI, TW, & MW): increasing in $U$
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- 'Net' returns to search/matching (UI, JA, & TW): increasing in $h$ and decreasing in $U$
Economic forces in the choice of policies

- **Effort compensation cost** (UI, TW, & MW): increasing in $U$
- ‘Net’ returns to search/matching (UI, JA, & TW): increasing in $h$ and decreasing in $U$
- **Incentive costs**
  
  **Search (UI):**
  \[ U^s - U^f \geq \frac{e}{\beta \pi(h)} \]  
  \[ \text{(IC-S)} \]

  **Retention (JA & TW):**
  \[ U^s \geq U^f \]  
  \[ \text{(IC-R)} \]

  - IC-S costs decreasing in $h$
  - Both IC-S and IC-R costs increasing in $U$, since $u^{-1}$ has convex first derivative
Optimal policy transitions and benefits

• Proposition 1: *Without human capital depreciation*, there is no policy transition within an optimal welfare program, i.e. every policy is absorbing.
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• **Proposition 2:** *With human capital depreciation:*
  
  (i) SA and MW are absorbing policies
  
  (ii) the possible optimal policy sequences are:

  1. \( UI \rightarrow JA \rightarrow SA \)
  2. \( UI \rightarrow TW \rightarrow MW \)
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• Proposition 1: Without human capital depreciation, there is no policy transition within an optimal welfare program, i.e. every policy is absorbing.

• Proposition 2: With human capital depreciation:
  (i) SA and MW are absorbing policies
  (ii) the possible optimal policy sequences are:

  1. $UI \rightarrow JA \rightarrow SA$
  2. $UI \rightarrow TW \rightarrow MW$

• Proposition 3: Optimal benefits are decreasing during $UI$ and $JA$, and constant during $SA$, $TW$, and $MW$. 
Application: United States

- Federal legislation attributes to States power to administer/design welfare programs

- *National Evaluation of Welfare-to-Work Strategies (NEWWS)*: government-sponsored large-scale longitudinal study based on random assignment of 40,000 individuals between 1991-1999 in five distinct U.S. locations

- Two sets of WTW programs with different features:
  - Labor Force Attachment (LFA): emphasis on work
  - Human Capital Developm. (HCD): emphasis on training