Wage Risk and Employment Risk Over the Life Cycle

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Main Question

In order to accurately analyze welfare costs of labor market risk and their policy implications, one must distinguish between wage movements caused by

Shocks vs Endogenous responses to shocks

- Which shocks are more costly in terms of welfare? Namely, distinguish between:
  - Shocks to Productivity
  - Shocks to Employment
- What partial insurance channels provided by the government are more useful?

Shocks vs. Responses

"Perceived" idiosyncratic risk in wage data can be decomposed into:

- Shocks
  - Wage Risk
    1. Individual productivity shocks
  - Employment Risk
    1. Job destruction
    2. Job offer arrival rates
    3. Firm-worker match quality
- Responses to Shocks
  1. Labor participation decision: (start) work, or quit
  2. Job mobility decision: switch jobs

Wage Structure

Two groups: High School diploma or less vs at least some college
For each group:

$$\ln w_{it} = d_t + x_{it}\psi + u_{it} + e_{it} + a_{ij(t_0)}$$

w_{it}: real hourly wage

d_t: log price of human capital at time t

x_{it}: vector of regressors which includes age

u_{it}: permanent idiosyncratic component ($u_{it} = u_{i,t-1} + \xi_t$)

e_{it}: measurement error

$a_{ij(t_0)}$: match quality between worker i and firm j for whom the worker began working in time $t_0 \leq t$. Constant for the duration of the (i, j) relationship.

$a_{ij(t_0)}$ and ξ_t normally distributed with variances σ_a, σ_ξ, respectively

Job Arrival, Destruction and Insurance

- Job Arrival and Destruction:
  - Employed workers receive offers at rate λ^e
  - Not employed workers receive offers at rate λ^n
  - Exogenous job destruction with probability δ
- Government provides partial insurance:
  - Unemployment Insurance: Paid for one period following job *destruction*
  - Universal Means-Tested Program: Paid in cash, and means tested on income only: *gross income* $\leq$ *poverty line*
  - Social Security: Given in retirement
  - Government funds programs with labor taxes, and balances *separate* budgets for each education group.

Life Cycle

- Each agent i has $U(c_{it}, P_{it}) = \frac{(c_{it}\exp(\eta P_{it}))^{1-\gamma}}{1-\gamma}$ and:

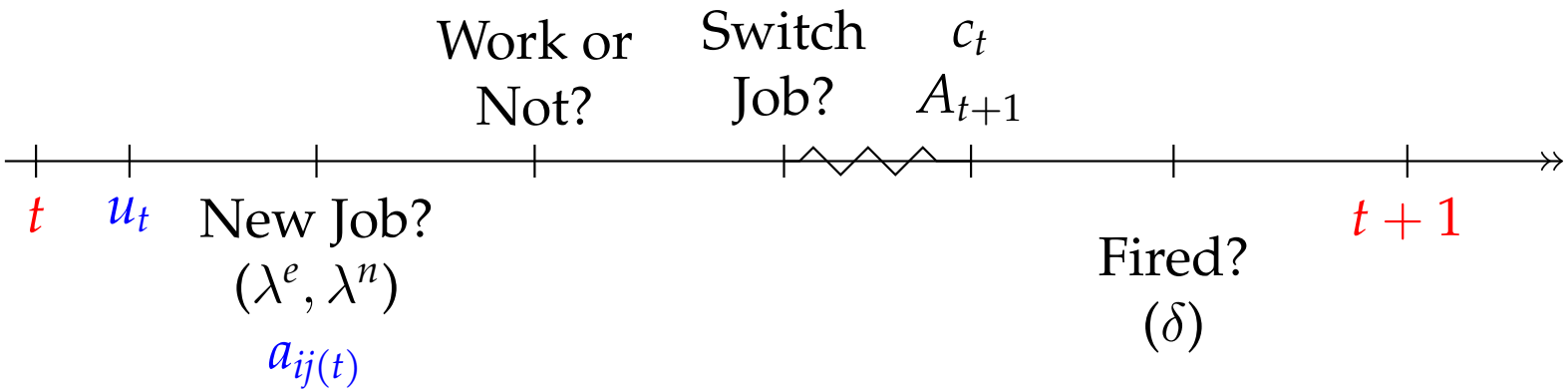
$$\max_{c,P} V_{it} = E_t \sum_{s=t}^{L} \beta^{s-t} U(c_{it}, P_{it})$$

- Budget and borrowing constraints:

$$\frac{A_{i,t+1}}{R} = A_{it} + (w_{it}(1-\tau_w)h - F_{it})P_{it} + B_{it}\mathbb{I}_{it}^{UI}(1-P_{it}) + T_{it}\mathbb{I}_{it}^{T} - c_{it}$$
$$A_{it} \geq 0$$

- Agents work between ages of 22 and 62, retires for 10 years and dies with certainty at 73
- In retirement, receive Social Security. Consume and save.

Agents' Problem



- 1. Begin Employed + quit $\Rightarrow$ (?) Food Stamps.
  2. Begin Unemployed + does not take offer $\Rightarrow$ UI + (?) Food Stamps.
- Make consumption and asset choices taking into account:
  1. Expected productivity next period
  2. Exogenous separation
  3. Expected offers next period (probability contingent on employment choice today)

CALIBRATION

1. Estimate wage process parameters from PSID and SIPP; separately for each education group
   - Two-step Heckman selection model to correct for participation and job switch decisions.
2. Internally calibrate ten parameters to match average *employment rates* for 4 age groups, and mean *unemployment duration* for 8 age groups, by education: 24 moments in total

	δ	λ^n	λ^e	F	η
High Educ	0.028	0.82	0.72	\$1213	-0.62
Low Educ	0.049	0.76	0.67	\$1088	-0.55

Results I: Fit

Figure 1: Employment over the Life-Cycle

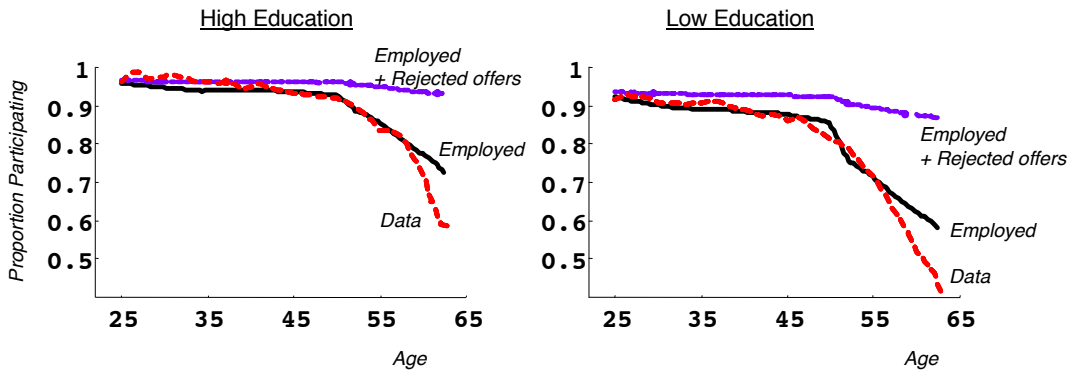
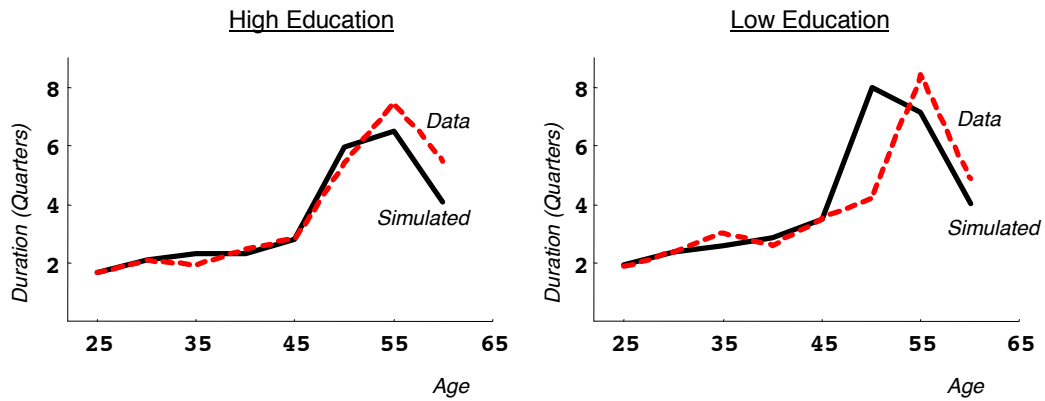
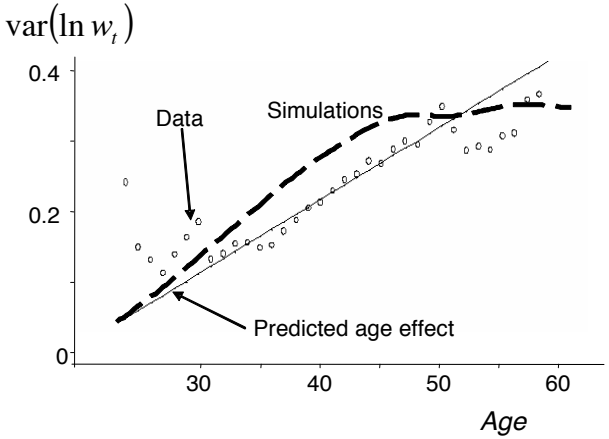


Figure 2: Mean Duration over the Life-Cycle



RESULTS II: IMPLICATIONS

1. *Costly displacement:* wages are 20% lower upon reentry for the high educated; 14% for the low educated.
2. *Accepted Offers:* Among high, 62% of offers are accepted by the unemployed; only 4.7% accepted by employed.
3. *Wage Dispersion:* Relative to the random walk persistent component, inequality is amplified in youth through match heterogeneity and dampened in old age through selection into work.



4. *Consumption Fall at Unemployment:* for high types, 61% of income loss passes onto consumption; 45% for low.

Welfare Cost of Risk

Two worlds:

- One with increased productivity risk,
- The other, with increased employment risk.

Ask the agents in the model:

Given that you live in the "experimental" world, how much lifetime consumption would you be willing to give up in order to live in the baseline world?

Welfare Cost of Risk

- Increase in productivity risk ($\sigma_\xi^2 \uparrow$):
  1. Output drops: decreased participation
  2. Welfare Drop $>$ Output Drop: high agents are willing to "pay" 19.2% of consumption, when output is only 3.7% below baseline.
  3. Welfare drop is larger for the high educated
     ...even though output drop is larger for the low educated
     $\Rightarrow$ low group benefits more from insurance
- Increase in job destruction rate ($\delta \uparrow$):
  1. Output drops: increased unemployment, shorter times for good matches
  2. Welfare loss smaller than output drop: increased leisure offsets welfare loss

Welfare Cost of Risk

Another way to ask the previous question:
Drop variance of annual income growth by 5%.

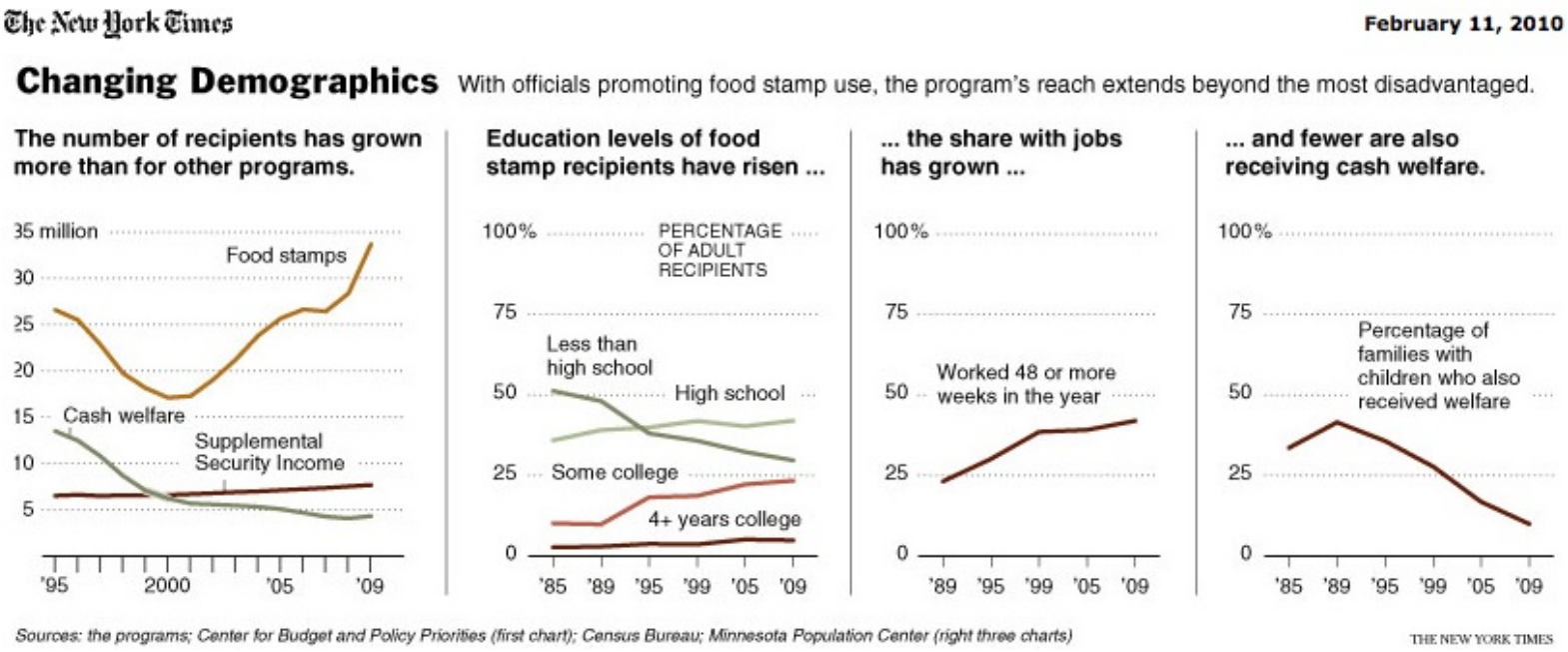
- Do this through lowering *only* productivity risk or *only* employment risk.
- Both groups willing to ”pay” more to lower productivity risk (at least 3.5% in consumption vs at most 0.75%)
- Wage risk increases the variance of the permanent component of earnings
- ... employment risk has a lot less persistent effects on income

Which Government Insurance?

Government wants to increase spending in social insurance by 1%

- Unemployment insurance or Food-Stamps type program?
- Both groups gain more from Food Stamps program
- Pure insurance effect (no redistribution)
- In the model, food stamps provide insurance against productivity shocks - connect to previous experiments

NY Times Article



Value Function (Employed)

$$
\begin{aligned}
V_t^e(A_{it}, u_{it}, a_{ij(t_0)}) = \max_c \{ & U(c_{it}, P_{it} = 1) + \beta\delta\mathbb{E}[V_{t+1}^n(A_{i,t+1}, u_{i,t+1})|u_t] \\
& + \beta(1-\delta)(1-\lambda^e)\mathbb{E}[\max\{V_{t+1}^n(A_{i,t+1}, u_{i,t+1}), \\
& \qquad V_{t+1}^e(A_{i,t+1}, u_{i,t+1}, a_{ij(t_0)})\}|u_t] \\
& + \beta(1-\delta)\lambda^e\mathbb{E}[\max\{V_{t+1}^n(A_{i,t+1}, u_{i,t+1}), \\
& \qquad V_{t+1}^e(A_{i,t+1}, u_{i,t+1}, a_{ij(t_0)}) \\
& \qquad V_{t+1}^e(A_{i,t+1}, u_{i,t+1}, a_{ij(t+1)})\}|u_t, a_{ij(t)}]\}
\end{aligned}
$$