ECON 810 Final Project

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March 9, 2022

Roadmap

1. Data
2. Model
3. Results

Model

Environment

- Households live for T periods, without retirement.
- Agents are heterogeneous in human capital h, assets k, and years of schooling S.
- They spend s proportion of time in school each period.
- Agents are either employed or unemployed (but looking for a job).
- There are two kinds of firms: a high type and a low type.

Model

Firms

- There are 2 firm types $I \in \{L, H\}$.
- μ fraction of firms are low type. Alternatively, we could think of this as μ proportion of all job vacancies are for the low type firm.
- Firm type $I = L$ hires all workers while firm type $I = H$ hires only workers with $S \geq \underline{S}$.

Model
Workers

- Workers are either employed (without on the job search) or unemployed (actively searching for a job).

- Agents take as given these 3 state variables each period:
    - $h \in \mathbb{R}_+$ human capital. Law of motion $h' = \exp z' H(h, s)$.
    - $k \in \mathbb{R}_+$ assets.
    - $S \in \mathbb{R}_+$ (accumulated) schooling. Law of motion $S' = S + s$.

- S, i.e. years of schooling, determines the probability that an agents receives an offer from the high type firm.
    - We could think of S as minimum required qualifications for a high paying job.

Model

Unemployed Agents

- Agents divide their time between searching for a job with intensity γ and schooling s:

$$\gamma + s = 1$$

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- Given γ and S, their probability of finding a job is

$$\Pi_t(\gamma, S) = \gamma \cdot \frac{S}{t}$$

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- Value function depends on whether the agents have a minimum of $\underline{S}$ years of schooling or not.

Value Function if $S < \underline{S}$

$$U_t(h,k,S) = \max_{k',s}\Big\{u(c) + \beta\mathbb{E}\Big[\Pi(\gamma,S)\cdot\mu\cdot W^L_{t+1}(h',k',S') + (1-\Pi(\gamma,S)\cdot\mu)U^L_{t+1}(h',k',S')\Big]\Big\}$$

Value Function if $S \geq \underline{S}$

$$U_t(h,k,S) = \max_{k',s}\Big\{u(c) + \beta\mathbb{E}\Big[\Pi_t(\gamma,S)\left[\mu W^L_{t+1}(h',k',S') + (1-\mu)W^H_{t+1}(h',k',S')\right] + (1-\Pi_t(\gamma,S))U^L_{t+1}(h',k',S')\Big]\Big\}$$

with the budget constraint

$$c + k' \leq b + k(1+r).$$

- Divide their time for $s + l = 1$.
- No on-the-job search allowed.

Value function, employed at firm l

$$W_t^l(h, k, S) = \max_{k', s} \left\{ u(c) + \beta \mathbb{E} \left[(1-\delta) W_{t+1}^l(h', k', S') + \delta U_{t+1}(h', k', S') \right] \right\}$$

with the budget constraint

$$c + k' \leq R_t^l h l + k(1+r)$$

Model

Timing

1. Start each period t with (k, h, S). At $t = 1$, all agents are unemployed.
2. Given their employment status at the start of each period, agents choose s and k', and pin down c.
3. If employed, $l = 1 - s$. If unemployed, $\gamma = 1 - s$.
4. If unemployed, given γ, S, agents have a probability of receiving a job offer.
5. If $S > \underline{S}$, of the offers they receive, a fraction $1 - \mu$ comes from high type firm.
6. If employed, agents may lose their job with a probability δ.

Results

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Results