

ECON 810 Final Project

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Roadmap

- 1 Data
- 2 Model
- 3 Results

- Agents live for T periods, without retirement.
- Agents are heterogeneous in human capital h , assets k , and years of schooling S .
- Agents have 1 unit of time endowment each period.
- They spend $s \leq 1$ investing in education each period.
- Agents are either employed or unemployed (but looking for a job).
- There are two kinds of firms: good firms (high type) and bad firms (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 $S \geq \underline{S}$.
- Firms differ in their productivity and consequently their rental rate of labor.

$$R_t^H > R_t^L, \forall t$$

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 $S < \underline{S}$

$$U_t(h, k, S) = \max_{k', s} \left\{ u(c) + \beta \mathbb{E} \left[\Pi(\gamma, S) \cdot \mu \cdot W_{t+1}^L(h', k', S') \right. \right. \\ \left. \left. + (1 - \Pi(\gamma, S) \cdot \mu) U_{t+1}^L(h', k', S') \right] \right\}$$

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

$$U_t(h, k, S) = \max_{k', s} \left\{ u(c) + \beta \mathbb{E} \left[\Pi_t(\gamma, S) \left[\mu W_{t+1}^L(h', k', S') + (1 - \mu) W_{t+1}^H(h', k', S') \right] \right. \right. \\ \left. \left. + (1 - \Pi_t(\gamma, S)) U_{t+1}^L(h', k', S') \right] \right\}$$

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

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

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

s policy function

Results

Results