Final Project Setup

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1 Model

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

1.1 Firms

- There are 2 firm types $I \in \{L, H\}$, with μ fraction of firms being the low type.
- Firm type $I = L$ hires all workers while firm type $I = H$ hires only workers with $S \geq \underline{S}$.

1.2 Workers

- Law of motion of human capital is: $h' = \exp(z)H(h, s)$ where $z \in \mathbb{R}_+$ is a random shock.

1.2.1 Unemployed Workers

- Search for a job with intensity γ, $(\gamma + s = 1)$.
- Receive a job offer with probability $\pi(\gamma, S)$, $(\pi(0, \cdot) = 0)$ – $\pi_t(\gamma, S) = \gamma \cdot \frac{S}{t}$.
- Dependent on S they might receive an offer from just L or both firms.
- Receive unemployment benefits b while unemployed.
- There are 3 state variables:
  - $h \in \mathbb{R}_+$ 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 $S' = S + s$.

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

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

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

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

with the budget constraint

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

1.2.2 Employed Workers

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

Value function

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

with the budget constraint

$$c + k' \leq R^I_t hl + k(1+r)$$