

The model of Krusell and Smith (1998) with endogenous labor supply

Recursive formulation

The heterogeneous household's problem is as follows:

$$\begin{aligned} V(a, z; S) &= \max_{c, l, a'} \theta \log(c) + (1 - \theta) \log(1 - l) + \beta \mathbb{E}V(a', z'; S') \\ \text{s.t. } c + a' &= (1 + r(S))a + w(S)zl \\ a' &\geq 0 \\ S' &= \Gamma_S(S) \quad (\text{Aggregate law of motion}) \\ z' &\sim \pi(z'|z) \end{aligned}$$

where $S = \{\Phi, A\}$ is the aggregate state.

The production side is as follows:

$$\max_{K, L} AK^\alpha L^{1-\alpha} - w(S)L - (r(S) + \delta)K$$

The capital rent $r(S)$ and the wage $w(S)$ are determined at the competitive market:

$$\begin{aligned} [r] : \quad & \int a'(a, z; S) d\Phi(S) = K'(S) \\ [w] : \quad & \int zl(a, z; S) d\Phi(S) = L(S) \end{aligned}$$