

An RBC model with asset price and convex adjustment cost

A representative firm solves the following problem:

$$\begin{aligned} J(k; S) = \max_{k'} & Ak^\alpha - k' + (1 - \delta)k - \frac{\mu}{2} \left(\frac{k' - (1 - \delta)k}{k} \right)^2 k + \beta \mathbb{E} M(S, S') J(k'; S') \\ \text{s.t.} \quad & S' = \Gamma_S(S) \quad (\text{Aggregate law of motion}) \end{aligned}$$

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

The household-side problem is as follows:

$$\begin{aligned} V(a; S) = \max_{c, a'} & \log(c) + \beta \mathbb{E} V(a'; S') \\ \text{s.t.} \quad & c + \int a'(S') d\Gamma_{S'} = a \end{aligned}$$

The stochastic discount factor $M(S, S')$ is determined at the competitive market:

$$[M] : \quad a(S) = J(k(S); S)$$