

# An RBC model with asset price and convex adjustment cost

A representative firm solves the following problem:

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

where  $S = \{K, A, \mu\}$  is the aggregate state.  $A$  and  $\mu$  follow an exogenous Markov process.

The household-side problem is as follows:

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

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

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