

RBC Model With Endogenous Labour Supply and Aggregate Uncertainty

The Matlab code in this folder solves a canonical RBC model with Frisch elasticity labor supply and aggregate uncertainty (TFP) shock. The individual state vector for the household is $\mathbf{s} = (a, K, A)$ where a is individual capital/asset level, K is the aggregate level of capital, and A is the exogenous TFP shock. The household's recursive problem is formulated as follows:

$$V(a, K, A) = \max_{c, n, a'} \left\{ \frac{c^{1-\sigma}}{1-\sigma} - \eta \frac{n^{1+1/\chi}}{1+1/\chi} + \beta \mathbb{E}_{A'} V(a', K', A') \right\} \quad (1)$$

$$\text{s.t.} \quad c + a' = (1 + r(K, A))a + w(K, A)n, \quad c \geq 0, \quad n \in [0, 1], \quad a' \geq 0$$

The representative firm-side problem is as follows:

$$\max_{K, L} AK^\alpha L^{1-\alpha} - (\delta + r(K, A))K - w(K, A)L \quad (2)$$

The Market clearing conditions are:

$$a = K \quad (3)$$

$$n = L \quad (4)$$

and where the good's market clears by Walras' Law.

The consistency condition for a Recursive Competitive Equilibrium becomes:

$$a'(a, K, A) = K' \quad (5)$$

Finally, the TFP follows a stochastic log-AR1 process:

$$\log(A') = \mu + \rho \log(A) + \sigma_\epsilon \epsilon, \quad \epsilon \sim iid N(0, 1). \quad (6)$$