

A recursive competitive equilibrium is an initial distribution of assets, $\bar{a}_0(s_0)$ given the allocations $\{c^i(a, s), a_{t+1}^i(a, s^t, s_{t+1})\}$ and price $\sum_{s^{t+1}} Q_t(s_{t+1} \mid s^t)$ such that:

(i) for all i all $Q_t(s_{t+1} \mid s^t)$, the consumption allocations solve the household maximization problem:

$$\begin{aligned}
& \max \quad \sum_{t=0}^{\infty} \sum_{s^t} \beta^t u(c_t^i(s^t)) \pi(s^t) \\
s.t. \quad & c_t^i(s^t) + \sum_{s^t} Q_t(s^t) a_{t+1}^i(s^{t+1} \mid s_t) \leq y_t^i(s^t) + a_t^i(s^t) \\
& -a_{t+1}^i(s^{t+1} \mid s_t) \leq A_{t+1}^i(s^t) \\
& \text{where } A_{t+1}^i(s^t) = \sum_{\tau \geq t} \sum_{s^\tau \mid s^t} Q_t(s^\tau \mid s_t) y_t^i(s^\tau \mid s_t)
\end{aligned}$$