Neoclassical Growth Model

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Consumption-Saving

- Consumption Saving problem

$$
\begin{aligned}
V\left(s_{-1}\right) &= \max_{\{c_t, s_t\}} \sum_{t=0}^{\infty} \beta^t U\left(c_t\right) \\
c_t + s_t &= y_t + (1+r)\, s_{t-1}
\end{aligned}
$$

- Intertemporal BC
- Euler Equation
- Solving the problem (SS)

Neoclasscial Growth framework

- Social Planner problem

$$
\begin{aligned}
V\left(k_0\right) &= \max_{\{c_t, s_t\}} \sum_{t=0}^{\infty} \beta^t U\left(c_t\right) \\
c_t + i_t &= f\left(k_t\right) = A k_t^{\alpha} \\
k_{t+1} &= \left(1-\delta\right) k_t + i_t
\end{aligned}
$$

- Euler Equation
- The recursive formula using shooting algorithm
- Transition path
- Steady State

Neoclasscial Growth framework

- Dynamic programming framework

$$
\begin{aligned}
V(k) &= \max_{\{c_t, s_t\}} \left\{ U(c) + \beta V\left(k'\right) \right\} \\
c + i &= f(k) = Ak^{\alpha} \\
k' &= (1-\delta)k + i
\end{aligned}
$$

- Euler Equation
- Envelope Condition
- Value Function and Policy function
- Transition path
- Steady State

Neoclasscial Growth framework: Constant Growth

- Growth:

$$
\begin{aligned}
V(k_0) &= \max_{\{c_t, s_t\}} \sum_{t=0}^{\infty} \beta^t U(c_t) \\
c_t + i_t &= f(k_t) = A_t k_t^{\alpha} \\
k_{t+1} &= (1-\delta) k_t + i_t \\
A_t &= (1+g) A_{t-1}
\end{aligned}
$$

- Euler Equation
- Balanced Growth Path
- Transition path
- Steady State