Chapter 5: Dynamic Competitive Equilibrium
Graduate Macroeconomics Slides

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Outline

Introduction and Motivation

- **Background**
  - Chapter 2 analyzed long-run growth.
  - Production and technology are central.
- **Market Framework**
  - Firms and households act in self-interest.
  - Perfect competition as benchmark.
- **Aim**
  - Develop dynamic competitive equilibrium.
  - Link micro and macro outcomes.

Equilibrium Concepts

- **Arrow-Debreu** (Arrow and Debreu, 1954)
  - Complete markets at time zero.
  - Lifetime budget constraint.
- **Sequential**
  - Period-by-period trading.
  - Intertemporal asset prices.
- **Recursive**
  - Bellman equations.
  - State-dependent policies.

Arrow-Debreu Equilibrium

- **Household Problem**

$$\max \sum_{t=0}^{\infty} \beta^t u(c_t)$$

- **Budget Constraint**

$$\sum_{t=0}^{\infty} p_t c_t = \sum_{t=0}^{\infty} p_t y_t$$

- **Optimality**

$$\frac{u'(c_t)}{u'(c_0)} = \frac{p_t}{\beta^t}$$

Growth Model

- Production

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha}$$

- Capital

$$K_{t+1} = (1-\delta)K_t + I_t$$

- Euler Equation

$$\frac{u'(C_t)}{u'(C_{t+1})} = \beta(1 + r_{t+1} - \delta)$$

Recursive Equilibrium

● Bellman Equation

$$V(s) = \max_{a'}\{u(f(s, a')) + \beta V(s')\}$$

● Stationary Policies
● Numerical Tractability

Steady State

● Definition

$$K_{t+1} = K_t = K^*$$

● Prices

$$p_t = \beta^t$$

● Benchmark for Dynamics

Extensions and Policy

- Robustness
  - Equivalent equilibria.
  - Welfare optimality.
- Frictions
  - Market power.
  - Incomplete markets.
- Policy
  - Monetary transmission.
  - Fiscal effects.

Conclusion

- Unified dynamic framework
- Equivalence of concepts
- Importance of extensions

References I

Arrow, K. J. and Debreu, G. (1954). Existence of an equilibrium for a competitive economy. *Econometrica*, 22(3):265–290.

Thank You!

Questions?

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