Rental Prices, Capital Markets, and Investment

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Overview

Housing Markets

- Today we will consider market dynamics for a durable good such as housing.
- This is a classic example from the graduate Price Theory sequence taught by Prof. Kevin Murphy (also taught in the MBA sequence).
- Combines many important economic concepts (dynamics, forward looking behavior, market-clearing behavior determining prices).
- Links market prices to asset prices

Four Moving Pieces

1. Stock adjustment: capital today depends on capital yesterday, depreciation, and new investment
2. Asset pricing equilibrium: The rental price must eliminate arbitrage opportunities.
3. Rental market equilibrium: The rental price must clear the market for rental houses (assumes demand is downward sloping in rental prices).
4. Investment market equilibrium: The price of new capital clears the capital market (assumes supply of capital is upward sloping).

Interest Rates

- Nominal Interest Rate:Assume I can put money in the bank and get the interest rate r.
- Real Interest Rate: r^* is in terms of goods rather than dollars. "How many carrots can I get tomorrow for a carrot today."
- $$1 + r^* = (1 + r)\frac{P_t}{P_{t+1}}$$

Durable Goods

- Durable goods carry value across periods, thus they are capital assets
- How durable they are determined by depreciation rate δ (will generally assume we have a constant proportion depreciating each period)
- Durables have two sets of prices and quantities:
  - K is the stock of capital
  - R is the price of renting capital for one period
  - I is the newly produced capital
  - P is the price paid for the newly produced capital (purchase price).

No arbitrage:

$$R_t = P_t - \frac{1-\delta}{1+r} P_{t+1}$$

Price is its discounted flow of future revenue (ignoring risk here)

$$P_t = R_t + \frac{1-\delta}{1+r} R_{t+1} + \frac{(1-\delta)^2}{(1+r)^2} R_{t+2} + \dots$$

Four Moving Pieces

1. Stock adjustment:

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

2. Asset pricing equilibrium:

$$R_t = P_t - \frac{1-\delta}{1+r}P_{t+1}$$

3. Rental market equilibrium:

$$K_t = D(R_t)$$

4. Investment market equilibrium:

$$I_t = I(P_t)$$

Steady State

1. Stock adjustment:

$$\bar{K} = (1-\delta)\bar{K} + \bar{I}$$

2. Asset pricing equilibrium:

$$\bar{R} = \bar{P} - \frac{1-\delta}{1+r}\bar{P}$$

3. Rental market equilibrium:

$$\bar{K} = D(\bar{R})$$

4. Investment market equilibrium:

$$\bar{I} = I(\bar{P})$$

Steady State

- A simple example would be to to assume $D(R) = 1000 - 2R$
- $I(P) = P$

Sources

This lecture drew from material from:

1. Econ 301 and 302 at the University of Chicago taught by Kevin Murphy
2. Business 33002 at the Booth School of business taught by Owen Zidar