Chapter 7

A Real Intertemporal Model with **Investment**

Already Done

- Consumer Behavior:
  - Work-Leisure choices (CHAPTER 4)
  - Intertemporal Consumption-Savings choices (CHAPTER 6)
- Production Side:
  - Firms' Production Technology and Labor Demand (CHAPTER 4)
  - Changes in Productivity affect c, E and y. (CHAPTER 5)
- Government Side:
  - Government expenditure and the timing of taxes.

To do: REAL Model

- **REAL INTERTEMPORAL MODEL**: show how real aggregate output, real consumption, real investment, employment, real wage and the real interest rate are determined.
- CHAPTER 7: Investment behavior.

Investment Behavior

- Determinants of Investment:
  Study the microeconomic investment behavior of the firm, which makes an intertemporal decision regarding investment in the current period.
- Forgoes current profits to have higher capital stock and higher profits in the future.

Determinants of **high Investment**

- Lower capital stock.
- Higher expected future total factor productivity.
- Lower real interest rate.

KEY:
opportunity cost
of Investment

STUDY

- Effects of:
  - Government Spending Shock.
  - Total Factor Productivity Shock.
  - Capital Stock Shock.

MODEL

- Representative Consumer:
  - Supply labor and demand goods.
- Representative Firm:
  - Demand labor, supply goods and demand investment goods.
- Government:
  - Demand goods for purchases.

Consumer Budget

- CURRENT $c + s = w\,(h-l) + \pi - T$
- FUTURE $c' = w'\,(h-l') + \pi' - T' + (1+r)\,s$

- **LIFETIME**

$$c + c'/1+r = w(h-l) + \pi - T + (w'(h-l')+\pi'-T')/1+r$$

Consumer Problem

- Choose c, c', *l* and *l'*
- Given w, w', r, T and T'
- Cannot depict this on a single graph,
- Solution: describe consumer decision in terms of THREE marginal conditions (Chapter 4 and 6)

Three Marginal (Optimal) Decisions

- Work-leisure decision (CHAPTER 4):
  $MRS_{l,c} = w$

Substitution between *l* and c is determined by w

Remember: Income/Substitution effects of a change in w

- Same in the future:
  $MRS_{l',c'} = w'$
- Consumption-Savings decision (CHAPTER 6):
  $MRS_{c,c'} = 1 + r$

NOTE

w

price of current leisure (labor) in terms of current c

w'

price of future leisure in terms of future c'

1+r

price of current consumption in terms of future consumption

w(1+r)/w'

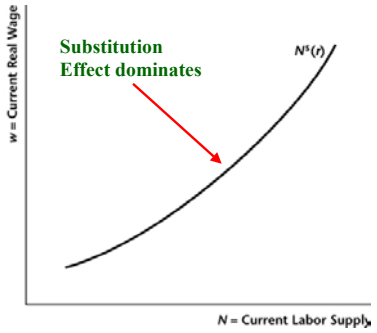
current price of leisure relative to the future price of leisure

CONSUMER
The Labor Supply

Figure 7-1 The Representative Consumer's Current Labor Supply Curve

Why?

We care for the Short-Run. In the Long-Run, both effects cancel out

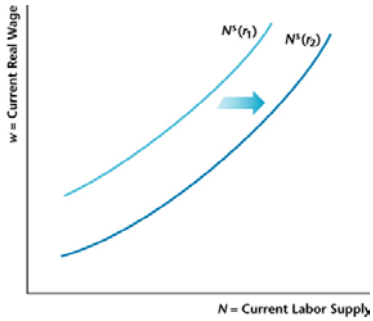


Slide 13

Figure 7-2 An Increase in the Real Interest Rate Shifts the Current Labor Supply Curve to the Right

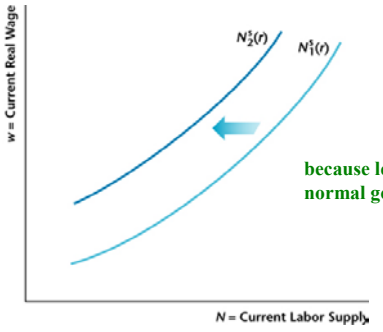
↑ r → ↑ price of current leisure relative to future leisure

Intertemporal Substitution of leisure



Slide 14

Figure 7-3 Effects of an Increase in Lifetime Wealth

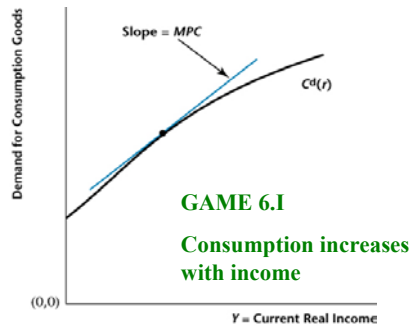


Slide 15

CONSUMER
The Demand for Goods

Remember the FOUR games in chapter 6.

Figure 7-4 The Representative Consumer's Current Demand for Consumption Goods Increases with Income

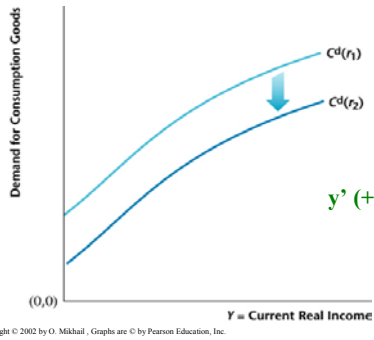


GAME 6.I

Consumption increases with income

Slide 17

Figure 7-5 An Increase in the Real Interest Rate from r_1 to r_2 Shifts the Demand for Consumption Goods Down



Shifters are
GAME 6.II
GAME 6.IV

y' (+) and r (-)

Slide 18

THE FIRM
THE DEMAND FOR LABOR