

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

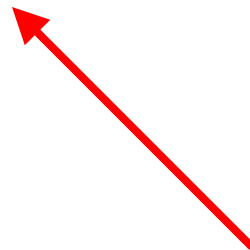
- **Determinants of Investment:**

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):

$$\text{MRS}_{l,c} = w$$

Substitution between l and c is determined by w

Remember: Income/Substitution effects of a change in w

- Same in the future:

$$\text{MRS}_{l',c'} = w'$$

- Consumption-Savings decision (CHAPTER 6):

$$\text{MRS}_{c,c'} = 1 + r$$

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

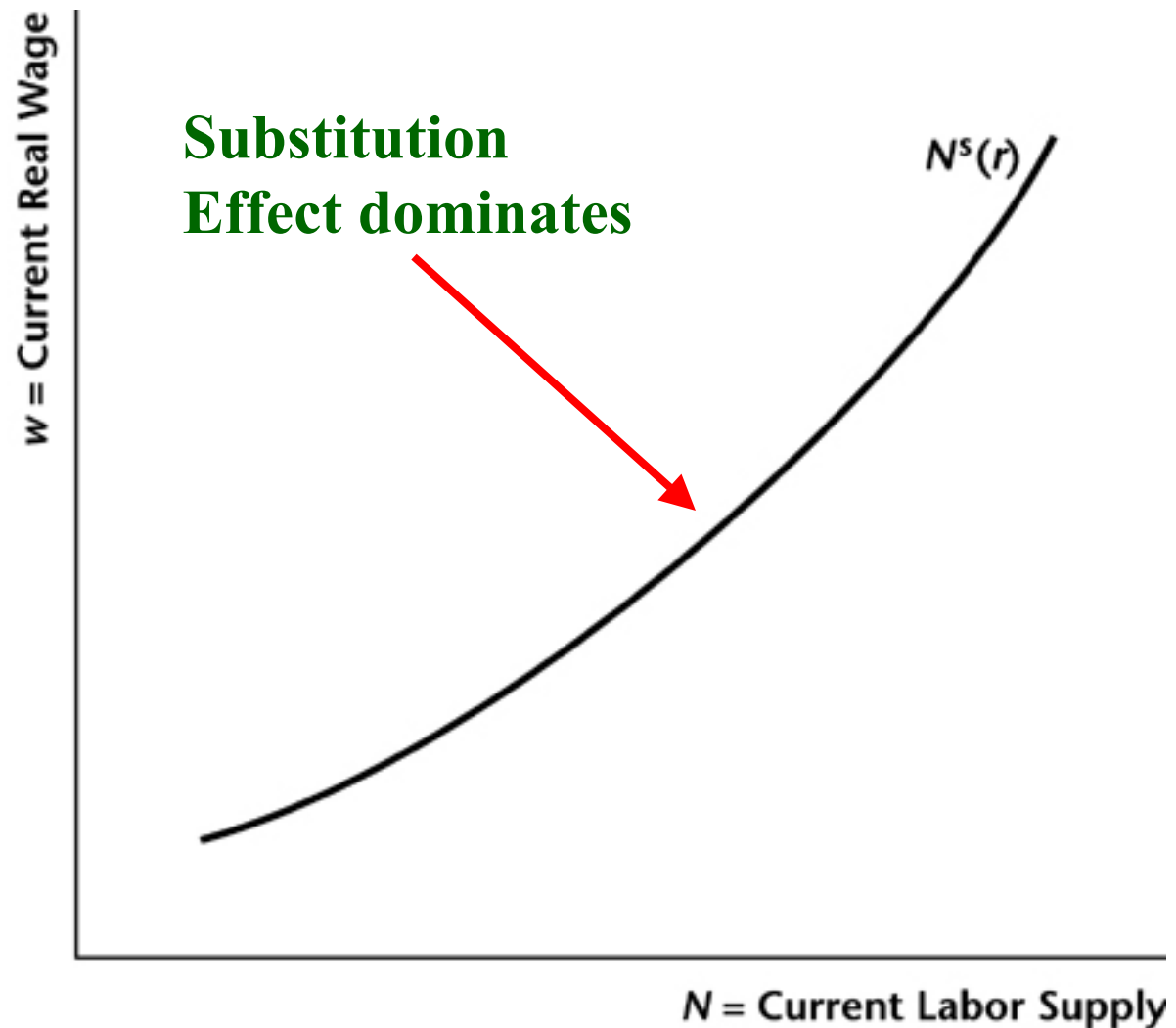


Figure 7-2 An Increase in the Real Interest Rate Shifts the Current Labor Supply Curve to the Right

$\uparrow r \rightarrow \uparrow$ price of current leisure relative to future leisure

Intertemporal Substitution of leisure

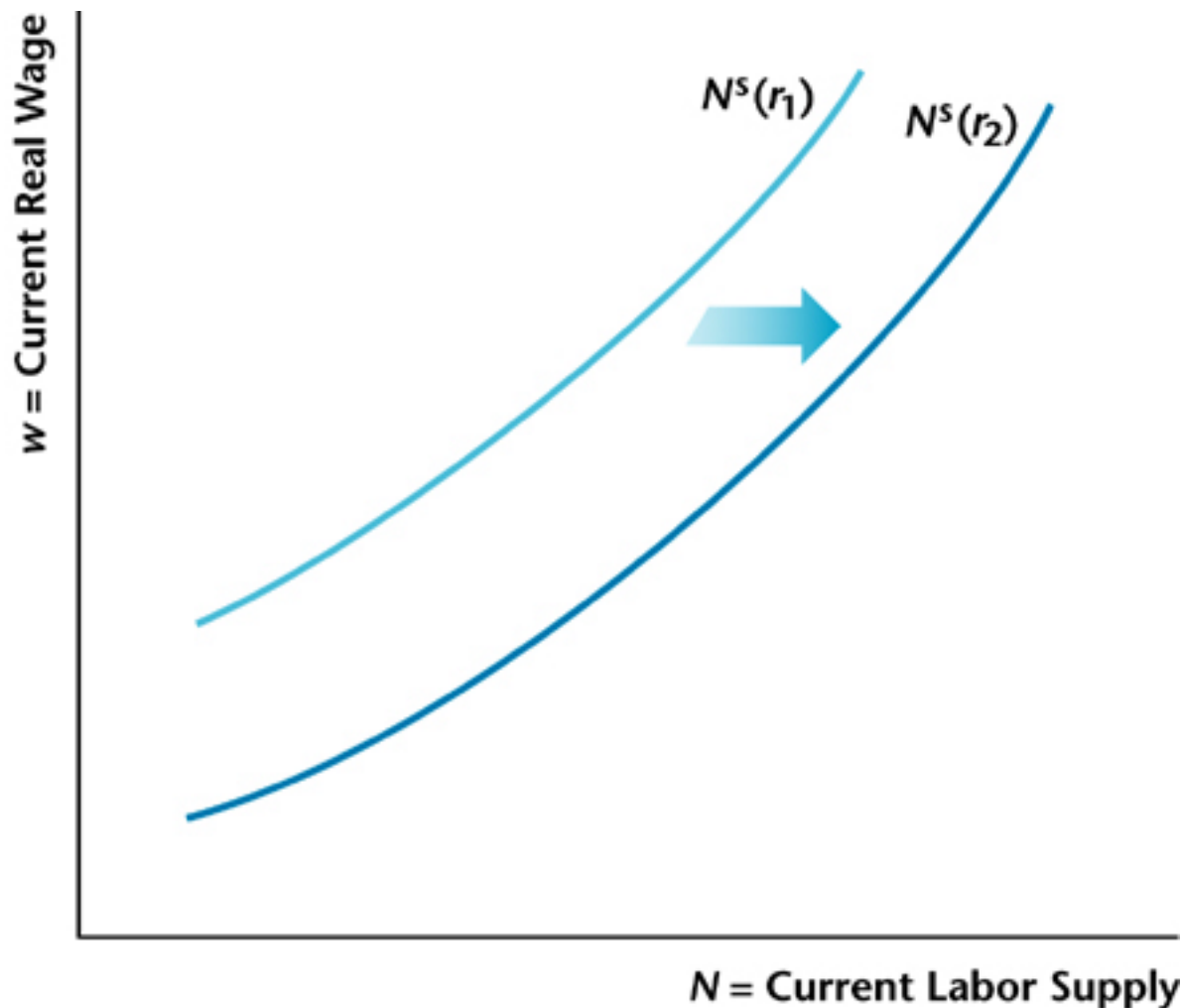
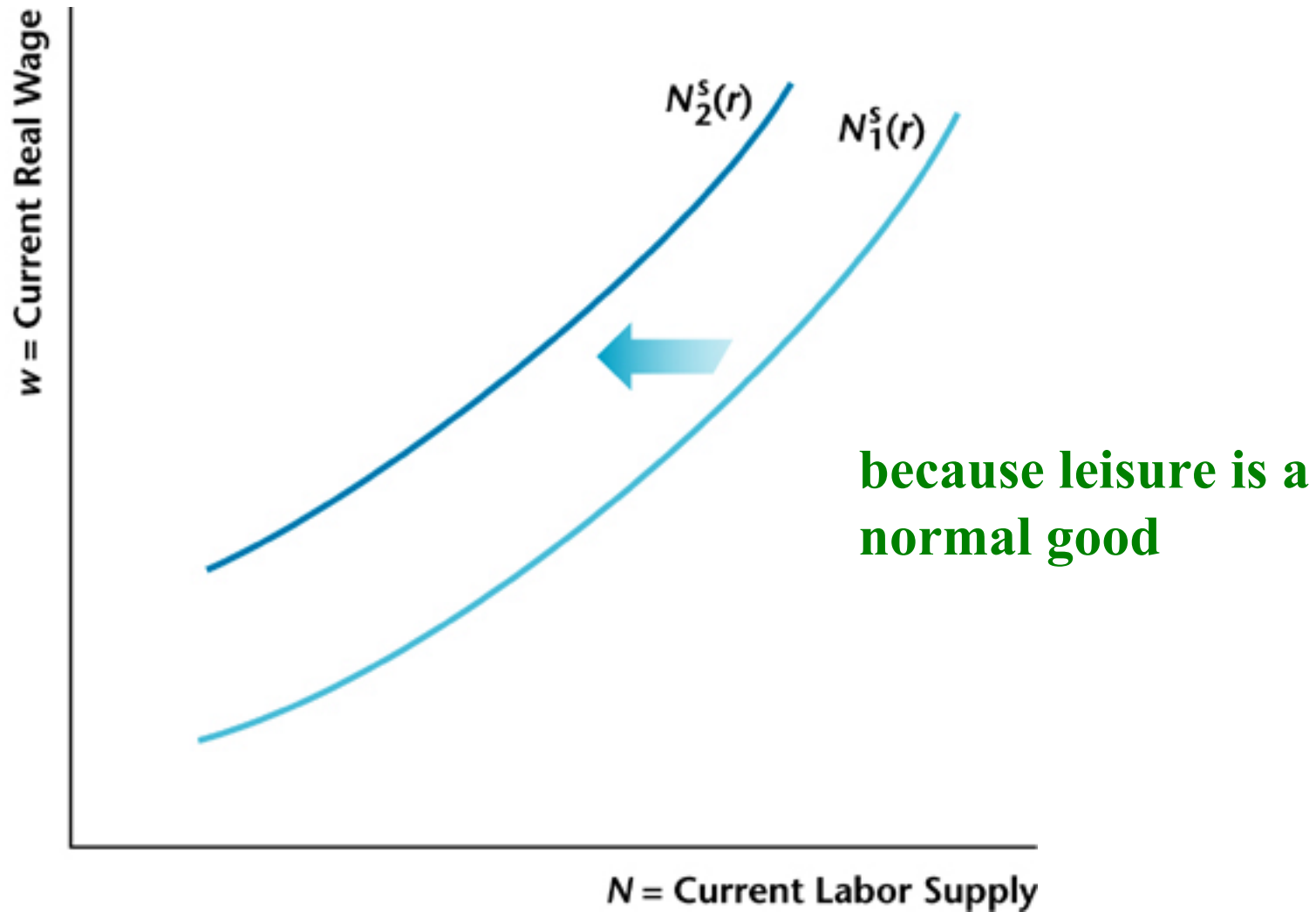


Figure 7-3 Effects of an Increase in Lifetime Wealth



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

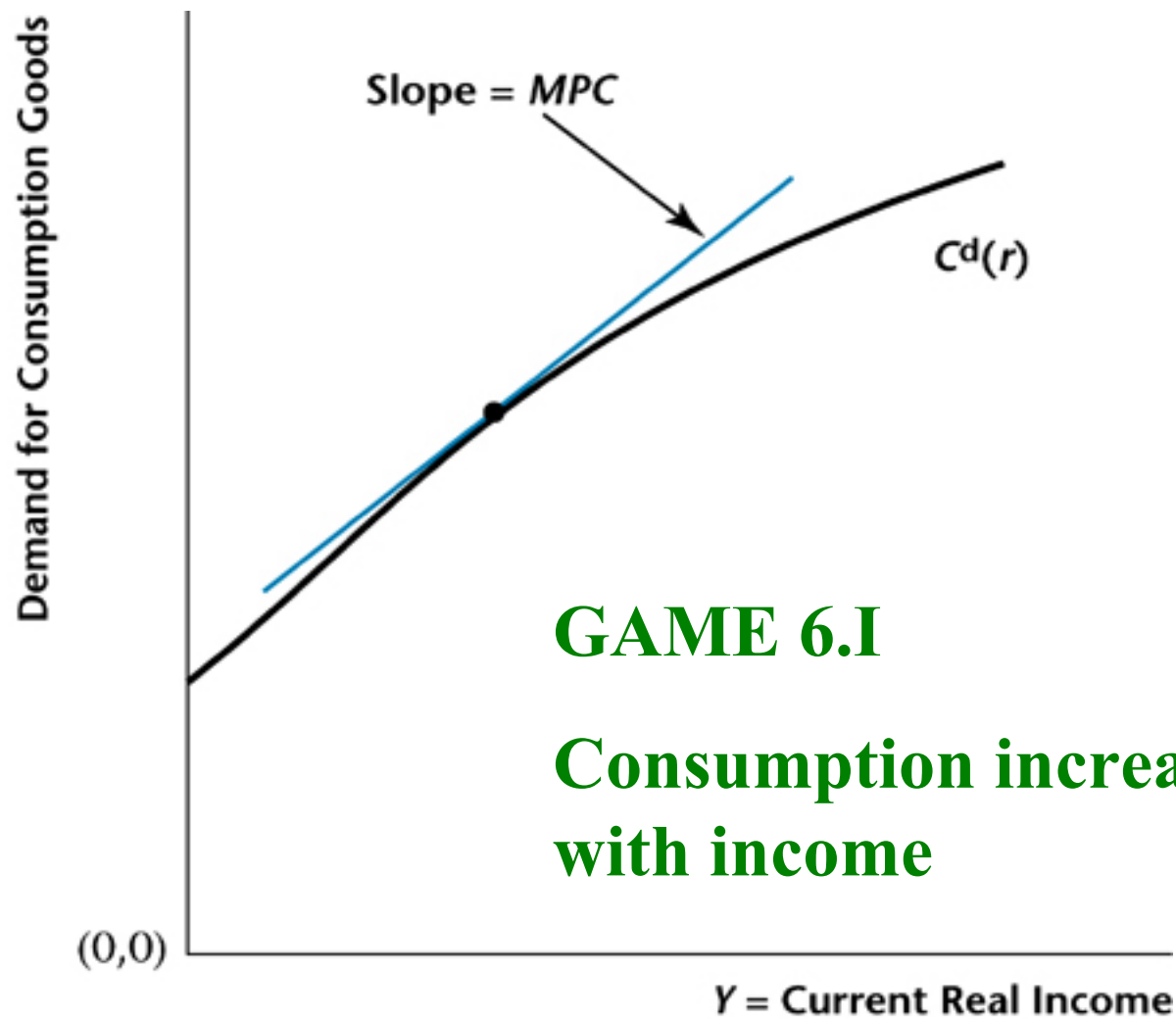
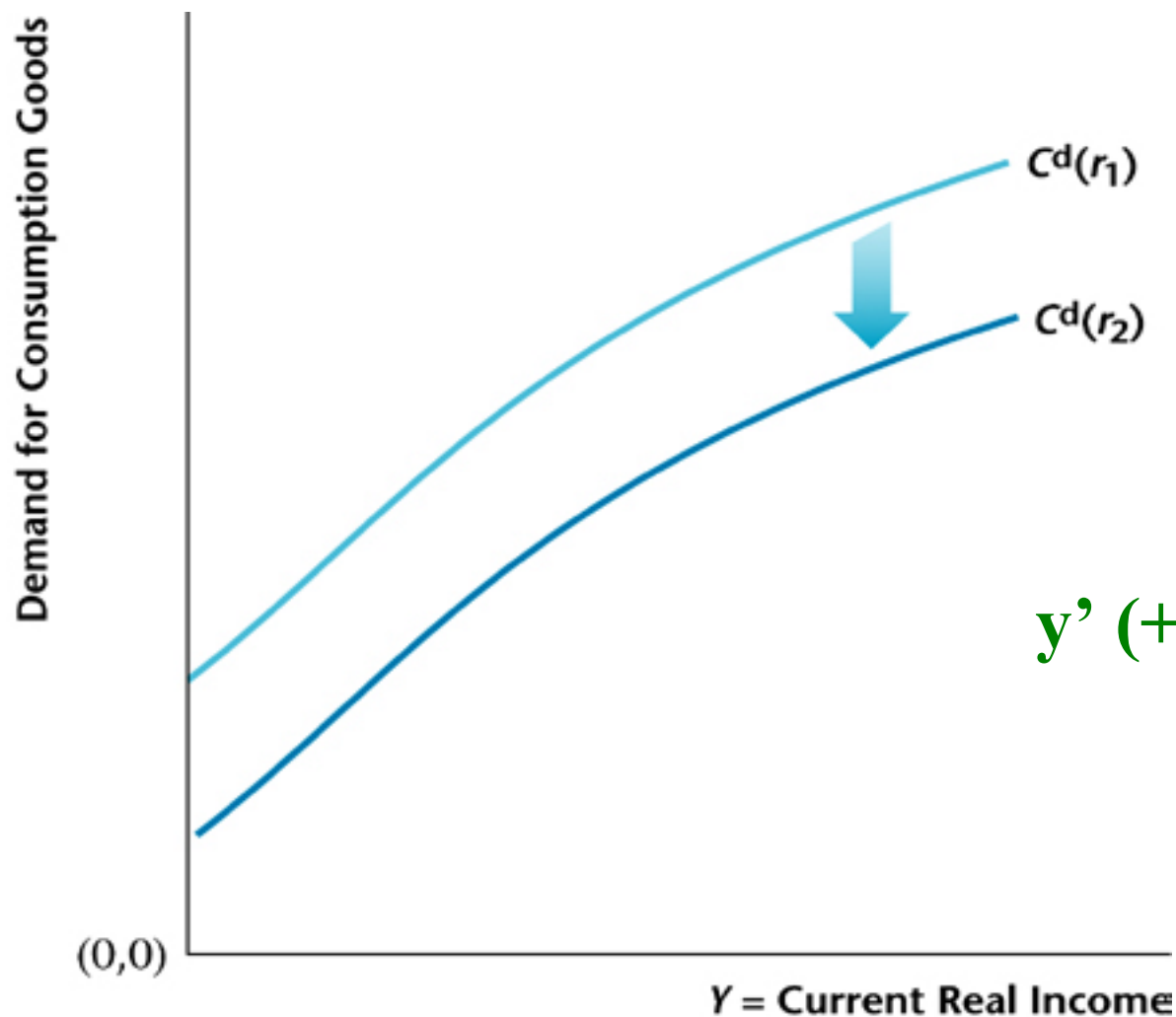


Figure 7-5 An Increase in the Real Interest Rate from r_1 to r_2 Shifts the Demand for Consumption Goods Down



**Shifters are
GAME 6.II
GAME 6.IV**

y' (+) and r (-)

THE FIRM
THE DEMAND FOR LABOR