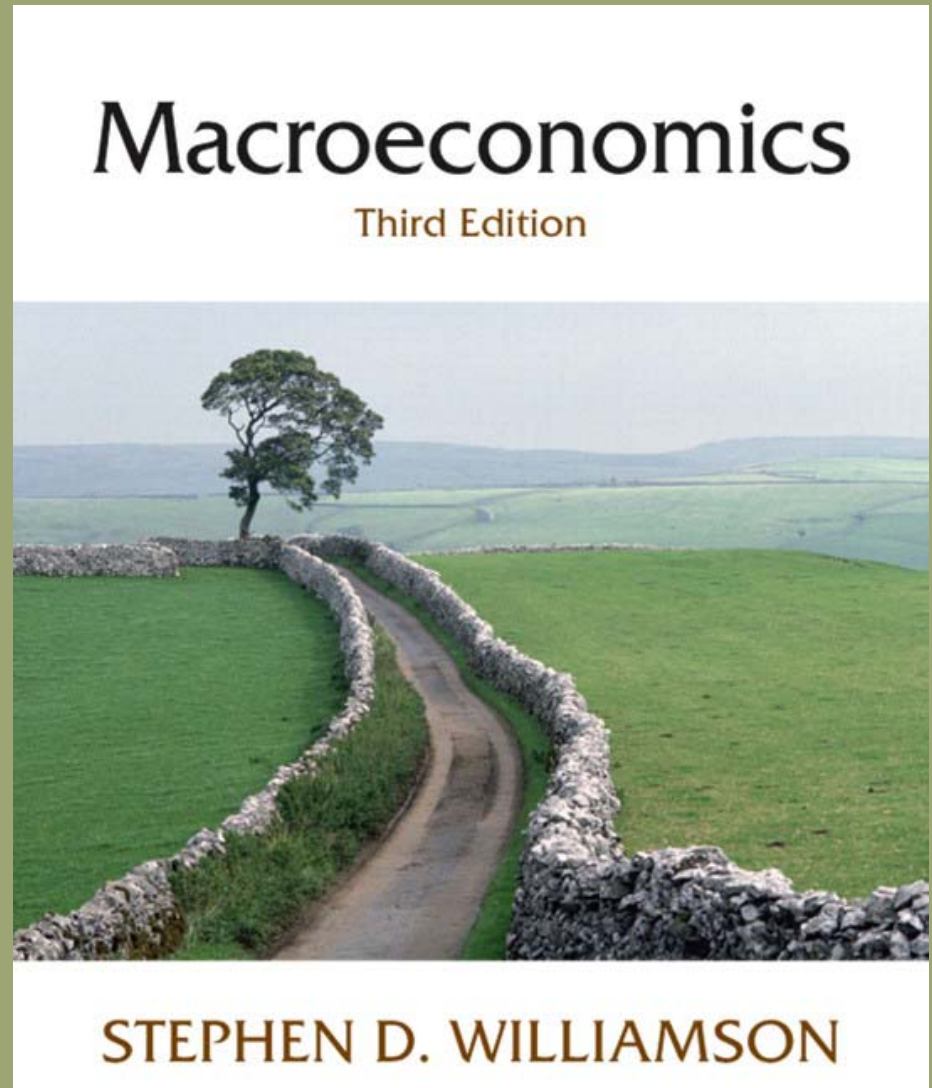


Chapter 4

Consumer and Firm Behavior: The Work-Leisure Decision and Profit Maximization



Chapter 4 Topics



- Behavior of the representative consumer
- Behavior of the representative firm

Representative Consumer



- Consumer's preferences over consumption and leisure as represented by indifference curves.
- Consumer's budget constraint.
- Consumer's optimization problem: making his or herself as well off as possible given his or her budget constraint.
- How does the consumer respond to: (i) an increase in non-wage income; (ii) an increase in the market real wage rate?

Representative Consumer's Indifference Curves



- An indifference curve slopes downward (more is preferred to less).
- An indifference curve is convex (the consumer has a preference for diversity in his or her consumption bundle).

Figure 4.1 Indifference Curves

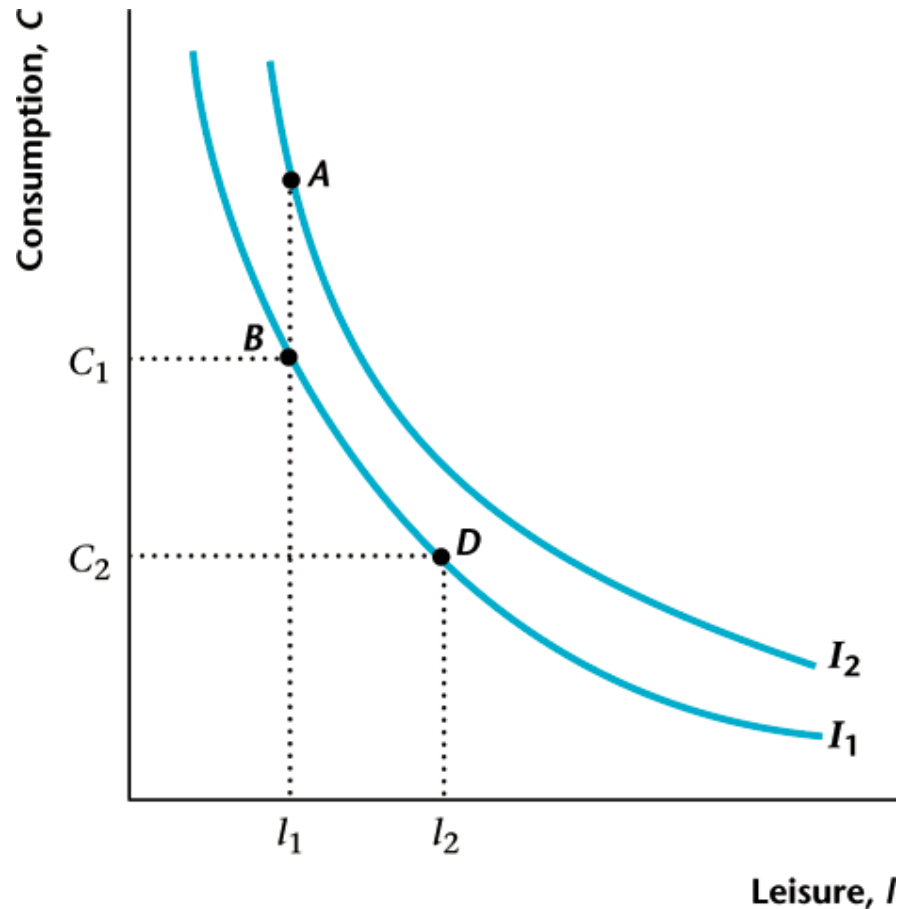
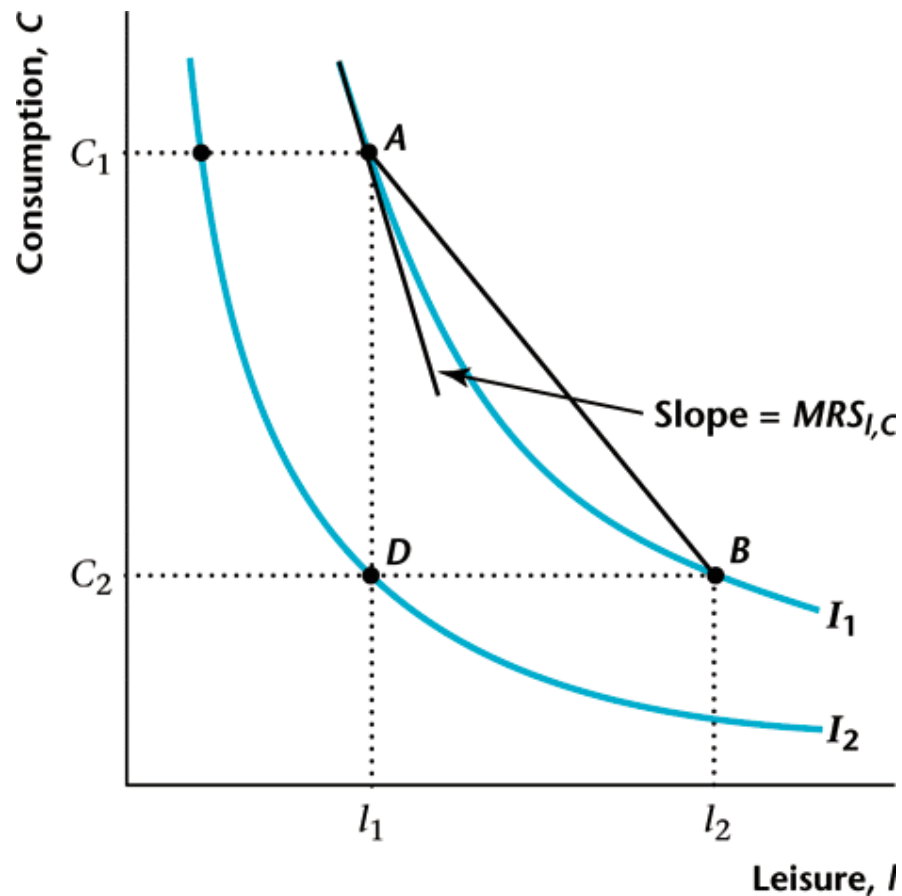


Figure 4.2 Properties of Indifference Curves



Equation 4.1: The consumer's time constraint



$$l + N^s = h$$

Equation 4.2: The consumer's budget constraint



$$C = wN^s + \pi - T$$

The Consumer's Budget Constraint



- Consumption is equal to total wage income, plus dividend income, minus taxes.

Equation 4.3: Budget constraint accounting for time constraint.



$$C = w(h - l) + \pi - T$$

Equation 4.4: Rewriting the Budget Constraint



$$C + wl = wh + \pi - T$$

Equation 4.5: Rewriting the Budget Constraint Again



$$C = -wl + wh + \pi - T$$

Figure 4.3 Representative Consumer's Budget Constraint ($T > \Pi$)

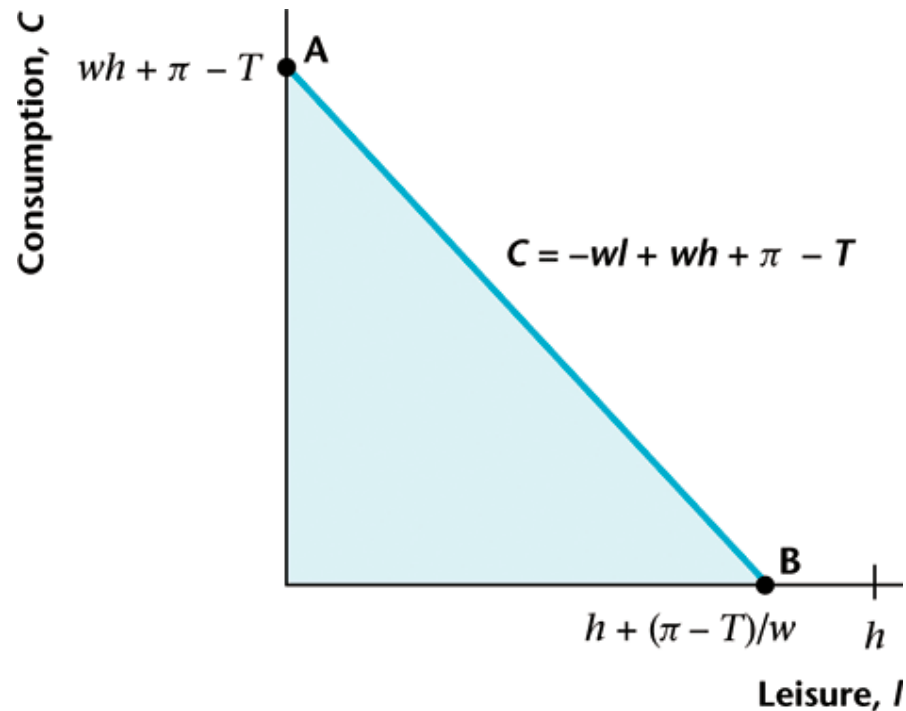
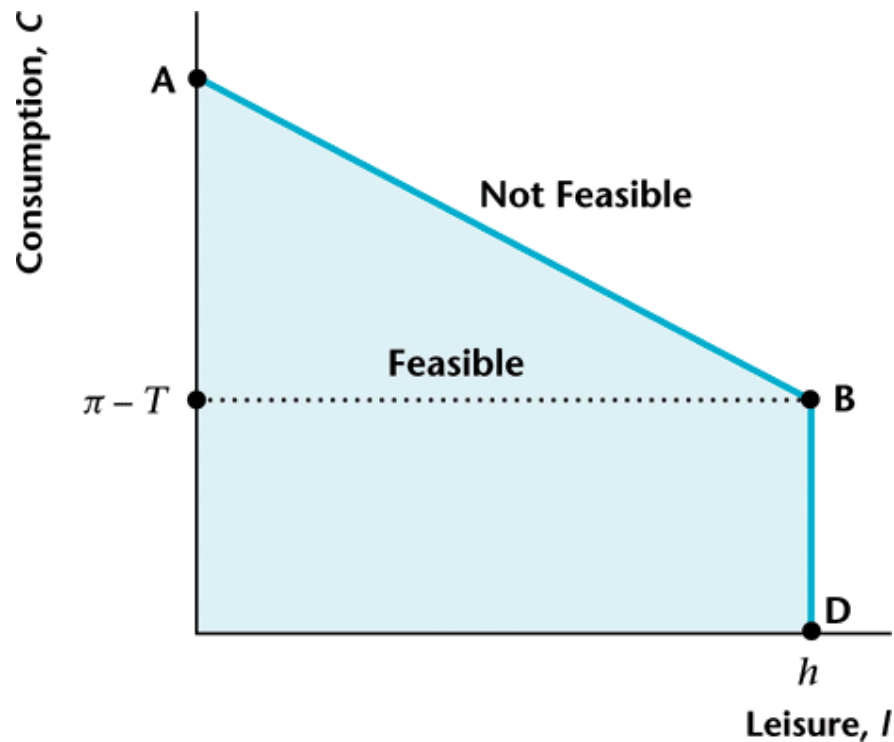


Figure 4.4 Representative Consumer's Budget Constraint ($T < \Pi$)

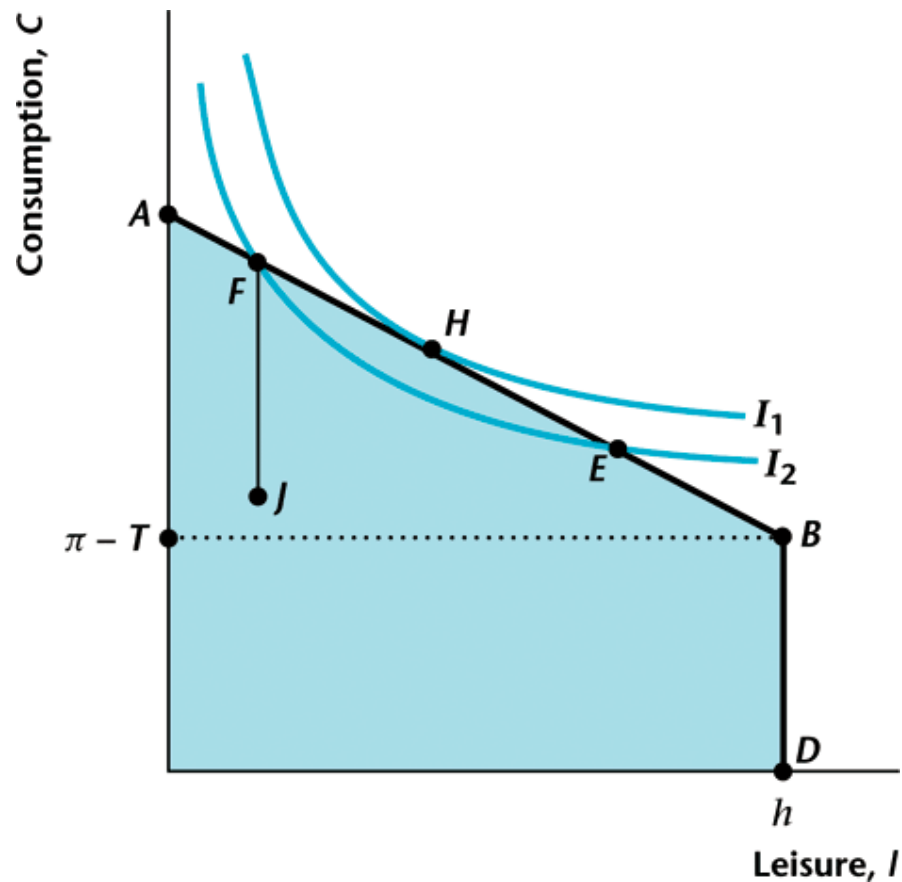


Consumer Optimization



The consumer chooses the consumption bundle that is on his or her highest indifference curve, while satisfying his or her budget constraint.

Figure 4.5 Consumer Optimization



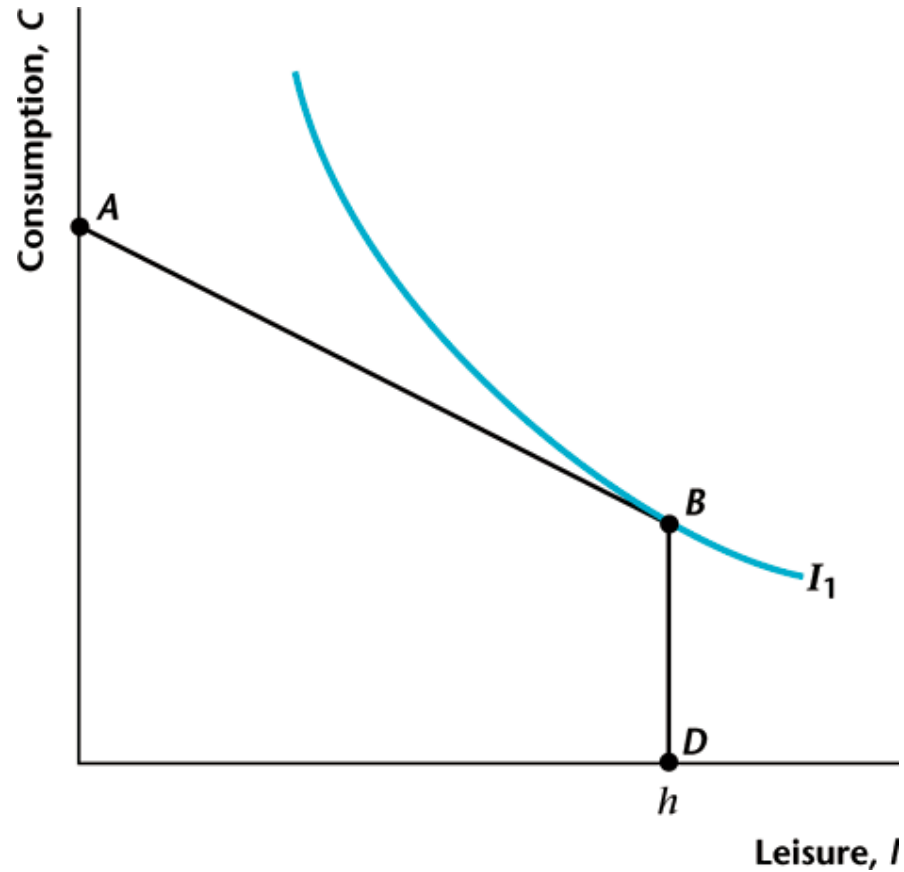
Equation 4.6: Holds when the consumer is optimizing



The marginal rate of substitution of leisure for consumption equals the real wage.

$$MRS_{l,C} = w$$

Figure 4.6 The Representative Consumer Chooses Not to Work

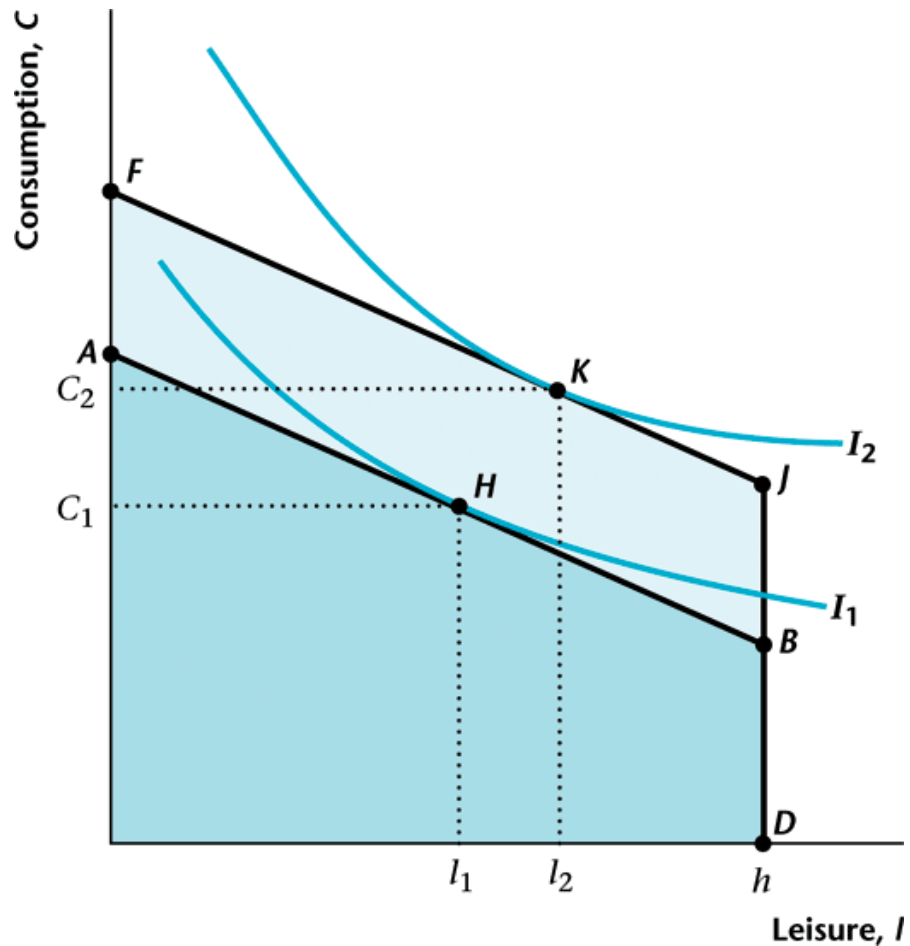


Real dividends or taxes change for the consumer



- Assume that consumption and leisure are both normal goods.
- An increase in dividends or a decrease in taxes will then cause the consumer to increase consumption and reduce the quantity of labor supplied (increase leisure).

Figure 4.7 An Increase in $\Pi - T$ for the Consumer.



An increase in the market real wage rate



- This has income and substitution effects.
- Substitution effect: the price of leisure rises, so the consumer substitutes from leisure to consumption.
- Income effect: the consumer is effectively more wealthy and, since both goods are normal, consumption increases and leisure increases.
- Conclusion: Consumption must rise, but leisure may rise or fall.

Figure 4.8 Increase in the Real Wage Rate—Income and Substitution Effects

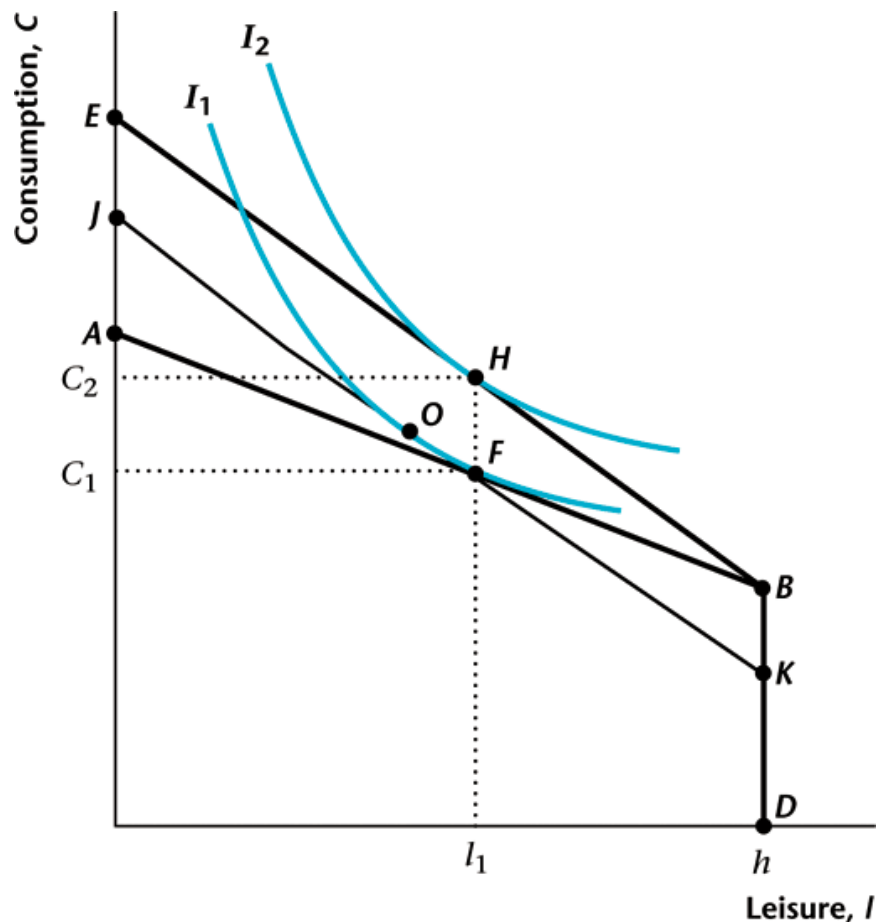


Figure 4.9 Labor Supply Curve

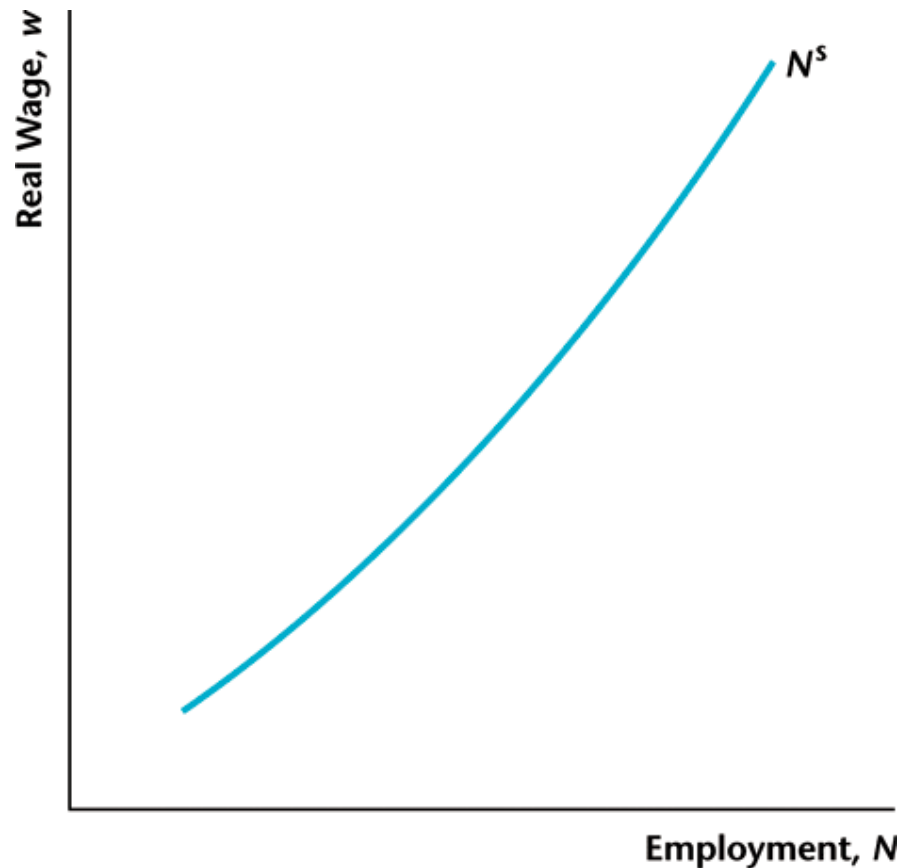


Figure 4.10 Effect of an Increase in Dividend Income or a Decrease in Taxes

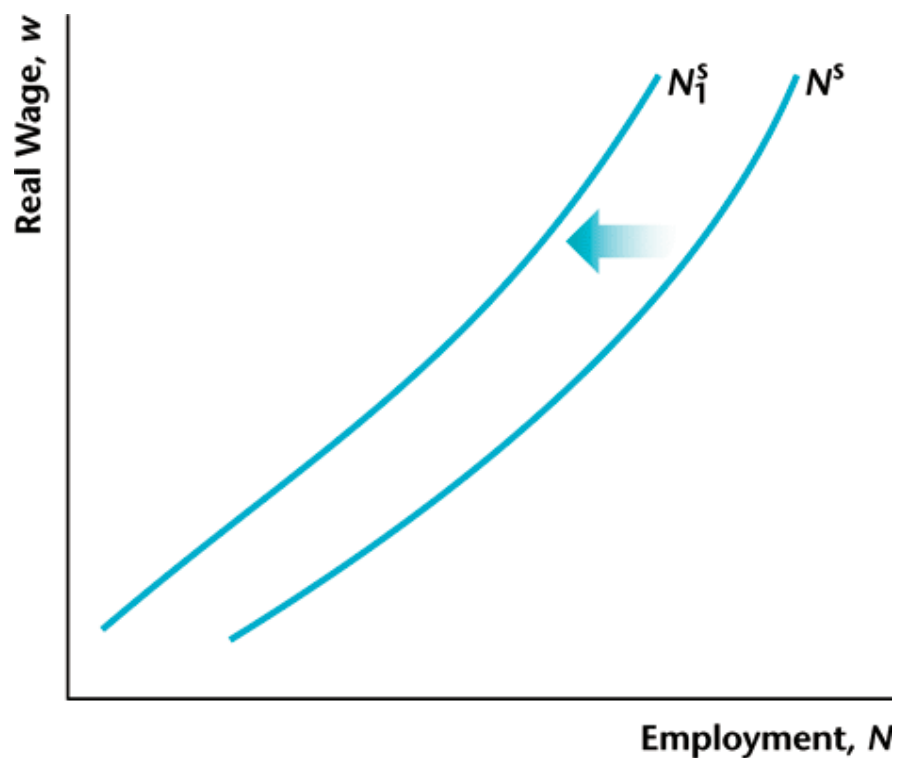
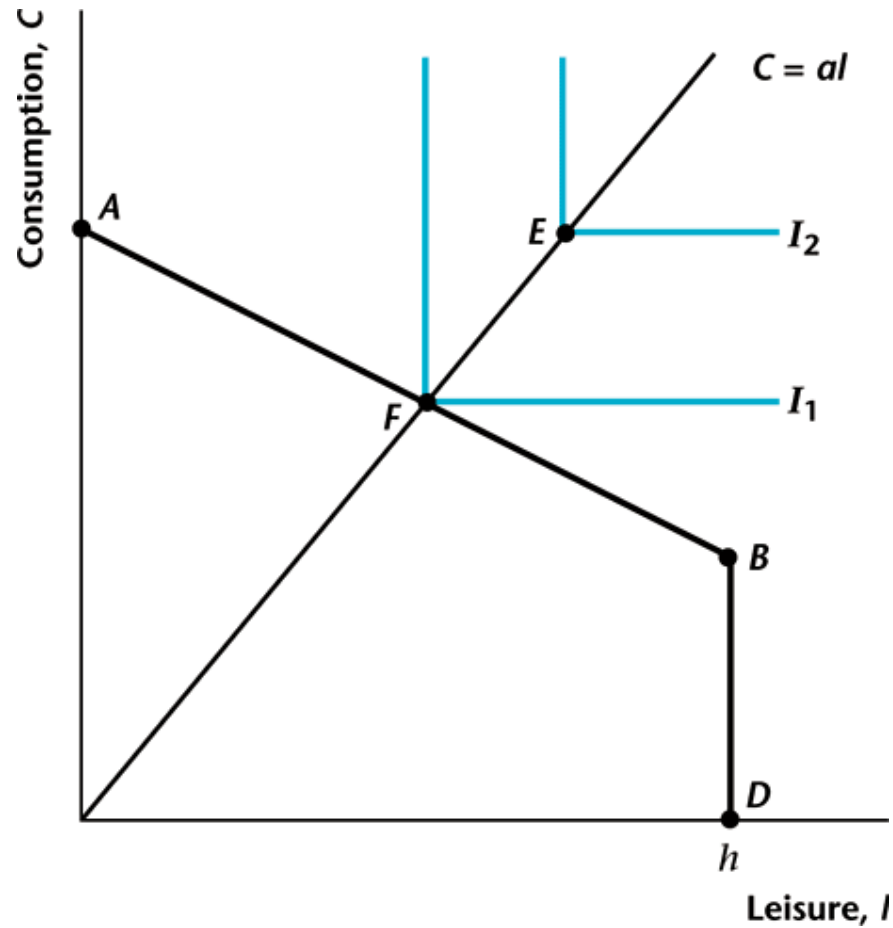


Figure 4.11 Perfect Complements



The Representative Firm



- The production function.
- Profit maximization and labor demand.

Equation 4.9: The Firm's Production Function



$$Y = zF(K, N^d)$$

Properties of the Firm's Production Function



- Constant returns to scale.
- Output increases with increases in either the labor input or the capital input.
- The marginal product of labor decreases as the labor input increases.
- The marginal product of capital decreases as the capital input increases.
- The marginal product of labor increases as the quantity of the capital input increases.

Figure 4.12 Production Function, Fixing the Quantity of Capital and Varying the Quantity of Labor

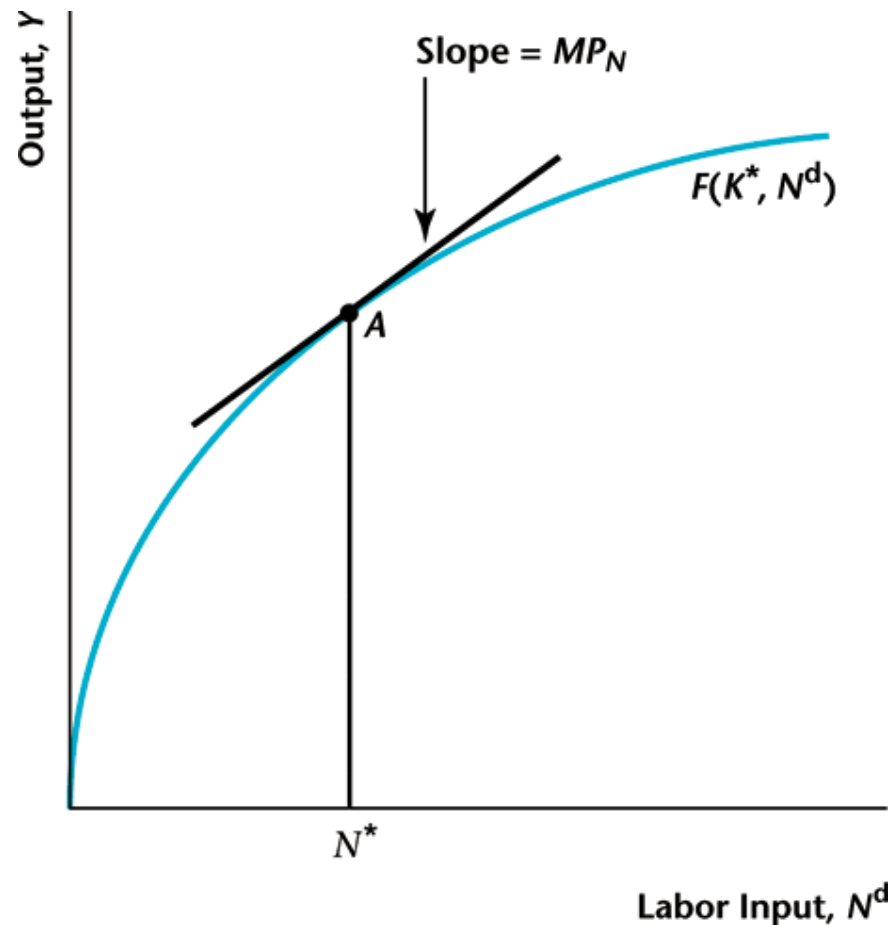


Figure 4.13 Production Function, Fixing the Quantity of Labor and Varying the Quantity of Capital

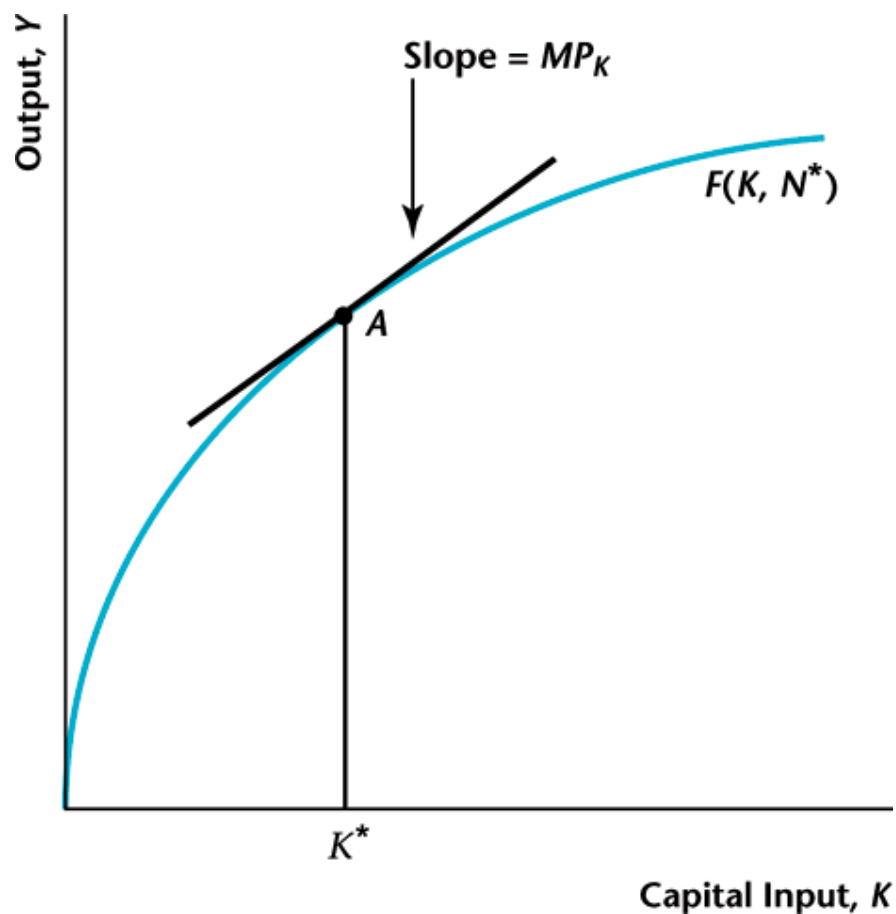


Figure 4.14 Marginal Product of Labor Schedule for the Representative Firm

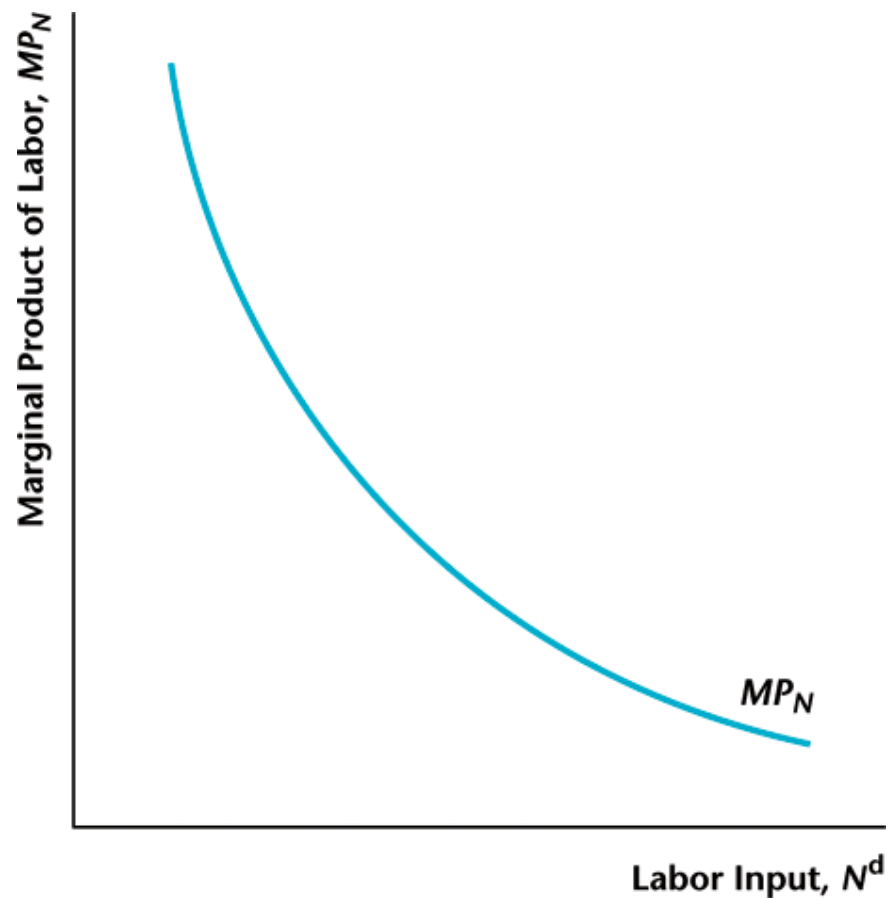


Figure 4.15 Adding Capital Increases the Marginal Product of Labor

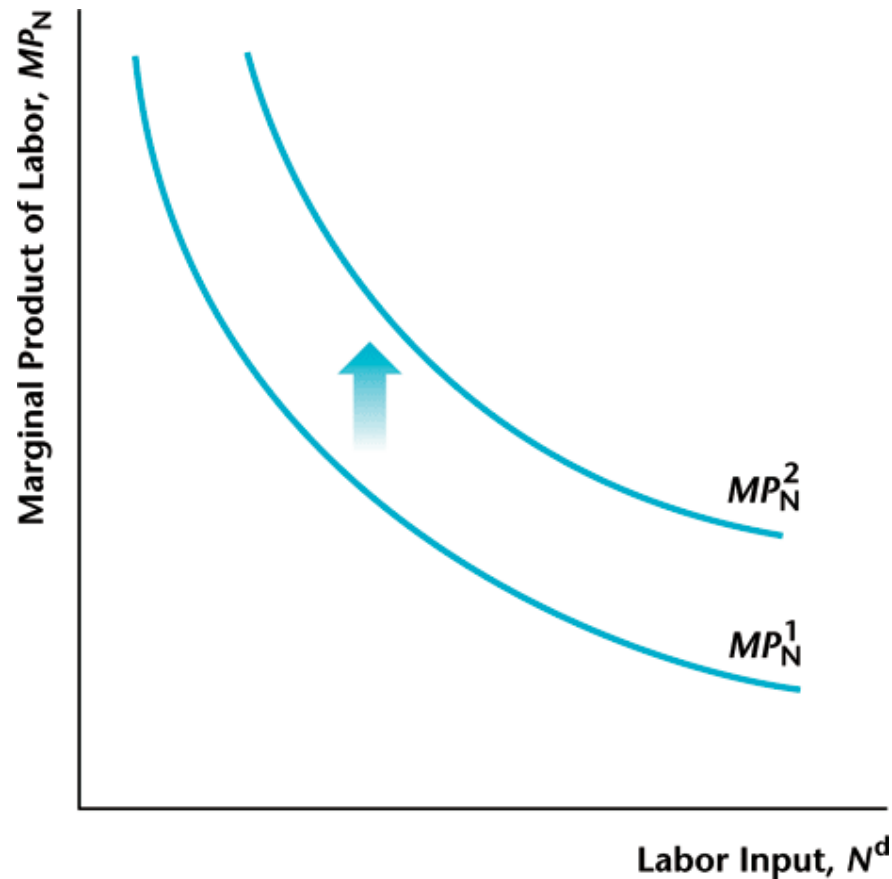


Figure 4.16 Total Factor Productivity Increases

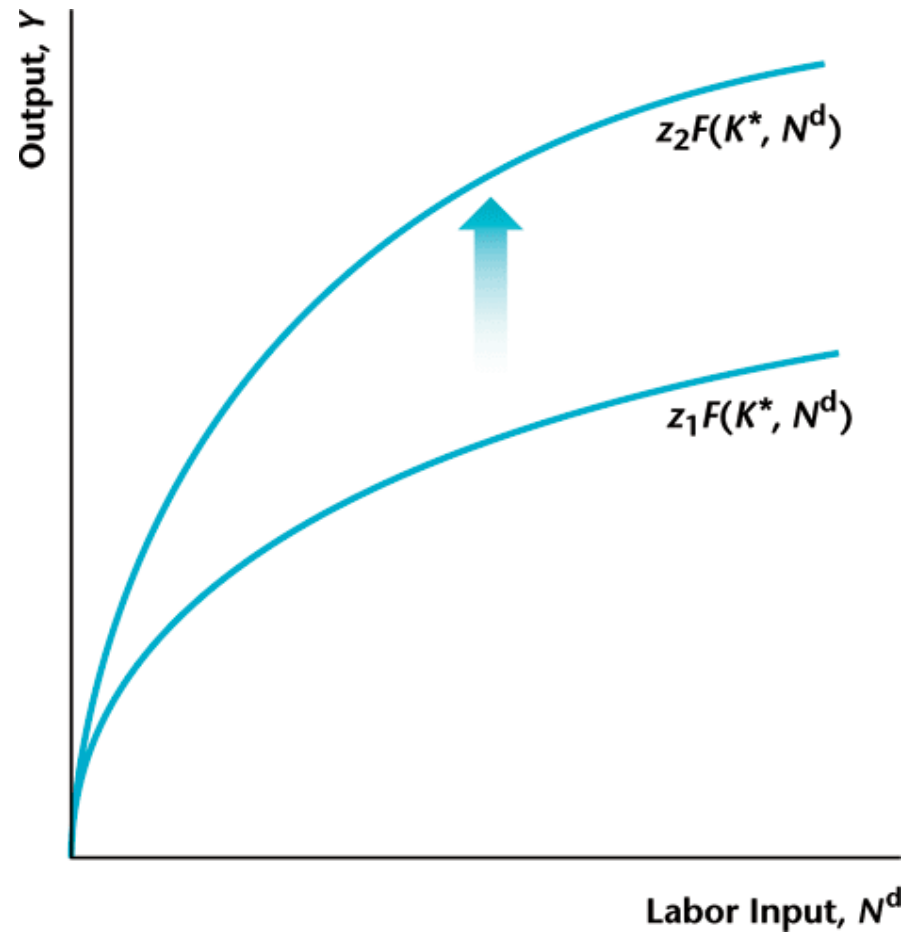
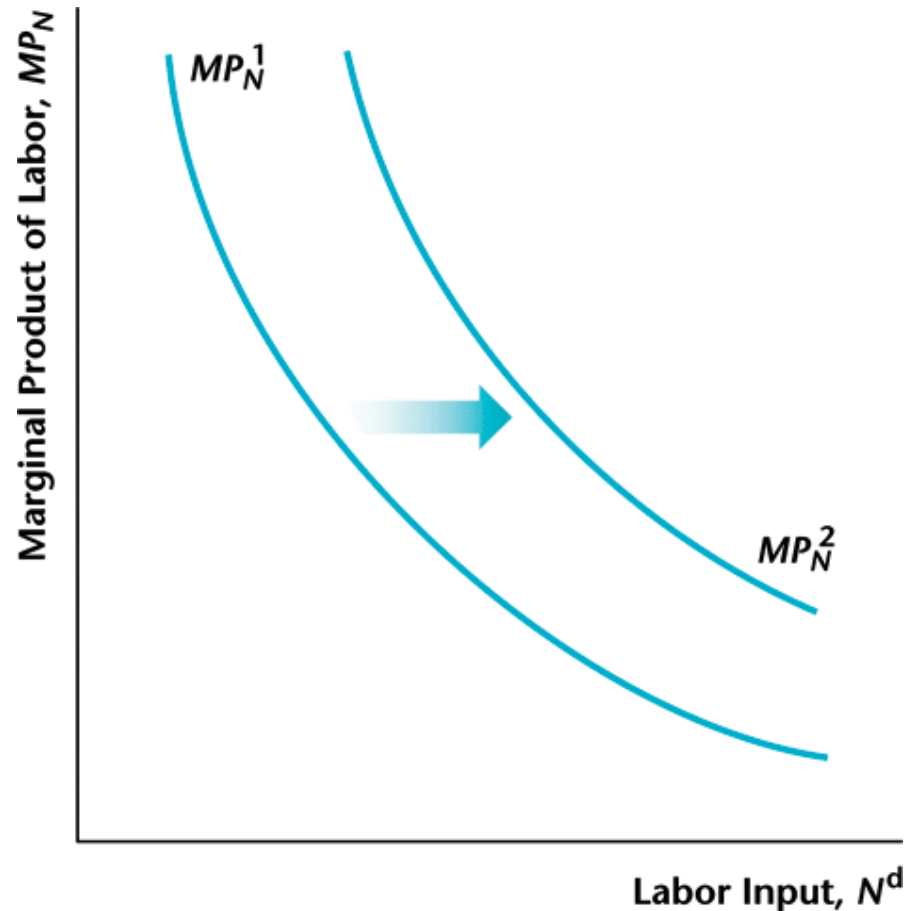


Figure 4.17 Effect of an Increase in Total Factor Productivity on the Marginal Product of Labor



Equation 4.10: Specific Production Function



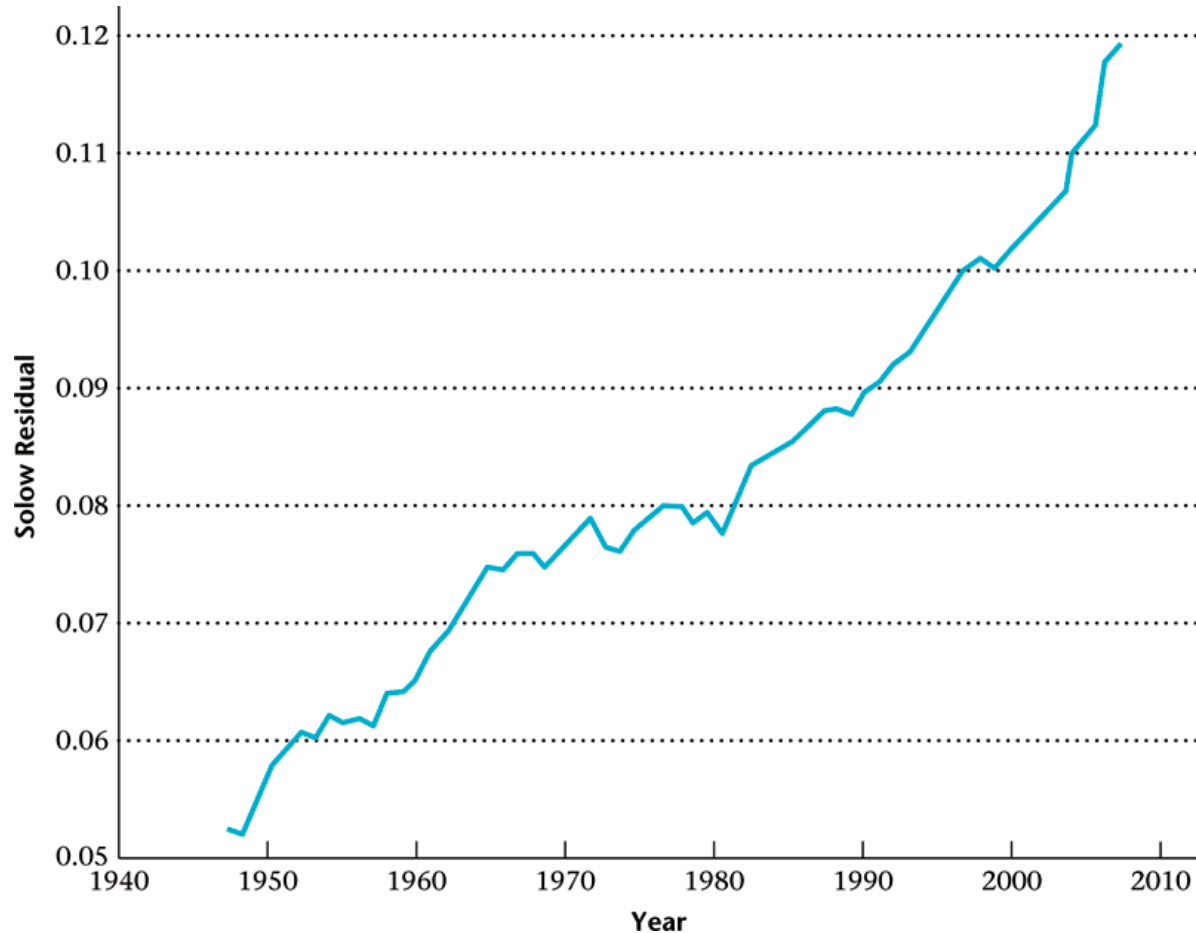
$$Y = zK^{0.36}(N^d)^{0.64}$$

Equation 4.11: Solow Residual



$$z = \frac{Y}{K^{0.36} (N^d)^{0.64}}$$

Figure 4.18 The Solow Residual for the United States



Equation 4.12: Profit Maximization



When the firm maximizes profits, the marginal product of labor equals the real wage.

$$MP_N = w$$

Figure 4.19 Revenue, Variable Costs, and Profit Maximization

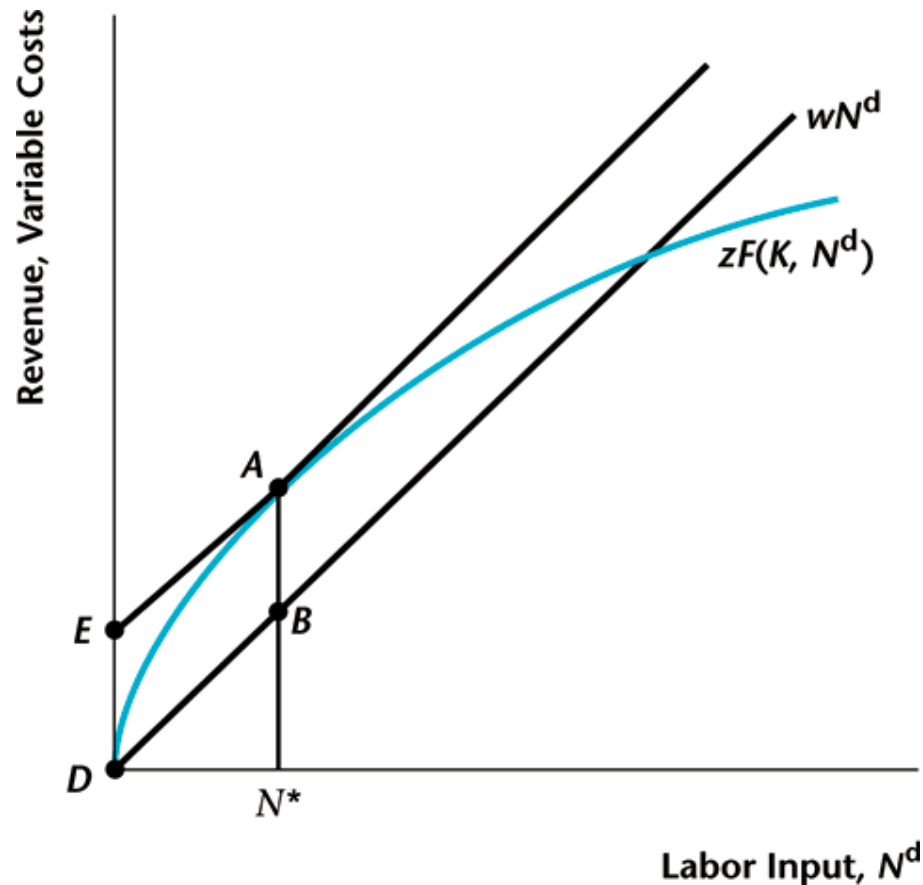


Figure 4.20 The Marginal Product of Labor Curve Is the Labor Demand Curve of the Profit-Maximizing Firm

