Principles of Economics

Twelfth Edition

Chapter 11

Input Demand: The Capital Market and the Investment Decision

Chapter Outline and Learning Objectives
(1 of 2)

11.1 Capital, Investment, and Depreciation

- Define the concepts of capital, investment, and depreciation.

11.2 The Capital Market

- Describe the forms and functions of capital income and discuss the fundamentals of financial markets and mortgage markets.

11.3 The Demand for New Capital and the Investment Decision

- Discuss the demand for new capital and explain the investment decision process.

Chapter Outline and Learning Objectives
(2 of 2)

A Final Word on Capital

Appendix: Calculating Present Value

- Be able to calculate the present value of $100 that you receive in 5 years for various interest rates.

Chapter 11 Input Demand: The Capital Market and the Investment Decision

- In the capital market, households often *indirectly* supply financial resources through, for example, adding funds to their bank accounts.
- Firms then can borrow those funds from the bank to finance their capital purchases.
- This chapter looks at the institutions through which capital flows from household to firms.

Capital, Investment, and Depreciation

Capital

- **capital** Those goods produced by the economic system that are used as inputs to produce other goods and services in the future.

Tangible Capital

- **physical,** or **tangible, capital** Material things used as inputs in the production of future goods and services. The major categories of physical capital are nonresidential structures, durable equipment, residential structures, and inventories.

Capital *(1 of 3)*

Social Capital: Infrastructure

- **social capital,** or **infrastructure** Capital that provides services to the public. Most social capital takes the form of public works (roads and bridges) and public services (police and fire protection).

Capital *(2 of 3)*

Intangible Capital

- **intangible capital** Nonmaterial things that contribute to the output of future goods and services.
- **human capital** A form of intangible capital that includes the skills and other knowledge that workers have or acquire through education and training and that yields valuable services to a firm over time.

Capital *(3 of 3)*

Measuring Capital

- **capital stock** For a single firm, the current market value of the firm's plant, equipment, inventories, and intangible assets.
- Capital is measured in terms of money, or value, as a *stock* value at a point in time.
- Capital is not money or financial assets such as bonds and stocks but instead is the firm's actual capital stock—its physical plant, equipment, inventory, and intangible assets.

Investment and Depreciation

- **investment** New capital additions to a firm's capital stock. Although capital is measured at a given point in time (a stock), investment is measured over a period of time (a flow). The flow of investment increases the capital stock.
- **depreciation** The decline in an asset's economic value over time.

TABLE 11.1 Private Investment in the U.S. Economy, 2014

GDP = $17,418.9 billion	Billions of Current Dollars	As a Percentage of Total Gross Investment	As a Percentage of GDP
Nonresidential structures	506.9	17.8	2.9
Equipment and intellectual property products	1,703.6	59.7	9.8
Change in private inventories	82.0	2.9	0.5
Residential structures	559.1	19.6	3.2
Total gross private investment	2,851.6	100.0	16.4
− depreciation	−2,216.3	−77.7	−12.7
Net investment =gross investment − depreciation	635.3	22.2	3.6

Source: U.S. Department of Commerce, Bureau of Economic Analysis, March 27, 2015

ECONOMICS IN PRACTICE

Investment Banking, IPOs, and Electric Cars

In 2010, Tesla Motors, a new electric car manufacturer, became a public company through the process of initial public offering (IPO).

This enabled the firm to raise $226 million in stock shares, each for a price of $17.

THINKING PRACTICALLY

1. Stock prices after an IPO are often quite volatile. Why?

The Capital Market *(1 of 2)*

- **capital market** The market in which households supply their savings to firms that demand funds to buy capital goods.
- Investment by firms is the *demand for capital*. Saving by households is the *supply of capital*.
- **bond** A contract between a borrower and a lender, in which the borrower agrees to pay the loan at some time in the future. Some bonds also make regular, constant payments once or twice a year.

The Capital Market *(2 of 2)*

- An *entrepreneur* organizes, manages, and assumes the risk of a new firm.
- When entrepreneurs start a new business by buying capital with their own savings, they are both demanding capital and supplying the resources (i.e., their savings) needed to purchase that capital.
- **financial capital market** The part of the capital market in which savers and investors interact through intermediaries.

FIGURE 11.1 $1,000 in Savings Becomes $1,000 of Investment

Capital Income: Interest and Profits *(1 of 4)*

- **capital income** Income earned on savings that have been put to use through financial capital markets.

Capital Income: Interest and Profits *(2 of 4)*

Interest

- **interest** The payments made for the use of money.
- **interest rate** Interest payments expressed as a percentage of the loan.
- Sometimes borrowers and lenders agree to periodically adjust the level of interest payments depending on market conditions. These types of loans are called *adjustable*, or *floating-rate*, *loans*.
- *Fixed rate loans* are loans in which the interest rate never varies.

Capital Income: Interest and Profits *(3 of 4)*

Profits

- **common stock** A share of stock is an ownership claim on a firm, entitling its owner to a profit share.
- **dividend** Payment made to shareholders of a corporation.
- In discussing profit, it is important to distinguish between profit as defined by generally accepted *accounting* principles (GAAP) and *economic* profits, as we defined them in Chapter 7.

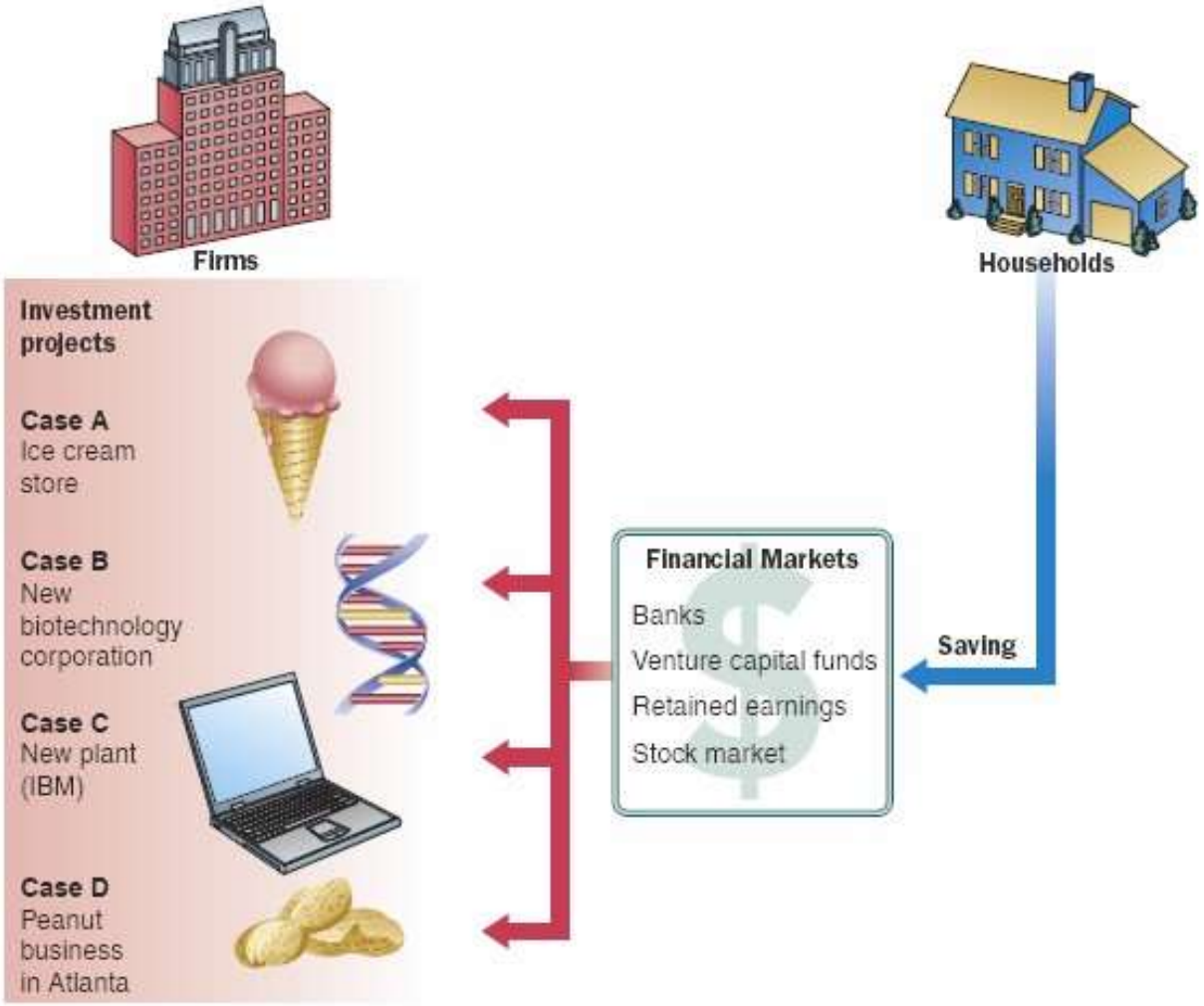
Capital Income: Interest and Profits *(4 of 4)*

Functions of Interest and Profit

- Interest may function as an incentive to postpone gratification.
- Profit serves as a reward for innovation and risk taking.

Financial Markets in Action *(1 of 3)*

FIGURE 11.2 Financial Markets Link Household Saving and Investment by Firms



Financial Markets in Action *(2 of 3)*

Case A: Business Loans

- Banks have funds to lend only because households deposit their savings there.

Case B: Venture Capital

- Household funds make it possible for firms to undertake investments. If a venture succeeds, those owning shares in the venture capital fund receive substantial profits.

Financial Markets in Action *(3 of 3)*

Case C: Retained Earnings

- In essence, when a firm retains earnings for investment purposes, it is actually saving on behalf of its shareholders.

Case D: The Stock Market

- Households' shares of stock become part of their net worth. The proceeds from stock sales are used to buy plant equipment and inventory.
- Savings flow into investment, and the firm's capital stock goes up by the same amount as household net worth.

ECONOMICS IN PRACTICE

Who Owns Stocks in Malaysia?

Buying shares of a company provides households a share of the company's future profits in return for the capital invested.

In terms of value, a bulk of the stock in the Malaysia is held by households.

For some companies a majority of stocks are held by households through such investment institutions.

THINKING PRACTICALLY

1. Why do some companies have more institutional shareholdings and less individual holdings than other companies?

Capital Accumulation and Allocation *(1 of 2)*

- Various connections between households and firms facilitate the movement of savings into productive investment.
- All societies exist through time and thus must allocate resources over time.
- In modern industrial societies, investment decisions (capital production decisions) are made primarily by firms.

Capital Accumulation and Allocation *(2 of 2)*

- Households decide how much to save, and in the long run, savings limit or constrain the amount of investment that firms can undertake.
- The capital market directs savings into profitable investment projects.

The Demand for New Capital and the Investment Decision

- Firms have an incentive to expand in industries that earn positive profits and in industries in which economies of scale lead to lower average costs at higher levels of output.
- Positive profits in an industry stimulate the entry of new firms.
- The expansion of existing firms and the creation of new firms both involve investment in new capital.
- A perfectly competitive firm invests in capital up to the point at which the marginal revenue product of capital is equal to the price of capital.

Forming Expectations *(1 of 3)*

- Capital produces useful services over *some period of time*, though capital goods do not begin to yield benefits until they are *used*.

Forming Expectations *(2 of 3)*

The Expected Benefits of Investments

- The investment process requires that the potential investor evaluate the expected flow of future productive services that an investment project will yield.

Forming Expectations *(3 of 3)*

The Expected Costs of Investments

- The ability to lend at the market rate of interest means that there is an *opportunity cost* associated with every investment project.
- The evaluation process involves not only estimating future benefits but also comparing them with the possible alternative uses of the funds required to undertake the project.

Comparing Costs and Expected Return
(1 of 3)

- **expected rate of return** The annual rate of return that a firm expects to obtain through a capital investment.
- The expected rate of return on an investment project depends on the price of the investment, the expected length of time the project provides additional cost savings or revenue, and the expected amount of revenue attributable each year to the project.

Comparing Costs and Expected Return
(2 of 3)

- The most important thing to remember about the investment demand curve is that its shape and position depend critically on the *expectations* of those making the investment decisions.

TABLE 11.2 Potential Investment Projects and Expected Rates of Return for a Hypothetical Firm, Based on Forecasts of Future Profits Attributable to the Investment

Project	(1) Total Investment (Dollars)	(2) Expected Rate of Return (Percent)
A. New computer network	400,000	25
B. New branch plant	2,600,000	20
C. Sales office in another state	1,500,000	15
D. New automated billing system	100,000	12
E. Ten new delivery trucks	400,000	10
F. Advertising campaign	1,000,000	7
G. Employee cafeteria	100,000	5

FIGURE 11.3 Total Investment as a Function of the Market Interest Rate

The demand for new capital depends on the interest rate.

When the interest rate is low, firms are more likely to invest in new plant and equipment than when the interest rate is high.

This is so because the interest rate determines the direct cost (interest on a loan) or the opportunity cost (alternative investment) of each project.

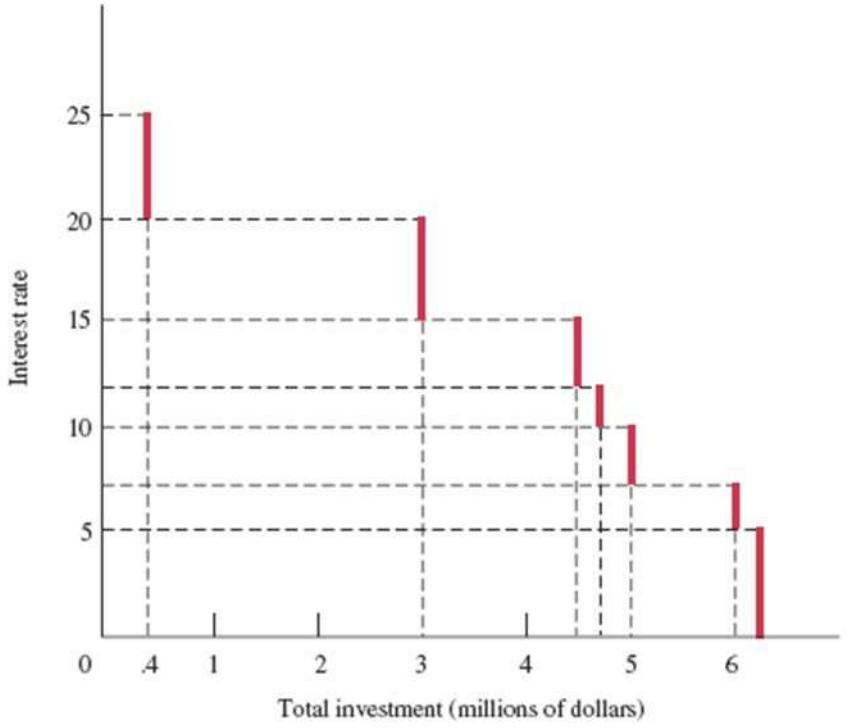
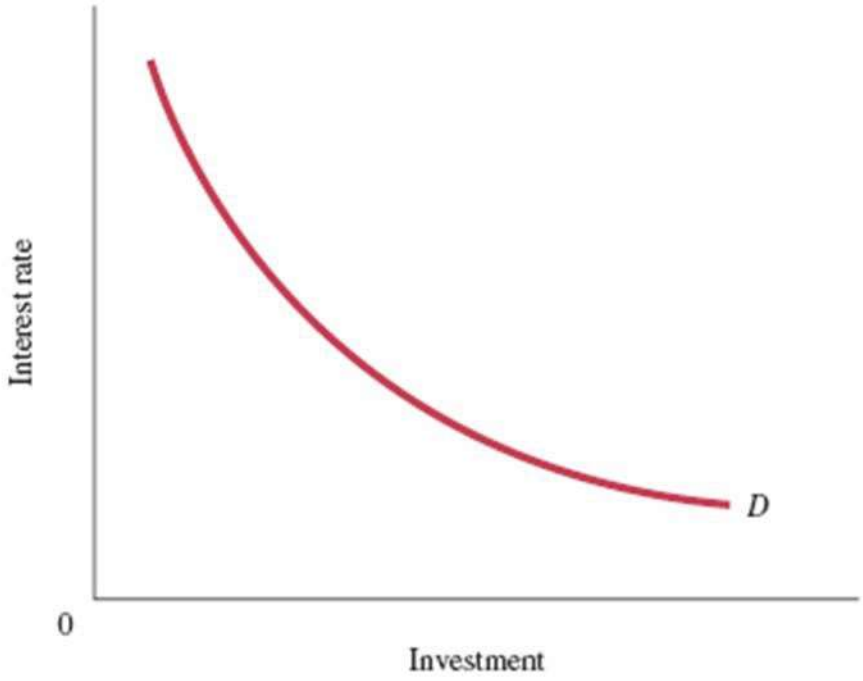


FIGURE 11.4 Investment Demand

Lower interest rates are likely to stimulate investment in the economy as a whole, whereas higher interest rates are likely to slow investment



Comparing Costs and Expected Return
(3 of 3)

The Expected Rate of Return and the Marginal Revenue Product of Capital

- Recall that we defined an input's marginal revenue product as the additional revenue a firm earns by employing one additional unit of that input, *ceteris paribus*.
- A perfectly competitive profit-maximizing firm will keep investing in new capital up to the point at which the expected rate of return is equal to the interest rate.
- The firm will continue investing up to the point at which the marginal revenue product of capital is equal to the price of capital, or $MRP_K = P_K$.

A Final Word on Capital

- The concept of capital is one of the central ideas in economics.
- Capital is produced by the economic system itself.
- Capital generates services over time, and it is used as an input in the production of goods and services.
- All the analysis done by financial managers seeking to earn a high yield for clients, by managers of firms seeking to earn high profits for their stockholders, and by entrepreneurs seeking profits serves to channel capital into its most productive uses.

REVIEW TERMS AND CONCEPTS

- bond
- capital
- capital income
- capital market
- capital stock
- common stock
- depreciation
- expected rate of return
- financial capital market
- human capital
- intangible capital
- interest
- interest rate
- investment
- physical, or tangible, capital
- social capital, or infrastructure

CHAPTER 11 APPENDIX: Calculating Present Value

Present Value

- **present discounted value (PDV)** or **net present value (NPV)** The present discounted value of *R* dollars to be paid *t* years in the future is the amount you need to pay today, at current interest rates, to ensure that you end up with *R* dollars *t* years from now. It is the current market value of receiving *R* dollars in *t* years.

TABLE 11A.1 Expected Profits from a $1,200 Investment Project

Year 1	$100
Year 2	100
Year 3	400
Year 4	500
Year 5	500
All later years	0
Total	1,600

Present Value

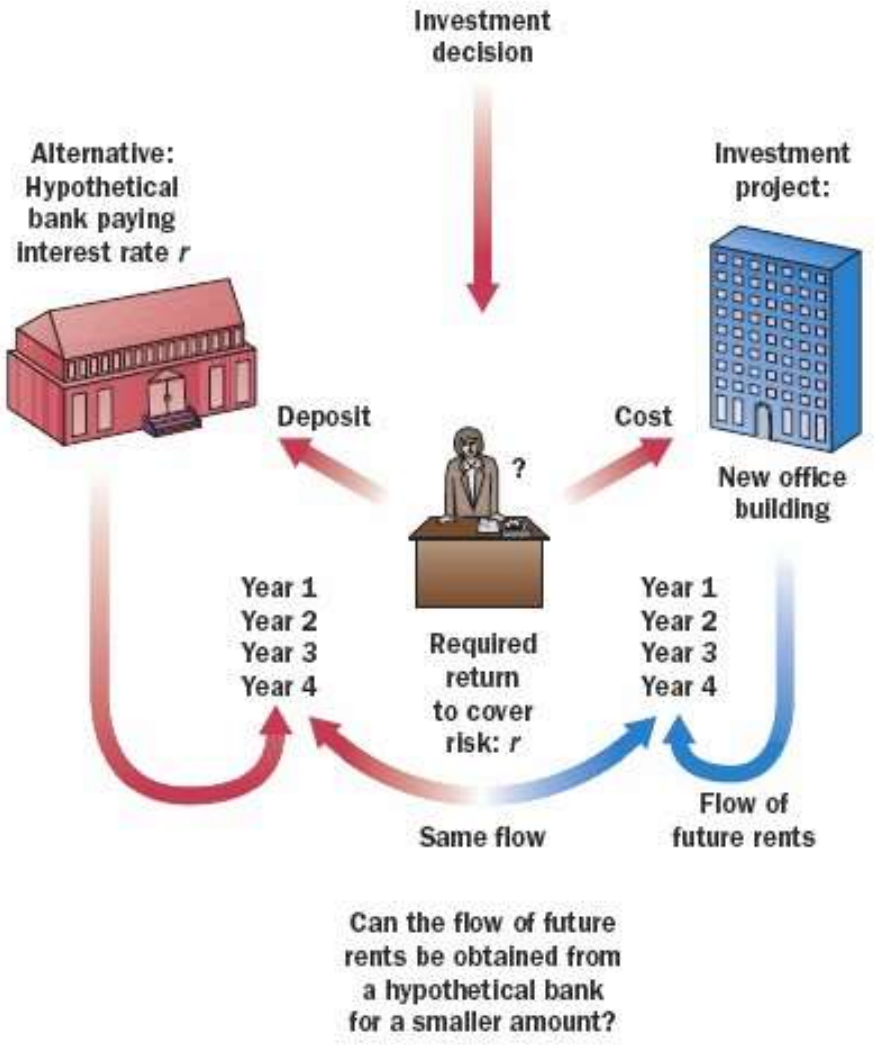
- In general, the present value, or present discounted value (PDV), of *R* dollars to be received in *t* years is:

$$PDV = \frac{R}{(1+r)^t}$$

TABLE 11A.2 Calculation of Total Present Value of a Hypothetical Investment Project (Assuming r = 10 Percent)

End of…	$(r)	Divided by $(1 + r)^t$	=	Present Value ($)
Year 1	100	(1.1)		90.91
Year 2	100	$(1.1)^2$		82.64
Year 3	400	$(1.1)^3$		300.53
Year 4	500	$(1.1)^4$		341.51
Year 5	500	$(1.1)^5$		**310.46**
Total present value				1,126.05

FIGURE 11A.1 Investment Project: Go or No? A Thinking Map



Lower Interest Rates, Higher Present Values

The basic rule is as follows:

- If the present value of an expected stream of earnings from an investment exceeds the cost of the investment necessary to undertake it, the investment should be undertaken.
- If the present value of an expected stream of earnings falls short of the cost of the investment, the financial market can generate the same stream of income for a smaller initial investment, and the investment should not be undertaken.

TABLE 11A.3 Calculation of Total Present Value of a Hypothetical Investment Project (Assuming r = 5 Percent)

End of…	$(r)	Divided by $(1 + r)^t$	=	Present Value ($)
Year 1	100	(1.05)		95.24
Year 2	100	$(1.05)^2$		90.70
Year 3	400	$(1.05)^3$		345.54
Year 4	500	$(1.05)^4$		411.35
Year 5	500	$(1.05)^5$		391.76
Total present value				1,334.59

APPENDIX REVIEW TERMS AND CONCEPTS

- present discounted value (PDV) or net present value (NPV)

Equation:

$$PDV = \frac{R}{(1+r)^t}$$