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THE ECONOMICS OF LABOR MARKETS

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The Markets for the Factors of Production

The Markets for the Factors of Production

- Factors of production are the inputs used to produce goods and services.

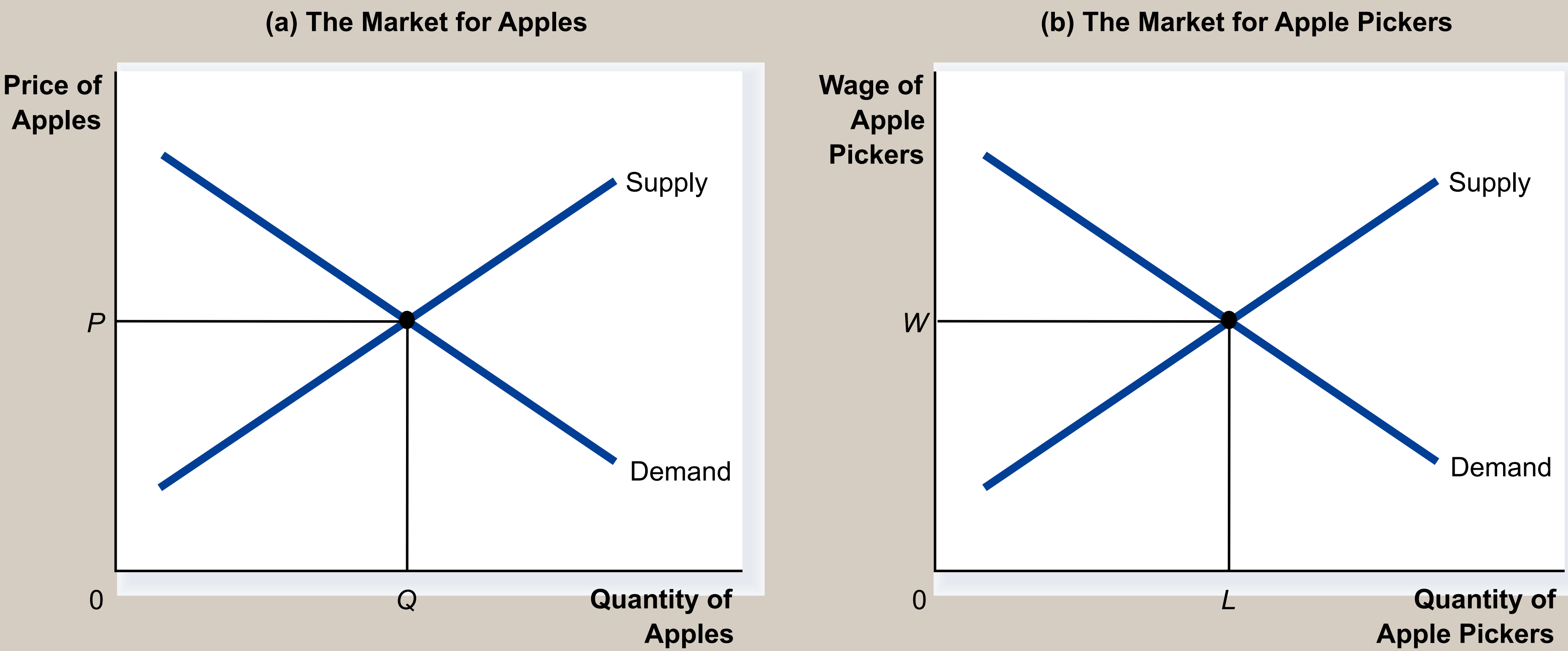
The Market for the Factors of Production

- The demand for a *factor of production* is a derived demand.
- A firm's demand for a factor of production is *derived* from its decision to supply a good in another market.

THE DEMAND FOR LABOR

- Labor markets, like other markets in the economy, are governed by the forces of *supply and demand*.

Figure 1 The Versatility of Supply and Demand



THE DEMAND FOR LABOR

- Most labor services, rather than being final goods ready to be enjoyed by consumers, are inputs into the production of other goods.

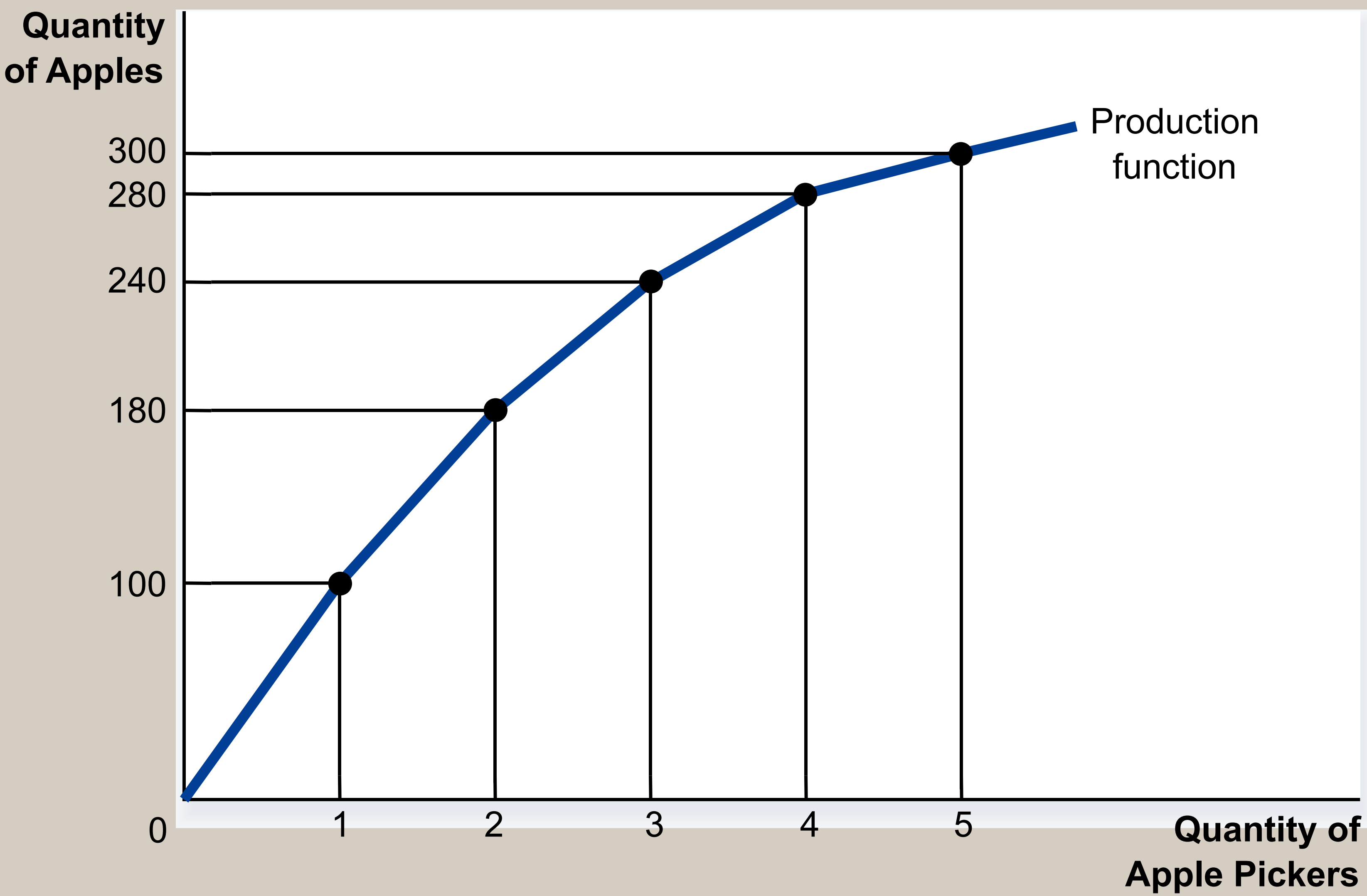
The Production Function and the Marginal Product of Labor

- The *production function* illustrates the relationship between the quantity of inputs used and the quantity of output of a good.

Table 1 How the Competitive Firm Decides How Much Labor to Hire

Labor	Output	Marginal Product of Labor	Value of the Marginal Product of Labor	Wage	Marginal Profit
L (number of workers)	Q (bushels per week)	$MPL = \Delta Q / \Delta L$ (bushels per week)	$VMPL = P \times MPL$	W	$\Delta \text{Profit} = VMPL - W$
0	0				
		100	$1,000	$500	$500
1	100				
		80	800	500	300
2	180				
		60	600	500	100
3	240				
		40	400	500	−100
4	280				
		20	200	500	−300
5	300				

Figure 2 The Production Function



The Production Function and the Marginal Product of Labor

- The *marginal product of labor* is the increase in the amount of output from an additional unit of labor.
  - $MPL = \Delta Q / \Delta L$
  - $MPL = (Q_2 - Q_1)/(L_2 - L_1)$

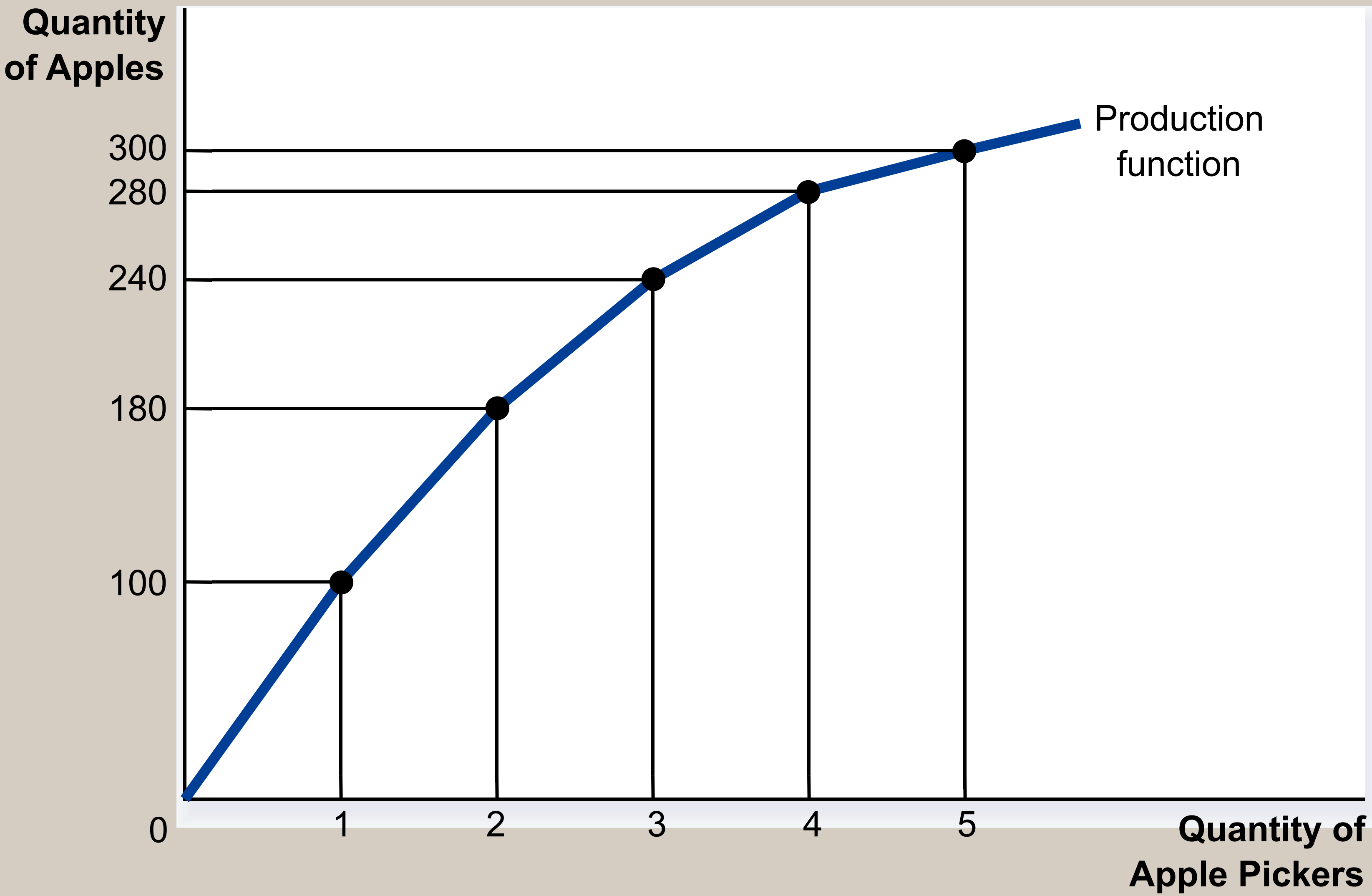
The Production Function and the Marginal Product of Labor

- Diminishing Marginal Product of Labor
  - As the number of workers increases, the marginal product of labor declines.
  - As more and more workers are hired, each additional worker contributes less to production than the prior one.
  - The production function becomes flatter as the number of workers rises.
  - **This property is called *diminishing marginal product.***

The Production Function and the Marginal Product of Labor

- Diminishing marginal product refers to the property whereby the marginal product of an input declines as the quantity of the input increases.

Figure 2 The Production Function



The Value of the Marginal Product and the Demand for Labor

- The value of the marginal product is the marginal product of the input multiplied by the market price of the output.

$$VMPL = MPL \times P$$

The Value of the Marginal Product and the Demand for Labor

- The *value of the marginal product* (also known as marginal revenue product) is measured in dollars.
- It diminishes as the number of workers rises because the market price of the good is constant.

The Value of the Marginal Product and the Demand for Labor

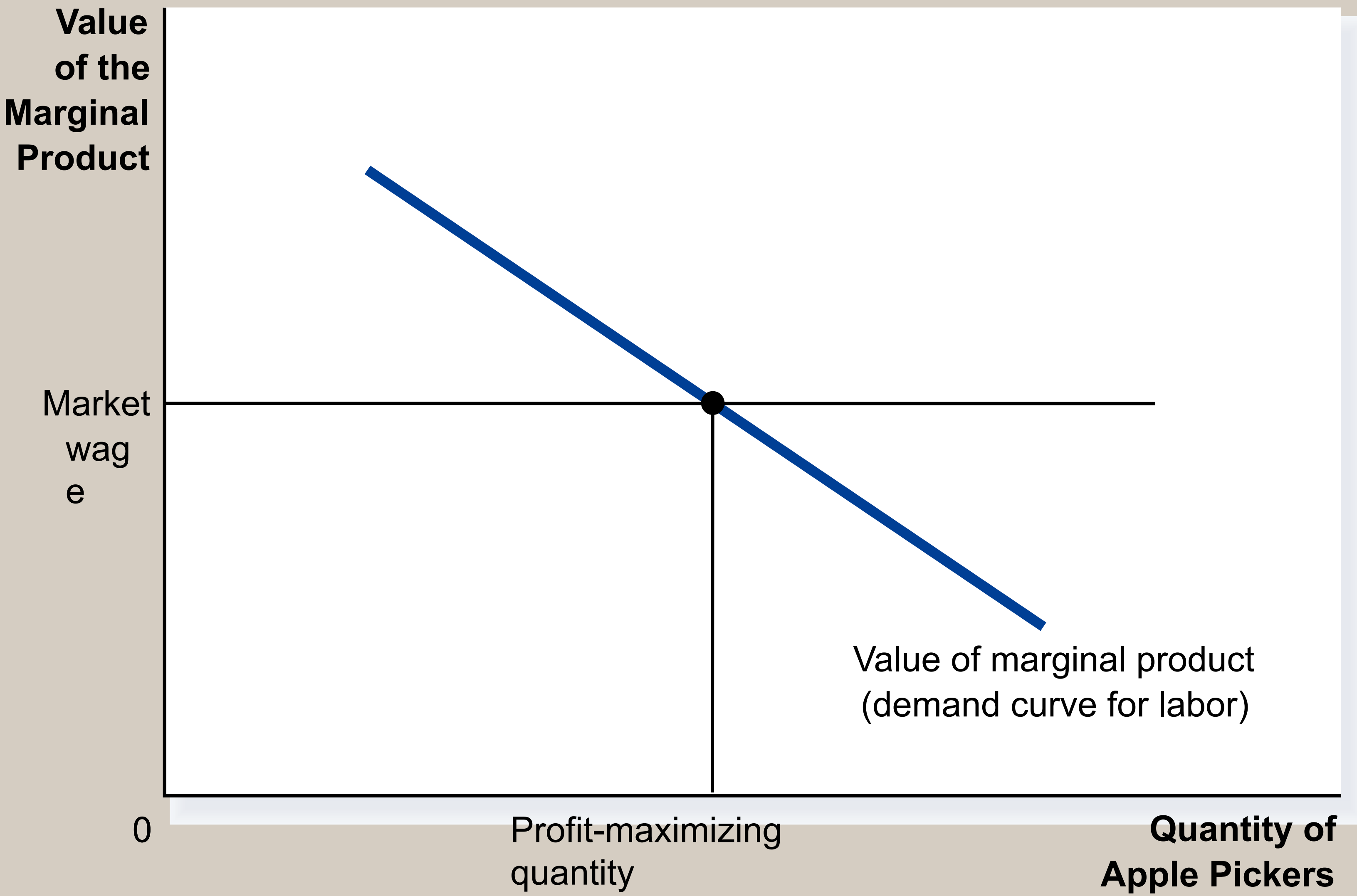
- To maximize profit, the competitive, profit-maximizing firm hires workers up to the point where the value of the marginal product of labor equals the wage.

$$VMPL = \text{Wage}$$

The Value of the Marginal Product and the Demand for Labor

- The value-of-marginal-product curve is the labor demand curve for a competitive, profit-maximizing firm.

Figure 3 The Value of the Marginal Product of Labor



FYI—Input Demand and Output Supply

- When a competitive firm hires labor up to the point at which the value of the marginal product equals the wage, it also produces up to the point at which the price equals the marginal cost.

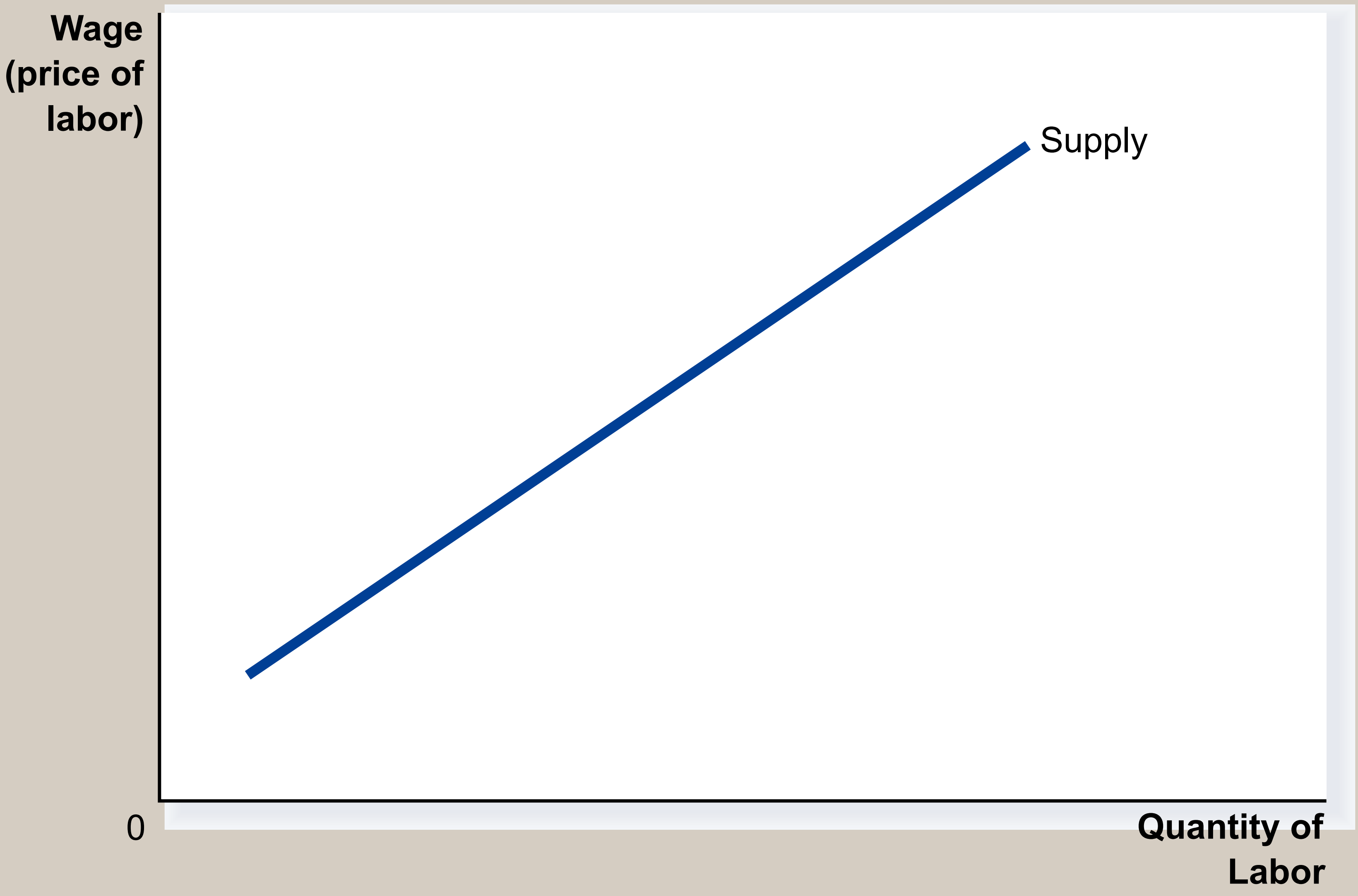
What Causes the Labor Demand Curve to Shift?

- Output Price
- Technological Change
- Supply of Other factors

THE SUPPLY OF LABOR

- The labor supply curve reflects how workers' decisions about the labor-leisure tradeoff respond to changes in opportunity cost.
- An upward-sloping labor supply curve means that an increase in the wages induces workers to increase the quantity of labor they supply.

Figure 4 Equilibrium in a Labor Market



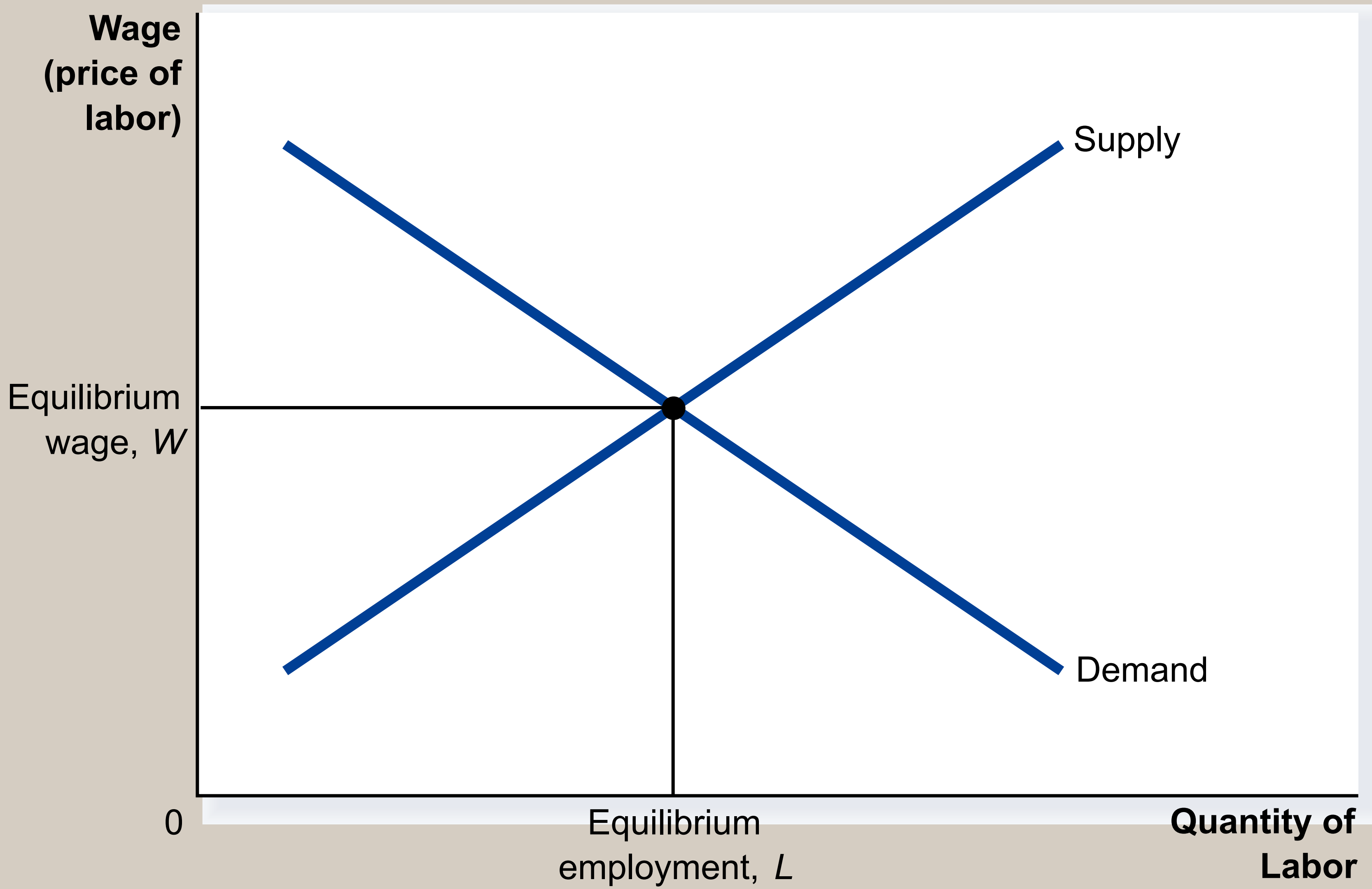
What Causes the Labor Supply Curve to Shift?

- Changes in Tastes
- Changes in Alternative Opportunities
- Immigration

EQUILIBRIUM IN THE LABOR MARKET

- The wage adjusts to balance the supply and demand for labor.
- The wage equals the value of the marginal product of labor.

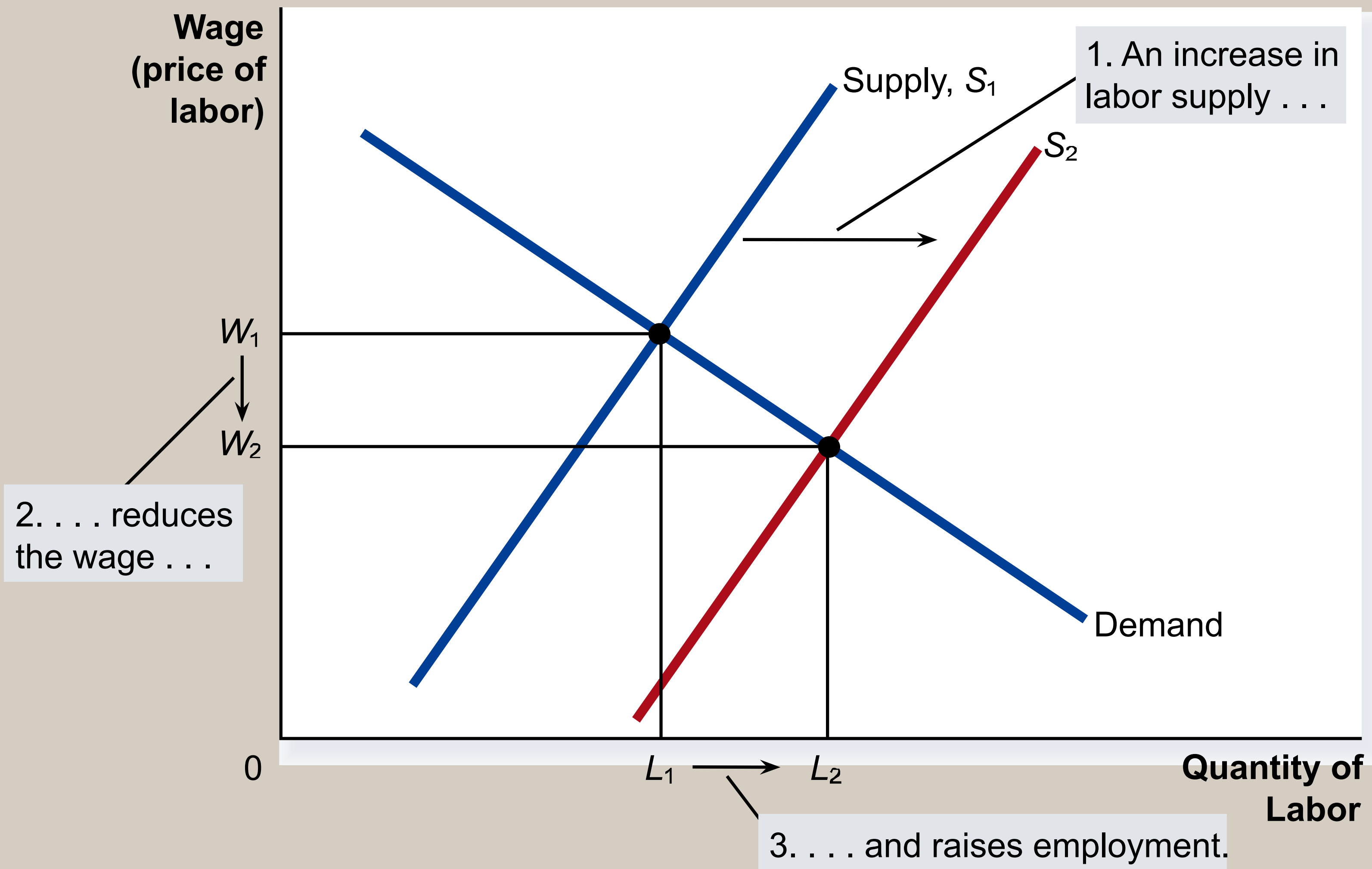
Figure 4 Equilibrium in a Labor Market



EQUILIBRIUM IN THE LABOR MARKET

- Labor supply and labor demand determine the equilibrium wage.
- Shifts in the supply or demand curve for labor cause the equilibrium wage to change.

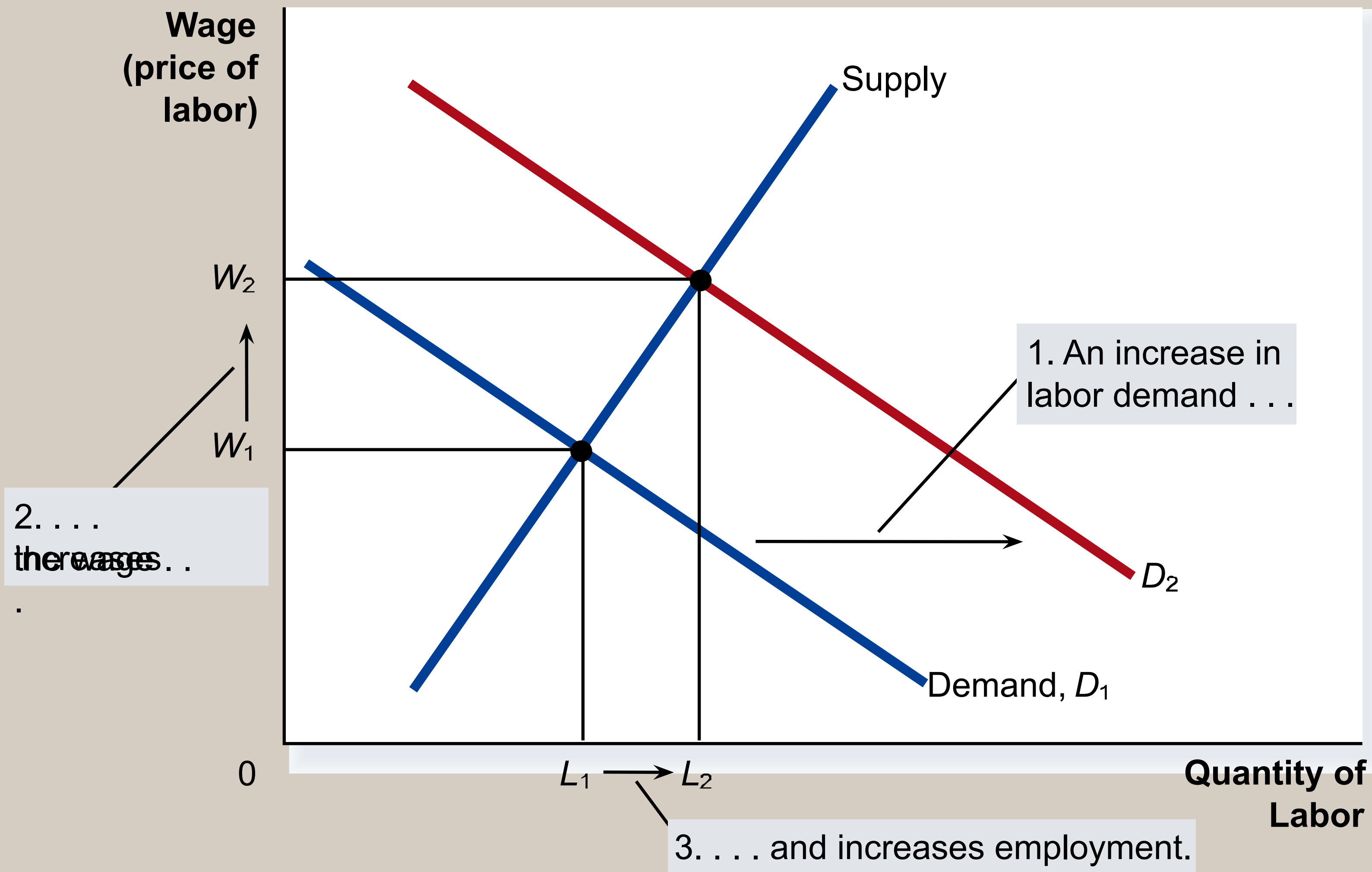
Figure 5 A Shift in Labor Supply



Shifts in Labor Supply

- An increase in the supply of labor :
  - Results in a surplus of labor.
  - Puts downward pressure on wages.
  - Makes it profitable for firms to hire more workers.
  - Results in diminishing marginal product.
  - Lowers the value of the marginal product.
  - Gives a new equilibrium.

Figure 6 A Shift in Labor Demand



Shifts in Labor Demand

- An increase in the demand for labor :
  - Makes it profitable for firms to hire more workers.
  - Puts upward pressure on wages.
  - Raises the value of the marginal product.
  - Gives a new equilibrium.

Table 2 Productivity and Wage Growth in the United States.

Time Period	Growth Rate of Productivity	Growth Rate of Real Wages
1959–2000	2.0	2.0
1959–1973	2.9	3.0
1973–1995	1.3	1.1
1995–2000	2.6	2.9

Source: *Economic Report of the President 2002,* table B-49, p. 378. Growth in productivity is measured here as the annualized rate of change in output per hour in the nonfarm business sector. Growth in real wages is measured as the annualized change in compensation per hour in the nonfarm business sector divided by the implicit price deflator for that sector. These productivity data measure average productivity—the quantity of output divided by the quantity of labor—rather than marginal productivity, but average and marginal productivity are thought to move closely together.

OTHER FACTORS OF PRODUCTION: LAND AND CAPITAL

- *Capital* refers to the equipment and structures used to produce goods and services.
  - The economy's capital represents the accumulation of goods produced in the past that are being used in the present to produce new goods and services.

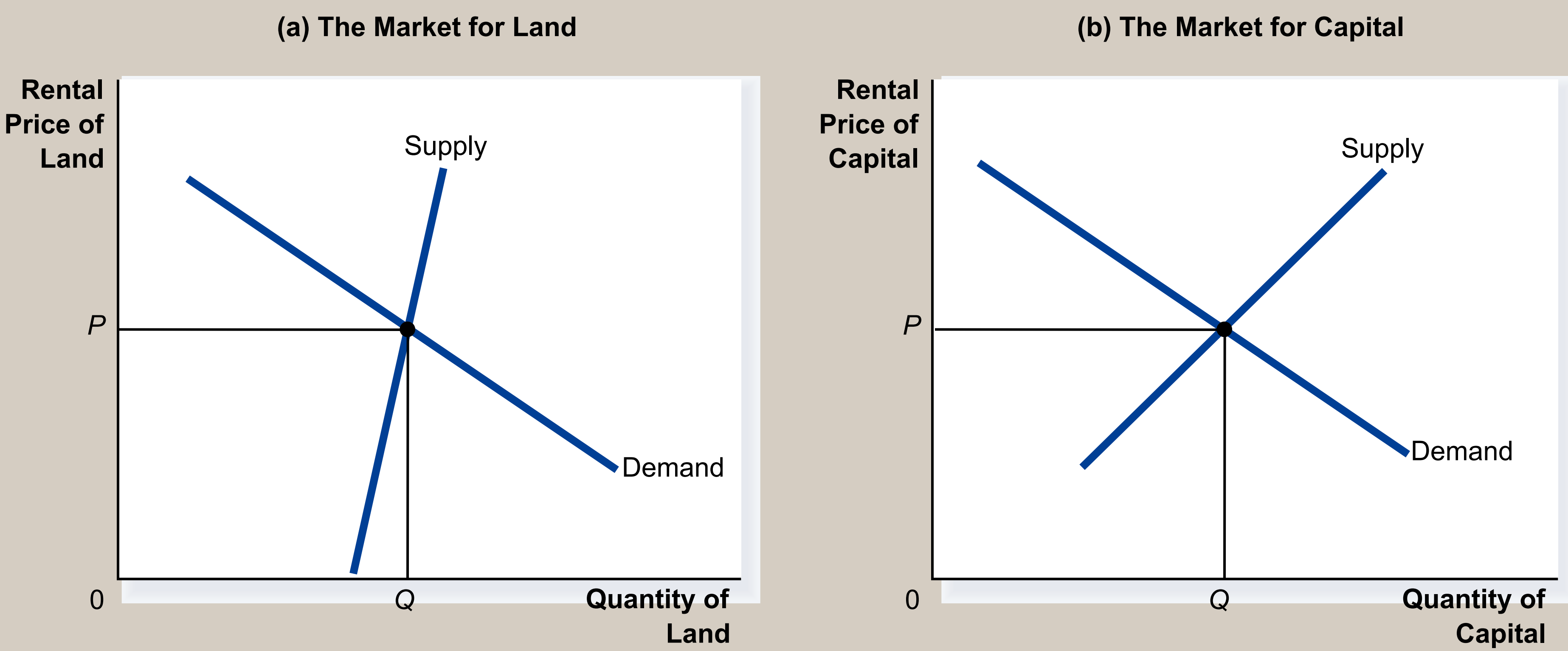
OTHER FACTORS OF PRODUCTION: LAND AND CAPITAL

- Prices of Land and Capital
  - The purchase price is what a person pays to own a factor of production indefinitely.
  - The rental price is what a person pays to use a factor of production for a limited period of time.

Equilibrium in the Markets for Land and Capital

- The rental price of land and the rental price of capital are determined by supply and demand.
  - The firm increases the quantity hired until the value of the factor’s marginal product equals the factor’s price.

Figure 7 The Markets for Land and Capital



Equilibrium in the Markets for Land and Capital

- Each factor's rental price must equal the value of its marginal product.
- They each earn the value of their marginal contribution to the production process.

Linkages among the Factors of Production

- Factors of production are used together.
  - The marginal product of any one factor depends on the quantities of all factors that are available.

Linkages among the Factors of Production

- A change in the supply of one factor alters the earnings of all the factors.

Linkages among the Factors of Production

- A change in earnings of any factor can be found by analyzing the impact of the event on the value of the marginal product of that factor.

Summary

- The economy's income is distributed in the markets for the factors of production.
- The three most important factors of production are labor, land, and capital.
- The demand for a factor, such as labor, is a derived demand that comes from firms that use the factors to produce goods and services.

Summary

- Competitive, profit-maximizing firms hire each factor up to the point at which the value of the marginal product of the factor equals its price.
- The supply of labor arises from individuals' tradeoff between work and leisure.
- An upward-sloping labor supply curve means that people respond to an increase in the wage by enjoying less leisure and working more hours.

Summary

- The price paid to each factor adjusts to balance the supply and demand for that factor.
- Because factor demand reflects the value of the marginal product of that factor, in equilibrium each factor is compensated according to its marginal contribution to the production of goods and services.

Summary

- Because factors of production are used together, the marginal product of any one factor depends on the quantities of all factors that are available.
- As a result, a change in the supply of one factor alters the equilibrium earnings of all the factors.