CHAPTER CHECKLIST

1. Describe the anatomy of the markets for labor, capital, and land.

2. Explain how the value of marginal product determines the demand for a factor of production.

3. Explain how wage rates and employment are determined.

4. Explain how interest rates, borrowing, and lending are determined.

5. Explain how rents and natural resource prices are determined.

LECTURE TOPICS

- The Anatomy of Factor Markets
- The Demand for a Factor of Production
- Wages and Employment
- Financial Markets
- Land and Natural Resource Markets
The four factors of production that produce goods and services are:
- Labor
- Capital
- Land
- Entrepreneurship

**Factor price**
The price of a factor of production.
- The wage rate is the price of labor.
- The interest rate is the price of capital.
- Rent is the price of land.

**Factor market**
A market for labor, capital, or land.

**Labor Markets**
- Labor market
  A collection of people and firms who are trading labor services.
- Job
  A long-term contract between a firm and a household to provide labor services.

**Financial Markets**
- Capital
  The tools, instruments, machines, and other constructions that have been produced in the past and that businesses use to produce goods and services.
- Financial capital
  The funds that firms use to buy and operate physical capital.
Financial Market
A collection of people and firms who are lending and borrowing to finance the purchase of physical capital.

The two main types of financial market are:
- Stock market
- Bond market

Stock Market
A stock market is a market in which the shares in the stocks of companies are traded.
Examples: the New York Stock Exchange, NASDAQ.

Bond Market
A bond market is a market in which bonds issued by firms or governments are traded.

Bond
A promise to pay specified sums of money on specified dates.

Land Markets
Land consists of all the gifts of nature.
The markets for raw materials are called commodity markets.

Competitive Factor Markets
Most factor markets have many buyers and sellers and are competitive markets.
16.2 DEMAND IN FACTOR MARKET

Derived demand
The demand for a factor of production, which is derived from the demand for the goods and services it is used to produce.

Value of marginal product
The value to a firm of hiring one more unit of a factor of production, which equals price of a unit of output multiplied by the marginal product of the factor of production.

### Value of Marginal Product
Table 16.1 on the next slide walks you through the calculation of the value of marginal product.

<table>
<thead>
<tr>
<th>Quantity of labor (workers)</th>
<th>Total product (car washes per hour)</th>
<th>Marginal product (washes per worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>E</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

The first two columns of the table are the firm's total product schedule. To calculate marginal product, find the change in total product as the quantity of labor increases by 1 worker. To calculate the value of marginal product, multiply the marginal product numbers by the price of a car wash, which in this example is $3.
16.2 DEMAND IN FACTOR MARKET

The blue bars show the value of the marginal product of labor that Max hires based on the numbers in the table.

**Table:**

<table>
<thead>
<tr>
<th>Quantity of labor (workers)</th>
<th>Total product (car washes per hour)</th>
<th>Marginal product (washes per worker)</th>
<th>Value of marginal product (dollars per worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>E</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>F</td>
<td>5</td>
<td>15</td>
<td>3</td>
</tr>
</tbody>
</table>

Figure 16.1 shows the value of the marginal product at Max’s Wash’n’ Wax. The blue bars show the value of the marginal product of the labor that Max hires based on the numbers in the table.

16.2 DEMAND IN FACTOR MARKET

The orange line is the firm’s value of the marginal product of labor curve.

**A Firm’s Demand for Labor**

A firm hires labor up to the point at which the value of marginal product equals the wage rate.

If the value of marginal product of labor exceeds the wage rate, a firm can increase its profit by employing one more worker.

If the wage rate exceeds the value of marginal product of labor, a firm can increase its profit by employing one fewer worker.
A Firm's Demand for Labor Curve

A firm's demand for labor curve is also its value of marginal product curve. If the wage rate falls, a firm hires more workers.

Figure 16.2 shows the demand for labor at Max's Wash'n' Wax. At a wage rate of $10.50 an hour, Max makes a profit on the first 2 workers but would incur a loss on the third worker. So Max's quantity of labor demanded is 2 workers. Max's demand for labor curve is the same as the value of marginal product curve.

The demand for labor curve slopes downward because the value of the marginal product of labor diminishes as the quantity of labor employed increases.
Changes in the Demand for Labor
The demand for labor depends on:
- The price of the firm’s output
- The prices of other factors of production
- Technology

The Price of the Firm’s Output
The higher the price of a firm’s output, the greater is its demand for labor.

The Prices of Other Factors of Production
If the price of using capital decreases relative to the wage rate, a firm substitutes capital for labor and increases the quantity of capital it uses. Usually, the demand for labor will decrease when the price of using capital falls.

Technology
New technologies decrease the demand for some types of labor and increase the demand for other types.

The Supply of Labor
People supply labor to earn an income. Many factors influence the quantity of labor that a person plans to provide, but the wage rate is a key factor. Figure 16.3 on the next slide shows an individual’s labor supply curve.
The table shows Larry's labor supply schedule, which is plotted in the figure as Larry's labor supply curve.

1. At a wage rate of $10.50 an hour, Larry...
2. ...supplies 30 hours of labor a week.

3. As the wage rate rises, Larry’s quantity of labor supplied ...
4. ...increases,
5. ...reaches a maximum,
6. ...then decreases.

Larry’s labor supply curve eventually bends backward.
16.3 WAGES AND EMPLOYMENT

Market Supply Curve
A market supply curve shows the quantity of labor supplied by all households in a particular job. It is found by adding together the quantities of labor supplied by all households at each wage rate. Figure 16.4 on the next slide shows the supply of car wash workers.

16.3 WAGES AND EMPLOYMENT

This supply curve shows how the quantity of car wash workers supplied changes when the wage rate changes, other things remaining the same.

16.3 WAGES AND EMPLOYMENT

In a market for a specific type of labor, the quantity supplied increases as the wage rate increases, other things remaining the same.

16.3 WAGES AND EMPLOYMENT

Influences on the Supply of Labor
Three key factors influence the supply of labor:
- Adult population
- Preferences
- Time in school and training
16.3 WAGES AND EMPLOYMENT

**Adult Population**
An increase in the adult population increases the supply of labor.

**Preferences**
There has been a large increase in the supply of female labor since 1960. The percentage of men with jobs has shrunk slightly.

16.3 WAGES AND EMPLOYMENT

**Time in School and Training**
The more people who remain in school for full-time education and training, the smaller is the supply of low-skilled labor.

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**Labor Market Equilibrium**
Labor market equilibrium determines the wage rate and employment.

Figure 16.5 on the next slide illustrates equilibrium in the market for car wash workers.

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1. The equilibrium wage rate is $10.50 an hour.
2. The equilibrium quantity of labor is 300 workers.
16.3 WAGES AND EMPLOYMENT

If the wage rate exceeds $10.50 an hour, the quantity demanded is less than the quantity supplied and the wage rate falls.

If the wage rate is below $10.50 an hour, the quantity demanded exceeds the quantity supplied and the wage rate rises.

16.4 FINANCIAL MARKETS

- The Demand for Financial Capital
  - A firm’s demand for financial capital stems from its demand for physical capital to produce goods and services.
  - The quantity of physical capital that a firm plans to use depends on the price of financial capital - the interest rate.
  - Two factors that change the demand for capital are:
    • Population growth
    • Technological change

- The Supply of Financial Capital
  - The quantity of financial capital supplied results from people’s saving decisions.
  - The higher the interest rate, the greater is the quantity of saving supplied.
  - The main influences on the supply of saving are:
    • Population
    • Average income
    • Expected future income
16.4 FINANCIAL MARKETS

Financial Market Equilibrium and the Interest Rate

Financial market equilibrium occurs when the interest rate has adjusted to make the quantity of capital demanded equal the quantity of capital supplied. Figure 16.6 on the next slide illustrates financial market equilibrium.

The demand for financial capital is \( KD \), and the supply of financial capital is \( KS \).

1. The equilibrium interest rate is 6 percent a year.

2. The equilibrium quantity of financial capital is $200 billion.

16.5 LAND AND NATURAL RESOURCES

All natural resources are called land, and they fall into two categories:

- Renewable
- Nonrenewable

Renewable natural resources

Natural resources that can be used repeatedly.

Nonrenewable natural resources

Natural resources that can be used only once and that cannot be replaced once they have been used.

The Market for Land (Renewable Natural Resources)

The lower the rent, the greater is the quantity of land demanded.

The supply of a particular block of land is perfectly inelastic.

Figure 16.7 illustrates this market for land.
The demand curve for a 10-acre block of land is $D$, and the supply curve is $S$. Equilibrium occurs at a rent of $1,000 an acre per day.

### Economic Rent and Opportunity Cost

**Economic rent**

The income received by any factor of production over and above the amount required to induce a given quantity of the factor to be supplied.

The income that is required to induce the supply of a given quantity of a factor of production is its **opportunity cost**—the value of the factor of production in its next best use.

### The Supply of a Nonrenewable Resource

Over time, the quantity of a nonrenewable resource decreases as it is used up.

But the known quantity of a natural resource increases because advances in technology enable ever less accessible sources of the resource to be discovered.

Using a natural resource decreases its supply, which causes price to rise.

New discoveries increase supply, which cause prices to fall.