UNIT 5

Factor Markets

How firms hire labor and other resources — applying marginal analysis to the demand for inputs

10–13%	6–8	4
EXAM WEIGHTING	CLASS PERIODS	TOPICS IN UNIT

Teacher presentation · Aligned to the College Board Course and Exam Description

What This Unit Covers

TOPICS IN THIS UNIT

- 5.1 Introduction to Factor Markets
- 5.2 Changes in Factor Demand and Factor Supply
- 5.3 Profit-Maximizing Behavior in Perfectly Competitive Factor Markets
- 5.4 Monopsonistic Markets

BIG IDEAS

- PRD — Production Choices and Behavior: How are prices for resources determined?
- How do firms use resource prices to make decisions?

WHY IT MATTERS

Factor prices provide incentives and convey information to firms and resource owners. Like product markets, factor markets follow the laws of supply and demand — and firms hire each resource up to the point where its marginal revenue product equals its marginal resource cost.

10–13% of the AP Exam multiple-choice and free-response score

TOPIC 5.1

Introduction to Factor Markets

Enduring Understanding PRD-4 — Factor prices provide incentives and convey information to firms and factors of production.

LEARNING OBJECTIVES: PRD-4.A — Key terms of factor markets; the relationship between factors, firms, and factor prices.

Factor Markets and Derived Demand

Factors Respond to Factor Prices

The factors of production — labor, capital, and land — respond to factor prices: wages, interest, and rent. These prices guide resources to their uses.

Derived Demand

The demand for a factor is DERIVED from the demand for the goods it produces. Firms hire workers not for their own sake, but to produce goods that consumers want.

The Firm's Hiring Decision

A firm's decision to hire a factor depends on three things: the PRODUCTIVITY of the factor, the PRICE of the output it produces, and the COST of the factor.

The Labor Market and the Firm

Like a product market, the labor market has a downward-sloping demand curve and an upward-sloping supply curve.

- The quantity of labor demanded is negatively related to the wage — labor demand slopes DOWN.
- The quantity of labor supplied is positively related to the wage — labor supply slopes UP.
- The market's supply and demand set the equilibrium wage (W*).
- In a perfectly competitive labor market, each firm takes that wage as given and hires where the wage equals marginal revenue product.

KEY TAKEAWAY

The labor market sets the wage through supply and demand; the individual firm takes that wage as given.

TOPIC 5.2

Changes in Factor Demand and Factor Supply

What shifts the demand for and supply of labor.

LEARNING OBJECTIVES: PRD-4.B — Firms' and factors' responses to changes in incentives and constraints.

Determinants of Labor Demand

Labor demand shifts when the marginal revenue product of labor changes — driven mainly by two factors.

Output Price

A change in the price of the good the workers produce shifts labor demand. Higher output price raises the value of each worker's output, so labor demand shifts right.

Worker Productivity

A change in workers' productivity shifts labor demand. Better training, technology, or capital makes workers more productive, raising labor demand.

Remember: Demand Is Derived

Because labor demand is derived demand, anything that changes the demand for the final product also shifts the demand for the labor that makes it.

Determinants of Labor Supply

Labor supply shifts with the factors that change how many people are willing to work at each wage.

Population and Immigration

Immigration and changes in the age distribution of the population change the number of available workers, shifting labor supply.

Education, Skills, and Alternatives

Education and training, the availability of alternative job options, and working conditions affect how many workers supply their labor to a given market.

Preferences and Expectations

Preferences for leisure versus work, and cultural expectations about employment, also shift the labor supply curve.

TOPIC 5.3

Profit-Maximizing Behavior in Perfectly Competitive Factor Markets

How a firm decides exactly how many workers to hire.

LEARNING OBJECTIVES: PRD-4.C — The profit-maximizing behavior of firms buying labor in perfectly competitive markets.

Marginal Revenue Product and Marginal Factor Cost

Marginal Revenue Product (MRP)

The additional revenue a firm earns from hiring one more unit of a factor. MRP is the factor's MARGINAL BENEFIT — and it is the firm's labor demand curve.

Marginal Factor Cost (MFC)

The additional cost of hiring one more unit of a factor. In a perfectly competitive labor market, MFC equals the market wage, which is constant for the firm.

The Hiring Rule

Hire labor as long as MRP exceeds the wage. The profit-maximizing quantity of labor is where MRP = MFC (the wage).

Calculating Marginal Revenue Product

MARGINAL REVENUE PRODUCT

$$MRP = MP \times MR$$

MRP equals the marginal product of the factor multiplied by the firm's marginal revenue. It is also the change in total revenue divided by the change in the factor.

VALUE OF THE MARGINAL PRODUCT

$$VMPL = MPL \times P$$

For a firm in a perfectly competitive OUTPUT market, MR = price, so MRP equals the value of the marginal product (marginal product times output price).

THE PROFIT-MAXIMIZING RULE

Hire where MRP = MFC

Hire each factor up to the point where its marginal revenue product equals its marginal factor cost (the wage in a competitive labor market).

Deciding How Many Workers to Hire

A firm sells output at $4 each in a competitive market. The market wage is $40 per worker per day.

- **Worker 1: marginal product 15 units → MRP = 15 x $4 = $60.**
- **Worker 2: marginal product 12 units → MRP = 12 x $4 = $48.**
- **Worker 3: marginal product 10 units → MRP = 10 x $4 = $40.**
- **Worker 4: marginal product 7 units → MRP = 7 x $4 = $28.**
- **Hire each worker whose MRP is at or above the $40 wage → hire 3 workers (MRP = MFC at worker 3).**
- Worker 4 is not hired: an MRP of $28 is below the $40 wage.

The Least-Cost Rule for Multiple Inputs

When a firm uses several inputs, it minimizes cost by allocating spending so the last dollar on each input yields the same marginal product.

The Least-Cost Rule

To minimize cost (or maximize profit), a firm allocates inputs so the last dollar spent on EACH input yields the same amount of marginal product: MP of labor ÷ price of labor = MP of capital ÷ price of capital.

Why It Works

If one input gives more marginal product per dollar, the firm shifts spending toward it. Reallocating continues until the marginal product per dollar is equal across all inputs.

It Mirrors Consumer Choice

This is the same logic as utility maximization in Unit 1 — there, consumers equate marginal utility per dollar; here, firms equate marginal product per dollar.

TOPIC 5.4

Monopsonistic Markets

A labor market with a single, dominant employer.

LEARNING OBJECTIVES: PRD-4.D — The profit-maximizing behavior of firms buying labor in monopsonistic markets.

The Monopsony Labor Market

A monopsony is a market with a single buyer of labor — it has wage-setting power.

- To hire more workers, a monopsonist must raise the wage — and pay that higher wage to ALL workers.
- So the marginal factor cost (MFC) lies ABOVE the labor supply curve.
- The monopsonist hires where MRP = MFC.
- It then pays the wage from the SUPPLY curve at that quantity — below MRP.

KEY TAKEAWAY

A monopsonist hires where MRP = MFC but pays a wage off the supply curve — resulting in a lower wage and fewer workers than a competitive market.

Competitive Labor Market vs. Monopsony

A monopsonist's wage-setting power leads to outcomes worse for workers.

PERFECTLY COMPETITIVE

- **Many employers compete for workers.**
- Each firm is a wage taker; MFC = the market wage (constant).
- The firm hires where MRP = wage.
- Wage equals MRP — workers are paid the value of their marginal product.

MONOPSONY

- **A single dominant employer.**
- The firm is a wage setter; MFC lies above the labor supply curve.
- The firm hires where MRP = MFC.
- Wage is read off the supply curve — below MRP. Lower wage, fewer workers hired.

Common Pitfalls & Exam Tips

Demand for labor is derived

Labor demand comes from demand for the product. A change in product demand shifts labor demand.

MRP = MP x MR

For a competitive output seller, MR = price, so MRP = MP x P (value of the marginal product). With output-market power, MRP is below VMPL.

Hire where MRP = MFC

The firm hires each factor up to MRP = MFC. In a competitive labor market, MFC is the constant market wage.

Least-cost rule

Minimize cost by equating marginal product per dollar across all inputs — the firm's version of utility maximization.

Monopsony: MFC above supply

A monopsonist's MFC lies above the labor supply curve. It hires where MRP = MFC, then pays the lower supply-curve wage.

Don't rush this unit

Factor markets are a top challenge area. Give the concepts and numerical practice the time they need.

Unit 5 — Key Takeaways

1. Factor markets follow supply and demand; the demand for a factor is DERIVED from demand for the product it makes.
2. Labor demand slopes down and labor supply slopes up; the market sets the wage, and the firm takes it as given.
3. Labor demand shifts with output price and productivity; labor supply shifts with population, education, and preferences.
4. A firm hires each factor up to the point where marginal revenue product equals marginal factor cost (MRP = MFC).
5. The least-cost rule equates marginal product per dollar across all inputs — the firm's utility-maximization analog.
6. A monopsonist's MFC lies above labor supply; it hires fewer workers and pays a lower wage than a competitive market.