

10

CHAPTER 10

Perfect Competition

The benchmark market structure, many tiny price takers, free entry, and a price set by the cost of production.

What this chapter covers



10.2–10.4 The firm

- What perfect competition is
- The output rule: $P = MC$
- Profit, loss, and shutting down



10.5–10.6 Long run & efficiency

- Free entry & exit
- Long-run supply
- Surplus & efficiency
- Price supports in farming



10.7–10.8 Evidence

- Case: wheat & the world price
- The vanishing American farm

THE BIG IDEA

Perfect competition is the first extreme, sellers entirely at the mercy of the market price. It is the benchmark against which every other market structure in the book is measured.

10.1

Introduction

- A Kansas wheat farmer who cannot budge the price
- Price takers vs. price makers
- Perfect competition as the benchmark

10.1 INTRODUCTION

The farmer who cannot set the price

- A Kansas wheat farmer can plant more acres or fewer, but she cannot budge the price of wheat, it is set on global exchanges by millions of buyers and sellers.
- Charge a penny above the going price and she sells nothing: identical wheat is available everywhere else.
- Why are some sellers at the mercy of the market price, while a drug company holding a patent can set its own? This chapter studies the first extreme.

10.2

What Is Perfect Competition?

- Four conditions
- Price taking
- $P = MR = \text{firm's demand}$

10.2 WHAT IS PERFECT COMPETITION?

Four conditions define a perfectly competitive market

1

1. Many buyers & sellers

Each one too small to affect the market price.

2

2. Identical product

Buyers have no reason to prefer one seller's output to another's.

3

3. Free entry & exit

Firms enter when there is money to be made and leave when there is not.

4

4. Good information

Buyers know the prices on offer.

10.2 WHAT IS PERFECT COMPETITION?

The central consequence: each firm is a price taker

■ Price taker

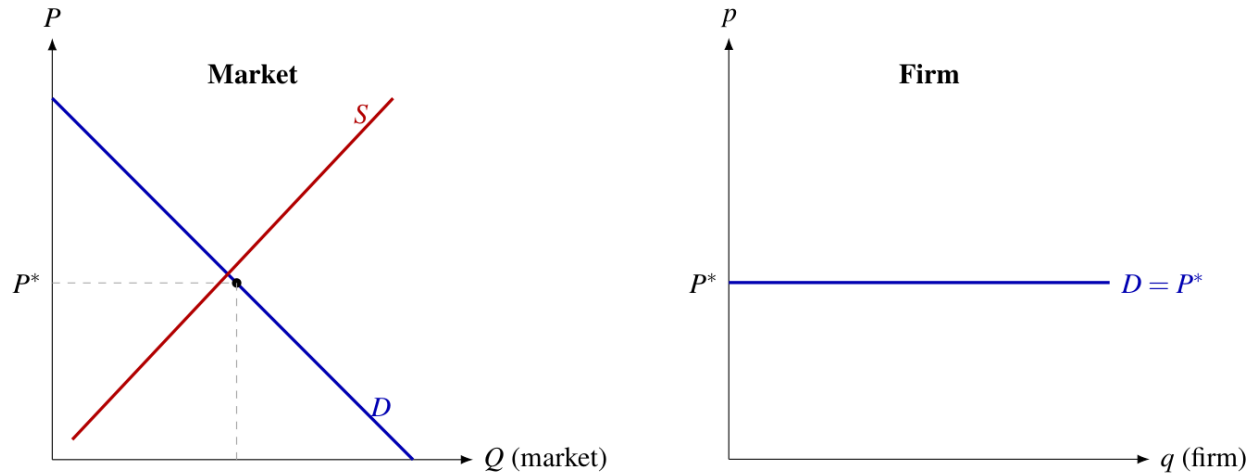
A firm that can sell as much as it wants at the going market price, but nothing at all above it. The market's supply and demand set the price; the individual firm simply accepts it.

THE KEY PICTURE

The market demand curve slopes down, but the demand curve facing a single firm is a flat line at the market price.

10.2 WHAT IS PERFECT COMPETITION?

Market demand slopes down; the firm's is flat



- The market sets the price through total supply and demand.
- At that price the firm can sell any quantity, its demand curve is horizontal.

Figure 10.1 The market sets the price (left); the firm faces a horizontal demand curve at that price (right).

10.3

The Firm's Output Decision

- Marginal revenue = price
- Produce where $P = MC$
- Profit as a rectangle

Marginal revenue equals the market price

■ Marginal revenue (for a price taker)

The revenue from selling one more unit is simply the market price, since the firm can sell each unit at that price.

FROM CHAPTER 1

Expand output as long as the extra revenue exceeds the extra cost, and stop where they are equal. For a price taker this gives a simple rule.

The output rule

THE COMPETITIVE OUTPUT RULE

Produce the quantity at which price equals marginal cost.

- Producing less would mean passing up units whose price exceeds their marginal cost.
- Producing more would mean making units that cost more than the price to produce.

10.3 THE FIRM'S OUTPUT DECISION

A worked example at a price of \$80

Item	Value
Market price	\$80
Output where MC = \$80	6 units
Average total cost at 6	\$67
Profit per unit	$\$80 - \$67 = \$13$
Total profit	$\$78$

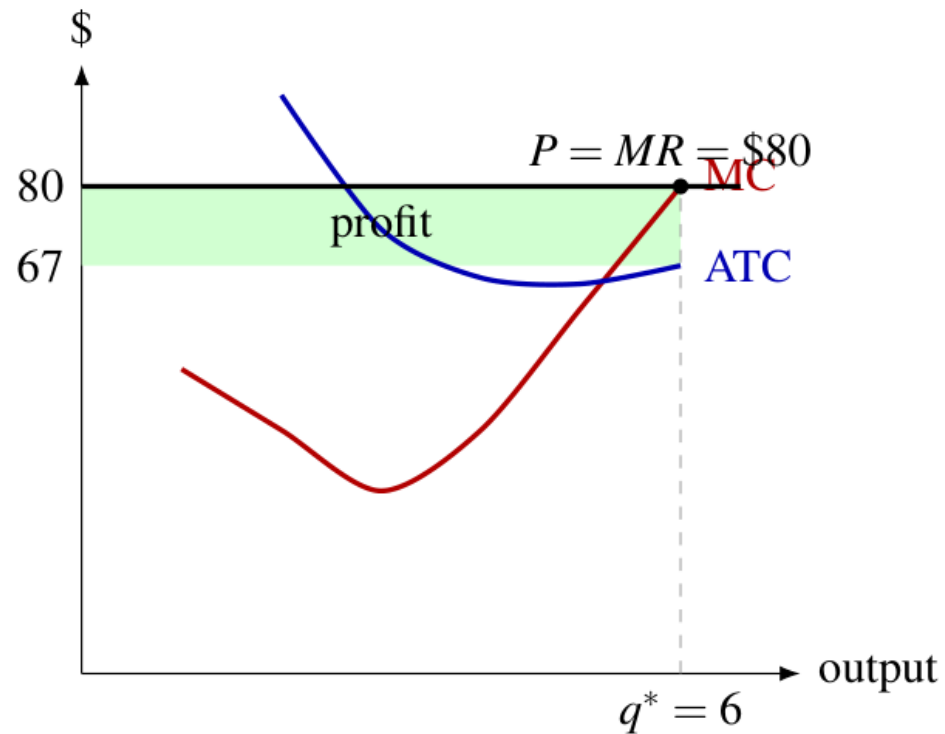
Using the cost structure of Table 9.1.

HOW WE READ IT

Reading the marginal-cost column of Table 9.1, the firm expands until marginal cost reaches \$80, at 6 units. Average total cost there is \$67, so profit is \$13 on each of 6 units, \$78 in total. Figure 10.2 shows it as a rectangle.

10.3 THE FIRM'S OUTPUT DECISION

Profit per unit is price minus average total cost



- Output is set where the flat price line crosses the MC curve.
- The profit rectangle = $(P - ATC) \times \text{quantity}$.

Figure 10.2 The firm produces where price equals marginal cost; profit per unit is price minus average total cost.

10.3.1 PROFIT & LOSS AT DIFFERENT PRICES

Same firm, three outcomes, set only by the price

Price	Output (P = MC)	ATC there	Outcome
\$80	6 units	\$67	profit of \$13/unit
\$64	5 units	\$64	breaks even (zero profit)
\$50	where P = MC	above \$50	loss, but keeps operating
below \$40	0 units		shut down

Minimum ATC = \$64, minimum AVC = \$40 (Table 9.1). In every operating case the firm produces where $P = MC$.

10.3.1 PROFIT & LOSS AT DIFFERENT PRICES

Why a firm at \$50 keeps operating

- At \$50 the price lies below average total cost, so the firm makes a loss.
- But \$50 still exceeds the \$40 minimum average variable cost, so it covers all variable cost and part of fixed cost.
- It loses less by operating than by shutting down and still owing the fixed cost.
- Only if the price fell below \$40, below minimum AVC, would shutting down be the smaller loss.

The Single Rule behind All Four Cases

Produce where price equals marginal cost, provided the price covers average variable cost.

10.4

When Does a Firm Shut Down?

- Fixed costs are paid no matter what
- The shut-down price: minimum AVC
- The short-run supply curve

10.4 WHEN DOES A FIRM SHUT DOWN?

Operate while the price covers average variable cost

■ Shut-down rule

In the short run, fixed costs must be paid no matter what. The firm keeps operating as long as the price covers its average variable cost, at least it earns something toward the fixed cost it owes anyway. If price falls below minimum AVC (\$40 in Table 9.1), it loses less by producing zero.

WHY

A ski resort closes in summer and a food stand shuts on a slow day, not because they are bankrupt, but because the price fails to cover even the variable cost of operating.

10.4 WHEN DOES A FIRM SHUT DOWN?

The firm's short-run supply curve

SHORT-RUN SUPPLY

The firm's short-run supply curve is its marginal-cost curve, above the minimum of average variable cost.

SELF-CHECK

A firm has minimum AVC of \$40 and minimum ATC of \$64. Does it operate or shut down if the price is (a) \$50, (b) \$30?

(a) At \$50, above the \$40 minimum AVC, it OPERATES, at a loss, but covering variable cost and part of fixed cost. (b) At \$30, below \$40, it SHUTS DOWN.

10.5

Profit, Loss, and the Long Run

- Free entry erodes profit
- Zero economic profit = normal return
- The long-run supply curve

Free entry erodes the profit away



Profits attract entry

New firms enter; their output shifts market supply right, pushing the price DOWN, until price reaches minimum ATC and profit is zero.



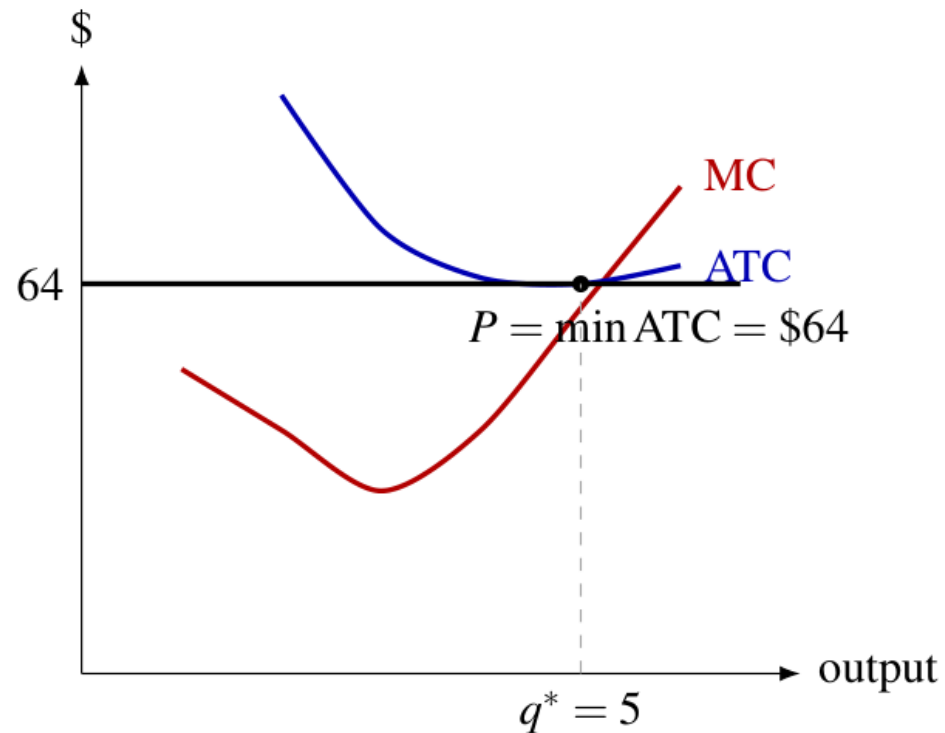
Losses cause exit

Some firms exit; supply falls and the price RISES until the survivors break even.

WHERE IT STOPS

Entry continues until the profit that attracted it is gone, that is, until price has fallen to the minimum of average total cost (\$64 in Table 9.1).

Long-run equilibrium: price at minimum ATC



- The price line just touches the bottom of the ATC curve.
- No entry or exit pressure remains, the long-run resting point.

Figure 10.3 Free entry drives the price to the minimum of average total cost; economic profit is zero.

Zero economic profit is not zero earnings

■ What zero economic profit means

Economic cost includes the owner's opportunity costs (Chapter 9). Zero economic profit means the firm earns exactly what its owners could have earned elsewhere, a normal return, no more and no less.

This is the long-run resting point of a competitive industry.

10.5.1 LONG-RUN SUPPLY OF A COMPETITIVE INDUSTRY

The long-run supply curve is flat at minimum ATC

- In the short run, with a fixed number of firms, market supply slopes upward, as in Chapter 2.
- In the long run, a price above minimum ATC draws entry until output pushes it back down; a price below it triggers exit until the price recovers.
- With identical firms, the long-run supply curve is flat at the minimum average total cost.

THE LESSON

Demand then determines the QUANTITY but not the PRICE, which is set by the firms' lowest achievable cost. This is why a competitively produced good's price tracks its cost so closely, and why permanent windfalls are rare.

10.6

Producer Surplus and Efficiency

- Producer surplus
- Why $P = MC$ maximizes total surplus
- Regulating a competitive market

Producer surplus, and total surplus

■ Producer surplus

The difference between the price a seller receives and the lowest price at which it would have been willing to sell, given by the marginal-cost curve.

■ Total surplus

Consumer surplus (Chapter 6) plus producer surplus, the total value the market creates.

Competition maximizes total surplus

THE EFFICIENCY RESULT

The competitive equilibrium has a remarkable property: it maximizes total surplus.

- Output expands to where price, what the marginal unit is worth to buyers, equals marginal cost, what it costs to make.
- Every unit worth more than it costs gets produced; no unit costing more than it is worth does.
- No reallocation could make society better off. Smith called this the “invisible hand.”

10.6.1 THE EFFICIENCY OF COMPETITION

The efficiency of competition, in surplus terms

- At equilibrium $P = MC$, so the value of the last unit to buyers (willingness to pay, off the demand curve) equals its cost to producers (off the supply curve).
- Every unit worth more than it costs gets produced; none costing more than it is worth does, so total surplus is as large as it can possibly be.

Why Competition Is the Benchmark

Any force that pushes price away from marginal cost, a tax (Chapter 4), a price control, or the monopoly of Chapter 11, shrinks total surplus, leaving a deadweight loss. This is the precise sense of Adam Smith's invisible hand.

Agricultural price supports: a regulated benchmark market

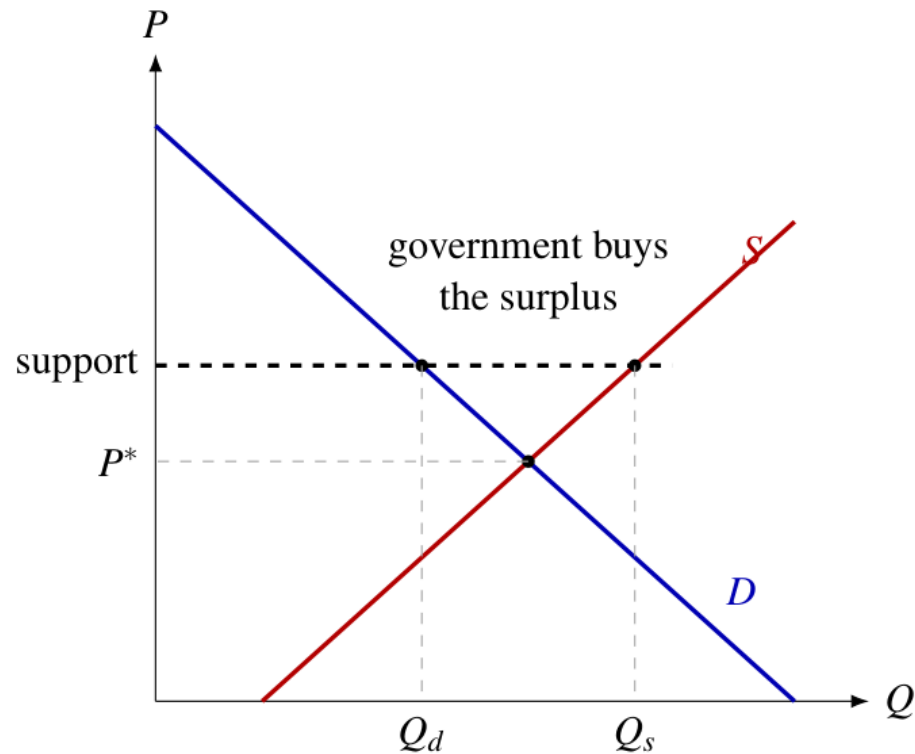
■ Price support

A price floor set above the competitive equilibrium (Chapter 4). At the support price, the quantity farmers wish to sell exceeds the quantity buyers will purchase, leaving a surplus, which the government buys up and stores to keep the price from falling back.

THE PARADOX

Agriculture is the textbook example of perfect competition, yet among the most heavily regulated sectors in the world, a paradox worth examining.

A price support holds the price above equilibrium



- At the support price, quantity supplied exceeds quantity demanded.
- The gap is a surplus the government must buy and store.

Figure 10.4 An agricultural price support: the government holds the price above equilibrium by buying the resulting surplus.

Price supports in practice



European Union

The Common Agricultural Policy guaranteed “intervention prices”; surpluses piled into the famous “butter mountains” and “wine lakes” of the 1980s.



United States

A web of price supports, subsidized crop insurance, and direct payments costing well over \$30 billion a year.

THE TRADE-OFF

These programs raise farm incomes, but exactly as Figure 10.4 predicts, by holding prices above market-clearing, generating surpluses the government must buy, store, or dispose of.

The same policy in the developing world: India's MSP

23 crops

covered by India's minimum support price (MSP)

51 Mt

wheat & rice held by public agencies, late 2020

THE APPEAL AND THE TRAP

The MSP lifted and steadied millions of farmers' incomes, but produced exactly the surplus of the model, much stored at great expense, some left to rot. A 2020 attempt to loosen the system met a year of farmer protests that forced the laws' repeal in 2021: the price floor yields real benefits, but creates surpluses, fiscal costs, and a constituency that makes it hard to unwind.

10.7

Case Study: Wheat Farming and the World Price

Few markets come as close to perfect competition as a basic crop.

10.7 CASE STUDY

Wheat meets the conditions of perfect competition



Identical product

Wheat of a given grade is the same from Kansas, Ukraine, or Australia, buyers have no reason to favor one farm's output.



Numerous, tiny sellers

Even the U.S., the world's 4th-largest producer, accounts for ~a tenth of global trade, grown by tens of thousands of farms.

THE RESULT

No single farmer produces enough to move the world price, exactly the price-taking of Section 10.2.

10.7 CASE STUDY

Price takers compete only on cost

- The price of wheat is set on global commodity exchanges by total world supply and demand; each farmer treats it as given, deciding only how much to plant and harvest.
- A drought in one major region cuts the global harvest, so the world price rises for everyone, the supply shift of Chapter 2.
- Farmers compete not by setting prices, which they cannot do, but by lowering their costs, the only margin a price taker controls.

10.8

Empirical Evidence: The Vanishing American Farm

The long-run force of entry and exit, over a century.

10.8 EMPIRICAL EVIDENCE

Entry, exit, and the vanishing American farm

6.81 M

U.S. farms at the 1935 peak

1.88 M

U.S. farms in 2024, lowest in 100+ years

- The total land farmed stayed roughly constant, even as the count fell, so average farm size grew.
- This is the long-run force of Section 10.5: entry when returns are high, exit when they are low.

10.8 EMPIRICAL EVIDENCE

The competitive long run, at work over decades

- Rapid productivity growth, better seeds, machines, methods, repeatedly lowered costs and pushed crop prices down.
- With razor-thin margins near minimum average cost, farmers earning less than they could elsewhere left for better-paying nonfarm jobs, exactly the exit the model predicts.
- Survivors expanded to capture economies of scale (Chapter 9).

THE TAKEAWAY

The disappearance of millions of small farms is not a market failure but the competitive long run in action: free exit grinding economic profit toward zero and reallocating labor to where it is more valuable.

Key takeaways

1

Price taking

Many tiny firms and an identical product make each firm a price taker; its demand curve is flat at the market price.

2

$P = MC$

The competitive firm produces where price equals marginal cost, the single output rule.

3

Shut-down rule

Operate while price covers average variable cost; below minimum AVC, shut down. Supply = MC above minimum AVC.

4

The long run

Free entry and exit drive price to minimum ATC, where economic profit is zero, a normal return.

5

Efficiency

$P = MC$ maximizes total surplus; taxes, price controls, and monopoly create deadweight loss, the invisible hand.

6

Evidence

Price supports and surpluses, wheat at the world price, and the century-long decline in U.S. farms.