

PERFECT COMPETITION



Objectives

- Explain how price and output are determined in perfect competition
- Explain why firms sometimes shut down temporarily and lay off workers
- Explain why firms enter and leave the industry
- Predict the effects of a change in demand or a technological advance
- Explain why perfect competition is efficient

Competition

Perfect competition is an industry in which:

- Many firms sell identical products to many buyers.
- There are no restrictions to entry into the industry.
- Established firms have no advantages over new ones.
- Sellers and buyers are well informed about prices.

Competition

How Perfect Competition Arises

Perfect competition arises:

- When firm's minimum efficient scale is small relative to market demand so there is room for many firms in the industry.
- And when each firm is perceived to produce a good or service that has no unique characteristics, so consumers don't care which firm they buy from.

Competition

In perfect competition, each firm is a **price taker**.

- No single firm can influence the price—it must “take” the equilibrium market price.
- Each firm’s output is a *perfect substitute* for the output of the other firms,
- Demand for each firm’s output is *perfectly elastic*.

Competition

Economic Profit and Revenue

The goal of each firm is to maximize *economic profit*, which equals *total revenue* minus *total cost*.

Total cost is the *opportunity cost* of production, which includes *normal profit* for the owner(s).

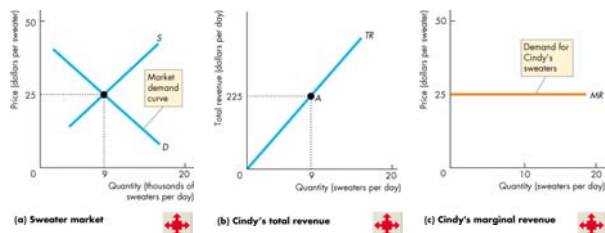
A firm’s **total revenue** equals price, P , multiplied by quantity sold, Q , or $P \times Q$.

Competition

Market demand and supply determine the price that the firm must take.

A firm’s **marginal revenue** is the change in total revenue that results from a one-unit increase in the quantity sold.

Because in perfect competition the price remains the same as the quantity sold by a single firm changes, marginal revenue equals price.



The Firm's Decisions in Perfect Competition

A perfectly competitive firm faces two constraints:

- A market constraint summarized by the market price and the firm's revenue curves
- A technology constraint summarized by firm's product curves and cost curves.

The Firm's Decisions in Perfect Competition

The perfectly competitive firm makes two decisions in the short run:

- Whether to produce or to shut down.
- If the decision is to produce, what quantity to produce.

A firm's long-run decisions are:

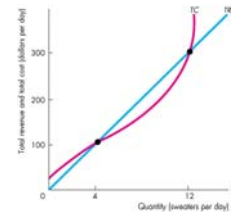
- Whether to increase or decrease its plant size.
- Whether to stay in the industry or leave it.

The Firm's Decisions in Perfect Competition

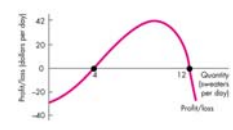
Choosing output to maximize profits.

Total revenue minus total cost is profit.

To maximize profit, choose the output that maximizes the vertical distance between TR and TC.



(a) Revenue and cost

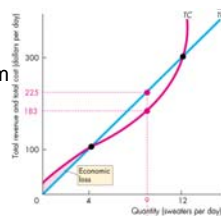


(b) Economic profit and loss

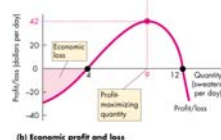
The Firm's Decisions in Perfect Competition

Profit is maximized when the firm day.

At low output levels, the firm incurs an economic loss—it can't cover its fixed costs.



(a) Revenue and cost



(b) Economic profit and loss

The Firm's Decisions in Perfect Competition

Marginal Analysis

The firm can use marginal analysis to determine the profit-maximizing output.

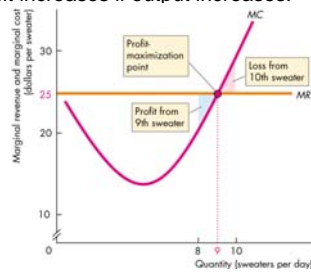
Because marginal revenue is constant and marginal cost eventually increases as output increases, profit is maximized by producing the output at which marginal revenue, MR , equals marginal cost, MC .

The Firm's Decisions in Perfect Competition

If $MR > MC$, economic profit increases if output increases.

If $MR < MC$, economic profit decreases if output increases.

If $MR = MC$, economic profit decreases if output changes in either direction, so economic profit is maximized.



The Firm's Decisions in Perfect Competition

Profits and Losses in the Short Run

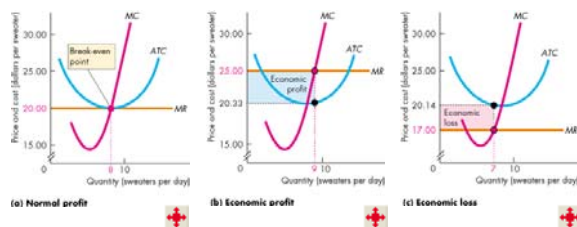
Maximum profit is not always a positive economic profit.

To determine whether a firm is earning an economic profit or incurring an economic loss, we compare the firm's average total cost, ATC , at the profit maximizing output with the market price.

$$\text{Profit} = (P - ATC) \times \text{Quantity}$$

The Firm's Decisions in Perfect Competition

Prices and profits



The Firm's Decisions in Perfect Competition

The Firm's Short-Run Supply Curve

- shows how the firm's profit-maximizing output varies as the market price varies, other things remaining the same.
- linked to its marginal cost curve.
- but there is a price below which the firm produces nothing and shuts down temporarily.

The Firm's Decisions in Perfect Competition

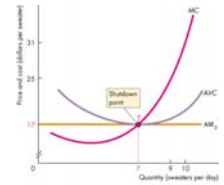
Temporary Plant Shutdown

$$\begin{aligned}\text{Profit} &= (P - ATC) \cdot Q \\ &= (P - AVC) \cdot Q - TFC\end{aligned}$$

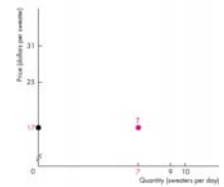
- If price is less than the minimum average variable cost, the firm shuts down temporarily and incurs a loss equal to total fixed cost.
- This is the largest loss that the firm must bear.
- If the price exceeds minimum average variable cost, the firm produces the quantity at which marginal cost equals price, even if profits are negative.

The Firm's Decisions in Perfect Competition

If price equals minimum average variable cost, \$17 in this example, the firm is indifferent between producing nothing and producing at the shutdown point, 7.



(a) Marginal cost and average variable cost



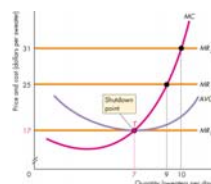
(b) Cindy's short-run supply curve

The Firm's Decisions in Perfect Competition

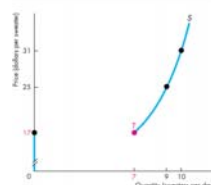
If the price is \$25, the firm produces 9 sweaters a day, the quantity at which $P = MC$.

If the price is \$31, the firm produces 10 sweaters a day, the quantity at which $P = MC$.

The blue curve in part (b) traces the firm's short-run supply curve.



(a) Marginal cost and average variable cost



(b) Cindy's short-run supply curve

The Firm's Decisions in Perfect Competition

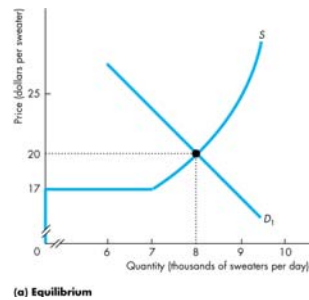
Short-Run Industry Supply Curve

The quantity supplied by the industry at any given price is the sum of the quantities supplied by all the firms in the industry at that price.

Output, Price, and Profit in Perfect Competition

Short-Run Equilibrium

Short-run industry supply (assuming 1000 firms) and industry demand determine the market price and output.

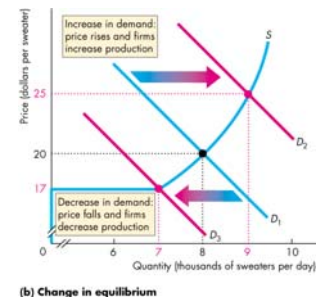


Output, Price, and Profit in Perfect Competition

A Change in Demand

An increase in demand brings a rightward shift of the industry demand curve: the price rises and the quantity increases.

A decrease in demand brings a leftward shift of the industry demand curve: the price falls and the quantity decreases.



Output, Price, and Profit in Perfect Competition

Long-Run Adjustments

In short-run equilibrium, a firm may earn an economic profit, earn normal profit, or incur an economic loss and which of these states exists determines the further decisions the firm makes in the long run.

In the long run, the firm may:

- Enter or exit an industry
- Change its plant size

Output, Price, and Profit in Perfect Competition

Entry and Exit

New firms enter an industry in which existing firms earn an economic profit.

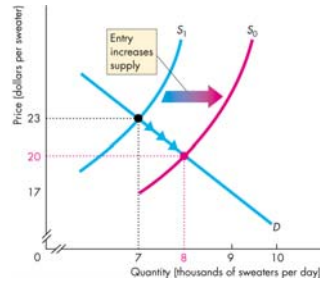
Firms exit an industry in which they incur an economic loss.

Output, Price, and Profit in Perfect Competition

As new firms enter an industry, industry supply increases.

The industry supply curve shifts rightward.

The price falls, the quantity increases, and the economic profit of each firm decreases.

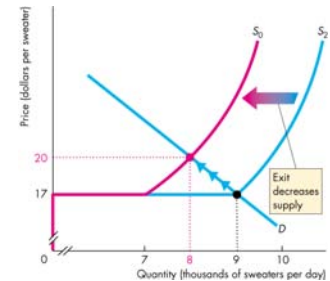


Output, Price, and Profit in Perfect Competition

As firms exit an industry, industry supply decreases.

The industry supply curve shifts leftward.

The price rises, the quantity decreases, and the economic profit of each firm increases.



Output, Price, and Profit in Perfect Competition

Changes in Plant Size

Firms change their plant size whenever doing so is profitable.

If average total cost exceeds the minimum long-run average cost, firms change their plant size to lower costs and increase profits.

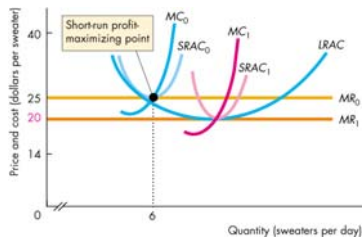
Output, Price, and Profit in Perfect Competition

If the price is \$25, firms earn zero economic profit with the current plant.



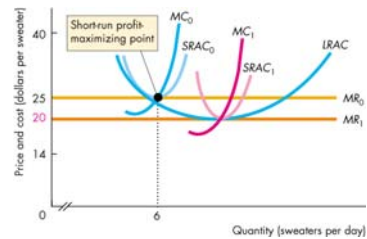
Output, Price, and Profit in Perfect Competition

But if the *LRAC* curve is sloping downward at the current output, the firm can increase profit by expanding the plant.



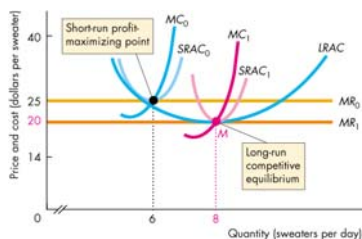
Output, Price, and Profit in Perfect Competition

As the plant size increases, short-run supply increases, the price falls, and economic profit decreases.



Output, Price, and Profit in Perfect Competition

Long-run equilibrium occurs when the firm is producing at the minimum long-run average cost and earning zero economic profit.



Output, Price, and Profit in Perfect Competition

Long-Run Equilibrium

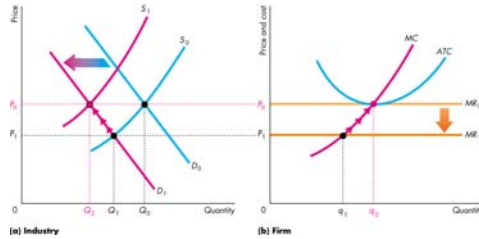
Long-run equilibrium occurs in a competitive industry when:

- Economic profit is zero, so firms neither enter nor exit the industry.
- Long-run average cost is at its minimum, so firms don't change their plant size.

Changing Tastes and Advancing Technology

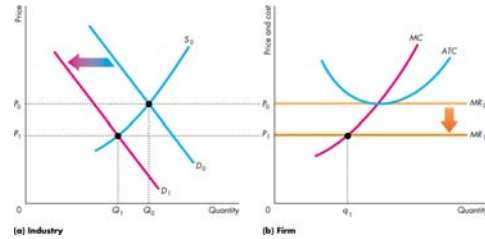
A Permanent Change in Demand

A decrease in demand shifts the demand curve leftward. The price falls and the quantity decreases.



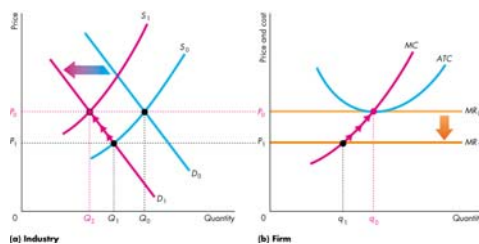
Changing Tastes and Advancing Technology

Starting from a position of long-run equilibrium, the fall in price puts the price below each firm's minimum average total cost and firms incur an economic loss.



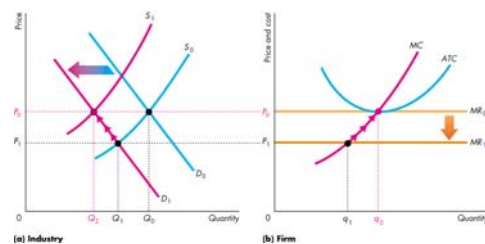
Changing Tastes and Advancing Technology

Economic losses induce exit, which decreases short-run supply and shifts the short-run industry supply curve leftward.



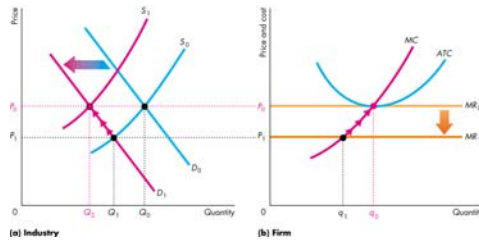
Changing Tastes and Advancing Technology

As industry supply decreases, the price rises and the market quantity continues to decrease.



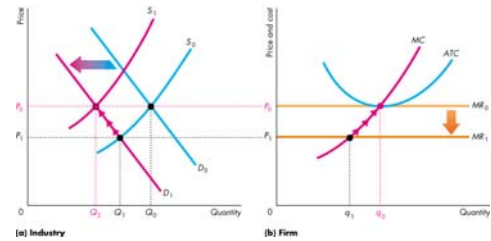
Changing Tastes and Advancing Technology

With a rising price, each firm that remains in the industry *increases* production in a movement along the firm's marginal cost curve (short-run supply curve).



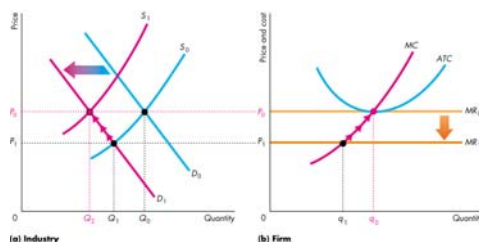
Changing Tastes and Advancing Technology

A new long-run equilibrium occurs when the price has risen to equal minimum average total cost so that firms do not incur economic losses, and firms no longer leave the industry.



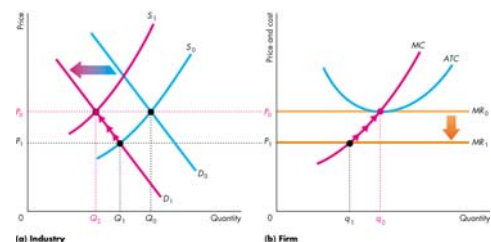
Changing Tastes and Advancing Technology

The main difference between the initial and new long-run equilibrium is the number of firms in the industry.



Changing Tastes and Advancing Technology

In the new equilibrium, a smaller number of firms produce the equilibrium quantity.



Changing Tastes and Advancing Technology

A permanent increase in demand has the opposite effects to those just described.

An increase in demand shifts the demand curve rightward. The price rises and the quantity increases.

Economic profit induces entry, which increases short-run supply and shifts the short-run industry supply curve rightward.

As industry supply increases, the price falls and the market quantity continues to increase.

LR effect of an increase in demand

Changing Tastes and Advancing Technology

External Economics and Diseconomies

The change in the long-run equilibrium price following a permanent change in demand depends on external economies and external diseconomies.

External economies are factors beyond the control of an individual firm that lower (raise) the firm's costs as the industry output increases (decreases).

External diseconomies are factors beyond the control of a firm that raise (lower) the firm's costs as industry output increases (decreases).

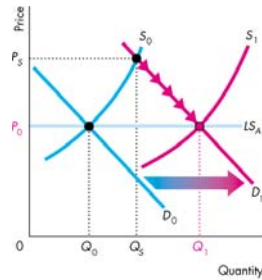
Changing Tastes and Advancing Technology

In the absence of external economies or external diseconomies, a firm's costs remain constant as industry output changes.

The three possible cases show result in a different **long-run industry supply curve**, which shows how the quantity supplied by an industry varies as the market price varies after all the possible adjustments have been made, including changes in plant size and the number of firms in the industry.

Changing Tastes and Advancing Technology

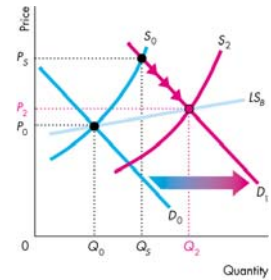
In the absence of external economies or external diseconomies, the price remains constant when demand increases.



(a) Constant-cost industry

Changing Tastes and Advancing Technology

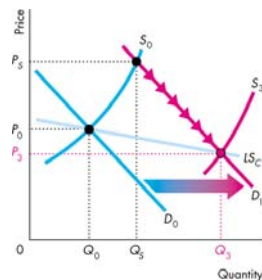
When external diseconomies are present, the price rises when demand increases.



(b) Increasing-cost industry

Changing Tastes and Advancing Technology

When external economies are present, the price falls when demand increases.



(c) Decreasing-cost industry

Technological Advances

- New-technology firms enter and old-technology firms either exit or adopt the new technology.
- Optimal sized firm could be either larger or smaller
- Industry supply increases and the industry supply curve shifts rightward.
- The price falls and the quantity increases.
- Eventually, a new long-run equilibrium emerges in which
 - all the firms use the new technology
 - the price has fallen to the minimum average total cost,
 - each firm earns normal profit (zero economic profit)

Competition and Efficiency

Competitive equilibrium is efficient only if there are no external benefits or costs.

External benefits are benefits that accrue to people other than the buyer of a good.

External costs are costs that are borne not by the producer of a good or service but by someone else.

Applications

- SR versus LR effect of increase in demand
- Effect of barriers to entry on competitive market
- SR versus LR effect of increase in variable input price
- SR versus LR effect of increase in cost of fixed input
- SR versus LR effect of commodity taxes