Chapter 11
Perfect Competition
Perfect Competition

• Conditions for Perfectly competitive markets
  - Product firms are perfect substitutes (*homogeneous product*)
  - Firms are price takers  Reasonable with many firms, all with very small market share
  - Perfect and symmetric information
  - Long run: Perfect factor mobility
  - Capital and labor flow freely  all firms face same factor prices
  - Free entry and exit of firms (*no barriers to entry*)

• This Chapter
  - How do firms in perfectly competitive market choose?
  - What forces drive the market price and quantity?
  - Long run vs short-run
  - Welfare properties of perfectly competitive markets
Organization

Setup

• Competitive markets in the short run
  ➢ The quantity chosen by the firm
  ➢ Aggregating individual supply curves to market supply curve
  ➢ The market equilibrium

• Digression: Welfare revisited

• Competitive markets in the long run

• Welfare in competitive markets
Definition of Profits

• Economic profit:
  ➢ is defined as the difference between total revenue and total cost, where total cost includes fixed cost (implicit cost/opportunity cost) and variable cost (explicit cost)

• Accounting profit:
  ➢ is defined as the difference between total revenue and all explicit costs incurred.

• Here we consider economic profit.
11.3 Competitive markets in the short run

Short run (in this context)

- # firms is fixed (no entry or exit)

(a) The short-run quantity decision

- Firms take price as given
- Firms face short-run cost curves (as capital is fixed)

Problem of the competitive firm:

$$\max_q pQ - C(Q)$$

- In words, choose q so as to maximize profits given the price of output (and input prices)

  - Necessary condition: marginal benefit (MB) = marginal cost (MC).
  - \( p - C'(q) = 0 \), that is \( p = MC(q) \) (with price taking behavior)

  - Here, necessary condition \( p = MC(q) \), to get optimum q
Competitive market in the short run

**Figure 11-2**

**Revenue, Cost, and Economic Profit**

The total revenue curve is the ray labeled TR in the top panel. The difference between it and total cost (TC in the top panel) is economic profit (Π_Q in the bottom panel). At Q = 0, Π_Q = -FC = -$30/wk. Economic profit reaches a maximum ($12.60/wk) for Q = 7.4 units/wk.
Competitive market in the short run

**FIGURE 11-3**

**The Profit-Maximizing Output Level in the Short Run**

A necessary condition for profit maximization is that price equal marginal cost on the rising portion of the marginal cost curve. Here, this happens at the output level $Q^* = 7.4$ units/wk.
Competitive market in the short run

(b) Short-run supply curve of the individual firm

– Supply curve: curve relating price and quantity supplied
– Supply curve coincides with MC curve, but...
– Only if price exceeds average variable costs \( p > AVC(q) \).
– This way at least the variable costs are covered, otherwise the firm will shut down.
– Condition to stay in business: \( p \geq AVC \)
Competitive market in the short run

**FIGURE 11-4**

The Short-Run Supply Curve of a Perfectly Competitive Firm

When price lies below the minimum value of average variable cost (here $12/unit of output), the firm will make losses at every level of output, and will keep its losses to a minimum by producing zero. For prices above min AVC, the firm will supply that level of output for which \( P = MC \) on the rising portion of its MC curve.
Competitive market in the short run

(c) Short-run market supply

– Aggregate Supply Curve: aggregating (“Add up”) supplied quantities across all firms in industry. \( Q_{agg} = q_1 + q_2 + \ldots + q_n \)
Competitive market in the short run

FIGURE 11-5

The Short-Run Competitive Industry Supply Curve
To get the industry supply curve (right panel), we simply add the individual firm supply curves (left and center panels) horizontally.
Competitive market in the short run

(d) Market equilibrium in the short run

- Short-run market equilibrium (definition)
  - Firms maximize profits
  - Consumers maximize utility given budget restriction
  - No excess demand or supply (demand = supply)
What’s going on here?
Competitive markets in short run

(d) Market equilibrium in the short run

• In the SR, firms can make a loss
• The idea is that producing results in a loss of that is smaller than not producing at all (can be due to fixed cost).
Welfare

Welfare Implication.

• Consumer surplus (CS) = the measure of consumer welfare
  ➢ CS expresses by how much consumers value access to market i.e. Area under demand curve and above price level

• Producer surplus (PS) = the measure of producer welfare
  ➢ PS expresses by how much producers value access to market i.e. profits (or loss) + fixed costs for individual firm i.e. area between MC curve and price level for all firms in industry
Welfare:
Producer surplus of the individual firm

FIGURE 11-9
Two Equivalent Measures of Producer Surplus
FIGURE 11-10
Aggregate Producer Surplus When Individual Marginal Cost Curves Are Upward Sloping Throughout
Welfare

- *Total surplus* = *the measure of social welfare* (welfare of society, also known as *social surplus*)
- Expresses by how much all agents in society (all consumers, producers, and government) value access to market
- Measure total surplus by area between MC curve and demand curve
(e) Important property competitive markets: allocative efficiency

- No scope for further beneficial trades between consumers and firms
- Total welfare or social surplus is maximized
- One way to see this: \( p = MC(q) \). That is: “willingness to pay \( p \) is exactly equal to extra cost to produce \( C'(q) \)”
- Another way to see this: No better \( Q \) than \( Q^* \)
Competitive markets, the short run (cont.)

FIGURE 11-11
The Total Benefit from Exchange in a Market
Competitive markets, the long run

11.8-11.11 Competitive markets in the long run

• *Long-run market equilibrium (definition)*
  - Firms choose output optimally
  - Consumers maximize utility given budget restriction
  - Firms choose inputs optimally
  - There are no incentives to enter or exit from the market, that is:
    - no extra-normal profits or losses
    - No excess demand or supply (demand = supply)
Competitive markets, the long run

From SR to LR competitive market equilibrium

Before entry or exit

FIGURE 11-13
A Price Level That Generates Economic Profit
At the price level $P = $10/unit, the firm has adjusted its plant size so that SMC2 = LMC = 10.
At the profit-maximizing level of output, $Q = 200$, the firm earns an economic profit equal to $600 each time period.
Competitive markets, the long run

Profits induce market entry:

**FIGURE 11-14**
A Step Along the Path Toward Long-Run Equilibrium

Entry of new firms causes supply to shift rightward, lowering price from 10 to 8. The lower price causes existing firms to adjust their capital stocks downward, giving rise to the new short-run cost curves SAC3 and SMC3. Incentives for new firms to enter remains there.
Competitive markets, the long run
Finally:

FIGURE 11-15
The Long-Run Equilibrium Under Perfect Competition
If price starts above $P^*$, entry keeps occurring and capital stocks of existing firms keep adjusting until the rightward movement of the industry supply curve causes price to fall to $P^*$. At the profit maximizing level of output we have $P^* = SMC^* = LMC = SAC^* = LAC$. Economic profits of all firms are equal to zero.
Competitive Market

The Price Elasticity of Supply.

- < 1 implies Inelastic. A large change in price causes a small change in quantity supplied.
- > 1 implies Elastic. A small change in price causes a small change in quantity supplied.
- = 1 implies Unit elastic. A 1% change in price causes 1% change in quantity supplied.

• Read section 11.12.