Perfect Competition

EE311

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Topics to be Discussed

- Perfectly Competitive Markets
- Profit Maximization
- Marginal Revenue, Marginal Cost, and Profit Maximization
- Choosing Output in the Short-Run
- The Competitive Firm's Short-Run Supply Curve
- Short-Run Market Supply
- Choosing Output in the Long-Run

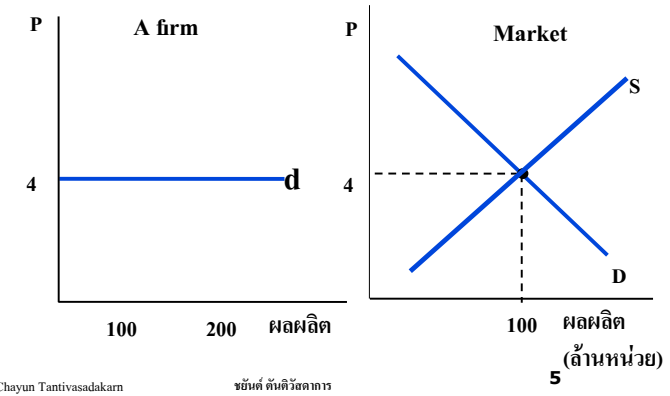
Perfectly Competitive Markets

- The model of perfect competition can be used to study a variety of markets (Agricultural products, stock market, exchange rate)
- Basic assumptions of Perfectly Competitive Markets
  - Many small firms -->Price taking
  - Product homogeneity
  - Free entry and exit
  - Perfect information

Perfectly Competitive Markets

1. Price Taking
   - The individual firm sells a very small share of the total market output and, therefore, cannot influence market price.
   - Each firm takes market price as given – price taker
   - The facing demand curve of each firm is horizontal.

Facing demand curve for a competitive firm



Perfectly Competitive Markets

2. Product Homogeneity
   - The products of all firms are perfect substitutes.
   - Product quality is relatively similar as well as other product characteristics
   - Example: Agricultural products, copper ore, lumber
   - Heterogeneous products, such as brand names, can charge higher prices because they are perceived as better

Perfectly Competitive Markets

3. Free Entry and Exit

- When there are no special costs that make it difficult for a firm to enter (or exit) an industry (no laws or regulations, free factor mobility)
  - Buyers can easily switch from one supplier to another.
  - Suppliers can easily enter or exit a market.
    - Pharmaceutical companies not perfectly competitive because of the large costs of R&D required

Perfectly Competitive Markets

4. Perfect Information
   - No information cost for buyers and sellers
   - Perfect information and homogenous products imply one market price.
   - Perfect information and free entry and exit imply zero profit in the long run.
     - Excess profits attract new entry which increases market supply. Price is then decreased until profit is zero.
     - Losses force firms to exit which decreases market supply. Price is then increased until profit is zero.

Profit Maximization

- We can study profit maximizing output for any firm whether perfectly competitive or not
  - Profit (π) = Total Revenue - Total Cost
  - If q is output of the firm, then total revenue is price of the good times quantity
  - Total Revenue (TR) = TR(q)

Profit Maximization

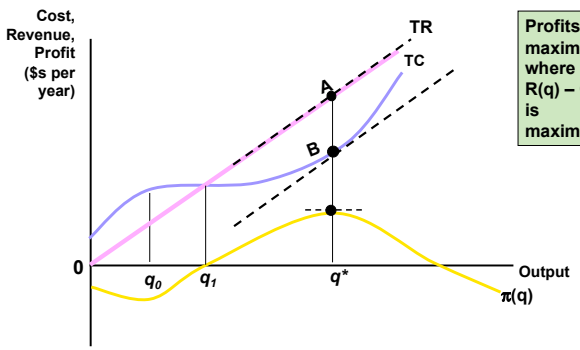
- Costs of production depends on output
  - Total Cost (TC) = TC(q)
- Profit for the firm, π, is difference between revenue and costs

$$\pi(q) = TR(q) - TC(q)$$

- Firm selects output to maximize the difference between revenue and cost

Profit Maximization – Short Run

Profits are maximized where MR (slope at A) and MC (slope at B) are equal or slope of $\pi(q) = 0$



Profits are maximized where R(q) – C(q) is maximized

Profit Maximization

- If the producer tries to raise price, sales are zero.
- Profit is negative to begin with since revenue is not large enough to cover fixed and variable costs
- As output rises, revenue rises faster than costs increasing profit
- Profit increases until it is maxed at q*
- Profit is maximized where MR = MC or where slopes of the TR(q) and TC(q) curves are equal

Profit Maximization

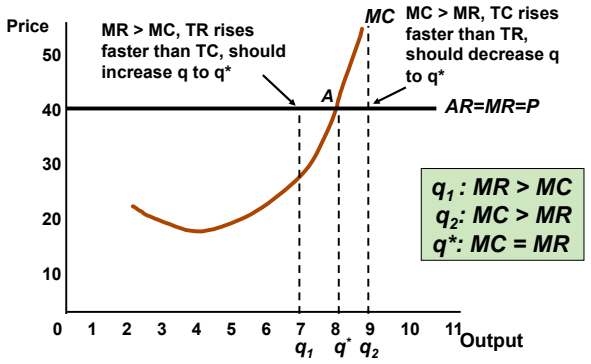
- Profit is maximized at the point at which an additional increment to output leaves profit unchanged $\pi = TR - TC$

$$\frac{\Delta\pi}{\Delta q} = \frac{\Delta TR}{\Delta q} - \frac{\Delta TC}{\Delta q} = 0$$

$$= MR - MC = 0$$

$$MR = MC$$

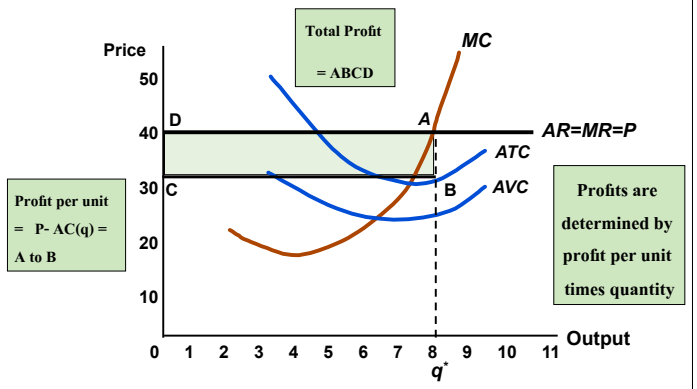
Profit Maximization: MR = MC



Choosing Output: Short Run

- The point where MR = MC, the profit maximizing output is chosen
  - MR=MC at quantity, q*, of 8
  - At a quantity less than 8, MR > MC so more profit can be gained by increasing output
  - At a quantity greater than 8, MC > MR, increasing output will decrease profits

Choosing output: Positive Profits



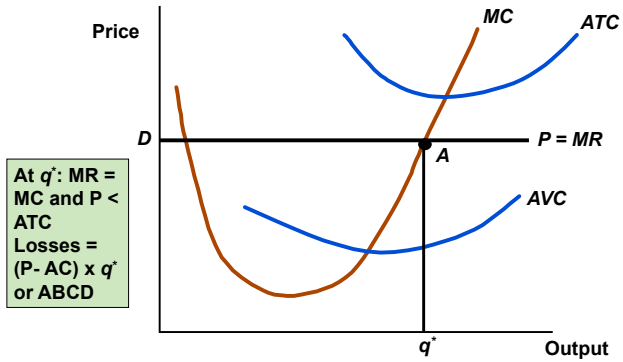
Exercise

- A fruit vender in a perfectly competitive market is maximizing profit. One day the Mafia who controls the area forces the vender to pay a protection fee = 100 baht per day. The vender is still making some profit. Should the vender increase the price or increase the output to cover the extra cost?

Choosing output: Losses

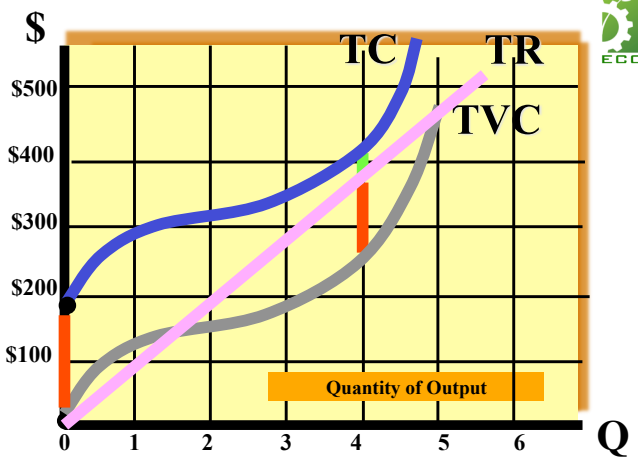
- A firm does not always make profits
- It is possible for a firm to incur losses if the P < AC at the profit maximizing quantity
  - Still measured by profit per unit times quantity
  - Profit per unit is negative (P – AC < 0)

Choosing output: Losses

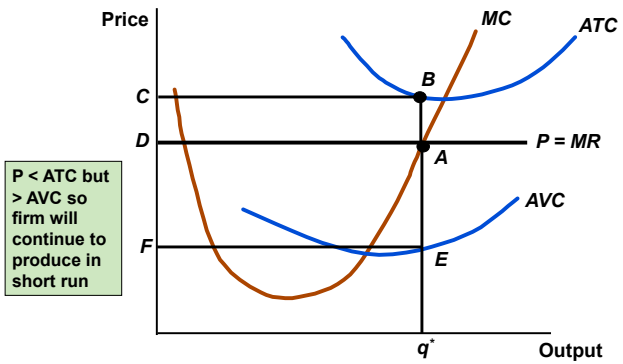


Choosing output: Losses

- Why would firm produce at a loss?
  - Might think price will increase in near future
  - Shutting down and starting up could be costly
  - The loss may be smaller than when shut down
- Firm has two choices in short run
  - Continue producing
  - Shut down temporarily
  - Will compare profitability of both choices



Choosing output: Losses but should operate



P < ATC but > AVC so firm will continue to produce in short run

When should the firm shut down?

Operate: net revenue = PQ – TVC – TFC.

Shut down: net revenue = – TFC .

It should operate if PQ – TVC – TFC > – TFC

PQ – TVC > 0

TR > TVC

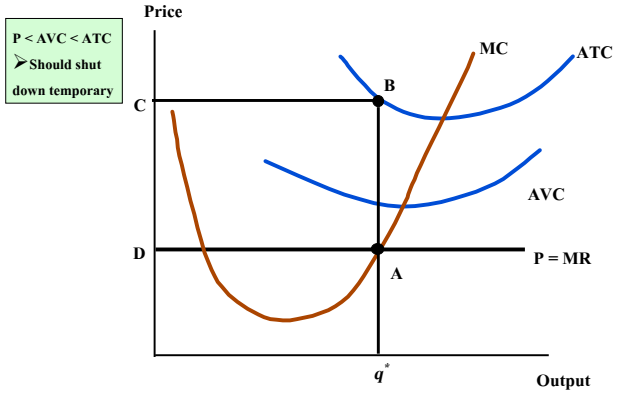
or P > AVC

It should shut down if P = or < minimum AVC

When should the firm shut down?

- When should the firm shut down?
  - If AVC < P < ATC the firm should continue producing in the short run
    - Can cover all of its variable costs and some of its fixed costs
  - If P < AVC < ATC the firm should shut-down.
    - Can not cover even its variable costs

Choosing output: Losses and should shut down



Exercise

A fruit vender is currently making a zero profit.

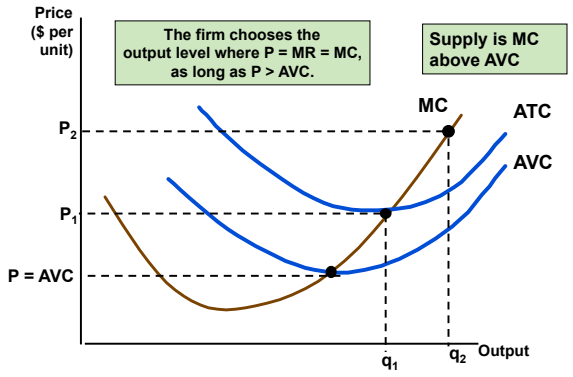
(a) What will be the impact of the economic recession on this vender's sales and profit?

(b) Should the fruit vender continue to operate or close its operation?

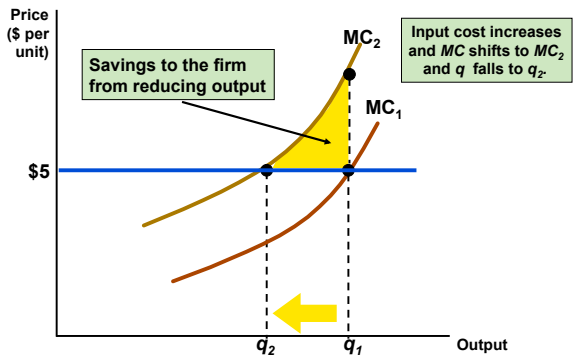
Competitive Firm – Short Run Supply

- Supply curve tells how much output will be produced at different prices
- Competitive firms determine quantity to produce where P = MC
  - Firm shuts down when P < AVC
- Competitive firms supply curve is portion of the marginal cost curve above the AVC curve

A Competitive Firm's Short-Run Supply Curve



The Response of a Firm to a Change in Input Price



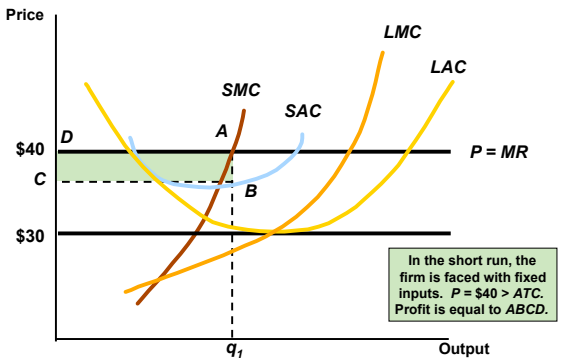
Choosing Output in the Long Run

- In short run, one or more inputs are fixed
  - Depending on the time, it may limit the flexibility of the firm
- In the long run, a firm can alter all its inputs, including the size of the plant.
- We assume free entry and free exit.
  - No legal restrictions or extra costs

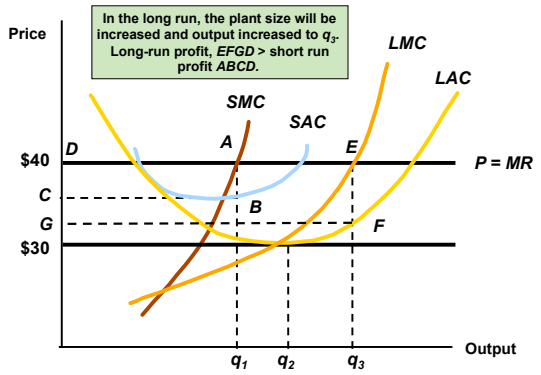
Choosing Output in the Long Run

- In the short run a firm faces a horizontal demand curve
  - Take market price as given
- The short-run average cost curve (SAC) and short run marginal cost curve (SMC) are low enough for firm to make positive profits (ABCD)
- The long run average cost curve (LRAC)
  - Economies of scale to q_2
  - Diseconomies of scale after q_2

Output Choice in the Long Run



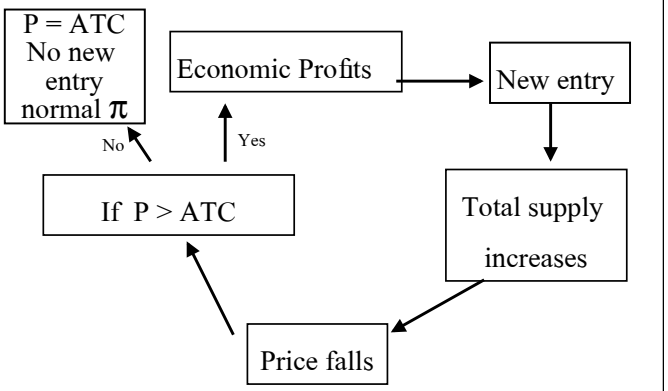
Output Choice in the Long Run



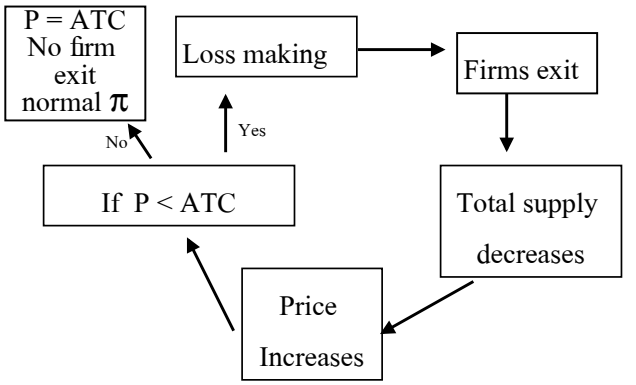
Long-run Competitive Equilibrium

- For long run equilibrium, firms must have no desire to enter or leave the industry
- Zero-Profit
  - A firm is earning a normal return on its own resources
  - Doing as well as it could by using its resources elsewhere
  - Normal profit is firm's opportunity cost of using its own resources instead of using them elsewhere

Long run Equilibrium: New Entry

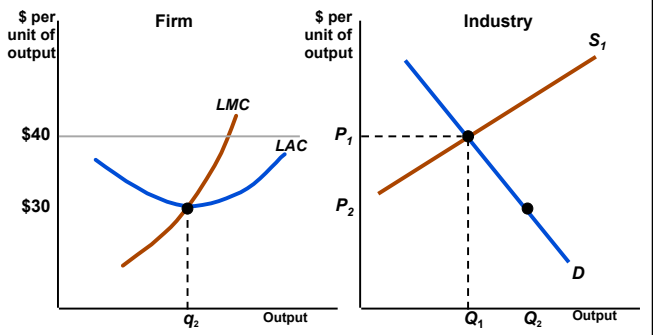


Long run Equilibrium: Exit



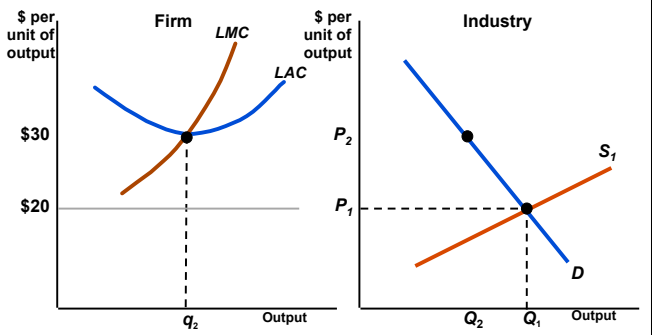
Long-Run Competitive Equilibrium – Profits

•Profit attracts firms
•Supply increases until profit = 0



Long-Run Competitive Equilibrium – Losses

•Losses cause firms to leave
•Supply decreases until profit = 0



Long-Run Competitive Equilibrium

1. All firms in industry are maximizing profits
   - P = MR = LMC = LAC
2. No firm has incentive to enter or exit industry
   - Earning zero economic profits

Efficiency

- Perfectly competitive market is the most efficient market
- Produce at the lowest possible cost
  - P = Minimum LAC or
  - It has productive efficiency
- Generate the highest social welfare
  - D = S and CS + PS are largest
  - P = LMC, marginal benefit = marginal cost
  - It has allocative efficiency

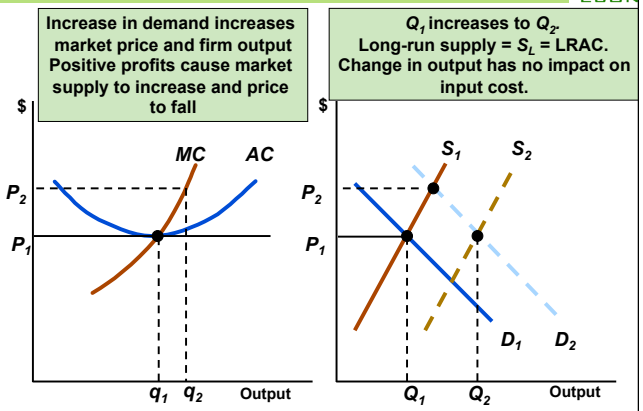
The Industry's Long-Run Supply Curve

- The shape of the long-run supply curve depends on the extent to which changes in industry output affect the prices the firms must pay for inputs.
- Assume
  - All firms have access to the available production technology
  - Output is increased by using more inputs, not by invention
  - The market for inputs does not change with expansions and contractions of the industry.

Constant-Cost Industry

- Industry whose long-run supply curve is horizontal
- Assume a firm is initially in equilibrium
  - Demand increases causing price to increase
  - Individual firms increase supply
  - Causes firms to earn positive profits in short-run
  - Supply increases causing market price to decrease
  - Long run equilibrium – zero economic profits

Constant-Cost Industry



Long-Run Supply in a Constant-Cost Industry

- Price of inputs does not change
  - Firms cost curves do not change
- In a constant-cost industry, long-run supply is a horizontal line at a price that is equal to the minimum average cost of production.

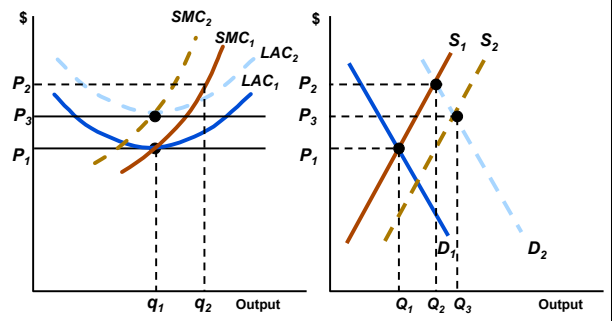
Increasing-Cost Industry

- Prices of some or all inputs rises as production is expanded when demand of inputs increases
- When demand increases causing prices to increase and production to increase
  - Firms enter the market increasing demand for inputs
  - Costs increase causing an upward shift in supply curves
  - Market supply increases but not as much

Long-run Supply in an Increasing-Cost Industry

Due to the increase in input prices, long-run equilibrium occurs at a higher price.

Long Run Supply is upward Sloping



Long-Run Supply in a Increasing-Cost Industry

- In an increasing-cost industry, long-run supply curve is upward sloping.
- More output is produced, but only at the higher price needed to compete for the increased input costs

Decreasing-Cost Industry

- Industry whose long-run supply curve is downward sloping
- Increase in demand causes production to increase
  - Increase in size allows firm to take advantage of size to get inputs cheaper
  - Increased production may lead to better efficiencies or quantity discounts
  - Costs shift down and market price falls

Long-run Supply in a Decreasing-Cost Industry

Due to the decrease in input prices, long-run equilibrium occurs at a lower price.

Long Run Supply is Downward Sloping