

Market structure 1: perfect competition

1. Definition of profit
2. Conditions for profit maximization - general
3. Definition of perfect competition
4. SR supply curve - firm, market
5. SR market equilibrium
6. LR

Have firm's production and cost functions;
- turn to production and marketing decisions

1. How much does firm produce?
2. What price does it charge?

Firm's objective: maximize profits

Profits? $\Pi = \text{total revenue} - \text{total cost}$
 $= TR(q) - TC(q)$

note: costs include *all* costs - including normal rate of return on investment (different from accounting profits)

$TC(q)$ = total cost function

$TR(q)$: price at which each unit sold, multiplied by number of units sold.

Firm chooses quantity to max profits = max $TR(q) - TC(q)$

optimal quantity: where

$$MR = \frac{dTR(q)}{dq} = \frac{dTC(q)}{dq} = MC(q)$$

Interpretation?

Addition to total revenue of last unit produced
and sold = last unit's addition to total cost

Have costs; what is MR?

- derived from market demand curve
- depends on relation between market demand curve
and firm's demand curve
- depends on market structure.

What is “market structure”?

- usually described by size and number of firms in industry, and type of product
 - # range from 1 - large number
 - firms all same size, or different
 - milk(homogeneous product) , or jeans (brands)?

Structure # 1: Perfect Competition

- 4 conditions:
1. Standard (homogeneous) product
 2. Perfect information
 3. Firm acts as price-taker - usually large # firms
 4. Free entry and exit (LR)

Implications for firm’s demand?

consumers care only about price, and know all prices;

firm’s demand horizontal at market price;

LR: zero economic profits for each firm.

Perfect competition in the short run

- firm's perspective? Can sell all it wants at going market price
 - if raises price above market, sales = 0 (full info)
 - if lowers price, excess demand
- firm's demand curve horizontal at going market price
- firm's profit function:

$$\Pi = pq - TC(q) = pq - VC(q) - FC$$

- affected by firm's choices? Q , $VC(q)$...
- to max profit, max $pq - VC(q)$
 - choose quantity where $MR(q) = MC(q)$
 - for pc, $MR(q) = p$, so rule is
choose quantity where $p = MC(q)$

Firm's output decision has two steps?

1. What is optimal $q > 0$?
2. Which is better, $q = 0$ or $q > 0$?

Ans: 1. Profit- max'g q sets $MR = MC$

- for pc firm, $MR = p$, so rule is: produce where $p = MC(q)$

2. If $q = 0$, profits = $-FC$

If $q > 0$, profits = $pq - VC(q) - FC$

$\geq -FC$ if $pq - VC(q) \geq 0$, or $p \geq VC(q)/q = AVC(q)$

So: positive output better for firm if can cover variable costs of production, and some of fixed costs.

Competitive firm's SR supply curve (quantity supplied as a function of price, in SR): given by SMC above min AVC

Example: $C(q) = 16 + 2q + q^2$
 $MC = 2 + 2q$, $AVC = 2 + q$

Derive supply curve? 1. Equate price and MC: $p = 2 + 2q$
2. Solve for $q = (p - 2) / 2 = 0.5(p - 2)$
3. Find minimum $AVC = 2$ at $q = 0$

Then: SR supply is $q = 0.5(p - 2)$ if $p \geq 2$
 $= 0$ if $p < 2$

NB: as with demand, quantity is dependent variable!

*Short run **market** supply curve?*

- horizontal summation of individual firms' supply curves
- why horizontal? (same argument as for consumers)

Examples of SR market supply curves:

a) Firm 1: $q_1 = p - 2, p \geq 2$

firm 2 identical

market: $Q = q_1 + q_2 = 2(p - 2)$

b) firm 1: $q_1 = p - 2, p \geq 2$

firm 2: $q_2 = 3p, p \geq 0$

market:

$$Q = \begin{cases} 3p, & 0 \leq p < 4 \\ 4p - 2, & p \geq 4 \end{cases}$$

Market equilibrium in the short run

What determines price?

Interaction of market demand and market supply

Def'n: *short run equilibrium for a perfectly competitive market:*

a price-quantity pair such that

i) no individual firm wants to change its quantity supplied;

ii) no individual consumer wants to change quantity

demanded; and

iii) aggregate quantity supplied = aggregate quantity
demanded

(if equilibrium price and quantity both finite and >0)

Properties?

Each firm max'g own profits

Each consumer max'g own utility

Profits of individual firm? - no restriction (can be
positive, negative or zero)

Market eq'm:

- pictures
- algebra

Efficiency properties of SR pc market equilibrium:

- SR eq'm satisfies condition of *allocative efficiency*:
 - not possible for production or consumption to be rearranged to make some agent better off, without making some other agent worse off.
 - value of resources used to produce last unit of output (measured by MC) = value of last unit purchased by consumers (measured by price)
- sum of *consumer surplus* and *producer surplus* maximized

Def'ns:

1. *consumer surplus*: total value consumer receives from consumption of good, less total expenditure on good
 - in pc, price *all* units same; consumers purchase until value of *last* unit = opp'y cost → value > price for all but last unit.
 - measured by: area under demand curve, above price.
2. *producer surplus*: value received from production, over and above costs of production
 - economic profit + **fixed cost (in SR)**
 - measured by area above MC below price

Aggregate benefit from production: CS + PS

- max'd by p.c market
- because price-taking behaviour of all agents (firms and consumers) leads to eq'm where marginal value of cons'm of last unit = marginal cost of prod'n of last unit.

Long run adjustments?

1. In SR, economic profits < 0 possible. Not so in LR, given free entry and exit.
 - i) If profits > 0 , entry - more firms means market supply \uparrow , price \downarrow , so profits of existing firms \downarrow - entry continues until profits = 0;
 - ii) if profits < 0 , exit - market supply \downarrow , price \uparrow ... profits of remaining firms \uparrow . Exit until profits = 0;
 - iii) without entry or exit, or in combination: firms can adjust fixed factor - move along LAC.
2. LR equilibrium: profits = 0; price = minimum LAC = LMC