

## Perfect Competition

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Industrial Organization

Perfect Competition

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## Outline

- Understanding Perfect Competition
  - Differences Between Short Run and Long-Run
  - Elasticities
- Contestable Markets
- Sources of Barriers to Entry
- First Theorem of Welfare Economics

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## Intuition of Perfect Competition

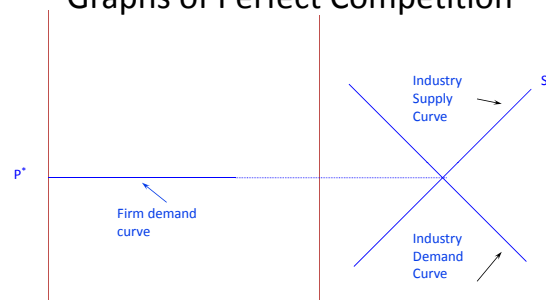
### Basic Assumptions

- Homogeneous Perfectly Divisible Output
- Perfect Information
- No Transaction Costs
- Price Taking
- No Externalities

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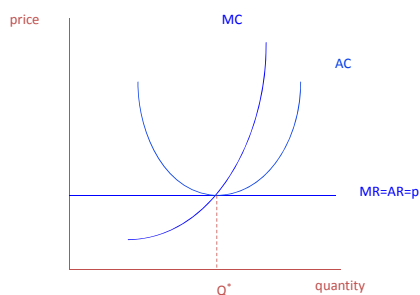
## Graphs of Perfect Competition



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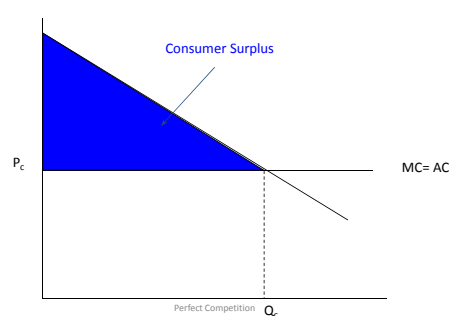
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### Math of Perfect Competition

Profits = Revenue - Costs

$$\pi = R - C$$

FOC:  $MR = MC$

$$\pi = pq - C(q)$$

$$\max_q \pi = pq - C(q)$$

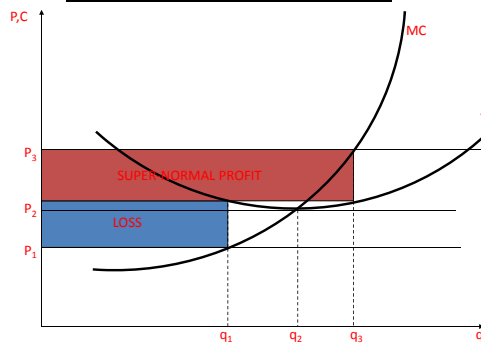
$$p - C'(q) = 0$$

$$p = C'(q)$$

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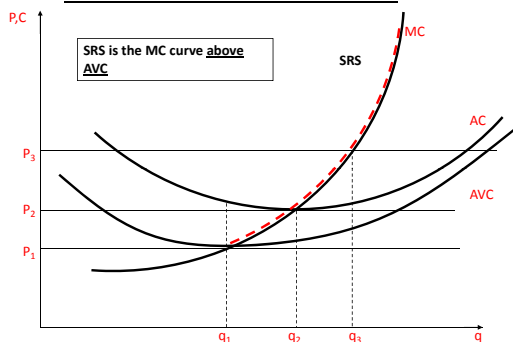
### SHORT-RUN EQUILIBRIUM OF THE FIRM



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### SHORT-RUN SUPPLY CURVE OF THE FIRM



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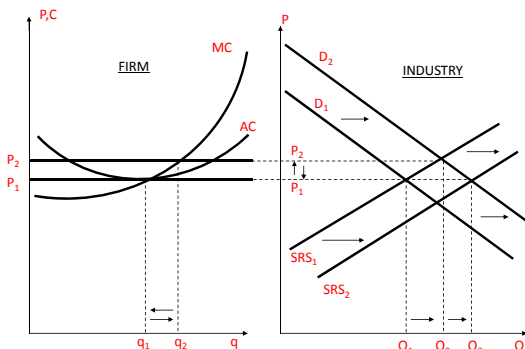
### Short-run Supply Curve of the Industry

- In the short run the number of firms is fixed – (No entry or exit)
- Therefore Industry SRS is simply the **horizontal sum** of all the current Firms' SRS curves

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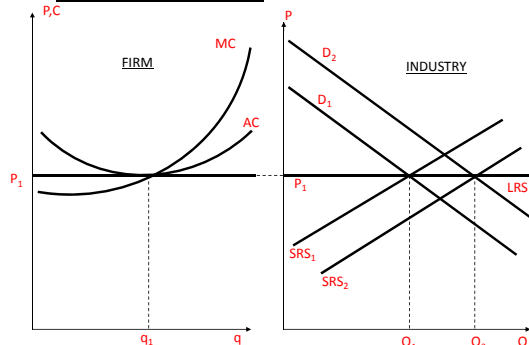
### ADJUSTMENT TOWARDS LONG-RUN EQUILIBRIUM



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### THEREFORE, WITH IDENTICAL FIRMS, HORIZONTAL LONG-RUN INDUSTRY SUPPLY CURVE



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### Efficiency of Perfect Competition

- Output is produced at Minimum Average Cost
- Price is equal to Minimum Average Cost
- Supernormal Profit competed away
  - Zero Economic Profit remains
- Price is equal to Marginal Cost

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### What happens if firms aren't identical?

- Can positive economic profits be consistent with long-run competitive equilibrium?
- What is the marginal cost of the last unit sold if firms are not identical and one firm is capacity constrained (ie is it the MC of the high cost firm or the low cost firm)?
- How much profit do the less efficient firms earn?
- In the long-run competitive equilibrium, must the profit of the marginal entrant be zero?

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### Elasticity of demand:

Percentage change in output resulting from a 1% change in price.

$$\eta = \frac{\Delta Q/Q}{\Delta P/P}$$

slope                      normalization

$\eta = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$

Elasticity is units free

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- Elasticity is not the same as the slope

Constant Slope                      Constant Elasticity

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### Why elasticity declines down the demand curve.

$\text{slope} = \frac{Q_1 - Q_0}{P_1 - P_0} = \frac{Q_2 - Q_1}{P_2 - P_1}$

$P_0/Q_0 > P_2/Q_2$

Elasticity at  $P_0, P_1$ :  $\frac{(Q_1 - Q_0) * P_0}{(P_1 - P_0) * Q_0}$                       Elasticity at  $P_2, P_3$ :  $\frac{(Q_2 - Q_1) * P_2}{(P_3 - P_2) * Q_2}$

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- However, we often say:

(elastic)                      (inelastic)

perfectly elastic                      perfectly inelastic

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## Elasticities and Revenue

- If  $\eta < -1$ , demand is elastic
  - i.e.  $|\Delta Q/Q| > |\Delta P/P|$
  - quantity effect is greater than price effect
  - $P \downarrow \quad Q \uparrow \quad R \uparrow$  (Luxury domestic cars,  $\eta = -1.91$ )
- If  $-1 < \eta < 0$ , demand is inelastic
  - i.e.  $|\Delta Q/Q| < |\Delta P/P|$
  - $P \downarrow \quad R \downarrow$
  - (Cigarettes,  $\eta = -.75$ )

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## Discussion: Is a Fish Market Perfectly Competitive?

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## Ultra Free Entry: Contestable Markets (Baumol 1982)

- Assumptions
  - Homogeneous goods
  - Firms set prices
  - No sunk costs
  - Free entry and exit
  - Entrant may enter and undercut rival before incumbent is able to respond

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- Results: With increasing returns to scale the following conclusions are predicted
  - There is a unique operating firm in the industry
  - This firm makes zero profits
  - Average-cost pricing prevails
- In the absence of competition, potential entry is very effective in disciplining incumbent firms -- this theory presents a strong argument against regulation or nationalization of utilities
- Criticism: Generally believed that prices adjust more rapidly than decisions about quantity or entry

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## Problems with Perfect Competition: Barriers to Entry

- Bain defined a BTE as anything which allows incumbent firms to earn supernormal profits without the threat of entry. He asserted that there are four elements of market structure which give rise to barriers to entry:

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## Barriers to Entry

- Economies of scale
- Absolute cost advantages
  - Scarce resources
  - Legal barriers
  - Patents
  - Learning
- Product Differentiation
  - Location
  - Switching costs
  - Complementary goods
- Capital Raising Requirements

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### In Conclusion: First Theorem of Welfare Economics

- Markets in Competitive Equilibrium are "Pareto Efficient"

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### Conclusion

- Perfect Competition in the Long-Run and Short Run
- Contestable Markets
- Sources of Barriers to Entry
- First Theorem of Welfare Economics

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