

Handout 7

1 Announcements

1. Register ProctorU.
2. Fill out the invitation form on the website.
3. **16 days left** to make a post on section's Tumblr page!

2 Revenue Analysis

- Total Revenue (TR) = $P \cdot Q$
- Average Revenue (AR) = $\frac{TR}{Q}$
- Marginal Revenue (MR) = $\frac{\partial TR}{\partial Q} = \frac{\text{change in TR}}{\text{change in } Q}$
- Total Cost (TC) = Variable Cost (VC) + Fixed Cost (FC)

3 Perfect Competition

- Characteristics of markets: Perfect Competition, Oligopoly, and Monopoly.
- Price and output determination:
 - A **large** number of sellers and buyers.
 - Each seller sells a very small amount of the total market output.
 - Sellers have no control on price \implies **Price takers** (no price wars).
 - Sellers face a **horizontal** demand curve (perfectly elastic demand).
 - All goods are **homogeneous** (identical).
 - Firms can **freely enter or exit** the market.

4 Extensive Analysis

- Competing inside and outside options \implies Should we *enter* the market or *stay out*?
- Consider the fixed cost (sunk cost), opportunity cost.

5 Intensive Analysis

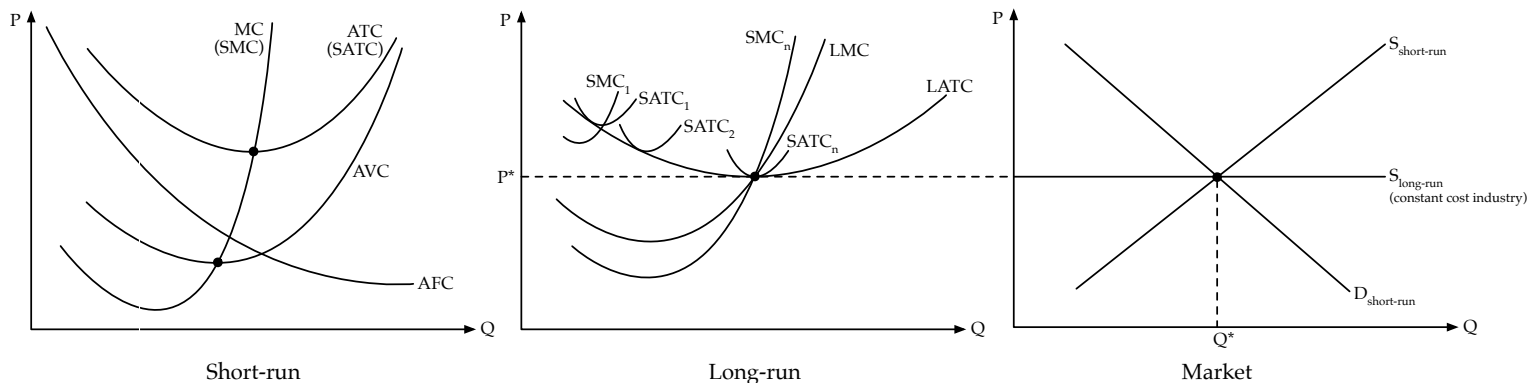
- Constrained optimization and the “Bang per Buck” principle \implies Now we are in the market, *how much* should we produce?
- **P = MR = AR**
- *Profit maximization criterion*: **MR = MC** (MC curve is the firm's supply curve)
- Firm's profit maximization decision in competitive market: **P = MC**

6 Short Run Analysis

1. Considered over a *short time period*.
2. Variable cost (VC): costs that vary with the *quantity of output*.
3. Sunk cost (irrelevant to decisions making):
 - A cost that has already been committed and cannot be recovered.
 - Fixed cost (FC) is a sunk cost.
4. $P > AVC$: a firm **enters** the market and maximizes profit by **producing the quantity** at $MR = MC = P$. From the **determined** output level, the (market) price is decided by the demand curve.
5. $P < AVC$: a firm will **shut down** (stop producing temporarily but still need to pay fixed cost). (proof)
6. **Short run supply curve**: the portion of MC curve that is **above** AVC curve.
7. In short run, market supply curve is upward slopping (horizontal summation of individual firm's supply curve).
8. Possible to make a profit.
9. In the short run, entry is not possible, and an increase in demand increases firms' profits.

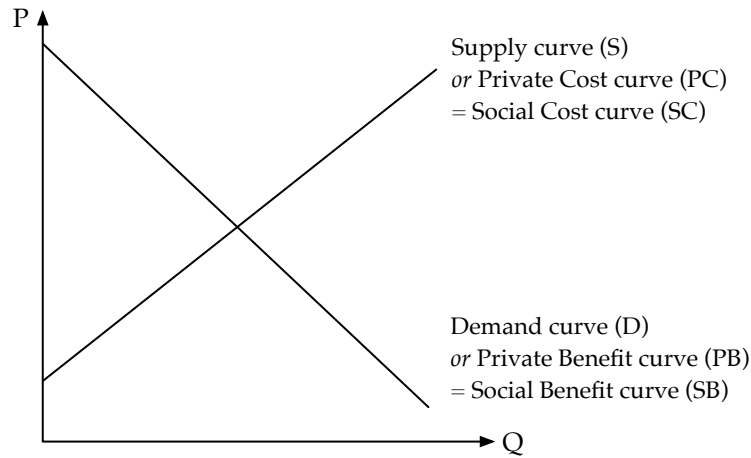
7 Long Run Analysis

1. Considered over a *long time period* (no fixed cost).
2. The **long run ATC** curve (LATC) is the **envelope** (minimum) of all **short run ATC** curves (SATC).
3. $P > LATC$: a firm **enters** the market.
4. $P < LATC$: a firm **exits** the market (does not have to pay any cost, neither fixed or variable cost).
5. **Long run supply curve**: the portion of LMC curve that is **above** LATC curve.
6. Produce at **price** $P = LMC = \text{minimum SATC} = \text{minimum LATC}$.
7. *Long run zero profit condition* (in equilibrium).
8. Market supply curve is horizontal with **price** $P = \min\{LATC\}$ (minimum of long run average cost), only when the following assumptions are ALL satisfied:
 - (a) All firms have **identical costs**.
 - (b) Costs **do not change** as other firms enter or exit the market.

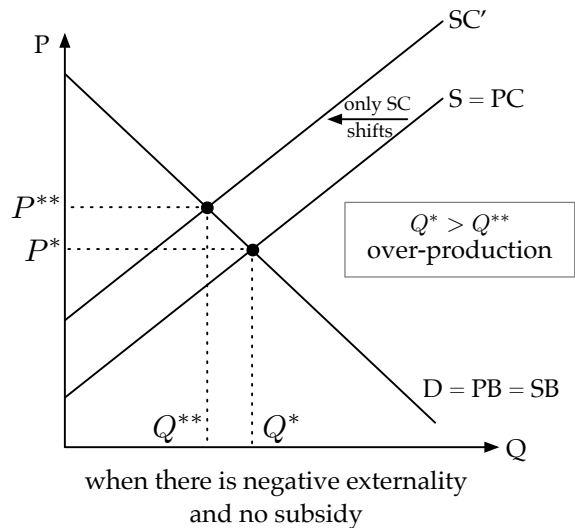
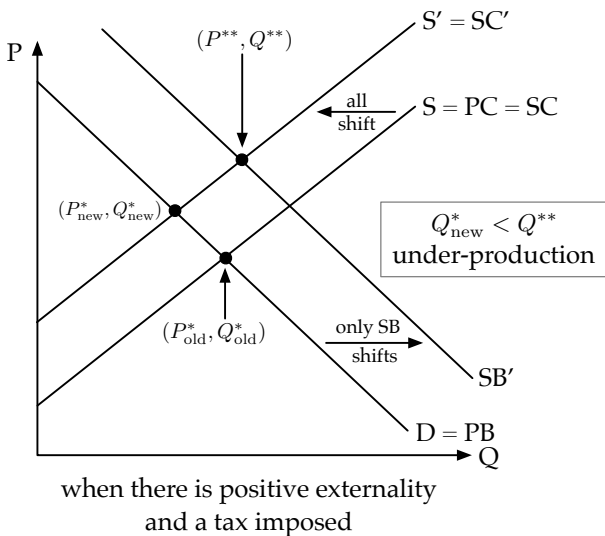


8 Externality

There are **four** curves in the demand-supply graph. When there is **NO externality**: $PC = SC$, $PB = SB$.



- **Tax**: shifts (private) supply (cost) curve.
- **Subsidy**: shifts (private) demand (benefit) curve.
- **Negative externality**: shifts social supply (cost) curve.
- **Positive externality**: shifts social demand (benefit) curve.



- **Left figure**: There is positive externality, so it will affect social benefit curve (SB). This will cause SB to move away from the demand curve (PB). There is no subsidy so the PB will stay the same. However, a tax will affect the supply curve. Hence, the private cost curve (supply) will shift leftwards.
- **Right figure**: The social benefit/cost curves will only respond to externalities. So a negative externality will cause the social cost curve (SC) to shift leftwards. Since there is no tax and no subsidy, the demand curve (a.k.a. “demand” or “private benefit curve, PB”) and the supply curve (the “supply” or “PC curve”) will remain unchanged.
- Intersection of **demand** (private benefit) and **supply** (private cost): market equilibrium (P^* , Q^*).
- Intersection of **social benefit** and **social cost**: social efficient (P^{**} , Q^{**}).