

**IDX G10 AP Microeconomics**  
**Study Guide S1 Midterms**  
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**Basic Economic Concepts**

Fundamental Economic Problem

- Scarcity
  - Limited resources, goods, and services
  - Unlimited wants
- Choices and resource allocation
  - What to produce?
  - How to produce?
  - For whom to produce?
- Trade-off: a situation where choosing one option means sacrificing another due to limited resources
- Opportunity cost: the value of the next-best alternative that was not chosen

Economic Systems

- Market economy: individual producers and consumers decide what, how, and for whom to produce with little government involvement
- Command economy: industry is publicly owned, and a central authority makes production and consumption decisions
- Mixed economy: part of the economy is left to the free market, and part of it is managed by the government
  - most of today's economies

Free Market	Government Intervention
Entrepreneurs able to make profit	Progressive taxes to reduce inequality
Freedom to set up business	Government regulations
Prices determined by market forces	Taxes on demerit goods
Private ownership of business	Gov't provision of public goods

#### Optimal Choice/Decision: MB and MC

- Marginal analysis: comparing the additional benefit of increasing a given activity with the additional cost
- Marginal benefit: the extra satisfaction or the most a consumer is willing to pay for one more unit of a good or service
- Marginal cost: the additional cost a producer or any business incurs by adding one more unit of production or sales
- The optimal quantity is achieved when marginal benefit is equal to marginal cost or where total benefit is maximized

#### Optimal Choice/Decision: Utility

- Marginal utility: the increased happiness or satisfaction that an actor derives from consuming an additional unit of a certain good
- Total utility: the total satisfaction or benefit derived from consuming a good or service
  - Economic assumption: consumers will strive to maximize their utility
- Principle of diminishing marginal utility: successive units of a good or service add less total utility than do previous units

#### Budget Constraints and Lines

- Budget line: shows the consumption bundles available to a consumer who spends all of their income
- Optimal consumption bundle: the consumption bundle that maximizes a consumer's total utility given their budget constraint
  - Optimal consumption rule: the optimal consumption bundle occurs where the marginal utility per dollar spent on each good is equal
  - $\frac{MU_C}{P_C} = \frac{MU_T}{P_T}$  where C and T are the two goods

## Supply, Demand, and Elasticity

### Demand Curve

- Downward sloping because of the law of demand, derived from:
- Income effect: as prices fall, the real incomes of consumers increase, so they tend to buy more of most goods
- Substitution effect: as prices fall, the real prices of substitute goods appear to increase, so consumers buy more of the good for which price has decreased
- Law of diminishing marginal utility: because consumers get less utility (satisfaction) from each additional unit of a good they consume, they will only buy more of the good if its price decreases.

### PED and PES

- Price elasticity of demand (PED)
  - $PED = \frac{\% \Delta Q_D}{\% \Delta P} = \text{slope} * \frac{P_1}{Q_1}$  at each point
    - not constant along a constant demand curve
  - Factors
    - Close substitutes: PED ↑ with close substitutes – easy to replace
    - Share of income: PED ↑ for large share of income – costs a lot
    - Necessity v.s. luxury: PED ↑ for luxuries – not necessary
    - Time: PED ↑ in the long-run – more time to adjust
- Price elasticity of supply (PES)
  - $PES = \frac{\% \Delta Q_S}{\% \Delta P}$
  - Factors
    - Availability of inputs: PES ↑ when inputs can be used/removed at low cost
    - Time: PES ↑ in the long-run – more time to adjust
- Elasticity and total revenue

- Total revenue: the total value of sales of a good or service =  $P * Q$
- Elastic ( $>1$ ): price rise reduces total revenue
- Unit elastic ( $=1$ ): price rise does not change total revenue
- Inelastic ( $<1$ ): price rise increases total revenue

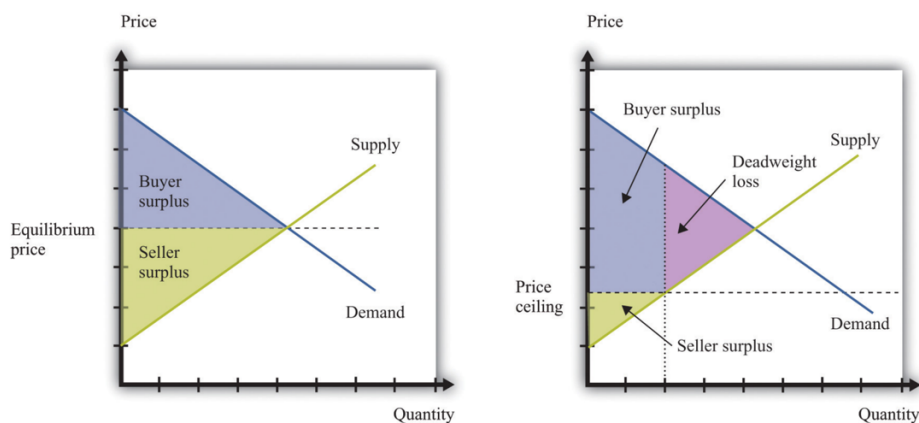
#### Other Elasticities

- Income elasticity of demand (YED): % change in the quantity of a good demanded when a consumer's income changes divided by the % change in the consumer's income
  - $YED = \frac{\% \Delta Q_D}{\% \Delta income}$
  - Positive: normal good
    - $>1$ : Income-elastic
    - $<1$ : Income-inelastic
  - Negative: inferior good
- Cross-price elasticity of demand (XED): the effect of the change in one good's price on the quantity demanded of the other good
  - $XED = \frac{\% \Delta Q_{AD}}{\% \Delta P_B}$  where  $Q_{AD}$  refers to  $Q_D$  of product A, and  $P_B$  refers to price of B
  - Positive: substitute
  - Negative: complement

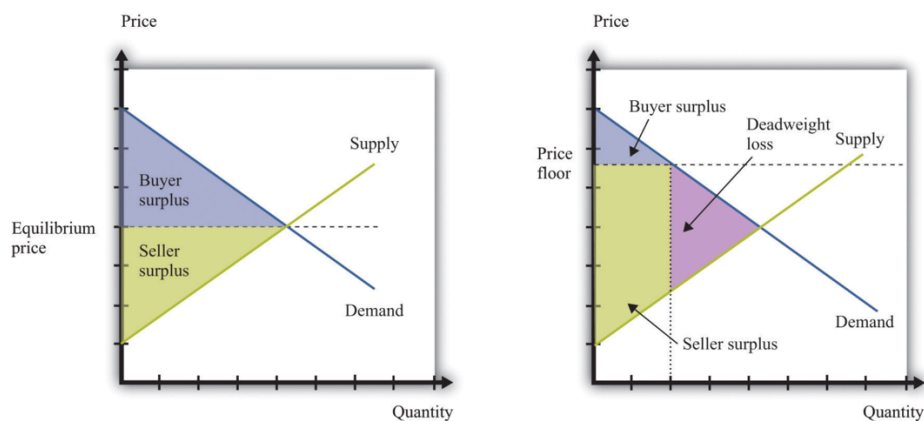
#### Government Intervention

##### Price Control

- Price ceiling: a maximum price that sellers are allowed to charge for a good or service
  - Makes basic goods and services more affordable for poorer residents i.e. staple food
  - Inefficiency and shortage
    - Wasted resources: people spend money, effort, and time to cope with shortages
    - Inefficiently low quality: sellers offer low-quality goods at a low price even if buyers prefer a higher quality at a higher price
    - Black markets: goods illegally sold at high prices to avoid price ceiling



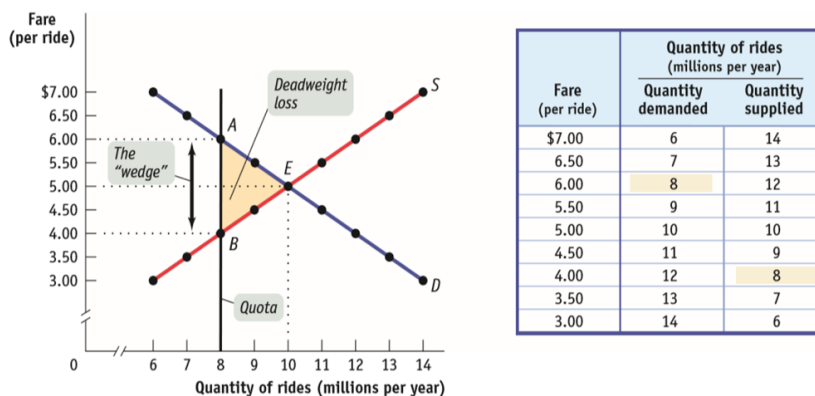
- Price floor: a minimum price that buyers are required to pay for a good or service
  - Goals
    - Increase the income of producers of goods and services that the government considers important
    - Discourage consumers from buying goods that are considered harmful, i.e. alcohol
    - To protect workers by setting a minimum wage that ensures they earn enough to have a reasonable standard of living
  - Inefficiency and surplus
    - Inefficiently low quantity: reduces the quantity of a good bought and sold below equilibrium quantity
    - Inefficient allocation among sellers: those willing to sell a good at the lowest price are not always those who manage to sell it
    - Wasted resources: gov't has to deal with the surplus, and it is often destroyed + time and effort spent searching for a buyer are wasted
    - Black markets: incentivizes illegal activity, similar to price ceilings



## Quantity Control

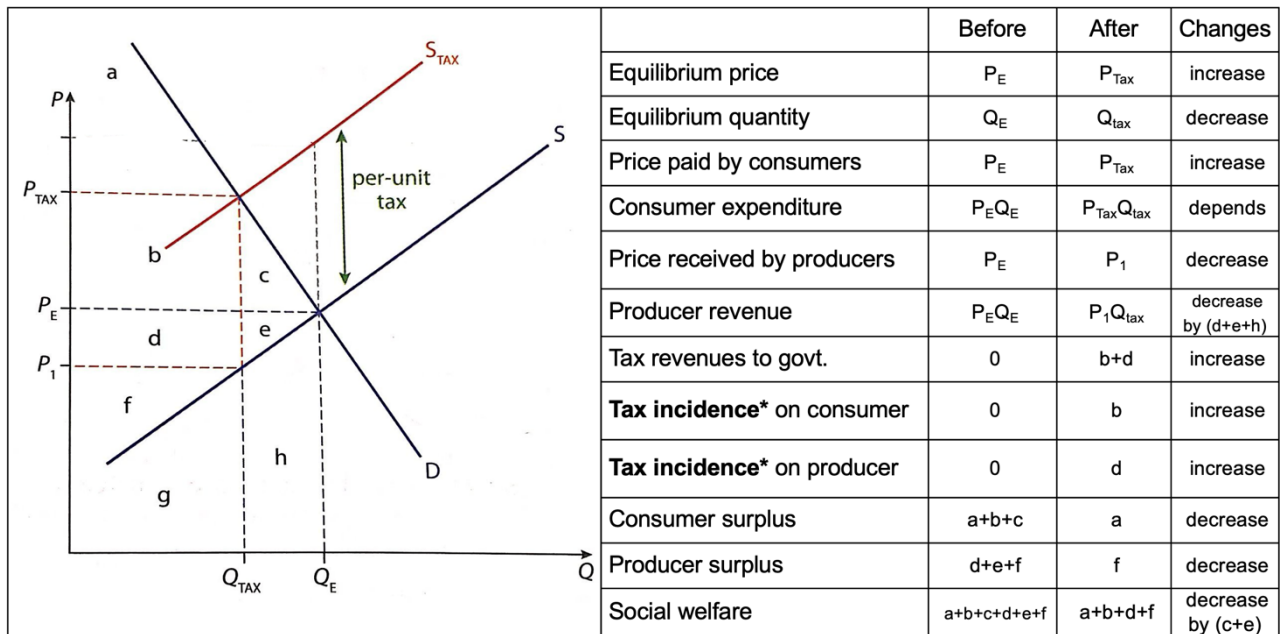
- Quota: an upper limit on the quantity of some good that can be bought or sold
- Quota rent: the difference between the demand and supply price at the quota amount
  - represents the increased earnings of a license-holder in a market with quota
- Deadweight loss: value of foregone mutually beneficial transactions.
  - = the value of all transactions that would've occurred but do not

**Figure 9.2** Effect of a Quota on the Market for Taxi Rides



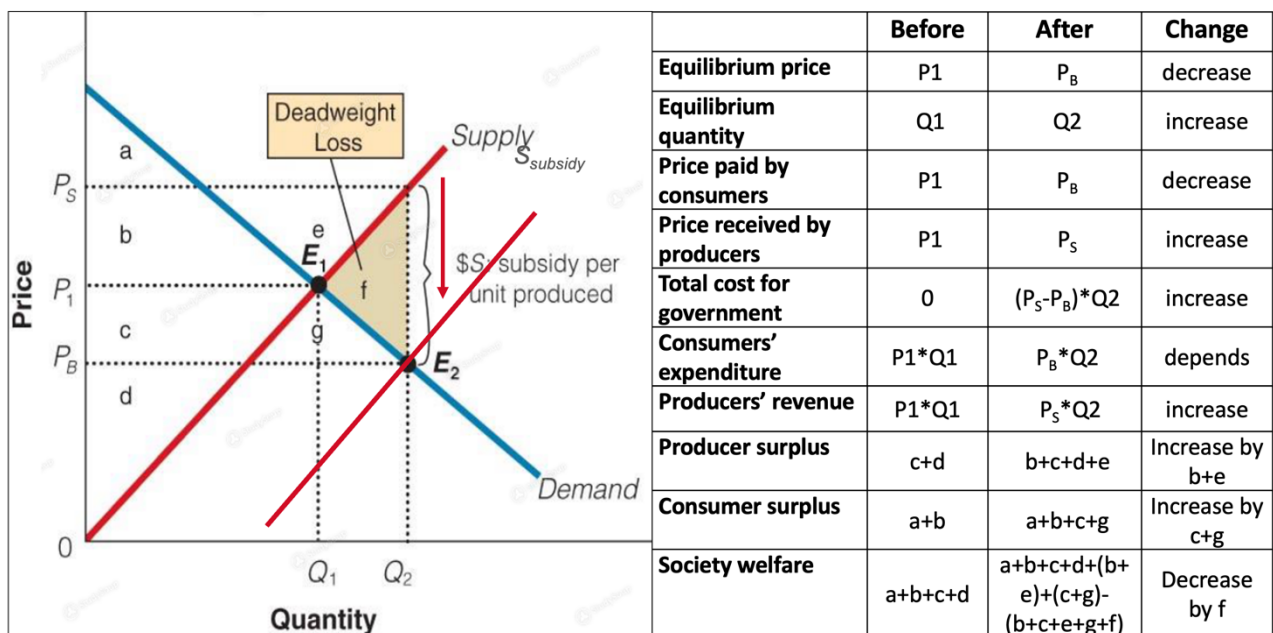
## Tax

- Definition: amount of money imposed by government on households and firms
  - Direct taxes: imposed on income
  - Indirect taxes: imposed on expenditure on goods and services
- Proportion of income
  - Progressive: high-income taxpayers pay a larger % of income
  - Regressive: high-income taxpayers pay a smaller % of income
  - Proportional: all taxpayers pay the same % of income
- Causes
  - Collect revenue for public projects
  - Discourage consumption of certain goods
- Tax incidence: how the burden of a tax is shared among participants in a market
  - Elastic S, inelastic D: buyers bear most of tax
  - Inelastic S, elastic D: sellers bear most of tax



### Subsidy

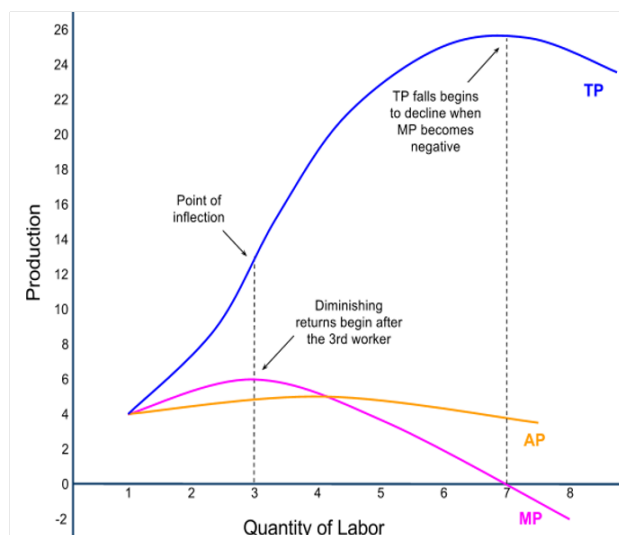
- Definition: a payment from the government to an individual or firm
- Goals
  - Increase revenues for producers
  - Support a particular industry by helping with production cost
  - Make goods more affordable for low-income households
  - Increase consumption and production of some goods by lowering the price
  - Increase export revenue by making a good more competitive in the world



## Production, Costs, Revenue, and Profit

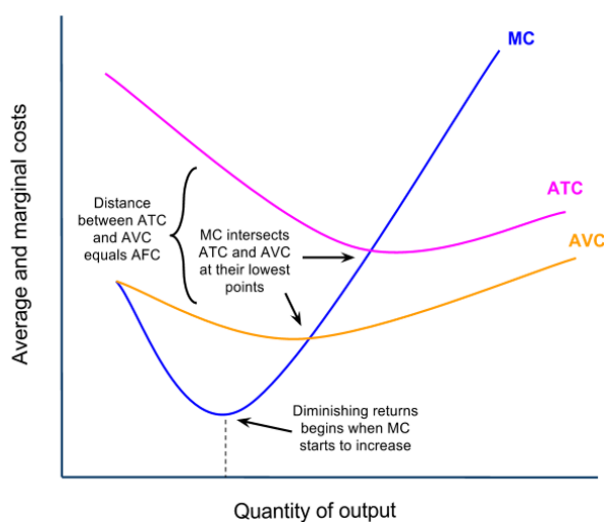
### Short Run Production and Costs

- Short run: at least one factor of production is fixed
- Total product (TP): total output of a particular firm at a particular period of time
  - Rate of change: MP
    - MP increasing: TP becomes steeper
    - MP decreasing: TP becomes flatter
    - $MP < 0$ : TP decreases
- Marginal product (MP): the change in total product divided by the change in quantity of labor
$$\text{labor} = \frac{\Delta TP}{\Delta Q}$$
  - Increase at the first few inputs hired – employment of idle resources, specialization and division of labor make production more efficient
  - Law of diminishing marginal returns (DMR): after a certain point, as more of a variable resource, the marginal product will decrease
    - with fixed factors of production, the business becomes more crowded, lowering productivity and efficiency
- Average product (AP): the output per worker =  $\frac{TP}{Q}$ 
  - Intersected by MP at lowest point
  - AP increases when  $MP > AP$ 
    - the next amount added is larger than the current average, so it pulls the average up
  - AP decreases when  $MP < AP$ 
    - the next amount added is smaller than the current average, so it drags the average down





- Total costs
  - Total fixed cost (TFC): costs which do not vary with output
    - Average fixed cost (AFC): fixed costs per unit of output
    - Spreading effect: the larger the output, the greater the quantity of output over which the fixed cost is spread, leading to a lower average fixed cost
    - Because of the spreading effect, the distance between AFC and AVC decreases
  - Total variable cost (TVC): costs which vary with output
  - Total costs = TFC + TVC
  - At 0 output: any costs that a firm has must be fixed and no variable costs
- Productivity and costs
  - When productivity of workers is rising, a firm's per unit costs are falling (more output per dollar of wages)
  - When marginal product is increasing, marginal cost is falling
  - When average product is rising, average cost is falling
  - When MP and AP are maximized, MC and AC are minimized
- Average total cost (ATC): cost per unit of production =  $\frac{TFC+TVC}{Q} = \frac{TC}{Q} = AVC + AFC$ 
  - Lies above AVC
  - Intersected by MC at its lowest point
    - If the last unit produced cost less than the average, then the average must be falling, and vice versa
- Marginal cost (MC): change in total cost divided by the change in quantity of labor =  $\frac{\Delta TC}{\Delta Q}$ 
  - First falls because of increasing marginal returns
  - Then increases due to DMR
- Average variable cost (AVC): variable costs per unit of output =  $\frac{TVC}{Q}$ 
  - First falls as the optimal factor of production is approached
  - Then increases as DMR sets in
  - Intersected by MC at its lowest point
    - If the last unit produced cost less than the average, then the average must be falling, and vice versa

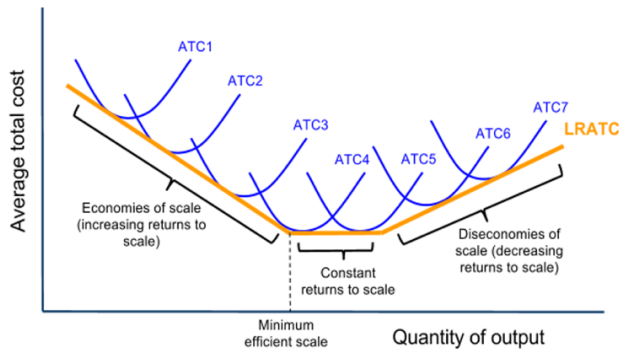


- Shifts in curves
  - Fixed costs increase
  - Variable costs increase

### Long Run Production and Costs

- Long run: all factors of production are variables
  - Firms can increase output by changing factors in the combination to maximize profits
- Returns to scale
  - Increasing: a given increase in the quantity of factor inputs leads to a larger proportional increase in output
  - Decreasing: a given increase in the quantity of factor inputs leads to a smaller proportional increase in output
  - Constant: a given increase in the quantity of factor inputs leads to a proportionally identical increase in output
- Long run average cost (LRAC): a curve that joins all the points of the short run average cost (SRAC) curves, giving the lowest cost of producing a given output
  - all SRACs are tangent to the LRAC
  - DMR no longer exists
  - Economies of scale: the cost advantages companies gain from increasing their output
    - higher specialization, greater productivity
    - lower average costs at larger quantities
    - improved manufacturing techniques
  - Minimum efficient scale: the smallest quantity at which a firm's long run average total cost is minimized

- Diseconomies of scale: increasing average unit costs as output is expanded
  - coordination and communication problems
  - increased regulation
  - office politics and multiple levels of management



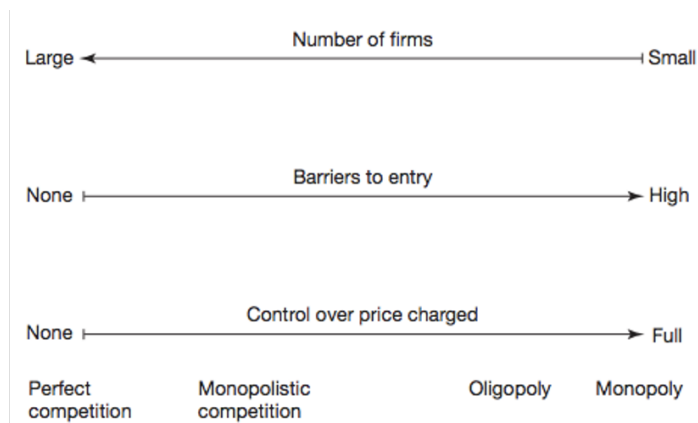
## Revenue and Profit

- Revenue
  - Total revenue (TR) =  $P * Q$
  - Average revenue (AR): revenue per unit =  $\frac{TR}{Q} = P$  assuming a single-price seller
    - Price at any given output
    - Demand curve also shows the relationship between P and Q, so it must be equivalent  $\rightarrow D = AR = P$
  - Marginal revenue (MR): the addition to TR when output/sales are increased by an additional unit =  $\frac{\Delta TR}{\Delta Q}$
- Total costs
  - Explicit costs: monetary payments for the resources employed
    - i.e. rent, wages, interest, etc.
  - Implicit costs: the opportunity costs of an owner who chooses to start the business and benefits that are forgone
    - i.e. cost of financial capital, compensation for risk, entrepreneur's time, salary if employed by another firm, etc.
    - Cost of financial capital: the income the owner could have realized from that capital if it had been used in its next best alternative way
- Profit = TR – TC
  - Accounting profit: TR – explicit costs
  - Economic profit: TR – explicit costs – implicit costs
    - usually less than accounting profit
  - Abnormal/economic profit: TR > TC (explicit and implicit)

- Normal profit/zero economic profit:  $TR = TC$
- Economic loss:  $TR < TC$
- Profit maximization
  - TR and TC approach
    - $Profit = TR - TC$
    - Profit maximizing point = greatest difference between TR and TC
    - Not easy to identify
  - MR and MC approach
    - A firm weights the benefits and costs of additional units of output to decide when to stop producing more units
    - $MR > MC$ : more profit → produce more
    - $MR < MC$ : less profit → produce less
    - $MR = MC$ : profit maximizing point

## Perfect Competition

### Four Market Structures

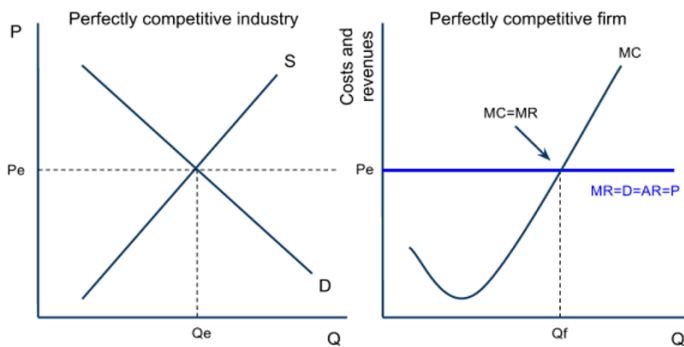


### Characteristics of Perfect Competition

- Infinite number of small firms
- All firms produce same products
- Each individual firm is a price taker and has no market power
  - If it raises its price, it will sell no output as buyers will go to other sellers
  - If it lowers its price, it will lose revenue unnecessarily because they can already sell all they want at the market price.
- Perfect knowledge throughout the market (all decisions made by producers and consumers and instantaneously known to all in the market)
- No barriers and costs to entry and exit the market

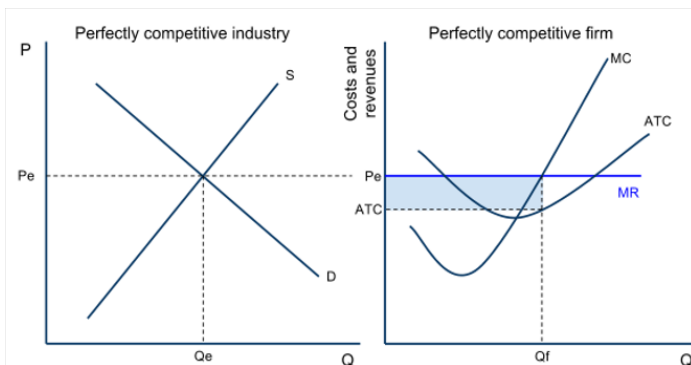
## Features of Curve

- $D = MR = AR = P$ 
  - MR is constant
- Perfectly elastic demand curve
- MC is an individual supply curve
  - shows relationship between P and Q produced
- Profit is maximized at  $MR = MC$

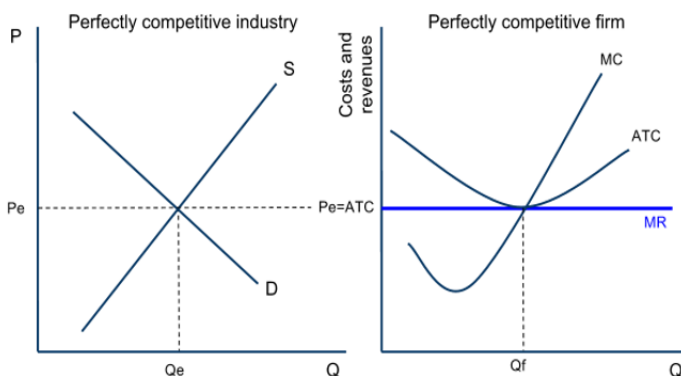


## Short Run

- Economic profit:  $P > ATC$



- Normal profit:  $P = ATC$

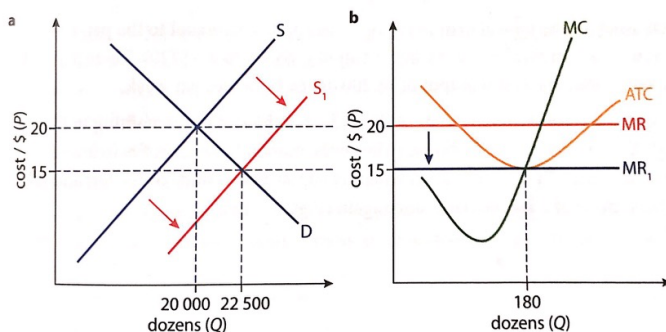


- Economic loss:  $AVC < P < ATC$ 
  - If keep producing: loss of  $(ATC - P)(Q) \rightarrow$  difference between ATC and P
  - If shut down: loss of  $(ATC - AVC)(Q) \rightarrow$  fixed costs

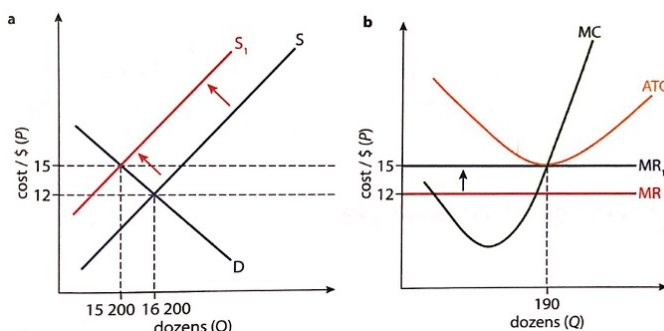
- Price can still cover AVC and  $TFC > \text{total loss} \rightarrow \text{keep producing to minimize loss}$
- Shut down rule:  $P < AVC$ 
  - Price can no longer cover AVC
  - $TFC < \text{total loss}$
  - Shut down point: lowest AVC

### Long Run

- In perfectly competitive markets, firms can enter or exit the market in the long run
- In the long run, the firm does not have AVC, so it will shut down when  $P < ATC$ .
- Abnormal profit
  - The economic profit earned attracts new firms to the industry
  - The number of sellers increases the market supply, shifting the curve to the right
  - The increased competition decreases price and increases quantity
  - MR falls, causing the firm to reduce output to maintain  $MR = MC$
  - Economic profit returns to normal as the price falls to the firm's ATC



- Economic loss
  - The economic loss makes firms shut down and leave industry
  - The number of sellers decreases the market supply, shifting the curve to the left
  - The decreased competition increases price and decreases quantity
  - MR rises, causing the firm to increase output to maintain  $MR = MC$
  - Economic loss returns to normal profit as the price rises to the firm's ATC



- A perfectly competitive firm can only make abnormal profit and losses in the short run.

- Cost of industry
  - Constant: input prices do not change when industry expands
    - Each firm's cost curves stay the same
    - New firms enter → supply shifts right → price falls short run → returns to original long run price → long run price stays constant
  - Increasing: input prices rise when industry expands
    - Scarce resources are more competitive i.e. mining, agriculture, etc.
    - New firms enter → supply shifts right but higher input costs → upward shift in firm's cost curves → higher long run price than before
    - Vice versa if firms exit
  - Decreasing: input prices decrease/efficiency increases when industry expands
    - i.e. tech industries, better supplier networks, etc.
    - New firms enter → supply shifts right but lower input costs → downward shift in firm's cost curves → lower long run price than before
    - Vice versa if firms exit

Industry Type	Input Price Behavior	Firm Cost Curve Shift	Long Run Supply Curve	Long Run Price Effect
Constant Cost	None	None	Horizontal	Cost
Increasing Cost	↑	Downward	Upward Sloping	↑
Decreasing Cost	↓	Upward	Downward Sloping	↓

## Efficiency

- Productive efficiency: produce at lowest of ATC, not considering allocation of products
  - Firms use resources at maximum efficiency
  - Price is higher than the firm's ATC → The firms are earning economic profits
  - In the long run, more firms will enter the market to satisfy demand
  - As new firms enter, price will fall to minimum ATC, and firms will be more productively efficient
- Allocative efficiency: produce at  $D = S$ ,  $MB = MC$ , or  $P = MC$ 
  - Market produces at the quantity where there is neither under- nor over-allocation of resources
  - $P > MC$ :  $MB > MC$ , more output is desired
  - $P < MC$ :  $MB < MC$ , less output is desired
  - $P = MC$ : right amount of output

- A perfectly competitive firm is allocative efficient in both short run and long run
- A perfect competition firm can reach both productive and allocative efficient in only in the long run

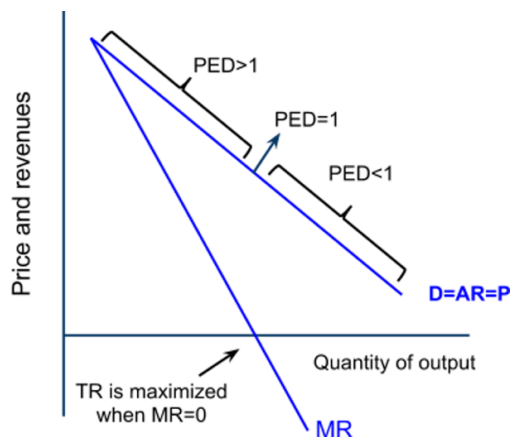
## Imperfect Competition – Monopolies

### Characteristics of Monopolies

- Single seller
- No close substitutes
- High barriers to entry
  - High start-up costs
  - Control of sources of supply
  - Copyright and Patents
  - etc.
- Significant market power
- Monopolist is a price maker

### Features of Curve

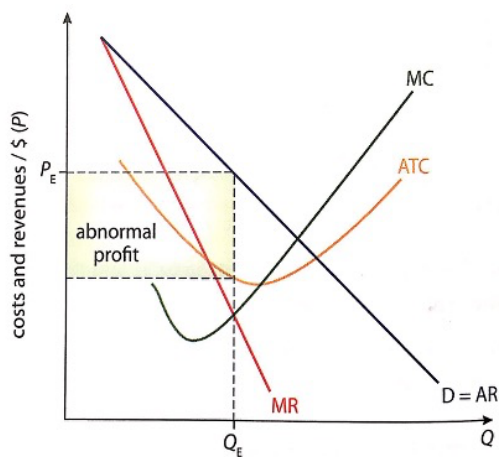
- Monopolist's D curve = market's D curve
- Downward sloping demand curve
- $MR \neq AR$  and MR always lies below AR
- Total revenue is maximized when  $MR = 0$  and  $PED = 1$
- MR crosses the x-axis corresponding to the midpoint of the D curve



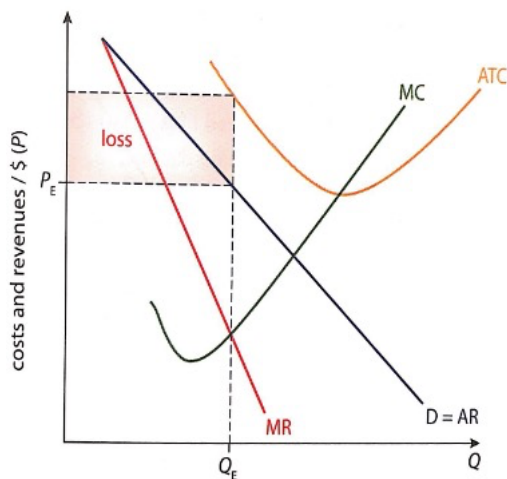
### Short Run

- Economic profit
  - ATC lies under P at  $MR = MC$
  - $\text{Profit} = (P - ATC)(Q_E)$

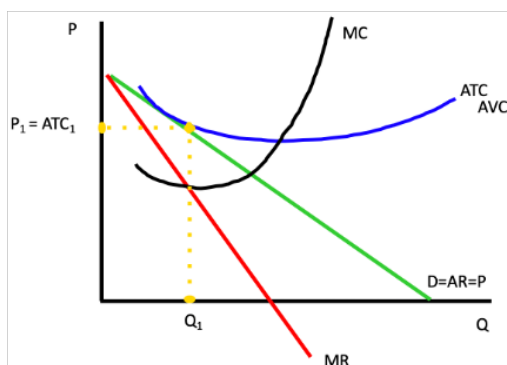




- Economic loss
  - ATC lies above P at  $MR = MC$
  - $Loss = (ATC - P)(Q_E)$

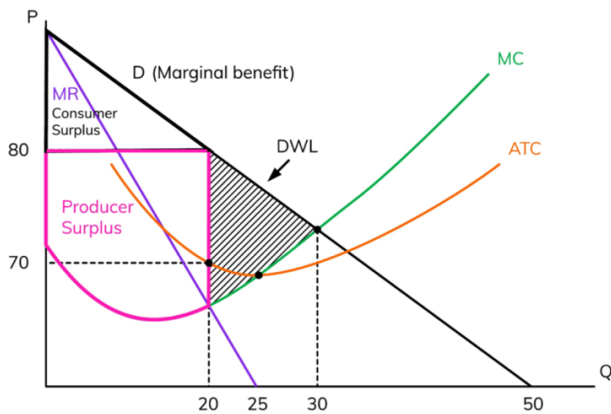


- Normal profit
  - ATC is tangent to P at  $MR = MC$



- Profit, Revenue, Output
  - Profit maximization price and output
    - Firms won't produce when  $MR < 0$
    - MC intersects ATC at its lowest point
    - Profit is maximized when  $MR = MC$

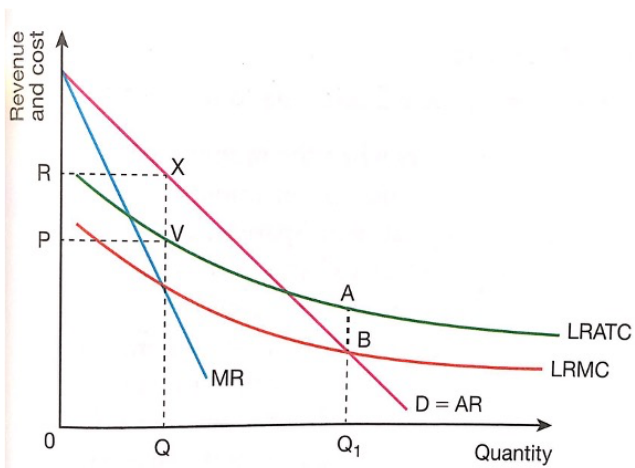
- Revenue maximization price and output
  - Revenue is maximized when  $MR = D$
  - Price is lower and quantity is higher for a revenue maximizer
  - Revenue maximizer earns abnormal profit
- Efficiency
  - $P$  always  $> MC$
  - Monopoly firms are not allocative efficient  $\rightarrow$  abuse of market power



- The monopoly can maintain abnormal profits in the long run because new firms cannot enter the industry to take advantage of these abnormal profits

### Natural Monopolies

- When the production of a good can be done more efficiently by a single producer than multiple producers, an industry is a natural monopoly
  - High start-up costs with high output
  - i.e. water, gas, electricity, railways, etc.
  - Inefficient and wasteful with more than one firm
- Features
  - LRAC downward sloping
  - LRMC lies below LRAC
  - Allocative efficiency at point B:  $P = MC$ 
    - Downward part of LRATC  $\rightarrow$  economies of scale
  - Firms produce at profit maximization point X:  $MR = MC$ 
    - Price is higher and quantity is lower than socially optimal
    - Underproduction
  - Ideal: intersection of ATC and P
    - Causes economic loss
    - Gov't intervention needed



- Gov't Regulations

- Price ceiling at the intersection of ATC and  $P \rightarrow$  break-even
- Subsidy reducing MC  $\rightarrow$   $P$  decreases,  $Q$  increases
- Anti-trust legislation: protect consumers against monopolistic behaviors
  - legislating against predatory behavior
  - restricting market share
  - breaking up the firm
- Licensing, standards, inspections, or fines
- Nationalization: take control of a private sector industry
  - Downside: less efficiently managed
- Granting exclusive production rights to single firms where a natural monopoly is likely to yield lower costs and more output