Mr. Dachpian

Microeconomics Review

AP Microeconomics – Chapter 1: Limits, Alternatives, & Choices

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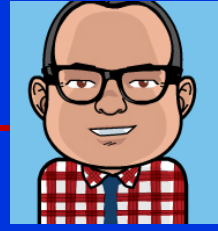
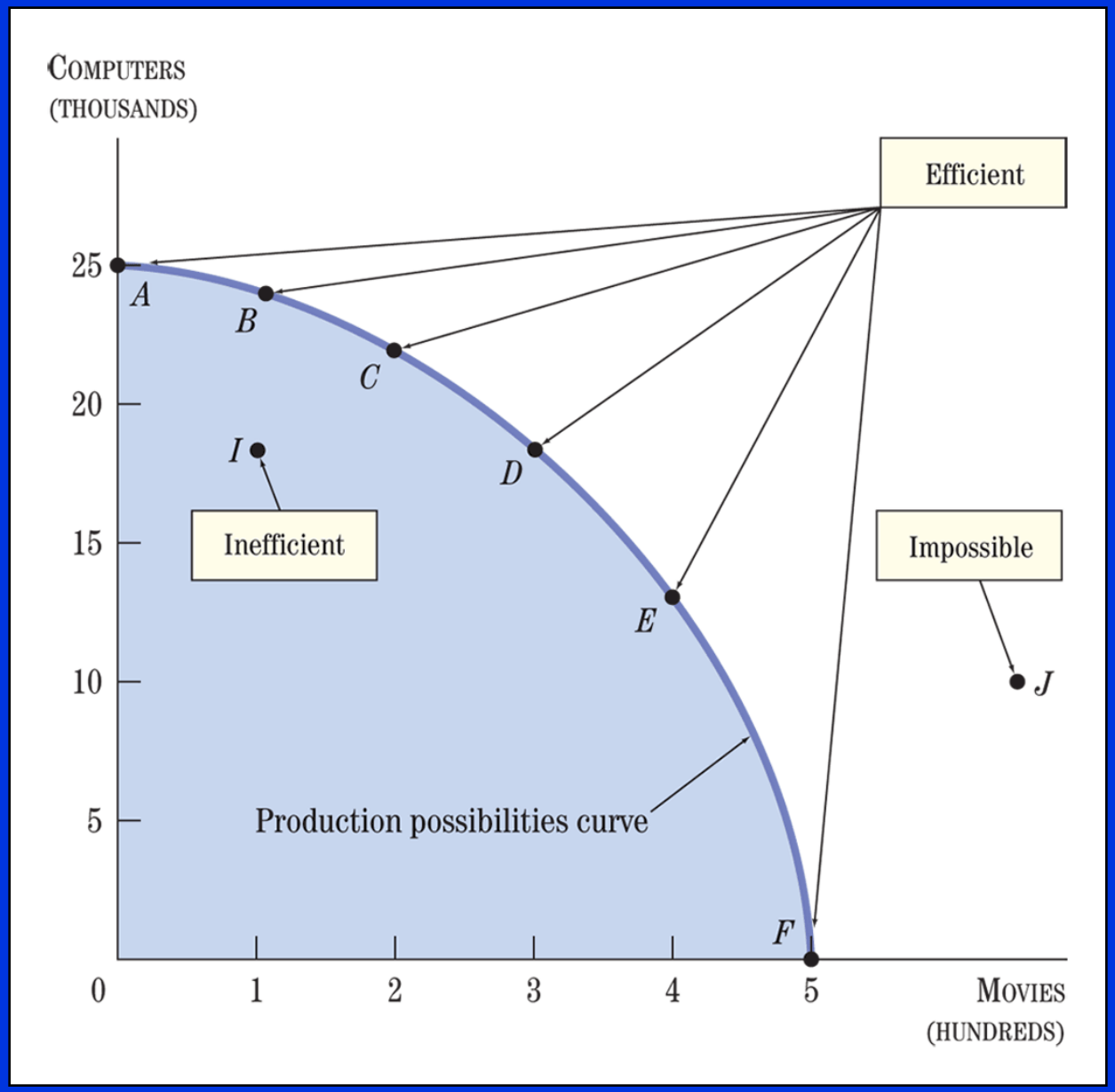
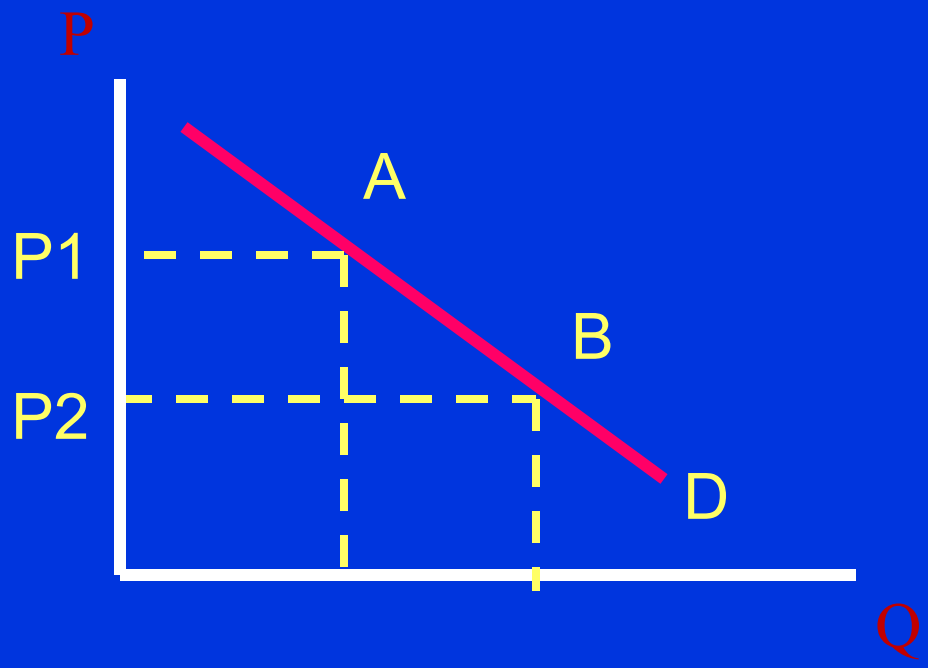




Market Economies and the Price System

- ***The Three Fundamental Economic Questions***
  - There are three essential questions or problems that every economic system must find a way to solve:
    - WHAT is to be produced?
    - HOW are these goods to be produced?
    - FOR WHOM are the goods to be produced?
  - Two Alternative Approaches to Answering the Three Fundamental Questions???

Shifts vs. Movement



Movement along the demand curve: A change in the quantity demanded of a good brought along by a change in its price. A decrease in price can be seen in the diagram above as a movement from A to B, in the same demand curve. An increase in the price is depicted as a movement from point B to A.

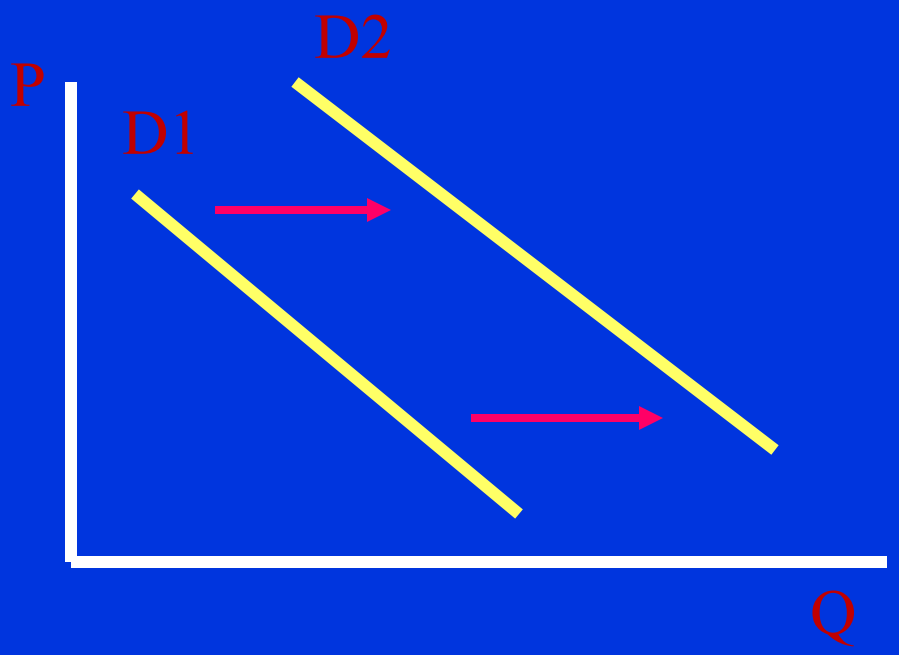
Shifts vs. Movement (cont'd)

- **A shift in demand**: a movement of the demand curve brought about by a change other than the price of the good. The demand curve can shift left (a decrease in demand) or shift right (an increase in demand).

An Increase in Demand

Possible causes

1. Greater preference
2. More population
3. Incomes increase (normal good)
4. Incomes decrease (inferior good)
5. Expected future price increase.
6. More expensive substitute
7. Less expensive complement

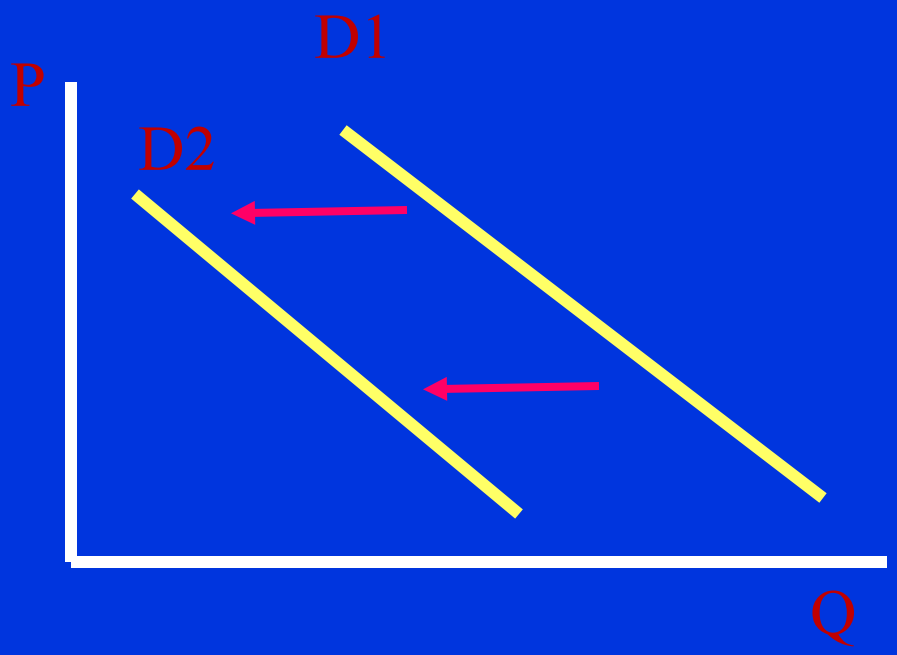


An increase in demand is illustrated as a shift in the demand curve to the right.

An Decrease in Demand

- **Possible causes**

1. Less preference
2. Less population
3. Incomes decrease (normal good)
4. Incomes increase (inferior good)
5. Expected future price decrease.
6. Less expensive substitute
7. More expensive complement



An decrease in demand is illustrated as a shift in the demand curve to the left.

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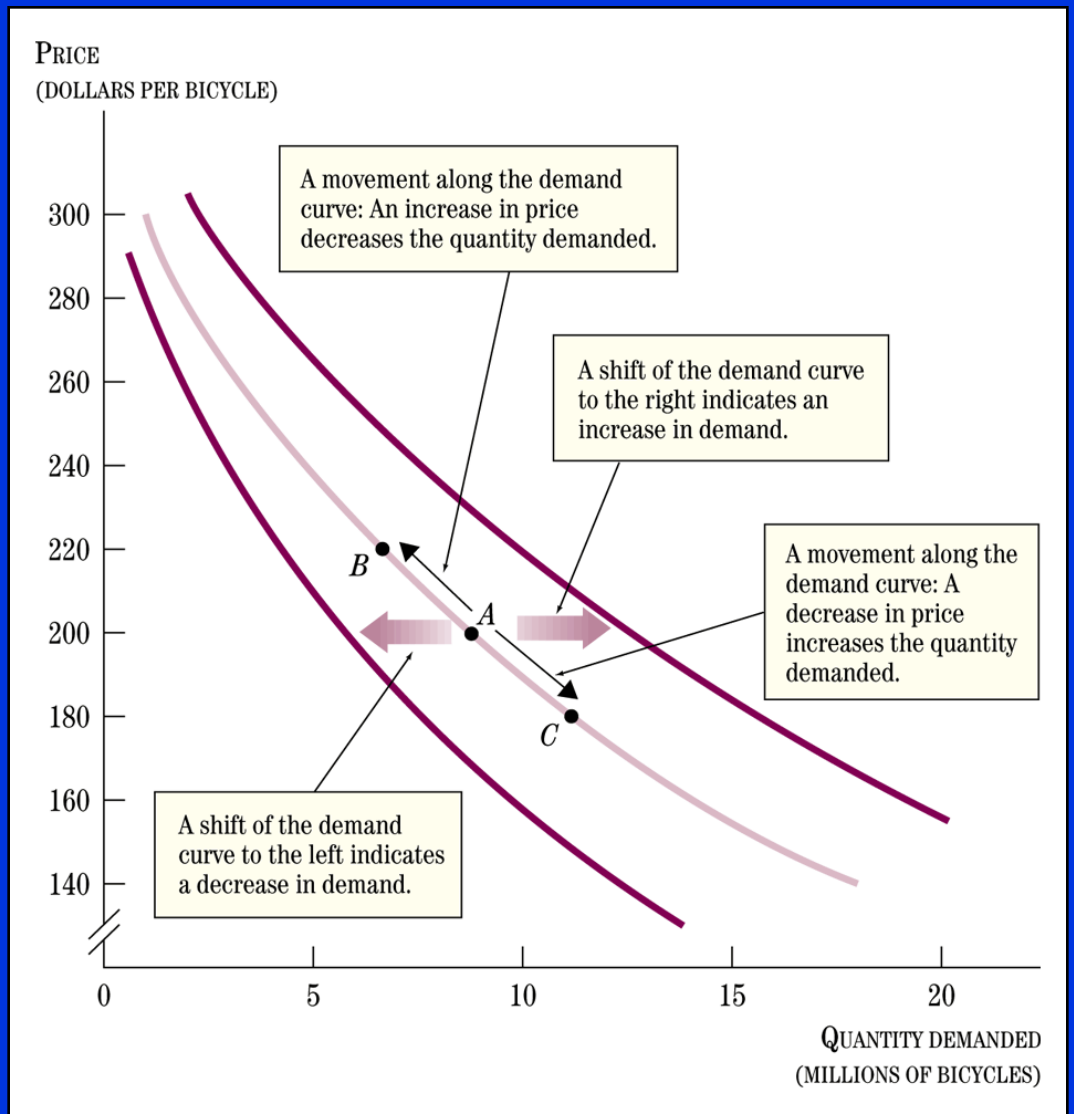
Shifts vs. Movements: Summary



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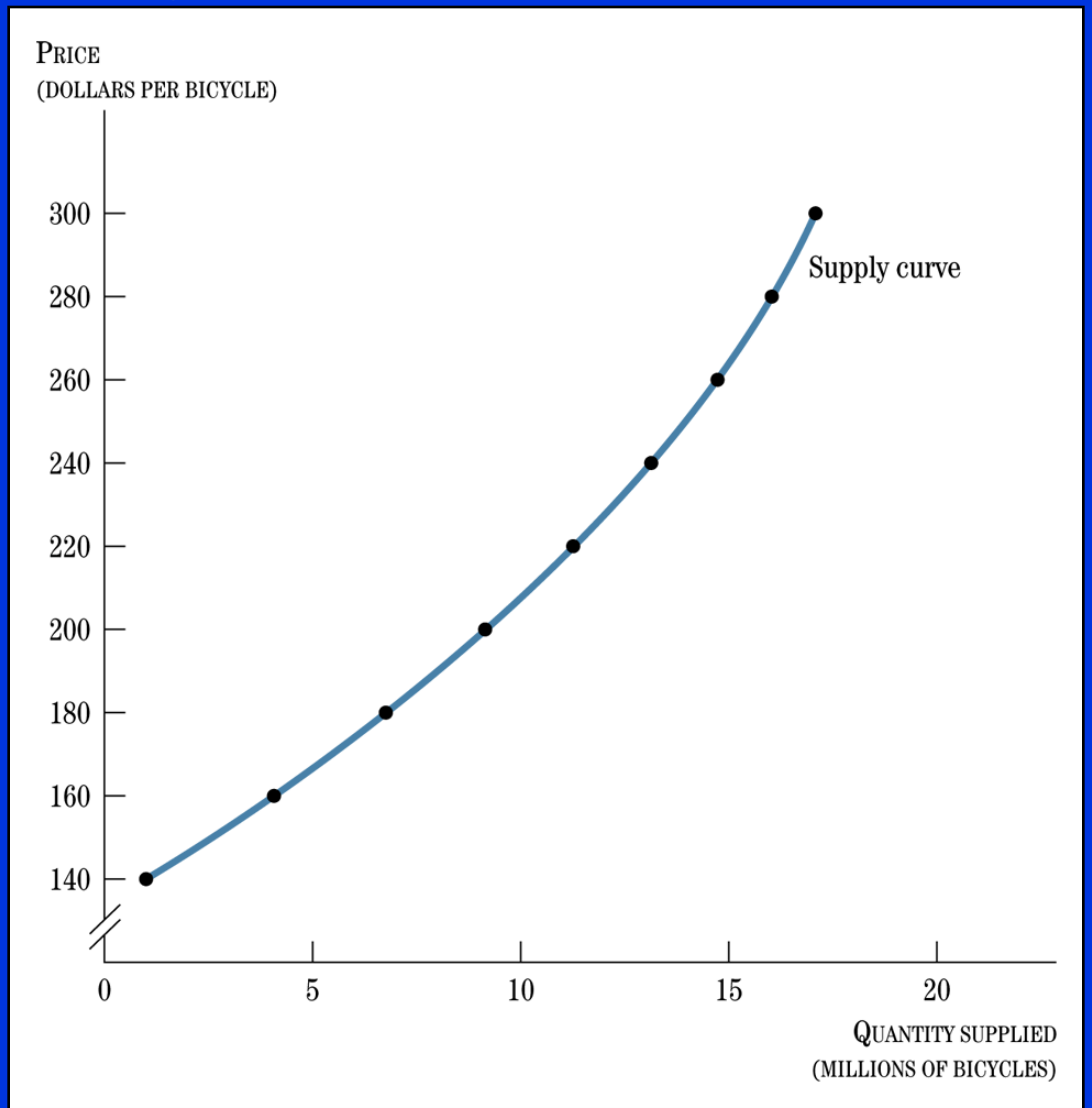
Supply Curve: an Example



The Law of Supply

- **Law of Supply**: The higher the price, the larger the quantity supplied. $↑ **S**↑ / $↓ **S**↓
- **Change in Quantity Supplied:** A change in quantity resulting from a change in the price of the good; *causes movement along supply curve.*

Supply: All Other Things Equal

- The following variables also affect the quantity supplied of a good, and are held constant when analyzing the law of supply.
  1. Technology
  2. The price of goods used as an input in production
  3. Number of firms in the market
  4. Seller's expectations of future prices
  5. Government taxes, subsidies and regulations

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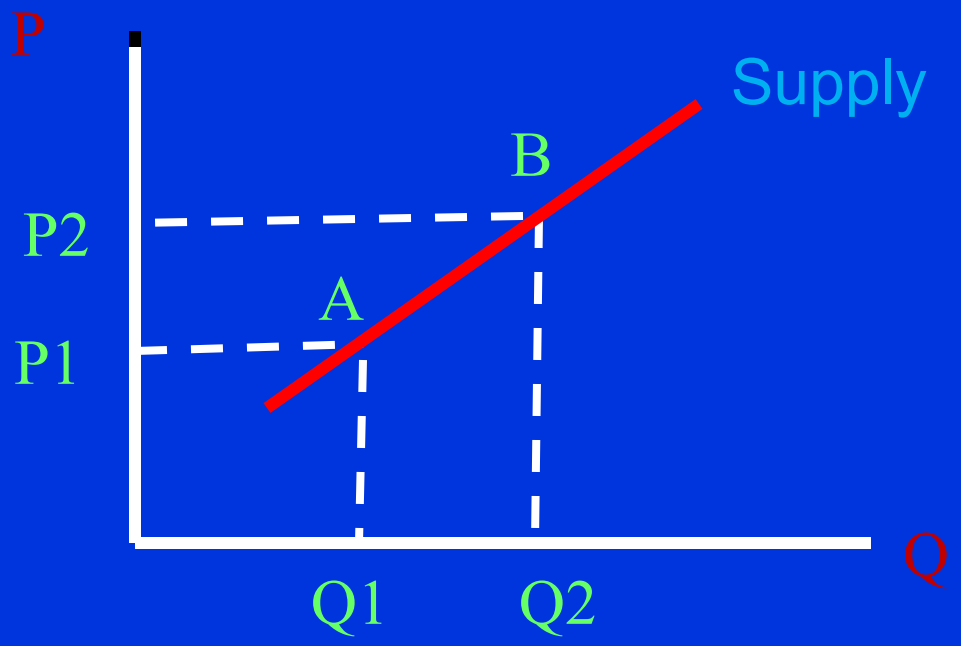
Shifts vs. Movement

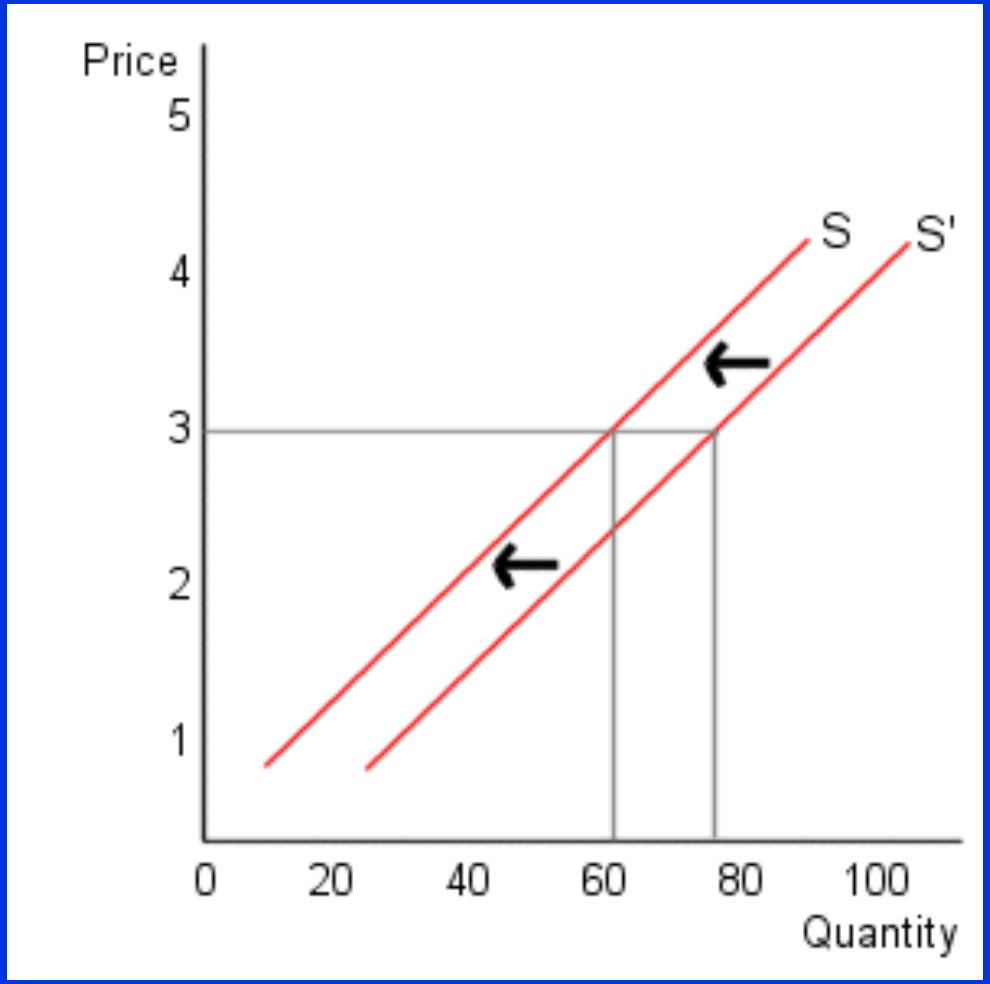


- **Movement along the supply curve:** A change in the quantity supplied of a good brought along by a change in its price. An increase in price can be seen in the diagram above as a movement from A to B, in the same supply curve. A decrease in the price is depicted as a movement from point B to A.

An Increase in Supply

Possible causes

1. Better technology
2. Less expensive inputs
3. More firms
4. A lower expected price in the future
5. More subsidies or less taxes

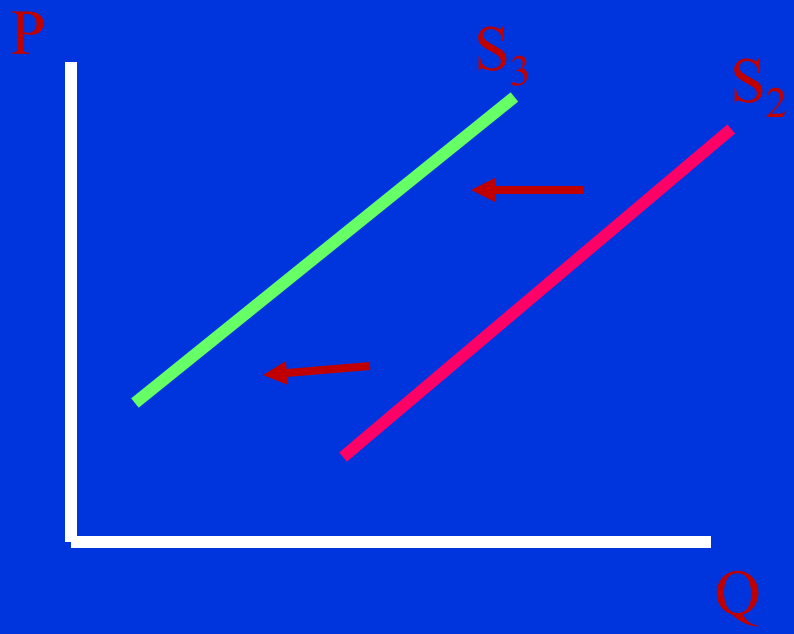


An increase in supply is illustrated as a shift in the supply curve to the right.

A Decrease in Supply

Possible causes

1. Deteriorating technology
2. More expensive inputs
3. Fewer firms
4. A higher expected price in the future
5. Less subsidies or more taxes



An decrease in supply is illustrated as a shift in the supply curve to the left.

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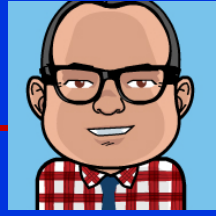
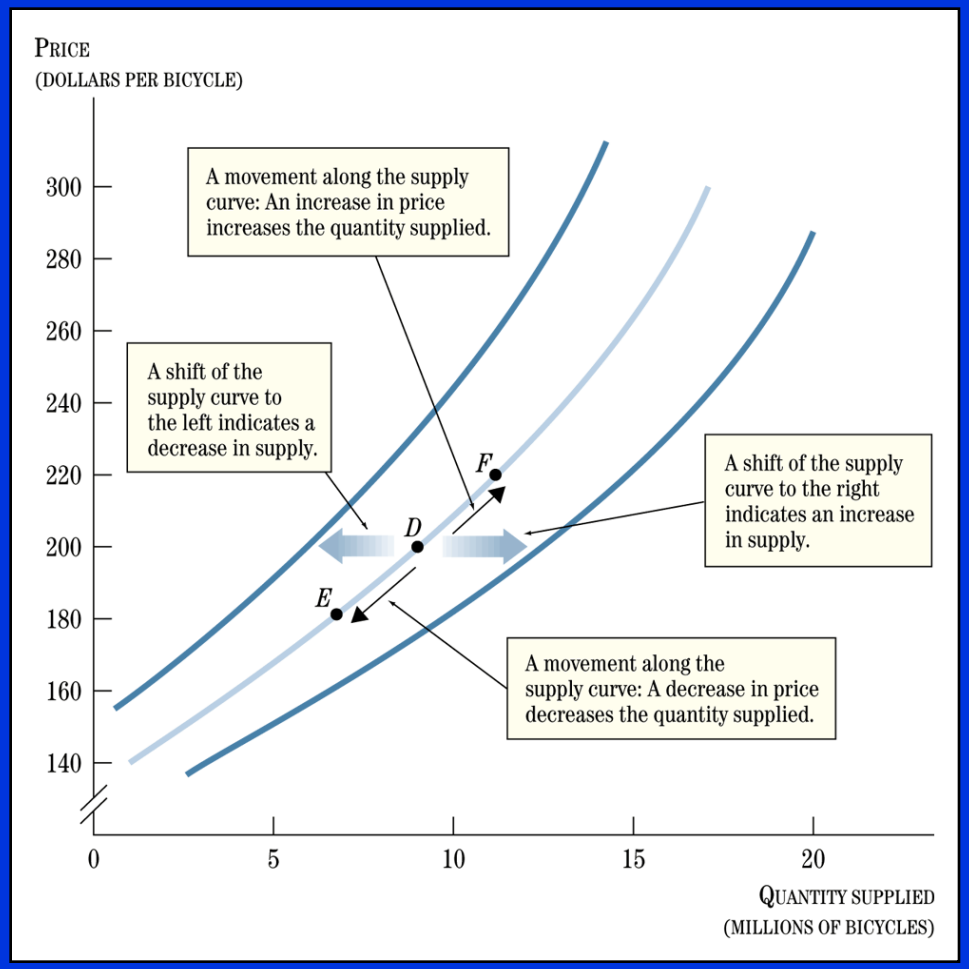


Movements Vs. Shifts: Summary

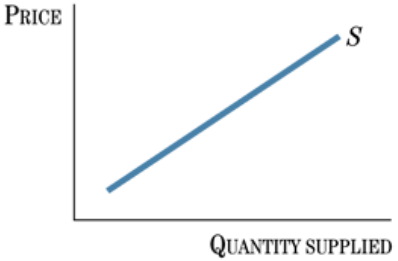


Supply and Demand: A Review

SUPPLY

Supply describes firms.

The supply curve looks like this:



Law of Supply

Price and quantity supplied are positively related.

Movements along supply curve occur

when price rises and quantity supplied rises
or
when price falls and quantity supplied falls.

Shifts in supply are due to:

Technology (new inventions)

Number of firms in market

Price of goods used in production (inputs such as fertilizer, labor)

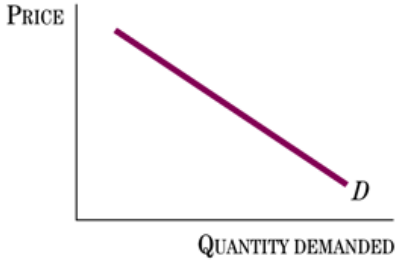
Expectations of future prices (firms will sell less now if prices are expected to rise; for example, farmers may store goods to sell next year)

Government taxes, subsidies, regulations (commodity taxes, agricultural subsidies, safety regulations)

DEMAND

Demand describes consumers.

The demand curve looks like this:



Law of Demand

Price and quantity demanded are negatively related.

Movements along demand curve occur

when price rises and quantity demanded falls
or
when price falls and quantity demanded rises.

Shifts in demand are due to:

Preferences (nice weather or fitness craze changes tastes)

Number of consumers in market

Consumers' information (about cholesterol or smoking, for example)

Consumers' income (normal goods versus inferior goods)

Expectations of future prices (consumers will buy more now if prices are expected to rise in the future)

Price of related goods (both substitutes, like butter and margarine, and complements, like coffee and sugar)

Market Not in Equilibrium

- Shortage (excess demand): A situation in which the quantity demanded is greater than the quantity supplied. This occurs when the price in the market is below the equilibrium price.
- Surplus (excess supply): A situation in which the quantity supplied is greater than the quantity demanded. This occurs when the current price in the market is above the equilibrium price.

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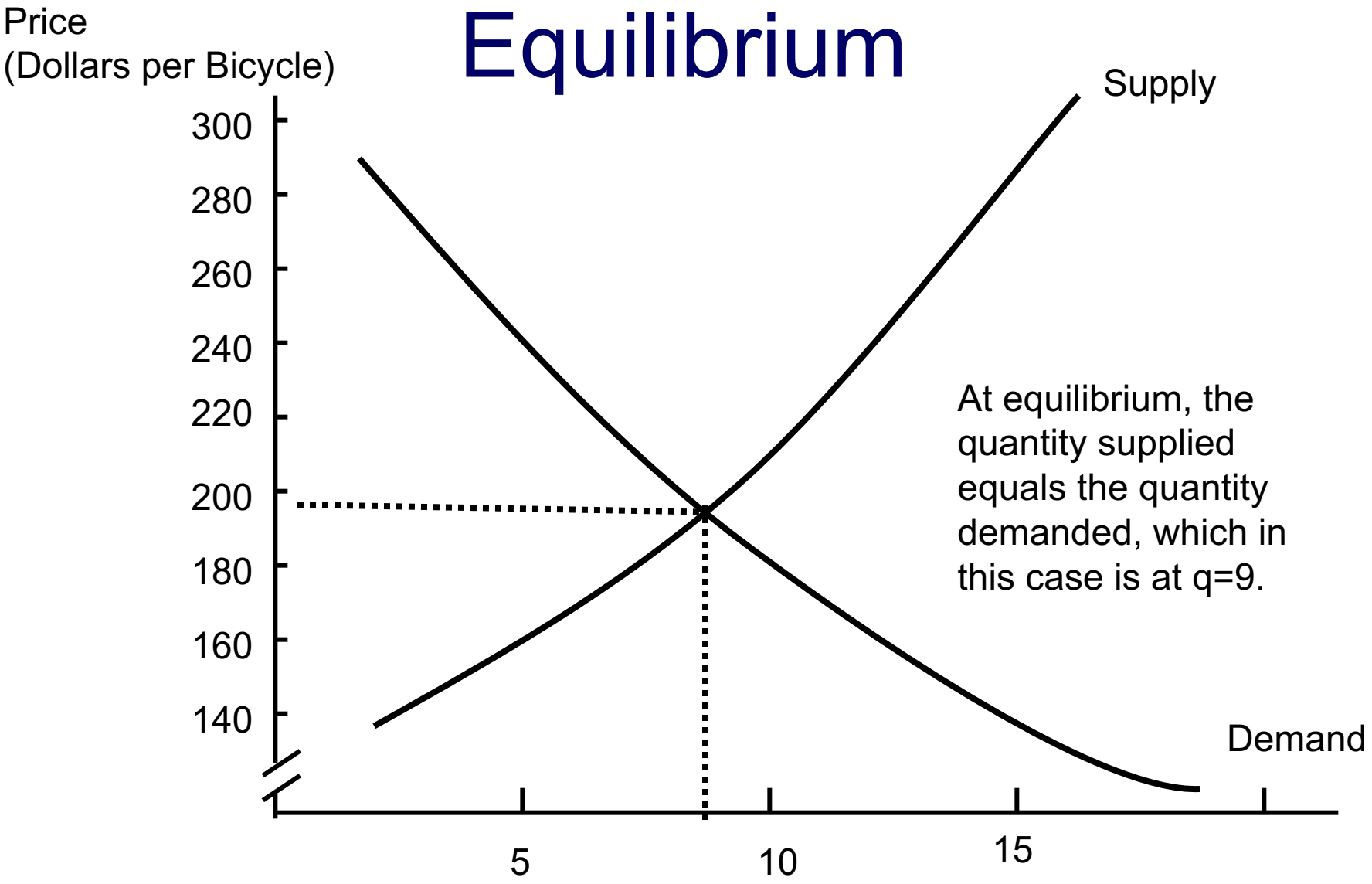
Equilibrium



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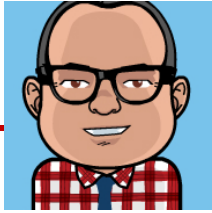
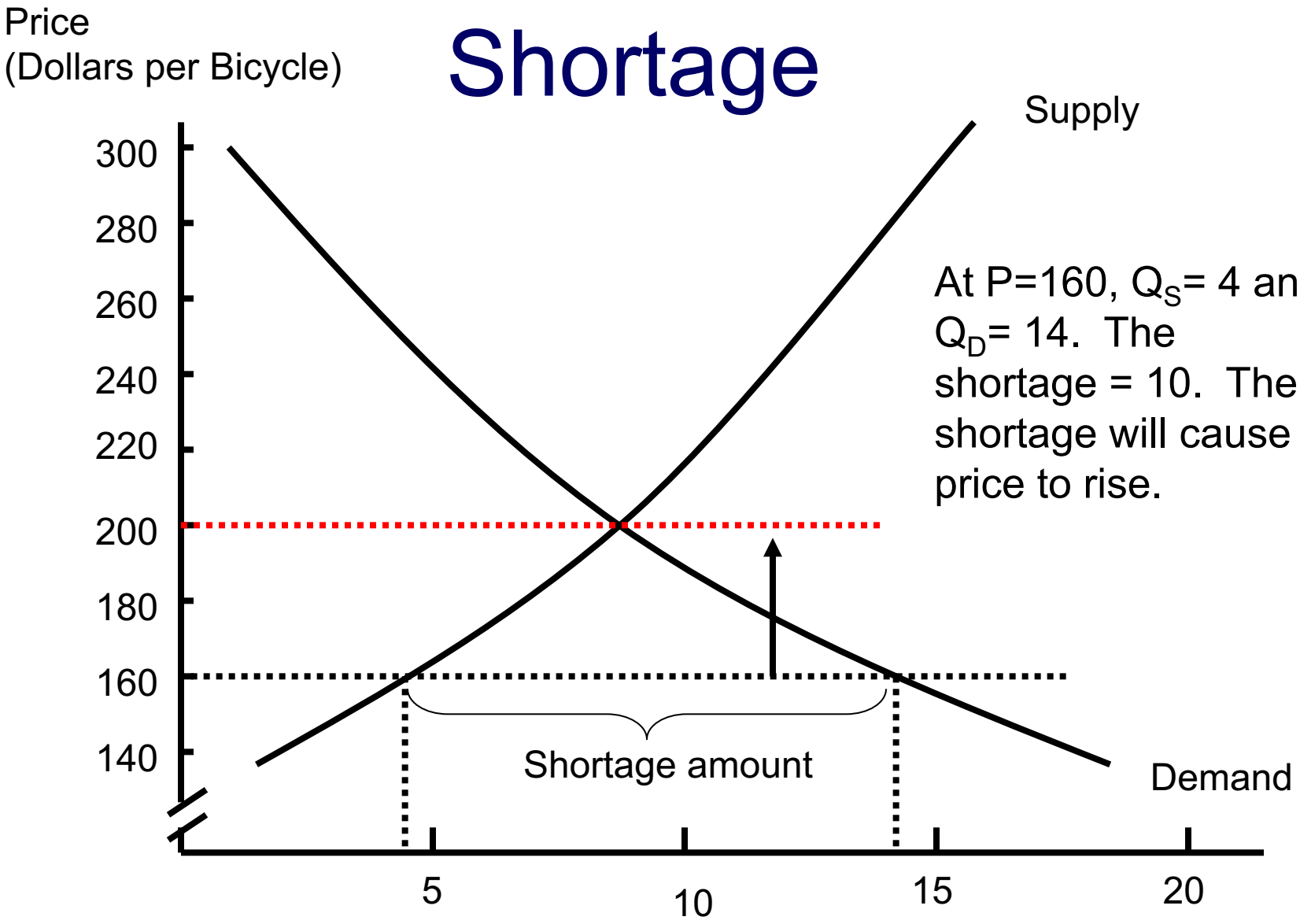
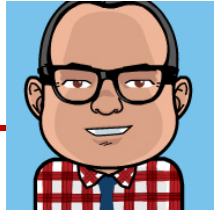


Shortage



At P=160, Q_S= 4 and Q_D= 14. The shortage = 10. The shortage will cause the price to rise.



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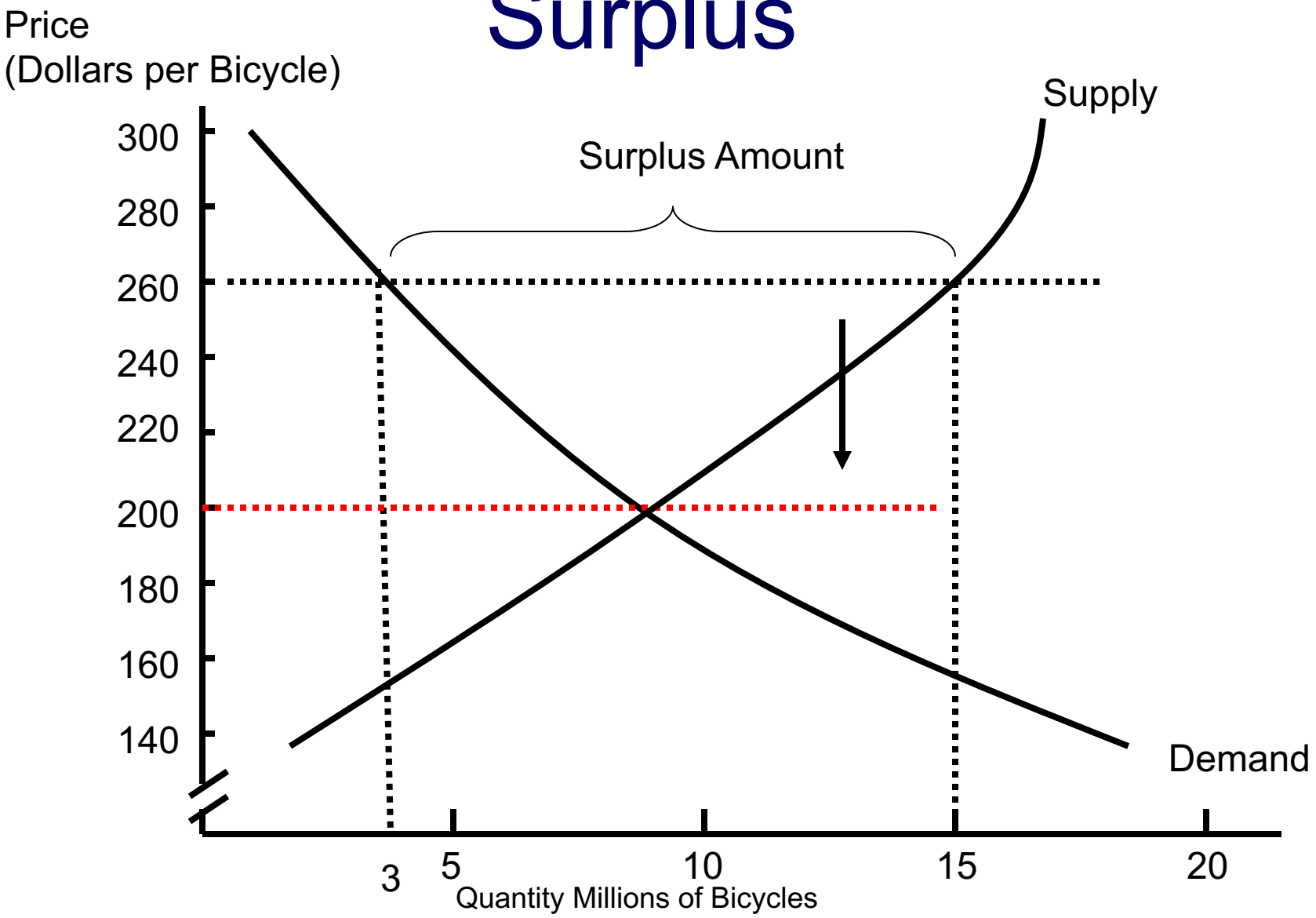
Surplus



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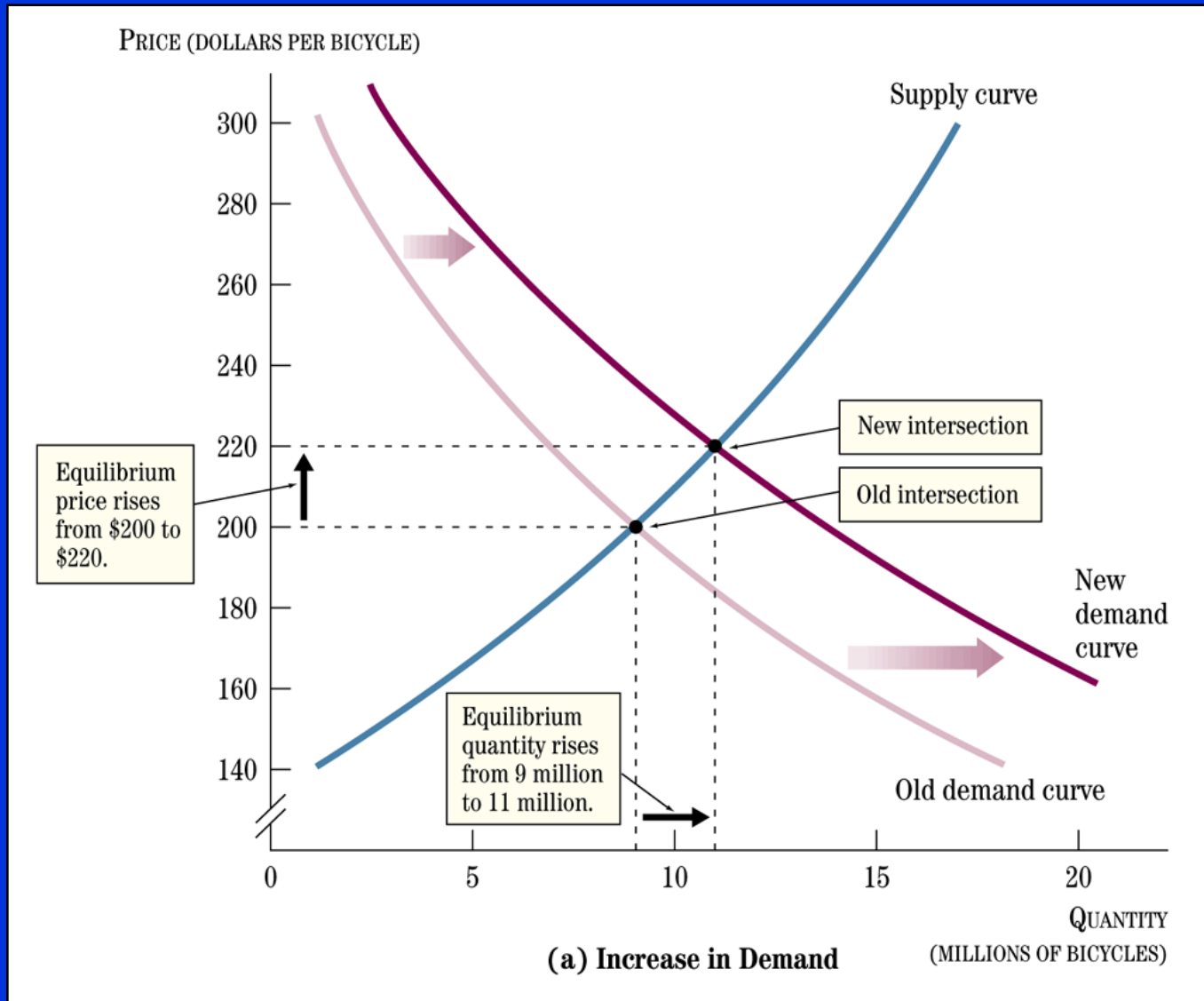
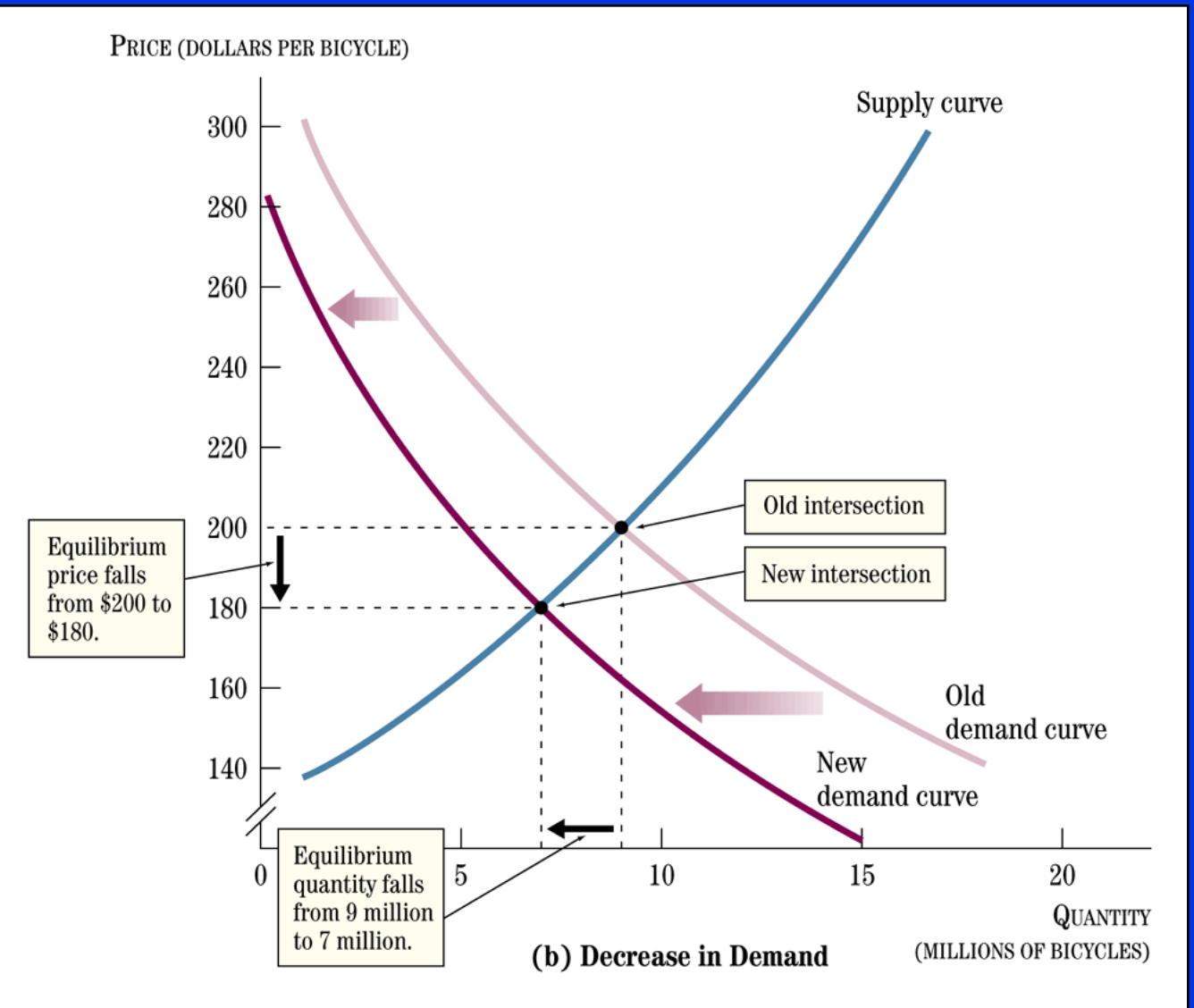
Effects of an Increase in Demand

An increase in demand will shift the demand curve to the right, resulting in a higher equilibrium price and quantity.



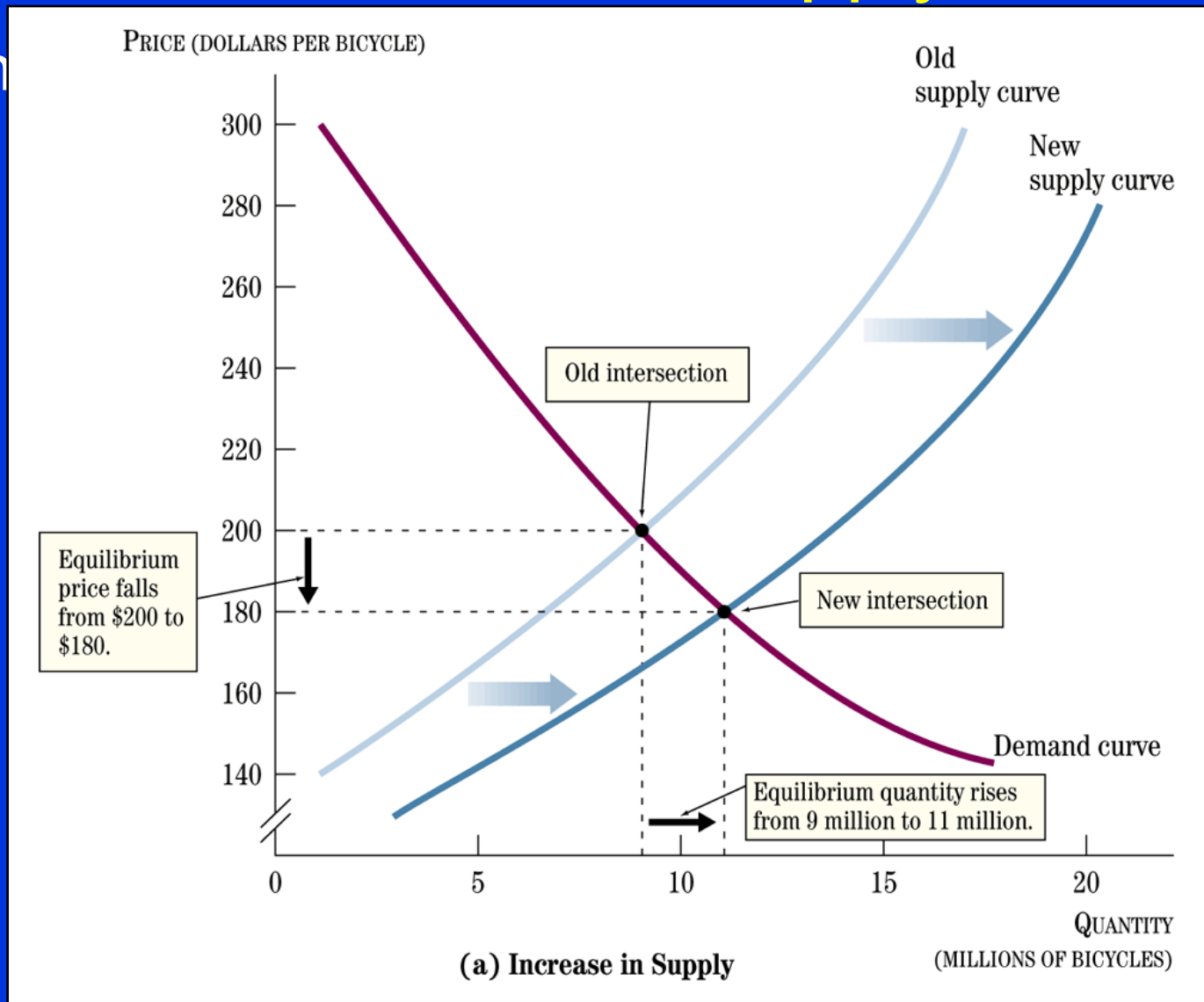
Effects of a Decrease in Demand



- A decrease in demand will shift the demand curve to the left, resulting in a lower equilibrium price and quantity.

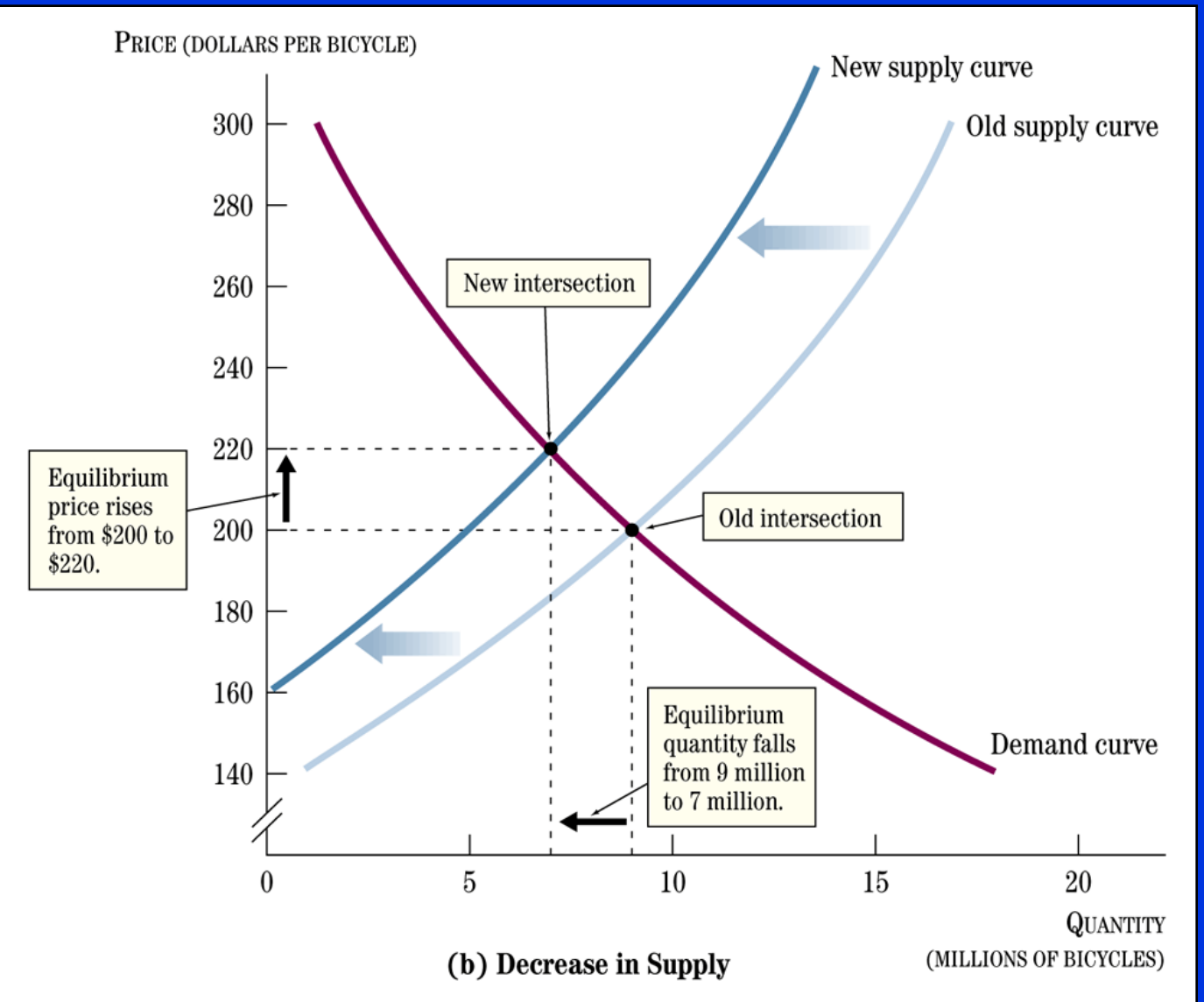
Effects of an Increase in Supply

An increase in supply will shift the supply curve to the right, resulting in a lower equilibrium price and a higher equilibrium quantity.



(a) Increase in Supply

Effects of a Decrease in Supply



(b) Decrease in Supply

A decrease in supply will shift the supply curve to the left, resulting in a higher equilibrium price and a lower equilibrium quantity.

Interference with Market Prices

- So far, our analysis of supply and demand involves situations where the equilibrium can be reached. In this section, we will analyze the effects of price controls on the market. The two types of government price controls are:
  1) Price Ceilings
  2) Price Floors

Interference with Market Prices

- Price Control: A government law or regulation that sets or limits the price to be charged for a particular good

- Maximum Price Laws/Price Ceiling: A government price control that sets the maximum allowable price for a good

- Minimum Price Laws/ Price Floor: A government price control that sets the minimum allowable price for a good

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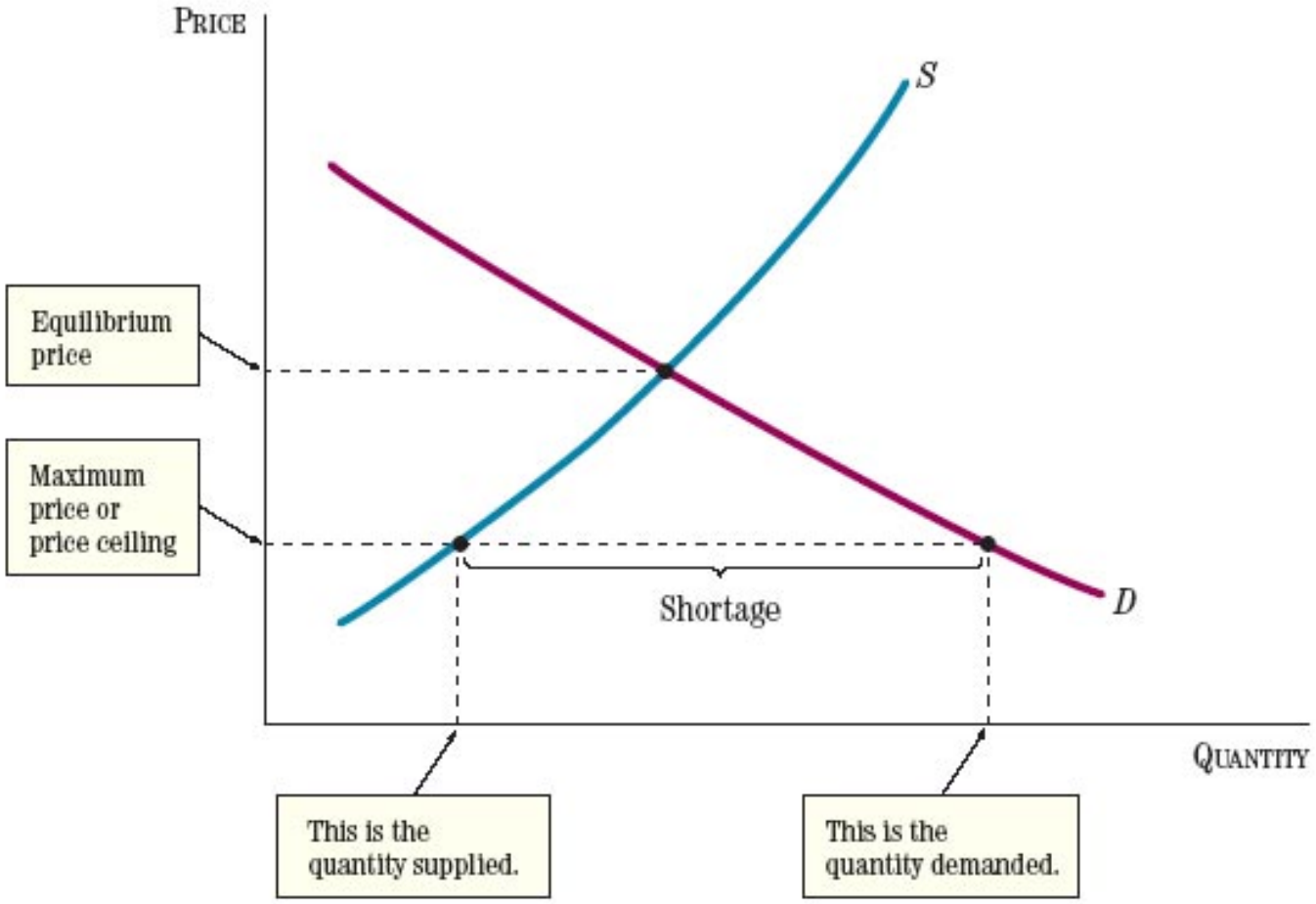
Maximum Price Law

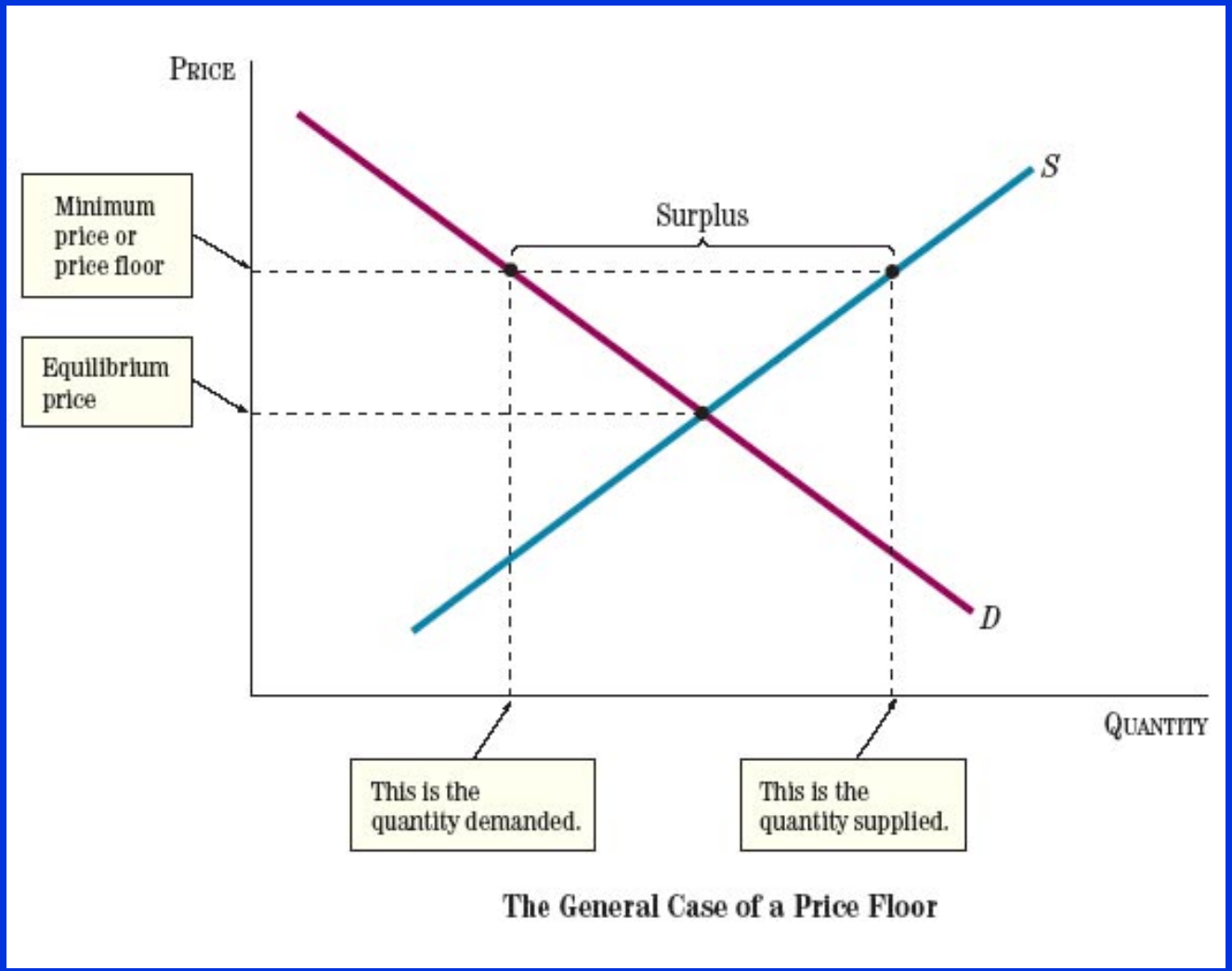


The General Case of a Price Ceiling

Minimum Price Law

- Since most minimum price laws (price floors) are imposed above the equilibrium price, quantity supplied is greater than quantity demanded, resulting in a surplus. There is pressure for prices to fall into the illegal region in the next figure, but the price floor prevents this. The surplus will persist unless demand increases or supply decreases enough to bring the equilibrium above the maximum price (P*).
- Note: a minimum price below the equilibrium price will bring the market into equilibrium.

Minimum Price Law (cont'd)



The General Case of a Price Floor

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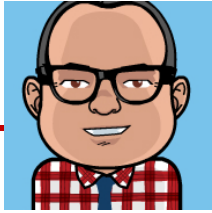

elasticity

- Elastic Demand: when E_d is greater than 1
- Inelastic Demand: when E_d is less than 1
- Unit Elasticity: when E_d is 1

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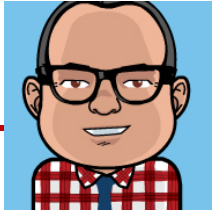
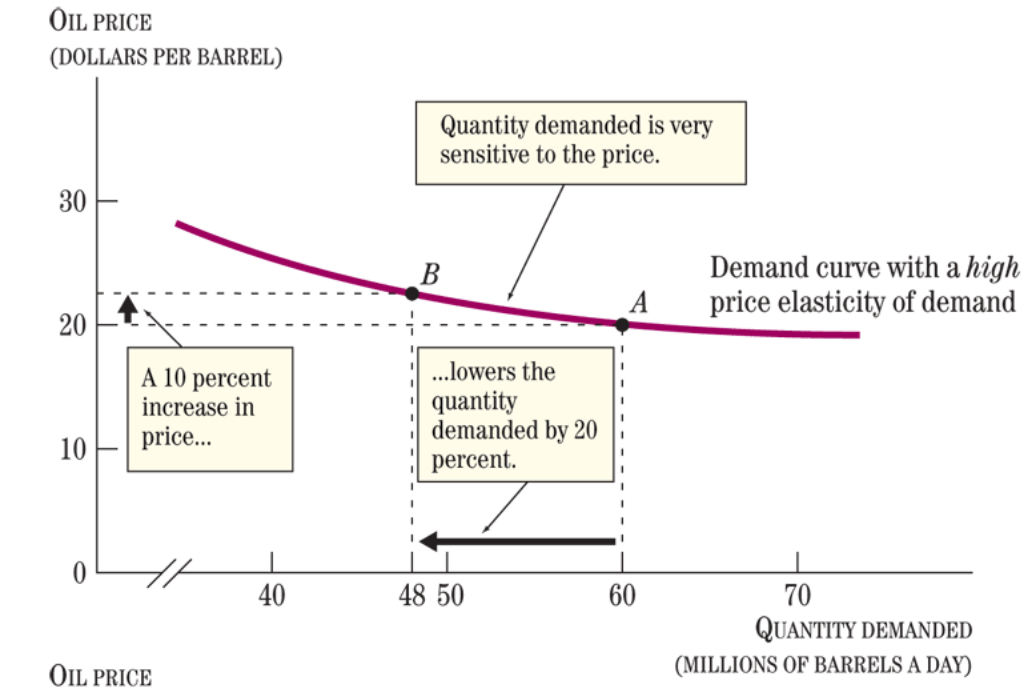


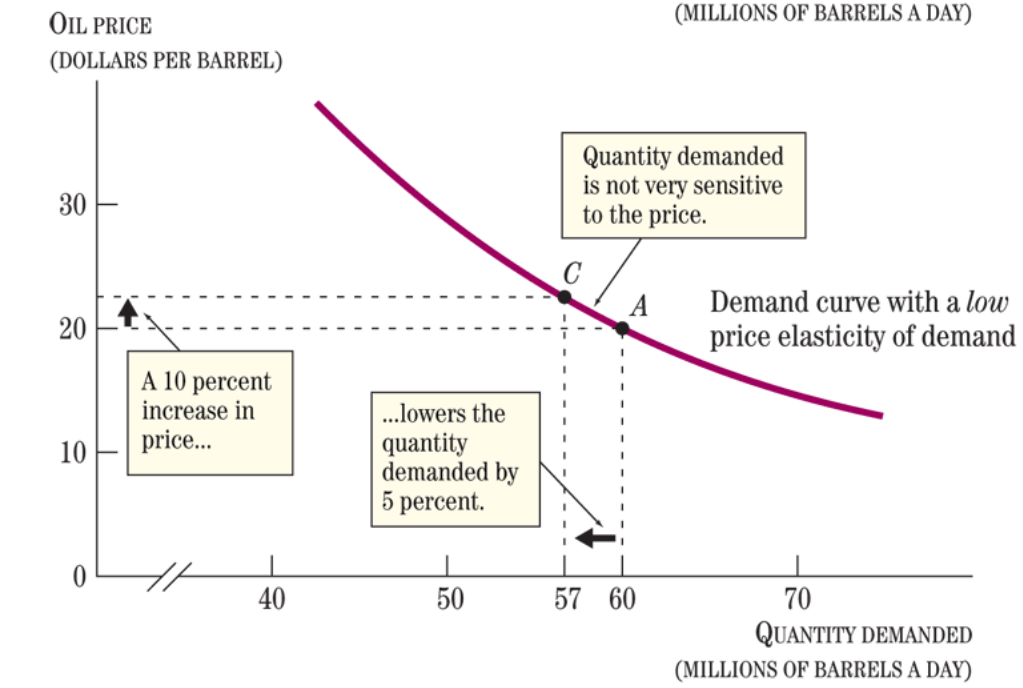
Elasticity of Demand

- **Price elasticity of demand** - the percentage change in the quantity demanded of a good divided by the percentage of the price of that good. It is a measure of the sensitivity of the quantity demanded or changes in the price of the good.

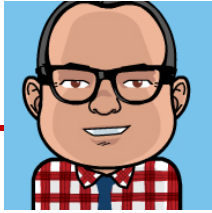
Price Elasticity of Demand

$$= \frac{percentage\_change\_in\_quantity\_demanded}{percentage\_change\_in\_price}$$



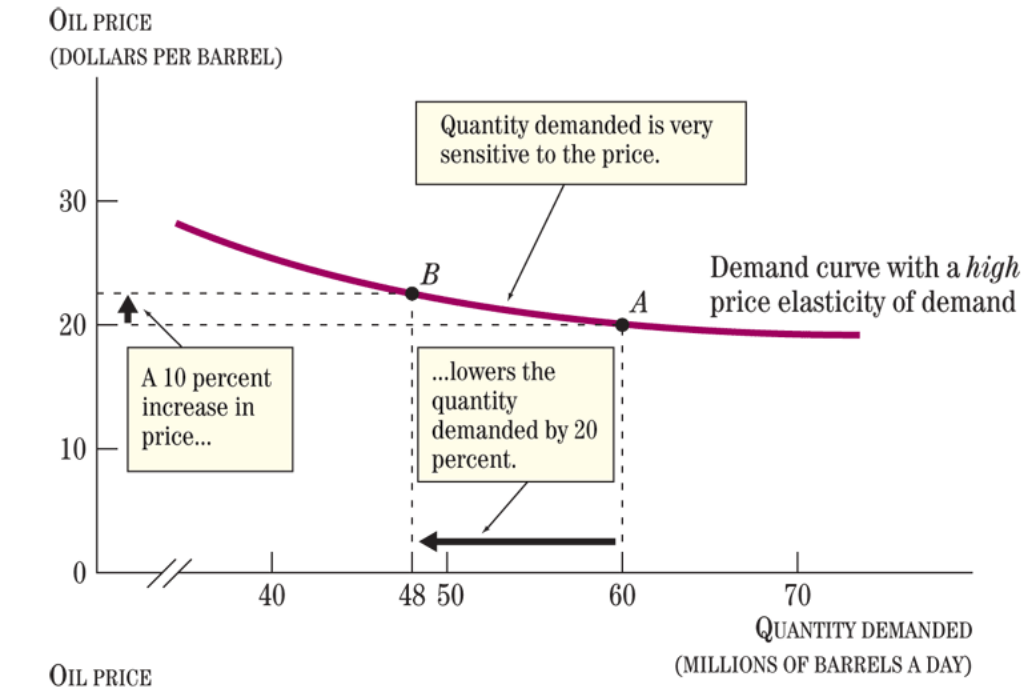


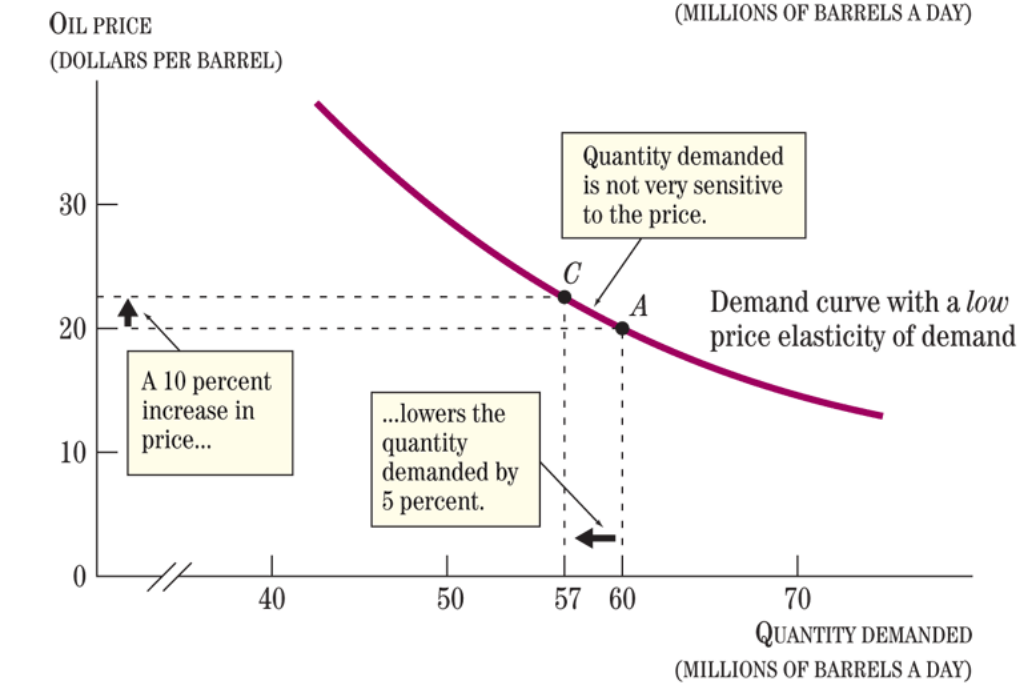
High Elasticity vs. Low Elasticity



High Elasticity vs. Low Elasticity

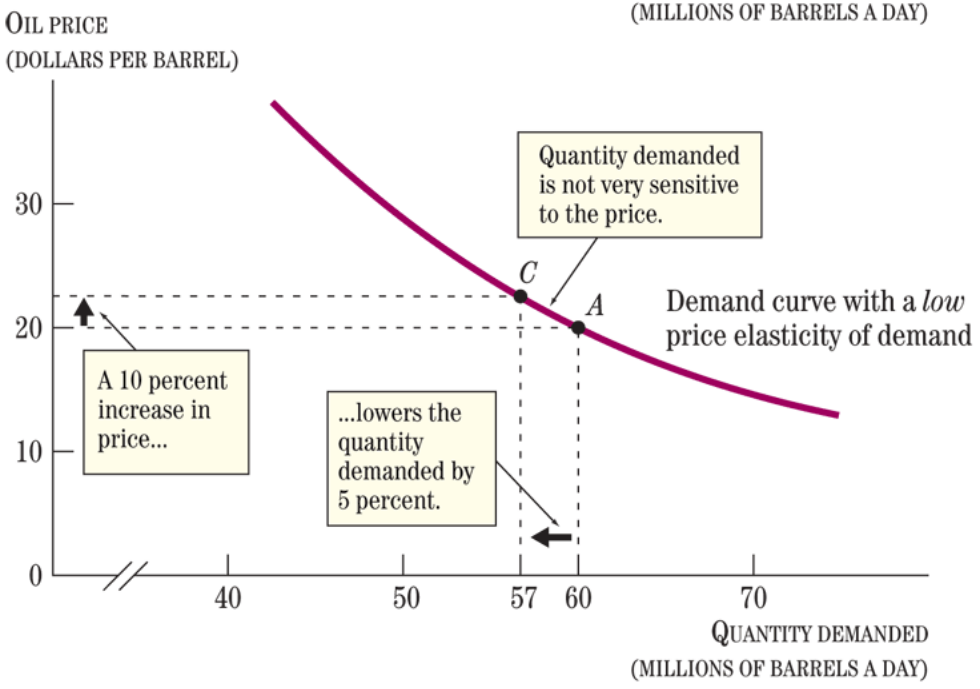
- The graph depicts two demand curves, one with high elasticity and another with low elasticity. The graph on the top shows a demand curve with a high price elasticity of demand, since a small increase in the price (10 percent, from $20 to $22) results in a large decrease in the quantity demanded (20 percent, from 60 million barrels to 48 million barrels), or:

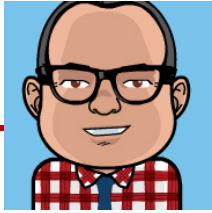




High Elasticity vs. Low Elasticity

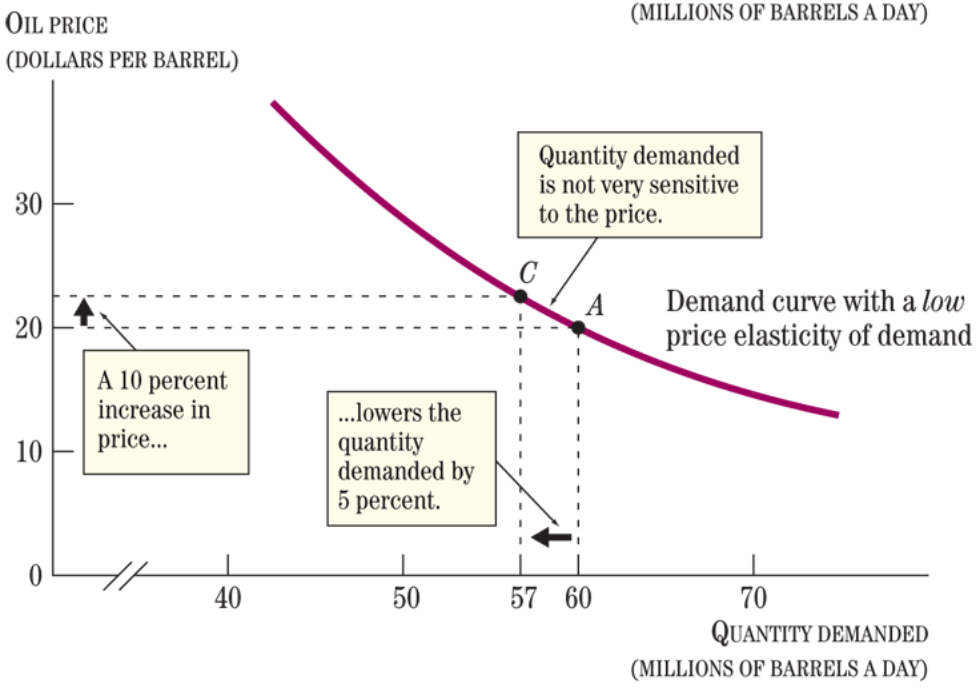
High Elasticity vs. Low Elasticity

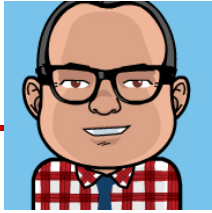




- The bottom graph shows a demand curve with a lower price elasticity of demand. For the same price increase (10 percent, from $20 to $22), the decrease in the quantity demanded is much smaller (5 percent, from 60 million barrels to 57 million barrels), or:

High Elasticity vs. Low Elasticity

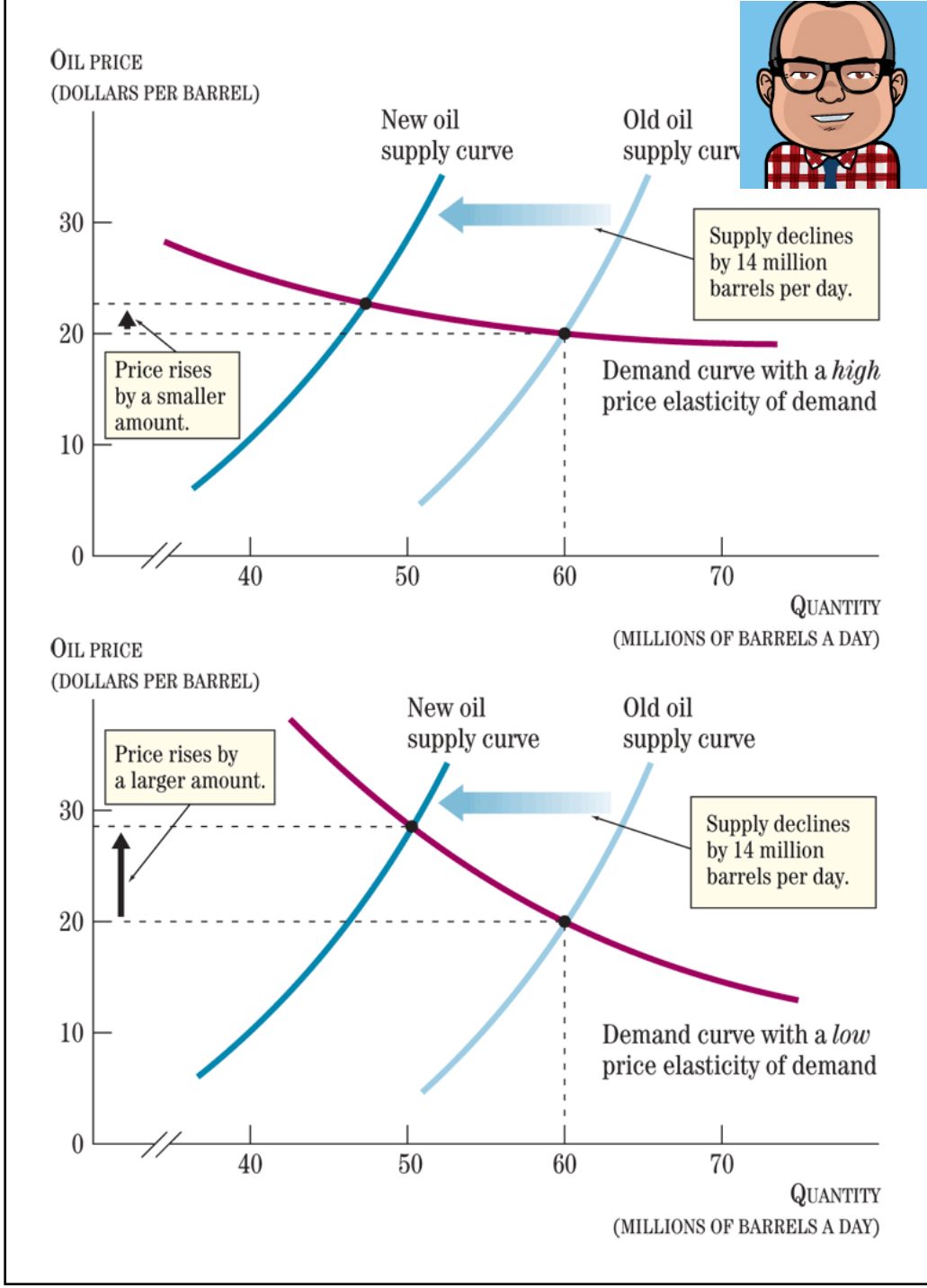




Impact of a Price Change in Oil

- One application of knowing the price elasticity of demand is in analyzing the impact of a change in supply of a good. The next graph analyzes the effect of an decrease in the supply of oil on the equilibrium price of oil.

Impact of a Price Change in Oil



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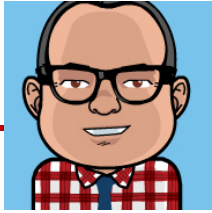
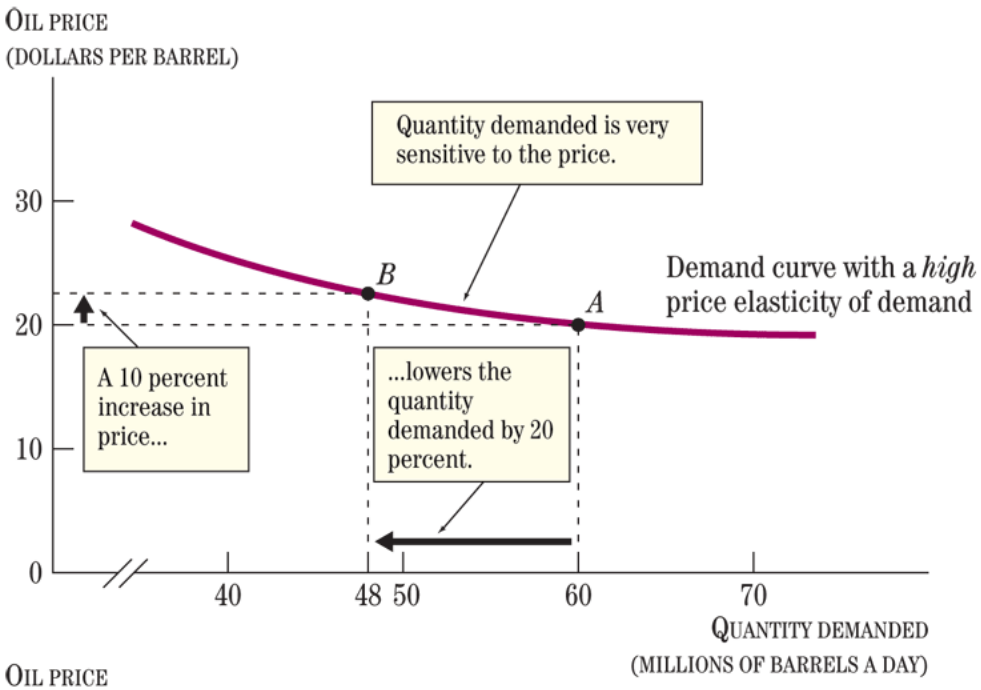
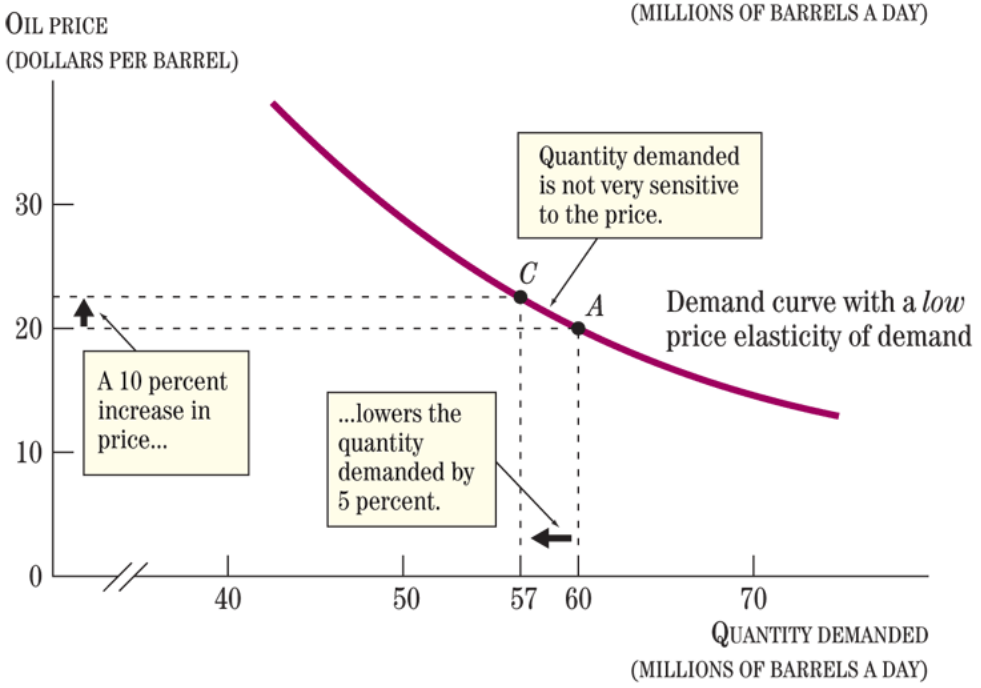
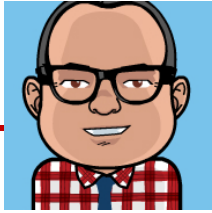


Impact of a Price Change in Oil

- The same shift in the supply of oil to the right results in a higher equilibrium price in the bottom graph, where the demand curve has a lower price elasticity, than in the top graph, which has a higher price elasticity.


OIL PRICE
(DOLLARS PER BARREL)
Quantity demanded is very sensitive to the price.
30
20
10
0
B
A
Demand curve with a *high* price elasticity of demand
A 10 percent increase in price...
...lowers the quantity demanded by 20 percent.
40
48
50
60
70
QUANTITY DEMANDED
(MILLIONS OF BARRELS A DAY)


OIL PRICE
(DOLLARS PER BARREL)
Quantity demanded is not very sensitive to the price.
30
20
10
0
C
A
Demand curve with a *low* price elasticity of demand
A 10 percent increase in price...
...lowers the quantity demanded by 5 percent.
40
50
57
60
70
QUANTITY DEMANDED
(MILLIONS OF BARRELS A DAY)



Elastic vs. Inelastic Demand

- Elastic demand - Demand (or part of the demand curve) where the price elasticity is greater than one.

- Unit Elastic demand - Demand (or part of the demand curve) where the price elasticity is exactly equal to one.

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Elastic vs. Inelastic Demand

- Perfectly inelastic demand - Demand (or part of the demand curve) where the price elasticity is zero, indicating no response to a change in price. A perfectly inelastic demand curve is a vertical line.

- Perfectly elastic demand - Demand (or part of the demand curve) where the price elasticity is infinite, indicating an infinite response to a change in price. A perfectly elastic demand curve is a horizontal line.

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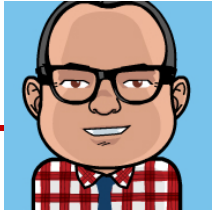
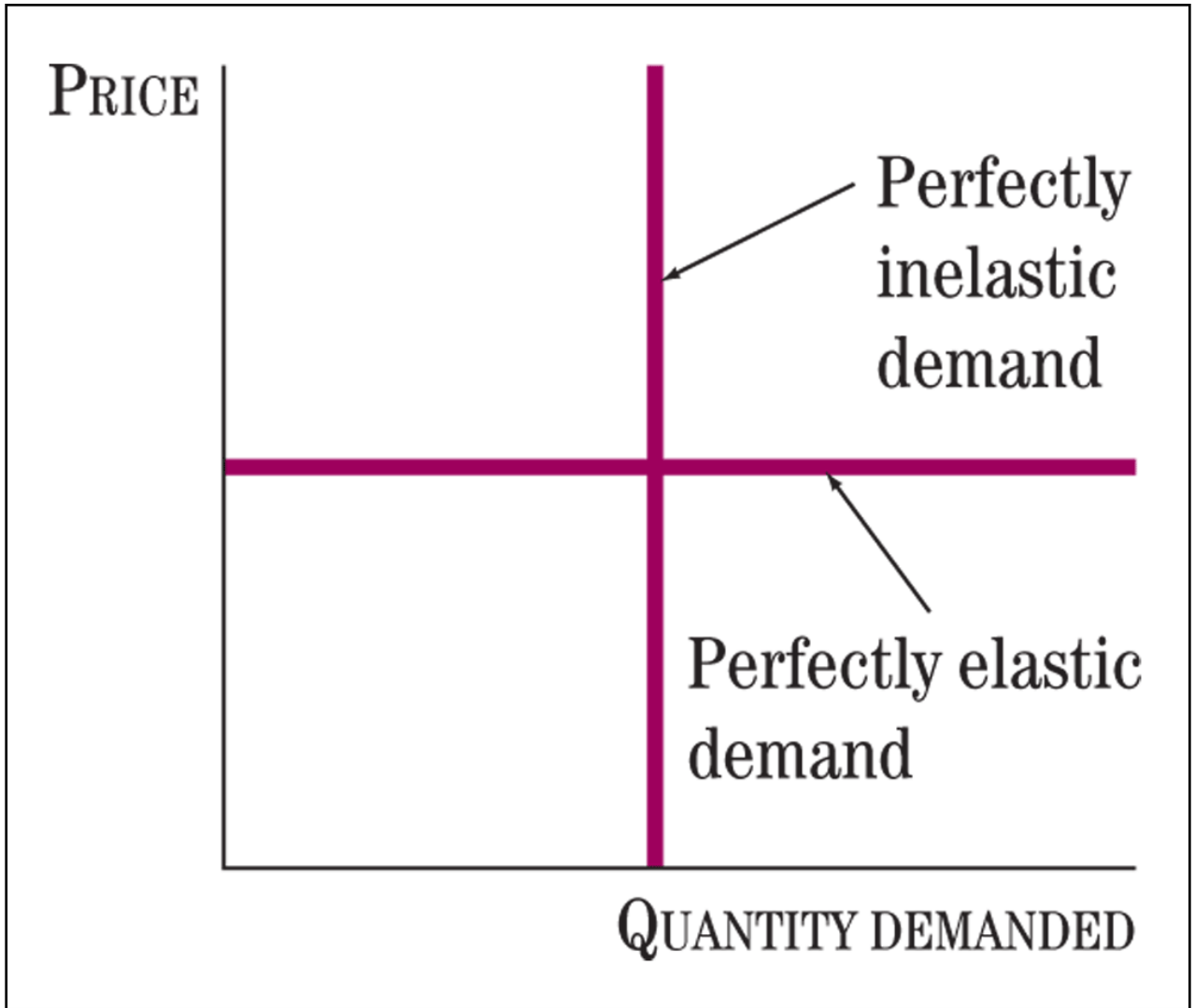
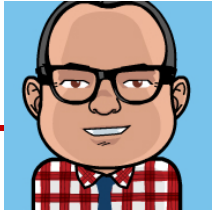


Elastic vs. Inelastic Demand





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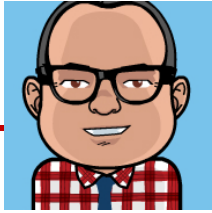
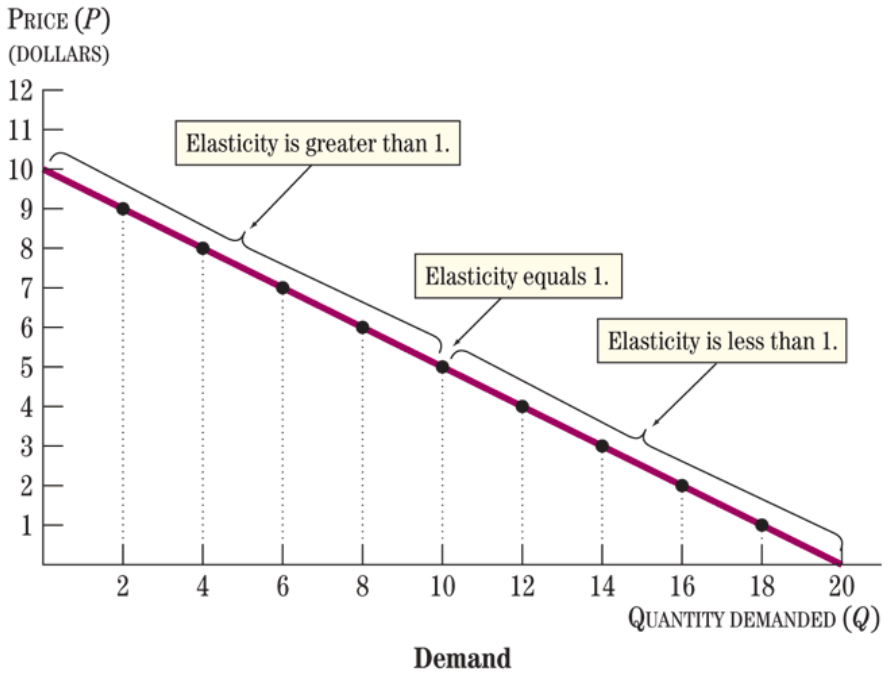
Revenue and the Price Elasticity of Demand

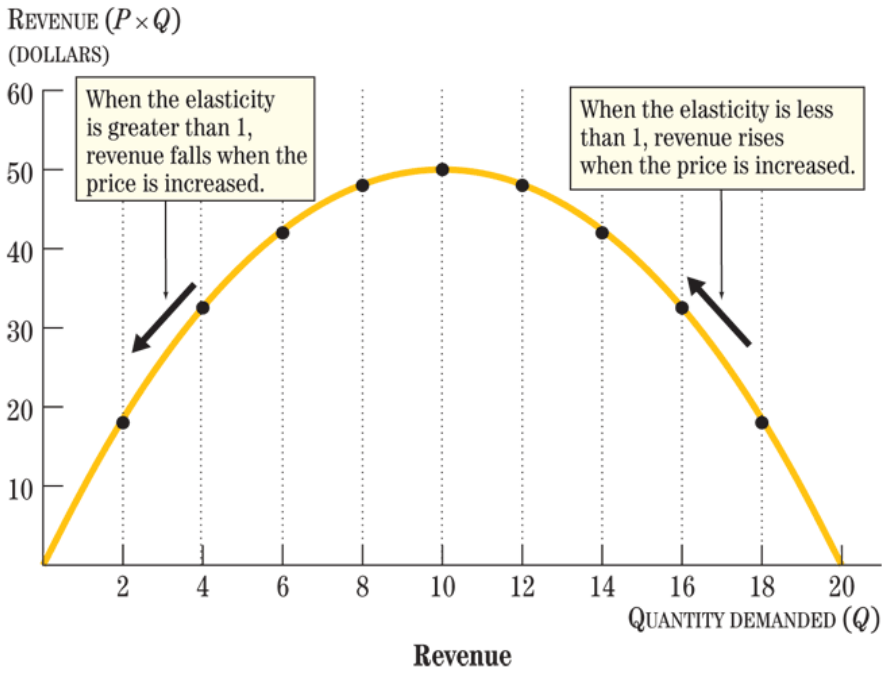
- In some situations, increasing the price will increase revenue if the effect of the increase in price on revenue is greater than the effect of the drop in quantity on revenue. If the effect of the increase in price on revenue is less than the effect of the drop in quantity on revenue, then raising prices may reduce revenue.
- Note: Our discussion focuses on revenue, not profits. Higher revenues may not always lead to an increase in profits.



- The graph illustrates two related points. The top graph shows that with a straight line demand curve, elasticity is not constant. Specifically, points on the demand curve above the midpoint have price elasticities greater than one, and are elastic. Points on the demand curve below the midpoint have price elasticities less than one, and are inelastic.

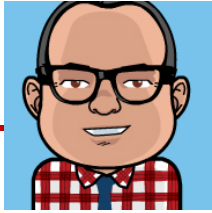


Demand

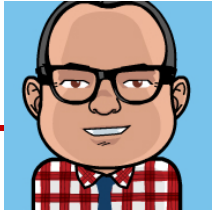


Revenue

Revenue and the Price Elasticity of Demand



- The bottom graph on the previous figure shows that the revenue that a firm receives is not constant. At the midpoint of the demand curve, the revenue that a firm expects is highest. Any quantity to the left or to the right of the midpoint of the demand curve yields a lower total revenue.



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Revenue and the Price Elasticity of Demand

- Putting the top graph in the previous figure together with the bottom graph, we can see that if the calculated (absolute) value of the price elasticity of demand is greater than one, the demand curve is elastic, and lowering the price will yield a higher revenue. If the calculated (absolute) value of the price elasticity of demand is less than one, the demand curve is inelastic, and raising the price will yield a higher revenue.

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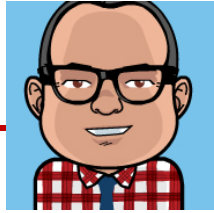
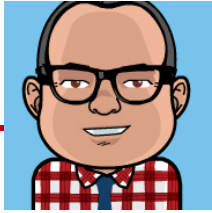


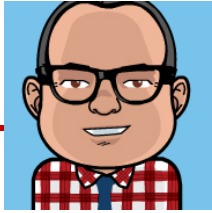
What Determines the Size of the Price Elasticity of Demand?

- Determinants of the Price Elasticity of Demand
  1) Degree of substitutability
  2) Big-ticket vs. little-ticket Items
  3) Temporary vs. permanent price change
  4) Differences in preferences
  5) Long run vs. Short run elasticity



Long Run vs. Short Run

- The length of time elapsed since a price change affects the price elasticity of demand. For example, if the price of gasoline rises, the price elasticity of demand for gasoline may be lower for SUV owners in the short run (just immediately after the price change) than in the long run. This is because it may take time to find substitutes for gasoline, or change cars in response to a higher price for gasoline.

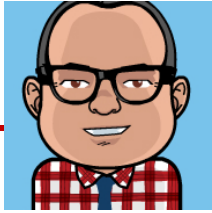


Income Elasticity of Demand

- If the income elasticity of demand is positive (i.e., you buy more as income increases), then the good is a normal good.

- If the income elasticity of demand is negative (i.e., you buy less as income increases), then the good is an inferior good.

- Note: With income elasticity of demand, it is incorrect to take the absolute value of the computed elasticity. Remember that taking the absolute value of elasticity is only applicable to the price elasticity of demand.



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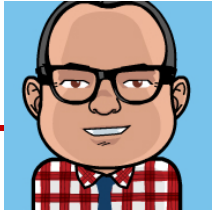
Cross-Price Elasticity of Demand

- Cross Price Elasticity of Demand – The percentage change in the quantity demanded of a good divided by the percentage change in the price of a related good (a substitute or a complement). This measures the sensitivity of quantity demanded of a good to a change in the price of another good.



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Cross-Price Elasticity of Demand

- If the cross-price elasticity of demand is positive (i.e., you buy more as price of the other good increases), then the two related goods are substitutes.

- If the cross-price elasticity of demand is negative (i.e., you buy less as price of the other good increases), then the two related goods are complements.

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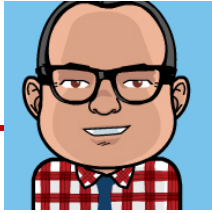
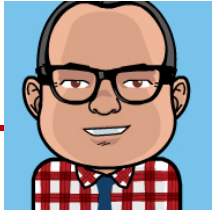


Elastic vs. Inelastic Supply

- Elastic supply - Supply (or part of the supply curve) where the price elasticity is greater than one

- Inelastic supply - Supply (or part of the supply curve) where the price elasticity is less than one

- Unit Elastic supply - Supply (or part of the supply curve) where the price elasticity is exactly equal to 1



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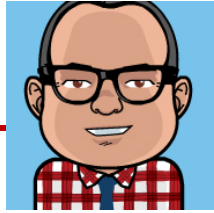
Perfectly Elastic vs. Perfectly Inelastic Supply

- Perfectly inelastic supply - Supply (or part of the supply curve) where the price elasticity is zero, indicating no response to a change in price. A perfectly inelastic supply curve is a vertical line

- Perfectly elastic supply - Supply (or part of the supply curve) where the price elasticity is infinite, indicating an infinite response to a change in price. A perfectly elastic supply curve is a horizontal line



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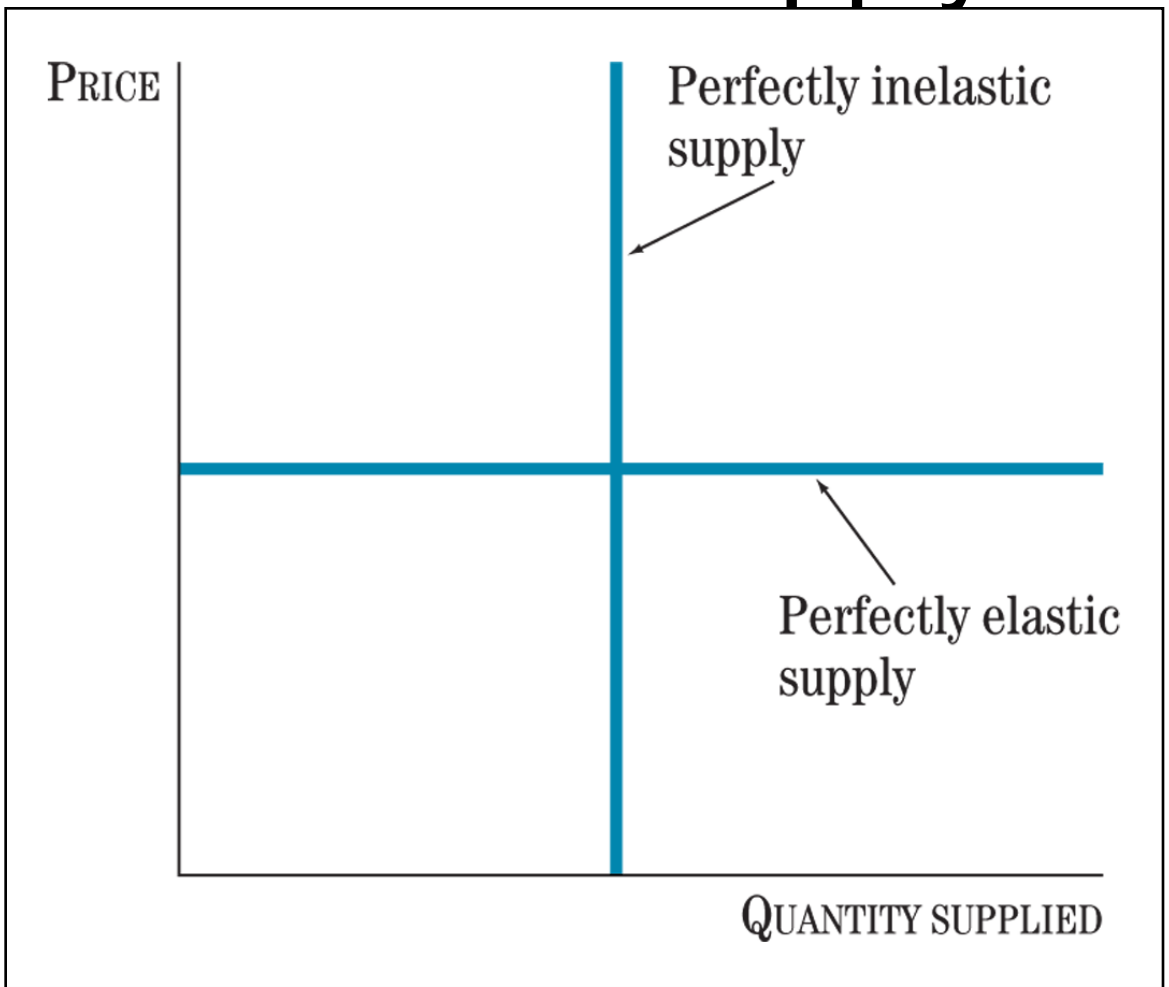
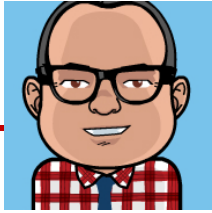
Perfectly Elastic vs. Perfectly Inelastic Supply





Elastic vs. Inelastic Supply

- One application of knowing the price elasticity of supply is in analyzing the impact of a change in demand for a good. The next figure illustrates the effect of an decrease in the demand of oil on the equilibrium price of oil.

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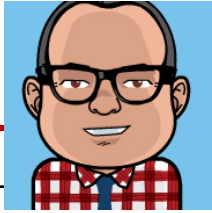
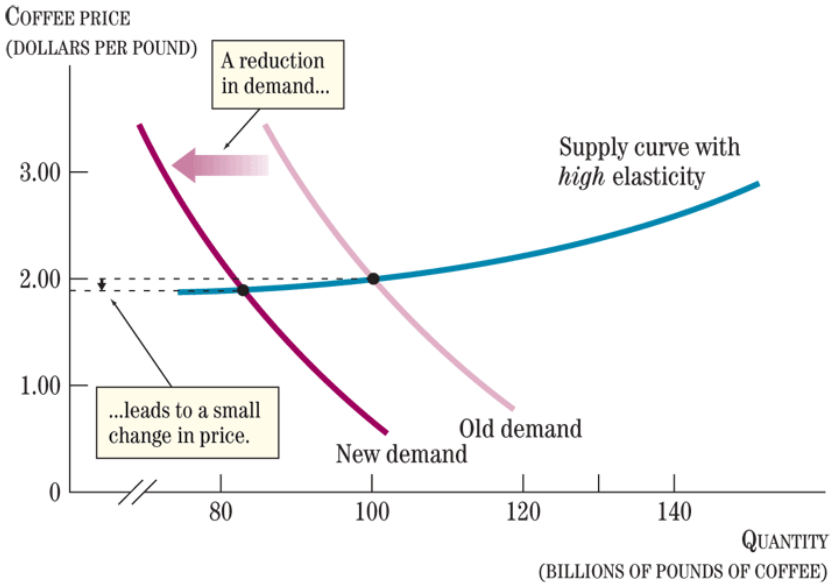
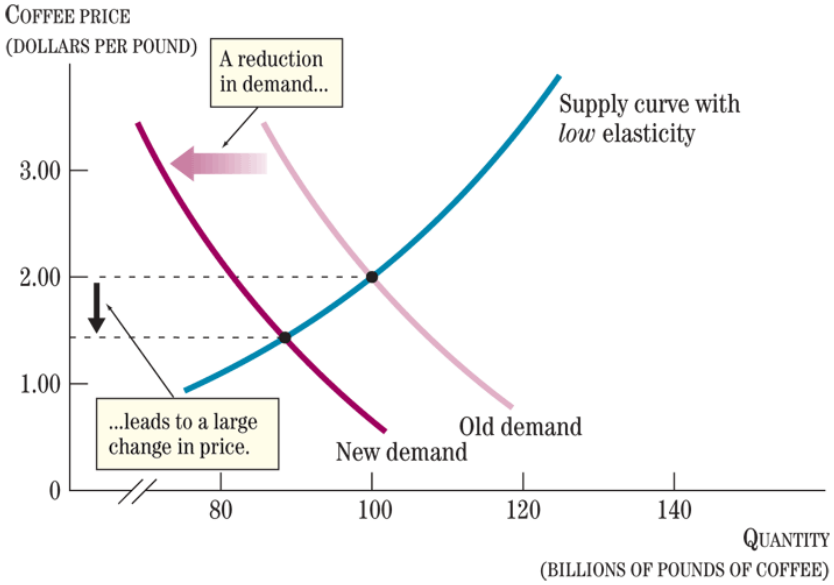
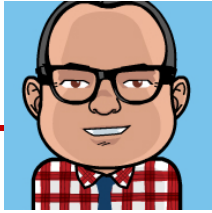


Elastic vs. Inelastic Supply







Elastic vs. Inelastic Supply

- The same shift in the demand for oil to the left results in a lower equilibrium price in the bottom graph, where the supply curve has a lower price elasticity, than in the top graph, which has a higher price elasticity.

The Income and Substitution Effect

- Similarly, a decrease in the price of one good (holding the price of the other good and the budget constant) increases the spending power of the original income (you can now buy the same bundle and still have extra), making it seem like the income has increased.

The Income and Substitution Effect

- The reason why the increase in the price of grapes (or any good) results in a decrease in the quantity demanded of that good can be broken down into two effects:
  1) The Income Effect of a Change in Price
  2) The Substitution Effect of a Change in Price

The Income and Substitution Effect

- The income effect – The amount by which the quantity demanded falls because of a decline in real income from a price change.
- An increase in the price of one good (holding the price of the other good and the budget constant) reduces the spending power of the original budget (you cannot afford as much), making it seem like the income has dropped.

The Income and Substitution Effect

- Similarly, a decrease in the price of one good (holding the price of the other good and the budget constant) increases the spending power of the original income (you can now buy the same bundle and still have extra), making it seem like the income has increased.

The Income and Substitution Effect

- The substitution effect – the amount by which the quantity demanded falls when the price rises, exclusive of the income effect.
- An increase in the price of one good (holding the price of the other good and the budget constant), makes that good relatively more expensive, so we tend to switch our spending away from that good and buy more of the good whose price remained the same.

The Income and Substitution Effect

- A decrease in the price of one good (holding the price of the other good and the budget constant), makes that good relatively less expensive, so we tend to switch our spending toward that good and away from the good whose price remained the same.

Willingness to Pay and the Demand Curve

- Marginal Benefit – the increase in the benefit from, or the willingness to pay for, one more unit of a good.

- Table 5.1 shows a hypothetical example of how we calculate Marginal Benefit.

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Willingness to Pay and the Demand Curve

Table 5.1
Willingness to Pay (Benefit) and Marginal Benefit

Quantity of *X*	Willingness to Pay for *X* (Benefit from *X*)	Marginal Benefit from *X*
0	$0.00	—
1	$5.00	$5.00
2	$8.00	$3.00
3	$9.50	$1.50
4	$10.50	$1.00
5	$11.00	$.50

The connecting lines emphasize how marginal benefit is the *change* in benefit (or willingness to pay) as one more unit of a good is consumed.

Willingness to Pay and the Demand Curve

- From Table 5.1, marginal benefit of consuming the third unit of X can be calculated by taking the difference of the willingness to pay two units of X and three units of X. In this case, the marginal benefit of the third unit of X is $3.00.
- Observe that the marginal benefit of consuming one more unit of X in Table 5.1 diminishes as more of X is consumed.

Willingness to Pay and the Demand Curve

- The demand curve can also be derived from the information on the marginal willingness to pay for a good.
- To proceed, we plot Table 5.1 into a graph with quantity of the good on the X-axis and dollars on the Y-axis. This is illustrated in Figure 5.6.

Willingness to Pay and the Demand Curve

- To derive the demand curve, one must simply compare the willingness to pay with the price of a good. For example, in Figure 5.6, if the price of a good is $2, then the consumer will want to buy the first and the second unit because the marginal benefit is greater than the price. The consumer will not want to buy the third unit at that price because the marginal benefit ($1.50) is less than the price of the good ($2.00).

The Price Equals Marginal Benefit Rule

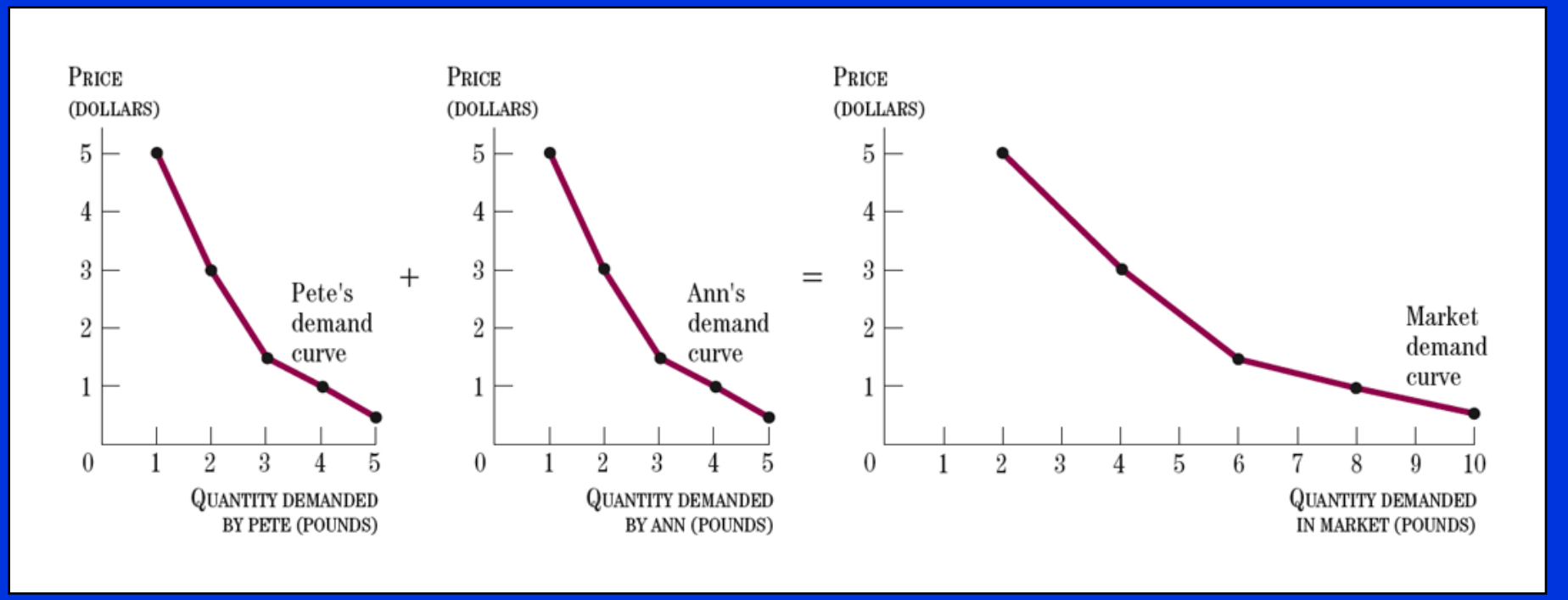
- If consumers can adjust consumption of a good in small increments – such as fractions of a pound – then the consumer will buy an amount for which the ***price equals the marginal benefit***. This rule helps explain a famous paradox in economics called "The Diamond – Water Paradox."
- Paradox – A seemingly contradictory statement that may nonetheless be true.

The Market Demand Curve

- Market demand curve – The horizontal summation of all individual demand curves for a good; also simply called as the demand curve.

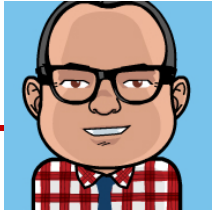
- Figure 5.8 shows an example of the horizontal summation of individual demand curves to derive the market demand curve.

The Market Demand Curve



Different Types of Individuals

- Even if the demand curves of individuals are not smooth, the market demand curve will be smooth because people have different tastes and preferences.



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Total Costs, Fixed Costs, Variable Costs and Marginal Costs

Review:

- Total Costs – The sum of variable costs and fixed costs
- Fixed Costs – Costs of production that do not depend on the quantity of production
- Variable Costs – Costs of production that vary with the quantity of production

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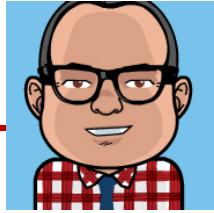
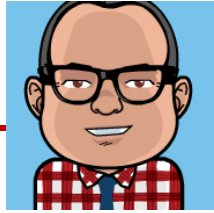


- Short run: The period of time during which it is not possible to change all inputs to production; only some inputs, such as labor, can be changed

- Long run: The minimum period of time during which all inputs to production can be changed

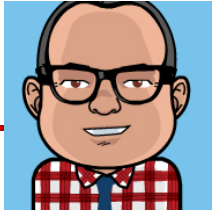
- Marginal Cost – The change in total costs due to a one-unit change in quantity produced



- Average Total Cost (ATC) – The total costs of production divided by the quantity produced; also known as the cost per unit.

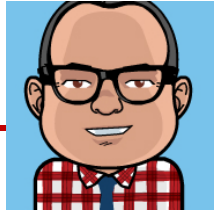
- Average Variable Cost (AVC) – The sum of all variable costs of production divided by the quantity produced.

- Average Fixed Cost (AFC) – The sum of all fixed costs of production divided by the quantity produced.



Costs for On-The Move

- Table 8.1 illustrates the cost data for a sample firm which specializes in moving pianos. Total costs, variable costs and marginal costs are all presented in the table.



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Costs for On-The Move (cont'd)

Table 8.1
Finding Average and Marginal Cost for On-the-Move
(costs measured in dollars per day)

Quantity (pianos moved per day) (*Q*)	Total Costs (*TC*)	Fixed Costs (*FC*)	Variable Costs (*VC*)	Average Total Cost (*ATC*)	Average Fixed Cost (*AFC*)	Average Variable Cost (*AVC*)	Marginal Cost (*MC*)
0	300	300	0	—	—	—	—
1	450	300	150	450	300	150	150
2	570	300	270	285	150	135	120
3	670	300	370	223	100	123	100
4	780	300	480	195	75	120	110
5	900	300	600	180	60	120	120
6	1,040	300	740	173	50	123	140
7	1,200	300	900	171	43	128	160
8	1,390	300	1,090	174	38	136	190
9	1,640	300	1,340	182	33	149	250
10	1,960	300	1,660	196	30	166	320
11	2,460	300	2,160	223	27	196	500

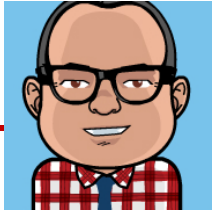
$TC = FC + VC$

$ATC = \frac{TC}{Q}$

$AFC = \frac{FC}{Q}$

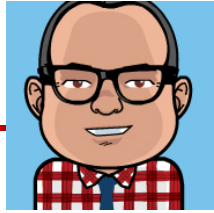
$AVC = \frac{VC}{Q}$

$\frac{\text{Change in } TC}{\text{Change in } Q}$



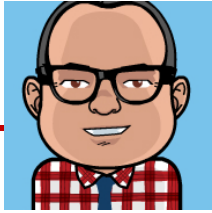
From Table 8.1, we can see that:

1) The fixed cost (FC) stays constant (FC = 300) regardless of the quantity of pianos moved per day.
2) The Average Fixed Cost (AFC) continuously declines as the quantity is increased.
3) The Average Variable Cost (AVC) and the Average Total Cost (ATC) first declines and then rises as production is increased.



From Table 8.1, we can see that:

4) The marginal cost (MC) also drops when quantity is low, then rises as quantity increases.
5) Once the firm experiences rising MC (or ATC or AVC), the firm will continue to see that cost rise as quantity keeps increasing in the short run (it will not go back down).

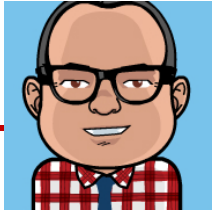


Costs for On-The Move (cont'd)

- Figure 8.2 shows the graphical relationship between the total fixed costs, the total variable costs and the total costs. The costs are graphed with quantity of the goods on the x-axis and dollars on the y – axis.

- Recall that the relationship between the three variables is captured by the equation:

Total costs = total fixed costs + total variable costs



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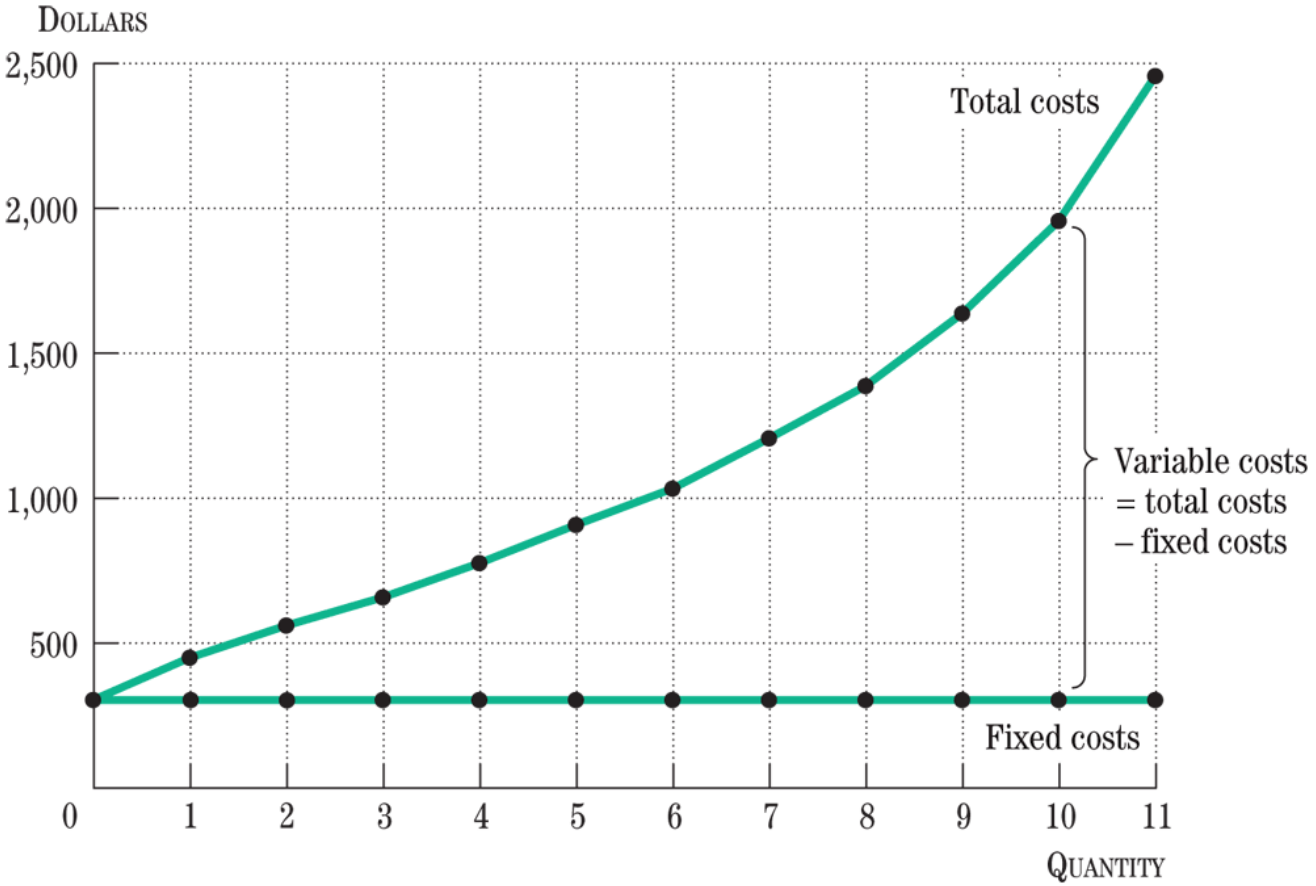
Costs for On-The Move (cont'd)

Figure 8.2



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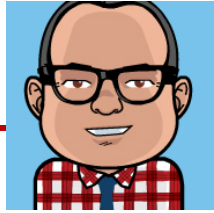
Costs Depend on the Firm's Production Function (cont'd)

- The variable costs represent the labor costs incurred by the firm. Table 8.2 brings together the production function and the labor or variables costs of production.

- In the table, you can see that since the firm is working in the short run time horizon, the only way for it to be able to increase the quantity produced is to increase the labor input, resulting in an increase in the labor costs.

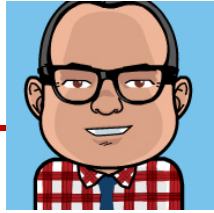


Costs Depend on the Firm's Production Function Table 8.2

Table 8.2
Using the Production Function to Compute Variable Costs

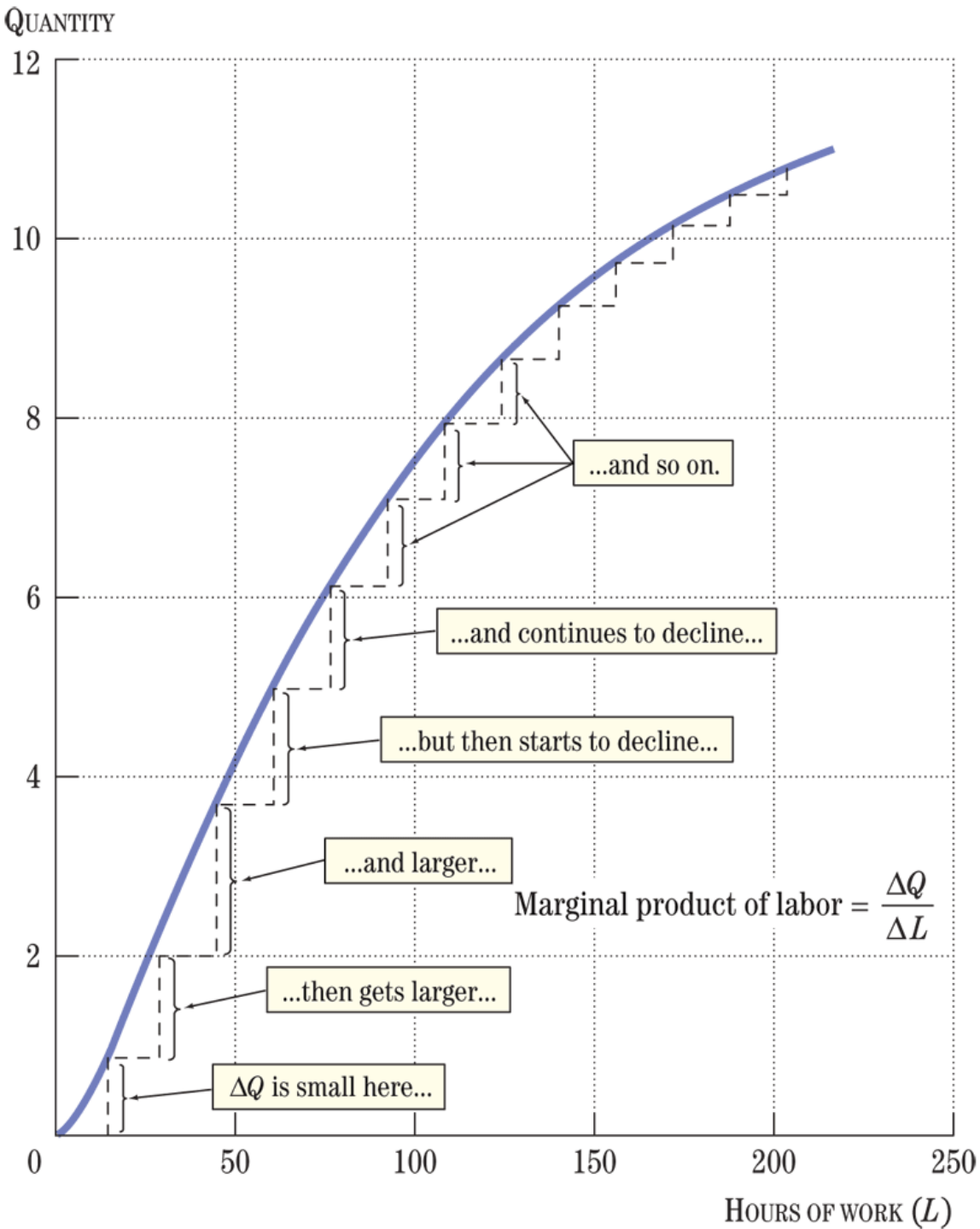
Quantity (pianos moved)	Hours of Work	Labor Costs at $10 Wage (variable costs)
0	0	0
1	15	150
2	27	270
3	37	370
4	48	480
5	60	600
6	74	740
7	90	900
8	109	1,090
9	134	1,340
10	166	1,660
11	216	2,160

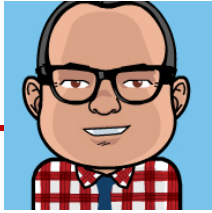
Observe that increasing marginal product of labor exists at low levels of production; for example, it takes only 10 hours of labor to increase production [by 1 unit] from 2 to 3 units, whereas it takes 12 hours of labor to increase production [by 1 unit] from 1 to 2 units. At higher levels of production, decreasing marginal product of labor exists.



- Figure 8.3 shows On-The-Move's production function in the short run. Note that as the number of work hours are used in production, the output increases, but at a decreasing rate, (after around 50 hours of work). Diminishing marginal product kicks in after the third piano moved.

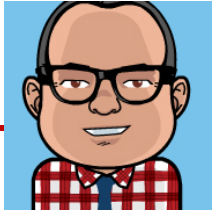
On-the-Move's Production Function





Average Cost Curves

- The information on the average total cost, average fixed costs, average variable costs and marginal costs found in Table 8.1 are illustrated graphically in Figure 8.4.



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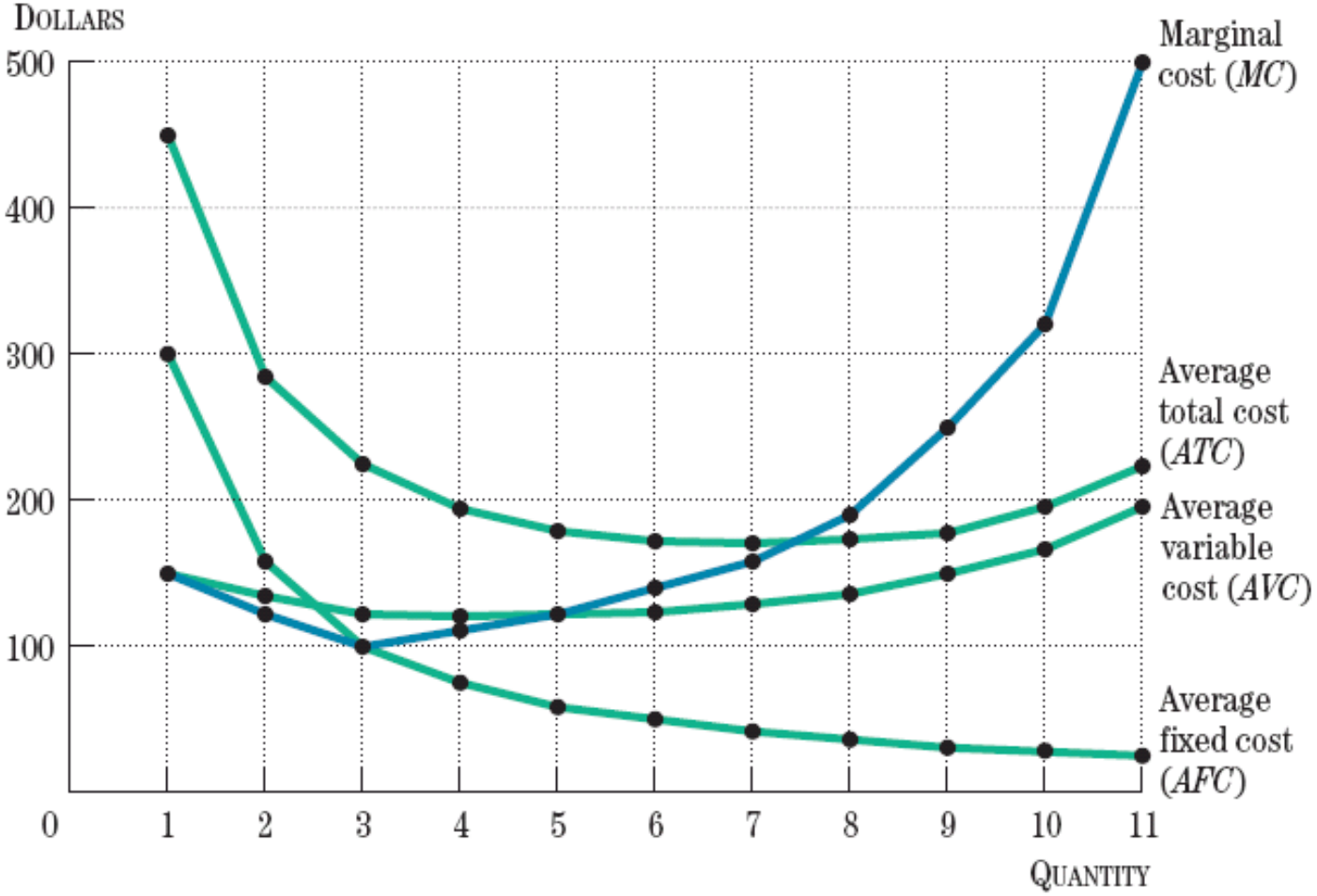
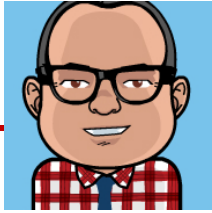
Average Cost Curves (cont'd)

Figure 8.4

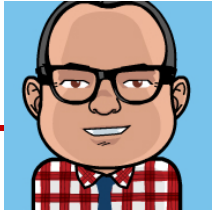




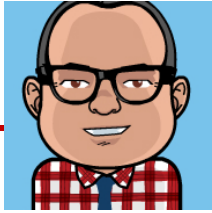
Average Cost Curves

- With dollars on the y-axis and quantity of output on the x-axis, Figure 8.4 shows that:

1) The average fixed cost curve is decreasing as quantity of the output is increased.
2) The average variable cost curve is decreasing up to the quantity of output =5, then starts to increase as quantity of output is greater than 5.



3) The average total cost curve is decreasing up to the quantity of output =7, then starts to increase as quantity of output is greater than 8.
4) The marginal cost curve is decreasing up to the quantity of output =3, then starts to increase as quantity of output is greater than 3.



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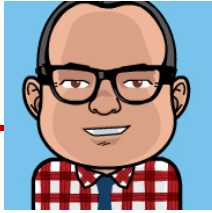
Average and Marginal Cost Curves

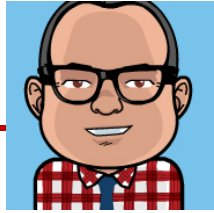
A closer look at Figure 8.4 reveals:

1) The vertical distance between the ATC and the AVC is becoming smaller as quantity is increased. This vertical distance is the AFC. Hence, since the AFC can never be zero or negative, the ATC will always be higher than the AVC, and both curves will never cross.



Costs and Production: Short Run

- We learned that a profit-maximizing competitive firm will set the quantity where the price equals the marginal cost (P = MC). This profit-maximizing rule is shown in Figure 8.6, where a horizontal line depicting the market price is drawn, and the intersection between the marginal cost and the horizontal line shows the profit-maximizing quantity.



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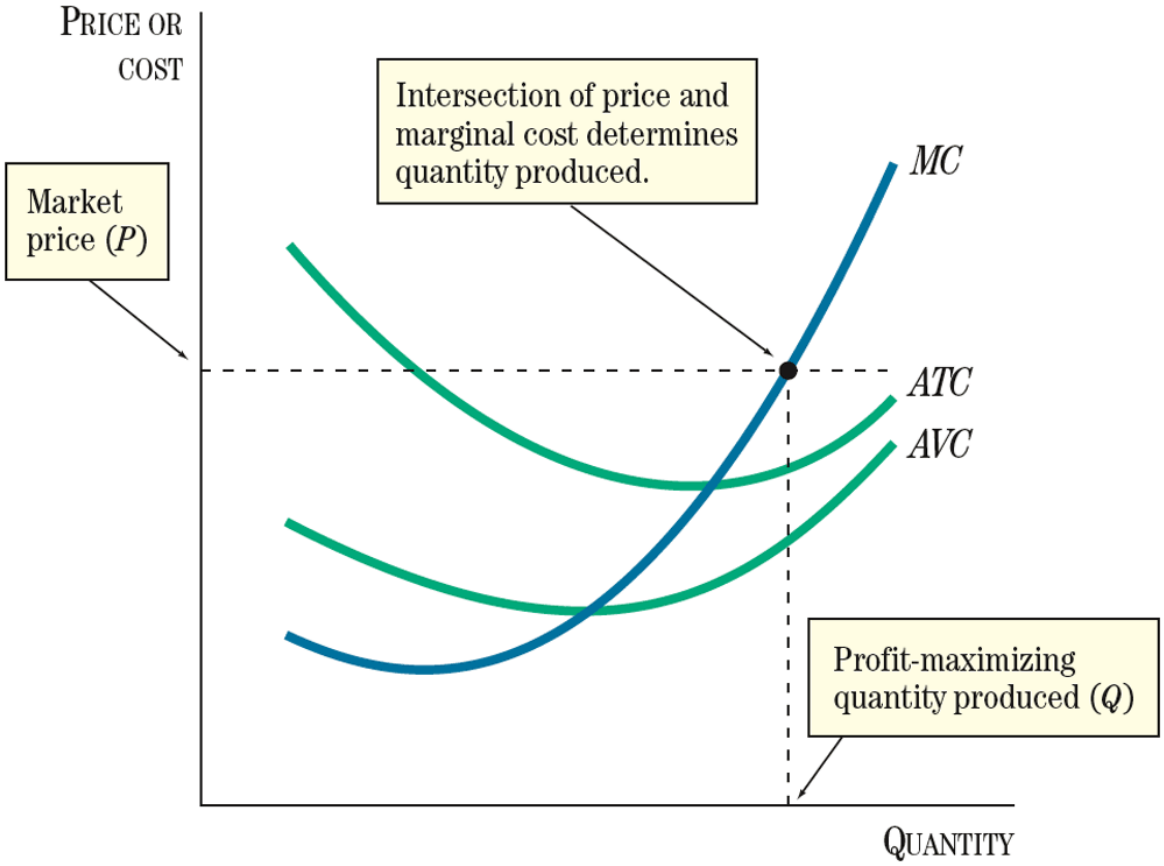
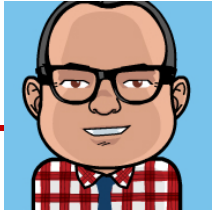
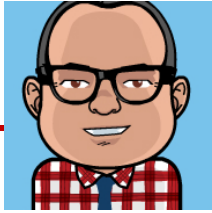
Costs and Production: Short Run(cont'd) Figure 8.6





Costs and Production: Short Run (cont'd)

- From Figure 8.6, we see that the ATC and the AVC do not play a role in determining the profit-maximizing quantity. However, these two curves play a role in determining the firm's total profit and decision to shut down.



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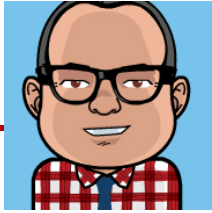
Costs and Production: Short Run (cont'd)

- Once the profit maximizing quantity is determined, the firms total profit earned can be determined by using the ATC curve. Figure 8.7 shows the firm profit earned using the cost diagram.



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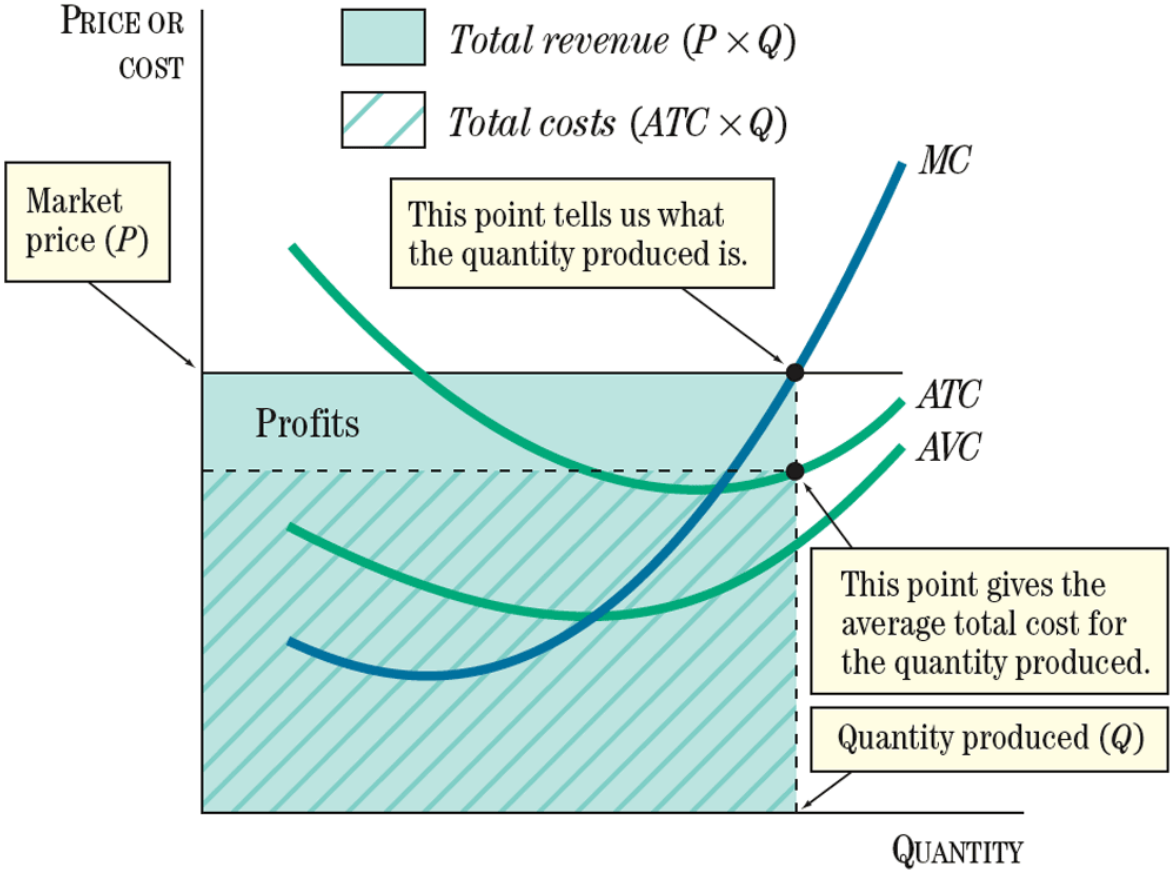
Costs and Production: Short Run (cont'd) Figure 8.7



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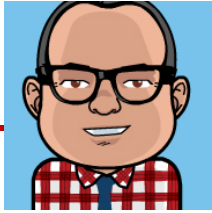

Costs and Production: Short Run (cont'd)

- From Figure 8.7, the total revenue generated by the firm is shown by the rectangle formed with height = market price and the width = quantity (Q).

- The total cost incurred by the firm for producing Q is shown by the rectangle formed with height = ATC and the width = quantity (Q). This rectangle is depicted by the hash-marked area.

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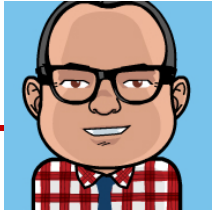
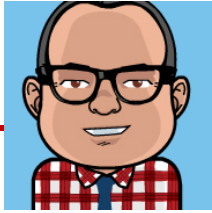


Costs and Production: Short Run (cont'd)

- From Figure 8.7, the total profits generated by the firm is shown by the rectangle formed with height = (market price – ATC) and the width = quantity (Q). This area in Figure 8.7 is the shaded area, without the hash-marks.

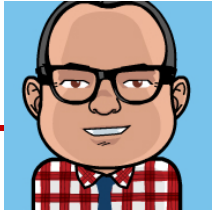
- Our graph in Figure 8.7 shows a firm that is generating positive profits. Positive profits are generated when at the profit maximizing quantity, the market price is higher than the ATC.



Costs and Production: Short Run

- If at the profit maximizing quantity (again, where P = MC) the market price is below the ATC but above the AVC curve, then the firm is generating losses, but will not shut down in the short run.

- This scenario is depicted in Figure 8.8.



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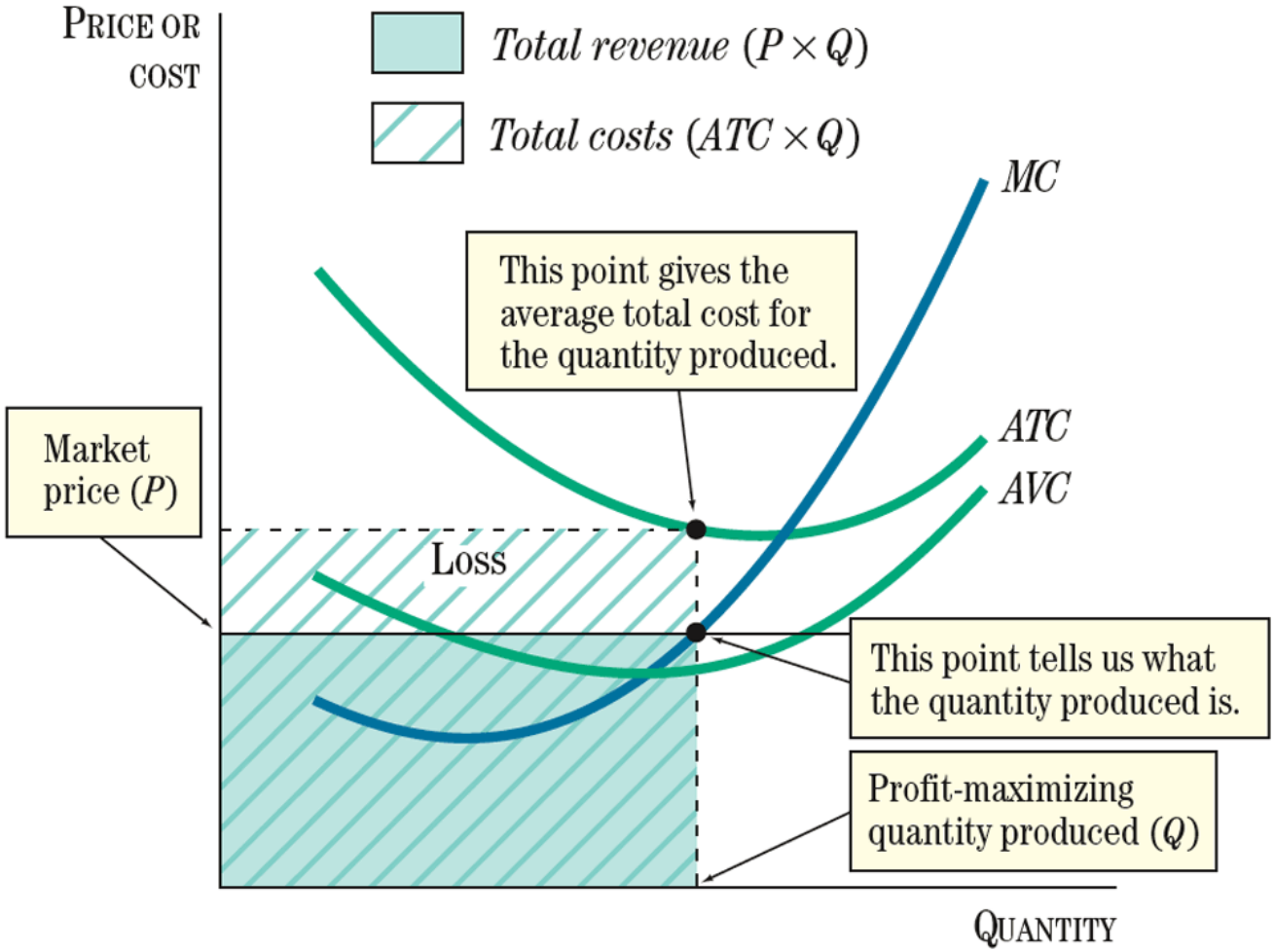
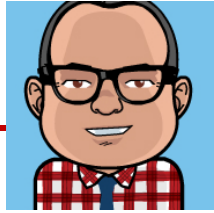
Costs and Production: Short Run (cont'd)
Figure 8.8

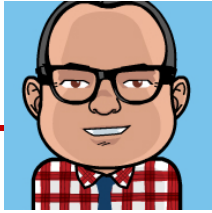




Costs and Production: Short Run

- From Figure 8.8, the total profits generated by the firm is shown by the rectangle formed with height = (market price – ATC) and the width = quantity (Q). Since the ATC is higher than the price, the profits are negative, and the firm is incurring losses.

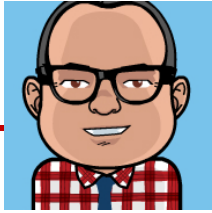
- The size of the loss is depicted by the unshaded area with hash-marks.



The Break Even Point

- The breakeven point – The point at which the price equals the minimum of the average total cost. This is also the point where the price passes through the intersection between the MC and the ATC curve.

- The break even point is shown on the middle graph on Figure 8.9.



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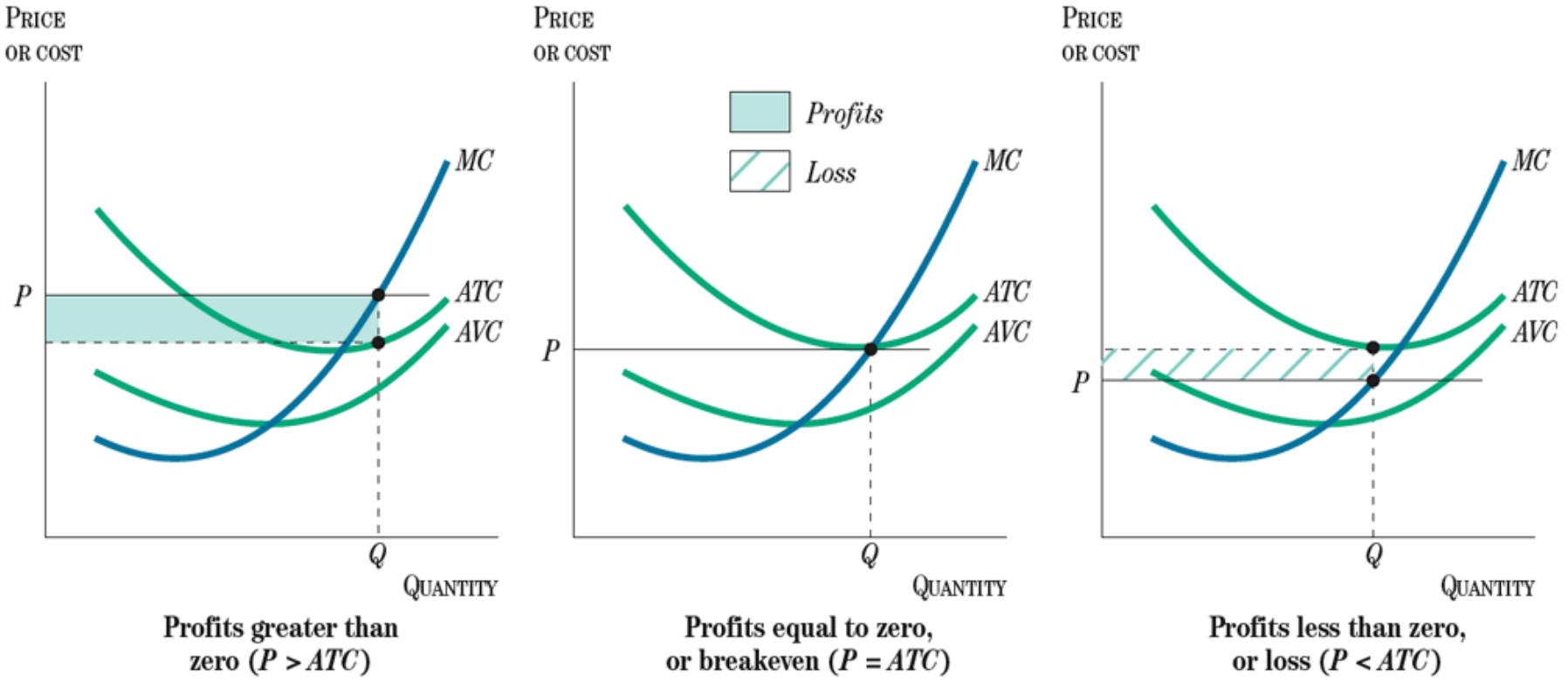
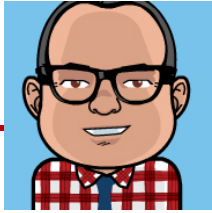
The Break Even Point (cont'd)

Figure 8.9



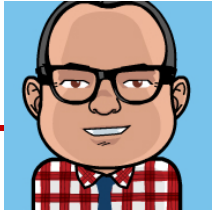


The Break Even Point (cont'd)

- The leftmost graph on Figure 8.9 depicts a firm that is generating positive profits in the short run (P> ATC at the profit maximizing Q).

- The rightmost graph on Figure 8.9 depicts a firm that is generating negative profits in the short run (P < ATC at the profit maximizing Q).

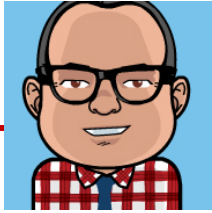
- All three graphs depicted on Figure 8.9 show firms that will not choose to shut down in the short run.



The Shutdown Point

- The shutdown point – The point at which the price equals the minimum of the average variable cost. This is also the point where the price passes through the intersection between the MC and the AVC.

- If the price equals the minimum of the AVC or lower, then the firm must shut down. At any quantity that the firm produces, the revenue that the firm gets is not even enough to pay for the variable costs of production.



The Shutdown Point

- If the price equals the minimum of the ATC or lower, the firm maximizes profit (or minimizes losses) when producing at Q=0. The firm's profit equals the negative of the firm's fixed costs.

If the firm shuts down,

Profit = total revenues – total costs

= 0 – total fixed costs

= – total fixed costs

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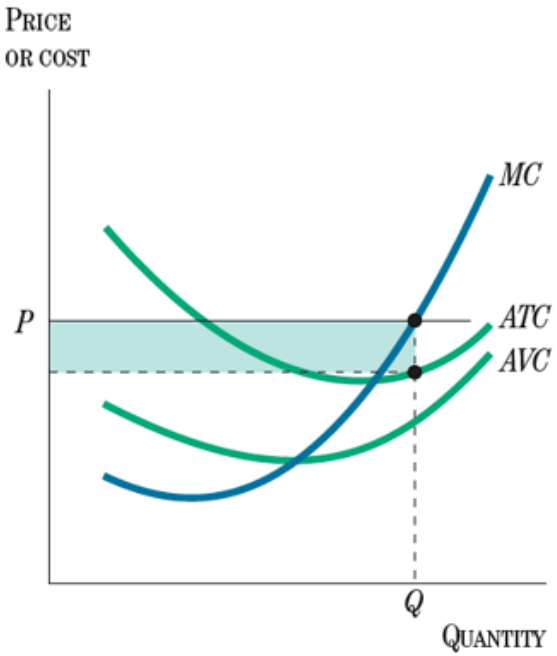
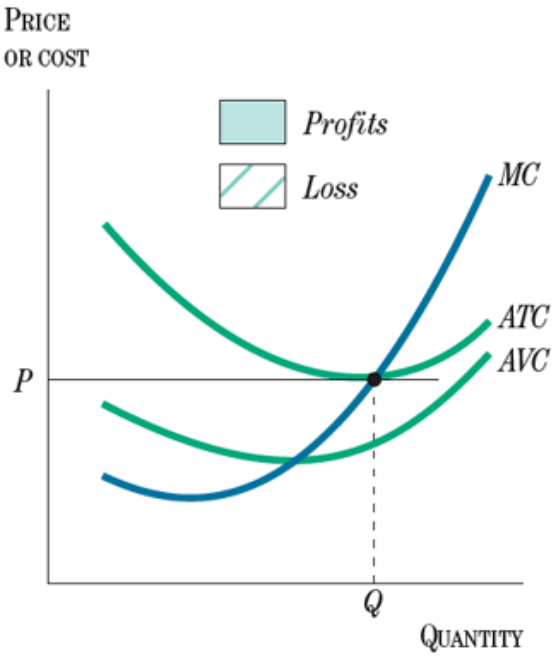
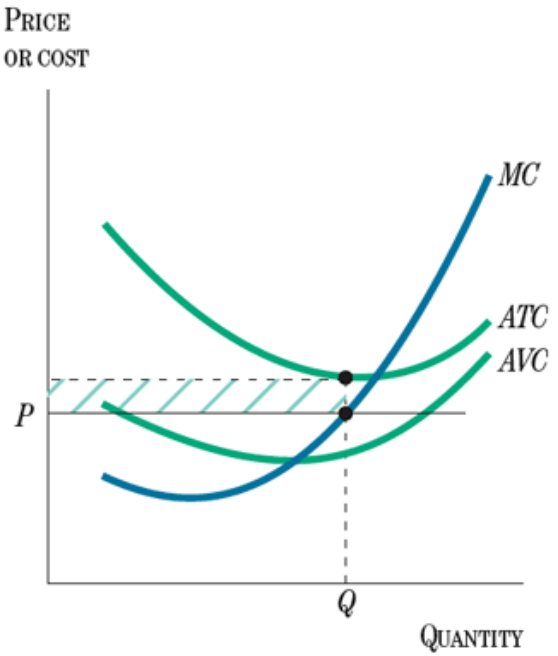
The Shutdown Point



Profits greater than zero ($P > ATC$)



Profits equal to zero, or breakeven ($P = ATC$)

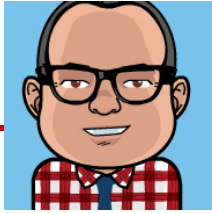


Profits less than zero, or loss ($P < ATC$)

The Shutdown Point

- The leftmost graph on Figure 8.10 depicts a firm that is receiving a price above the minimum of the AVC, but below the minimum of the ATC. In this case, the firm is losing profits, but must not shut down.

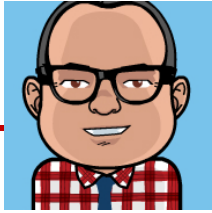
- The middle graph on Figure 8.10 depicts a firm that is receiving a price equal to the minimum of the AVC. This firm is indifferent between shutting down or producing at quantity = Q. In either case, the firm's losses will be the same (which is the negative of the fixed costs).



The Shut-Down Point

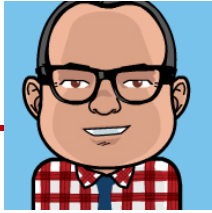
- The rightmost graph on Figure 8.10 depicts a firm that is receiving a price below the minimum of the AVC. In this case, the firm must shut down to minimize its losses.

- One thing to remember about shutting down is that having negative profits is a necessary—but not a sufficient—condition for a firm to shut down in the short run.



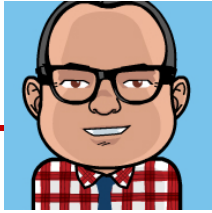
The Long Run Average Variable Cost

- Long Run Average Total Cost – The curve that traces out the short-run average total cost curves, showing the lowest average total cost for each quantity produced as firms expand in the long run



The Long Run Average Variable Cost

- Since firms can adjust capital inputs in the long run, each firm will increase or decrease capital inputs in order to produce the profit maximizing quantity at the lowest average total cost. The derivation of the long run average total cost is traced out in the thicker green line in Figure 8.13.



Economies of Scale

- Minimum efficient scale – The smallest scale of production for which the long run average total cost is at a minimum.

- Figure 8.15 illustrates the typical shape of the long run average total cost curve. It also shows the regions corresponding to economies of scale, diseconomies of scale, constant returns to scale and the minimum efficient scale.

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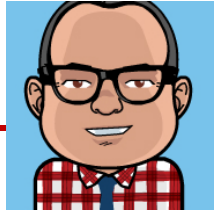
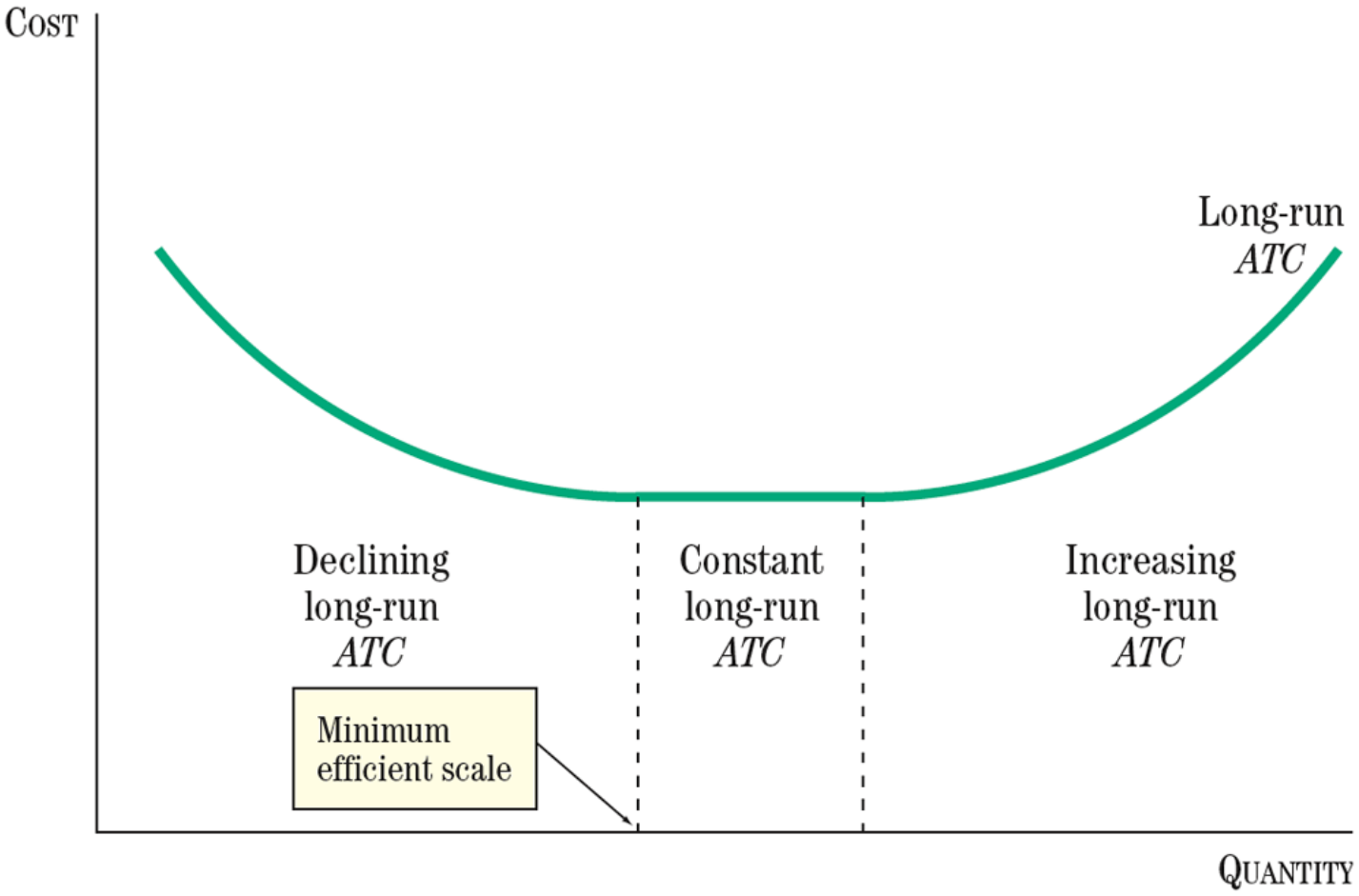


Economies of Scale



rules of absolutes to remember

- Fixed Cost = total cost – variable cost
- Average total cost = total cost / output
- Average variable cost = variable cost / output
- Fixed cost + variable cost = total cost
- Marginal cost = total cost of output$_1$ – total cost of output$_2$
- MR = D = AR = P [always a horizontal line]

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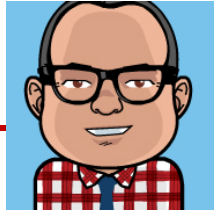
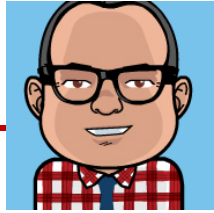


- Any point plotted below AVC = shut down of business because firm cant cover cost of business
- Any point plotted below ATC = economic loss in between MR = D = AR = P
- MC = ATC => zero economic profit
- Long run equilibrium = ATC @ MR = MC
- Variable cost = any point below AVC
- MR=MC => production
- AVC= vc/q x q/t



- On a graph, AVC is always intersected at the lowest point of the curve
- ATC = always intersects MC at the lowest point of the ATC curve
- ATC curve is always above or higher than AVC

IB Economics – The costs of production

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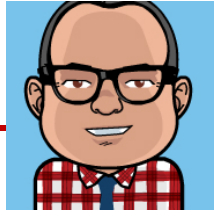

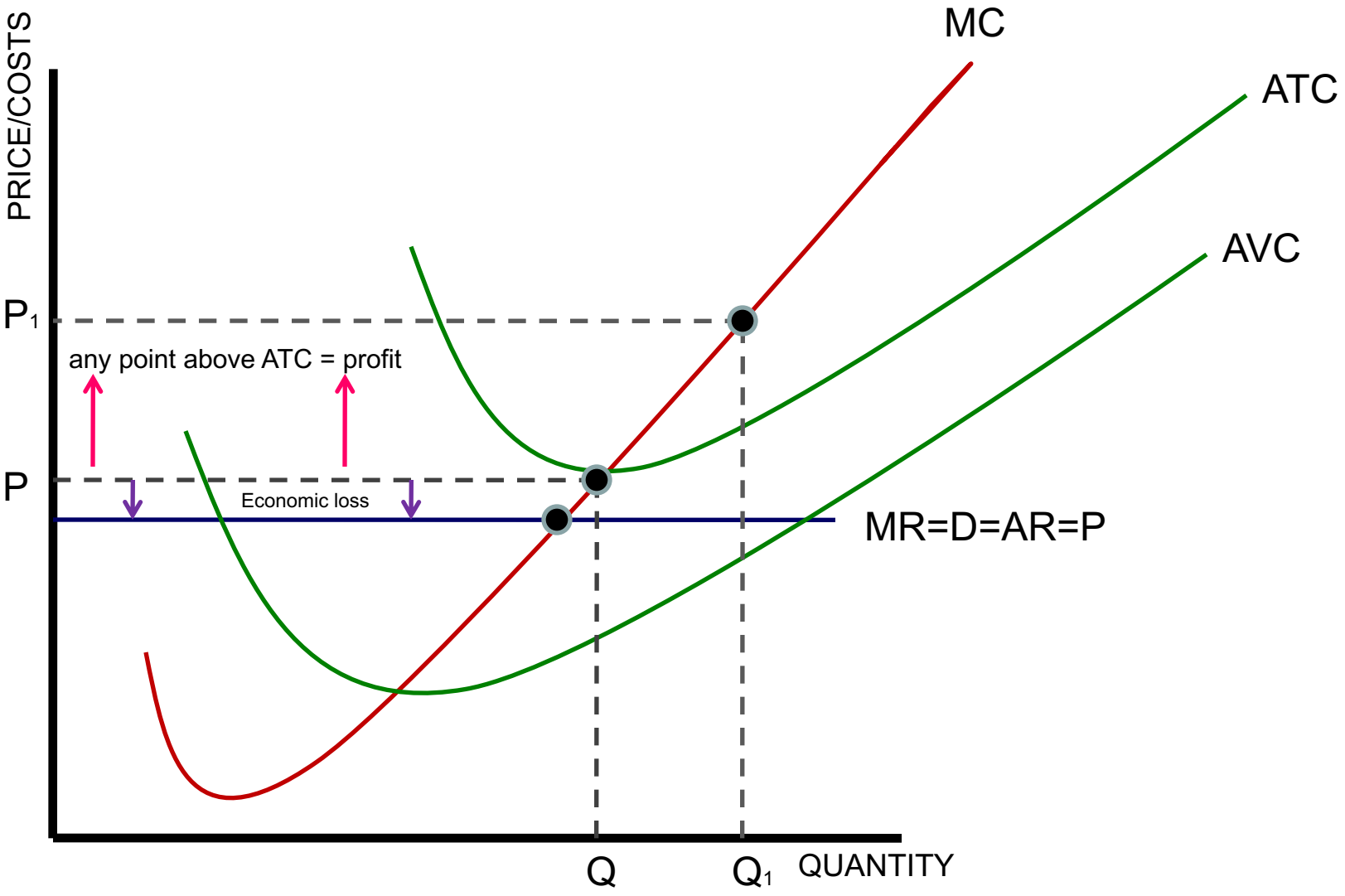

O = for output would work also

Four Types of Industries

Competition
- Many firms, free entry
- One product

Monopolistic Competition
- Many firms, free entry
- Differentiated product

Oligopoly
- Few firms, limited entry
- One or differentiated product

Monopoly
- One firm, no entry
- One product

Profit Maximization: MR=MC Rule

- Marginal Cost: the addition to the total cost that is or would be created by producing an additional unit of output.
- Marginal Revenue: the addition to the total revenue created by selling one more unit of output.
- Profits are maximized when marginal revenue equals marginal cost, or vice versa.

MC=MR Rule

- If MR is greater than MC, the producing an additional unit of output will add more to revenues than it would to cost, thus increasing profits.
- If MC is greater than MR, the firm in producing too much; additional units are adding more to costs than to revenue, thus decreasing profits.
- So why is it good that MR=MC? Answer??

- When MR=MC, profits are maximized, because any other level of output leaves the possibility of increasing profits by raising revenue or decreasing costs.

Pure Competition

- A competitive market has 4 characteristics:
  1. There are enough buyers and sellers in the market that no single one can influence price
  2. The products of all firms are largely the same
  3. Firms can enter or exit the market freely
  4. Information about prices and products is freely available to all firms

Perfect Competition

- Because no individual firm is this type of market can influence price, they are called price-takers.
- They are not powerful enough to influence price, which means that all firms must accept the price defined by the market. Thus…all units are sold at the same price, therefore each unit adds the same amount to total revenue….(think about this)

- That's why marginal revenue equals price: MR=P.
- For all firms, profits are maximized when MC=MR, because MR=P for the competitive firm, profits are maximized when MC=P.
- Perfectly competitive firms earn no economic profit in the long run.

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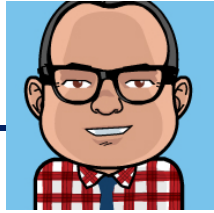
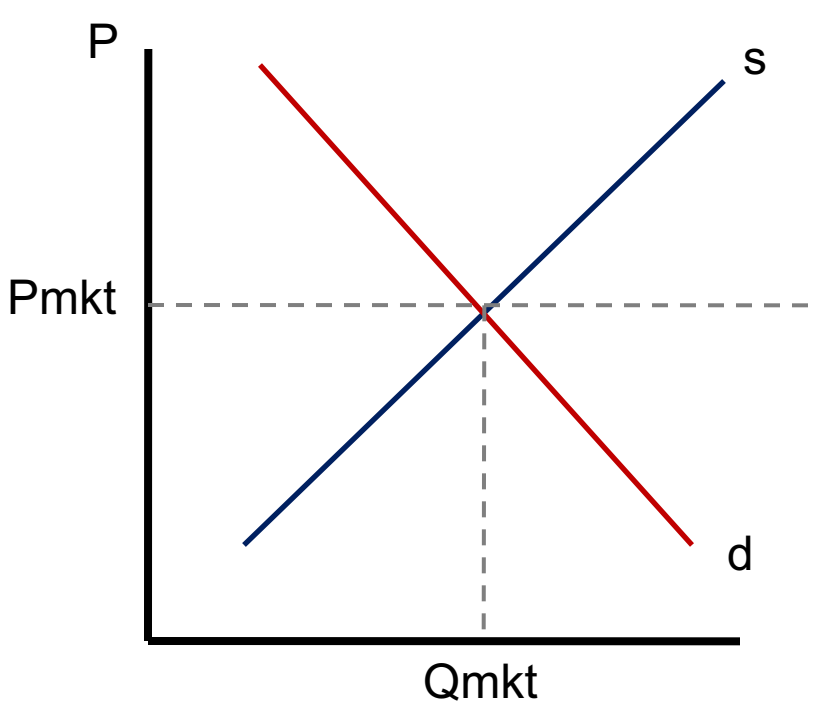
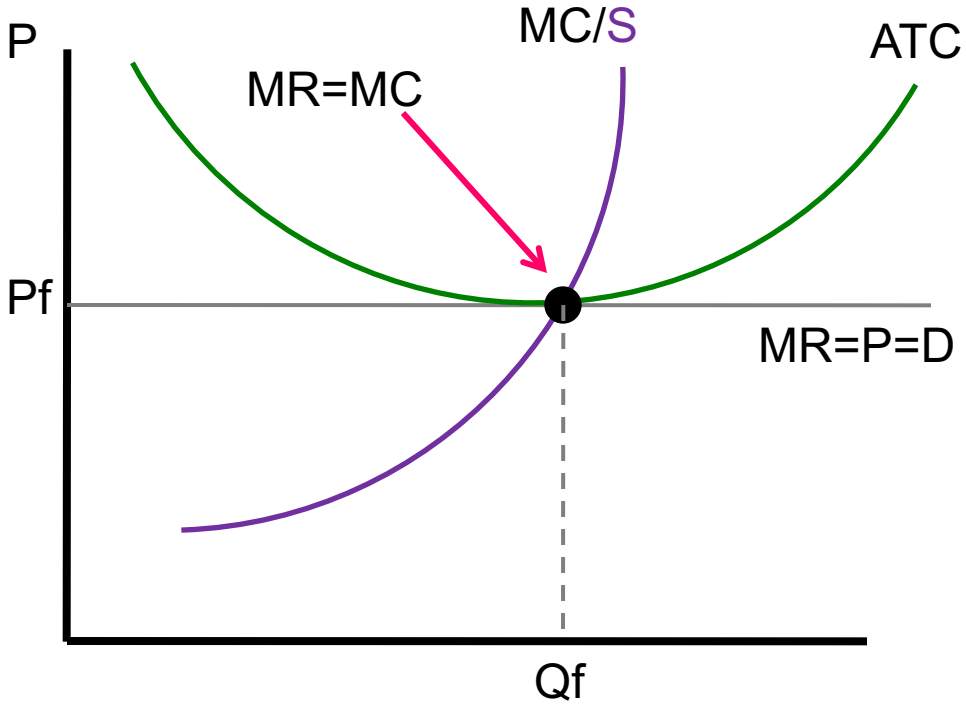


Side-by-side relationship between the market and the firm in the long run



Market graph



Firm graph

- Price comes directly from the market and gives the firm enough revenue from selling the product at the market price to cover all its ATC. The quantity in the market is the sum of all firms' quantities. Here the Q_f is shown is determined by MR=MC, which gives us the profit maximizing quantity. At this point, the firm shown is making normal profits-covering its implicit and explicit costs, but no more.

- Let us look at what happens when the demand curve shifts to the right; market price and quantity have increased. The firm now has the new price from the market and the quantity for the firm is also higher because the MR=MC quantity (QF_2) has moved to the right. If the average total costs do not change, the firm now realizes an economic profit.

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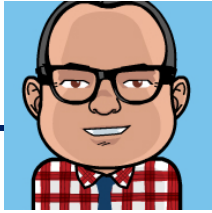
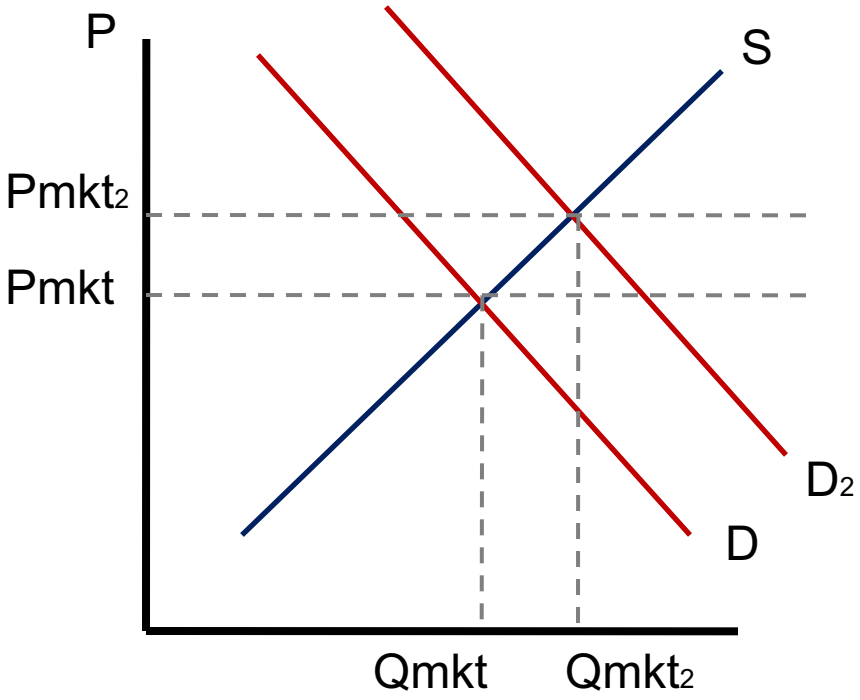
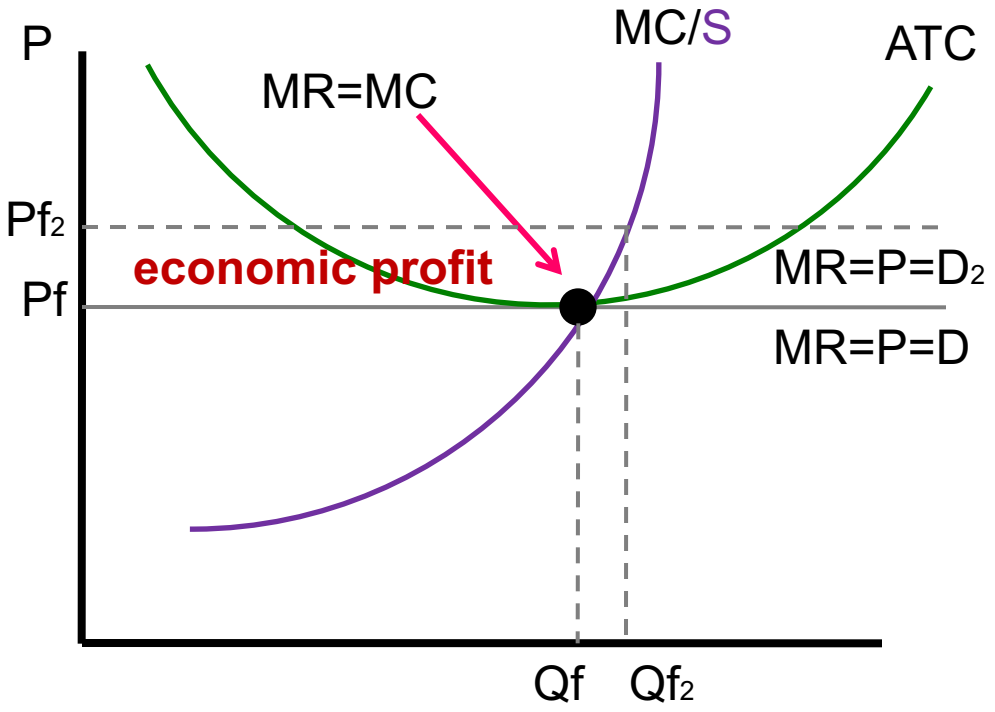


Effects with a shift in the D curve



Market graph



Firm graph

- Economic profit attracts new firms, new firms entering the market will cause the supply curve to shift _____, and _____ in supply will cause a _____ in price.
- New firms will continue to enter the market until all the economic profits disappear, moving the firm into the long run.

Short-Run Supply and Shutdown Decisions

- Starting from the long-run equilibrium, if market demanded decreased, price would fall for the perfectly competitive firm. This price would be below minimum average total cost and the firm would incur a loss. Finding MR=MC would indicate the loss-minimizing level of output.

- Economic theory tells us that in the short-run, the firm can not go out of business: it must continue paying its fixed costs. However, it can shut down and avoid paying its variable costs. To find out whether the firm should continue to operate or shut down, we compare marginal revenue to average variable cost. If MR(P)=AVC, OR MR>AVC, the firm will continue to operate; as long as MR=AVC the firm is covering its variable costs and only losing its fixed costs, which it would lose anyway it if shutdown. If MR>AVC, then the firm will cover its variable costs and have some revenue left over to apply to its fixed costs.

- A supply curve shows how much will be supplied at each price: it relates quantity to price. The marginal cost curve relates quantity to marginal cost. This the supply curve and the MC curve will follow the same line.
- So..under perfect competition, the firm's supply curve is entirely dependent on costs of production.
- The firm will not produce at a price below AVC, thus the supply curve is only that portion above the point at which it intersects the AVC line.

- If the ATC curve dips below the AR curve, then the firm will earn above average profit. Profit can be measured by the vertical difference between AR and ATC at Q.
- If the ATC curve were above the AR curve at all points, then the point where MC=MR represents the loss-minimizing point, a loss has occurred.

- Whether the firm is prepared to continue making a loss in the short run or whether it will close down immediately depends on the whether it can cover it's variable costs.
- Provided P is above AVC, the firm will still continue producing in the short-run because it can pay its variable costs and go some way to paying its fixed costs. It will shut down in the short-run only if the market price falls below MC=MR.

IB Economics – Pure Competition

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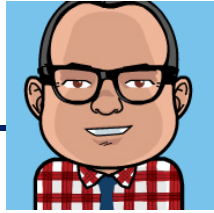

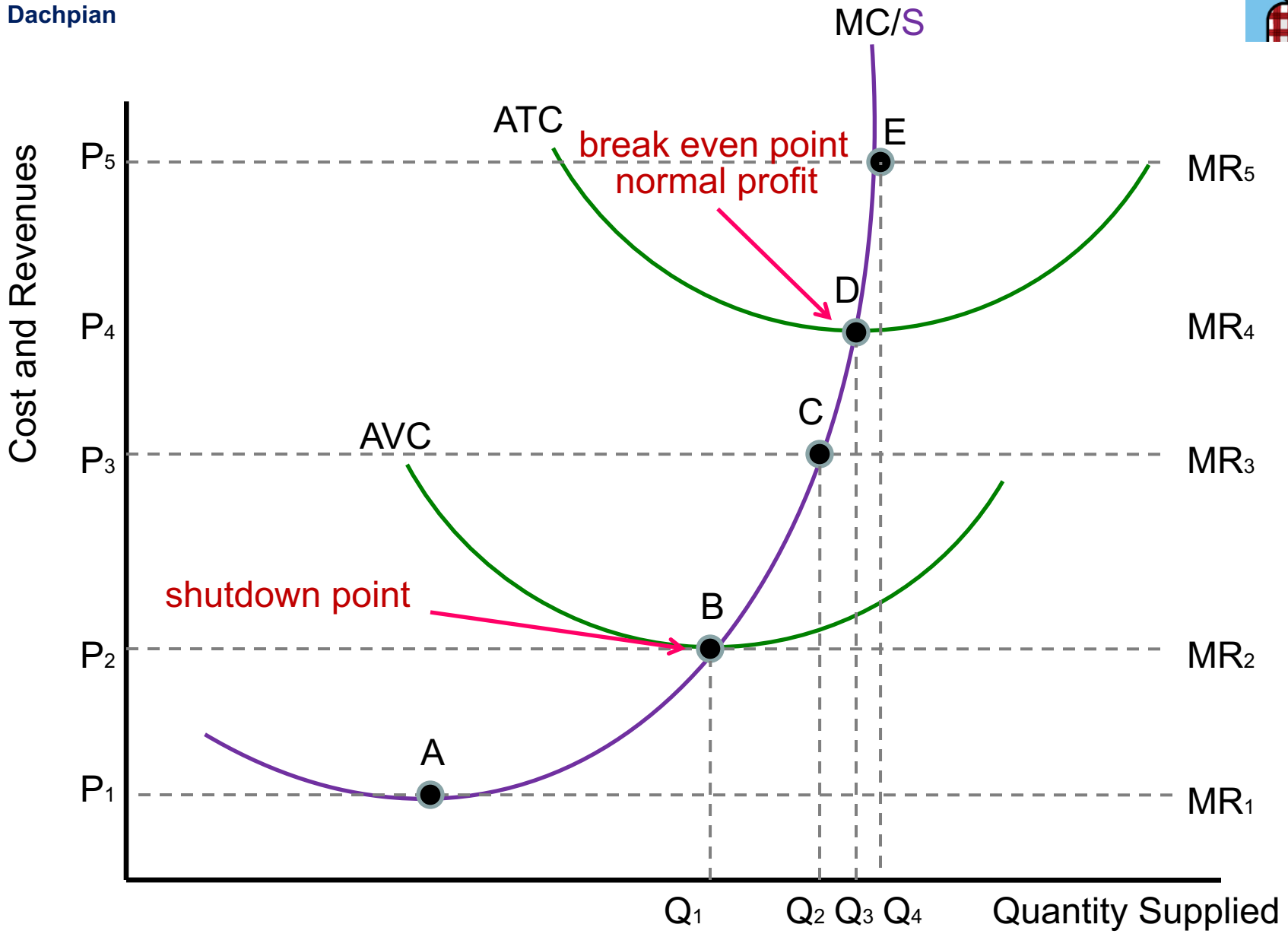

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Points on the graph

A. Indicates $P=MC_1$ where price is below the AVC. The firm should not produce and close. If the price rose, the firm would expand output so that again, price would equal marginal cost.

B. Where $P=MC_2$ shows the shutdown position, which is the last level of production (Q_1) at which the firm should operate. Here the firm is only able to cover its variable costs.

C. The firm is loss-minimizing where $P=MC_3$. This firm would operate and produce Q_2 in the hopes of doing better in the near future. Cutting its costs or gaining a higher price from the market will move this firm's to a better position.

D. Is the break-even point, where $P=MC_4$ to show that the firm's total costs are paid with the level of output at Q_3. At $P=MR_5$, price is above the ATC - the firm is earning economic profits. Since this firm will produce at levels above $P=MR_2$, above minimum average variable cost the firm's short-run supply curve is its marginal cost curve. Below minimum average variable cost, the firm will shot down.

- In the long-run, some firms will exit the market. Existing firms would cause the market supply curve to shift to the left, raising price, which benefits the firms remaining in the market. The process would continue until price comes back up to minimum average total cost-the long run equilibrium position.

Efficiency and Perfect Competition

- A perfectly competitive industry is a model for efficiency because perfectly competitive industries will automatically adjust supply to operate until price is equal to minimum average total cost, which means that over time firms will always adjust their output to produce at minimum average total cost.

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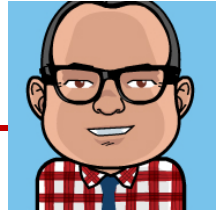

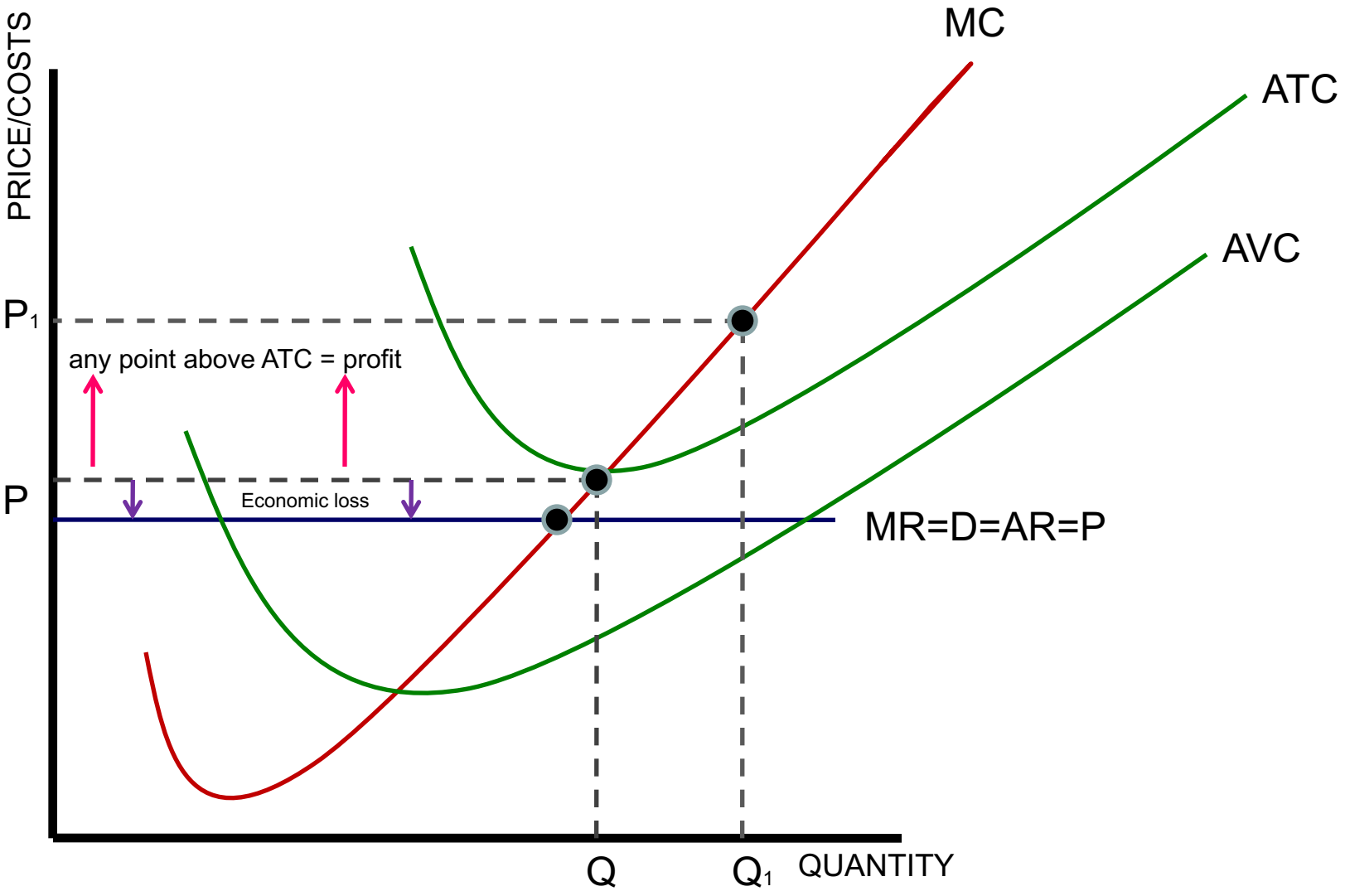

O = for output would work also

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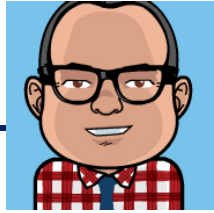

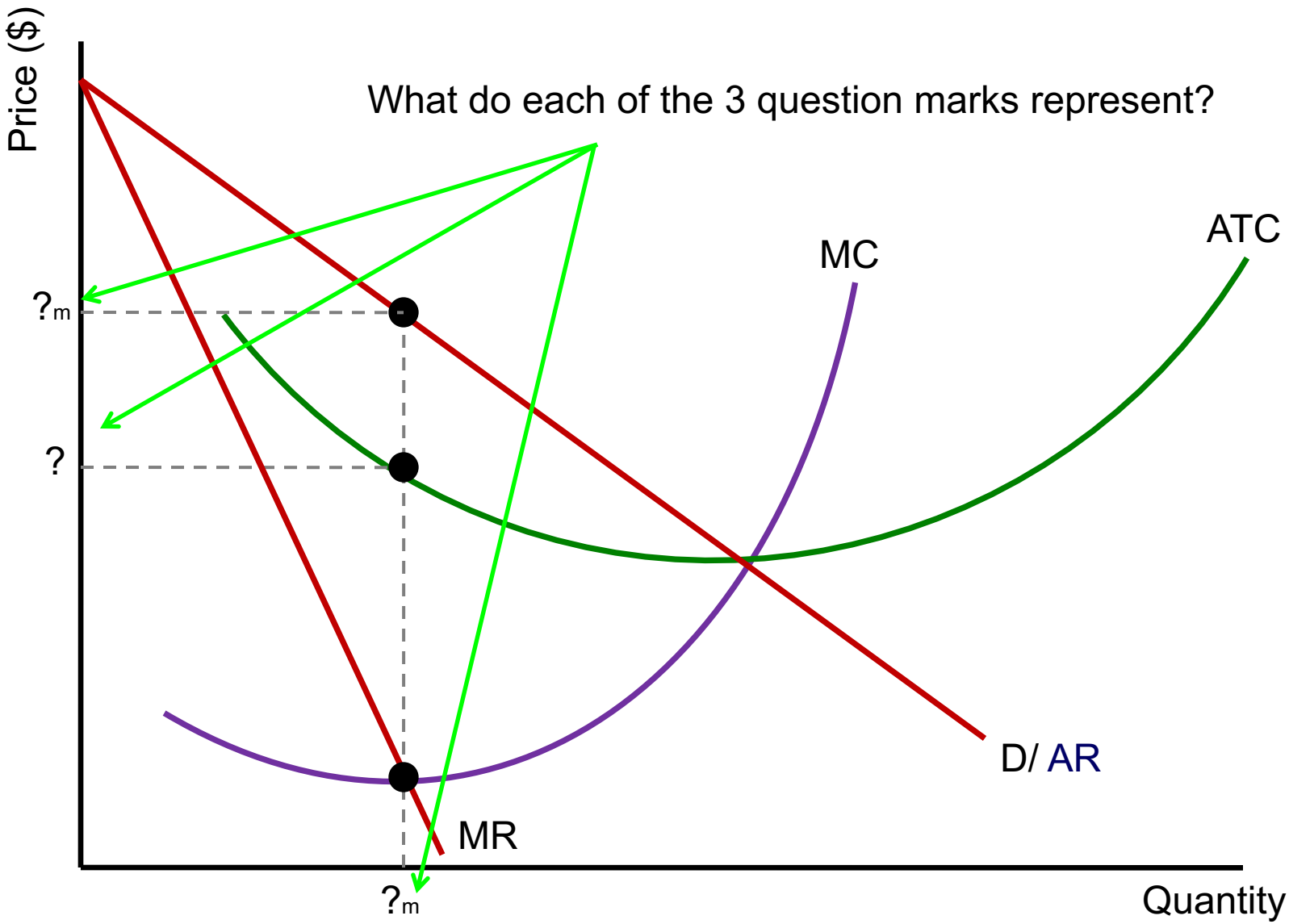

Monopoly

- A monopoly is an industry structure which there is only one seller for a good or service.
- Monopoly firms are price makers: they set price to suit the firm's interests.

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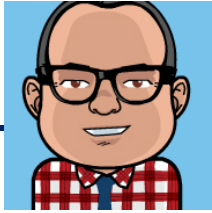
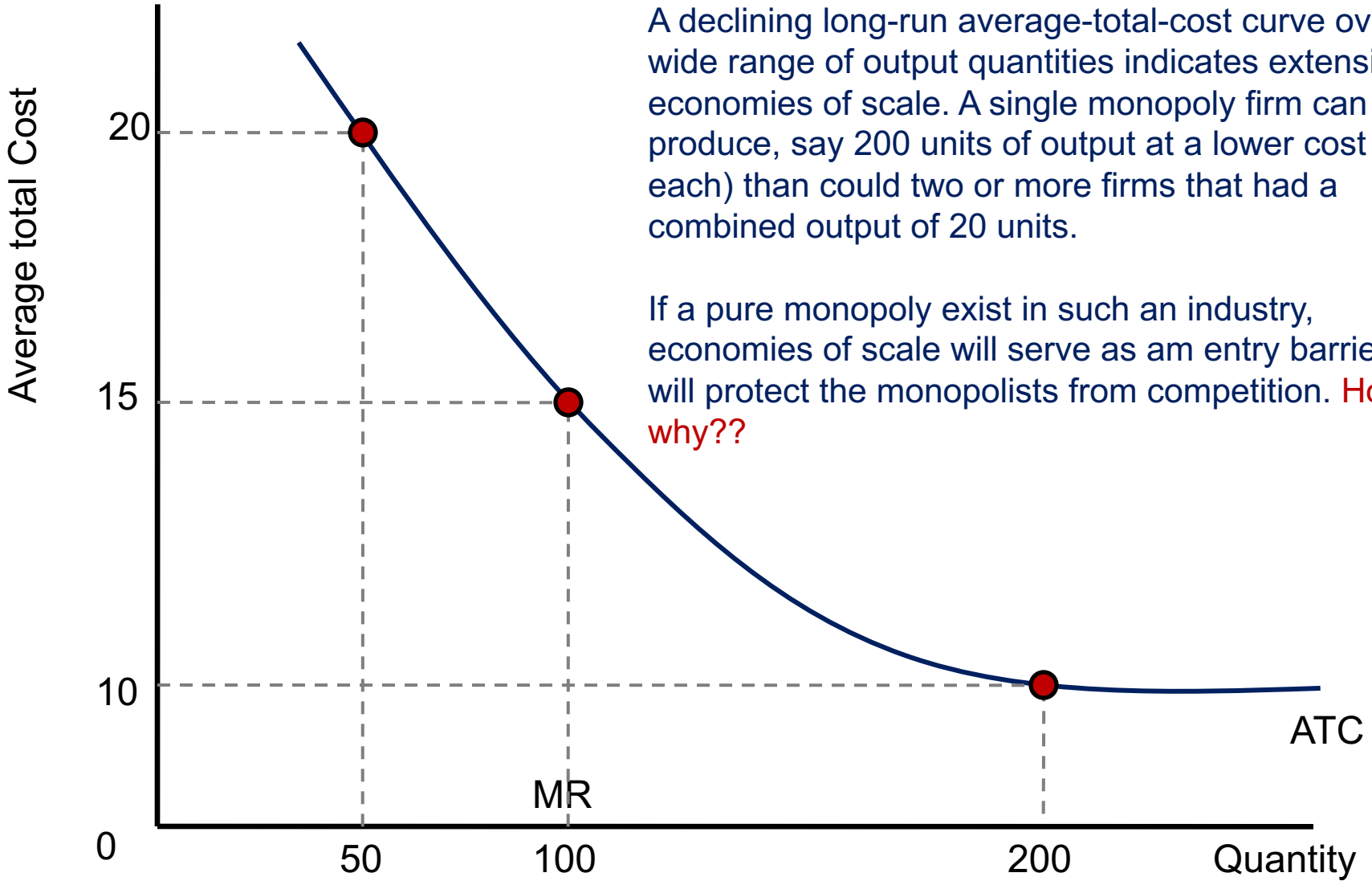


Economies of Scale: the natural monopoly case



A declining long-run average-total-cost curve over a wide range of output quantities indicates extensive economies of scale. A single monopoly firm can produce, say 200 units of output at a lower cost ($10 each) than could two or more firms that had a combined output of 20 units.

If a pure monopoly exist in such an industry, economies of scale will serve as am entry barrier and will protect the monopolists from competition. How and why??

Profit Maximization

- Because a monopolist is the only firm in an industry, the market demand curve is the same as the firm's demand curve.
- Demand under a monopoly will be relatively inelastic at each price because the monopolists can raise price and consumers have no alternative firm in the industry to turn to.
- The law of demand states that to increase sales, the firm must ___?___ price.
- Can a monopoly charge any price for their product?

PRICE	QUANTITY	TOTAL REVENUE	AVERAGE REVENUE	MARGINAL REVENUE
1	10	10	10	
2	9	18	9	8
3	8	24	5	6
4	7	28	7	4
5	6	30	6	2

Notice that marginal revenue is always below price. This is because the lower the price applies to all previous units, as well as the additional units.

- Monopolists face the same types of cost curves as the perfectly competitive firm, so its cost and revenue graph will appear like…

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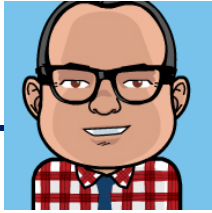

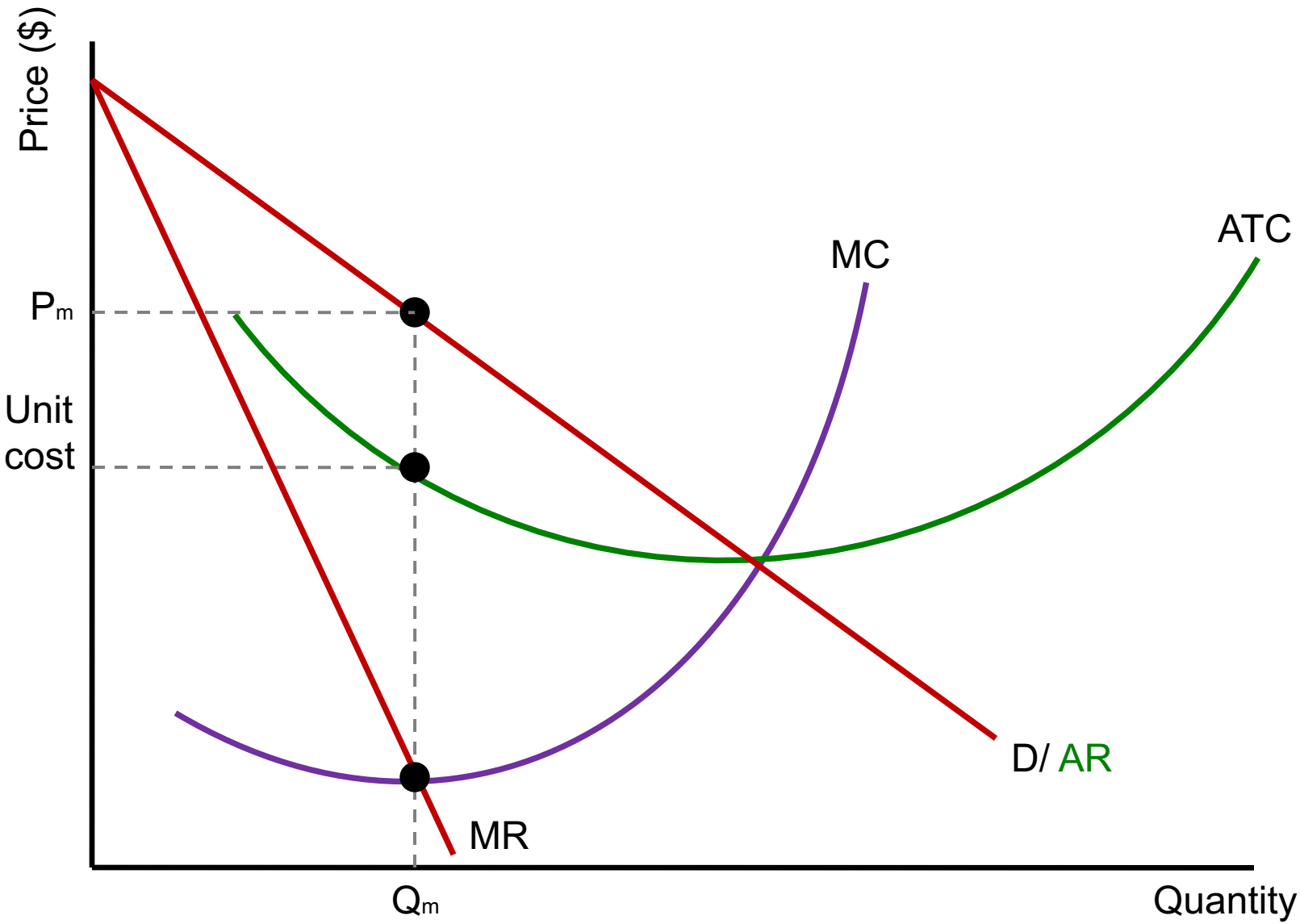

- Like the perfectly competitive firm, the monopolist maximizes profits where MR=MC. The quantity where this happens is Q_m. From that quantity, we read to the demand curve to find out the price, P_m. Monopoly firms earn economic profit if total average costs are lower than the price. The price in this graph is boxed, with the price as the upper parameter and the unit cost (where the MR=MC quantity intersects with the ATC) as the lower parameter.

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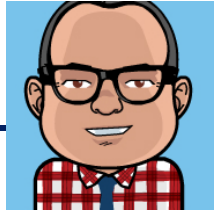

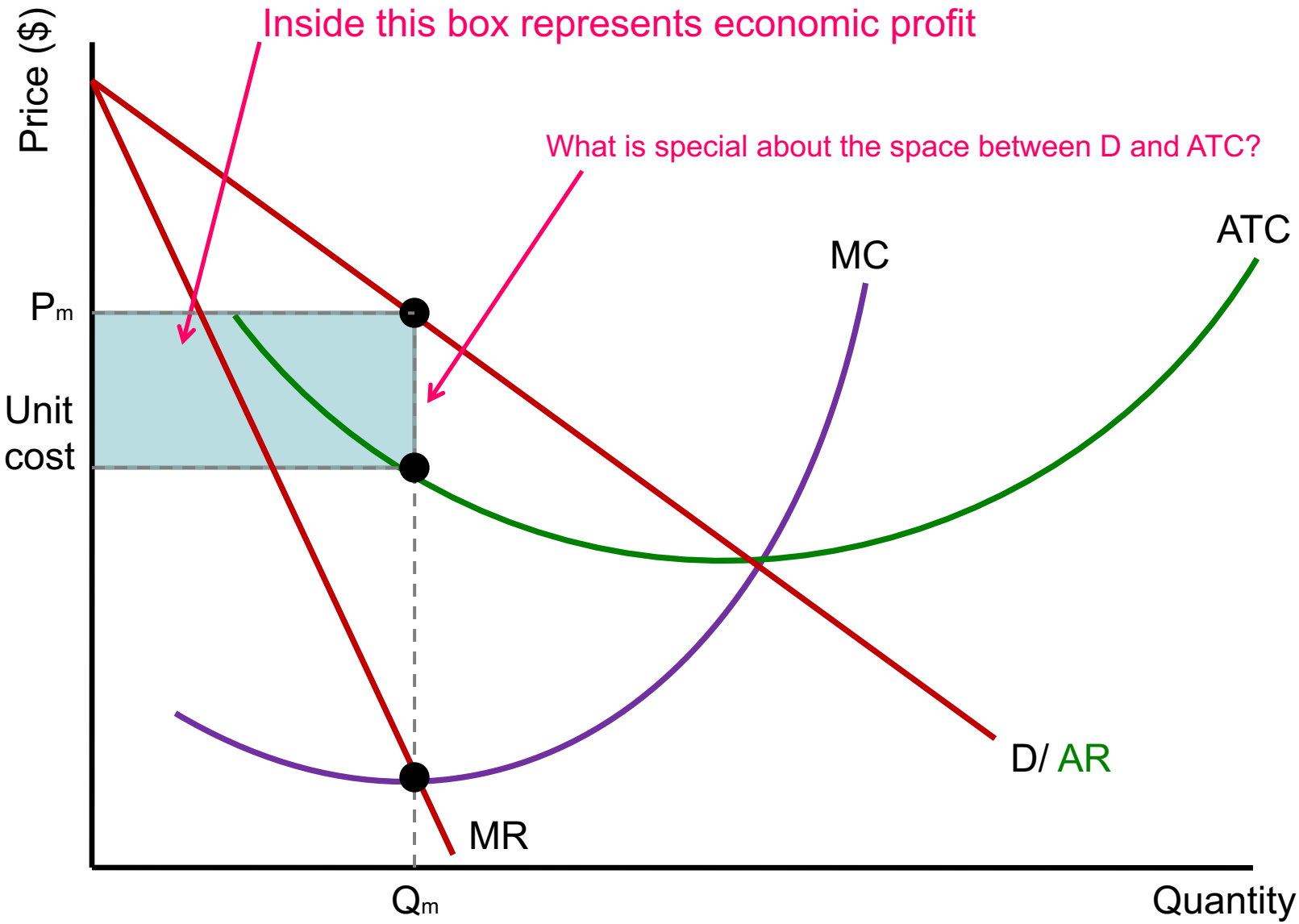

Inefficiency of Monopoly

- A monopoly will always charge a price greater than marginal cost, because of the difference between the demand and marginal revenue curves. We can use the concepts of consumer surplus to analyze the monopolist's efficiency.
- As price is greater than marginal cost, not all consumers who value the good above its cost can buy it.

- Notice that the graph shows fewer transactions being made under monopoly, which produces deadweight loss. The points of the triangle show the P_m the MR=MC output, and P=MC where the perfect competitor would produce. Since P>MC and P>minimum average cost, neither allocative nor productive efficiency is realized.

IB Economics – Monopoly

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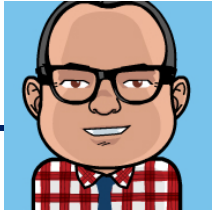

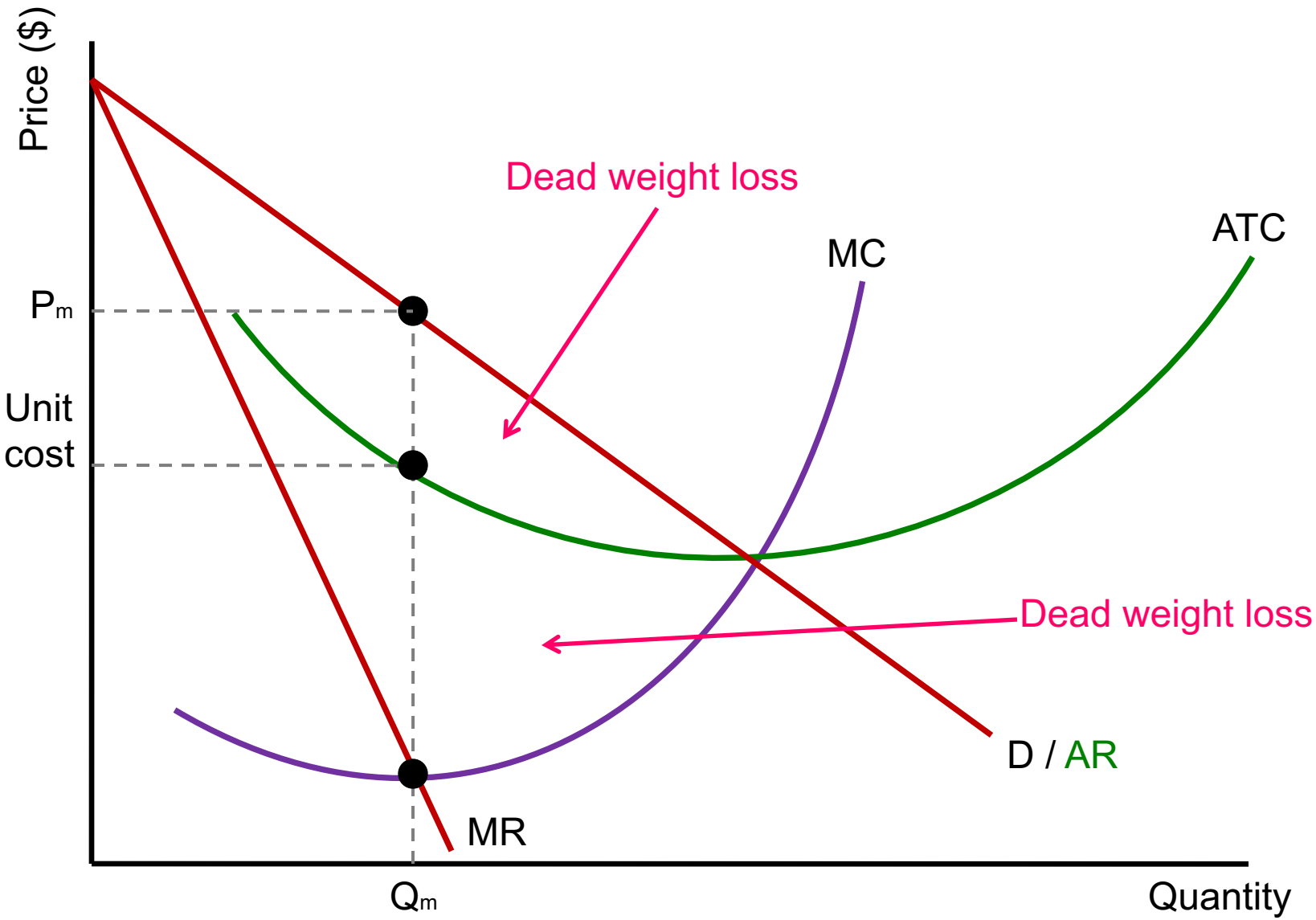

Monopoly Rules

- Produce at MR=MC
- Dead weight loss: units normally produced but not
- Break even point:
  - cost = revenue
  - ATC = AR
- P($) is above ATC = profit
- P($) is below ATC = loss
- Marginal cost pricing => MC=D

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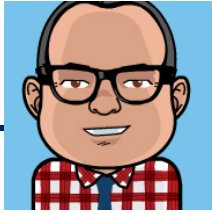
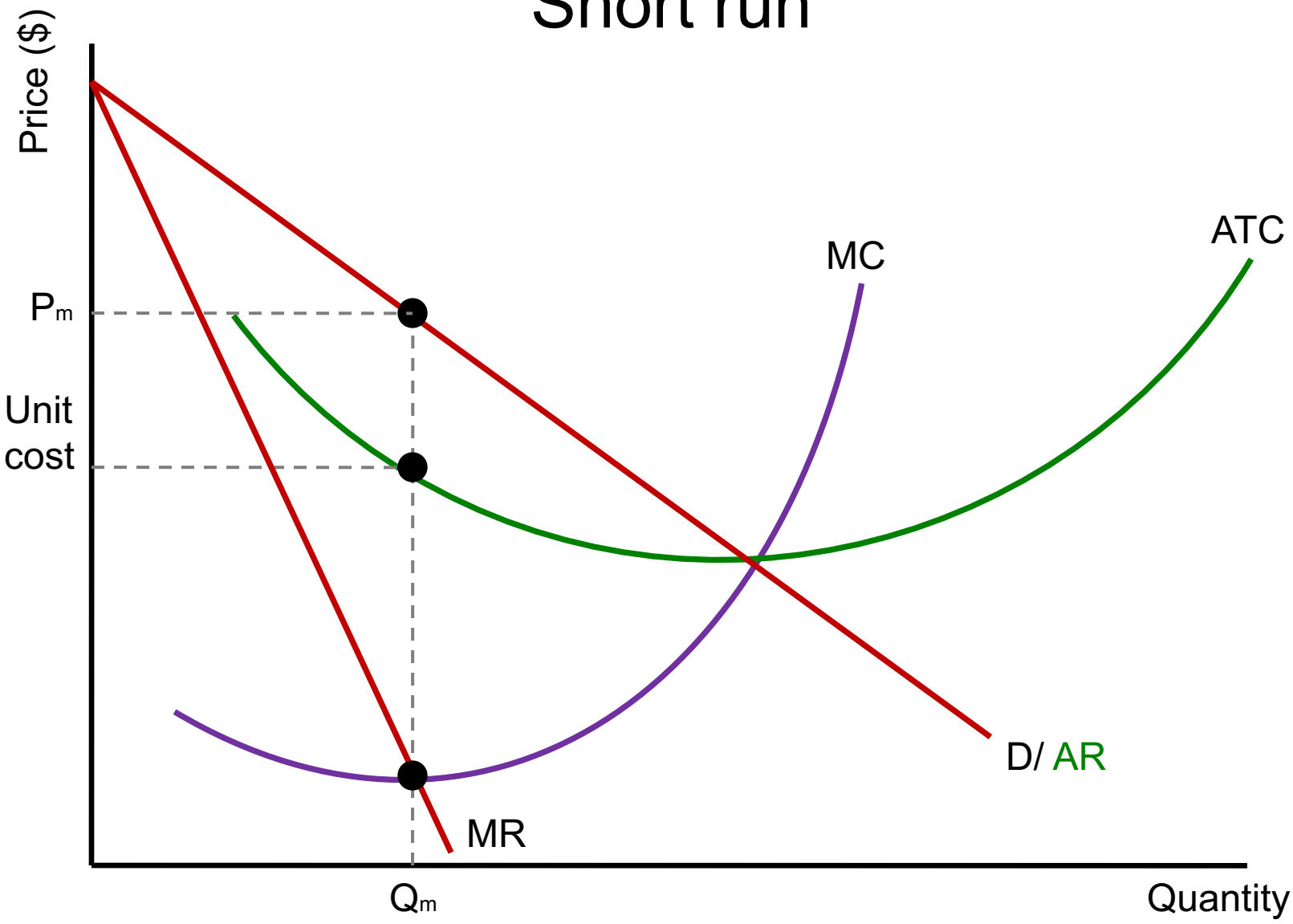


Short run



Monopolistic Competition

- The monopolistically competitive firm faces the same pattern of cost and revenue curves as the monopolist. The firm shown is making economic profits, because price is greater than average total cost.

Product Differentiation

- The difference between products is called product differentiation. Firms in monopolistically competitive industries strive for as much product differentiation as possible, for it is in the differentiation that their monopoly power lies. Many firms use advertising to keep their brand firmly fixed in consumers' minds. Some advertised items truly are different from one another, but some are merely perceived to be different due to the advertising.

Long Run

- The economic profit that the firm is making will attract new firms to enter the industry. As new firms enter, consumers are offered more choices, and some of them switch to new brands. This shifts the original firm's demand curve to the left. New firms will continue to enter until the industry reaches equilibrium. This will occur when all economic profits have been competed away and price equals average total cost. Thus in the long run these firms earn only normal profits.

IB Economics – Monopolistic Competition

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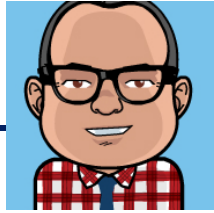
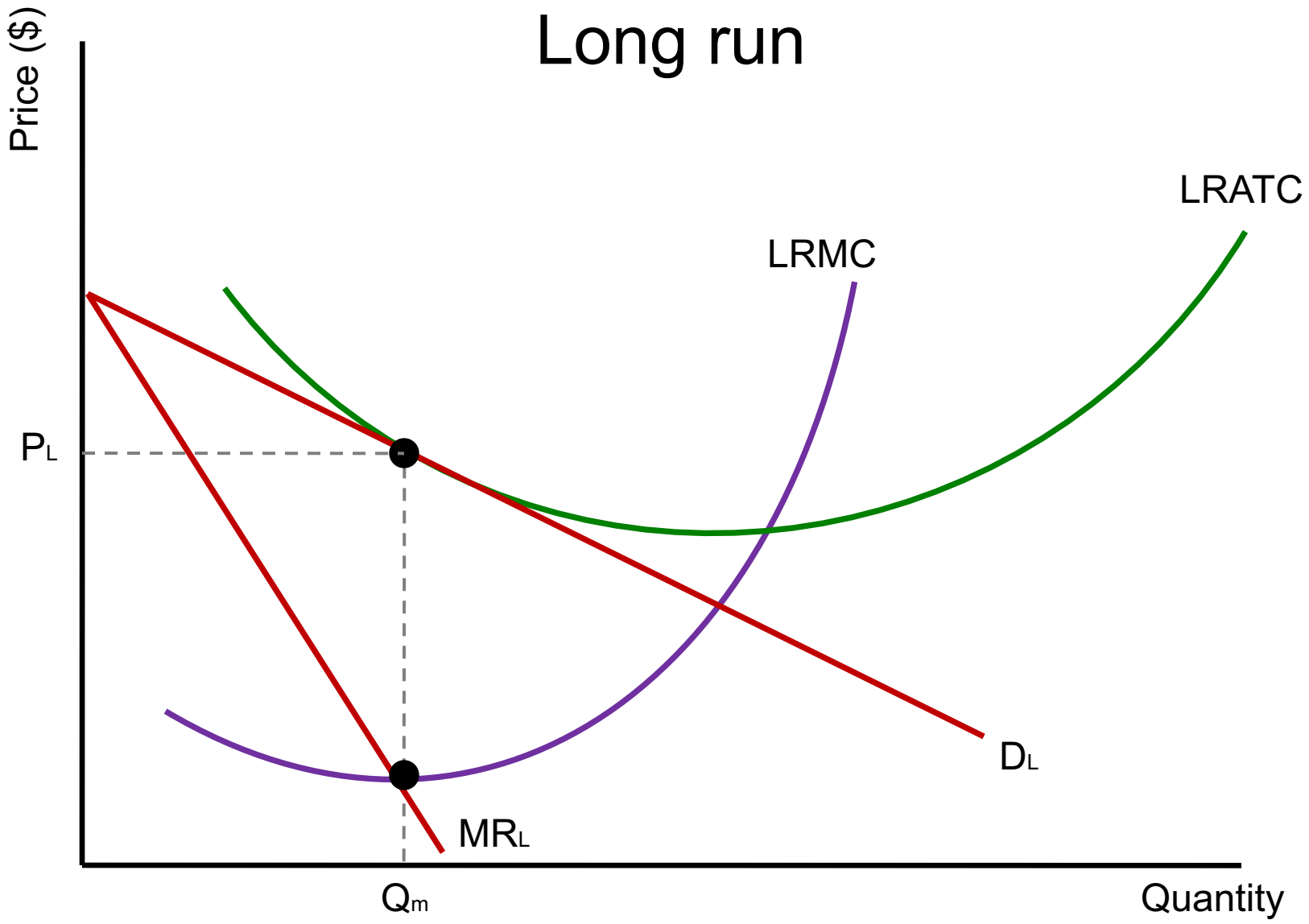


Long run



oligopoly

- An oligopoly is a market with only a few sellers; each offering a product that is largely the same as the others'. In this type of structure. There is always conflict between cooperation and competition.
- If the firms cooperate, they can operate as a monopolist, restricting output to raise price. However, each firm cares the most about its own interests, giving it an incentive to increase output in an effort to get a larger market share.

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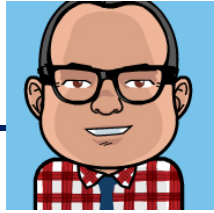
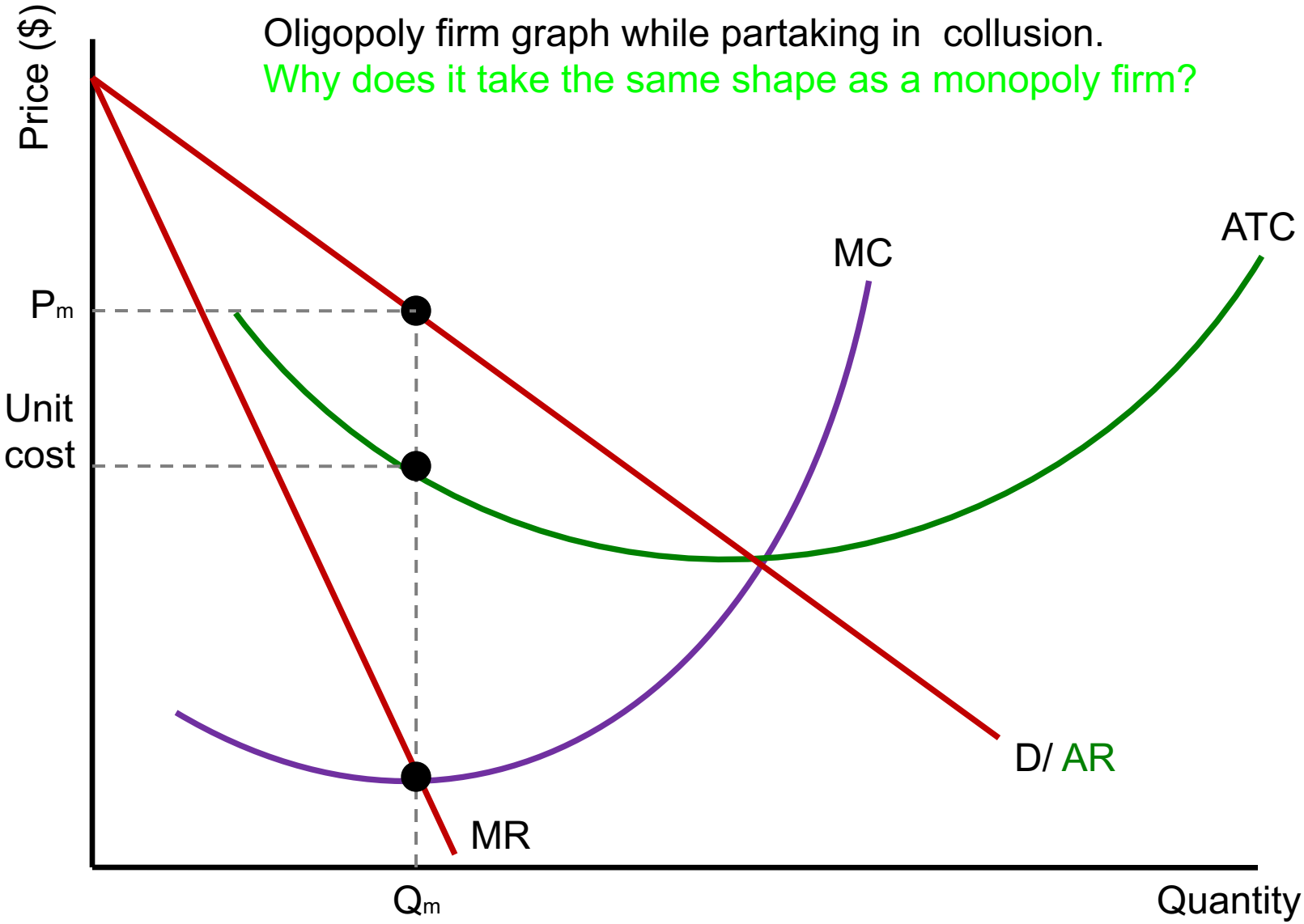


Oligopoly firm graph while partaking in collusion.

Why does it take the same shape as a monopoly firm?



Characteristics of an Oligopoly

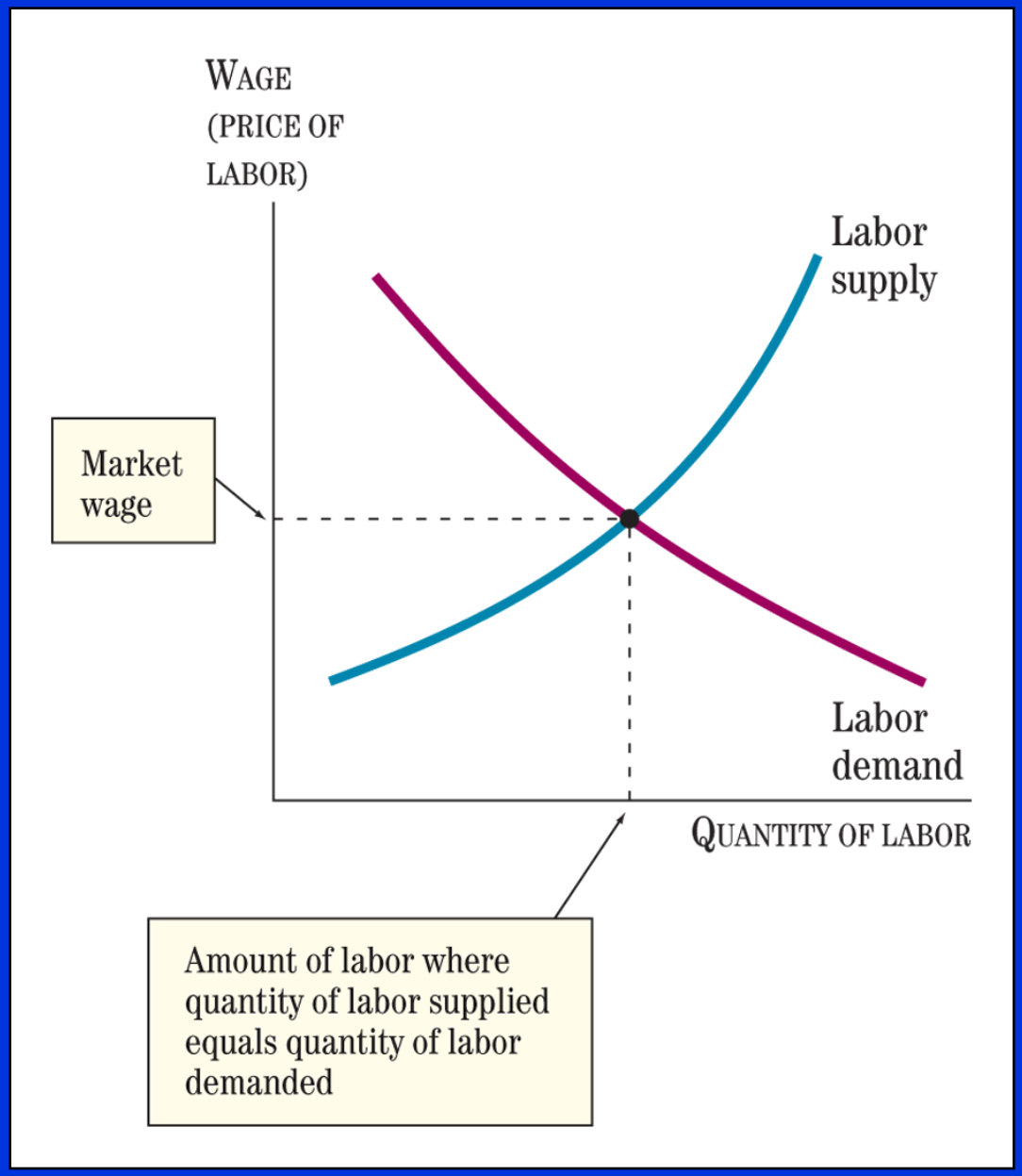
- A few large producers:
  - This a little vague and it depends on the industry.
- Homogeneous or differentiated products:
- An oligopoly can encompass both either identical or differentiated products.
- Mergers:
  - Some oligopolies have emerged mainly through the growth of dominant firms, but other industries have created oligopolies through mergers. How?
  - The urge to merge is the desire for monopoly power.

The Labor Market

- The labor market, just like the goods market, can be represented using a labor supply and labor demand curve. One big difference between the labor market and the goods market however, is households are sellers in the labor market, while firms are buyers.

IB Economics – The Demand for Resources

Mr. Dachpian



Adjusting for Inflation

- Wage – The price of labor defined over period of time; expressed as currency per unit of labor worked.

- Real wage – The wage or price of labor adjusted for inflation; in contrast, nominal wage has not been adjusted for inflation.

Labor Demand

- Labor Market – The market in which individuals supply their labor time to firms in exchange for salaries and wages.

- Labor Supply – The relationship between the quantity of labor supplied by individuals and the wage.

- Labor Demand – The relationship between the quantity of labor demanded by firms and the wage. Labor demand is a derived demand.

- Derived Demand – The demand for an input derived from the demand for the product produced with that input.

- Marginal product of labor – The change in production due to a one-unit increase in the labor input.
- Marginal revenue product of labor = the change in total revenue due to a one-unit increase in the labor input.
- The next table illustrates an example showing how the marginal product and the marginal revenue product of labor is calculated.

MRP = Wage

- If a firm is profit maximizing, it will hire the largest number of workers for which the MRP is greater than the wage. If the firm can hire fractional units of labor, then the firm will continue to hire until the MRP = Wage.

- Note: At the point where the MRP equals the wage, the MRP must be downward sloping.

Intuition

- If MRP of the next worker is greater than the wage, hiring the next worker will bring more revenues than costs, so profits will increase.
- If MRP of the next worker is less than the wage, hiring the next worker will bring less revenues than costs, so profits will decrease.

The Firm's Demand for Labor

- Because the firm will hire workers using the rule MRP = Wage, then the demand curve for labor is determined completely by the marginal revenue product of labor.

- Figure 13.3 illustrates how the labor demand curve is determined.

The Market Demand for Labor

- The market demand for labor is derived by the horizontal summation of the individual demand curves of the labor market.

- Figure 13.4 illustrates an example where the market demand for labor is derived from two firms. Note that the market demand curve is flatter than either of the individual demand curves.

IB Economics – The Demand for Resources

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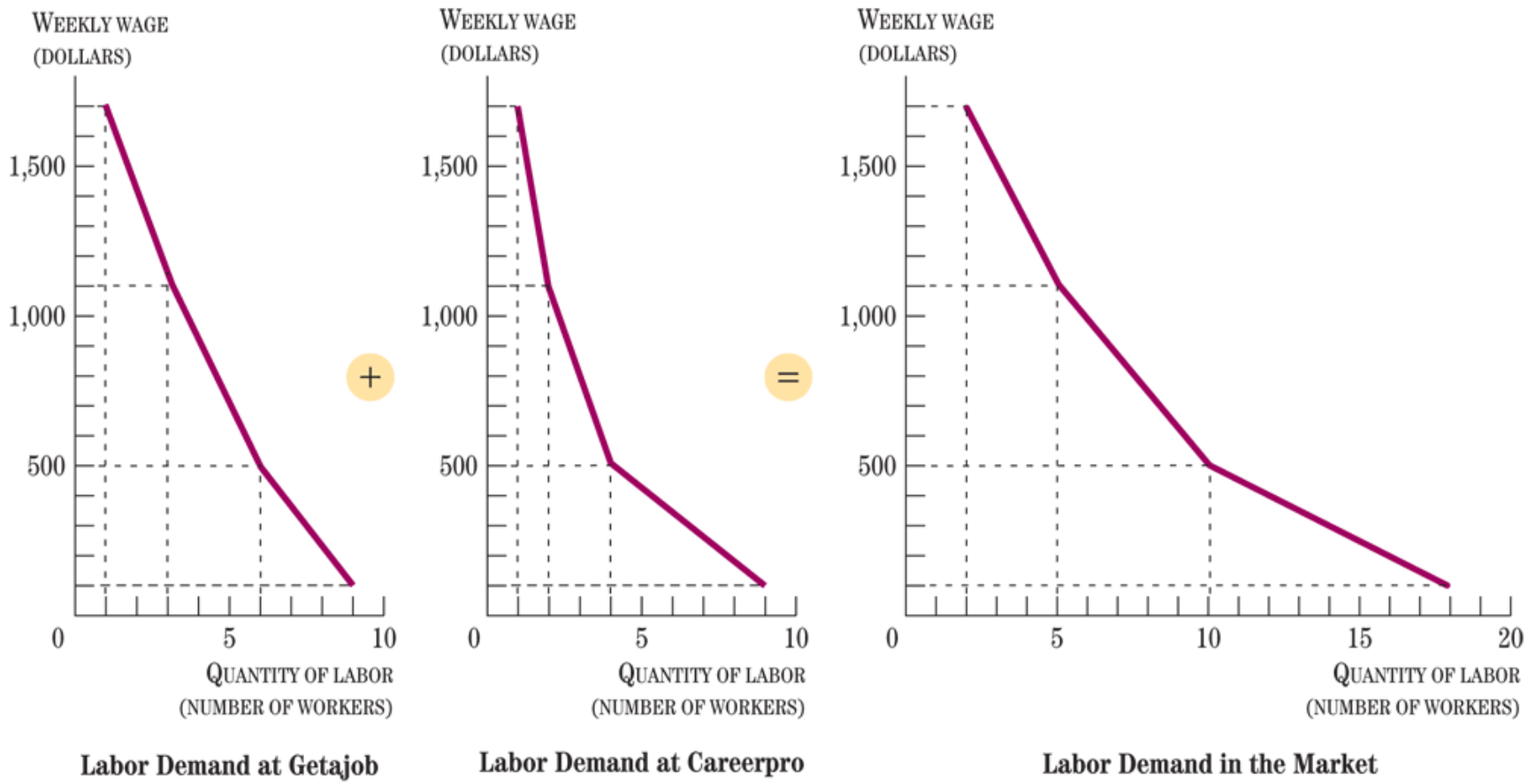

Labor Demand at Getajob | **Labor Demand at Careerpro** | **Labor Demand in the Market**

Labor Supply

- In economics, the decision to supply labor is analyzed as a decision between working and the other activities that can be done instead of working.

- Leisure – Generic term used by economists for non-work activities.

Recall

- Labor Supply – The relationship between the quantity of labor supplied by individuals and the wage.
- Like the decision to consume a commodity, the decision to work more or less given a wage change can be analyzed with the concepts of the *income effect* and the *substitution effect*.

The Shape of the Supply Curve

- The supply curve will be upward sloping if the income effect is smaller than the substitution effect.
- The supply curve will be downward sloping if the income effect is greater than the substitution effect (this is also known as the backward-bending labor supply curve).
- The supply curve will be vertical if the income effect equals the substitution effect.

The Shape of the Supply Curve (cont'd)

- Figure 13.5 illustrates the three possible shapes of the labor supply curve. Figure 13.6 summarizes the relative sizes of the income and substitution effects associated with the differing slopes of the labor supply curve.

IB Economics – The Demand for Resources

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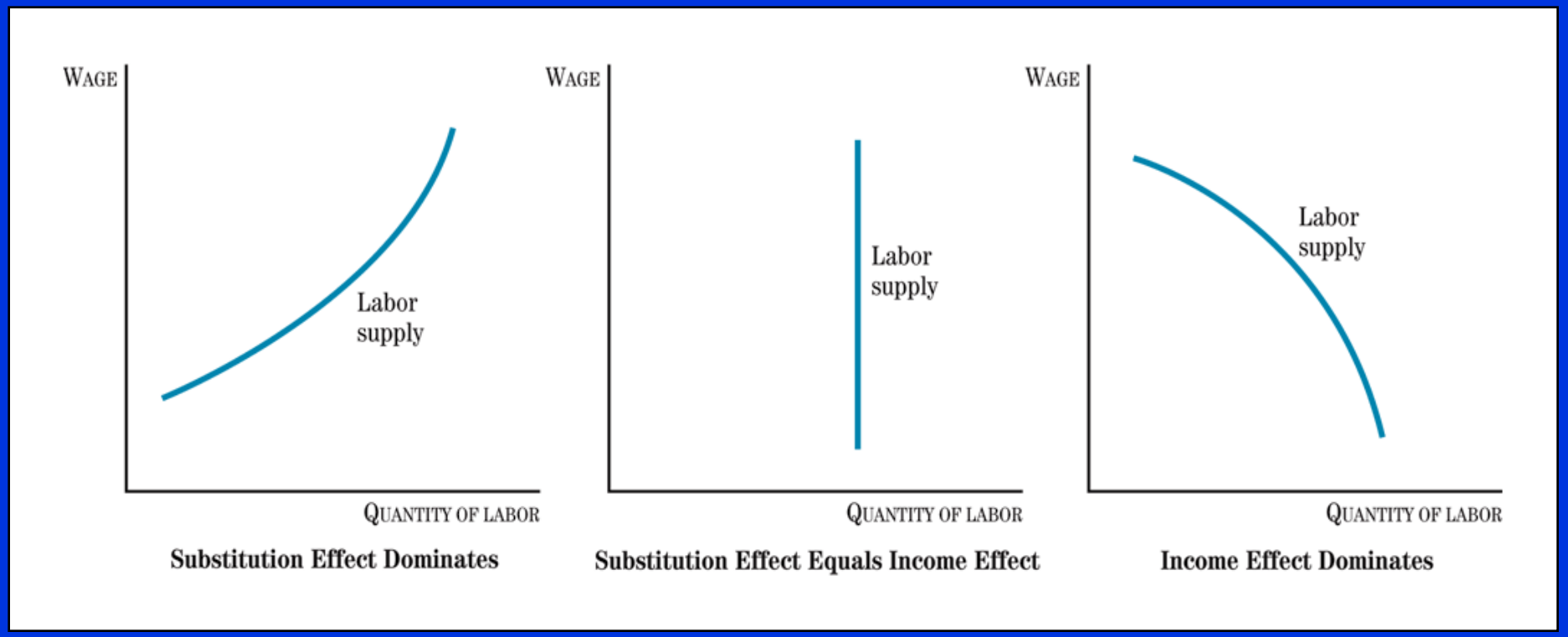

IB Economics – The Demand for Resources

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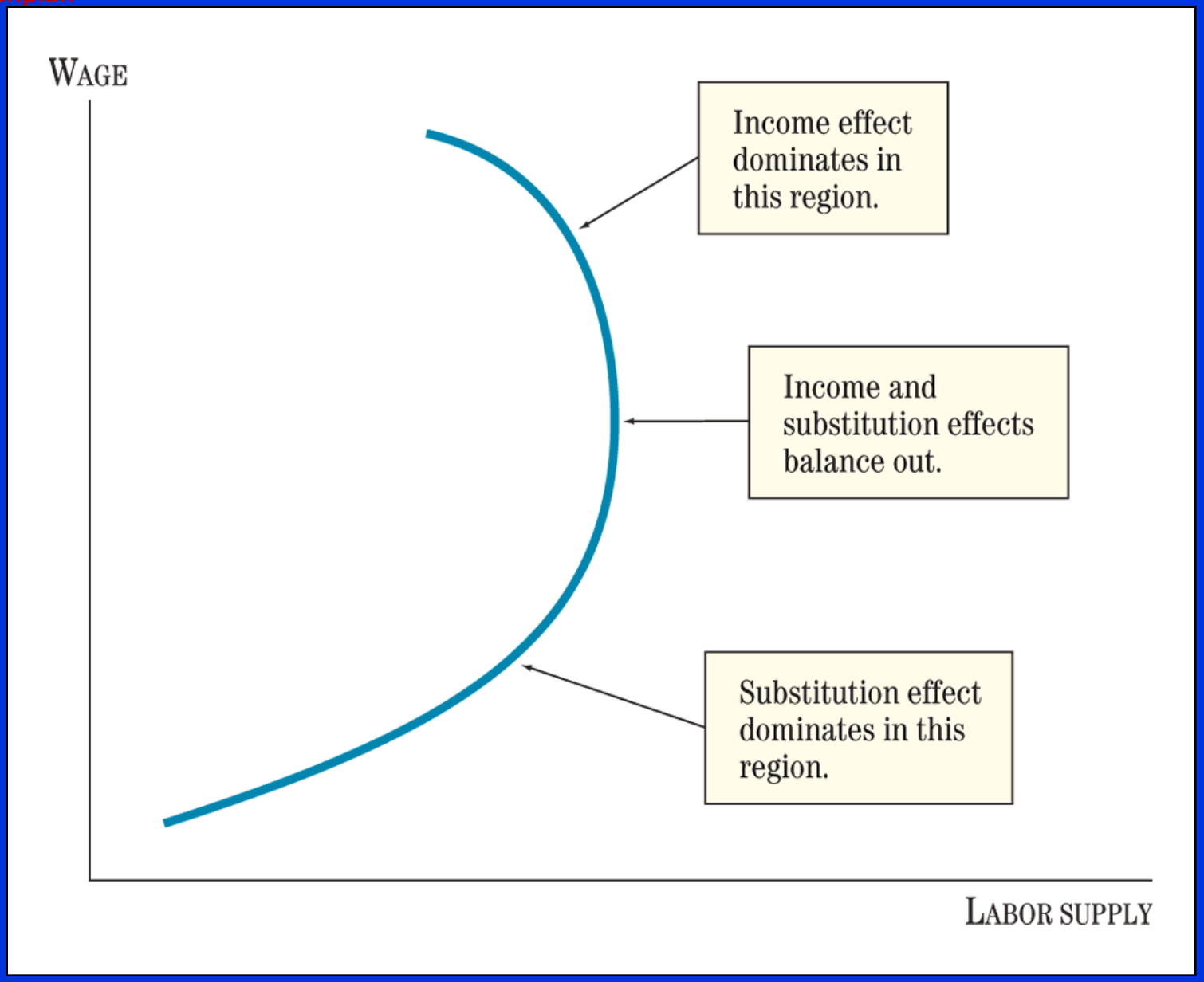


Monopsony and Bilateral Monopoly

- Monopsony – A situation in which there is a single buyer of a particular good or service in a given market.

- Bilateral monopoly – The situation in which there is one buyer and one seller in a market.

Public Goods

- Public Good – A good or service that has two characteristics: non-rivalry in consumption and non-excludability.
- Private Good – Has excludability or rivalry.
- Examples of Public Goods: National defense, levees, clean air, etc.

Free riders

- Free rider problem – A problem arising in the case of public goods because those who do not contribute to the costs of providing the public good cannot be excluded from the benefits of it.
- Again, going back to the national defense example. No one would choose to pay for it if it were a private good, because it is going to be provided anyway, regardless of whether you pay for it or not.

Avoiding Free-Rider Problems

- One way to avoid free rider problems is to charge fees to all users. For example, user fees have been common in government services such as national parks.

- User Fees – A fee charged for the use of a good normally provided by the government.

Cost – Benefit Analysis

- Decisions on which public good to produce or how much to produce can be analyzed using cost-benefit analysis.

- Cost-benefit analysis – An appraisal of a project based on the expected costs and benefits derived from it.

Externalities

- Externality – The situation in which the costs of producing or the benefits of consuming a good spill over onto those who are not producing or consuming the good.

Two Types of Externalities

1) Positive externality
2) Negative externality

Externalities (cont'd)

- Negative Externality – the situation in which the costs spill over onto someone not involved in producing or consuming the good.

- Positive Externality -the situation in which the benefits spill over onto someone not involved in producing or consuming the good.

Negative Externality

- With negative externalities, the market produces more of a good than the efficient quantity because producers do not take into account the cost to others when they produce their goods.

- Examples: air pollution, loud music, traffic, etc.

Negative Externality (cont'd)

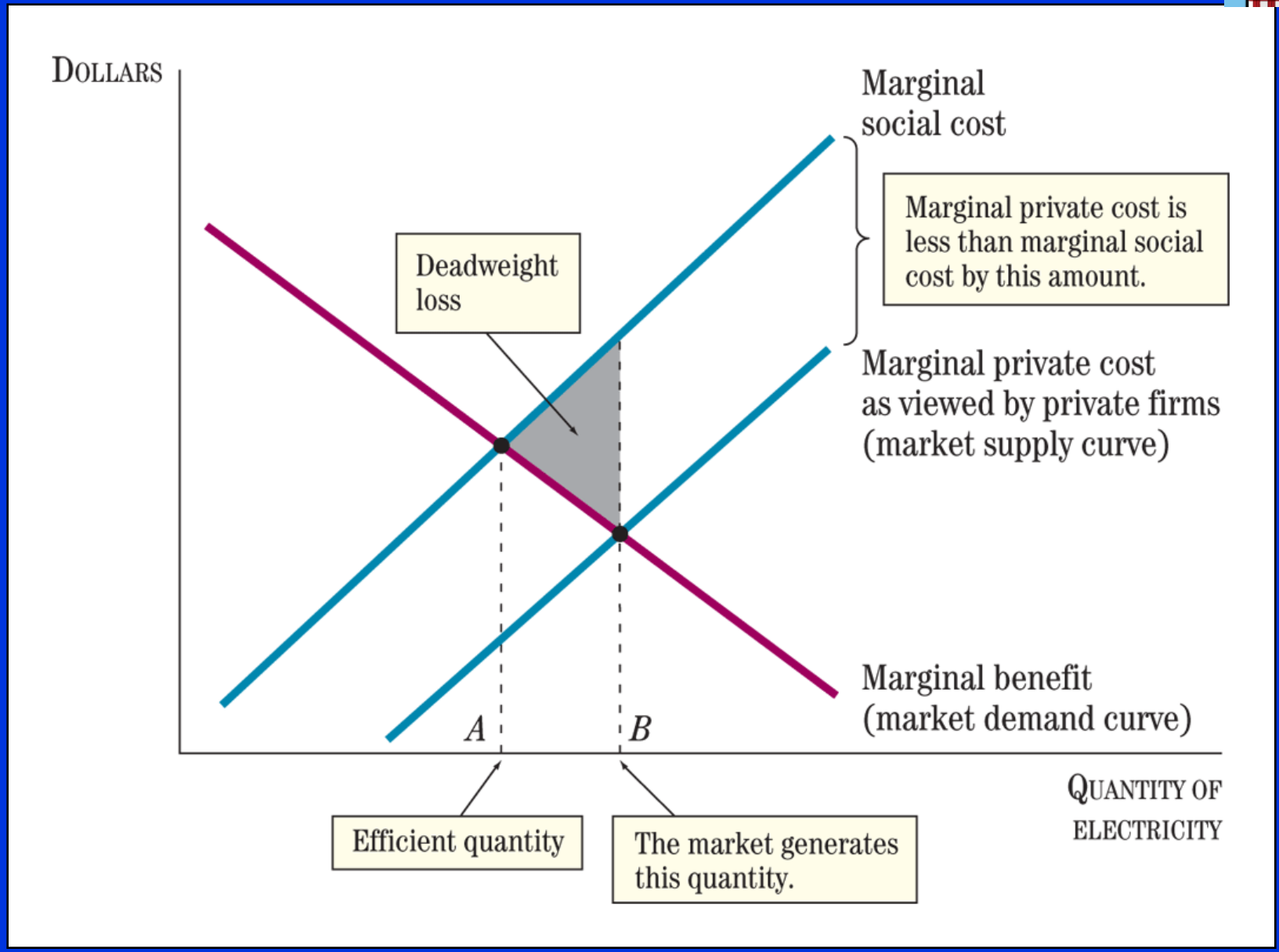
- Marginal Private Cost – The marginal cost of production as viewed by the private firm or individual.

- Marginal Social Cost – The marginal cost of production as viewed by society as a whole; the sum of the firm's marginal private cost and the increase in external costs to society as more is produced.

Negative Externality (cont'd)

- Marginal Social Cost = marginal private cost + marginal external cost

- Figure 15.1 illustrates the relationship between the marginal social cost and the marginal private cost in a situation with negative externality.


DOLLARS
Marginal social cost
Marginal private cost is less than marginal social cost by this amount.
Deadweight loss
Marginal private cost as viewed by private firms (market supply curve)
Marginal benefit (market demand curve)
A
B
QUANTITY OF ELECTRICITY
Efficient quantity
The market generates this quantity.

- From Figure 15.1: if producers produce goods by taking into account the marginal private costs, then the quantity produced will exceed the socially efficient quantity. At the quantity that the market produces, the marginal social cost is larger than the marginal benefit, and the economy generates a deadweight loss equal to the shaded triangle in Figure 15.1.

Positive Externalities

- Positive externality occurs when the activity of one person makes another person better off by either reducing costs or increasing benefits.
- Examples: Growing a nice garden in front of your home makes you and your neighbors happy; improving your hygiene makes it harder for some diseases to spread to other individuals.

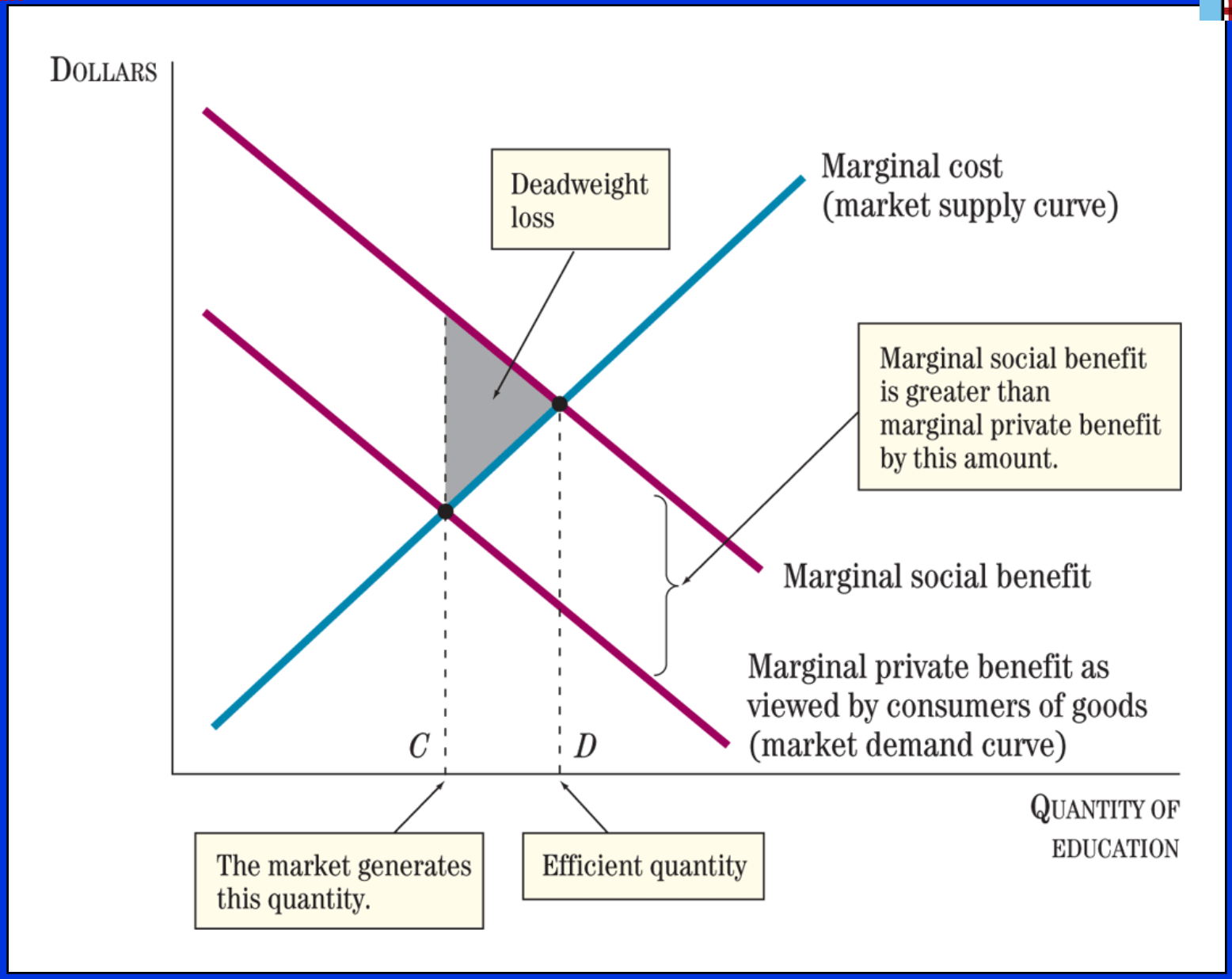
Positive Externalities (cont'd)

- Marginal Private Benefit – The additional benefit from consumption of a good as viewed by a private individual.

- Marginal Social Benefit – The additional benefit from consumption of a good from the viewpoint of society as a whole.

Positive Externalities (cont'd)

- Figure 15.2 illustrates the relationship between the marginal private benefit and the marginal social benefit when positive externality exists.


DOLLARS
Deadweight loss
Marginal cost (market supply curve)
Marginal social benefit is greater than marginal private benefit by this amount.
Marginal social benefit
Marginal private benefit as viewed by consumers of goods (market demand curve)
C
D
QUANTITY OF EDUCATION
The market generates this quantity.
Efficient quantity

Positive Externalities (cont'd)

- With positive externality, as illustrated in Figure 15.2, the marginal social benefit is higher than the marginal private benefit, so the socially efficient production quantity of the good with a positive externality is higher than what the market produces. At the quantity that the market produces, the social marginal benefit is larger than the marginal cost, so increasing production would have increased society's surplus.

Positive Externalities (cont'd)

- Producing at a quantity below the socially efficient quantity results in a deadweight loss. The deadweight loss is the shaded triangle illustrated in Figure 15.2.

Remedies for Externalities (cont'd)

- Internalizing the externality – the process of providing incentives so that the externalities are taken into account internally by firms or consumers.

Four ways to internalize an externality:

1) Private remedies
2) Command and control
3) Taxes and subsidies
4) Tradable permits

Private Remedies (cont'd)

- Coase Theorem – The idea that private negotiations between people will lead to an efficient resolution of externalities regardless of who has the property rights as long as property rights are defined (and the transaction costs are low).

- Transaction Costs – The costs of buying or selling in a market, including search, bargaining, and writing contracts.

Private Remedies (cont'd)

Coase Theorem, an example:

- Suppose a firm producing chemicals is polluting a lake that Bob likes to swim in. The benefit Bob gets from swimming is $500 while the benefit that the firm gets from polluting is the $1000 profit that it makes. The cost of cleaning the lake, so Bob can swim in it, is $200.

Private Remedies (cont'd)

- Suppose Bob owns the right to pollute. He can demand the firm to either stop polluting, pay the cost of cleaning, or pay Bob the $500 in lost benefits. Since the cost of cleaning is least expensive, the firm will choose to pollute and keep cleaning the lake. Bob will continue swimming.

Private Remedies (cont'd)

- If the firm owns the property rights, Bob can approach the firm and pay them to stop producing or he can pay for the cleaning of the lake so that he can swim. Bob can also choose to not swim and lose the $500 in benefits from swimming. Since the cost of cleaning is least expensive, Bob will choose to pay for cleaning the lake so that he can swim.

Private Remedies (cont'd)

- Notice that in the example, assigning Bob or the firm the right to the lake does not change the end solution, i.e., the firm pollutes, Bob swims, and the lake is cleaned.
- Transaction costs must be low for the solution to be the same. Imagine if in the same example, the cost of getting lawyers is $600, then Bob may not want to make a deal with the firm, since the transaction cost is larger than his benefit of swimming.

Private Remedies (cont'd)

- Free rider problems also complicate the analysis. Suppose there are 200 swimmers, and the property rights belong to the firm. In order to swim, swimmers must pay $1 each in order to pay for their share of the $200 clean-up cost.

- If one swimmer refuses to pay, others will have to end up paying that swimmer's share of the clean-up costs and the swimmer who did not pay gets a free ride.

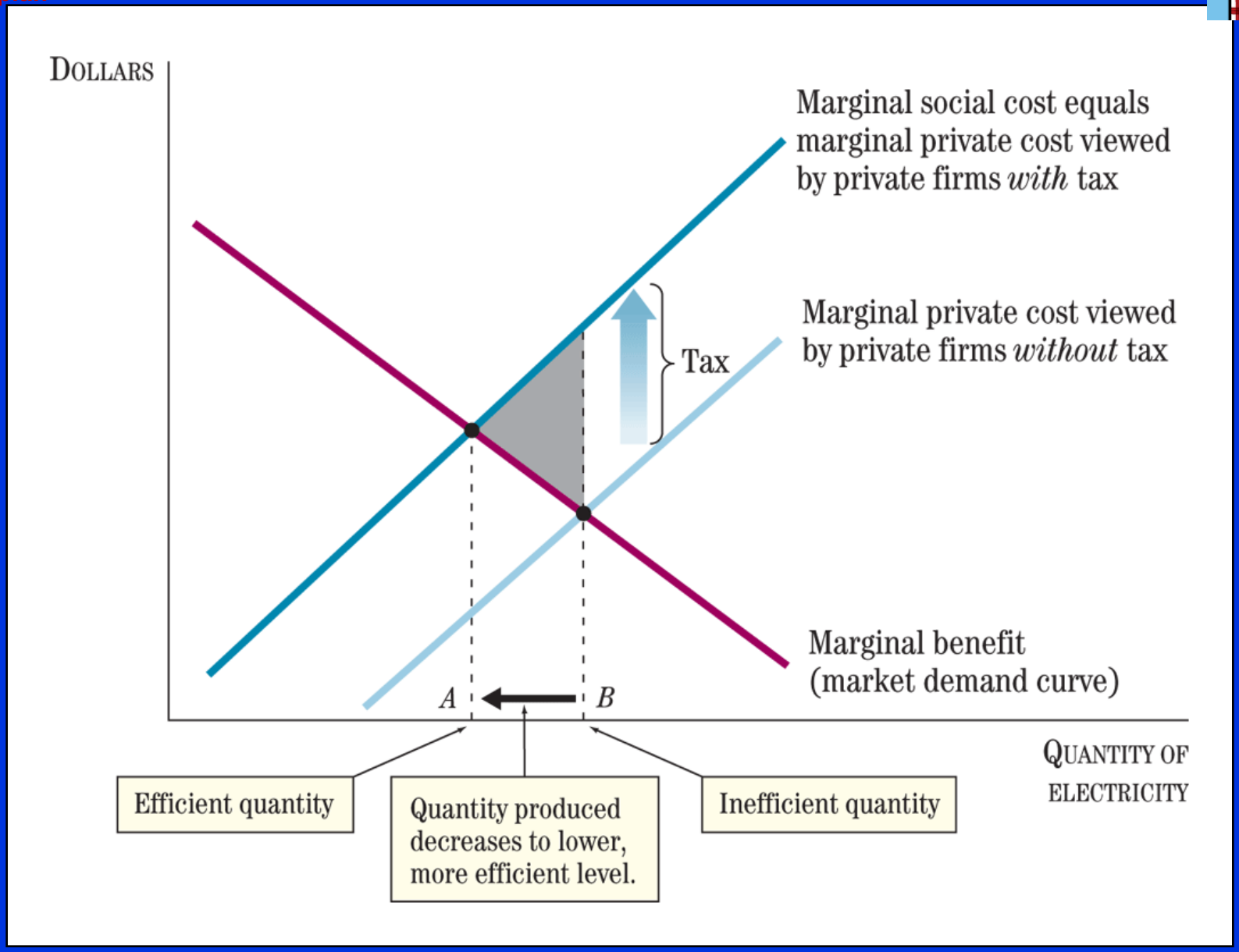
Taxes and Subsidies

- Goods that produce negative externalities are taxed in order to raise the producer's marginal private cost equal to the marginal social costs. The tax is aimed at encouraging the producer of the negative externality to decrease the quantity produced.
- Goods that produce positive externalities are subsidized in order to increase the marginal private benefits of the producer to equal the marginal social benefits. Subsidies aim to encourage the producer of the positive externality to increase the quantity produced.

Taxes and Subsidies (cont'd)

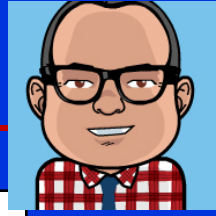
- Figure 15.3 illustrates how a tax will result in an efficient quantity produced. The tax that will shift the marginal private cost (faced by the producer) equal to the marginal social cost, will result in an efficient quantity. The deadweight loss will be eliminated.

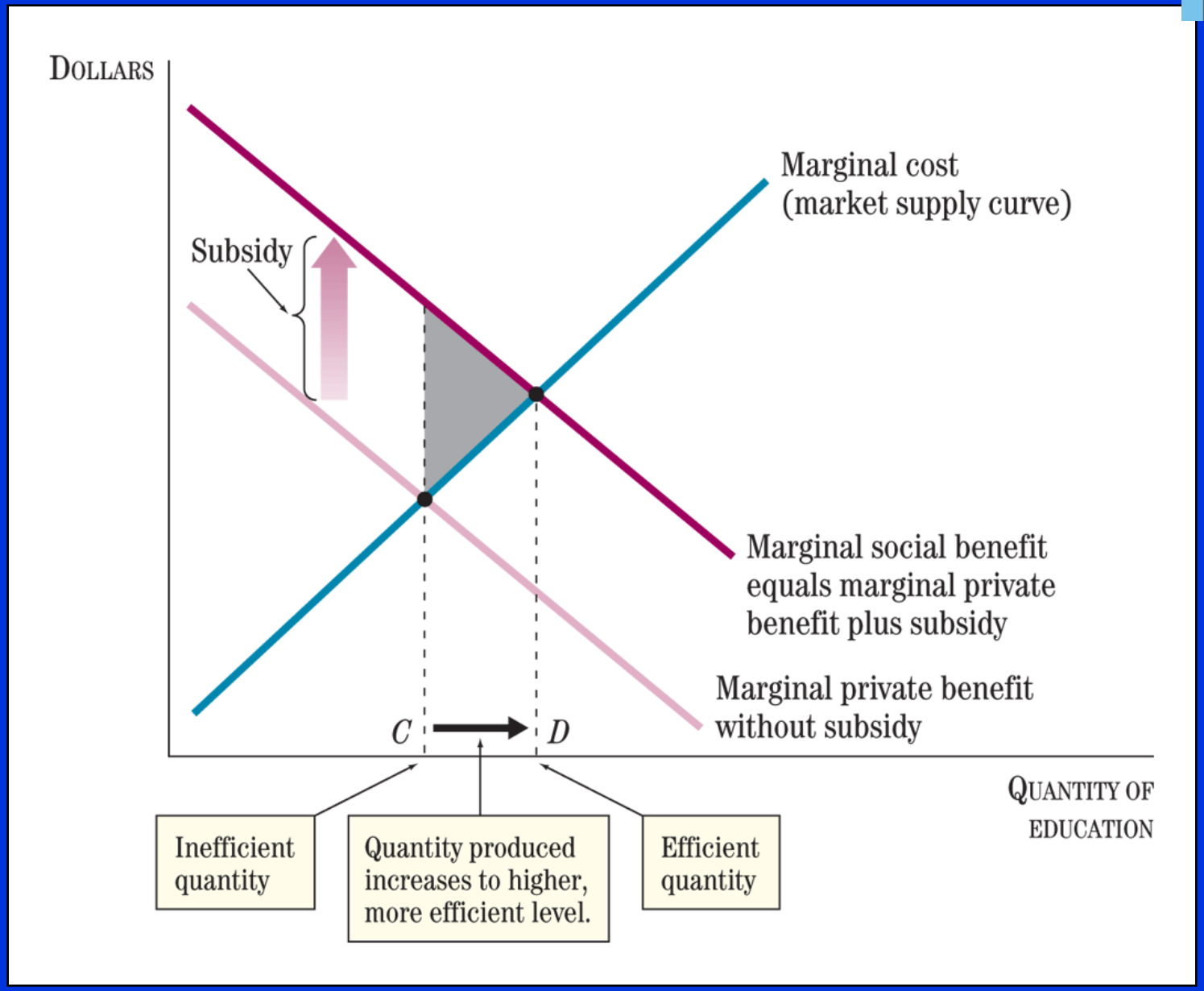
Mr. Dachpian


DOLLARS
Marginal social cost equals marginal private cost viewed by private firms *with* tax
Marginal private cost viewed by private firms *without* tax
Tax
Marginal benefit (market demand curve)
A
B
QUANTITY OF ELECTRICITY
Efficient quantity
Quantity produced decreases to lower, more efficient level.
Inefficient quantity

Taxes and Subsidies (cont'd)

- Figure 15.4 illustrates how a subsidy will result in an efficient quantity produced. The subsidy that will shift the marginal private benefit (faced by the consumer) equal to the marginal social benefit, will result in an efficient quantity. The deadweight loss will be eliminated.




DOLLARS
Marginal cost
(market supply curve)
Subsidy
Marginal social benefit
equals marginal private
benefit plus subsidy
Marginal private benefit
without subsidy
C
D
QUANTITY OF
EDUCATION
Inefficient
quantity
Quantity produced
increases to higher,
more efficient level.
Efficient
quantity