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Consumers, Producers, and
the Efficiency of Markets

PRINCIPLES OF
MICROECONOMICS
FOURTH CANADIAN EDITION

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PowerPoint® Slides
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Canadian adaptation by Marc Prud'Homme

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In this chapter, look for the answers to these questions:

- What is consumer surplus? How is it related to the demand curve?
- What is producer surplus? How is it related to the supply curve?
- Do markets produce a desirable allocation of resources? Or could the market outcome be improved upon?

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Welfare Economics

- Recall, the **allocation of resources** refers to:
 - how much of each good is produced
 - which producers produce it
 - which consumers consume it
- Welfare economics:**
the study of how the allocation of resources affects economic well-being
- First, we look at the well-being of consumers.

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Willingness to Pay (WTP)

A buyer's **willingness to pay** for a good is the maximum amount the buyer will pay for that good.

WTP measures how much the buyer values the good.

name	WTP
Anthony	\$250
Chad	175
Flea	300
John	125

Example:
4 buyers' WTP
for an iPod

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WTP and the Demand Curve

Q: If price of iPod is \$200, who will buy an iPod, and what is quantity demanded?

A: Anthony & Flea will buy an iPod,
Chad & John will not.

Hence, $Q^d = 2$
when $P = \$200$.

name	WTP
Anthony	\$250
Chad	175
Flea	300
John	125

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WTP and the Demand Curve

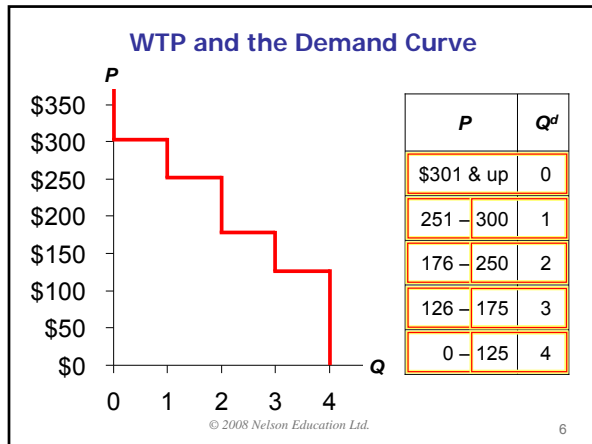
Derive the
demand
schedule:

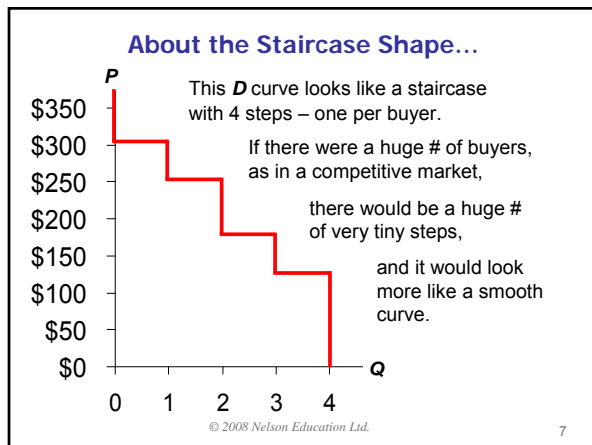
name	WTP
Anthony	\$250
Chad	175
Flea	300
John	125

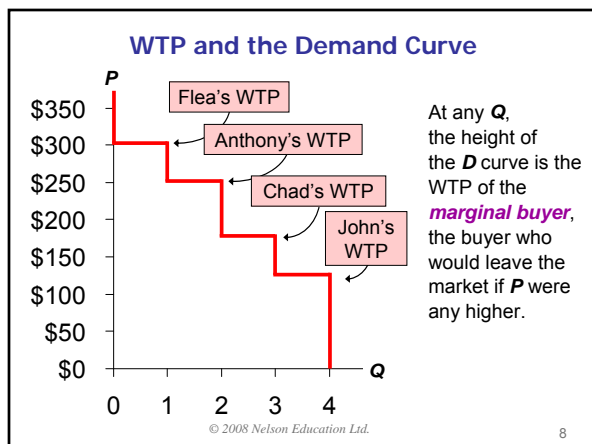
P (price of iPod)	who buys	Q^d
\$301 & up	nobody	0
251 – 300	Flea	1
176 – 250	Anthony, Flea	2
126 – 175	Chad, Anthony, Flea	3
0 – 125	John, Chad, Anthony, Flea	4

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Consumer Surplus (CS)

Consumer surplus is the amount a buyer is willing to pay minus the buyer actually pays:

$$CS = WTP - P$$

name	WTP
Anthony	\$250
Chad	175
Flea	300
John	125

Suppose $P = \$260$.

Flea's CS = $\$300 - 260 = \40 .

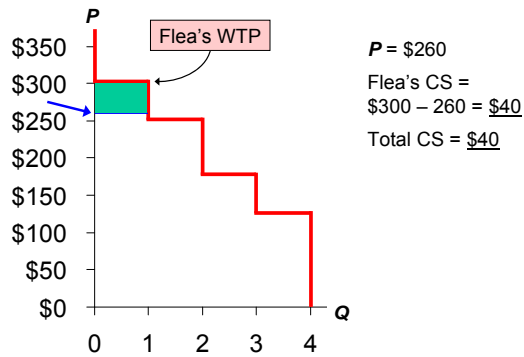
The others get no CS because they do not buy an iPod at this price.

Total CS = $\$40$.

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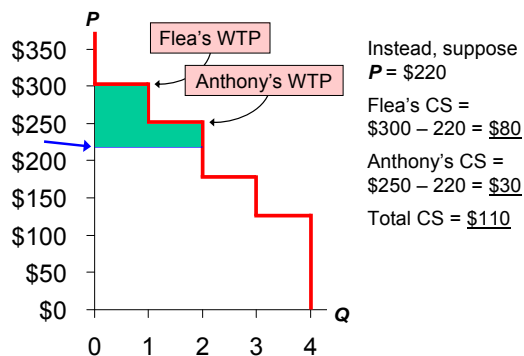
CS and the Demand Curve



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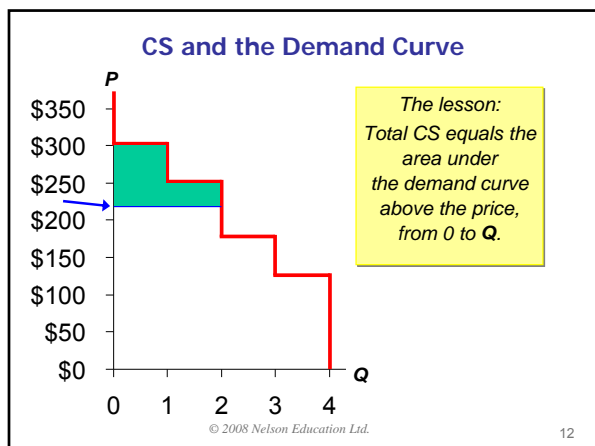
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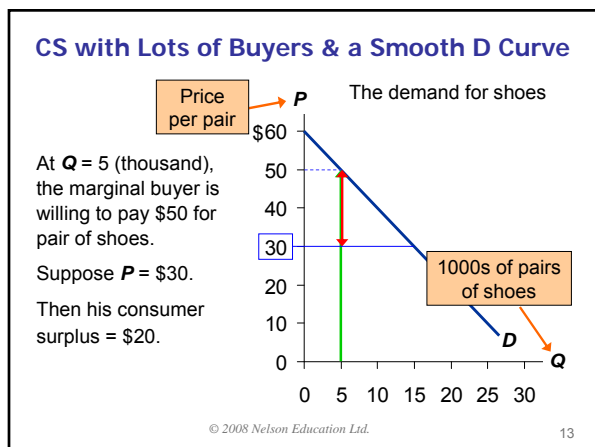
CS and the Demand Curve

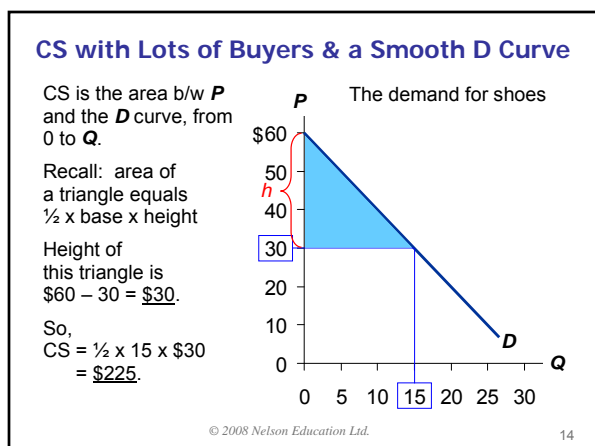


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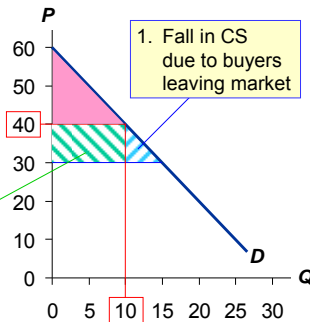




How a Higher Price Reduces CS

If P rises to \$40,
 $CS = \frac{1}{2} \times 10 \times \20
 $= \$100$.
 Two reasons for the
 fall in CS.

2. Fall in CS due to
 remaining buyers
 paying higher P



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ACTIVE LEARNING 1: Consumer surplus

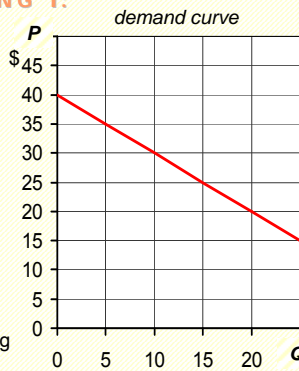
A. Find marginal
 buyer's WTP at
 $Q = 10$.

B. Find CS for
 $P = \$30$.

Suppose P falls to \$20.
 How much will CS
 increase due to...

C. buyers entering
 the market

D. existing buyers paying
 lower price



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ACTIVE LEARNING 1: Answers

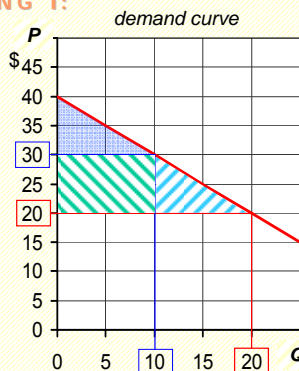
A. At $Q = 10$, marginal
 buyer's WTP is \$30.

B. $CS = \frac{1}{2} \times 10 \times \10
 $=$ \$50

P falls to \$20.

C. CS for the
 additional buyers
 $= \frac{1}{2} \times 10 \times \$10 =$ \$50

D. Increase in CS
 on initial 10 units
 $= 10 \times \$10 =$ \$100



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Cost and the Supply Curve

- **Cost** is the value of everything a seller must give up to produce a good (*i.e.*, opportunity cost).
- Includes cost of all resources used to produce good, including value of the seller's time.
- Example: Costs of 3 sellers in the lawn-cutting business.

name	cost
Angelo	\$10
Hunter	20
Kitty	35

A seller will only produce and sell the good if the price exceeds his or her cost.

Hence, cost is a measure of willingness to sell.

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Cost and the Supply Curve

Derive the supply schedule from the cost data:

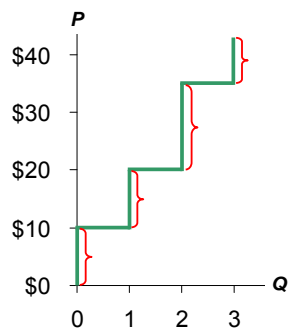
name	cost
Angelo	\$10
Hunter	20
Kitty	35

P	Q^s
\$0 – 9	0
10 – 19	1
20 – 34	2
35 & up	3

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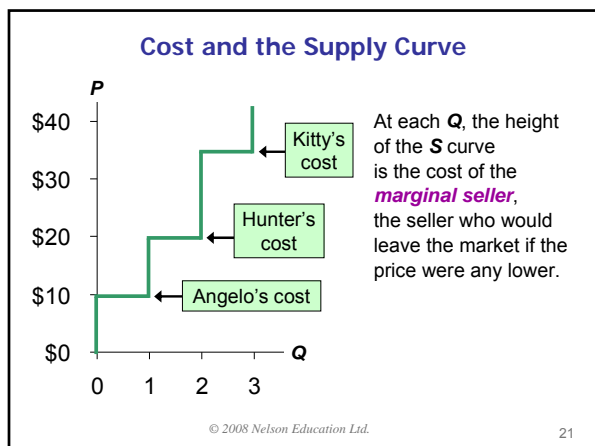
Cost and the Supply Curve

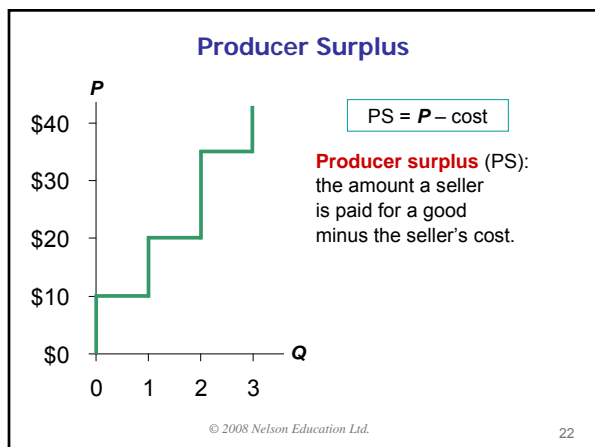


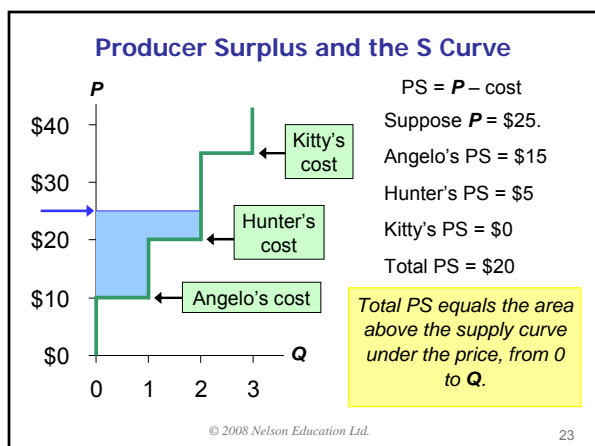
P	Q^s
\$0 – 9	0
10 – 19	1
20 – 34	2
35 & up	3

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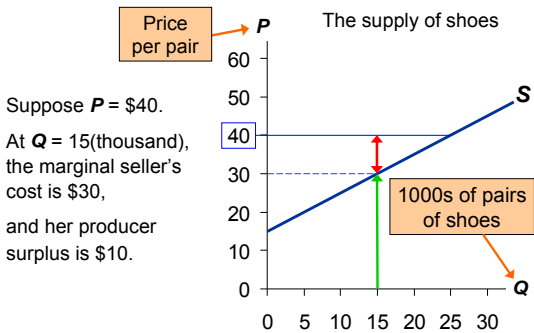
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PS with Lots of Sellers & a Smooth S Curve



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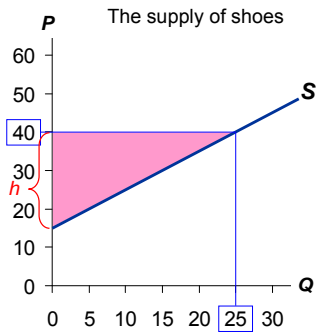
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PS with Lots of Sellers & a Smooth S Curve

PS is the area b/w
 P and the S curve,
from 0 to Q .

The height of this
triangle is
 $\$40 - 15 = \25 .

So,
 $PS = \frac{1}{2} \times b \times h$
 $= \frac{1}{2} \times 25 \times \25
 $= \underline{\$312.5}$



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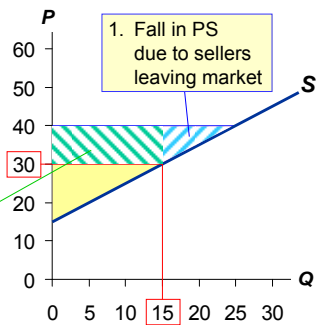
How a Lower Price Reduces PS

If P falls to \$30,

$PS = \frac{1}{2} \times 15 \times \15
 $= \underline{\$112.5}$

Two reasons for the
fall in PS.

2. Fall in PS due to
remaining sellers
getting lower P

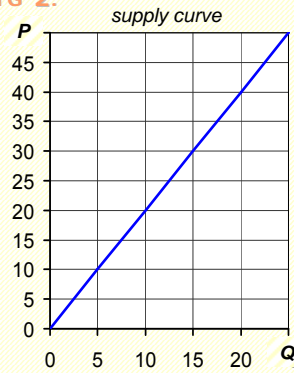


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ACTIVE LEARNING 2: Producer Surplus

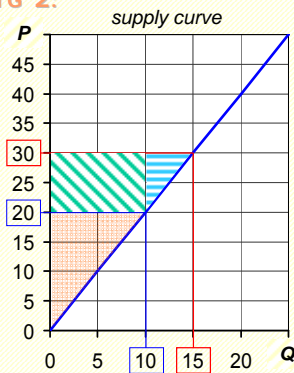
- A.** Find marginal seller's cost at $Q = 10$.
- B.** Find PS for $P = \$20$.
- Suppose P rises to \$30.
Find the increase in PS due to...
- C.** selling 5 additional units
- D.** getting a higher price on the initial 10 units



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ACTIVE LEARNING 2: Answers

- A.** At $Q = 10$, marginal cost = \$20
- B.** $PS = \frac{1}{2} \times 10 \times \$20 = \underline{\$100}$
- P rises to \$30.
- C.** PS on additional units
 $= \frac{1}{2} \times 5 \times \$10 = \underline{\$25}$
- D.** Increase in PS on initial 10 units
 $= 10 \times \$10 = \underline{\$100}$



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What Do CS, PS, and Total Surplus Measure?

CS = (value to buyers) – (amount paid by buyers)
 CS measures the benefit buyers receive from participating in the market.

PS = (amount received by sellers) – (cost to sellers)
 PS measures the benefit sellers receive from participating in the market.

Total surplus = CS + PS

TS measures the total gains from trade in a market.

The Market's Allocation of Resources

- In a market economy, the allocation of resources is decentralized, determined by the interactions of many self-interested buyers and sellers.
- Is the market's allocation of resources desirable? Or would a different allocation of resources make society better off?
- To answer this, we use total surplus as a measure of society's well-being.

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Measuring Society's Well-Being

Total surplus

= CS + PS

= (value to buyers) – ~~(amount paid by buyers)~~
+ ~~(amount received by sellers)~~ – (cost to sellers)
= (value to buyers) – (cost to sellers)

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Market Efficiency

Total surplus = (value to buyers) – (cost to sellers)

An allocation of resources is **efficient** if it maximizes total surplus. Efficiency means:

- Raising or lowering the quantity of a good would not increase total surplus.
- The goods are being produced by the producers with lowest cost.
- The goods are being consumed by the buyers who value them most highly.

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Market Efficiency

$$\text{Total surplus} = (\text{value to buyers}) - (\text{cost to sellers})$$

- Efficiency means making the pie as big as possible.
- In contrast, **equity** refers to whether the pie is divided fairly.
- What's "fair" is subjective, harder to evaluate.
- Hence, we focus on efficiency as the goal, even though policymakers in the real world usually care about equity, too.

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Evaluating the Market Equilibrium

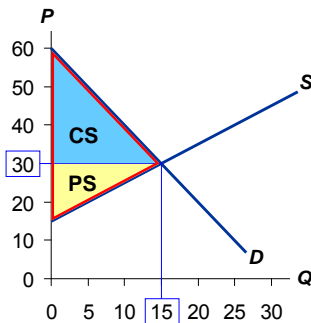
Market eq'm:

$P = \$30$

$Q = 15,000$

Total surplus
= CS + PS

Is the market eq'm
efficient?



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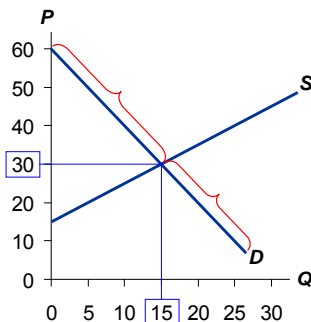
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Which Buyers Get to Consume the Good?

Every buyer
whose WTP is
 $\geq \$30$ will buy.

Every buyer
whose WTP is
 $< \$30$ will not.

So, the buyers who
value the good most
highly are the ones
who consume it.

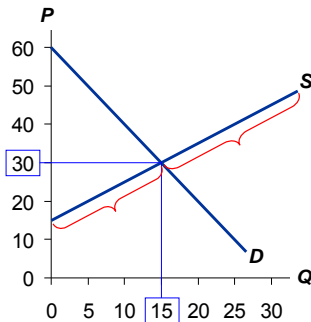


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Which Sellers Produce the Good?

Every seller whose cost is $\leq \$30$ will produce the good.
Every seller whose cost is $> \$30$ will not.
Hence, the sellers with the lowest cost produce the good.

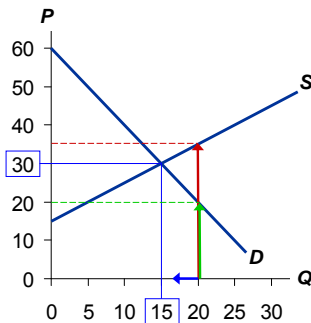


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Does Eq'm Q Maximize Total Surplus?

At $Q = 20$,
cost of producing the marginal unit is \$35
value to consumers of the marginal unit is only \$20
Hence, can increase total surplus by reducing Q .
This is true at any Q greater than 15.

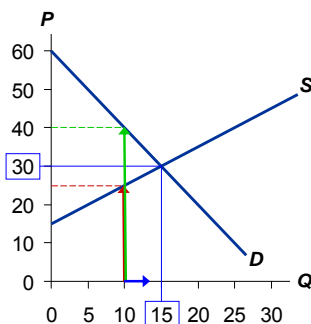


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Does Eq'm Q Maximize Total Surplus?

At $Q = 10$,
cost of producing the marginal unit is \$25
value to consumers of the marginal unit is \$40
Hence, can increase total surplus by increasing Q .
This is true at any Q less than 15.



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Evaluating the Market Eq'm: Summary

Is the "free" market equilibrium allocation of resources efficient? Does it maximize total surplus?

- The eq'm Q maximizes total surplus;
- The goods are produced by the producers with lowest cost; and
- The goods are consumed by the buyers who value them most highly.

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Evaluating the Market Eq'm: Summary

These observations lead to three insights about market outcomes:

1. Free markets allocate the supply of goods to the buyers who value them most highly, as measured by their willingness to pay;
2. Free markets allocate the demand of goods to the sellers who can produce them at least cost; and
3. Free markets produce the quantity of goods that maximizes the sum of consumer and producer surplus.

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Evaluating the Market Eq'm: Summary

Therefore, economic well-being cannot be increased by changing the allocation of consumption among buyers or the allocation of production among sellers.

The equilibrium of supply and demand maximizes the sum of consumer and producer surplus. It generates an efficient allocation of resources.

The gov't cannot improve on the market outcome.

Laissez faire (French for "allow them to do"): the gov't should not interfere with the market

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Why Non-Market Allocations Are Usually Bad

- Suppose the allocation of resources were instead determined by a central planner (e.g., the Communist leaders of the former Soviet Union.)
- To choose an efficient allocation, the planner would need to know every seller's cost and every buyer's WTP, for each of the thousands of goods produced in the economy.
- This is practically impossible, so centrally planned economies are never very efficient.

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Adam Smith and the Invisible Hand

Passages from *The Wealth of Nations*, 1776



Adam Smith,
1723-1790

"Man has almost constant occasion for the help of his brethren, and it is vain for him to expect it from their benevolence only. He will be more likely to prevail if he can interest their self-love in his favor, and show them that it is for their own advantage to do for him what he requires of them..."

It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest...."

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Adam Smith and the Invisible Hand

Passages from *The Wealth of Nations*, 1776



Adam Smith,
1723-1790

"Every individual...neither intends to promote the public interest, nor knows how much he is promoting it.... He intends only his own gain, and he is in this, as in many other cases, led by **an invisible hand** to promote an end which was no part of his intention.

Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it."

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CONCLUSION

- This chapter used welfare economics to demonstrate one of the Ten Principles:
Markets are usually a good way to organize economic activity.
- But we assumed markets are perfectly competitive.
- In the real world, sometimes there are **market failures**, when unregulated markets fail to allocate resources efficiently. Causes:
 - **market power** – a single buyer or seller can influence the market price, e.g. monopoly
 - **externalities** – side effects of transactions, e.g. pollution



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CONCLUSION

- When markets fail, public policy may remedy the problem and increase efficiency.
- Welfare economics sheds light on market failures and gov't policies.
- Despite the possibility of market failure, the assumptions in this chapter work well in many markets, and the invisible hand remains extremely important.

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CHAPTER SUMMARY

- The height of the **D** curve reflects the value of the good to buyers—their willingness to pay for it.
- Consumer surplus is the difference between what buyers are willing to pay for a good and what they actually pay.
- On the graph, consumer surplus is the area between **P** and the **D** curve.

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CHAPTER SUMMARY

- The height of the **S** curve is sellers' cost of producing the good. Sellers are willing to sell if the price they get is at least as high as their cost.
- Producer surplus is the difference between what sellers receive for a good and their cost of producing it.
- On the graph, producer surplus is the area between **P** and the **S** curve.

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CHAPTER SUMMARY

- To measure of society's well-being, we use total surplus, the sum of consumer and producer surplus.
- Efficiency means that total surplus is maximized, that the goods are produced by sellers with lowest cost, and that they are consumed by buyers who most value them.
- Under perfect competition, the market outcome is efficient. Altering it would reduce total surplus.

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End: Chapter 7

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