


Seventh Edition



Principles of
Economics
N. Gregory Mankiw

CHAPTER
7 Consumers, Producers,
and the Efficiency
of Markets

Modified by Joseph Tao-yi Wang

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

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?

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

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** studies how the allocation of resources affects economic well-being.
- First, we look at the well-being of consumers.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

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
Kenny	175
Quan	300
John	125

Example:
4 buyers' WTP
for an iPad

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

WTP and the Demand Curve

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

A: Anthony & Quan will buy an iPad, Keny & John will not.

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

name	WTP
Anthony	\$250
Kenny	175
Quan	300
John	125

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

WTP and the Demand Curve

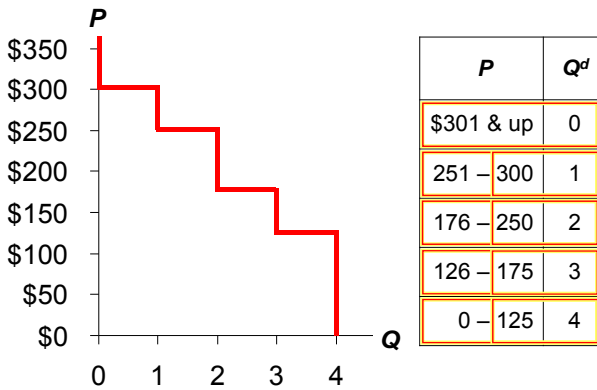
Derive the demand schedule:

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

name	WTP
Anthony	\$250
Kenny	175
Quan	300
John	125

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

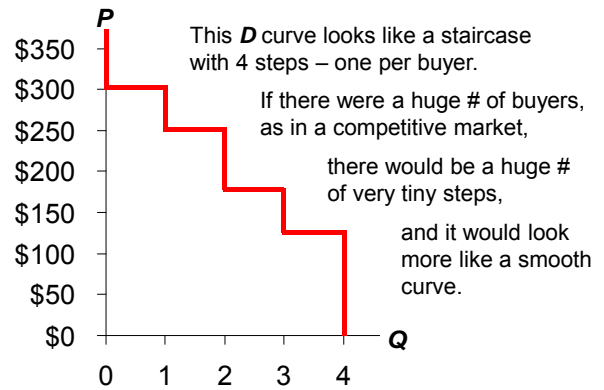
WTP and the Demand Curve



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

6

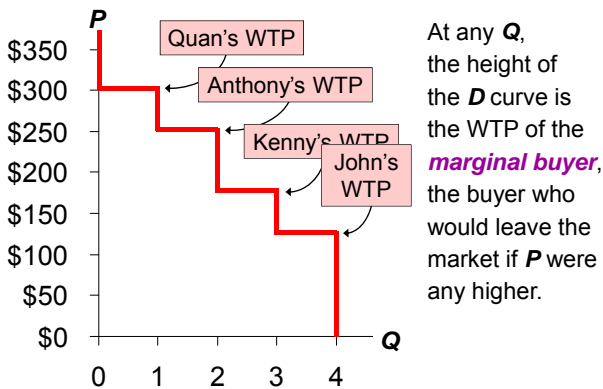
About the Staircase Shape...



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

7

WTP and the Demand Curve



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

8

Consumer Surplus (CS)

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

$$CS = WTP - P$$

name	WTP
Anthony	\$250
Kenny	175
Quan	300
John	125

Suppose **P** = \$260.

Quan's CS = \$300 – 260 = \$40.

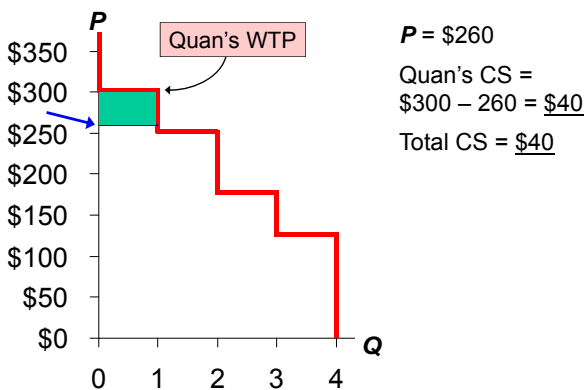
The others get no CS because they do not buy an iPad at this price.

Total CS = \$40.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

9

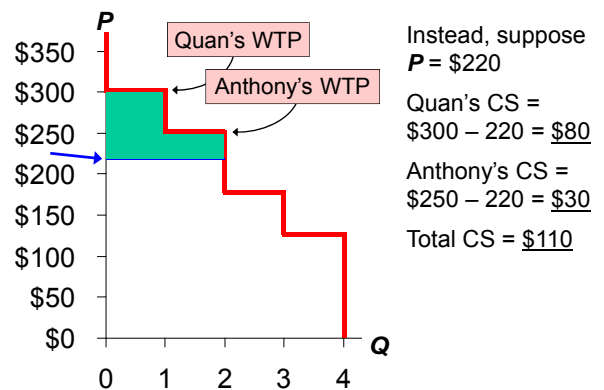
CS and the Demand Curve



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

10

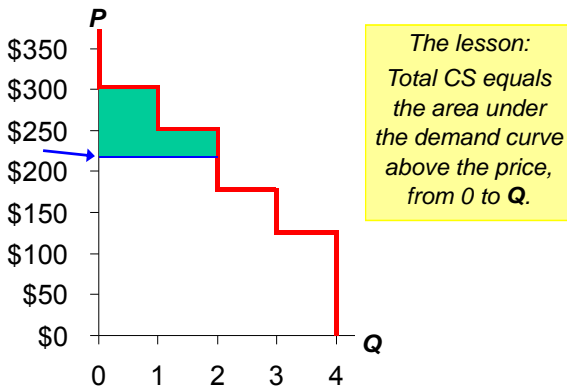
CS and the Demand Curve



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

11

CS and the Demand Curve



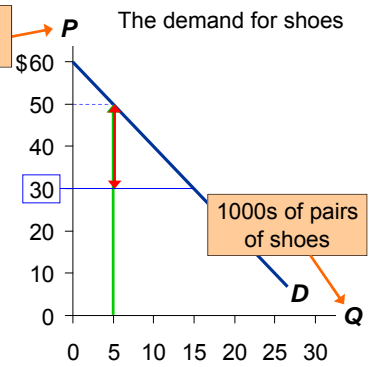
The lesson:
Total CS equals the area under the demand curve above the price, from 0 to Q.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

12

CS with Lots of Buyers & a Smooth D Curve

At $Q = 5$ (thousand), the marginal buyer is willing to pay \$50 for pair of shoes. Suppose $P = \$30$. Then his consumer surplus = \$20.



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

13

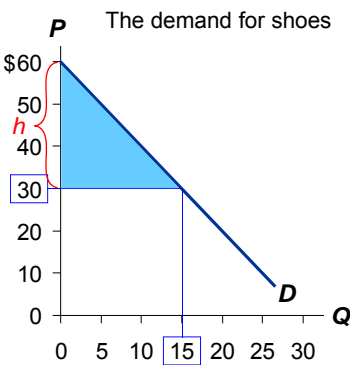
CS with Lots of Buyers & a Smooth D Curve

CS is the area b/w P and the D curve, from 0 to Q .

Recall: area of a triangle equals $\frac{1}{2} \times \text{base} \times \text{height}$

Height = $\$60 - 30 = \30 .

So, $CS = \frac{1}{2} \times 15 \times \$30 = \$225$.



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

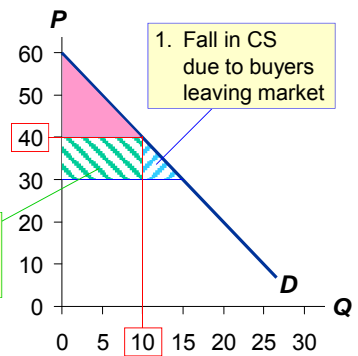
14

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



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

15

ACTIVE LEARNING 1 Consumer surplus

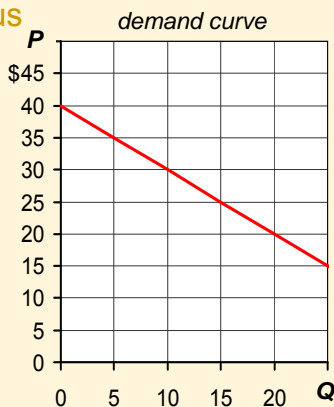
A. Find marginal buyer's WTP at $Q = 10$.

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



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

ACTIVE LEARNING 1 Answers

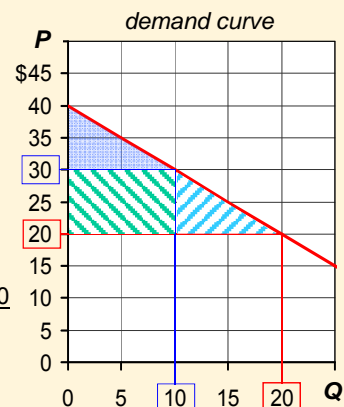
A. At $Q = 10$, marginal buyer's WTP is \$30.

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



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

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
Rosy	\$10
Chuck	20
Chiang	35

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

Hence, cost is a measure of willingness to sell.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

18

Cost and the Supply Curve

Derive the supply schedule from the cost data:

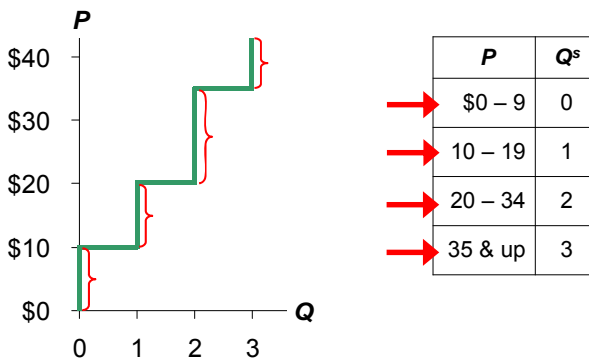
name	cost
Rosy	\$10
Chuck	20
Chiang	35

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

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

19

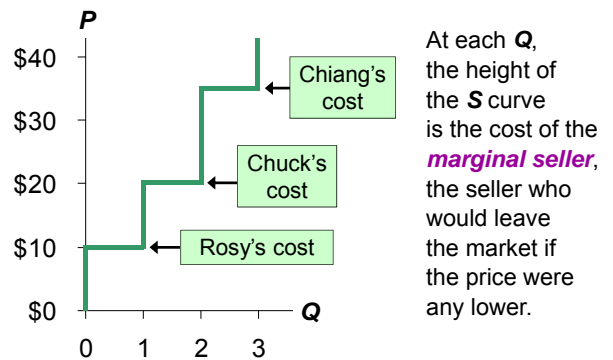
Cost and the Supply Curve



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

20

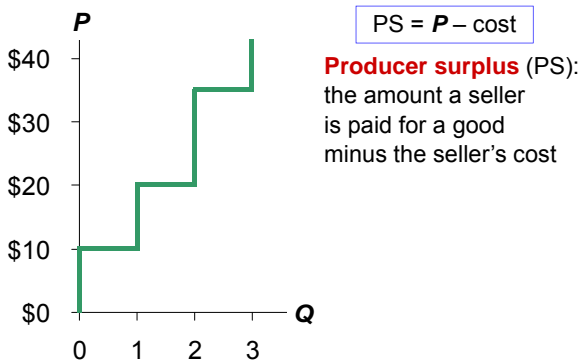
Cost and the Supply Curve



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

21

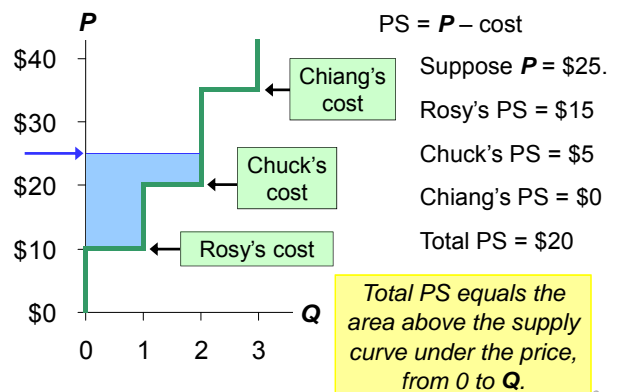
Producer Surplus



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

22

Producer Surplus and the S Curve

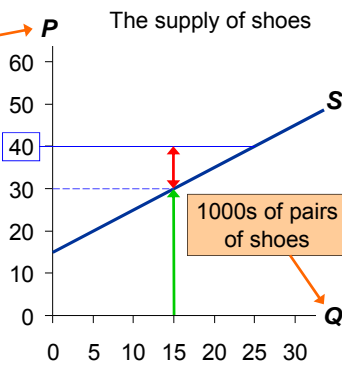


© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

23

PS with Lots of Sellers & a Smooth S Curve

Suppose $P = \$40$
 At $Q = 15$ (thousand pairs),
 the marginal seller's
 cost is \$30,
 and her producer
 surplus is \$10.



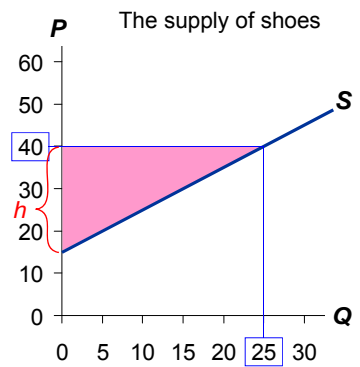
© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

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
 $= \underline{\$312.50}$



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

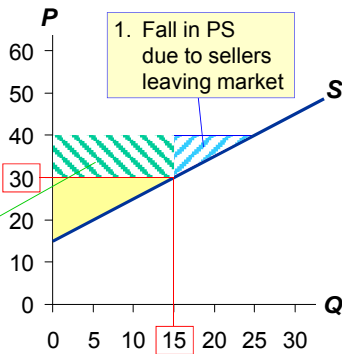
How a Lower Price Reduces PS

If P falls to \$30,

$PS = \frac{1}{2} \times 15 \times \15
 $= \underline{\$112.50}$

Two reasons for
 the fall in PS.

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



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

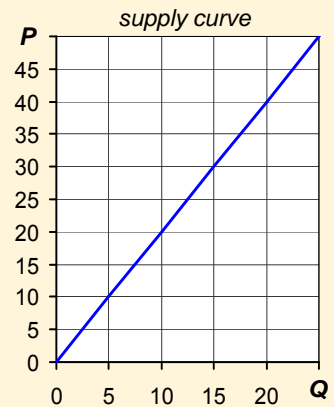
ACTIVE LEARNING 2 Producer surplus

A. Find marginal
 seller's cost
 at $Q = 10$.

B. Find total 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



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

ACTIVE LEARNING 2 Answers

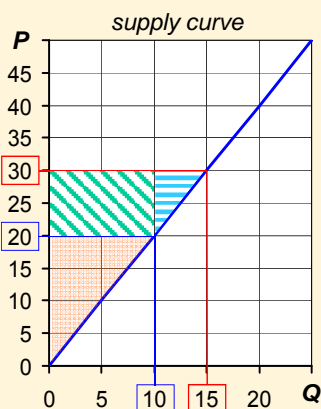
A. At $Q = 10$,
 marginal cost = $\underline{\$20}$

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
 $= 10 \times \$10 = \underline{\$100}$



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

CS, PS, and Total Surplus

CS = (value to buyers) – (amount paid by buyers)
 $=$ buyers' gains from participating in the market

PS = (amount received by sellers) – (cost to sellers)
 $=$ sellers' gains from participating in the market

Total surplus = CS + PS
 $=$ total gains from trade in a market
 $=$ (value to buyers) – (cost to sellers)

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

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, and we consider whether the market's allocation is *efficient*.
(Policymakers also care about *equality*, though our focus here is on efficiency.)

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

30

Efficiency

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

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

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

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

31

Evaluating the Market Equilibrium

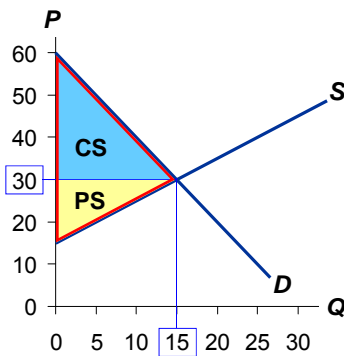
Market eq'm:

$$P = \$30$$

$$Q = 15,000$$

$$\text{Total surplus} = \text{CS} + \text{PS}$$

Is the market eq'm efficient?



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

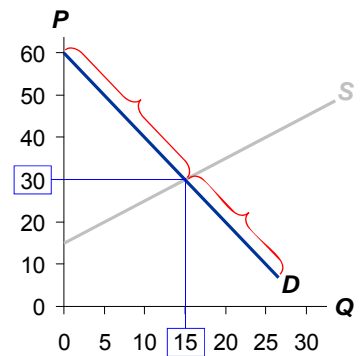
32

Which Buyers 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.**



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

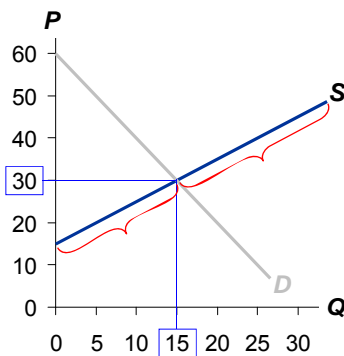
33

Which Sellers Produce the Good?

Every seller whose cost is $\leq \$30$ will produce the good.

Every seller whose cost is $> \$30$ will not.

So, **the sellers with the lowest cost produce the good.**



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

34

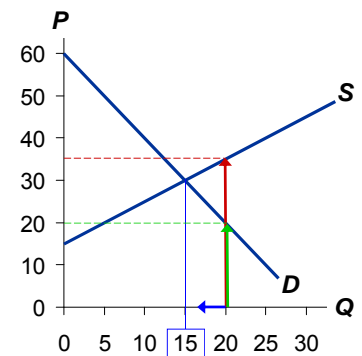
Does Eq'm Q Maximize Total Surplus?

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.

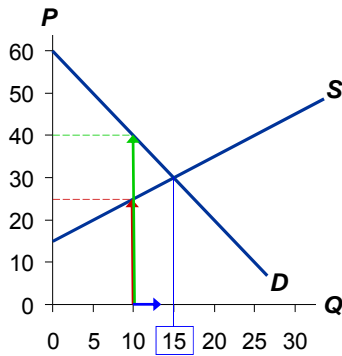


© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

35

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.

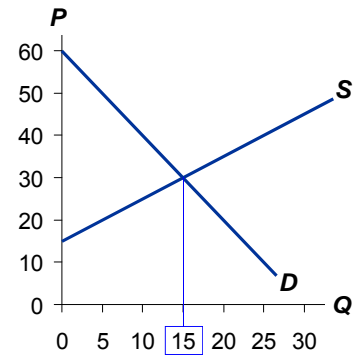


© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

36

Does Eq'm Q Maximize Total Surplus?

The market
 eq'm quantity
 maximizes
 total surplus:
 At any other
 quantity,
 can increase
 total surplus by
 moving toward
 the market eq'm
 quantity.



© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

37

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....”

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

38

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.”

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

39

The Free Market vs. Govt Intervention

- The market equilibrium is efficient. No other outcome achieves higher total surplus.
- Govt cannot raise total surplus by changing the market's allocation of resources.
- *Laissez faire* (French for “allow them to do”): the notion that gov't should not interfere with the market.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

40

The Free Market vs. Central Planning

- Suppose resources were allocated not by the market, but by a central planner who cares about society's well-being.
- To allocate resources efficiently and maximize total surplus, the planner would need to know every seller's cost and every buyer's WTP for every good in the entire economy.
- This is impossible, and why centrally-planned economies are never very efficient.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

41

CONCLUSION

- This chapter used welfare economics to demonstrate one of the Ten Principles:
Markets are usually a good way to organize economic activity.
- Important note:
We derived these lessons assuming perfectly competitive markets.
- In other conditions we will study in later chapters, the market may fail to allocate resources efficiently...

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

42

CONCLUSION

- Such market failures occur when:
 - a buyer or seller has *market power*—the ability to affect the market price.
 - transactions have side effects, called *externalities*, that affect bystanders. (example: pollution)
- We'll use welfare economics to see how public policy may improve on the market outcome in such cases.
- Despite the possibility of market failure, the analysis in this chapter applies in many markets, and the invisible hand remains extremely important.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

43

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.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

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.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

Summary

- To measure 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.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

Efficiency and Welfare

- Consumer Surplus + Producer Surplus
- = Total Surplus (maximized at Equilibrium)
- Efficiency vs. Equality
- Homework: Mankiw, Ch. 7, Problems 6, 7, 9, 10, 11.
- **True or False.** If consumers buy 1,000 heads of lettuce per week, and if the price of lettuce falls by \$1 per head, then the consumer surplus will increase by \$1,000.

© 2015 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

47