7

Consumers, Producers, and the Efficiency of Markets

PRINCIPLES OF
ECONOMICS
FOURTH EDITION

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Premium PowerPoint® Slides
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2008 update
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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?

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.

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 iPod

WTP and the Demand Curve

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

name	WTP
Anthony	$250
Kenny	175
Quan	300
John	125

A: Anthony & Quan will buy an iPod, Kenny & John will not.

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

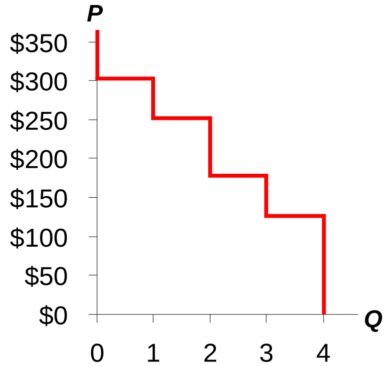
WTP and the Demand Curve

Derive the demand schedule:

name	WTP
Anthony	$250
Kenny	175
Quan	300
John	125

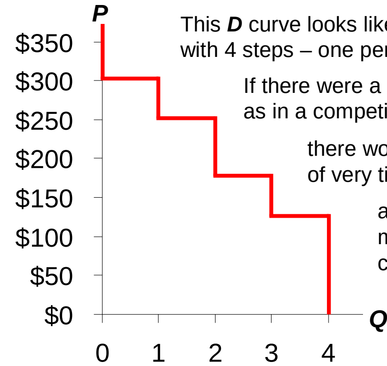
P (price of iPod)	who buys	Q^d
$301 & up	nobody	0
251 – 300	Quan	1
176 – 250	Anthony, Quan	2
126 – 175	Kenny, Anthony, Quan	3
0 – 125	John, Kenny, Anthony, Quan	4

WTP and the Demand Curve



P	Q^d
$301 & up	0
251 – 300	1
176 – 250	2
126 – 175	3
0 – 125	4

About the Staircase Shape…



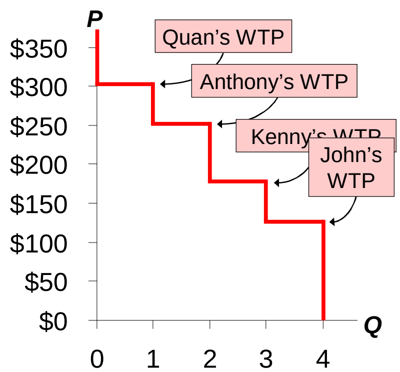
This ***D*** curve looks like a staircase with 4 steps – one per buyer.

If there were a huge # of buyers, as in a competitive market,

there would be a huge # of very tiny steps,

and it would look more like a smooth curve.

WTP and the Demand Curve



At any ***Q***, the height of the ***D*** curve is the WTP of the ***marginal buyer***, the buyer who would leave the market if ***P*** were any higher.

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

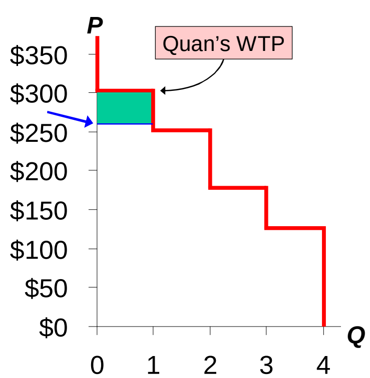
Suppose ***P*** = $260.

Quan's CS = $300 – 260 = $40.

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

Total CS = $40.

CS and the Demand Curve

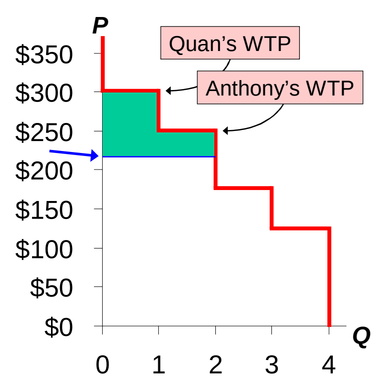


P = $260

Quan's CS = $300 – 260 = <u>$40</u>

Total CS = <u>$40</u>

CS and the Demand Curve



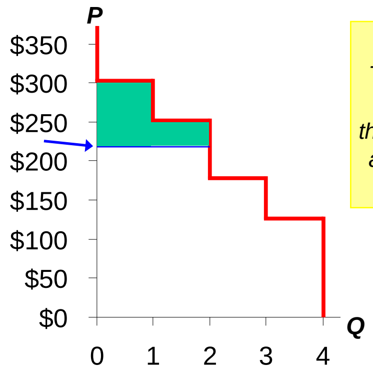
Instead, suppose ***P*** = $220

Quan's CS = $300 – 220 = <u>$80</u>

Anthony's CS = $250 – 220 = <u>$30</u>

Total CS = <u>$110</u>

CS and the Demand Curve



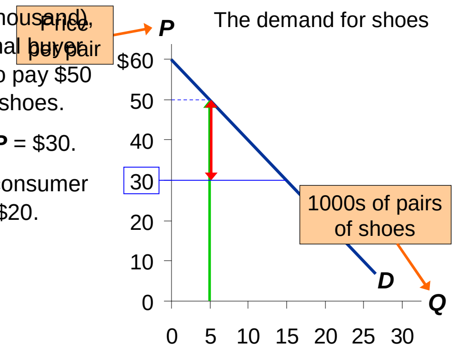
The lesson:
*Total CS equals the area under the demand curve above the price, from 0 to **Q**.*

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.



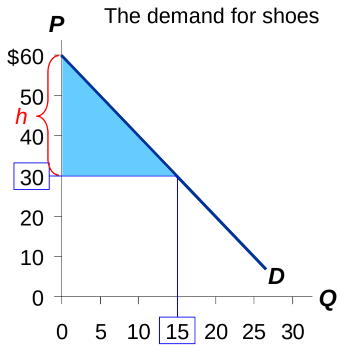
CS with Lots of Buyers & a Smooth D Curve

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

Recall: area of a triangle equals ½ x base x height

Height = $60 – 30 = $30.

So, CS = ½ x 15 x $30 = $225.

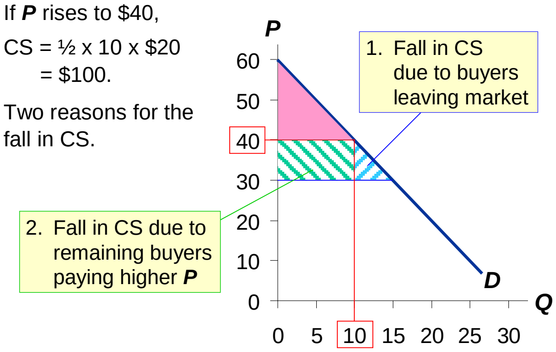


How a Higher Price Reduces CS

If ***P*** rises to $40,

CS = ½ x 10 x $20 = $100.

Two reasons for the fall in CS.



ACTIVE LEARNING 1: Consumer surplus

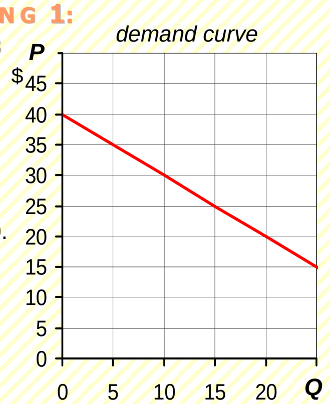
A. Find marginal buyer's WTP at ***Q*** = 10.

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



ACTIVE LEARNING 1: Answers

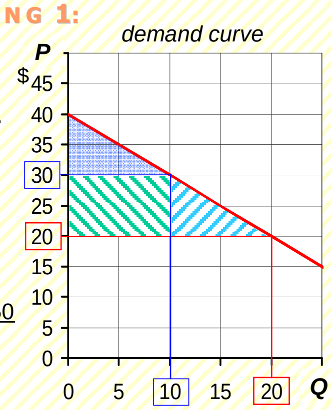
A. At ***Q*** = 10, marginal buyer's WTP is $30.

B. CS = ½ x 10 x $10 = $50

P falls to $20.

C. CS for the additional buyers = ½ x 10 x $10 = $50

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



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
Jane	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.

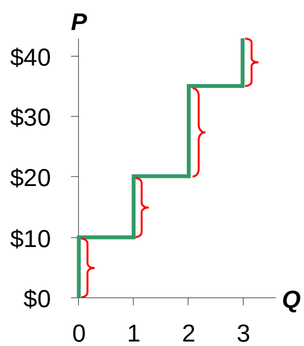
Cost and the Supply Curve

Derive the supply schedule from the cost data:

name	cost
Angelo	$10
Jane	20
Kitty	35

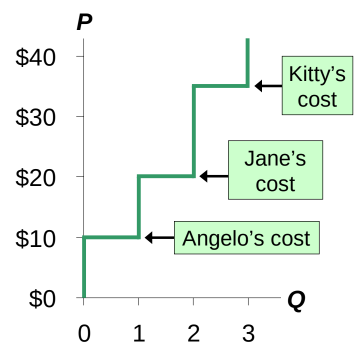
P	Q^s
$0 – 9	0
10 – 19	1
20 – 34	2
35 & up	3

Cost and the Supply Curve



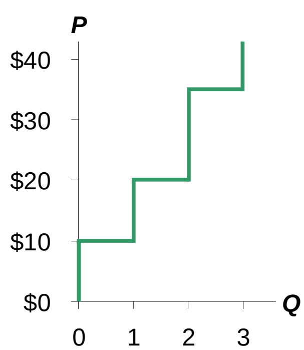
P	Q^s
$0 – 9	0
10 – 19	1
20 – 34	2
35 & up	3

Cost and the Supply Curve



At each ***Q***, the height of the ***S*** curve is the cost of the ***marginal seller***, the seller who would leave the market if the price were any lower.

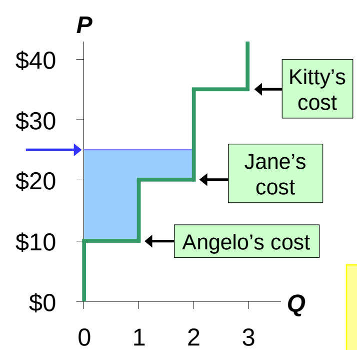
Producer Surplus



PS = ***P*** – cost

Producer surplus (PS): the amount a seller is paid for a good minus the seller's cost.

Producer Surplus and the S Curve



PS = ***P*** – cost

Suppose ***P*** = $25.

Angelo's PS = $15

Jane's PS = $5

Kitty's PS = $0

Total PS = $20

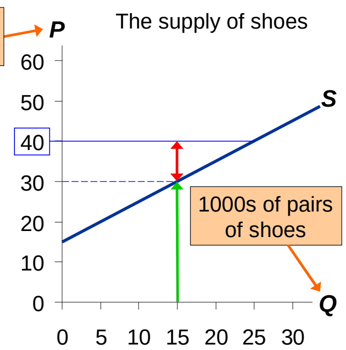
Total PS equals the area above the supply curve under the price, from 0 to ***Q****.*

PS with Lots of Sellers & a Smooth S Curve

Suppose ***P*** = $40.

At ***Q*** = 15(thousand), the marginal seller's cost is $30,

and her producer surplus is $10.

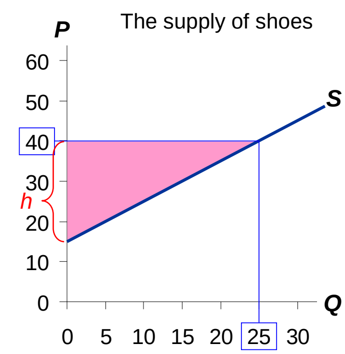


PS with Lots of Sellers & a Smooth S Curve

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 = ½ x *b* x *h*
= ½ x 25 x $25
= <u>$312.50</u>

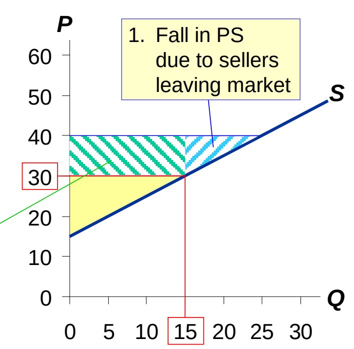


How a Lower Price Reduces PS

If ***P*** falls to $30,

PS = ½ x 15 x $15
= <u>$112.50</u>

Two reasons for the fall in PS.



ACTIVE LEARNING 2:
Producer Surplus

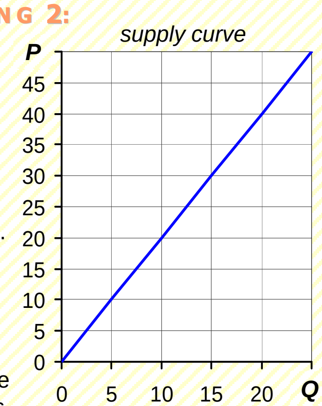
A. Find marginal seller's cost at ***Q*** = 10.

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



ACTIVE LEARNING 2:
Answers

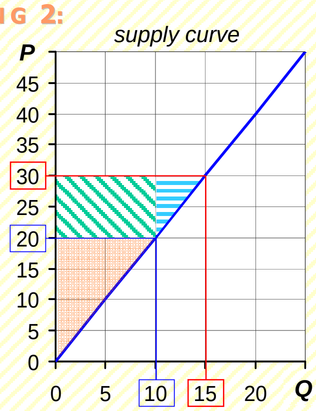
A. At ***Q*** = 10, marginal cost = <u>$20</u>

B. PS = ½ x 10 x $20
= <u>$100</u>

P rises to $30.

C. PS on additional units
= ½ x 5 x $10 = <u>$25</u>

D. Increase in PS on initial 10 units
= 10 x $10 = <u>$100</u>



What do CS, PS, and Total Surplus Measure?

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

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

Total surplus = CS + PS
= 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.

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)

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.

Efficiency

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

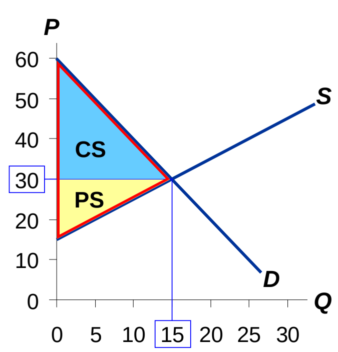
- Efficiency means making the pie as big as possible.
- In contrast, **equity** refers to whether the pie is divided fairly.
- What's "fair" is subjective, harder to evaluate.
- Hence, we focus on efficiency as the goal, even though policymakers in the real world usually care about equity, too.

Evaluating the Market Equilibrium

Market eq'm:
P = \$30
Q = 15,000

Total surplus
= CS + PS

Is the market eq'm efficient?

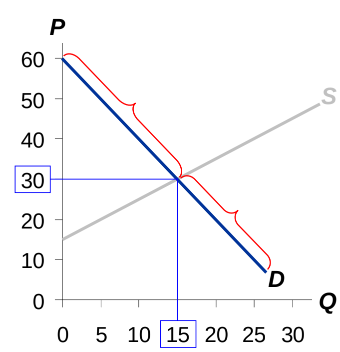


Which Buyers Get to Consume the Good?

Every buyer whose WTP is ≥ \$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.

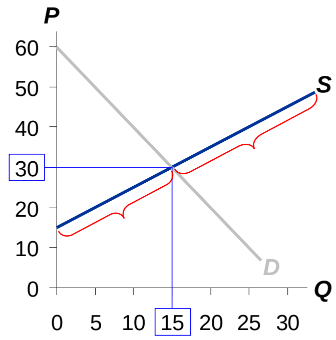


Which Sellers Produce the Good?

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

Every seller whose cost is > $30 will not.

Hence, the sellers with the lowest cost produce the good.



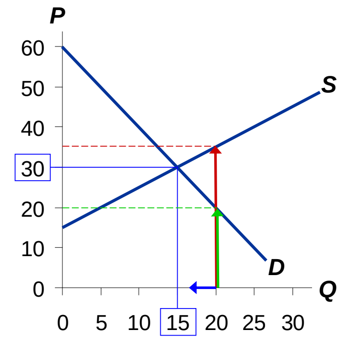
Does Eq’m *Q* Maximize Total Surplus?

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.*



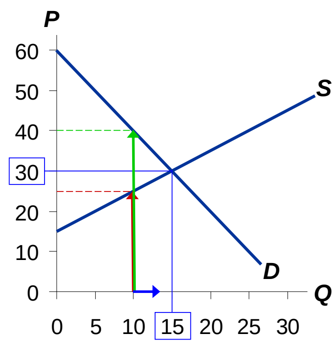
Does Eq’m *Q* Maximize Total Surplus?

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.*



Evaluating the Market Eq’m: Summary

The market eq’m is efficient:

- Eq’m ***Q*** maximizes total surplus.
- Goods produced by the lowest-cost producers.
- Consumed by buyers who value them the most.

Govt cannot improve on the market outcome.

Laissez faire (French for “allow them to do”):
the govt should not interfere with the market.

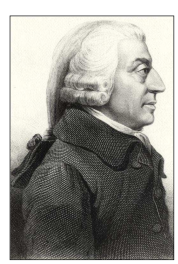
Why Non-Market Allocations Are Usually Bad

- Suppose the allocation of resources were instead determined by a central planner.
- To choose efficient allocation, planner must know
  - every seller’s cost
  - every buyer’s WTP

  for every good produced in the economy.
- This is practically impossible.
  Thus, centrally planned economies are never very efficient.

Adam Smith and the Invisible Hand

Passages from *The Wealth of Nations*, 1776

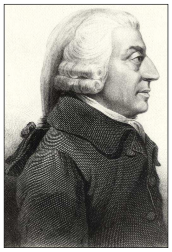


Adam Smith, 1723-1790

“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.…

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."

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

CONCLUSION

- When markets fail, public policy may remedy the problem and increase efficiency.
- Welfare economics sheds light on market failures and govt policies.
- Despite the possibility of market failure, the assumptions in this chapter work well in many markets, and the invisible hand remains extremely important.

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.

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.

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.

Chapter 7: Efficiency and Welfare

- Consumer Surplus
- Producer Surplus
- Total Surplus (maximized at Equilibrium)
- Efficiency vs. Equity

- Homework: Mankiw, ch. 7, pp. 156-157, problems 5, 8, 9, 10.