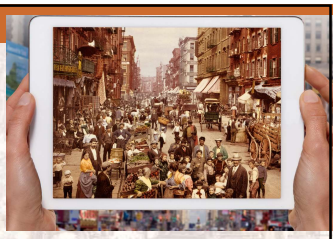
N. GREGORY MANKIW

PRINCIPLES OF

ECONOMICS

Eight Edition



CHAPTER 7

Consumers, Producers, and the Efficiency of Markets

Premium PowerPoint Slides by:
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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

- 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

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Willingness to Pay (WTP)

- A buyer's willingness to pay for a good
  - Maximum amount the buyer will pay for that good
  - How much the buyer values the good

name	WTP
Anthony	$250
Kenny	175
Quan	300
John	125

Example:
4 buyers' WTP
for an iPad

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WTP and the Demand Curve

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

name	WTP
Anthony	$250
Kenny	175
Quan	300
John	125

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

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

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WTP and the Demand Curve

- Derive the demand schedule:

name	WTP
Anthony	$250
Kenny	175
Quan	300
John	125

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

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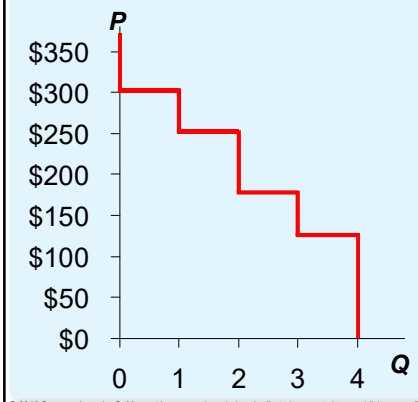
WTP and the Demand Curve



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

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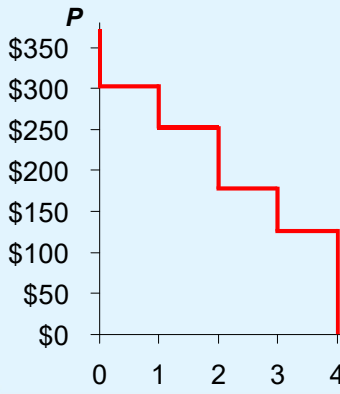
About the Staircase Shape…



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.

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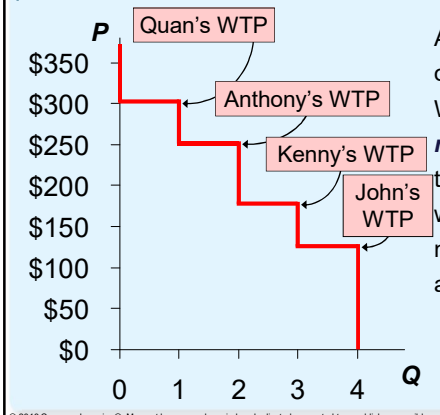
WTP and the Demand Curve



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.

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Consumer Surplus (CS)

- Consumer surplus CS = WTP – P
  - Amount a buyer is willing to pay minus the amount the buyer actually pays:

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 at this price.
Total CS = $40.

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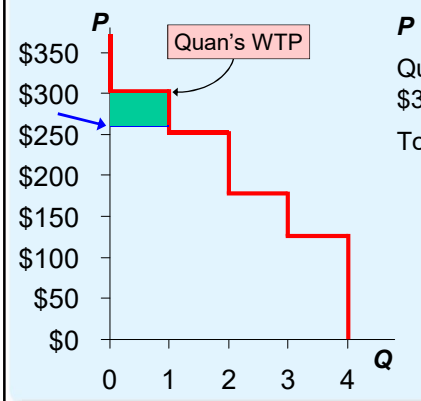
CS and the Demand Curve



P = $260
Quan's CS = $300 – 260 = $40
Total CS = $40

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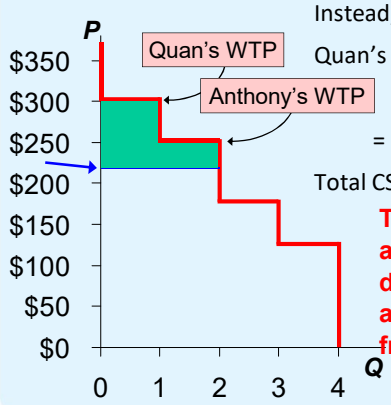
CS and the Demand Curve



Instead, suppose ***P*** = $220
Quan's CS = $300 – 220 = $80
Anthony's CS = $250 – 220 = $30
Total CS = $110

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

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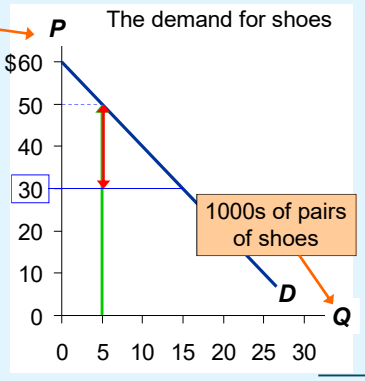
CS with Lots of Buyers & a Smooth D Curve

Price per pair

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



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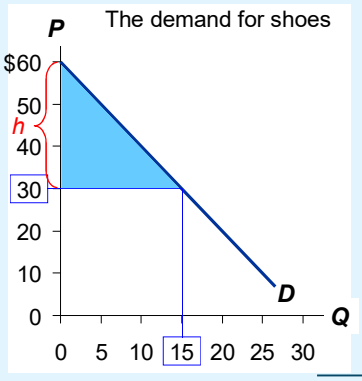
CS with Lots of Buyers & a Smooth D Curve

CS is the area between ***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.



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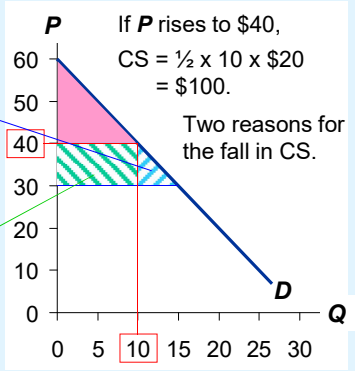
How a Higher Price Reduces CS

1. Fall in CS due to buyers leaving market
2. Fall in CS due to remaining buyers paying higher ***P***

If ***P*** rises to $40,
CS = ½ x 10 x $20
= $100.

Two reasons for the fall in CS.



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Active Learning 1 — Consumer surplus

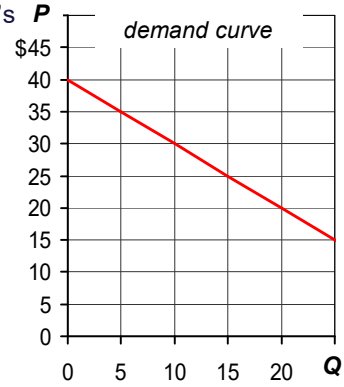
A. Find marginal buyer's WTP at Q = 10.

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

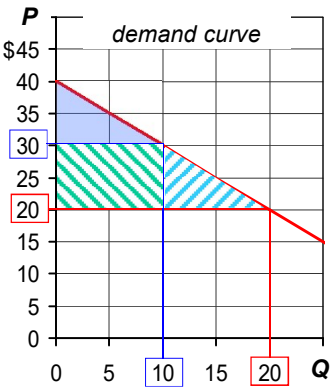
A. At Q = 10, marginal buyer's WTP is $30.

B. CS = 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



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Producer Surplus

- Cost
  - Value of everything a seller must give up to produce a good
    - Measure of willingness to sell: produce and sell the good/service only if the price > cost

name	*cost*
Rosy	$10
Chuck	20
Chiang	35

Example: Costs of 3 sellers in the lawn-cutting business.

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Producer Surplus

- 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

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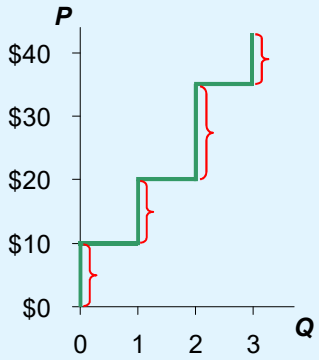
Cost and the Supply Curve



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

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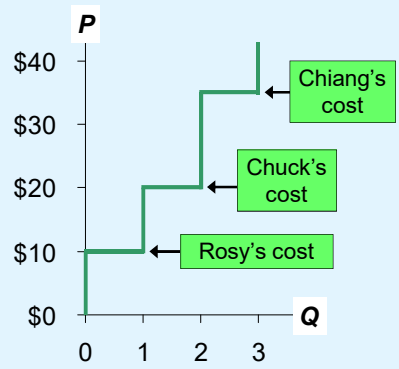
Cost and the Supply Curve



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.

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Producer Surplus

- Producer surplus, PS = P - cost
  - Amount a seller is paid for a good minus the seller's cost of providing it
  - Price received minus willingness to sell

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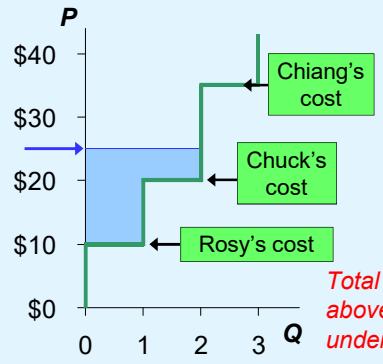
Producer Surplus and the S Curve



PS = ***P*** – cost

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

Rosy's PS = $15

Chuck's PS = $5

Chiang's PS = $0

Total PS = $20

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

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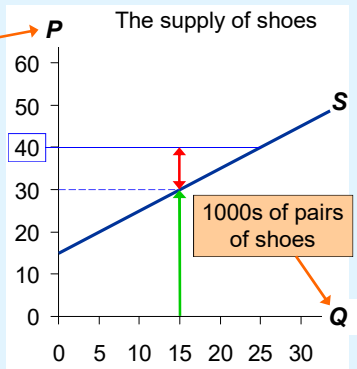
PS with Lots of Sellers & a Smooth S Curve

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

At ***Q*** = 15(thousand), the marginal seller's cost is $30, and her producer surplus is $10.



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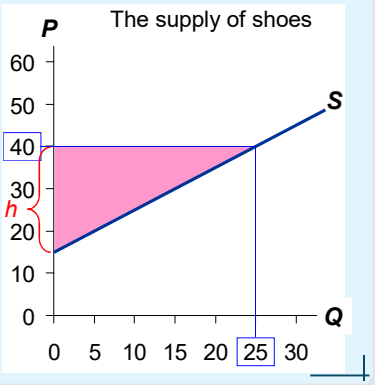
PS with Lots of Sellers & a Smooth S Curve

PS is the area between ***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
= $312.50



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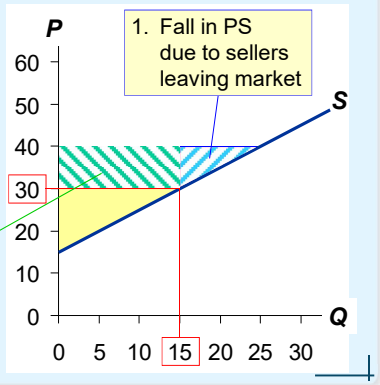
How a Lower Price Reduces PS

If ***P*** falls to $30,
PS = ½ x 15 x $15
= $112.50

Two reasons for the fall in PS.

1. Fall in PS due to sellers leaving market
2. Fall in PS due to remaining sellers getting lower ***P***



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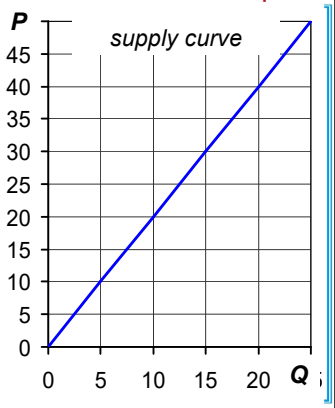
Active Learning 1 — Producer surplus

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



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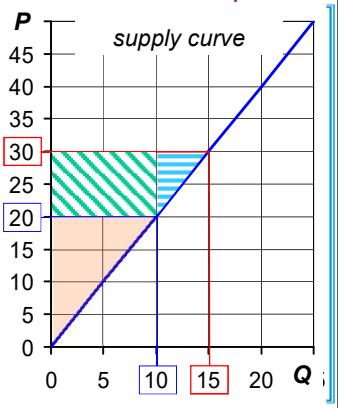
Active Learning 1 — Producer surplus

A. At Q = 10, marginal cost = $20
B. PS = ½ x 10 x $20
= $100

P rises to $30.

C. PS on additional units
= ½ x 5 x $10 = $25
D. Increase in PS on initial 10 units
= 10 x $10 = $100



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Market Efficiency

- Total surplus = CS + PS
  - Consumer surplus = Value to buyers – Amount paid by buyers
    - Buyers' gains from participating in the market
  - Producer surplus = Amount received by sellers – Cost to sellers
    - Sellers' gains from participating in the market

Total surplus = Value to buyers – Cost to sellers

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Market's Allocation of Resources

- Allocation of resources – desirable?
  - Decentralized (in a market economy)
    - Determined by interactions of many self-interested buyers and sellers
  - Total surplus
    - Measure of society's well-being
    - To consider whether the market's allocation is efficient

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Market's Allocation of Resources

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

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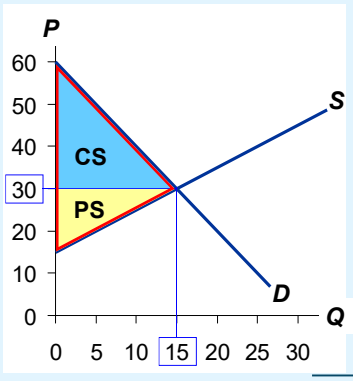
Evaluating the Market Equilibrium

Market equilibrium:
P = $30
Q = 15 (thousand)
Total surplus
= CS + PS

Is the market equilibrium efficient?



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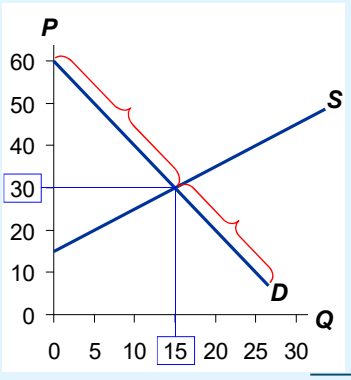
Which Buyers Consume the Good?

Every buyer whose WTP is ≥ $30 will buy.

Every buyer whose WTP is < $30 will not.

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



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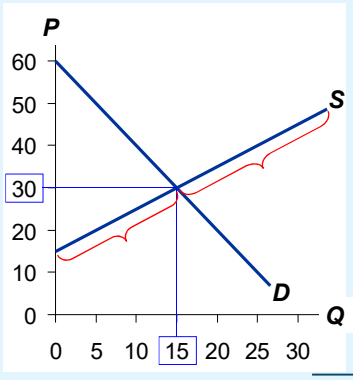
Which Sellers Produce the Good?

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

Every seller whose cost is > $30 will not.

The sellers with the lowest cost produce the good.



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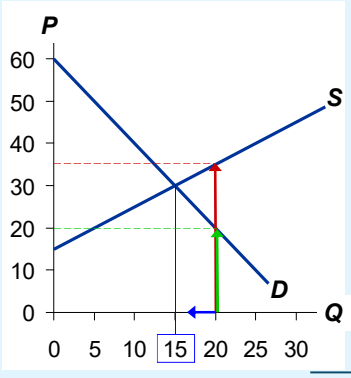
Does Equilibrium Q Maximize Total Surplus?

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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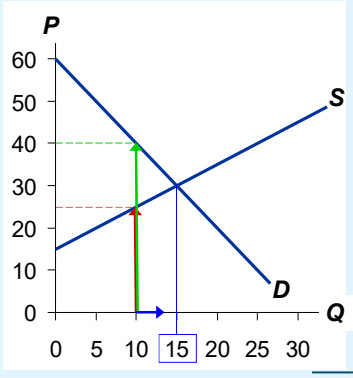
Does Equilibrium Q Maximize Total Surplus?

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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Adam Smith and the Invisible Hand
Passages from The Wealth of Nations, 1776

"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, 1723-1790

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Adam Smith and the Invisible Hand
Passages from The Wealth of Nations, 1776

"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."

Adam Smith, 1723-1790

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Market Efficiency

- Adam Smith's invisible hand
  - Takes all the information about buyers and sellers into account
  - Guides everyone in the market to the best outcome
  - Economic efficiency
- Free markets
  - Best way to organize economic activity

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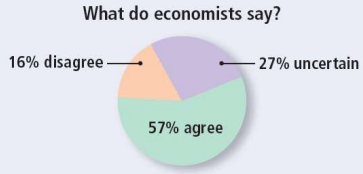
ASK THE EXPERTS
Supplying Kidneys

"A market that allows payment for human kidneys should be established on a trial basis to help extend the lives of patients with kidney disease."



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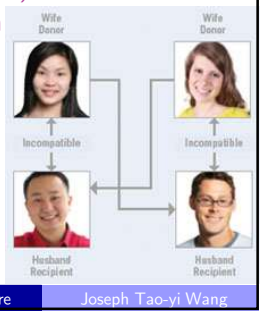
The Guardian posted a touching album of…

- postings on streets around hospitals offering to sell organs.
  - The posts advertise blood type—A, B, O…
- Kidneys for sale: Iran's trade in organs
  https://www.theguardian.com/society/2015/may/10/kidneys-for-sale-organ-donation-iran
- Kidney trade in Iran
  - Wikipedia Entry
  en.wikipedia.org/wiki/Kidney_trade_in_Iran

Even If Selling Organs is Not Allowed…

- Should we ban ALL organ exchanges
  - (even without monetary transfers)? Such as:
  - UCLA Kidney Exchange Program
  - Kidney SWAP(配對交換捐贈):
  - Paired Donor Exchange Transplantation
- When a donor and a recipient cannot match (blood type, etc.),
- they can exchange with another pair with similar problems
  - What about 3-way-exchange?



SWAP Allowed? Why Not Chain Reaction?

- Chain Transplantation, Kidney Chain (連鎖捐贈):
- Altruistic donor gives to a recipient, whose relative donates to a 2nd recipient, whose relative donates...

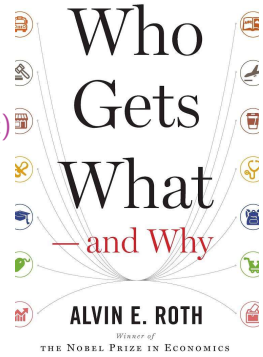
「肝肝相連到天邊」

60 Lives, 30 Kidneys, All Linked (2012/2/18 New York Times)

From Start to Finish
A donation by a Good Samaritan, Rick Ruzzamenti, upper left, set in motion a 60-person chain of transplants that ended with a kidney for Donald C. Terry Jr., bottom right.

Market Design (Prizing Winning Idea 2012)

- Both in the Lab and Field
- Alvin E. Roth (Stanford)
  (Keynote of 2013 ESA North American Meeting, Santa Cruz)



Market Efficiency & Market Failure

- Forces of supply and demand
  - Allocate resources efficiently
- Assumptions about how markets work
  1. Markets are perfectly competitive
  2. Outcome in a market matters only to the buyers and sellers in that market
- When these assumptions do not hold
  - "Market equilibrium is efficient" may no longer be true

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Market Efficiency & Market Failure

- Market failures
  - Market power: a single buyer or seller (small group) control market prices
    - Markets are inefficient
  - Externalities: decisions of buyers and sellers affect people who are not participants in the market at all
    - Inefficient equilibrium - from the standpoint of society as a whole

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Summary

- Consumer Surplus: buyers' willingness to pay for a good minus the amount they actually pay
  - Measures the benefit buyers get from participating in a market
  - Area below the ***D*** curve and above ***P***
- Producer Surplus: amount sellers receive for their goods minus their costs of production
  - Measures the benefit sellers get from participating in a market
  - Area below ***P*** and above the ***S*** curve

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Summary

- An allocation of resources that maximizes total surplus is said to be efficient
  - Policymakers are concerned with the efficiency, as well as the equality, of economic outcomes.
- Equilibrium of ***S*** and ***D*** maximizes total surplus
  - The invisible hand of the marketplace leads buyers and sellers to allocate resources efficiently.
- Markets do not allocate resources efficiently in the presence of market failures (market power or externalities)

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Chapter 7: Efficiency and Welfare

- Consumer Surplus + Producer Surplus
- = Total Surplus (maximized at Equilibrium)
- Efficiency vs. Equality
- Homework:
  - Mankiw, Ch.7, Problem 6, 7, 9-11

Chapter 7: Efficiency and Welfare

- Challenge Questions:
  - 2008 - (Multiple Choice Q6-Q7)
  - 2010 - Essay C
  - 2013 - (True/False Q8)
  - 2017 - Essay B3
- Additional Questions:
  - 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 increases by $1,000.