

Ch 7: Consumers, Producers, and the Efficiency of Markets

Consumer surplus, producer surplus, and what a market does well

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EC 111 Principles of Microeconomics, Bentley University, Fall 2026

From who pays to how much it costs

Chapter 6

Policy moves P and Q

We said who **gains** and who **loses**

Chapter 7

How much, in **dollars**?

Is the market outcome good for society?

Welfare economics

How the allocation of resources affects people's **economic well-being**

Two measures:

consumer surplus — what buyers gain

producer surplus — what sellers gain

Willingness to pay

Four fans, one Red Sox playoff ticket each

Fan	Willingness to pay
Ana	\$250
Ben	\$200
Cleo	\$150
Dev	\$100

Willingness to pay

The **most** a buyer would pay for a good: what it is worth to her

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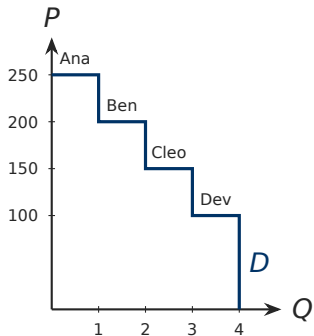
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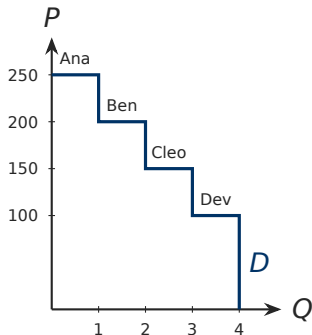
She values it at \$250 and pays \$180: she gains **\$70**.

Willingness to pay traces out the demand curve



Price	Tickets demanded
above \$250	0
\$200-\$250	1
\$150-\$200	2
\$100-\$150	3
\$100 or less	4

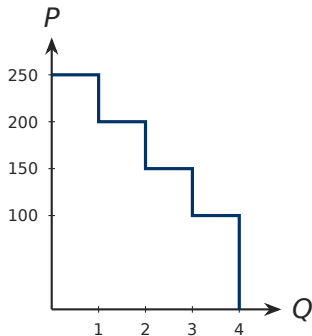
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The height of the demand curve at each Q is the willingness to pay of the **marginal buyer**: the one who would leave first if the price rose.

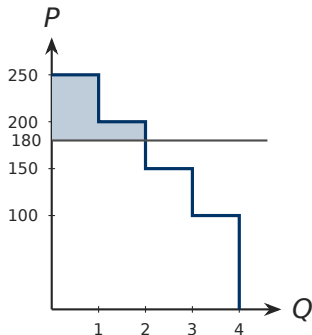
Consumer surplus



Consumer surplus

Willingness to pay **minus** the price paid, summed over buyers

Consumer surplus



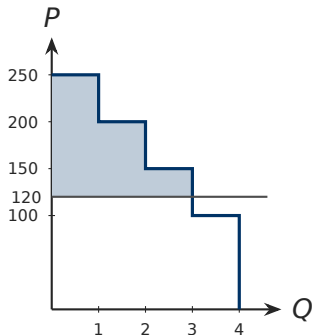
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$$CS = 70 + 20 = \$90$$

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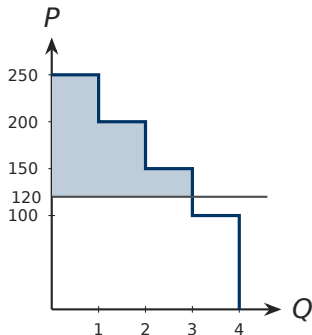
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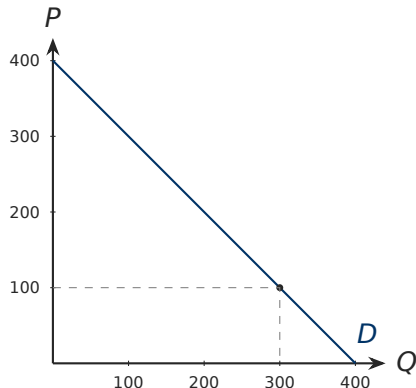
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CS is the **area below the demand curve and above the price.**

With many buyers: a triangle

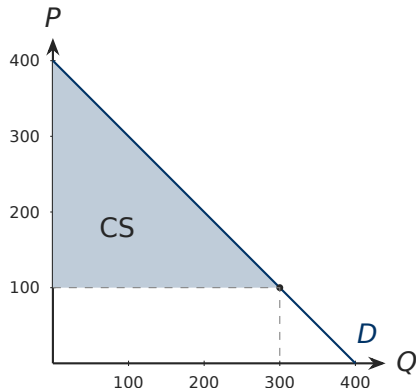


The market from Ch 6:

$$Q_d = 400 - P, \quad P^* = 100, \quad Q^* = 300$$

Demand reaches $Q = 0$ at $P = 400$:
no buyer values the good above \$400

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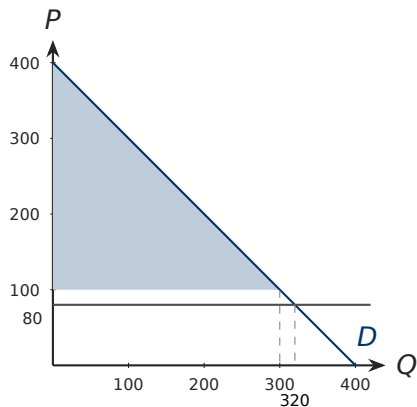
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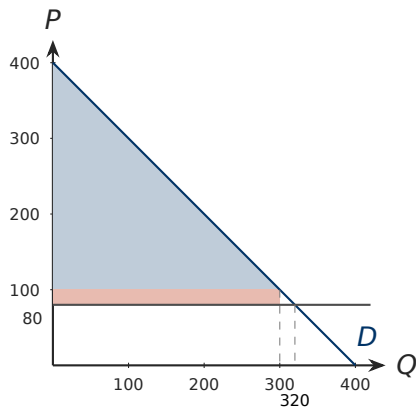
$$\begin{aligned} CS &= \frac{1}{2} \times \text{base} \times \text{height} \\ &= \frac{1}{2} \times 300 \times (400 - 100) \\ &= \$45,000 \end{aligned}$$

The price falls: who gains?

Supply grows and the price falls from \$100 to \$80



The price falls: who gains?

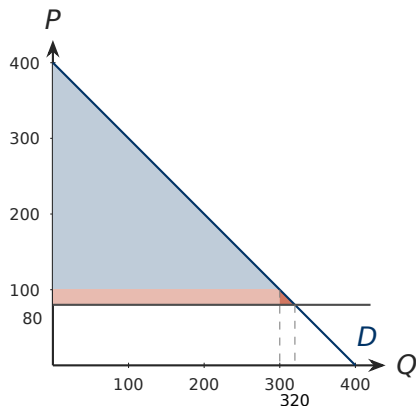


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$$300 \times 20 = \$6,000$$

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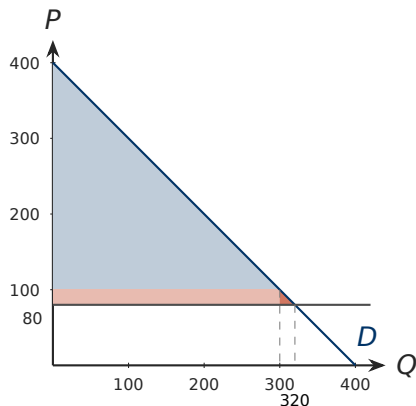
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CS rises from \$45,000 to

$$\frac{1}{2} \times 320 \times 320 = \$51,200$$

What consumer surplus measures

The benefit buyers get from taking part in the market, **as they see it**

A good measure of well-being when buyers' preferences are worth respecting

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Most economists say yes for ordinary goods: people are the best judges of what they want.

Addiction is the usual exception: the buyer's own willingness to pay may not reflect her well-being.

Cost and willingness to sell

Four students could each tutor one hour of economics

Tutor	Cost
Eli	\$20
Fay	\$30
Gus	\$45
Hal	\$60

Cost

The value of everything a seller gives up to produce the good, including her time: the **lowest** price at which she will sell

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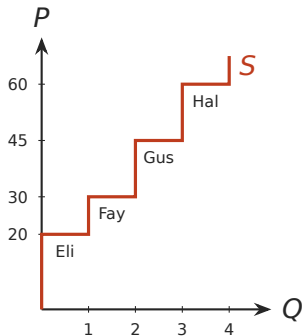
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His cost is \$20 and he is paid \$50: he gains **\$30**.

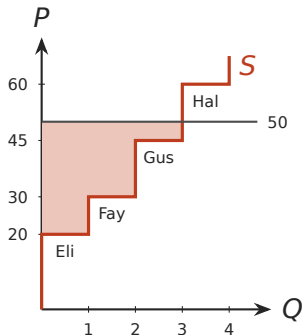
Producer surplus



Producer surplus

The price received **minus** the seller's cost, summed over sellers

Producer surplus



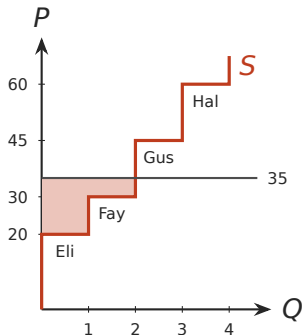
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$$PS = 30 + 20 + 5 = \$55$$

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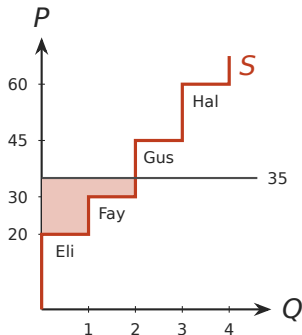
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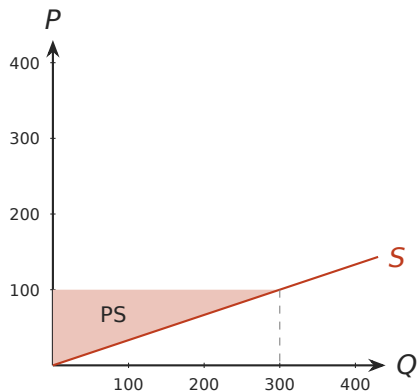
$$PS = 15 + 5 = \$20$$

The supply curve is the cost of the **marginal seller**. PS is the **area above the supply curve and below the price**.

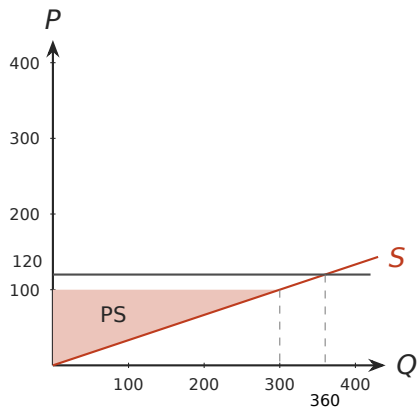
Producer surplus in the running market

$Q_s = 3P$. At \$100:

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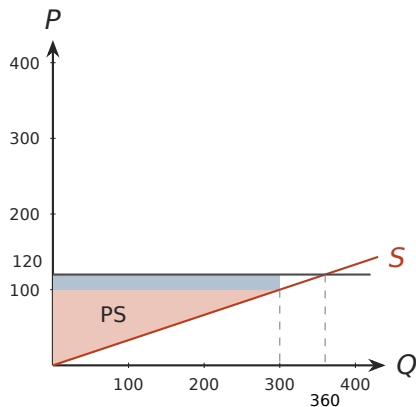


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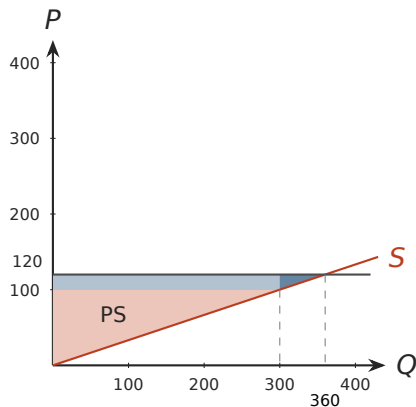
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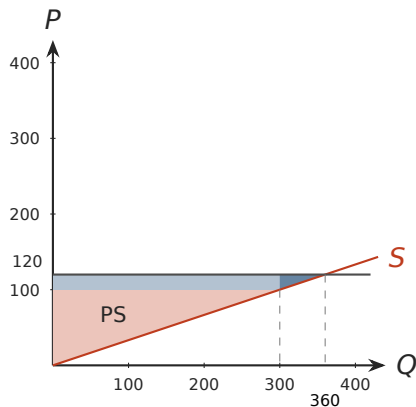
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New sellers: 60 more units, each costing less than \$120:

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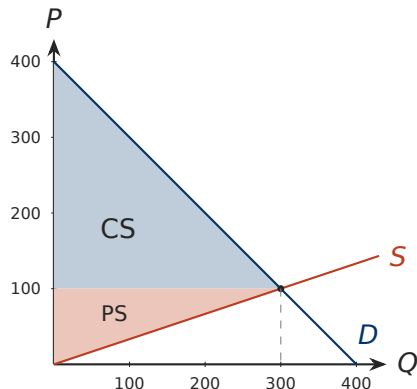
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$$PS \text{ rises to } \frac{1}{2} \times 360 \times 120 = \$21,600$$

Total surplus



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

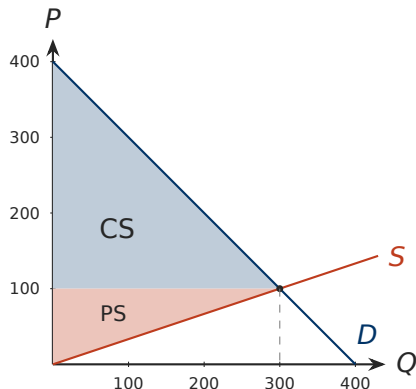
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Add them; the price cancels:

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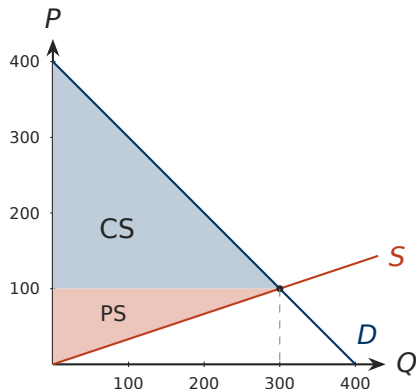
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Efficiency

An allocation is **efficient** if it maximizes total surplus

Efficiency and equality

Efficiency: is the pie as large as possible?

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Ana (willingness to pay \$250) buys a ticket from a seller whose cost is \$140. How much total surplus does the trade create? Does it depend on the price?

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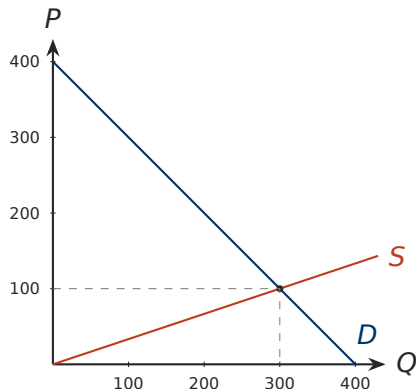
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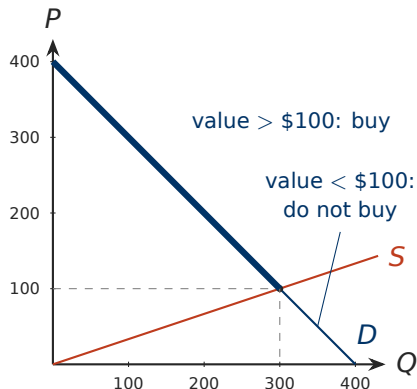
$250 - 140 = \$110$, at any price. At \$200, Ana gets 50 and the seller 60; at \$150, Ana gets 100 and the seller 10.

What the market gets right: the buyers



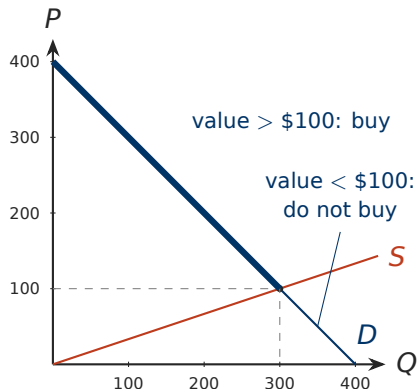
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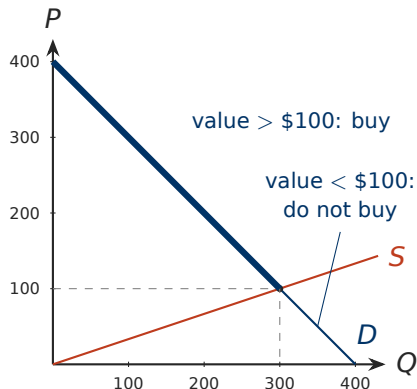


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A free market gives the goods to the buyers who **value them most**

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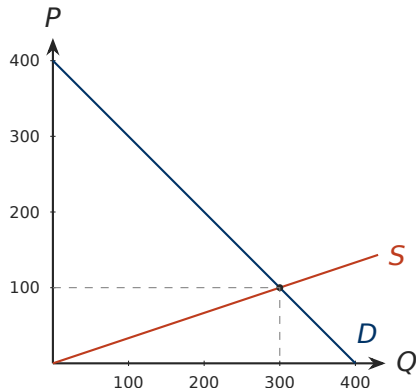
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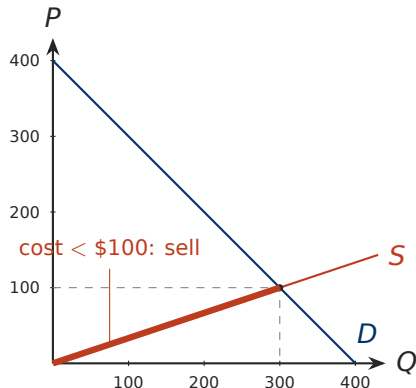
A lottery for the 300 units would give some to buyers who value them below \$100 and leave out some who value them more.

What the market gets right: the sellers



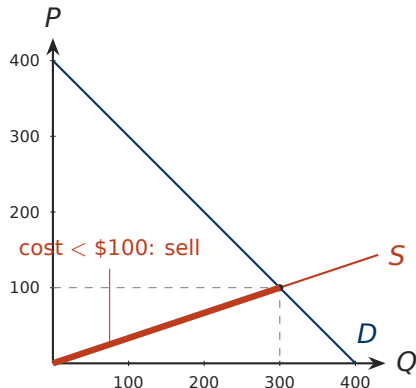
At $P = \$100$: sellers whose cost is below \$100 produce; the rest do not

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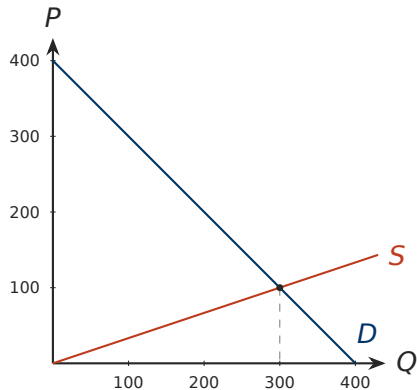


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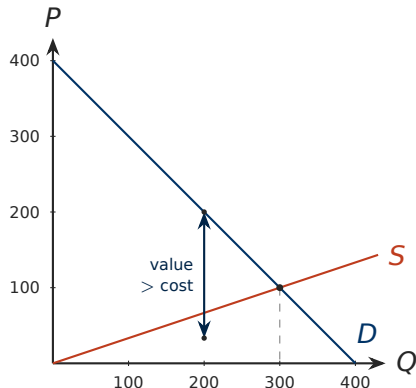
Insight 2

A free market gets the goods made by the sellers who produce them at the **lowest cost**

What the market gets right: the quantity

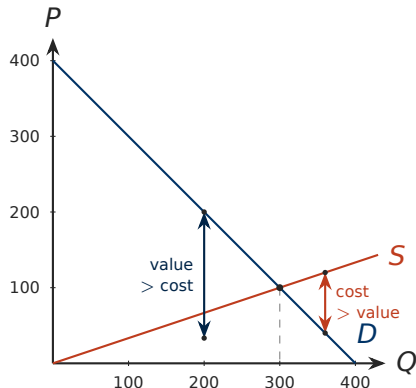


What the market gets right: the quantity



At $Q = 200$: the next unit is worth \$200 to a buyer and costs \$67 to make. Producing it adds **\$133**.

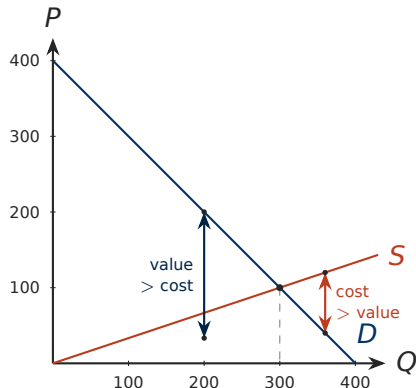
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At $Q = 360$: the next unit is worth \$40 and costs \$120. Producing it **loses** \$80.

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Insight 3

A free market produces the quantity that **maximizes total surplus**: $Q^* = 300$, where value = cost

The invisible hand

No one in the market is trying to maximize total surplus. Each buyer and seller looks after their own interest.

The price coordinates them:

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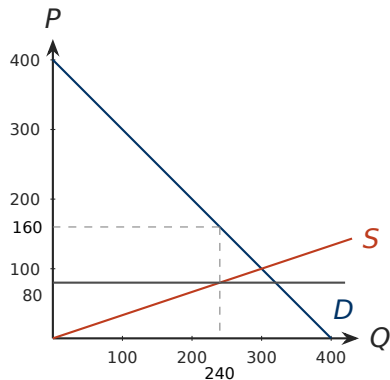
Adam Smith, 1776

“...led by an invisible hand to promote an end which was no part of his intention.”

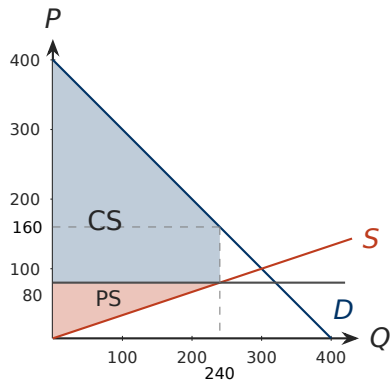
Ch 4: Hayek and the price as a signal. Ch 7 puts a dollar figure on it.

Back to Ch 6: the \$80 ceiling

240 units sold at \$80; the 240th is worth \$160 to buyers



Back to Ch 6: the \$80 ceiling



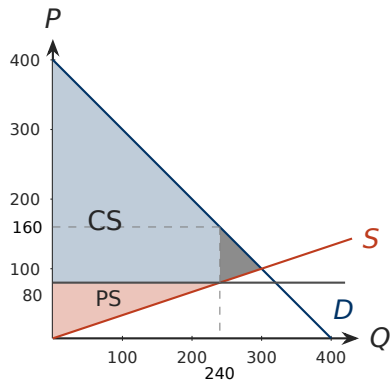
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If they go to the highest-value buyers:

$$CS = 240 \times 80 + \frac{1}{2} \times 240 \times 240 = \$48,000$$

$$PS = \frac{1}{2} \times 240 \times 80 = \$9,600$$

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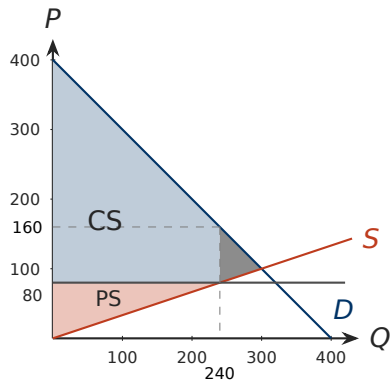
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TS = \$57,600, down \$2,400: the grey triangle $\frac{1}{2} \times 60 \times 80$. This lost surplus is the **deadweight loss**.

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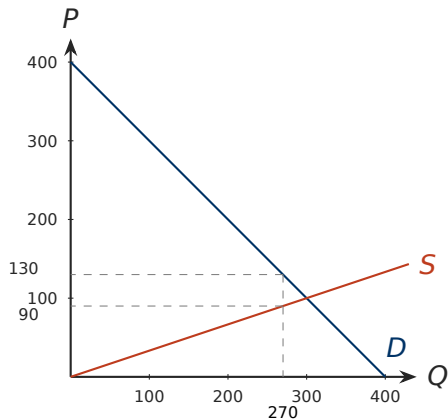
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Buyers gain \$3,000, sellers lose \$5,400.
Rationing by lines or luck loses more.

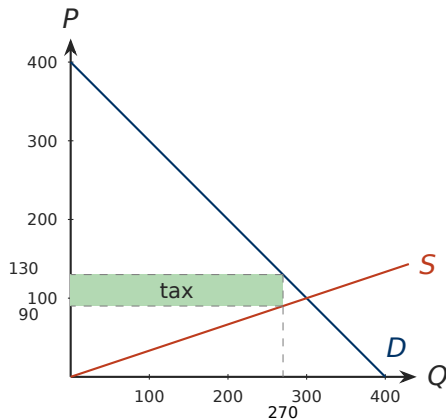
Back to Ch 6: a \$40 tax



$$400 - P_B = 3(P_B - 40)$$

buyers pay **\$130**, sellers keep **\$90**, $Q =$
270

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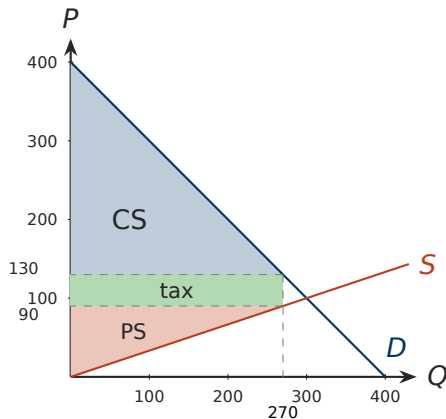


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Tax revenue: $40 \times 270 = \$10,800$ · still
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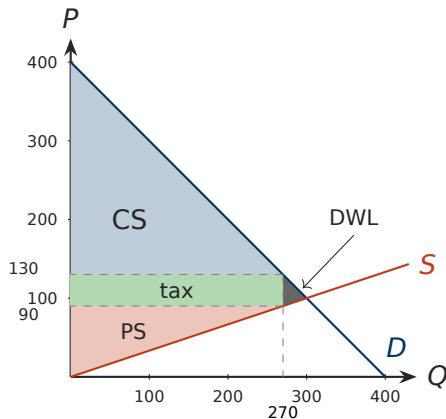
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Tax revenue: $40 \times 270 = \$10,800$ · still
surplus

CS \$36,450 · PS \$12,150 · revenue
\$10,800

TS = \$59,400, down \$600

Back to Ch 6: a \$40 tax



$$400 - P_B = 3(P_B - 40)$$

buyers pay **\$130**, sellers keep **\$90**, $Q = 270$

Tax revenue: $40 \times 270 = \$10,800$ · still surplus

CS \$36,450 · PS \$12,150 · revenue \$10,800

TS = \$59,400, down \$600

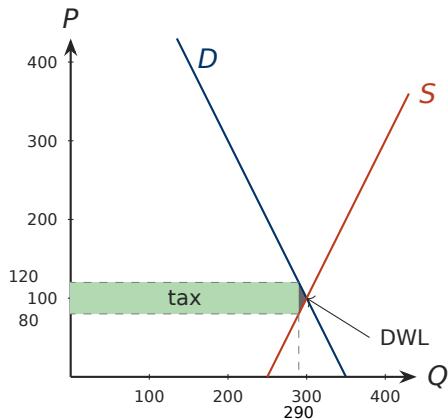
30 trades lost, each worth more than it costs

$$\text{Deadweight loss} = \frac{1}{2} \times 40 \times 30 = \text{\textcolor{red}{\$600}}$$

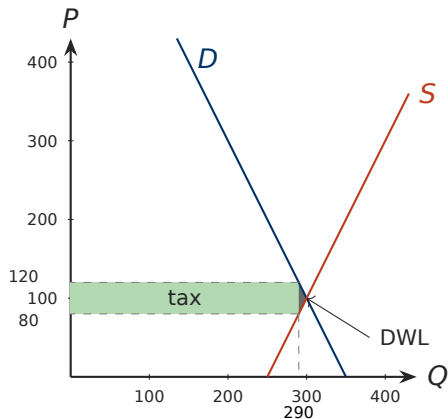
Less elastic curves, smaller loss

Same equilibrium (\$100, 300), steeper curves

$$Q_d = 350 - \frac{1}{2}P \cdot Q_s = 250 + \frac{1}{2}P$$



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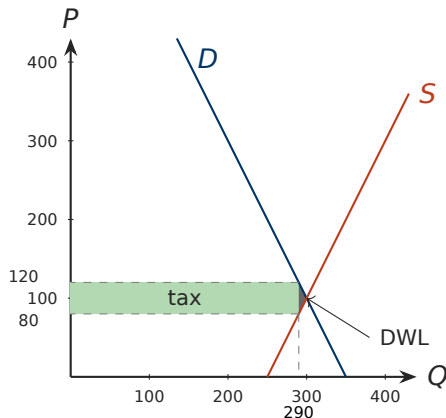


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Same \$40 tax: \$120 / \$80, $Q = 290$

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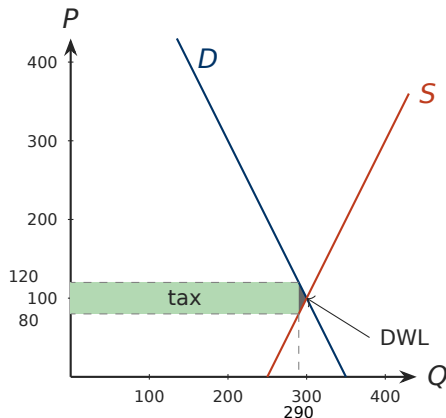
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Elasticity sets the loss

A tax loses surplus only through the trades it stops. Inelastic buyers and sellers: few trades stop, small loss

When the market does not get it right

The three insights assume **perfectly competitive** markets and that the price reflects all costs and benefits

Market power

One seller (or a few) can keep the price above cost and the quantity below Q^*

Ch 16-17

Externalities

A cost or benefit falls on people outside the market: pollution, vaccination

Buyers and sellers ignore it, so Q is too high or too low

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These are **market failures**: cases where policy can raise total surplus.

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Against it: fairness (the poor sell, the rich buy), exploitation, and the view that some things should not be for sale. Efficiency is **one** goal, not the only one.

Try it

Question

$$Q_d = 90 - P, \quad Q_s = 2P.$$

- (a) Find the equilibrium price and quantity.
- (b) Compute consumer surplus, producer surplus and total surplus.
- (c) A planner orders 40 units. Value of the 40th unit to buyers? Its cost to sellers? The deadweight loss?

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(c) Value $90 - 40 = \$50$, cost $40/2 = \$20$. Deadweight loss $\frac{1}{2} \times 20 \times (50 - 20) = 300$, so $TS = 2,400.$

Exam-style: four buyers, four sellers

Buyer	Value	Seller	Cost
A	250	E	60
B	200	F	90
C	150	G	140
D	100	H	210

Each buys or sells one unit.

- (a) How many units trade?
- (b) What prices clear the market?
- (c) Total surplus?

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(a) Pair the highest values with the lowest costs while value $\geq$ cost: A-E, B-F, C-G. D (100) and H (210) do not trade: **3 units**.

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(c) $(250 + 200 + 150) - (60 + 90 + 140)$
 $= 600 - 290 = \textbf{\$310}$, whatever the price in that range.

Summary

Surplus

- Willingness to pay: the most a buyer would pay. The demand curve's height
- Consumer surplus = value – price: area under D , above P
- Cost: the least a seller would accept. The supply curve's height
- Producer surplus = price – cost: area above S , below P
- A lower price raises CS; a higher price raises PS

Efficiency

- Total surplus = value to buyers – cost to sellers
- Efficient = total surplus as large as possible; equality is a separate question
- A competitive equilibrium gives goods to the highest-value buyers, gets them made at the lowest cost, and produces Q^*
- Price controls, taxes and market failures lower total surplus; the loss is the **deadweight loss**, larger when supply and demand are more elastic

Next: Ch 9, international trade.