Ch 10–11: Externalities, Public Goods and Common Resources

When the market price leaves someone out

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EC 111 Principles of Microeconomics, Bentley University, Fall 2026

Where the invisible hand slips

Chapter 7

Market equilibrium maximizes total surplus

The fine print

- market power
- effects on people outside the market

Chapters 10–11

Pollution, vaccines, fireworks, fish, traffic

Question

Your neighbor’s party runs until 3 AM.

Who pays for the noise? Does the host count that cost?

Externalities

Externality

The uncompensated impact of one person's actions on a bystander

Negative: harms the bystander

- factory smoke
- drunk driving
- a barking dog
- your phone ringing in class

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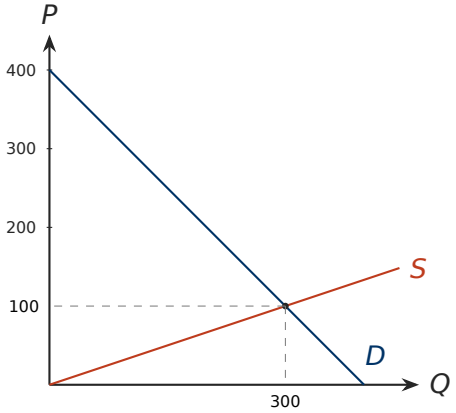
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Buyers and sellers ignore it $\Rightarrow$ market quantity too large (negative) or too small (positive)

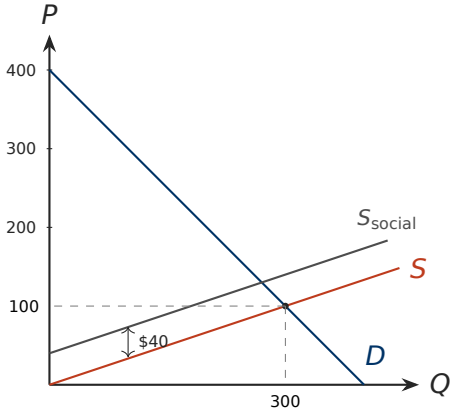
The running market, now with pollution



$Q_d = 400 - P \cdot Q_s = 3P$

Market: $P = \$100$, $Q = 300$

The running market, now with pollution



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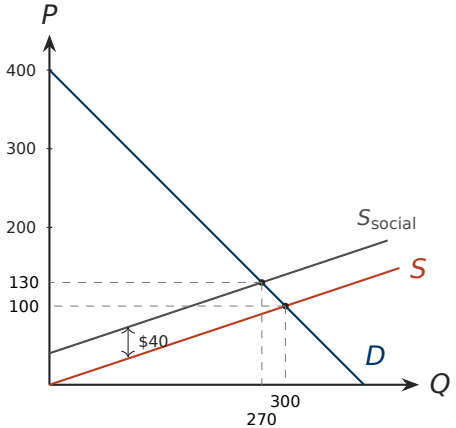
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Each unit: $40 of smoke on the neighbors

Social cost = private cost (S) + $40

the supply curve shifted up by $40

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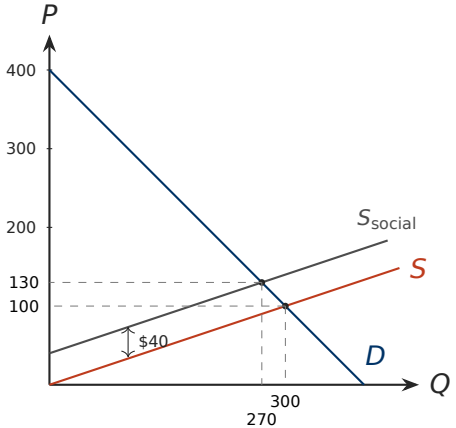
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Optimum: demand meets social cost

$400 - Q = Q/3 + 40 \Rightarrow Q = 270$

value of the last unit: $130

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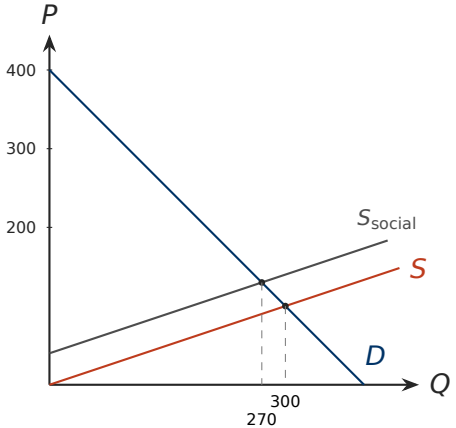
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Market makes 30 units too many

What the extra 30 units cost



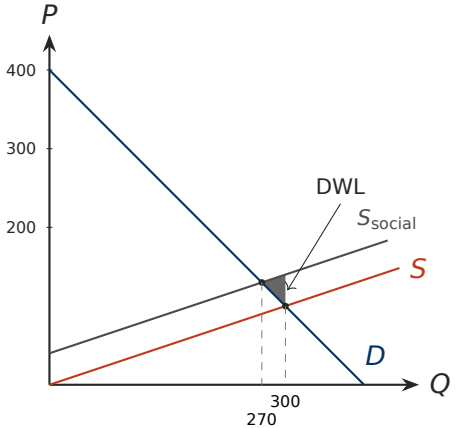
Units 271 to 300:

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social cost: \$130 up to \$140

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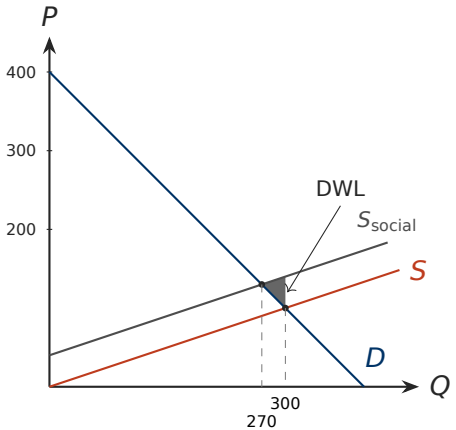


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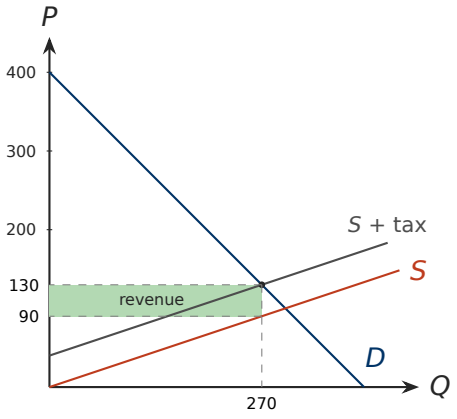
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The fix: make sellers feel the \$40 internalizing the externality

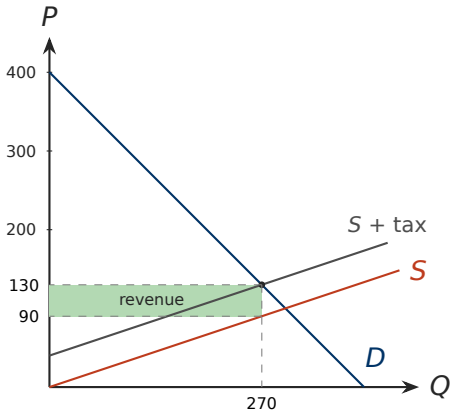
The fix: the $40 tax from Chapter 7



The Ch 7 tax: buyers \$130, sellers \$90, $Q = 270$

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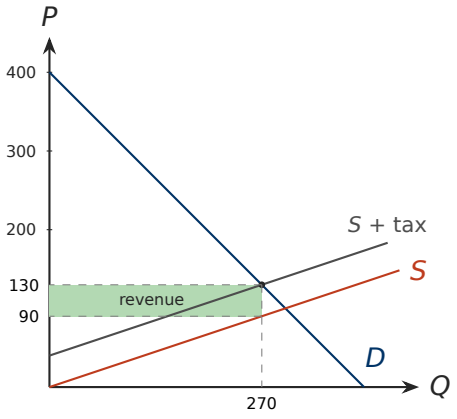


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CS	45,000	36,450
PS	15,000	12,150
Revenue	0	10,800
Smoke damage	−12,000	−10,800
TS	48,000	48,600

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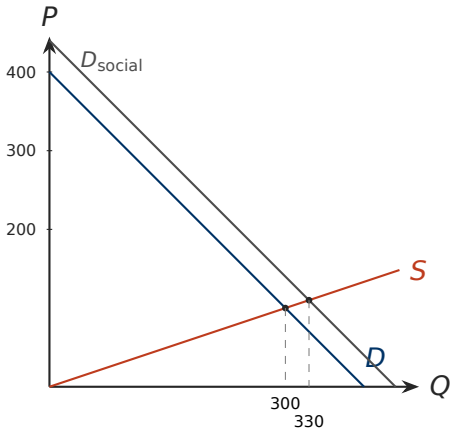
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Ch 7: this tax cost \$600. Here: +\$600

A corrective (Pigovian) tax

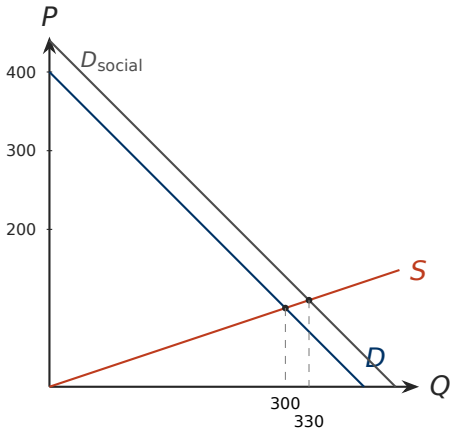
Positive externality: flu shots



Same curves. Each shot protects others: \$40 per shot

Social value = private value + \$40

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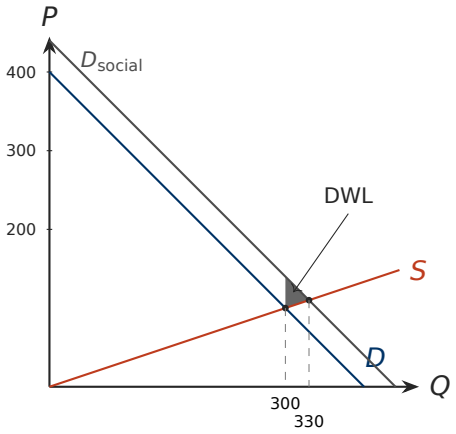
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Optimum: social value meets supply

$440 - Q = Q/3 \Rightarrow Q = 330$

Market: 300, 30 too few

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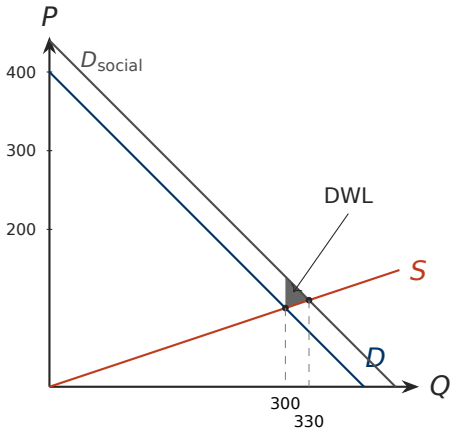
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Fix: a \$40 subsidy per shot

buyers pay \$70, sellers get \$110, $Q = 330$

Spillovers from ideas

Technology spillover

One firm's research helps other firms

- a better robot design, copied

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Industrial policy: subsidize the industries with big spillovers

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A property right to an idea, for 20 years

- inventor keeps more of the gain
- more research

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Education

Better-informed voters, less crime, new ideas

- public schools, Pell grants, state universities

Try it

Question

Negative or positive externality? Does the market make too much or too little?

(a) A loud motorcycle exhaust (b) Planting a tree in your front yard
(c) Alcohol, with drunk driving (d) A new open-source software library
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(a) negative, too much (b) positive, too little (c) negative, too much
(d) positive, too little (e) negative, too much: each use helps the patient, raises resistance for everyone

Public policy: two approaches

Command and control

Require or forbid behavior directly

EPA: emission limits, required scrubbers

Ban on dumping toxic waste

Public policy: two approaches

Command and control	Market-based
Require or forbid behavior directly	Change the incentives; let people choose
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Tax: cheap cutters cut a lot

- same pollution, lower cost
- revenue, and less deadweight loss

Corrective taxes in practice

Gasoline

Federal 18.4¢ + state 33¢: 51¢ a gallon (EIA, 2025)

Driving: congestion, accidents, pollution

Much higher in Europe

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A price on CO_2 in everything we buy

IGM panel, agree:

- less distorting than an income tax with the same revenue: 98%
- cheaper than fuel-economy rules: 95%

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Economists agree. Why is it so hard to pass?

Tradable pollution permits

Three firms, 20 permits each: 60 tons allowed, 90 emitted, 30 must go

	Firm A	Firm B	Firm C
Emissions today (tons)	30	40	20
Cost of cutting one ton	\$25	\$40	\$10

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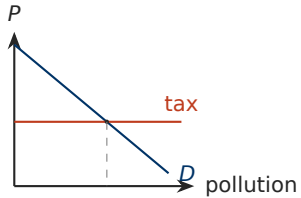
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Same 60 tons, \$600 cheaper: cheap cutters do the cutting

Tax or permits?

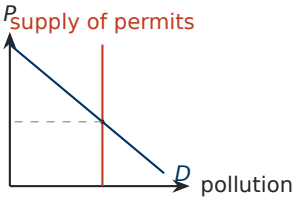
Corrective tax



Government sets the price

Market picks the quantity

Permits

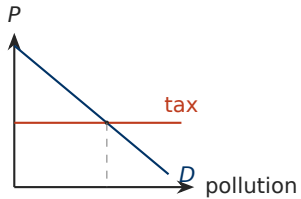


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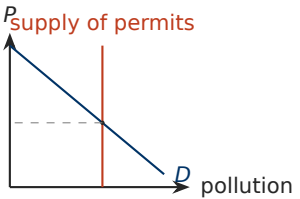
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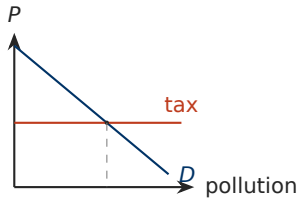
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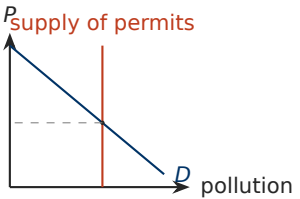
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Efficient pollution is not zero: clean air has a cost too

Private solutions

Moral codes: don’t litter

Charities: Sierra Club, alumni scholarships

Merging: beekeeper and apple orchard

Contracts: the orchard pays the beekeeper

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Coase theorem

If private parties can bargain at no cost, they solve the externality on their own

Whoever holds the right, the efficient outcome happens

The Coase theorem: a barking dog

Question

Emily's dog barks. Owning it is worth $600 to her; the barking costs her neighbor Horace $900.

(a) Emily has the right to keep the dog. What happens?

(b) Horace has the right to quiet. What happens?

(c) Now the barking costs Horace only $400. Redo (a) and (b).

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The rights decide only who pays whom

Why private solutions often fail

Transaction costs

The costs of reaching and enforcing a bargain

Lawyers, time, negotiating

Why private solutions often fail

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Bargaining breaks down: each side holds out for a better deal

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Small, clear cases: Coase

Large, diffuse cases: the government

Chapter 11: four kinds of goods

Excludable: can you stop people who don't pay? **Rival**: does my use leave less for you?

	Rival	**Not rival**
Excludable	**Private goods** ice cream, clothes congested toll road	**Club goods** Netflix, fire protection uncongested toll road
Not excludable		

Chapter 11: four kinds of goods

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Markets handle private goods well. The bottom row has no price: an externality problem

Public goods and free riders

Fireworks over a town of 400

Show costs $2,000

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Town fix: a $5 tax on each resident

everyone $10 better off

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Each resident values it at \$15

Total value:
$400 \times 15 = \$6{,}000 > \$2{,}000$

efficient to put it on

A private seller? No one buys a ticket

you see it anyway

Free rider

Gets the benefit, avoids paying

Town fix: a \$5 tax on each resident

everyone \$10 better off

Not every government good is public:

schools are excludable and rival

Important public goods

National defense

About 3% of U.S. GDP

Basic research

General knowledge: anyone can use it

- NIH, NSF
- applied research: patents instead

Fighting poverty

Private charity has free riders

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Ships can't be stopped from seeing the light

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19th-century England: private lighthouses

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- port didn't pay $\Rightarrow$ light off

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Public vs. private: depends on whether you can exclude

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Compare a public good’s costs and benefits to society

No price to read the value from

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Same logic: airbags, food inspection, highway guardrails

Common resources: the tragedy of the commons

A medieval town green

Every family grazes sheep for free

each extra sheep: a gain to the owner, less grass for all

too many sheep, grass gone

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- limit the sheep per family
- a tax per sheep
- auction grazing permits
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Today: ocean fish, groundwater, clean air, congested roads

Why the cow is not extinct

Bison: tens of millions in 1800; fewer than 1,000 by 1890

Elephants: hunted for ivory, numbers fell sharply

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Namibia, Zimbabwe: villages earn from elephants on their land

now worth protecting

Congested roads: a price on traffic

Free road at rush hour: a common resource

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Who gains, who loses?

Exam-style: a pollution problem

Question

$Q_d = 90 - P$, $Q_s = 2P$. Each unit causes \$15 of pollution damage to neighbors.

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(c) Deadweight loss of the market outcome? (d) The tax that fixes it: buyers' price, sellers' price, revenue?

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(d) A \$15 tax: buyers pay $90 - 50 = \$40$, sellers keep \$25 ($2 \times 25 = 50$), revenue $15 \times 50 = \$750$.

Summary

Externalities (Ch 10)

- Negative: market makes too much. Positive: too little
- Optimum: social value meets social cost
- Corrective tax or subsidy: internalizes it, removes a deadweight loss
- Permits: same cut at the lowest cost; tax sets the price, permits set the quantity
- Coase: bargaining works when transaction costs are low

Public goods, common resources (Ch 11)

- Excludable? Rival? Four kinds of goods
- Public goods: free riders, so the market makes too little
- Cost–benefit analysis decides how much; no price to guide it
- Common resources: used too much (tragedy of the commons)
- Fixes: regulation, a price, or property rights

Next: Ch 14, the costs of production.