

CHAPTER

Externalities

PRINCIPLES OF
Economics

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Premium PowerPoint Slides
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In this chapter, look for the answers to these questions:

- What is an externality?
- Why do externalities make market outcomes inefficient?
- What public policies aim to solve the problem of externalities?
- How can people sometimes solve the problem of externalities on their own? Why do such private solutions not always work?

Introduction

- One of the principles from Chapter 1:
Markets are usually a good way to organize economy activity.

In absence of market failures, the competitive market outcome is efficient, maximizes total surplus.

- One type of market failure: externalities, the uncompensated impact of one person's actions on the well-being of a bystander.
- Externalities can be positive or negative, depending on whether impact on bystander is adverse or beneficial.

Introduction

- Self-interested buyers and sellers neglect the external costs or benefits of their actions, so the market outcome is not efficient.
- Another principle from Chapter 1:
Governments can sometimes improve market outcomes.
In presence of externalities, public policy can improve efficiency.
- Externalities-video

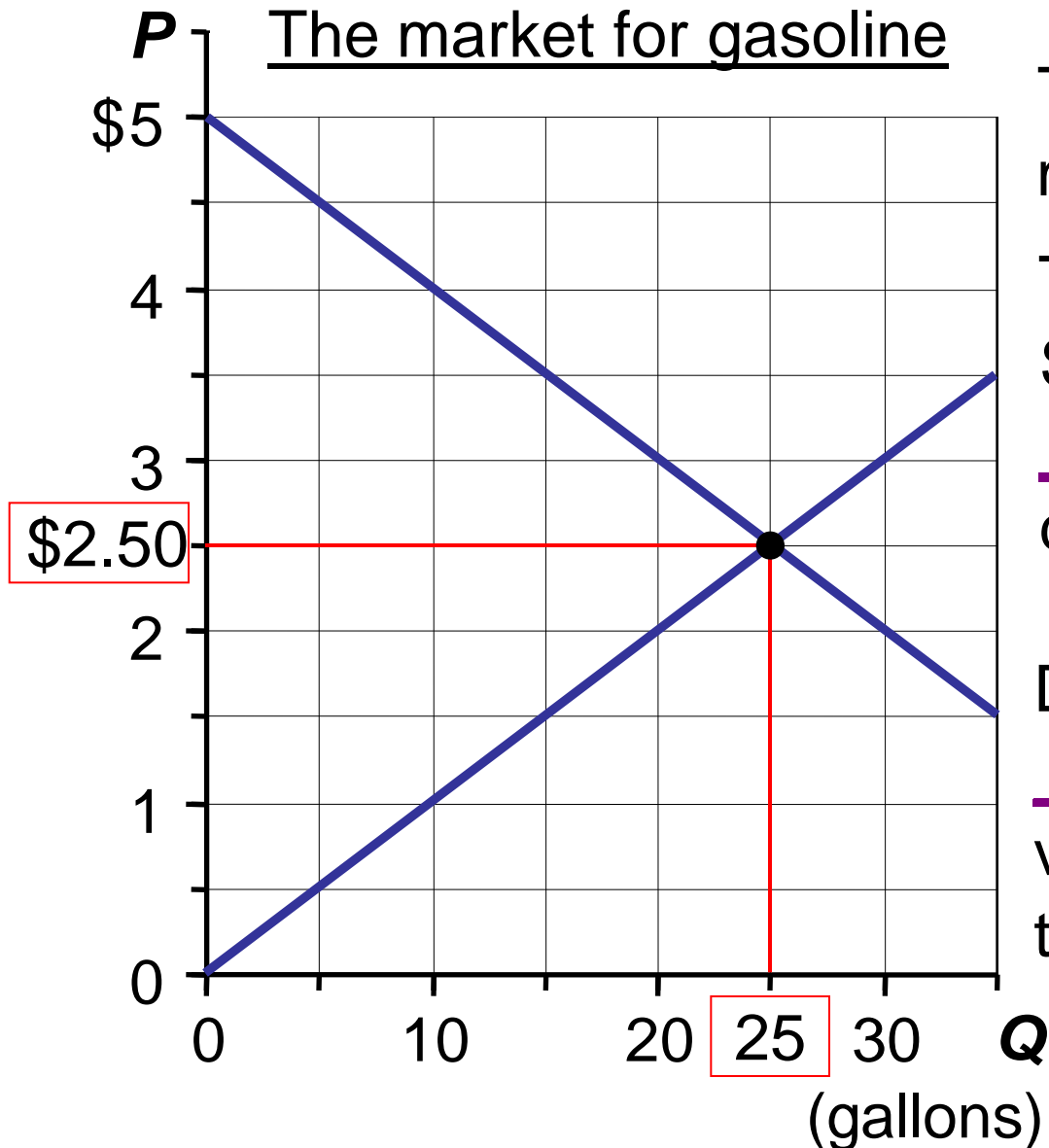
Examples of Negative Externalities

- Air pollution from a factory
- The neighbor's barking dog
- Late-night stereo blasting from the dorm room next to yours
- Noise pollution from construction projects
- Health risk to others from second-hand smoke
- Talking on cell phone while driving makes the roads less safe for others



Recap of Welfare Economics

The market for gasoline

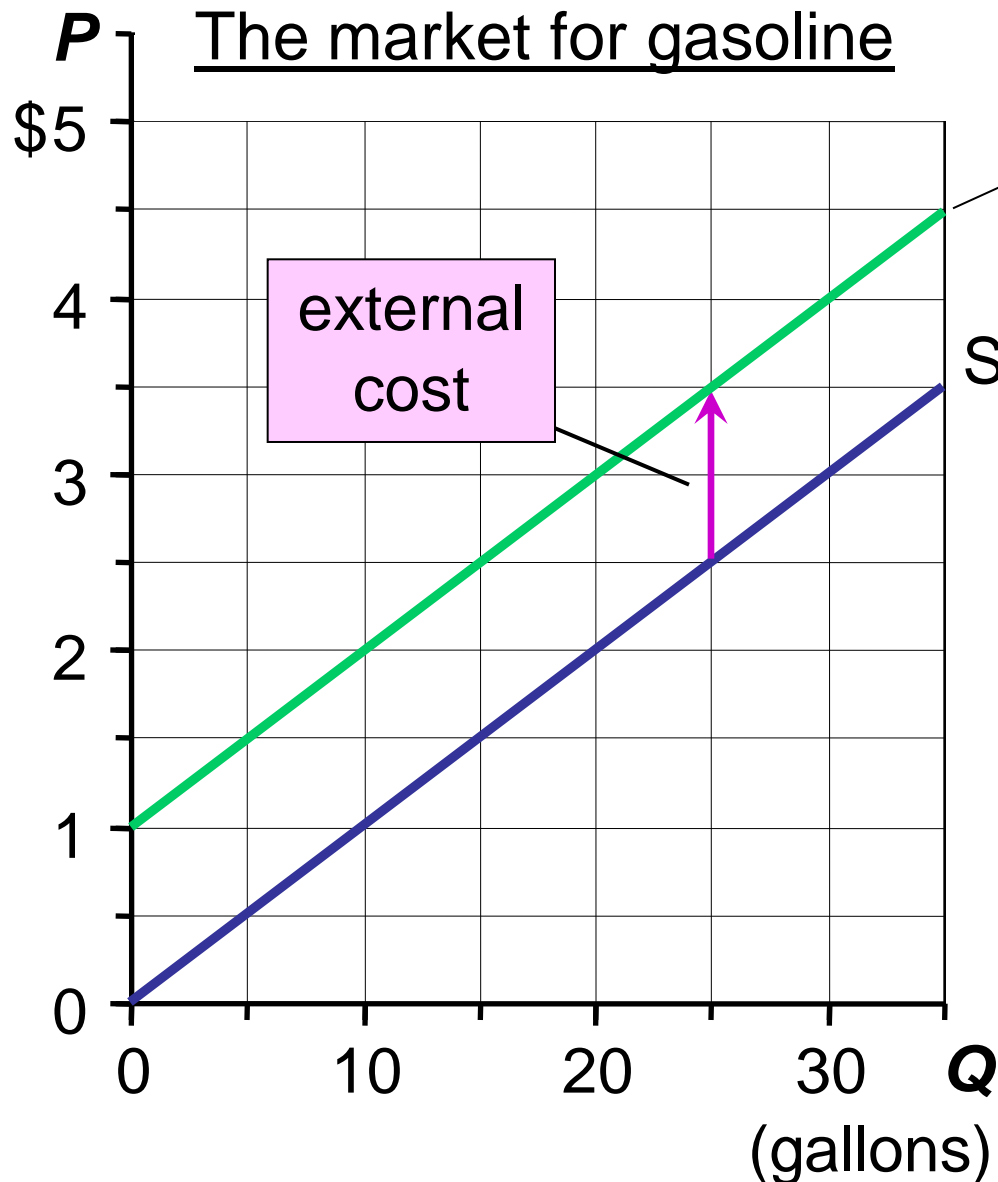


The market eq'm maximizes consumer + producer surplus.

Supply curve shows _____, the costs directly incurred by sellers.

Demand curve shows _____, the value to buyers (the prices they are willing to pay).

Analysis of a Negative Externality

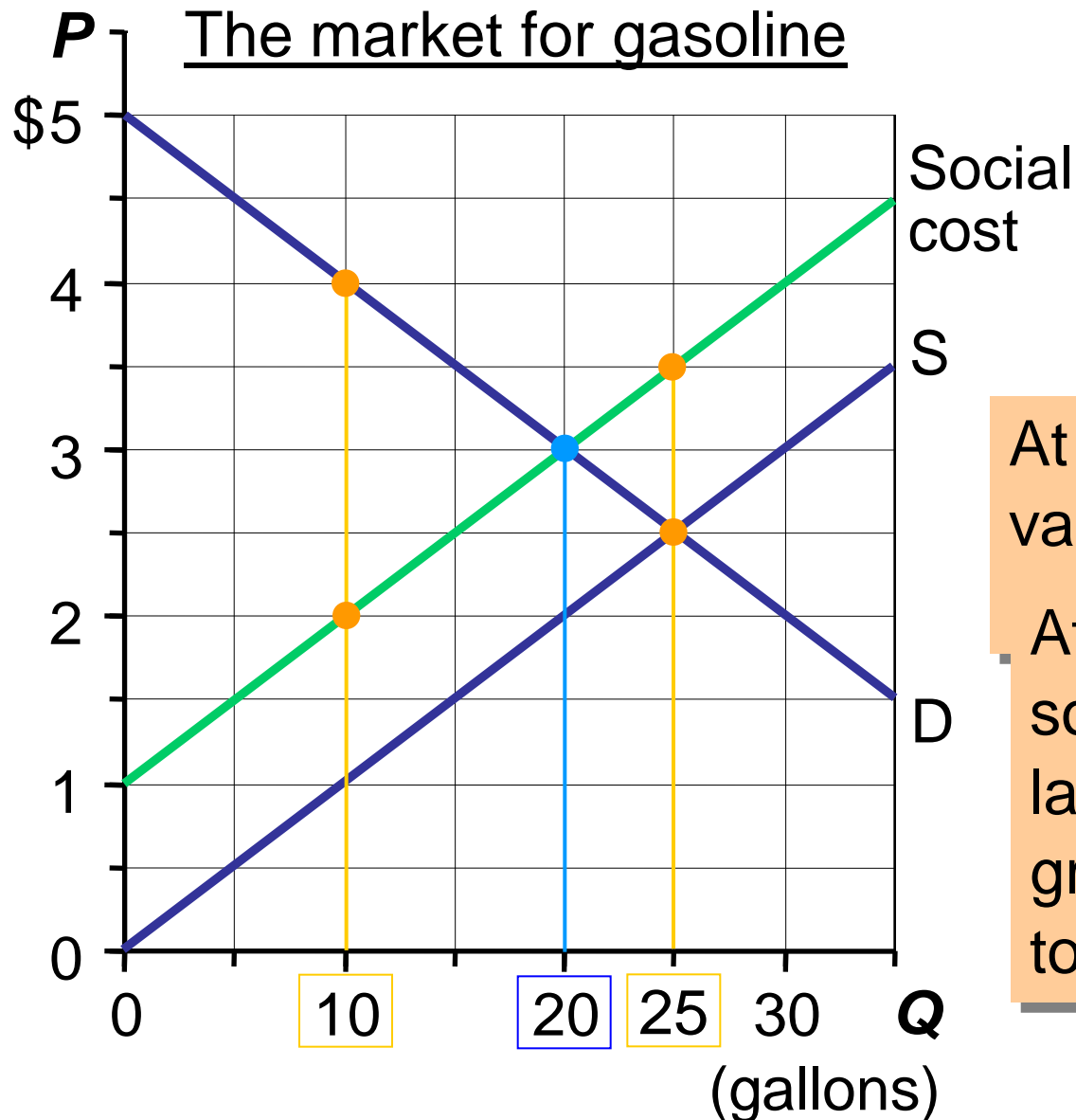


= private + external cost

= value of the
negative impact
on bystanders

= \$1 per gallon
(value of harm
from smog,
greenhouse gases)

Analysis of a Negative Externality

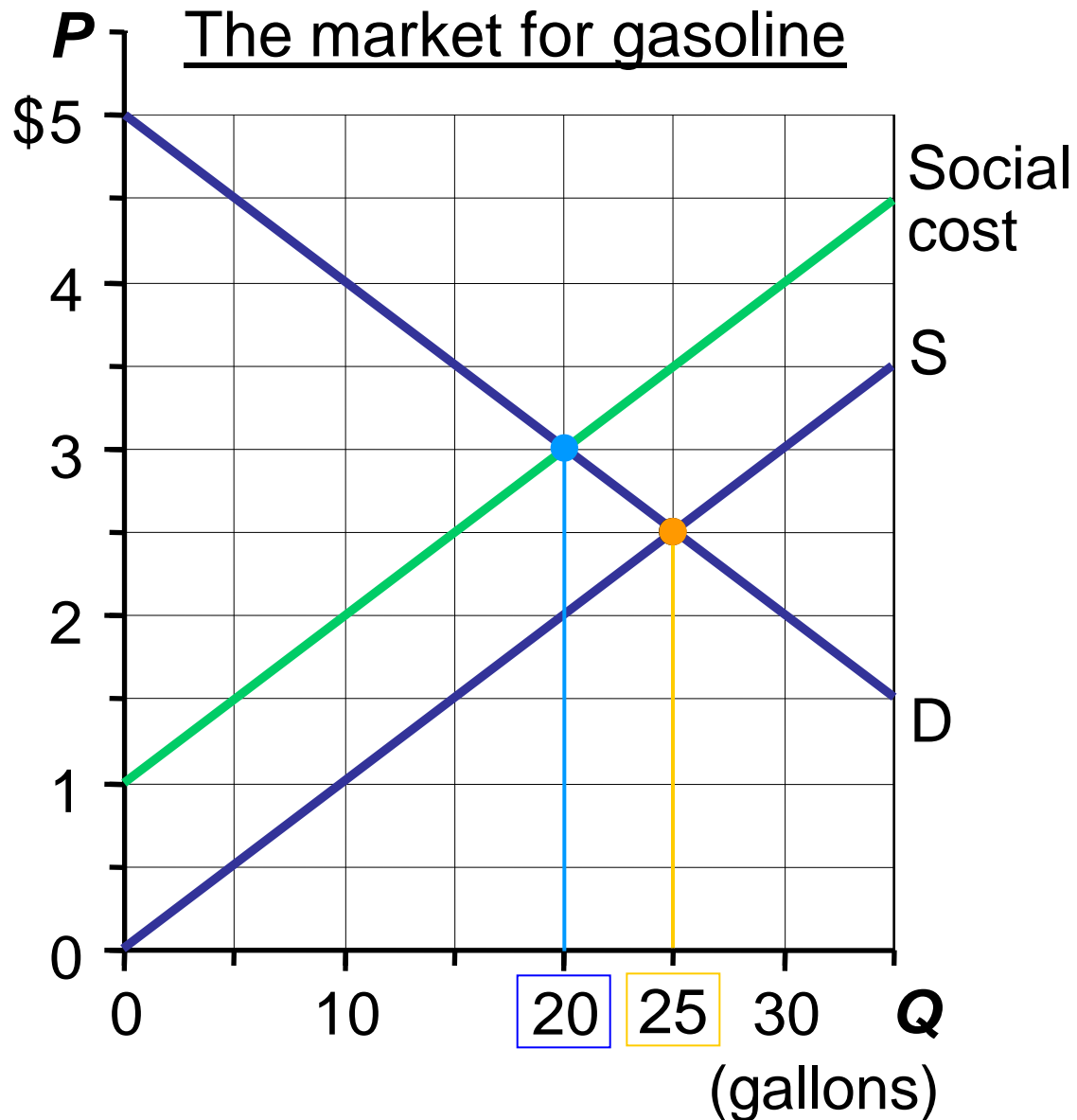


The socially optimal quantity is 20 gallons.

At any $Q < 20$, value of additional gas

At any $Q > 20$, social cost of the last gallon is greater than its value to society.

Analysis of a Negative Externality



Market eq'm
($Q = 25$)
is greater than
social optimum
($Q = 20$).

One solution:
tax sellers
\$1/gallon,
would shift
S curve up \$1.

“Internalizing the Externality”

- **Internalizing the externality**: altering incentives so that people take account of the _____ of their actions
 - In our example, the \$1/gallon tax on sellers makes sellers' costs = social costs.
 - When market participants must pay social costs, _____.
- (Imposing the tax on buyers would achieve the same outcome; market Q would equal optimal Q .)

Examples of Positive Externalities

- Being vaccinated against contagious diseases protects not only you, but people who visit the salad bar or produce section after you.
- R&D creates knowledge others can use.
- People going to college raise the population's education level, which reduces crime and improves government.



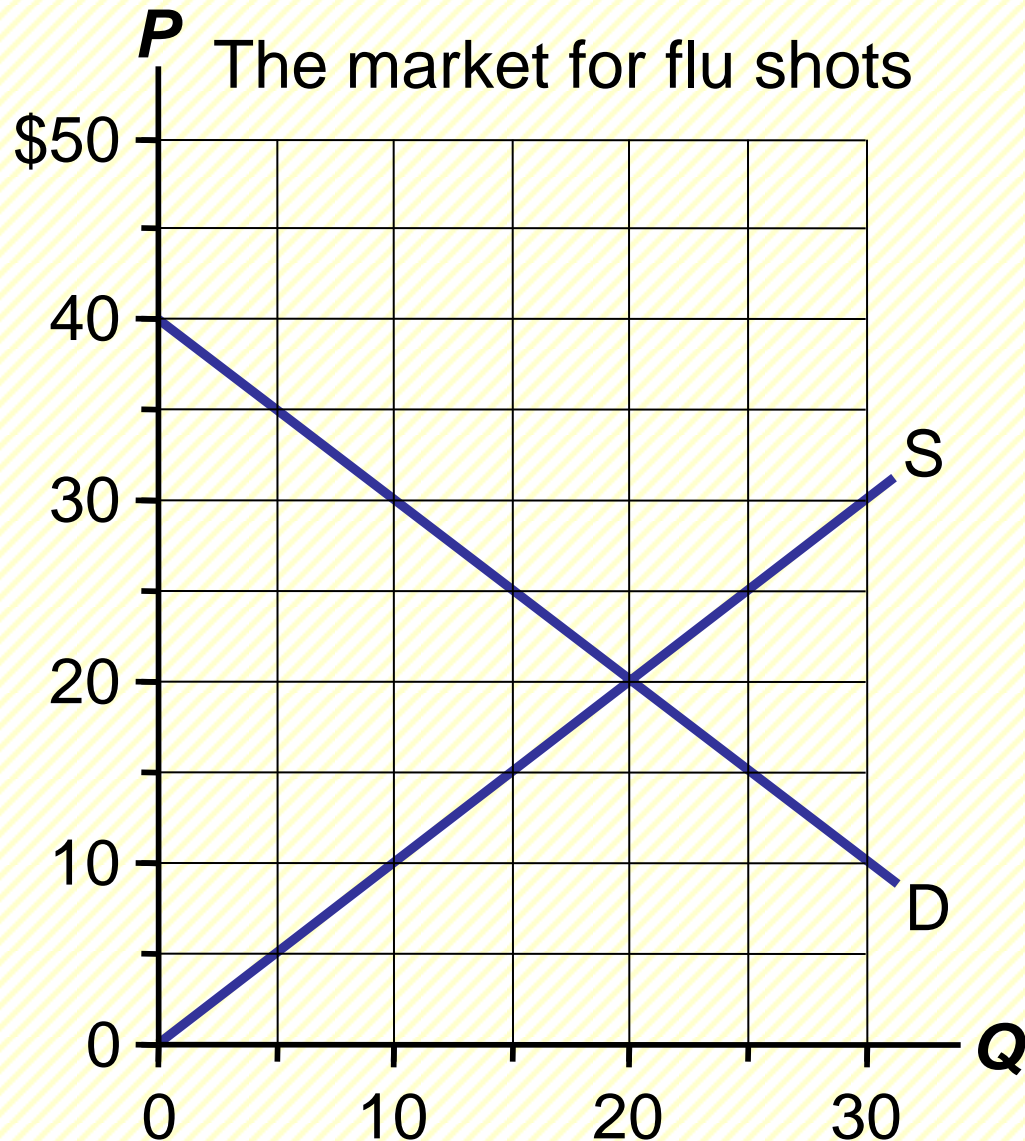
*Thank you for
not contaminating
the fruit supply!*

Positive Externalities

- In the presence of a positive externality, the _____ of a good includes
 - _____ – the direct value to buyers
 - _____ – the value of the positive impact on bystanders
- The socially optimal Q maximizes welfare:
 - At any lower Q , the social value of additional units exceeds their cost.
 - At any higher Q , the cost of the last unit exceeds its social value.

ACTIVE LEARNING 1

Analysis of a positive externality

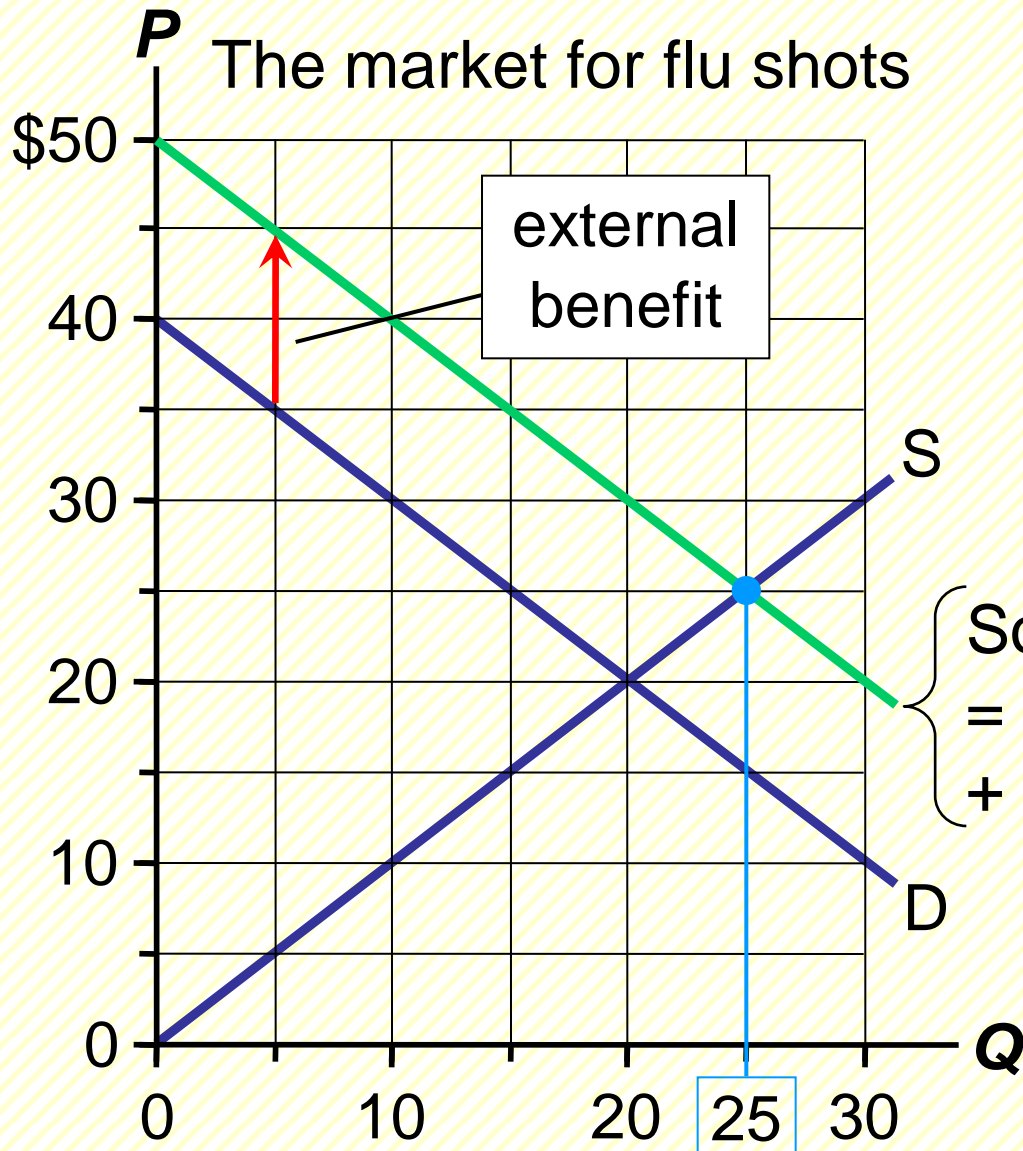


External benefit
= \$10/shot

- Draw the social value curve.
- Find the socially optimal **Q**.
- What policy would internalize this externality?

ACTIVE LEARNING 1

Answers



Socially optimal Q
= 25 shots.

To internalize the
externality, use
subsidy = \$10/shot.

Social value
= private value
+ \$10 external benefit

Effects of Externalities: Summary

If negative externality

- market quantity larger than socially desirable

If positive externality

- market quantity smaller than socially desirable

To remedy the problem,
“internalize the externality”

- tax goods with negative externalities
- subsidize goods with positive externalities

Public Policies Toward Externalities

Two approaches:

- _____ regulate behavior directly. Examples:
 - limits on quantity of pollution emitted
 - requirements that firms adopt a particular technology to reduce emissions
- _____ provide incentives so that private decision-makers will choose to solve the problem on their own. Examples:
 - _____
 - _____

Corrective Taxes & Subsidies

- **Corrective tax**: a tax designed to induce private decision-makers to take account of the social costs that arise from a _____
- Also called **Pigouvian taxes** after Arthur Pigou (1877-1959).
- The ideal corrective tax = _____
- For activities with positive externalities, ideal corrective subsidy = _____

Corrective Taxes vs. Regulations

- Different firms have different costs of pollution abatement (taking measures to cut pollution).
- Efficient outcome: Firms with the lowest abatement costs reduce pollution the most.
- A pollution tax is efficient:
 - Firms with low abatement costs will reduce pollution to reduce their tax burden.
 - Firms with high abatement costs have greater willingness to pay tax.
- In contrast, a regulation requiring all firms to reduce pollution by a specific amount not efficient.

Corrective Taxes vs. Regulations

Corrective taxes are better for the environment:

- The corrective tax gives firms incentive to continue reducing pollution as long as the cost of doing so is less than the tax.
- If a cleaner technology becomes available, the tax gives firms an incentive to adopt it.
- In contrast, firms have no incentive for further reduction beyond the level specified in a regulation.

Example of a Corrective Tax: The Gas Tax

The gas tax targets three negative externalities:

- Congestion

The more you drive, the more you contribute to congestion.

- Accidents

Larger vehicles cause more damage in an accident.

- Pollution

Burning fossil fuels produces greenhouse gases.

Tradable Pollution Permits

- A tradable pollution permits system reduces pollution at _____.
 - Firms with low cost of reducing pollution _____.
 - Firms with high cost of reducing pollution _____.
- Result: Pollution reduction is concentrated among those firms with _____.

Tradable Pollution Permits in the Real World

- SO₂ permits traded in the U.S. since 1995.
- Nitrogen oxide permits traded in the northeastern U.S. since 1999.
- Carbon emissions permits traded in Europe since January 1, 2005.
- As of June 2008, Barack Obama and John McCain each propose “cap and trade” systems to reduce greenhouse gas emissions.
- Waxman-Markey bill in 2009. Defeated in Senate.

Corrective Taxes vs. Tradable Pollution Permits

- Like most demand curves, firms' demand for the ability to pollute is a downward-sloping function of the "price" of polluting.



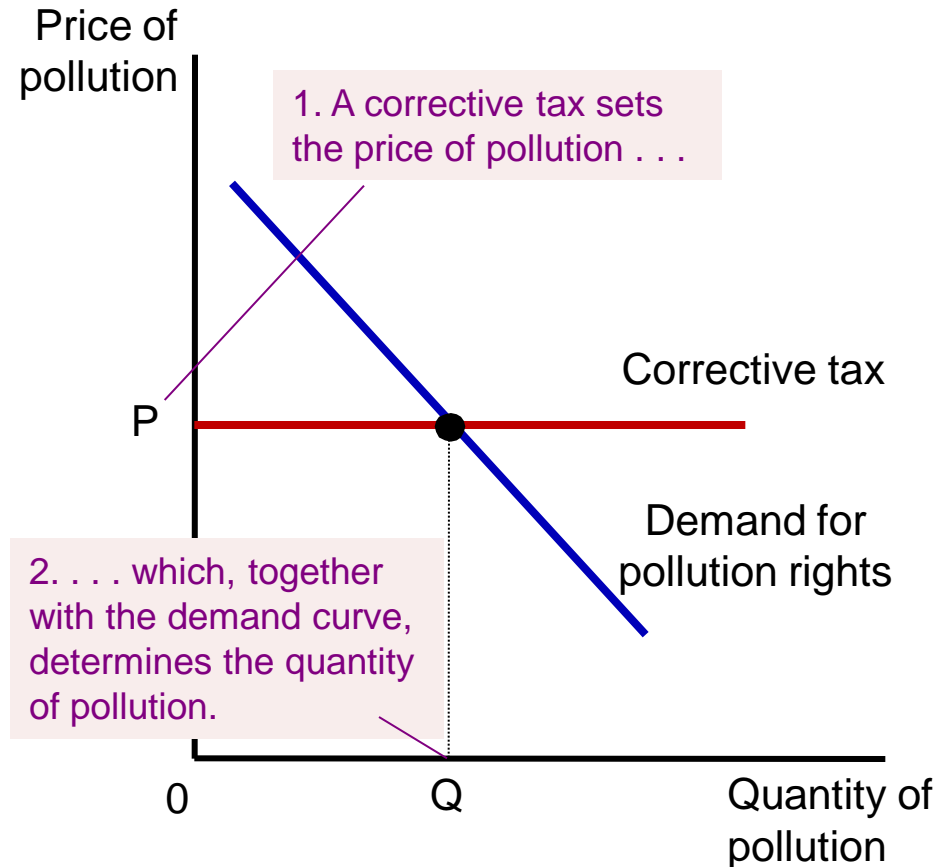


, has the same effect as the tax.

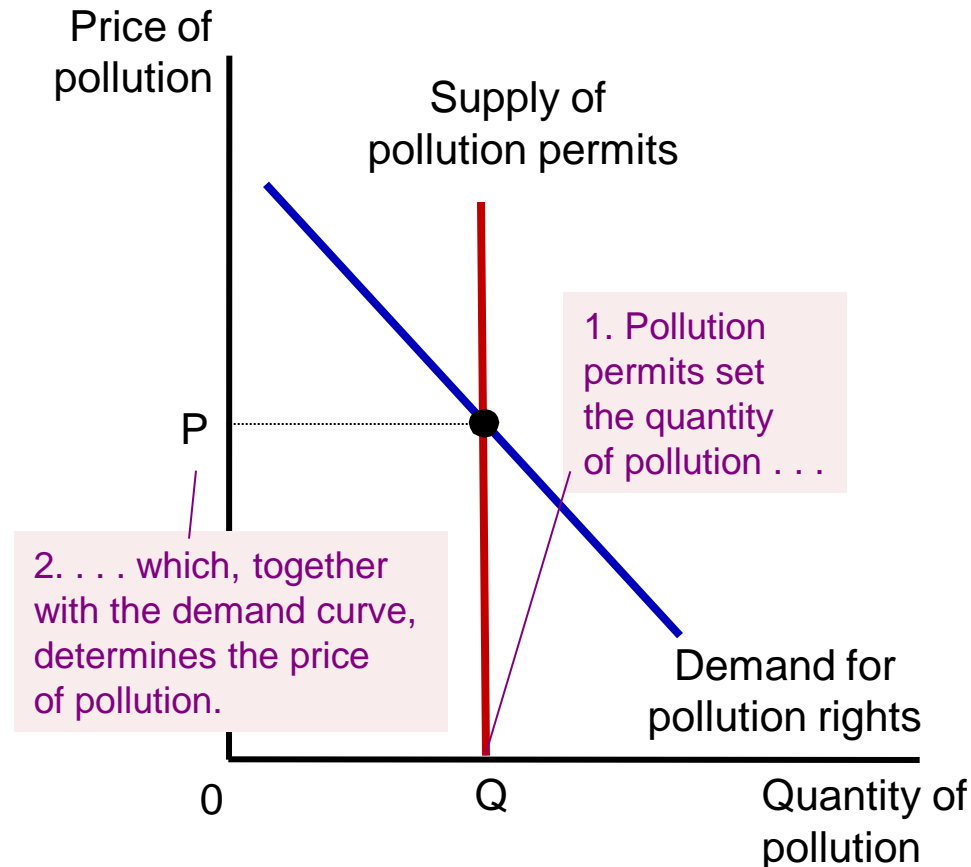
- When policymakers do not know the position of this demand curve, the permits system achieves pollution reduction targets more precisely.

The equivalence of corrective taxes & pollution permits

(a) Corrective tax



(b) Pollution permits



In panel (a), the EPA sets a price on pollution by levying a corrective tax, and the demand curve determines the quantity of pollution. In panel (b), the EPA limits the quantity of pollution by limiting the number of pollution permits, and the demand curve determines the price of pollution. The price and quantity of pollution are the same in the two cases.

Objections to the Economic Analysis of Pollution

- Some politicians, many environmentalists argue that no one should be able to “buy” the right to pollute, _____.
- However, people face tradeoffs. The value of clean air & water must be compared to their cost.
- _____,
_____ so it should increase the public’s demand for a clean environment.
- [Externalities-Market or Government Failure](#)-video

Private Solutions to Externalities

Types of private solutions:

- Moral codes and social sanctions, *e.g.*, the “Golden Rule”
- Charities, *e.g.*, the Sierra Club
- Contracts between market participants and the affected bystanders
- “Tragedy of the Commons”-video

Private Solutions to Externalities

- Coase's Theorem :
If private parties can costlessly bargain over the allocation of resources, they can solve the externalities problem on their own,

- Negative Externalities & Coase Theorem-video

The Coase Theorem: An Example

Mark owns a dog named Spot.

Negative externality:

Spot's barking disturbs Emily,
Mark's neighbor.

The socially efficient outcome
maximizes Mark's + Emily's well-being.

- If Mark values having Spot more
than Emily values peace & quiet,
the dog should stay.

Coase theorem:



See Spot bark.

The Coase Theorem: An Example

- CASE 1:

Mark has the right to keep Spot.

Benefit to Mark of having Spot = \$500

Cost to Emily of Spot's barking = \$800

- Socially efficient outcome:

- Private outcome:

Emily pays Mark \$600 to get rid of Spot,
both are better off.



The Coase Theorem: An Example

- CASE 2:

Mark has the right to keep Spot.

Benefit to Mark of having Spot = \$1000

Cost to Emily of Spot's barking = \$800

- Socially efficient outcome:

_____.

- Private outcome:

Emily not willing to pay more than \$800,

Mark not willing to accept less than \$1000,

_____.

- _____.

The Coase Theorem: An Example

- CASE 3:
Emily has the legal right to peace & quiet.
Benefit to Mark of having Spot = \$800
Cost to Emily of Spot's barking = \$500
- Socially efficient outcome: _____.
- Private outcome: Mark pays Jane \$600 to put up with Spot's barking.

The private market achieves the efficient outcome regardless of the initial distribution of rights.

Why Private Solutions Do Not Always Work

1. Transaction Costs:

The costs parties incur in the process of agreeing to and following through on a bargain. These costs may make it impossible to reach a mutually beneficial agreement.

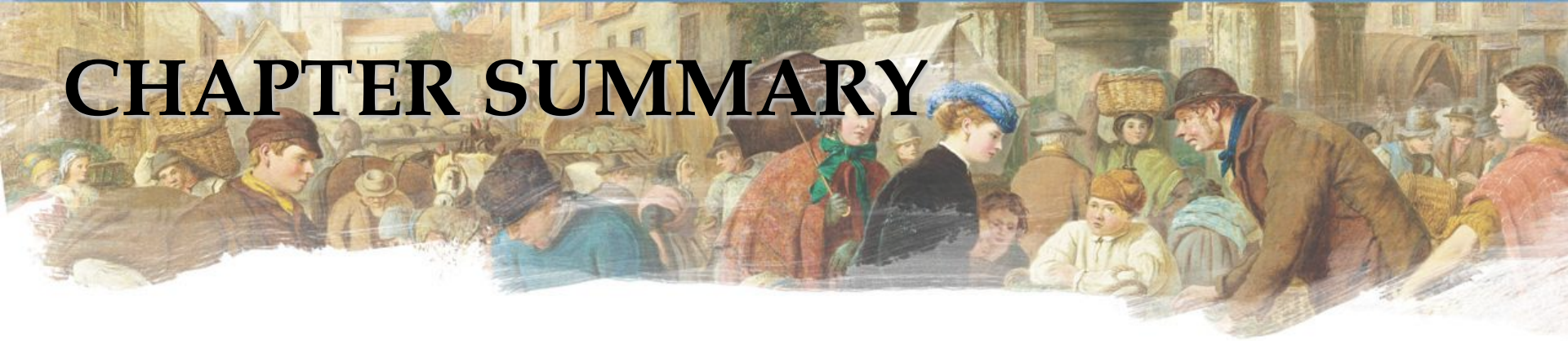
2. Holdouts:

Even if a beneficial agreement is possible, each party may hold out for a better deal.

3. Coordination Problems:

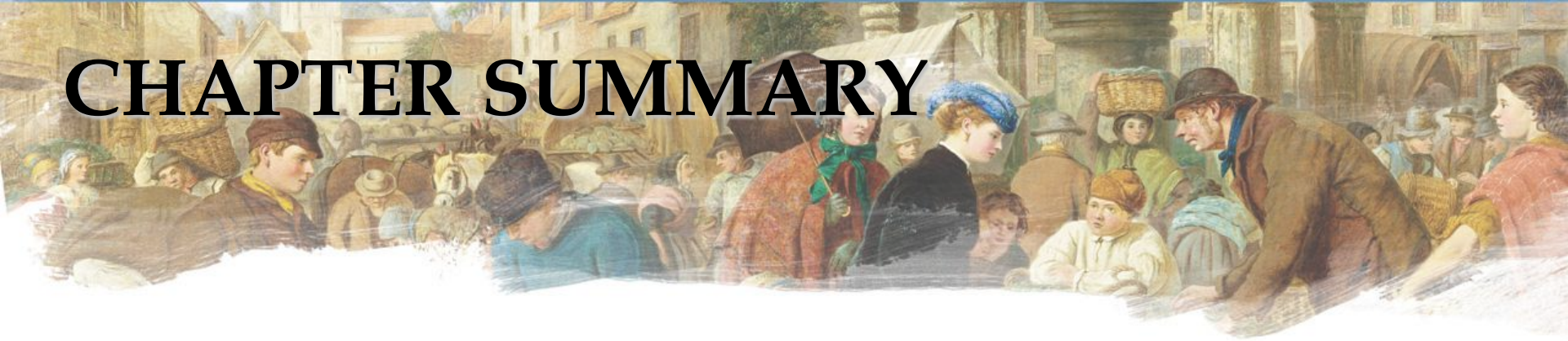
If # of parties is very large, coordinating them may be costly, difficult, or impossible.

CHAPTER SUMMARY



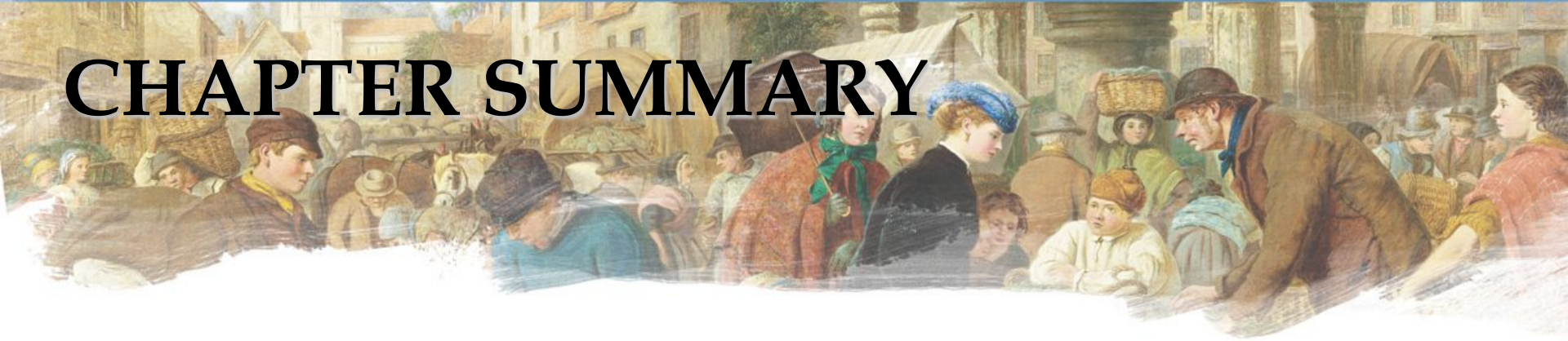
- An externality occurs when a market transaction affects a third party. If the transaction yields negative externalities (e.g., pollution), the market quantity exceeds the socially optimal quantity. If the externality is positive (e.g., technology spillovers), the market quantity falls short of the social optimum.

CHAPTER SUMMARY



- Sometimes, people can solve externalities on their own. The Coase theorem states that the private market can reach the socially optimal allocation of resources as long as people can bargain without cost. In practice, bargaining is often costly or difficult, and the Coase theorem does not apply.

CHAPTER SUMMARY



- The government can attempt to remedy the problem. It can internalize the externality using corrective taxes. It can issue permits to polluters and establish a market where permits can be traded. Such policies often protect the environment at a lower cost to society than direct regulation.