INTRODUCTORY ECONOMICS: LECTURE 5

From Firms to Industry

Highlights

- *Methods of procuring*
- *Transaction cost*
- *The principle-agent problem*
- *S-C-P Paradigm*
- *Externality*
- *Coase Theorem*

Methods of Procuring Inputs

- **Spot exchange**
  - An informal relationship between a buyer and seller in which neither party is obligated to adhere to specific terms for exchange.
- **Contract**
  - A formal relationship between a buyer and seller that obligates the buyer and seller to exchange at terms specified in a legal document.
- **Produce inputs internally (vertical integration)**
  - A situation where a firm produces the inputs required to make its final product.

Methods of Procuring Inputs In Action

- Determine whether the following transactions involve spot exchange, a contract, or vertical integration:
  - Clone 1 PC is legally obligated to purchase 300 computer chips each year for the next 3 years from AML. The price paid in the first year is $200 per chip, and the price rises during the second and third years by the same percentage by which the wholesale price index rises during those years.
  - Clone 2 PC purchased 300 computer chips from a firm that ran an advertisement in the back of a computer magazine.
  - Clone 3 PC manufactures its own motherboards and computer chips for its personal computers.
- Answers:
  - Clone 1 PC is using a contract.
  - Clone 2 PC used the spot exchange.
  - Clone 3 PC uses vertical integration.

Transaction Costs

- The cost that parties incur in the process of agreeing to and following through on a bargain.
- In our context, transaction costs are cost associated with acquiring an input that is in excess of the amount paid to the input supplier.
- Types of “obvious” transaction costs
  - Cost of searching for a supplier.
  - Cost of negotiating a price.
  - Investments and expenditures required to facilitate exchange.
- Discussions: Transaction costs in reality?

The Principal-Agent Problem

- The separation of ownership and control creates the **Principle-Agent (P-A) problem**.
  - **Principal-agent problem in our context:** if the owner is not present to monitor the manager, how can she get the manager to do what is in her best interest?
  - Owners have to incent managers since they are not present to monitor.
- Other examples of P-A problem in reality:
  - Patient and doctors?
  - Supervisor and PhD students?
  - Landlord and tenant?

Managers' Compensation Mechanisms

- Manager's economic trade-off
  - Leisure.
  - Labor
- Fixed salary
  - Receives wage independent of labor hours and effort.
    - No strong incentive to monitor other employees labor hours and effort.
    - Adversely impacts firm performance.
- Incentive contract (e.g., Stock option, bonus)
  - Tie manager wage to firm performance (like profits).
  - Manager makes labor-leisure choice and is accordingly compensated.

The Manager-Worker Principal-Agent Problem

- The owner-manager, principal-agent problem is not unique.
  - A similar problem exists between the firm's managers and the employees he or she supervises.

Solutions to the Principal-Agent Problem

- Manager-worker principal-agent problem solutions:
  - Profit sharing
  - Revenue sharing
  - Piece rates
  - Time clocks and spot checks
- Discussions: solutions to supervisor-student P-A problem?

From Firms to Industry

- Market structure factors that impact managerial decisions:
  - Number of firms competing in an industry
  - Relative size of firms (concentration)
  - Technological and cost conditions
  - Demand conditions
  - Ease of firm exit or entry

Industry Concentration

- Measures the size distribution of firms within an industry.
  - Are there many small firms?
  - Are there only a few large firms?

Measuring Industry Concentration

- Measures of industry concentration
  - Four-firm concentration ratio:

$$C_4 = \frac{S_1 + S_2 + S_3 + S_4}{S_T}$$

  - Herfindahl-Hirschman index (*HHI*):

$$HHI = 10{,}000 \sum_{i=1}^{N} \left(\frac{S_i}{S_T} \right)^2$$

Measuring Industry Concentration in Action

- Suppose an industry is composed of six firms. Four firms have sales of $10 each, and two firms haves sales of $5 each. What is the four-firm concentration ratio for this industry?
- Answer:
  - Total industry sales are $S_T = \$50$.
  - Sales of the four largest firms are $40.
  - The four-firm concentration ratio is: $C_4 = \frac{\$10+\$10+\$10+\$10}{\$50} = 0.80$
  - The four largest firms in the industry account for 80 percent of total industry output.

Table 7–2

Four-Firm Concentration Ratios and Herfindahl-Hirschman Indexes for Selected U.S. Manufacturing Industries

Industry	C_4 (percentage)	HHI
Breweries	90	NA
Distilleries	70	1,519
Electronic computers	87	NA
Fluid milk	46	1,075
Furniture and related products	11	62
Jewelry (excluding costume)	29	347
Men's and boys' cut and sew apparel	27	324
Motor vehicles	68	1,744
Ready-mix concrete	23	313
Semiconductor and other electronic components	34	476
Snack foods	53	1,984
Soap and cleaning compound	47	848
Soft drinks	52	891
Women's and girls' cut and sew apparel	20	174

SOURCE: *Concentrations Ratios: 2007*, U.S. Bureau of the Census, 2012.

NOTE: The U.S. Bureau of the Census approximates the HHI by using only data on the top 50 firms in the industry

Potential for Entry

- Optimal decisions by firms in an industry will depend on the ease with which new firms can enter the market.
- Several factors can create ***barriers to entry*** (or make entry difficult).
  - Capital requirements
  - Patents
  - Economies of scale

Conduct

- Behavior of firms:
  - Price markup over costs
  - Integration and merger
  - Advertising expenditures
  - Research and development expenditures

Pricing Behavior

- **Lerner index**
  - A measure of the difference between price and marginal cost as a fraction of the product's price.

$$L = \frac{P - MC}{P}$$

rearranging this equation yields

$$P = \left(\frac{1}{1 - L}\right) MC$$

where $\left(\frac{1}{1-L}\right)$ is the *markup factor* over marginal costs.

Pricing Behavior in Action

- A firm in the airline industry has a marginal cost of $200 and charges a price of $300. What are the Lerner index and markup factor?
  - The Lerner index is

$$L = \frac{P - MC}{P} = \frac{\$300 - \$200}{\$300} = \frac{1}{3}$$

- The markup factor is

$$\frac{1}{1 - L} = \frac{1}{1 - \frac{1}{3}} = 1.5$$

Table 7–5

Lerner Indexes and Markup Factors for Selected U.S. Industries

Industry	Lerner Index	Markup Factor
Food	0.26	1.35
Tobacco	0.76	4.17
Textiles	0.21	1.27
Apparel	0.24	1.32
Paper	0.58	2.38
Printing and publishing	0.31	1.45
Chemicals	0.67	3.03
Petroleum	0.59	2.44
Rubber	0.43	1.75
Leather	0.43	1.75

SOURCES: Michael R. Baye and Jae-Woo Lee, "Ranking Industries by Performance: A Synthesis," Texas A&M University, Working Paper No. 90-20, March 1990; Matthew D. Shapiro, "Measuring Market Power in U.S. Industry," National Bureau of Economic Research, Working Paper No. 2212, 1987.

Integration and Merger Activity

- Integration
  - Uniting productive resources of firms.
  - Can occur during the formation of a firm.
- Merger
  - Two or more existing firms “unite,” or merge, into a single firm
- Type: Vertical, Horizontal, Conglomerate
- Reasons firms merge:
  - Reduce transaction costs.
  - Reap benefits of economies of scale and scope.
  - Increase market power.
  - Gain better access to capital markets.

Other Firm Behaviors

- Research and development
  - Expenditures made by firms to gain a technological advantage, with the aim of acquiring a patent.
- Advertisement
  - Expenditures made by firms to inform or persuade consumers to purchase their products.

Performance

- Refers to the profits and social welfare that result in a given industry.

The Structure-Conduct-Performance (S-C-P) Paradigm

- ***Structure***:
  - Factors like technology, concentration and market conditions.
- ***Conduct***:
  - Individual firm behavior in the market. Behavior includes pricing decisions, advertising decisions and R&D decisions, among other factors.
- ***Performance***:
  - Resulting profit and social welfare that arise in the market.
- ***Structure-conduct-performance paradigm***
  - Model that views these three aspects of industry as being integrally related.

The Ideas of S-C-P Paradigm

- Market structure “causes” firms to behave in a certain way.
- … this behavior, or conduct, “causes” resources to be allocated in certain ways.
- … this resource allocation leads to “good” or “bad” performance.

The Critique on S-C-P Paradigm

- There is no one-way causal link among structure, conduct and performance.
  - Firm conduct can affect market structure;
  - Market performance can affect conduct and market structure.

Frims and Society: Externality

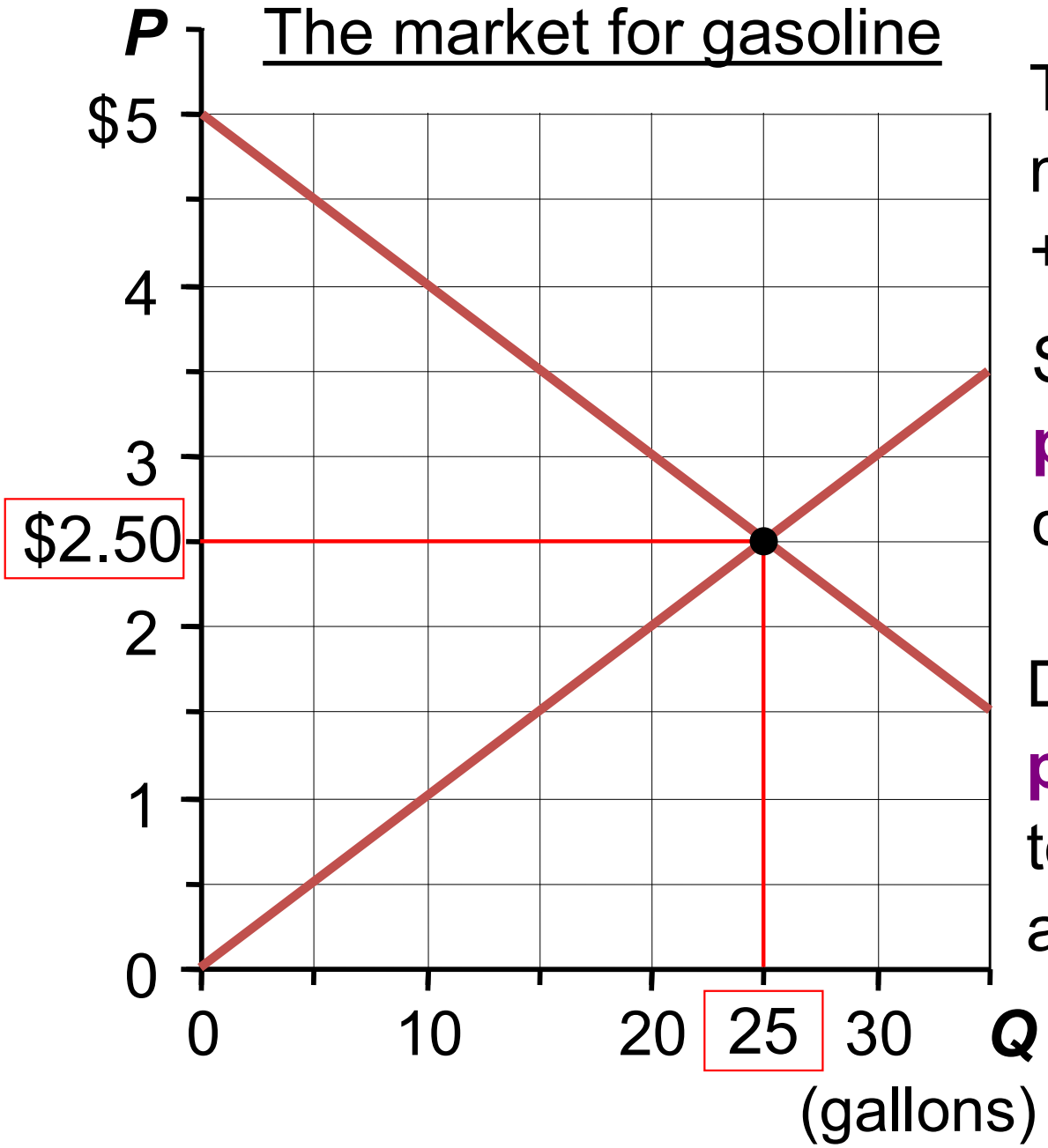
- In absence of market failures, **the competitive market outcome is efficient, maximizes total surplus**.
- One type of market failure: **externality**, the uncompensated impact of one person's actions on the well-being of a bystander.
- Externalities can be **negative** or **positive**, depending on whether impact on bystander is adverse or beneficial.

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

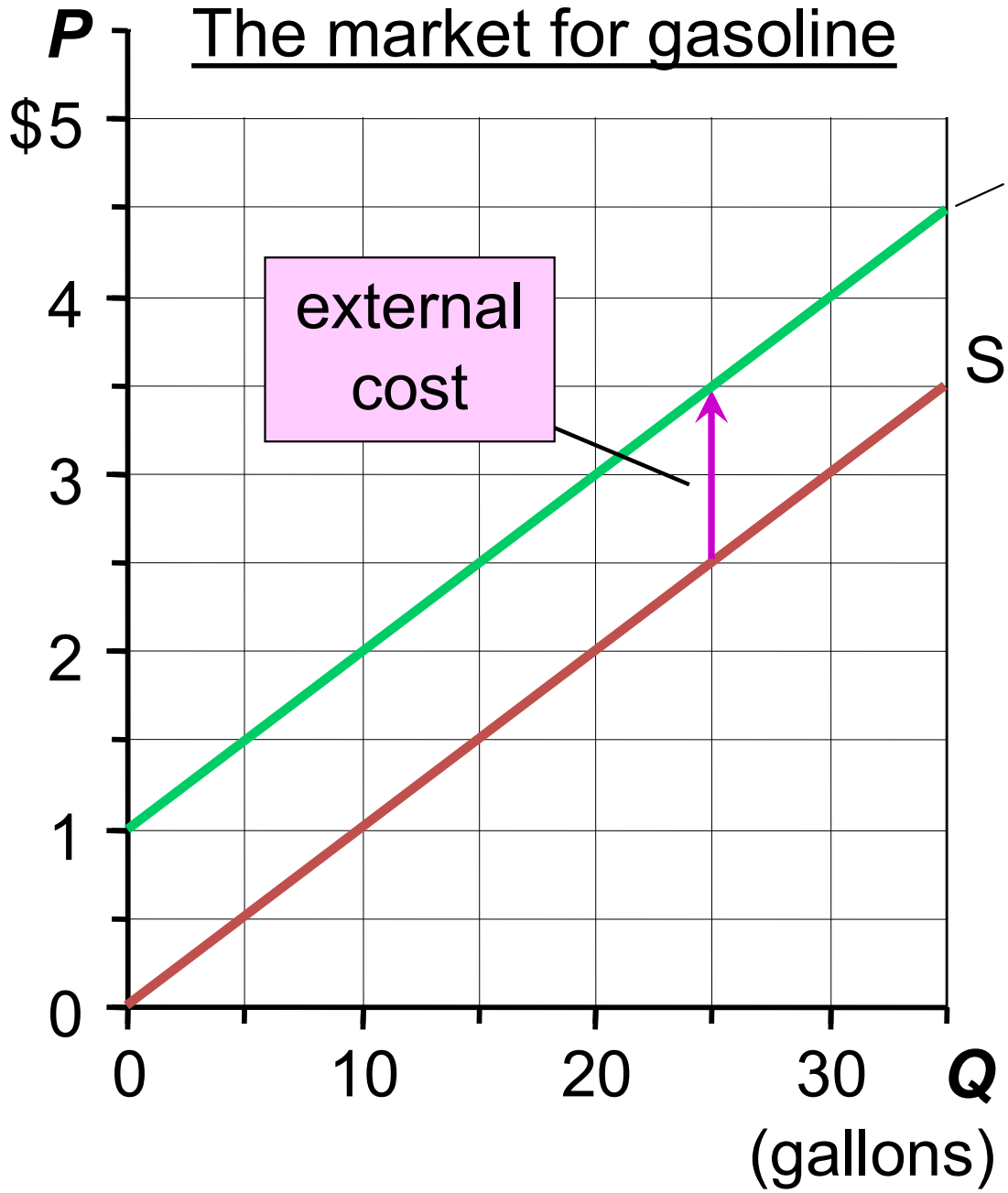


The market eq'm maximizes consumer + producer surplus.

Supply curve shows **private cost**, the costs directly incurred by sellers.

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

Analysis of a Negative Externality



Social cost
= private + external cost

Supply (private cost)

External cost
= value of the negative impact on bystanders
= $1 per gallon (value of harm from smog, greenhouse gases)

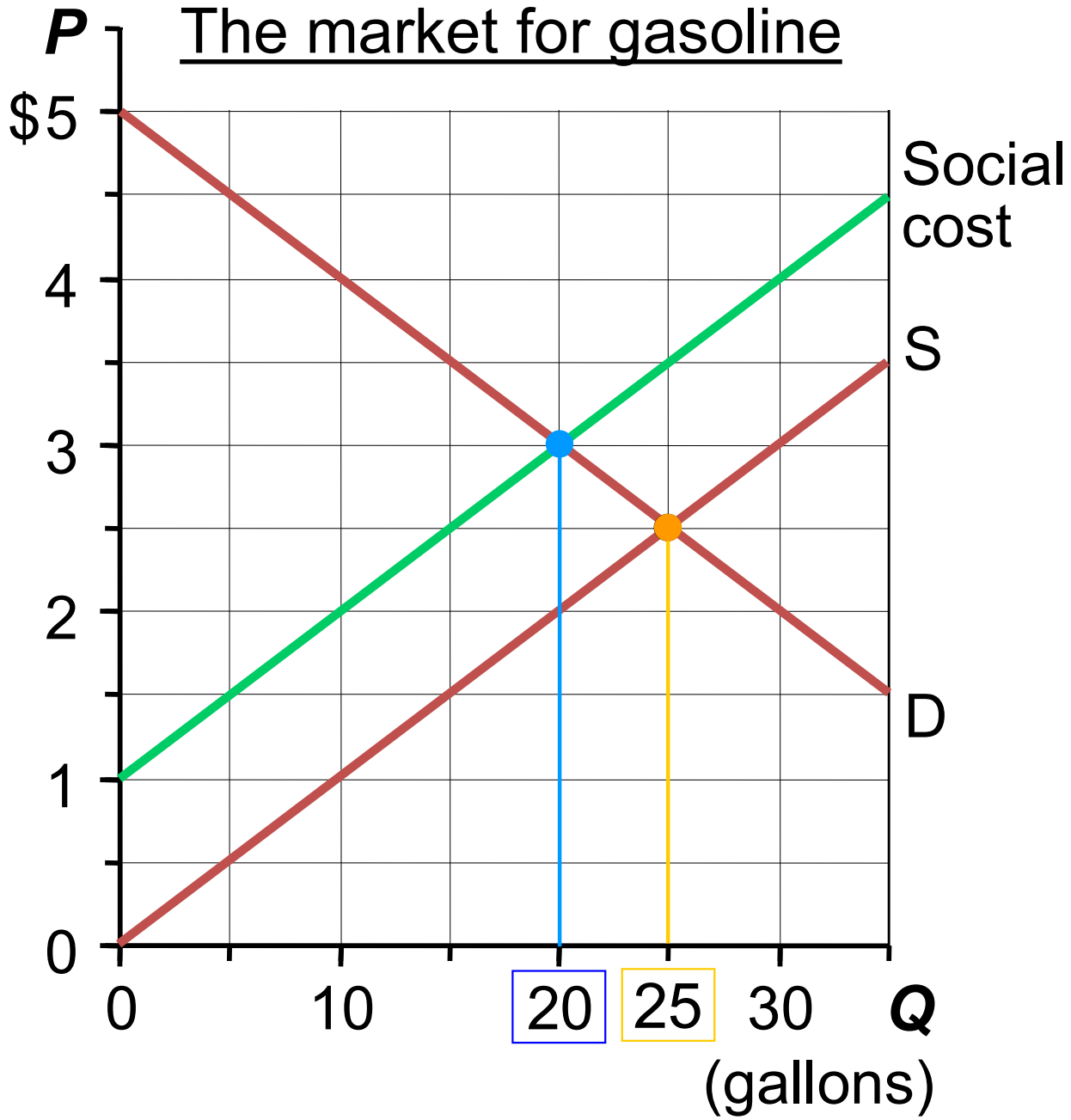
Analysis of a Negative Externality

The socially optimal quantity is 20 gallons.

At any ***Q*** < 20, value of additional gas exceeds social cost.

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 external effects of their actions
- In our example, the $1/gallon tax on sellers makes sellers' costs = social costs.
- When market participants must pay social costs, market equilibrium = social optimum.

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.
- **Discussion: How to internalize the positive externalities of vaccination?**

Thank you for not contaminating the fruit supply!

Private Solutions to Externalities

- **The Coase theorem**:
  If private parties can costlessly bargain over the allocation of resources, they can solve the externalities problem on their own.

The Coase Theorem: An Example

- Dick owns a dog named Spot.
- Negative externality:
  Spot's barking disturbs Jane,
  Dick's neighbor.
- The socially efficient outcome
  maximizes Dick's + Jane's well-being.
  - If Dick values having Spot more
    than Jane values peace & quiet,
    the dog should stay.

See Spot bark.

Coase theorem: The private market will reach the efficient outcome on its own…

The Coase Theorem: An Example

- CASE 1:
  Dick has the right to keep Spot.
  Benefit to Dick of having Spot = $500
  Cost to Jane of Spot's barking = $800
- Socially efficient outcome:
  Spot goes bye-bye.
- Private outcome:
  Jane pays Dick $600 to get rid of Spot,
  both Jane and Dick are better off.
- Private outcome = efficient outcome.

The Coase Theorem: An Example

- CASE 2:
  Dick has the right to keep Spot.
  Benefit to Dick of having Spot = $1000
  Cost to Jane of Spot's barking = $800
- Socially efficient outcome:
  See Spot stay.
- Private outcome:
  Jane not willing to pay more than $800,
  Dick not willing to accept less than $1000,
  so Spot stays.
- Private outcome = efficient outcome.

The Coase Theorem: An Example

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

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. **Stubbornness**:
   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.

Take-home Message

- **Transaction costs** are the costs parties incur in the process of agreeing to and following through on a bargain.
- To overcome **principal-agent problems**, principals must align the agents' interests with the principals' interests.
- 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.**

Take-home Message

- The **Coase theorem** states that the private market can solve externalities and 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.
- The government can attempt to remedy the problem, e.g., it can **internalize the externality** using corrective taxes.