Chapter 14 Exercises

Self-Check Questions

1. Do market demand curves reflect positive externalities? Why or why not?

2. Suppose Sony's R&D investment in digital devices has increased profits by 20%. Is this a private or social benefit?

3. The Gizmo Company is looking at plans for developing many new household gadgets. The following table shows the company's demand for financial capital for R&D of these gadgets, based on expected rates of return from sales. However, say that every investment would have an additional 5% social benefit; that is, an investment that pays at least a 6% return to the Gizmo Company will pay at least an 11% return for society as a whole; an investment that pays at least 7% for the Gizmo Company will pay at least 12% for society as a whole, and so on. Answer the questions that follow based on this information.

Estimated Rate of Return	Private Profits of the Firm from an R&D Project (in millions)
10%	$100
9%	$102
8%	$108
7%	$118
6%	$133
5%	$153
4%	$183
3%	$223

a. If the going interest rate is 9%, how much will Gizmo invest in R&D if it receives only the private benefits of this investment?

b. Assume that the interest rate is still 9%. How much will the firm invest if it also receives the social benefits of its investment? (Add an additional 5% return on all levels of investment.)

4. The Junkbuyers Company travels from home to home, looking for opportunities to buy and resell or recycle items that would otherwise be put out with the garbage. Will the private or social benefits be larger?

5. When a neighborhood is cleaned up and kept neat, there are a number of positive spillovers: higher property values, less crime, and happier residents. What types of government policies can encourage neighborhoods to clean up?

6. Education provides both private benefits to those who receive it and broader social benefits for the economy as a whole. Think about the types of policies a government can follow to address the issue of positive spillovers in technology. Then, suggest a parallel set of policies that governments could follow for addressing positive externalities in education.

7. Which of the following goods or services are nonexcludable?

a. police protection

b. streaming music from satellite transmission programs

c. roads

d. primary education

e. cell phone service

8. Are the following goods nonrival in consumption?

a. slice of pizza

b. laptop computer

c. public radio

d. ice cream cone

Review Questions

9. In what way do company investments in R&D create positive externalities?

10. Will the demand for borrowing and investing in R&D be higher or lower if there are no external benefits?

11. Why might private markets tend to provide too few incentives for the development of new technology?

12. What can government do to encourage the development of new technology?

13. What are the two key characteristics of public goods?

14. Name two public goods and explain why they are public goods.

15. What is the free rider problem?

16. Explain why the federal government funds national defense.

Critical Thinking Questions

17. Can a company be guaranteed all the social benefits of a new invention?

18. Is it inevitable that government must become involved in supporting investments in new technology?

19. How do public television stations, like PBS, try to overcome the free rider problem?

20. Why is a baseball game a quasi-public good on ESPN but a public good on NBC, CBS, or ABC?

21. Provide two examples of goods/services that are classified as private even though they are provided by the federal government.

22. Radio stations, tornado sirens, lighthouses, and street lights are all public goods because they are nonrival and nonexcludable. Therefore, why does the government provide tornado sirens, street lights, and lighthouses but not radio stations (other than PBS stations)?

Problems

23. HighFlyer Airlines wants to build new airplanes with greatly increased cabin space. This will allow the firm to increase the comfort of passengers and sell more tickets at a higher price. However, redesigning the cabin means rethinking many other elements of the airplane as well, like the placement of engines and luggage and the most efficient shape of the plane for moving through the air. HighFlyer Airlines has developed a list of possible methods to increase cabin space, along with estimates of how these approaches would affect costs of operating the plane and sales of airline tickets. Based on these estimates, the following table shows the value of R&D projects that provide at least a certain private rate of return.

Private Rate of Return	Value of R&D Projects that Return at Least the Private Rate of Return to HighFlyer Airlines
12%	$100
10%	$200
8%	$300
6%	$400
4%	$500

a. If the opportunity cost of financial capital for HighFlyer Airlines is 6%, how much should the firm invest in R&D?

b. Assume that the social rate of return for R&D is an additional 2% on top of the private return; that is, an R&D investment that had a 7% private return to HighFlyer Airlines would have a 9% social return. How much investment is socially optimal at the 6% interest rate?

24. Assume that the marginal private costs of a firm producing fuel-efficient cars is greater than the marginal social costs. Assume that the marginal private benefits of a firm producing fuel-efficient cars is the same as the marginal social benefits. Discuss one way the government can try to increase production and sales of fuel-efficient cars to the socially desirable amount. (*Hint*: the government is trying to affect production through costs, not benefits.)

25. Becky and Sarah are sisters who share a room. Their room can easily get messy, and their parents are always telling them to clean it up. If both Becky and Sarah clean, they each spend two hours and get a clean room. If Becky decides not to clean and Sarah does all the cleaning, Sarah spends ten hours cleaning, Becky spends zero, and Sarah is exhausted. The same would occur for Becky if Sarah decided not to clean: Becky spends ten hours and becomes exhausted. If both girls decide not to clean, they both have a dirty room.

a. What is the best outcome for Becky and Sarah? What is the worst outcome? (It would help you to construct a prisoner's dilemma table.)

b. Unfortunately, we know that the optimal outcome will most likely not happen and that the worst one will probably be chosen instead. Explain what about Becky's and Sarah's reasoning will lead them both to choose the worst outcome.