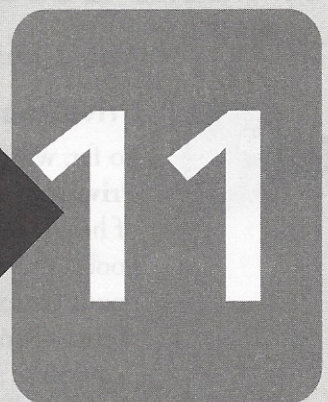




CHAPTER



11

Public Goods, Externalities, and the Role of Government

IN THIS CHAPTER

Summary: One of the recurring themes of the first half of this book is that the competitive marketplace provides the most efficient societal outcome where goods are produced at the point where $MB = MC$, or at the intersection of market supply and market demand. We have not, however, explored the possibility that the demand curve might not capture all of the benefits to society from the consumption of a good. There is also the possibility that the supply curve might not capture all of the costs to society from the production of the good. If these benefits and/or costs are indeed not reflected in the market equilibrium price and quantity, then we conclude that the market has failed to provide the efficient outcome. When this occurs, the government usually needs to step in.

Key Ideas

- ★ Public and Private Goods
- ★ Positive and Negative Externalities
- ★ Income Distribution
- ★ Tax Structures



KEY IDEA

11.1 Public Goods and Spillover Benefits

Main Topics: *Private and Public Goods, Spillover Benefits and Positive Externalities*



Private and Public Goods

So far, when discussing goods and services, we have focused on private goods and services. **Private goods** are goods that are both rival and excludable. A bag of potato chips and a cup of herbal tea are all private goods. These are rival in that only one person can consume the good, and so consumption by one consumer necessarily means another cannot. Private goods are excludable in that consumers who do not pay for the good are excluded from the consumption.

Public goods however, are special cases where the goods are both nonrival and nonexcludable. These characteristics mean that one person's consumption does not prevent another from also consuming the good. If a public good is provided to some, it is necessarily provided to all, even if they do not pay for the good. Common examples of public goods are national defense, local fire and police services, space exploration, and environmental protection.

Who Pays?

In the case of private goods, each individual decides whether he or she is going to pay the going price. If the marginal benefit to me is at least as high as the price, I might decide to purchase and consume the good. For private goods, those who want the good badly enough are the ones who pay.

Maybe you have confronted the difficulty in paying for a public good if you have been assigned a group project in school. If each group member receives the same grade, regardless of his or her level of effort, some members of the group might slack off and benefit from the hard work of the others. If this sounds familiar, you have experienced the **free-rider problem**. The free-rider problem pops up whenever some members of the community understand that they can consume the public good while others provide for it.

A small town has a community meeting to decide how to pay for local police protection. The mayor passes a collection plate around the room, and we each make a voluntary donation toward this public good. There are some difficulties with paying for a public good in this way. How much do I use or value the next unit of police services in my protection? Is this more than, less than, or the same as my neighbor's use and value of police protection? It is impossible to answer this question and even if it were possible to determine how much my neighbor values police service, maybe he won't pay his fair share. After all, police protection is going to be provided to the entire community, and this protection cannot be denied to anyone, some members of the community might become **free riders**. The free-rider problem and the nonexcludable nature of public goods require that the government collect taxes to pay for their provision.



Spillover Benefits

In graduate school I rented a small house on a dead-end street. On the other side of the street, two older ladies had an immaculately landscaped yard with gorgeous rosebushes. Riding my mountain bike home from campus I was happy to see, and smell, the results of their hard yard work. I'm sure that I was not the only neighbor who felt that way. When one person's consumption of a good provides utility to a third party who has not directly purchased the good, there exist **spillover benefits** that are not reflected in the market price of that good. In my case, my neighbors went to the trouble, expense, and effort, to beautify

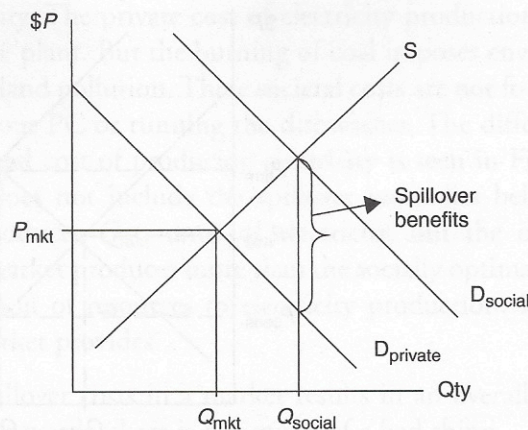


Figure 11.1

their yard. In the process, they beautified the neighborhood and provided benefits to those of us who received utility from the landscaping and the roses. This situation is described as a **positive externality** and is illustrated in Figure 11.1.

The market demand curve for roses captured the private benefits received by consumers of roses, but did not capture the additional benefits received by neighbors of those who consumed roses. Figure 11.1 incorporates the spillover benefits to the market for roses. The private demand curve, which does not include the spillover benefits, lies below the societal demand curve. The market produces only Q_{mkt} roses, but the optimal amount is greater at Q_{social} . Because the market produces less than the socially optimal amount, it is said that there is an underallocation of resources to rose production. In other words, society wants more than the market provides.

- The existence of spillover benefits in a market results in an underallocation of resources in that market. In other words, there is not enough of a good thing.

The older ladies who lived across the street from my house were essentially providing a public good that we might call “community beautification” and the rest of us were free riding on their activity. How could we have contributed to the provision of the public good? Maybe we could have brought these ladies cash donations, or we could have volunteered our labor. Each of these gestures would have lessened their burden and freed up their private resources to provide even more landscaping for the neighborhood.

Subsidies

On a larger scale, this type of market failure can be remedied through government intervention. Our goal as economic policymakers is to move the equilibrium quantity from Q_{mkt} to Q_{social} . One solution might be to provide a subsidy to gardeners equal to the amount of the spillover benefit that their activity provides to the community. By sending a check (or voucher) to the ladies, they would have increased their demand for roses and other landscaping and shifted the private demand out to equal the social demand. This is seen in Figure 11.2. The price received by the firm has risen to P_{firm} , but when the consumer applies the voucher, the actual price to the consumer is lower at P_{cons} .

Another possibility is to provide a subsidy to producers of roses. This type of subsidy would result in an outward shift in the supply curve so that the equilibrium quantity of roses would be at Q_{social} . This policy is seen in Figure 11.3. The price to consumers, P_{cons} , is also lower in this case, while producers receive, with the subsidy, P_{firm} .

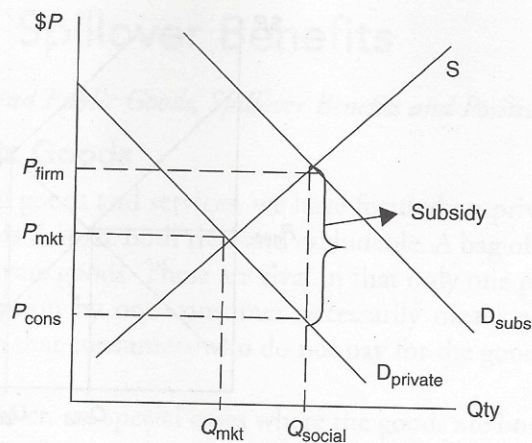


Figure 11.2

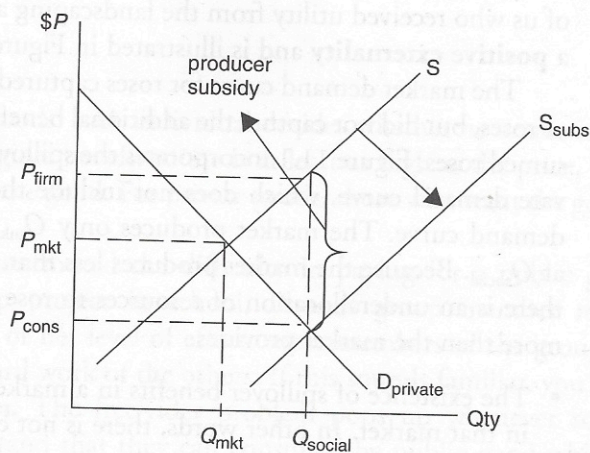


Figure 11.3

11.2 Pollution and Spillover Costs

Main Topics: *Spillover Costs and Negative Externalities*

Another kind of market failure occurs when there are additional costs associated with production of a good that are not reflected in the market price. Pollution of all kinds is a classic example.



Spillover Costs

Almost anyone who has dined at a restaurant has experienced secondhand smoke. Even a nonsmoker sitting in the nonsmoking section expects to come home smelling like an ashtray. While the smoker has chosen to pay the market price of tobacco, the nonsmoker also pays a price for that choice, either in minor disutility or worsened health. When one person's consumption of a good imposes disutility on a third party who has not directly purchased the good, there exist **spillover costs** that are not reflected in the market price of that good. A situation in which polluters impose costs upon third parties is called a **negative externality**.

The existence of spillover costs from a negative externality means that not all of the costs of production are captured by the supply curve. In the Midwest, the burning of coal

produces most electricity. The private cost of electricity production includes the coal, the labor, and capital at the plant. But the burning of coal imposes environmental costs in the form of air, water, and land pollution. These societal costs are not found in the market price (P_{mkt}) of booting up your PC or running the dishwasher. The difference between the private cost and the societal cost of producing electricity is seen in Figure 11.4. The private supply curve, which does not include the spillover costs, lies below the societal supply curve. The market produces Q_{mkt} units of electricity, but the optimal amount is less at Q_{social} . Because the market produces more than the socially optimal amount, it is said that there is an overallocation of resources to electricity production. In other words, society wants less than the market provides.

- The existence of spillover costs in a market results in an overallocation of resources in that market. In other words, there is too much of a bad thing.

So how could cigarette smokers alleviate the discomfort that they impose upon their nonsmoking citizens? The aim of any such policy is to try to move the spillover costs away from the third party victims and back upon those who produce the externality.

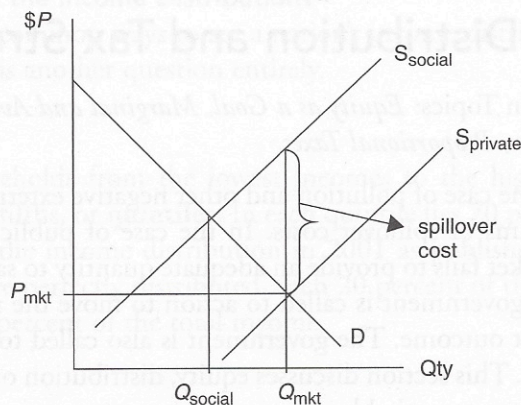


Figure 11.4

Pollution Taxes

Rather than allow the spillover costs to fall externally on members of society, the goal of pollution taxes is to internalize these costs by imposing a tax on the production or consumption of goods that create negative externalities. Our goal is to move the market equilibrium quantity closer to the socially optimal quantity of electricity. Suppose government imposes a tax, equal to the spillover cost, on every unit of coal that our power plant uses to produce electricity. This pollution tax results in an inward shift of the private supply curve so that it equals the social supply curve. See Figure 11.5. The price of using your PC has now increased, but now that price incorporates all of the costs of electricity, including the effects of pollution on the environment and human health.

In some cases, a tax may be imposed on consumers, if they are responsible for the negative externality. For example, in major metropolitan areas traffic is a serious problem and millions of commuters create significant amounts of pollution. We might increase the automobile registration tax, or create a system of toll highways so that the users of automobiles and the commuters themselves must pay an additional price for that behavior. We have seen that any time the price increases, quantity demanded (driving) must fall.

Be careful when designing a tax to remedy a negative externality. We must tax those who are imposing the spillover costs on society. Would you tax the nonsmoker to fix the problem of secondhand smoke? Hardly.



"I was always told to make big graphs to keep things clear. It ended up saving me from many careless errors."
—Ross,
AP Student



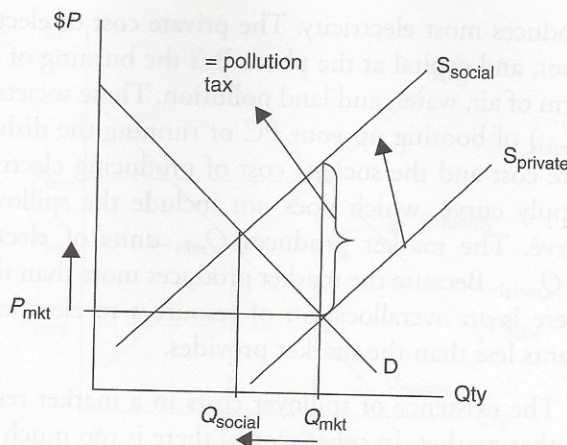


Figure 11.5

11.3 Income Distribution and Tax Structures

Main Topics: *Equity as a Goal, Marginal and Average Tax Rates, Progressive Taxes, Regressive Taxes, Proportional Taxes.*

In the case of pollution and other negative externalities, the marketplace fails to protect the victims of spillover costs. In the case of public goods or other positive externalities, the market fails to provide an adequate quantity to satisfy the needs of society. As we saw above, the government is called to action to move the market outcome closer to the societal efficient outcome. The government is also called to action to remedy issues of equity, or fairness. This section discusses equity, distribution of income, and tax structures to move closer to a more equitable outcome.

Equity as a Goal

While we tout the efficiency of competitive markets with a fervor that approaches deification, the one thing even the most efficient market does not do is provide equity, or fairness. Some consumers can afford a new Mercedes, some cannot; but I doubt that this is a good example of the unfairness of markets. But some consumers cannot afford pediatric services for their infant children. Even if these services are exchanged at the efficient quantity where the marginal social benefit is equal to the marginal social cost, even the most die-hard advocates of the free market can see that it is an outcome that should be remedied through some form of income redistribution.

An Equal Share?

There are some who propose that the economic resources should be equally divided amongst all members of society. This egalitarian, or equal share view, seems fair but has at least one serious criticism. **Egalitarianism** suffers from an issue of compensation that fails to match productivity. In other words, the incentives to work hard, take risks, and seek a competitive advantage are greatly reduced. If you were guaranteed an equal share of the resources, how hard would you work?

Example:

All students in your class are assured of being compensated with a “B,” regardless of the effort and productivity that might merit a B. C-level students lack the motivation to become more productive because they are guaranteed compensation

A Proportional Tax

A **proportional tax** exists if a constant tax rate is applied regardless of income. Many politicians, on the grounds of a more streamlined way of taxing the population, have proposed this kind of “flat tax.” Corporate taxes are taxed at a flat rate of approximately 35 percent and are one of few examples of a proportional tax in the United States. Some U.S. states have adopted a proportional income tax rather than the more traditional progressive tax on income.

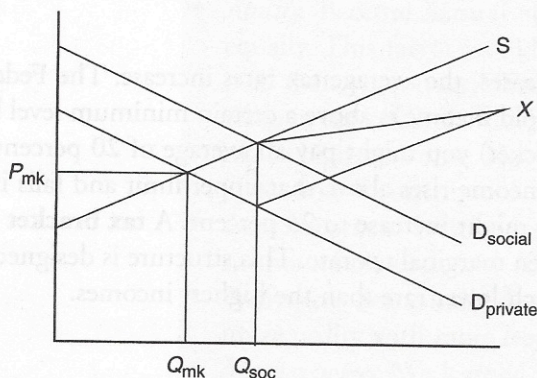
Example:

Bob and Nancy earn \$30,000 and \$60,000 respectively. A proportional tax of 10% would require that Bob pays \$300 and Nancy pays \$600 in taxes.

> Review Questions

1. In the figure below, X represents

- (A) spillover benefits.
- (B) a potential producer subsidy to eliminate an externality.
- (C) a potential consumer subsidy to eliminate an externality.
- (D) both A and C.
- (E) A, B, and C.



2. Which of the following scenarios best describes a negative externality?

- (A) A roommate subscribes to a monthly CD club and you share the same taste in music.
- (B) Your neighbor has a swimming pool and you have an open invitation to come on over for a pool party.
- (C) Your neighbor has a swimming pool and their six-year-old child has his first grade friends over every day for a pool party.
- (D) Your roommate's mom has decided that your apartment needs TiVo and pays for it.
- (E) Your dad has purchased a new sports coupe and has agreed that you can drive it to the prom.

3. Which of the following is the best example of a public good?

- (A) A lighthouse on a rocky coastline.
- (B) Tickets to the Super Bowl.
- (C) A granola bar.
- (D) A cup of coffee.
- (E) A magazine subscription.

4. Production of energy (i.e., electricity, natural gas, heating oil) creates a negative externality in the form of air pollution blown to communities downwind from the source of the pollution. Of the choices below, which is the most appropriate policy to remedy this negative externality?

- (A) a per unit tax on consumers of subway tickets and city bus passes.
- (B) a per unit tax on producers of energy.
- (C) a per unit subsidy for energy consumers.
- (D) a per unit tax on consumers of energy efficient light bulbs.
- (E) a per unit subsidy for energy producers.

5. Jason earns \$1,000 a week and pays a total of \$200 in taxes. Jennifer earns \$2,000 a week and pays a total of \$300 in taxes. We can conclude from this information that their income is taxed with a(n)

- (A) progressive tax.
- (B) proportional tax.
- (C) regressive tax.
- (D) tax bracket.
- (E) egalitarian tax.