Public Goods

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The city of Dhaka, Bangladesh, has a garbage problem. Every few days, residents of the various Dhaka neighborhoods bring their trash to large dumpsters in central areas or smaller dumpsters along their local streets. In theory, municipal employees then collect the garbage and cart it off for disposal. In practice, however, those employees often fail to show up, leaving the garbage to rot in the streets and residents to fume in frustration.

An economist might wonder why the residents of Dhaka don't simply scrap the current system of public trash collection and instead pay a private service to pick up their trash. In this way, the free market might solve Dhaka's problems. The trouble is that private trash collection, financed by a voluntary fee paid by neighborhood residents, faces the classic *free rider problem* introduced in Chapter 5: any resident could continue to throw his trash in the dumpsters, and then refuse to pay his share of the trash collection fee, with the hope that his neighbors would pick up the costs for him. If his neighbors cover the cost of collection, then this free-rider gets all the benefits of trash collection but pays none of the costs. Yet, if some in the neighborhood free-ride, then others will feel exploited by paying to have their non-paying neighbors' trash picked up; these residents might decide not to pay either. Eventually, the number of free-riders might grow large enough that the town would not be able to raise sufficient funds to finance the trash collection from a private company. For this reason, only about 50 of Dhaka's 1,100 neighborhoods have been able to replace the municipal trash collection with private collection financed by voluntary trash collection fees.[1]

The problems faced by the city of Dhaka illustrate the difficulties of effectively addressing the free rider problem through a private mechanism. Goods that suffer from this free rider problem are known in economics as *public goods*, and they are the focus of this chapter. We begin by defining *public goods* and determining the optimal level of their provision. We then turn to the first question of public finance and ask if the government should be involved in

[1] Bagal et al. (2000).

the provision of public goods. We show that the private sector is in fact likely to underprovide public goods due to the free rider problem. Sometimes, however, private actors successfully provide public goods, so we discuss the factors that make private provision successful.

We then discuss the public provision of public goods. In principle, the government can simply compute the optimal amount of a public good to provide, and provide that level. In practice, however, the government faces several difficulties in providing the optimal level of public goods. First, when private parties are already providing the public good, government provision may simply *crowd out* this private provision so that the total amount of the public good provided does not rise. Second, measuring the actual costs and benefits of public goods (which is required for determining optimal public goods provision) is difficult. Finally, determining the public's true preferences for public goods, and aggregating those preferences into an overall decision on whether to pursue public goods projects, raises a variety of challenges.

This chapter begins our section on public goods provision. Chapters 8 and 9 provide details on the problems of measuring the costs and benefits of public projects (*cost-benefit analysis*), and on the difficulties of effectively translating voters' preferences for public projects into public policy (*political economy*). Chapter 10 discusses the local provision of public goods and raises the important question of whether competition across localities can solve the public goods provision problems raised in Chapters 7–9. Finally, Chapter 11 focuses on one of the most important public goods provided in the United States, education.

re public goods Goods that perfectly non-rival in consumption and non-excludable.

n-rival in consumption individual's consumption of ood does not affect another's opportunity to consume the same good.

-excludable Individuals not deny each other the ortunity to consume a good.

ure public goods Goods satisfy the two public good litions (non-rival in consumption and non-excludable) to e extent, but not fully.

7.1 Optimal Provision of Public Goods

Goods that are **pure public goods** are characterized by two traits. First, they are **non-rival in consumption:** that is, my consuming or making use of the good does not in any way affect your opportunity to consume the good. Second, they are **non-excludable:** even if I want to deny you the opportunity to consume or access the public good, there is no way I can do so. These are fairly strong conditions, and very few goods meet these conditions in practice. Most of the goods we think of as public goods are really **impure public goods,** which satisfy these two conditions to some extent, but not fully.

Table 7-1 shows possible combinations of public good characteristics. Goods that are both excludable and rival are pure private goods. Private goods such as ice cream are completely rival (once you eat an ice cream cone, I cannot consume that ice cream cone at all) and they are completely excludable (you can simply refuse to sell me an ice cream cone).

There are two types of impure public goods. Some goods are *excludable, but not rival.* The best example here is cable television: the use of cable TV by others in no way diminishes your enjoyment of cable, so consumption is non-

rival. It is, however, possible to exclude you from consuming cable TV: the cable company can simply refuse to hook you up to the system. Other goods, such as walking on a crowded city sidewalk, are *rival but not excludable*. When you walk on a crowded city sidewalk, you reduce the enjoyment of that walking experience for other pedestrians, who must now fight against even more foot traffic. Yet it would be very difficult for any city to exclude individuals from using the sidewalk!

Pure public goods are rare because there are few goods that are both not excludable and not rival. A classic example of a pure public good is national defense. National defense is not rival because if I build a house next to yours, my action in no way diminishes your national defense protection. National defense is not excludable because once an area is protected by national defense, everyone in the area is protected: there is no way the government can effectively deny me protection since my house is in a neighborhood with many other houses. Other classic examples of pure public goods include lighthouses and fireworks displays.

■ TABLE 7-1

Defining Pure and Impure Public Goods

		Is the good rival in consumption? Yes	Is the good rival in consumption? No
Is the good excludable?	Yes	Private good (ice cream)	Impure public good (cable TV)
	No	Impure public good (crowded city sidewalk)	Pure public good (national defense)

Whether a good is private or public depends on whether it is rival and excludable. Pure private goods such as ice cream are both rival and excludable. Pure public goods such as national defense are neither rival nor excludable. Goods that are rival but not excludable, and vice versa, are impure public goods.

It is helpful to think about a public good as one with a large positive externality. If I set off fireworks high into the sky, it benefits many more people beyond myself, because many people will be able to see the display. I am not compensated for other people's enjoyment, however: I can't exclude others from seeing the fireworks, so I can't charge them for their enjoyment.

Optimal Provision of Private Goods

Before we model how to determine the optimal quantity of public goods to provide, let's review the conditions for optimal provision of private goods. Imagine that there are two individuals, Ben and Jerry, who are deciding between consuming cookies and ice cream, two pure private goods. For simplicity, suppose that the price of cookies is $1.

Quick Hint A convenient modeling tool in economics is the **numeraire good**, a good for which the price is set at $1. This tool is convenient because all choice models are technically written about the choice between goods, not the choice of a particular good. As a result, what matters for modeling the demand for any good (such as ice cream) is its price relative to other goods (such as cookies), not the absolute level of its price. By setting the price of cookies to $1, we make the analysis easier by making the absolute and relative price of ice cream equal.

numeraire good A good for which the price is set at $1 in order to model choice between goods, which depends on relative, not absolute, prices.