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# Market Inefficiencies: Externalities and Public Goods

Econ 304K: Intro to Microeconomics

## Should we eliminate all pollution?

In many preceding chapters, we saw that markets provide many benefits and they typically work because participants pursue their own self-interests, but sometimes markets need a helping hand. To explain why markets do not always operate efficiently, this chapter explores two important concepts: externalities and the difference between private and public goods.

## Big Questions

- What are externalities, and how do they affect markets?
- What are private goods and public goods?
- What are the challenges of providing non-excludable goods?

## What are externalities and how they Affect Markets?

We have seen that buyers and sellers benefit from trade; but what about the effects trade might have on bystanders? ***Externalities***, or the costs and benefits of a market activity that affect a third party, often lead to undesirable consequences. ***Market failure*** occurs when there is an inefficient allocation of resources in a market; ***externalities are type of market failure***.

For a market to work as efficiently as possible, two things must happen; **first**, each participant must be able to evaluate the **internal costs** of participation — the costs that only the individual participant pays. ***External costs*** are the costs of a market activity imposed on people who are not participants in that market. In the case of driving, the congestion and pollution our cars create are external costs. Economists define ***social costs*** as the sum of internal costs and external costs of a market activity.

In this section, we consider some of the mechanisms that encourage consumers and producers to account for the social costs of their actions.

### The Third-Party Problem

An externality exists whenever an internal cost (or benefit) diverges from a social cost (or benefit). A **third-party problem** occurs when those not directly involved in a market activity experience negative or positive externalities. If a third party is adversely

affected, the externality is negative. For examples, a negative externality occurs when the number of vehicles on the roads causes air pollution. Negative externalities present a challenge to society because it is difficult to make consumers and producers take responsibility for the full costs of their actions.

In general, society would benefit if all consumers and producers considered both the internal and external costs of their actions. Given most people feel this expectation is unlikely to happen, government design policies that create incentives for firms and people to limit the amount of pollution they emit.

## Correcting for negative externalities

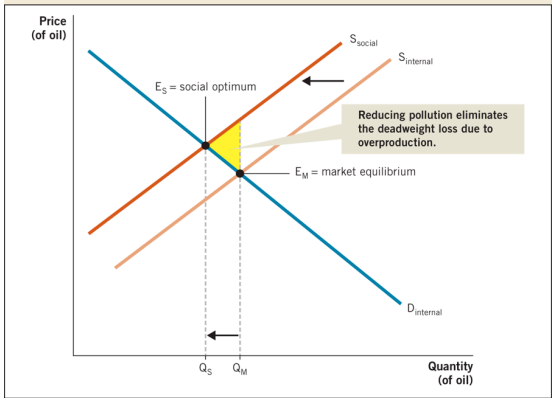
In this section, we explore ways to correct for negative externalities. To do so, we use supply and demand analysis to understand how the externalities affect the market. Let's begin with supply and compare the difference between the market force produce and what is the best for society in the case of an oil refinery. A refinery converts crude oil to gasoline; this complex process generates many negative externalities, including the release of pollutants into the air and the dumping of waste by-products.

The **social optimum** is the price and quantity combination that would exist if there were no externalities. The supply curve $S_{\text{internal}}$ represents how much the oil refinery will produce if it does not have to pay for the negative consequences of its activity. In this situation, the market equilibrium, $E_M$, accounts only for the internal costs of production.

**FIGURE 7.1**

**Negative Externalities and Social Optimum**

When a firm is required to internalize the external costs of production, the supply curve shifts to the left, pollution is reduced, and output falls to the socially optimal level, $Q_S$. The deadweight loss that occurs from overproduction is eliminated.



When a negative externality occurs, the government may be able to restore the social optimum by requiring externality-causing market participants to pay for the cost of their actions. In this case, there are three potential solutions. **First**, the refinery can be required to install pollution abatement equipment or change in production techniques to reduce emissions and waste by-products. **Second**, the government can levy a tax on the refinery as a disincentive to produce. **Finally**, the government can require the firm to pay for any environmental damage it causes. Each solutions forces the firm to **internalize** the externality, meaning that the firm must take into account the external costs (or benefits) to society that occur as a result of its actions.

Having to pay the costs of imposing pollution on others reduces the amount of the pollution-causing activity. This result is evident in the shift of the supply curve to $S_{\text{social}}$. The new supply curve reflects a combination of the internal and external costs of producing the good; because each corrective measure requires the refinery to spend money to correct the externality and therefore increases overall costs, the willingness to sell the good declines, or shifts to the left. The result is a social optimum at a lower quantity, $Q_S$, than at the market equilibrium quantity demanded, $Q_M$. The trade-off is clear; we can reduce negative externalities by requiring producers to internalize the externality. However, doing so does not come without cost, because the supply curve shifts to the left, the quantity produced is lower and price rises. In the real world, there is always a cost.

Table 7.1

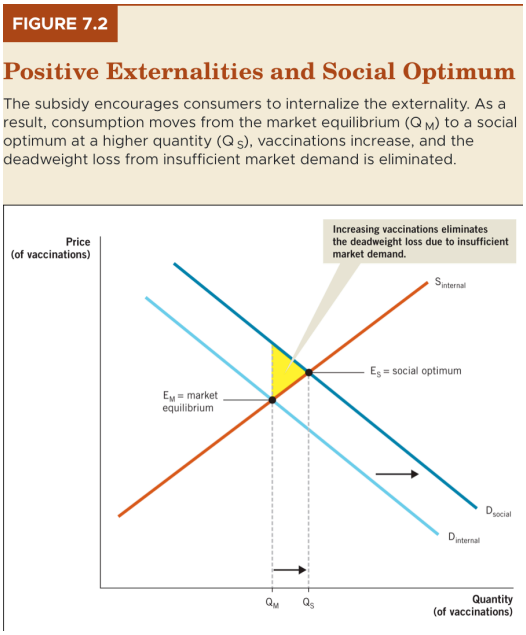
| **Private and Social Decision-making** | | | |
|---|---|---|---|
| **Personal decision** | **Social optimum** | **The problem** | **The Solution** |
| Based on internal costs | Social costs = internal costs + external costs | To get consumers and producers to take responsibility for the externalities they create | Encourage consumers and producers to *internalize* externailties |

**Table 7.1** outlines the basic decision-making process that guides private and social decisions. Private decision-makers consider only their internal costs,

but society as a whole experiences both internal and external costs. To align the incentives of private decision-makers with the interests of society, we must find mechanisms that encourage the internalization of externalities.

## Correcting for positive externalities

Positive externalities, such as vaccines, are the result of of economic activities that have benefits for third parties. As with negative externalities, economists use supply and demand analysis to compare the efficiency of the market with the social optimum. This time we will focus on the demand curve




Markets do not handle externalities well; with a negative externality, the market produces too much of a good; but in the case of a positive externality, the market produces too little. In both cases, the market equlibiurm creates deadweight loss. When positive externalities are present, the private market is not efficient because it is not fully capturing the social benefits. In other words, the market equilibrium does not maximize the gains for society as a whole. When positive externalities are internalized, the demand curve shifts outward and output rises to the socially optimal level, $Q_S$. The deadweight loss that results from insufficient market demand, and therefore underproduction, is eliminated.

**Table 7.2** summarizes the key characteristics of positive and negative externalities and presents additional examples of each type.

Before moving on, it is worth noting that not all externalities warrant corrective measures. There are times when the size of the externality is negligible and does not justify the cost of increased regulations, charges, taxes, or subsidies that might achieve the social optimum; because corrective measures have costs, the presence of negligible externalities does not by itself imply that the government should intervene in the market

| **A summary of externalities** | | |
|---|---|---|
| | **Negative externalities** | **Positive externalities** |
| **Definiton** | Costs borne by third parties | Benefits received by third parties |
| **Examples** | Oil refinining | Flu shots prevent the spread of disease |
| | Traffic congestion causes all motorists to spend more time on the road waiting | Education creates a more productive workforce and enables citizens to make more informed decisions for the betterment of society |
| | Airports create noise pollution | Restored historic buildings enable people to enjoy beautiful architectural details. |
| **Corrective measures** | Taxes or charges | Subsidies or gouvernement provisions |

# What are Private Goods and Public Goods?

The presence of externalities reflects a divide between the way markets operate and the social optimum. What creates the divide? The answer is often related to property rights. **Property rights** give the owner the ability to exercise control over a resource; when property rights are not clearly defined, resources can be mistreated.

To understand why firms sometimes overlook their actions' effects on others, we need to examine the role of property rights in market efficiency. When property rights are poorly established or not enforced effectively, the wrong incentives come into play. The difference is apparent when we compare situations in which people do have property rights. Private owners have an incentive to keep their property in good repair because they bear the costs of fixing what they own when it breaks or no longer works properly. The

difference between solving the problem and ignoring it is crucial to understanding why property rights matter.

# Private property

One way to minimize externalities is to establish well-defined private property rights. **Private property** provides an exclusive right of ownership that allows for the use, and especially the exchange, of property. This right creates incentives to maintain, protect, and conserve property and to trade with others.

1. The incentive to maintain property
2. The incentive to protect property
3. The incentive to conserve property
4. The incentive to trade with others

The incentives to maintain, protect, and conserve property help to ensure that owners keep their private property in good shape. The fourth incentive, to trade with others, helps to ensure that private property is held by the person with the greatest willingness to pay for it.

## The Coase Theorem

In 1960, Nobel Prize-winning economist Ronald Coase argued that establishing private property rights can close the gap between internal costs and social costs. ***Coase Theorem*** states that if there are no barriers to negotiations and if property rights are fully specified, interested parties will bargain privately to correct externalities. As a result, the assignment of property rights under the law gives each party an incentive to internalize and externalities. If it is difficult to bargain (because the costs of reaching an agreement are too high), private parties will be unable to internalize the externality between themselves, therefore, the Coase Theorem also suggests that private solutions to externality problems are not always possible, implying a prominent role for government in solving complex externality issues.

# Private and Public Goods

When we think of public goods, we think of goods provided by the government, like roads, the post office, and the military. The terms “private” and “public” typically imply ownership or production, but that is not the criterion economists use to categorize private and public goods; to understand the

difference between private and public goods, you need to know whether a good is excludable, rival in consumption, or both. An ***excludable good*** is one for which access can be limited to paying customers. A ***rival good*** is one that cannot be enjoyed by more than one person at a time.

## Private Goods

A **private good** is both excludable and rival in consumption.

## Public Goods

A **public good** are consumed by more than one person and it is difficult to exclude non-payers. Public goods are often underproduced because people can get them without paying for them. This causes a phenomenon called ***free-rider problem***; occurs whenever people receive a benefit for what they don't pay for.

Most people agree that government should provide certain public goods for society, including national defense, the interstate highway system, and medical and science-related research to fight pandemics. In this case, public-sector provision helps to eliminate the free-rider problem and create the socially optimal level of activity.

## Club goods and common-resource goods

There are two additional types of goods we have not yet introduced; because club goods and common-resource goods have characteristics of both private and public goods, the line between private provision and public provision is often blurred.

A **club good** is non-rival in consumption and excludable. A **common-resource good** is rival in consumption but excludable.

**TABLE 7.3**

**The Four Types of Goods**

| Excludable? | Consumption: Rival | Consumption: Nonrival |
|---|---|---|
| Yes | *Private goods* are rival and excludable: sandwiches, watches, automobiles.  | *Club goods* are nonrival and excludable: streaming services, education, country clubs.   |
| No | *Common-resource goods* are rival and nonexcludable: Alaskan king crab, a large shared popcorn at the movies, congested roads.  | *Public goods* are nonrival and nonexcludable: street performers, national defense, tsunami warning systems.  |

What are the challenges of providing non excludable goods?