Externality

CONTINUE…

When the activity of one entity (a person or a firm) directly affects the welfare of another in a way that is outside the market mechanism, that effect is called an **externality** (because one entity directly affects the welfare of another entity that is "external" to the market). Unlike effects that are transmitted through market prices, externalities adversely affect economic efficiency.

CONTINUE…

Externalities Can Be Produced by Consumers as Well as Firms Not all externalities are produced by firms. Just think of the person who smokes a cigar in a crowded room, lowering others' utility by using up the common resource, fresh air.

Externalities Are Reciprocal in Nature In our example, it seems natural to refer to Bart as the "polluter." However, we could just as well think of Lisa as "polluting" the river with fishermen, increasing the social cost of Bart's production. As an alternative to fishing, using the river for waste disposal is not obviously worse from a social point of view. As we show later, it depends on the costs of alternatives for each of these two activities.

CONTINUE…

Externalities Can Be Positive Suppose that in response to a terrorist threat you were to get yourself vaccinated against smallpox. You would incur some costs: the price of the vaccination, the associated discomfort, and the slight risk that it would induce a case of the disease. There would be a benefit to you in terms of a reduced probability of being stricken by the disease in the event of a bioterrorism attack. However, you simultaneously would benefit other members of your community, who would be less likely to come down with the disease because they could not catch it from you. But neither you nor other people take into account such external benefits when weighing the benefits and costs of getting vaccinated, and hence not enough people are vaccinated in the absence of some public intervention.

CONTINUE…

Public Goods Can Be Viewed as a Special Kind of Externality Specifically, when an individual creates a positive externality with full effects felt by every person in the economy, the externality is a pure public good. At times, the boundary between public goods and externalities is a bit fuzzy. Suppose that I install in my backyard a device for electrocuting mosquitoes. If I kill the whole community's mosquitoes, then I have, in effect, created a pure public good. If only a few neighbors are affected, then it is an externality. Although positive externalities and public goods are quite similar from a formal point of view, in practice it is useful to distinguish between them.

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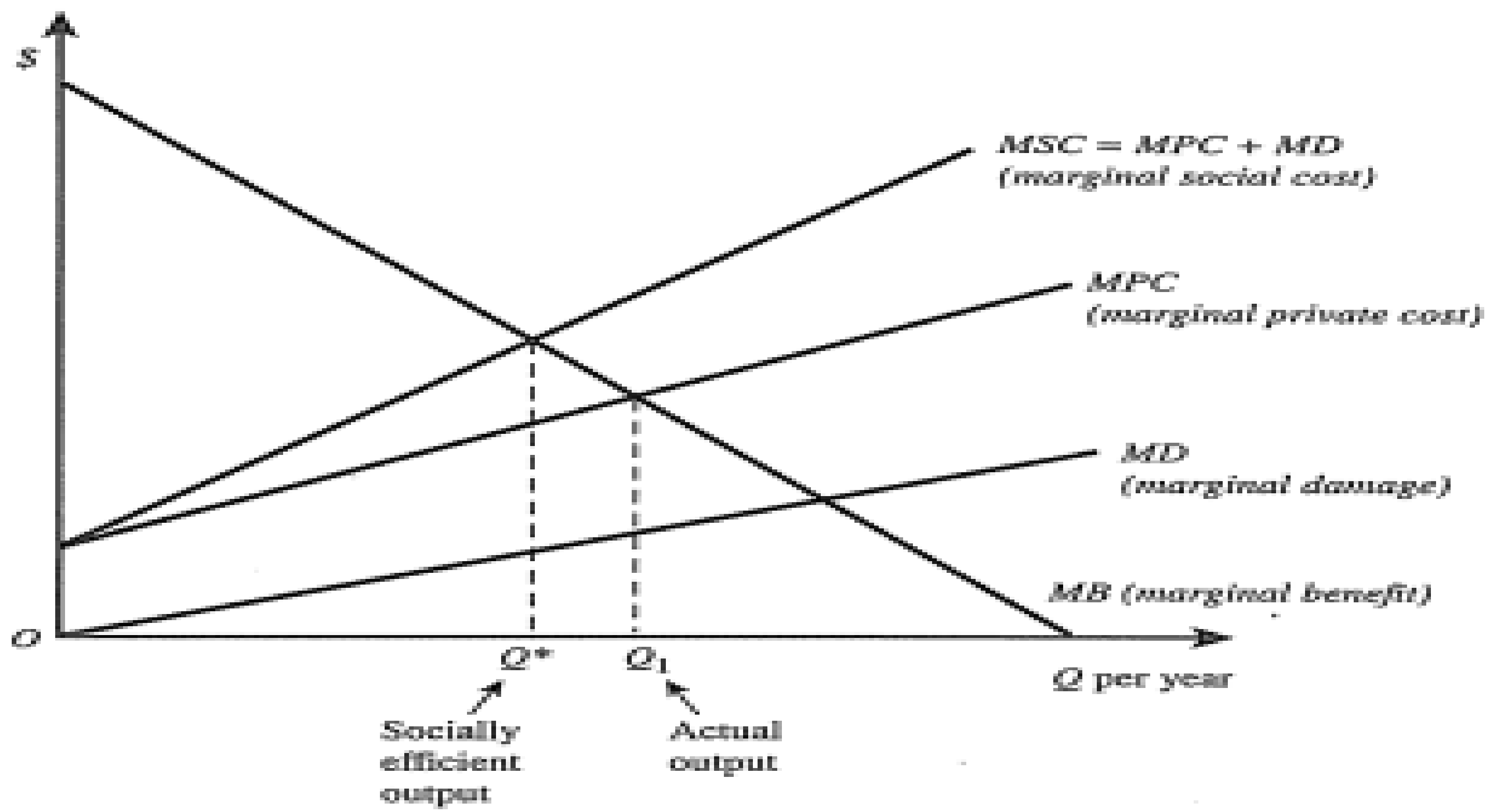


$
MSC = MPC + MD
(marginal social cost)
MPC
(marginal private cost)
MD
(marginal damage)
MB (marginal benefit)
O
Q*
Q1
Q per year
Socially efficient output
Actual output

CONTINUE…

If Bart wants to maximize profits, how much output does he produce? Bart produces each unit of output for which the marginal benefit *to him* exceeds the marginal cost *to him*. In Figure 5.1, he produces all levels of output for which *MB* exceeds *MPC* but does not produce where *MPC* exceeds *MB*. Thus, he produces up to output level Q_1, at which *MPC* intersects *MB*.

IMPLICATIONS

Implications

This analysis suggests the following observations: First, unlike the case without externalities, private markets need not produce the socially efficient output level. In particular, when a good generates a negative externality, too much of it is produced relative to the efficient output.[3]

CONTINUE…

Second, the model not only shows that efficiency would be enhanced by a move fron Q_1 to Q^* but also provides a way to measure the benefits from doing so. Figure 5. replicates from Figure 5.1 the marginal benefit (*MB*), marginal private cost (*MPC*) marginal damage (*MD*), and marginal social cost (*MSC*) schedules. When output i cut from Q_1 to Q^*, Bart loses profits. To calculate the precise size of his loss, recal that the marginal profit to Bart associated with each unit of output is the differenc between marginal benefit and marginal private cost. If the marginal private cost o the eighth unit is $10 and its marginal benefit is $12, the marginal profit is $2. Geo metrically, the marginal profit on a given unit of output is the vertical distanc between *MB* and *MPC*. If Bart is forced to cut back from Q_1 to Q^*, he therefor loses the difference between the *MB* and *MPC* curves for each unit of productio between Q_1 and Q^*. This is area *dcg* in Figure 5.2.

CONTINUE…

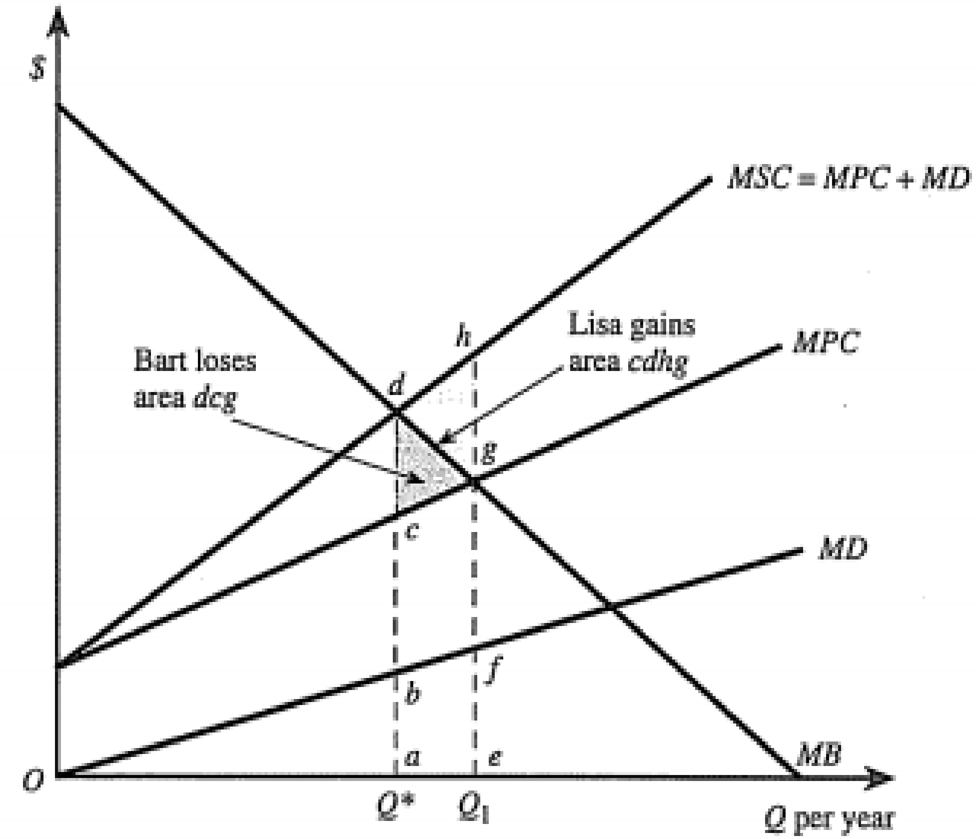
At the same time, however, Lisa becomes better off because as Bart's output falls, so do the damages to her fishery. For each unit decline in Bart's output, Lisa gains an amount equal to the marginal damage associated with that unit of output. In Figure 5.2, Lisa's gain for each unit of output reduction is the vertical distance between *MD* and the horizontal axis. Therefore, Lisa's gain when output is reduced from Q_1 to Q^* is the area under the marginal damage curve between Q^* and Q_1, *abfe*. Now note that *abfe* equals area *cdhg*. This is by construction—the vertical distance between *MSC* and *MPC* is *MD*, which is the same as the vertical distance between *MD* and the horizontal axis.

CONTINUE…

Figure 5.2

Gains and losses from moving to an efficient level of output

When output falls from Q_1 to Q^*, Bart loses area *dcg* in profits. However, the reduction in Bart's output increases Lisa's welfare by area *cdhg*. Thus, the net gain to society is area *dhg*.



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In sum, if output were reduced from Q_1 to Q^*, Bart would lose area *dcg* and Lisa would gain area *cdhg*. Provided that society views a dollar to Bart as equivalent to a dollar to Lisa, then moving from Q_1 to Q^* yields a net gain to society equal to the difference between *cdhg* and *dcg*, which is *dhg*.

▸ PRIVATE RESPONSES

Bargaining and the Coase Theorem

Recall our earlier argument that the root cause of the inefficiencies associated ' externalities is the absence of property rights. When property rights are assig individuals may respond to the externality by bargaining with each other. To see l suppose property rights to the river are assigned to Bart. Assume further that costless for Lisa and Bart to bargain with each other. Is it possible for the two ties to strike a bargain that results in output being reduced from Q_1?

CONTINUE…

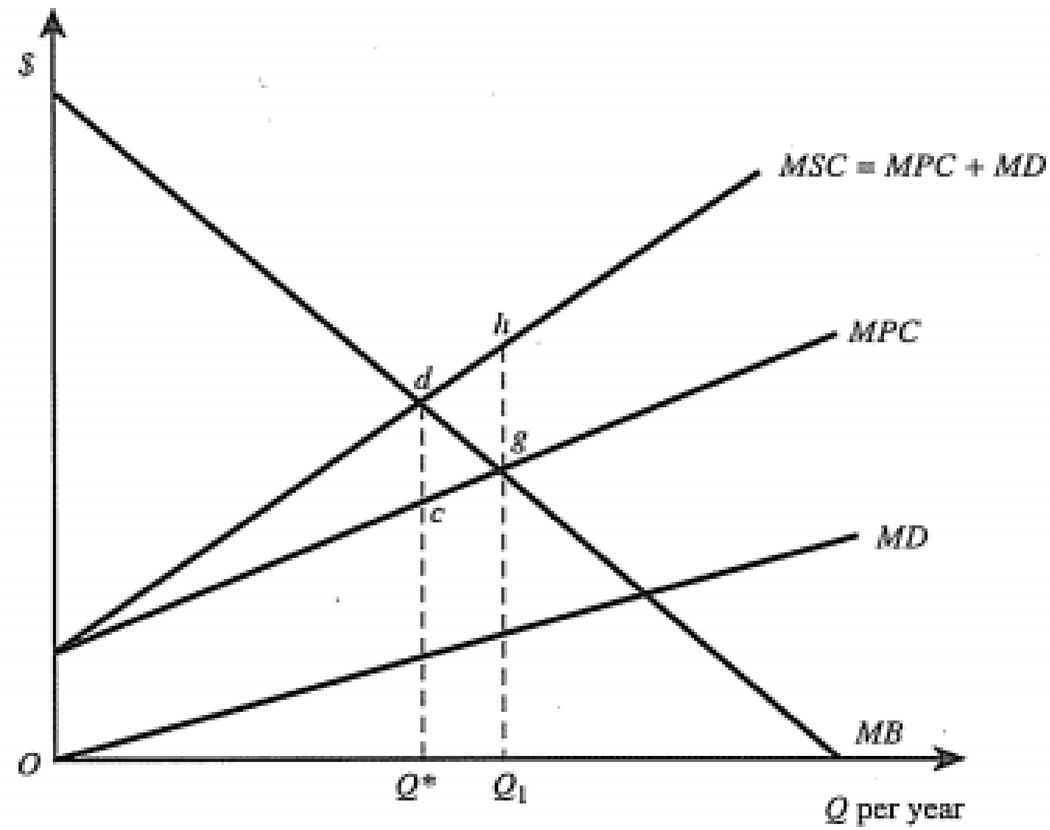
Bart would be willing to not produce a given unit of output as long as he received a payment that exceeded his net incremental gain from producing that unit ($MB - MPC$). On the other hand, Lisa would be willing to pay Bart not to produce a given unit as long as the payment was less than the marginal damage done to her, MD. As long as the amount that Lisa is willing to pay Bart exceeds the cost to Bart of not producing, the opportunity for a bargain exists. Algebraically, the requirement is that $MD > (MB - MPC)$. Figure 5.3 (which reproduces the information from Figure 5.1) indicates that at output Q_1, $MB - MPC$ is zero, while MD is positive. Hence, MD exceeds $MB - MPC$, and there is scope for a bargain.

CONTINUE…

Figure 5.3

Coase Theorem

If Bart has property rights to the river, he will reduce output by one unit as long as he receives a payment that exceeds the incremental profit he would have received from producing that unit (*MB* − *MPC*). Lisa is willing to pay Bart to reduce a unit of production as long as the payment is less than the damage the output causes her, *MD*. There is room for them to bargain at any level of output greater than *Q**.



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Similar reasoning indicates that the payment Lisa would be willing to make exceeds $MB - MPC$ at every output level to the right of Q^*. In contrast, to the left of Q^*, the amount of money Bart would demand to reduce his output would exceed what Lisa would be willing to pay. Hence, Lisa pays Bart to reduce output just to Q^*, the efficient level. We cannot tell without more information exactly how much Lisa ends up paying Bart, although the total payment will be at least *dcg* (the amount Bart loses by decreasing output to Q^*) and no greater than *cdhg* (the amount that Lisa gains by having Bart decrease output to Q^*). The exact amount depends on the relative bargaining strengths of the two parties. Regardless of how the gains from the bargain are divided, however, production ends up at Q^*.

CONTINUE…

- ASSUMPTION

Two important assumptions played a key role in the preceding analysis:

1. The costs to the parties of bargaining are low.
2. The owners of resources can identify the source of damages to their property and legally prevent damages.

CONTINUE…

Now suppose the shoe is on the other foot, and Lisa is assigned the property rights to the stream. Bart cannot produce any output without first gaining Lisa's permission. The bargaining process now consists of Bart paying for Lisa's consent to pollute. Lisa is willing to accept some pollution as long as the payment she receives from Bart for each unit of his output is greater than the marginal damage (*MD*) caused by that output to her fishing enterprise. Bart finds it worthwhile to pay for the privilege of producing as long as the amount is less than the value of $MB - MPC$ for that unit of output. Notice that for the first unit of output Bart produces, his marginal profit ($MB - MPC$) far exceeds the marginal damage (*MD*) to Lisa, so there is ample room to bargain and allow Bart to produce this unit. Applying this reasoning to each additional unit of production shows that they have every incentive to reach an agreement whereby Lisa sells Bart the right to produce at Q^*.