When Markets Fail

Introduction and Description

The material discussed in Lesson 2 appears frequently on the AP Microeconomics Exam. Students need to understand the conditions under which a competitive market fails to produce the socially optimal quantity of a good or service. They also need to know what steps can be taken to remedy this situation. Some government intervention in the economy is designed to remedy problems arising from third-party costs and benefits of private activities or transactions. Students who understand *third-party effects*, often called *externalities*, can analyze the need for and effect of such government interventions. Activity 5-2 provides an overview of the externality problem.

When a government tries to correct a negative externality, it can choose to intervene in a number of ways, or the problem may be corrected by private negotiations, which is the basis for the *Coase Theorem* presented in Activity 5-3. When government does intervene, its objective should be to use marginal analysis so as to have the marginal social benefit of the last unit produced equal to that unit's marginal social cost. Activity 5-4 provides practice in doing this type of analysis as students must decide on the optimal amount of pollution cleanup.

Objectives

1. Explain how private market activities can cause externalities.
2. Define and give examples of *third-party costs* (also called *negative externalities* or *social spillover costs*).
3. Define and give examples of *third-party benefits* (also called *positive externalities* or *social spillover benefits*).
4. Analyze why positive and negative externalities cause underproduction or overproduction of goods and services in a competitive market.
5. Analyze the effectiveness of government policies designed to remedy problems caused by positive or negative externalities.
6. Explain the *Coase Theorem* and use it to analyze how negotiations among private property owners can resolve market allocation problems.
7. Analyze how marginal analysis can determine the optimum amount of pollution cleanup.

Time Required

Three and a half class periods or 158 minutes

Materials

1. Activities 5-2, 5-3, and 5-4
2. Visuals 5-2 and 5-3

Bell Ringer

You hear a neighbor say, "Pollution is nasty and stinks. We should do all we can to eliminate all pollution!" Do you agree with your neighbor?

Teacher Alert: **Have students be clear in their answers using the terms marginal social benefit (MSB), marginal social cost (MSC), marginal private benefit (MPB), and marginal private cost (MPC). Do not let them just say "marginal benefit" or "marginal cost."**

Procedure

1. Begin with a discussion on the external effects of production and consumption and some commonsense examples of positive and negative externalities.
   (A) Smoking creates external costs. The smoker is satisfied, and the tobacco company gains;

but third parties often have to cope with smell and litter, as well as the hazard to health from breathing secondary smoke.

(B) People who drive under the influence of alcohol are much more likely to cause accidents than other drivers. These accidents cause third parties to suffer personal injury and/or property damage.

(C) The productive work of maintaining one's house is an example of an external benefit provided by a consumer who also acts as a producer. If people landscape their yards and paint and maintain their houses, the whole neighborhood looks better. The houses are then worth more than houses in comparable neighborhoods where the owners do not maintain their houses to an equal extent.

(D) Education provides third-party benefits. On the whole, people's productivity increases with their level of education. A higher level of education also tends to be correlated with better health and a lower crime rate. Third parties benefit from this greater productivity through fewer demands on health care services and the lower burden on the police and judiciary.

(E) If you teach in a public school, ask students why taxpayers should pay for their education. One reason is the third-party benefits that education creates.

2. Now use graphical analysis to illustrate negative and positive externalities and how these externalities can be corrected.

(A) Use Visual 5-2 to illustrate the effects of a negative externality. *(The market will provide the output Q_1 where MPB = MPC, whereas the socially optimal output Q_2 is where MSB = MSC. The market overproduces this good or service as a result of the negative externality.)*

(B) Use Visual 5-3 to illustrate the effects of a positive externality. *(The market will provide the output Q_1 where MPB = MPC, whereas the socially optimal output Q_2 is where MSB = MSC. The market underproduces this good or service as a result of the positive externality.)*

3. Have students read the opening section of Activity 5-2 and complete Part A. Discuss the answers to Part A. Note that not all textbooks handle the graphs of externalities the same way. Check out a couple of textbooks and see if you notice differences in how supply curves are used to represent MSC, MPC, and social spillover cost. Check out the demand curves in the textbooks as well with regard to how a positive externality is represented. The approach used in Activity 5-2 is to represent the *marginal external cost (MEC)* of an activity as the vertical distance between the MSC curve and the MPC curve. The *marginal external benefit (MEB)* of an activity is shown as the vertical distance between the MSB curve and the MPB curve.

4. Assign Parts B and C of Activity 5-2 and discuss the answers.

5. Part C of Activity 5-2 presents an important distinction between the effect of a per-unit tax and a lump-sum tax. (There is a parallel distinction between a per-unit subsidy and a lump-sum subsidy.) Because the per-unit policy affects a firm's marginal cost, it will change the firm's profit-maximizing output level where MR = MC. Because the lump-sum policy does not change the firm's marginal cost, that policy does not affect the firm's quantity. Be sure students are on the lookout for these two policies on the AP

Microeconomics Exam. A convenient way to incorporate a government per-unit subsidy to a firm is to reduce the firm's marginal cost by the amount of the subsidy; this will increase the quantity produced by the firm. Assign Parts C and D of Activity 5-2.

6. Discuss the Coase Theorem. Created by Ronald Coase, a Nobel Laureate in economics, this theory has many practical applications. The key is that resources can be allocated efficiently when private ownership rights are assigned and when there are no transaction costs. Most importantly, Coase maintained that no matter who receives the legal rights to ownership, the assignment will have no effect on the way economic resources are used.

7. Students may wonder why this is a big deal, particularly because all transactions do have costs. The excitement is that the Coase Theorem changes the way people look at economic problems. There is less need for government intervention. In any economic transaction, solutions that can benefit most parties can be achieved by negotiations. For example, environmental problems can be resolved if property rights are assigned rather than relying on government command and control.

8. Have students complete Activity 5-3 and go over the answers.

9. Now that we have established that markets can fail because of externalities, how should government address the problem? The environment is an important issue. Is it a good idea to clean up the environment as much as possible? This would ignore the opportunity cost of the cleanup. Therefore, the environment should be cleaned up to the point where the marginal social benefit of cleaning up equals the marginal social cost (MSB = MSC).

10. Before you assign Activity 5-4, note that the term "economic efficiency" in this example refers to using resources in a way that maximizes social welfare. This is a broader view of economic efficiency than the one used in Unit 4, where economic efficiency meant a given output was produced with the lowest cost combination of resources.

11. Have students complete Activity 5-4 and discuss the answers. Keep these points in mind as you discuss the answers:

    Question 1(A). Correctly interpreted, it costs Firm 1 $160 to reduce pollution emissions by the first unit. The MSB from this emission reduction is $350. Thus, it clearly pays to reduce emissions by this first unit.

    Question 1(B). Similarly, it costs Firm 1 $360 to reduce pollution emissions by the fifth unit, while the MSB from this damage reduction is only $150. Thus, it clearly does not pay to reduce emissions by this fifth unit of pollution.

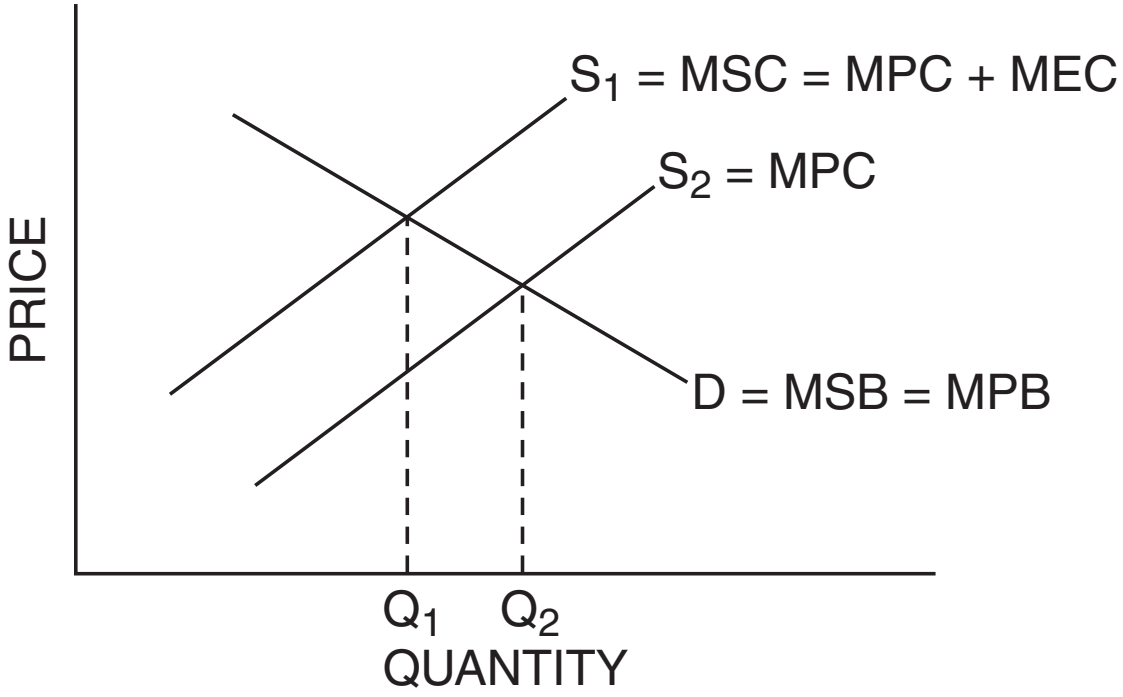
Question 2(A). With MSC of $160 being less than MSB of $200, it pays for Firm 2 to reduce pollution emissions by the fourth unit.

Question 2(B). Because the MSC of $160 is greater than the MSB of $150, it does not pay Firm 2 to eliminate the fifth unit of foul sludge emissions.

12. The explanations for Questions 3 and 4 are shown on the answer key. Because the basic logic of "keep reducing pollution as long as MSB > MSC, and stop reducing when MSB < MSC" lends itself to graphical exposition—and because a graph also helps illustrate the socially optimum quantity of pollution control where MSB = MSC—two graphs of the numerical data in this problem are in the answer key for Activity 5-4.

13. Conduct a general discussion about why markets fail and how government attempts to correct these failures.

Illustrating a Negative Externality



MSC = marginal social cost

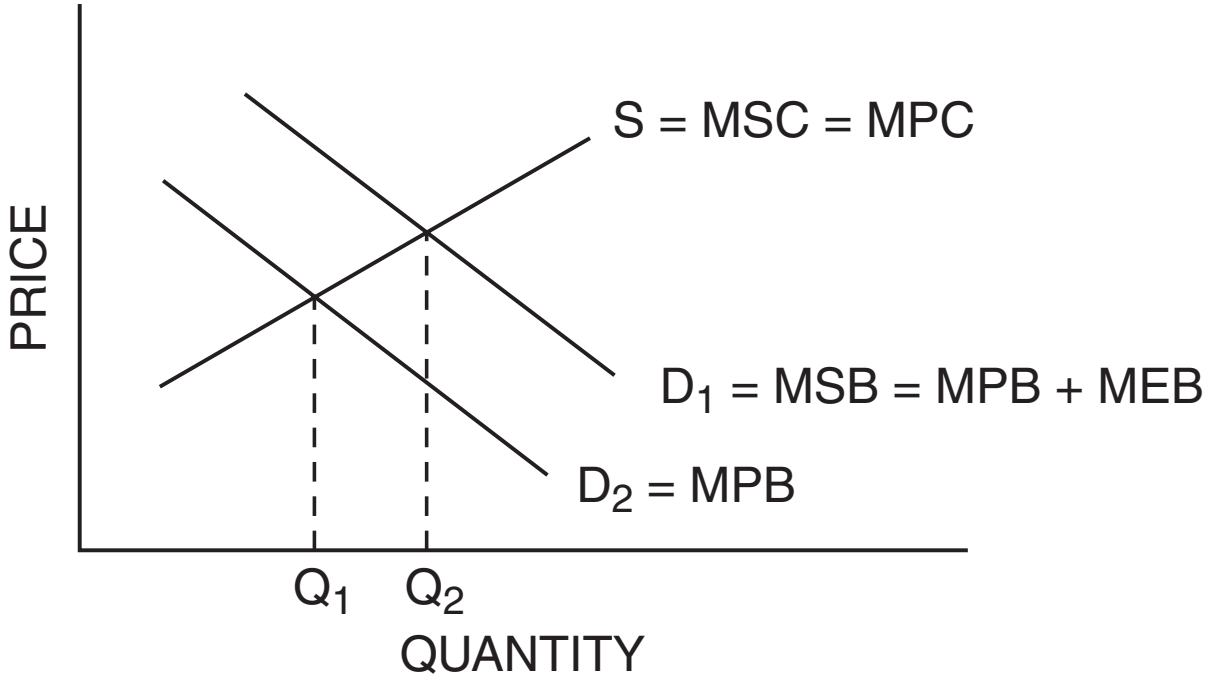
MPC = marginal private cost

MEC = marginal external cost

MSB = marginal social benefit

MPB = marginal private benefit

Illustrating a Positive Externality



MSB = marginal social benefit

MPB = marginal private benefit

MEB = marginal external benefit

MSC = marginal social cost

MPC = marginal private cost