Externalities

A *market externality* refers to a situation where some of the costs or benefits from an activity fall on someone other than the people directly involved in the activity. Externalities may be either positive (the activity provides a benefit to someone else) or negative (the activity places a cost on someone else). Costs that fall on someone else are called *external costs*, and benefits that fall on someone else are called *external benefits*. These external effects of an activity are also called *social spillover costs* and *social spillover benefits*, or *third-party costs* and *third-party benefits*.

The demand curve for a good or service shows the *marginal private benefit (MPB)* to those individuals who are consuming the product. It shows how many units will be demanded by consumers at different prices. The demand curve also shows the highest prices consumers will pay for different quantities of the product. The supply curve of a good or service shows the *marginal private cost (MPC)* to those individuals who are producing the product. It shows how many units will be supplied by producers at different prices. The supply curve also shows the lowest prices producers will accept for different quantities of the product.

If there are no positive externalities associated with the activity, then the marginal private benefit from an additional unit will be equal to the *marginal social benefit (MSB)*. The marginal social benefit shows the benefit to society from an extra unit of the activity. If no one other than the person associated with the activity receives any benefit from the extra unit, then MPB = MSB.

If there are no negative externalities associated with the activity, then the marginal private cost from an additional unit will be equal to the *marginal social cost (MSC)*. The marginal social cost shows the cost to society from an extra unit of the activity. If no one other than the person associated with the activity incurs any cost from the extra unit, then MPC = MSC.

Consumers of a product buy according to their marginal private benefits as shown by the demand curve, and producers of the item produce according to their marginal private costs as shown by the supply curve. The equilibrium quantity of the product in a perfectly competitive market will be the quantity where MPB = MPC. This is where the market demand curve intersects the market supply curve. *If there are no externalities, the competitive market output is the socially optimal (efficient) quantity because it is where MSB = MSC.* Society feels the market is producing exactly the right amount of the product. Given the marginal benefit society is receiving from the last unit, it feels the correct amount of its scarce resources is being allocated to the provision of that unit.

The competitive market results in *market failures*, however, if there are positive or negative externalities associated with the consumption or production of the good or service. These spillover benefits or costs, if not corrected, will result in the market producing either too much or too little of the activity from society's perspective. The externalities drive a wedge between the MSB and the MPB, or between the MSC and the MPC. Because the market will produce the output where MPB = MPC, these differences yield a quantity of the product at which MSB is not equal to MSC. We often turn to the government to attempt to correct these market failures.

To understand how externalities can result in market failures, it is important that you know these relationships:

- Marginal Social Benefit = Marginal Private Benefit + Marginal External Benefit

$$MSB = MPB + MEB$$

- Marginal Social Cost = Marginal Private Cost + Marginal External Cost

$$MSC = MPC + MEC$$

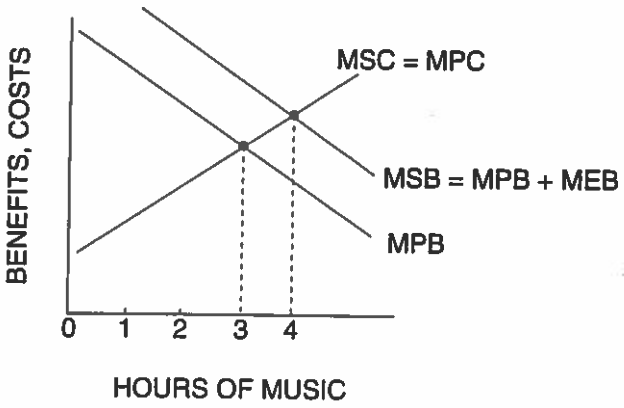
Summary of key points:

- Society wants a market to produce the quantity where MSB = MSC.
- Private decision makers want to have the quantity where MPB = MPC.
- As long as MEB and MEC are zero (no externalities), the market quantity will be the socially optimal (efficient) quantity.
- If MEB or MEC is not zero, we will have a market failure.

Student Alert: Some textbooks use slightly different approaches to the topic of externalities. While the end results with regard to the effects of externalities are the same, be sure you understand the approach and terminology that are being used.

Part A: How Much Music?

Figure 5-2.1
External Benefits



1. Margaret has Wendy as her roommate in a college residence hall. Wendy has brought an expensive stereo system to play in the room. Figure 5-2.1 shows Wendy's MPB and MPC curves for music played on the stereo system. Based on Figure 5-2.1, answer the following questions.

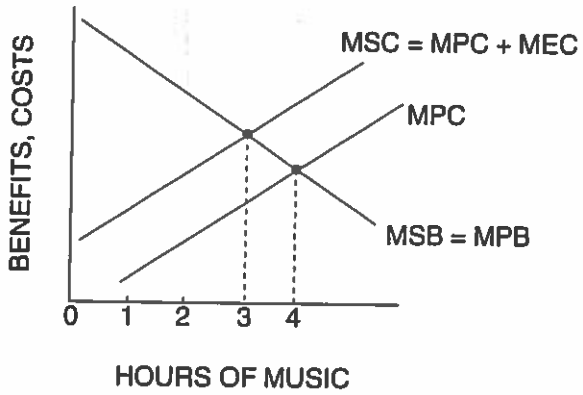
   (A) If Wendy considers only the MPB and MPC from playing music, how many hours of music will be played? Label the number of hours in Figure 5-2.1 as Q_p to indicate the private market quantity.

   (B) Assume that Wendy plays music only at times that do not disturb Margaret and plays only music that Margaret also enjoys. The "MSB = MPB + MEB" curve in Figure 5-2.1 shows the MSB from the music, including the MEB to Margaret. If Wendy considers the MSB from playing music rather than only the MPB, what happens to the quantity of music played? Label the number of hours as Q_s in Figure 5-2.1 to indicate the socially optimal quantity.

   (C) In Figure 5-2.1, what does the vertical gap between the MSB and MPB curves represent?

   (D) Assuming there are no external costs from the music, when Wendy does not consider the MEB from playing music, the number of hours played is (*greater than / equal to / less than*) the socially efficient number of hours.

Figure 5-2.2
External Costs



2. Again, Wendy has a new stereo system and Margaret is her roommate.

   (A) In Figure 5-2.2, assume Wendy only considers her MPB and MPC from music. How many hours of music will be played? Label the number of hours in Figure 5-2.2 as Q_p to indicate the private market quantity.

   (B) Now assume that Wendy plays music only at times that Margaret is trying to study and plays only music that Margaret hates. In Figure 5-2.2, the "MSC = MPC + MEC" curve shows the MSC from the music, including the MEC to Margaret. If Wendy considers the MSC from playing music rather than only the MPC, what happens to the quantity of music played? Label the number of hours as Q_s in Figure 5-2.2 to indicate the socially optimal quantity.

   (C) In Figure 5-2.2, what does the vertical gap between the MSC and MPC curves represent?

(D) Assuming there are no external benefits from the music, when Wendy does not consider the MEC from playing music, the number of hours played is (*greater than / equal to / less than*) the socially efficient number of hours.

3. How can government regulation (in this case, residence hall rules) assure the efficient quantity of music? Consider the circumstances under which prohibiting stereos or imposing daily "quiet hours" are efficient ways to regulate stereo use in the hall. Does economics suggest a more efficient approach to stereo regulation?

Part B: More Externalities Examples

4. For each of these activities, explain whether there is a positive or negative externality.

(A) Private high school education

(B) Smog from an electric power plant

(C) Your neighbor's yappy dog

(D) Pre-kindergarten measles vaccinations

Part C: Applying Your Knowledge of Externalities

The Women's National Basketball Association (WNBA) is considering awarding a new franchise to the city of Metropolis, but only if the team has a new arena in which to play. Proponents of the franchise argue that the team will generate new businesses, provide jobs, increase tax revenue, and promote tourism in Metropolis. Opponents argue that most of the money spent on basketball games will come from Metropolis-area residents who will simply reduce their spending on other activities. The opponents claim there will be few new jobs, little increase in tax revenue, and few new tourists coming

to Metropolis. They also say the new arena will cause property values to fall in the area and create traffic congestion and noise pollution.

Voters have the following three proposals before them:

Proposal #1: No city money should be used to construct the arena. Team owners should pay the full cost of building the facility and include that cost in the price of game tickets.

Proposal #2: The city should place a tax on each ticket sold to pay the full cost of the arena.

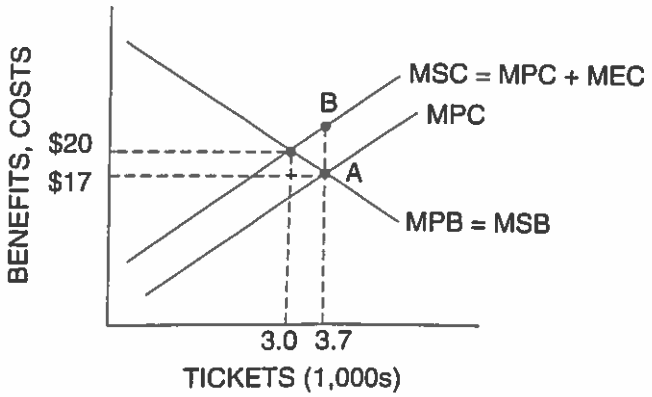
Proposal #3: The city should build the arena and lease the right to play there to the basketball club at a subsidized rate.

For the analysis that follows, assume the output of the team is the number of tickets sold.

5. What assumption does Proposal #1 make about external costs and external benefits associated with the new franchise?

Figure 5-2.3 can be used to illustrate the position of opponents to the franchise. Answer the following questions based on this graph.

Figure 5-2.3
Social Spillover Costs



6. What assumption is made about social spillover benefits from the franchise? Explain.

7. What assumption is made about social spillover costs from the franchise? Explain.

8. How many tickets will be sold based on the MPB and MPC?

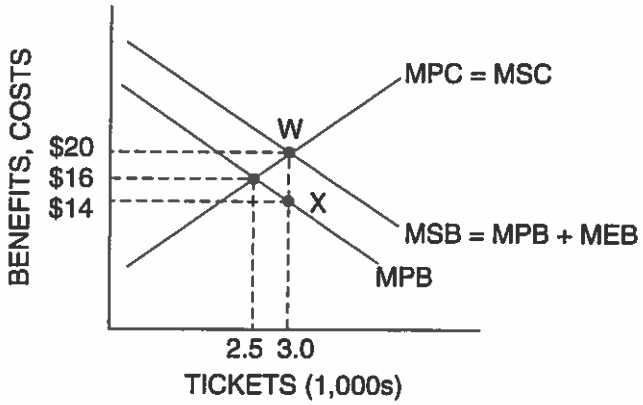
9. What is the socially optimal number of tickets?

10. What does the vertical gap "AB" represent?

11. What can the Metropolis city government do to make the market output be equal to the socially efficient output? Explain, using the graph to illustrate your answer.

Figure 5-2.4 can be used to illustrate the position of supporters of the franchise. Answer the following questions based on this graph.

Figure 5-2.4
Social Spillover Benefits



12. What assumption is made about social spillover benefits from the franchise? Explain.

13. What assumption is made about social spillover costs from the franchise? Explain.

14. How many tickets will be sold based on the MPB and MPC?

15. What is the socially optimal number of tickets?

16. What does the vertical gap "WX" represent?

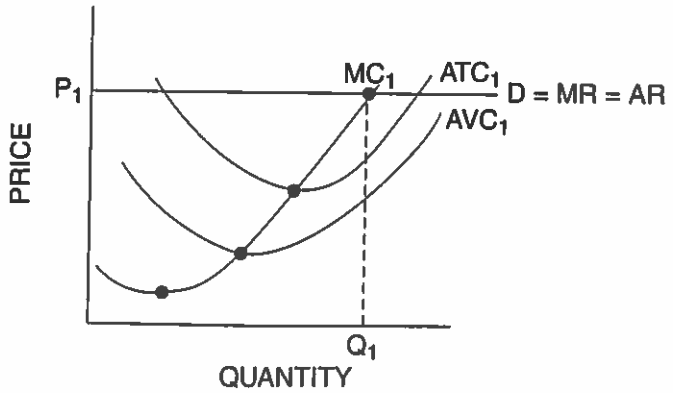
17. What can the Metropolis city government do to make the market output be equal to the socially efficient output? Explain, using the graph to illustrate your answer.

Part D: Per Unit or Lump Sum? Which Type of Tax or Subsidy to Use?

Student Alert: Which form of a tax or subsidy should the government use to correct the effects of an externality? Should it apply a per-unit or a lump-sum adjustment?

Figure 5-2.5 shows the average total cost (ATC), average variable cost (AVC), marginal cost (MC), demand (D), marginal revenue (MR), and average revenue (AR) functions of a perfectly competitive firm. The firm is producing Q_1 units because that is where MR = MC. Assume there is a negative externality associated with the firm's product and the government would like to have the firm reduce its output.

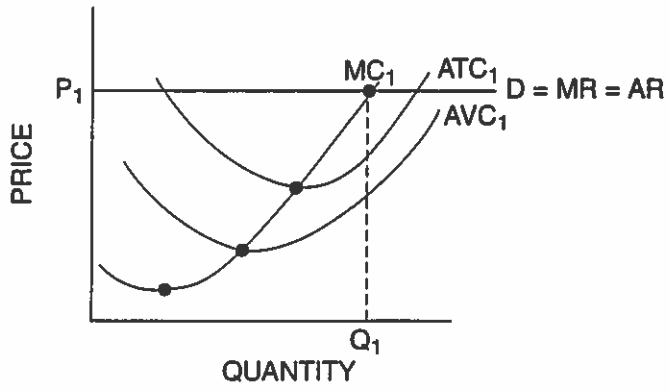
Figure 5-2.5
A Profit-Maximizing Perfectly Competitive Firm



18. Suppose the government places a per-unit tax of "t" on the firm's product. Which cost measures will be affected by this per-unit tax: ATC, AVC, average fixed cost (AFC), or MC? Show in Figure 5-2.6 how the cost curves will look after the tax is imposed. What happens to the output level the firm wants to produce? Was the per-unit tax successful in having the firm reduce its quantity?

Figure 5-2.6

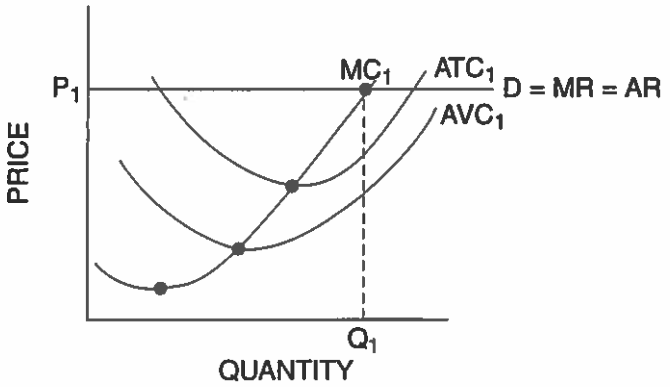
The Government Levies a Per-Unit Tax of "t"



19. Suppose the government places a one-time, lump-sum tax of "T" on the firm's product. Which of these cost measures will be affected by this lump-sum tax: ATC, AVC, AFC, or MC? Show in Figure 5-2.7 how the graph will look after the tax is imposed. What happens to the output level the firm wants to produce? Was the lump-sum tax successful in having the firm reduce its quantity?

Figure 5-2.7

The Government Levies a Lump-Sum Tax of "T"



20. Assume a firm produces a product for which there is a positive externality. As an incentive to the firm to produce more of its product, should the government give the firm a per-unit subsidy or a lump-sum subsidy? Explain.

Part E: Summary

21. When positive externalities are involved, private markets produce (*more than / exactly / less than*) the socially optimal amount of the product.

22. When negative externalities are involved, private markets produce (*more than / exactly / less than*) the socially optimal amount of the product.

23. Why do economists say the presence of an externality results in a market failure?

24. How can a tax be used to remedy a negative externality?

25. How can a subsidy mitigate an inefficient output level in the presence of a positive externality?

Wages and Employment in Competitive and Monopsonistic Labor Markets

This activity asks you to show how changes in economic conditions, government policy, and union activity affect different types of labor markets. The impact of such changes depends on the degree of competition on the demand and supply sides of the labor market. The symbols W_C, L_C, W_M, and L_M refer to the wages and labor in the competitive and monopsonistic labor markets. You are to consider the short-run effects in the specified labor market.

Part A: Perfect Competition and Monopsony

Figure 4-6.1
Perfectly Competitive and Monopsonistic Labor Markets

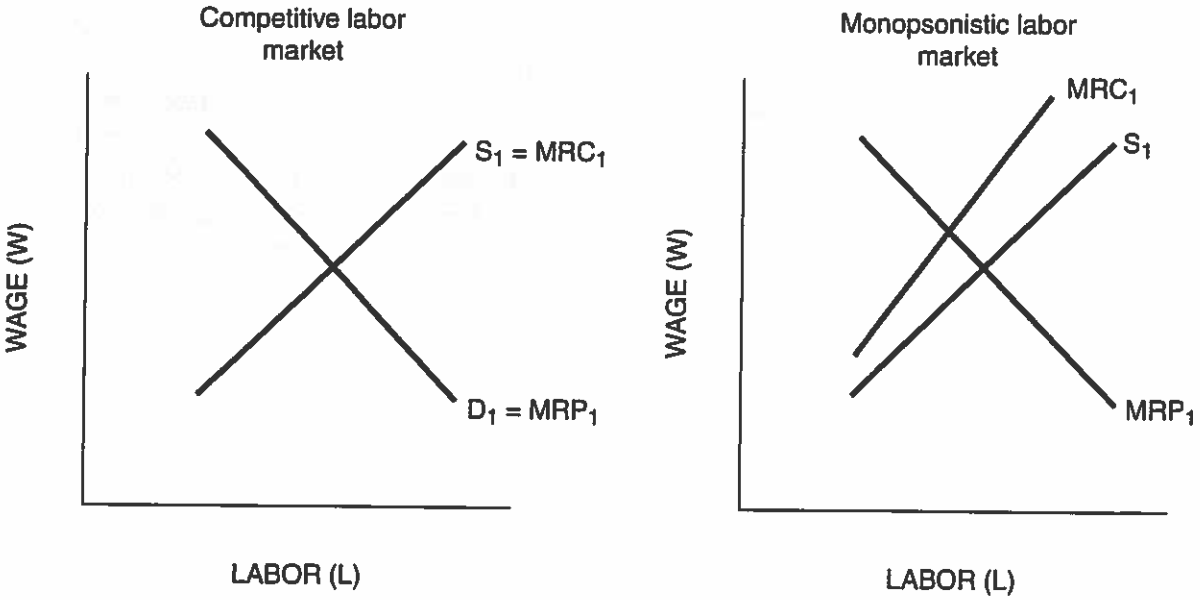


Figure 4-6.1 presents the basic setup of a perfectly competitive labor market and a monopsonistic labor market. Answer the following questions based on this figure.

1. Why is the marginal revenue product (MRP) curve equal to the market demand (D) curve for labor in the perfectly competitive labor market?

2. Why is the MRP curve not equal to the market D curve for labor in the monopsonistic labor market?

3. Why is the marginal resource cost (MRC) curve equal to the market labor supply (S) curve in the perfectly competitive labor market?

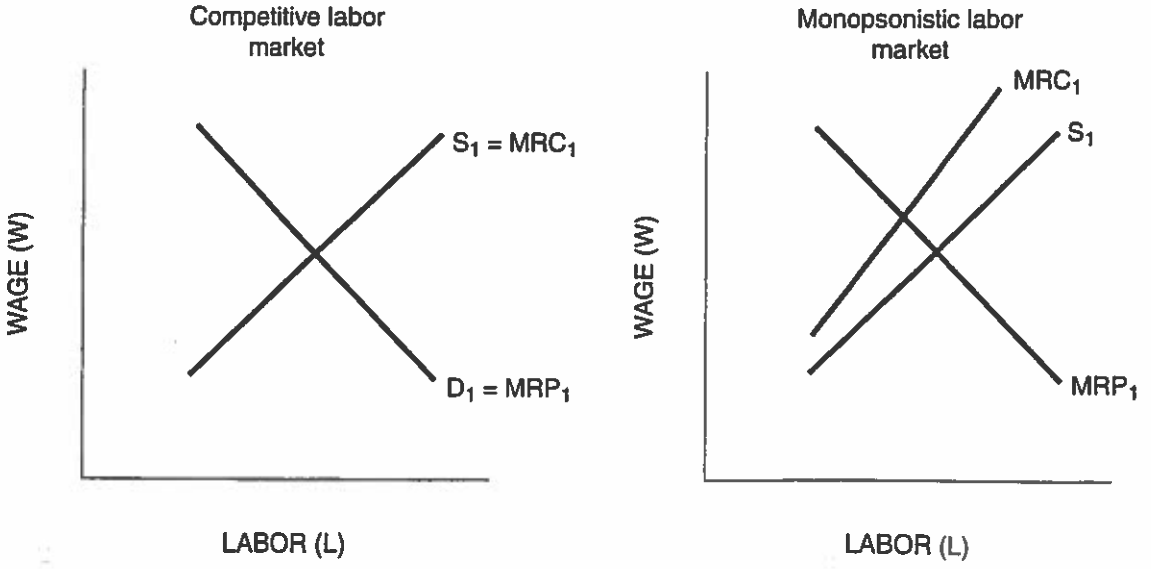
4. Why is the MRC curve not equal to the market labor S curve in the monopsonistic labor market?

5. In the appropriate graph, indicate by W_{C1} and L_{C1}, or W_{M1} and L_{M1}, the market wage and quantity of labor.

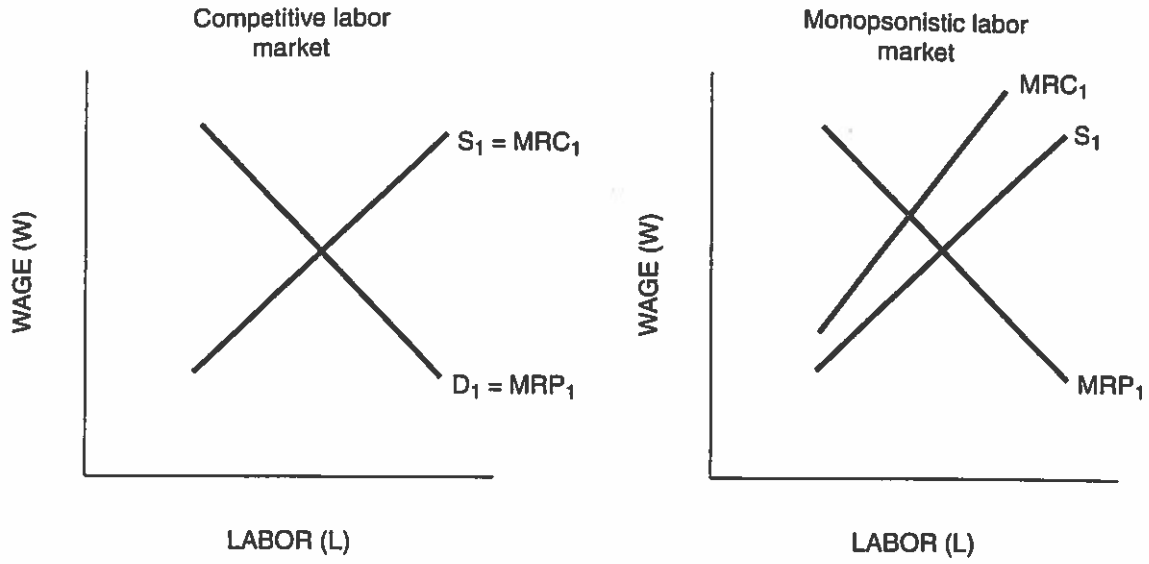
Part B: Analyzing Changes in the Labor Market

For each of the following scenarios, analyze the short-run effect of the specified event on each labor market. In the perfectly competitive labor market graph, indicate by W_{C1} and W_{C2} the market wage before and after the event. Indicate by L_{C1} and L_{C2} the equilibrium quantity of labor before and after the event. In the monopsonistic labor market graph, indicate by W_{M1} and W_{M2} the market wage before and after the event. Indicate by L_{M1} and L_{M2} the equilibrium quantity of labor before and after the event. State whether the event increases, decreases, or does not change the market wage and labor. Be sure to shift the curves that are affected by the events, leading to the changes in wage and labor.

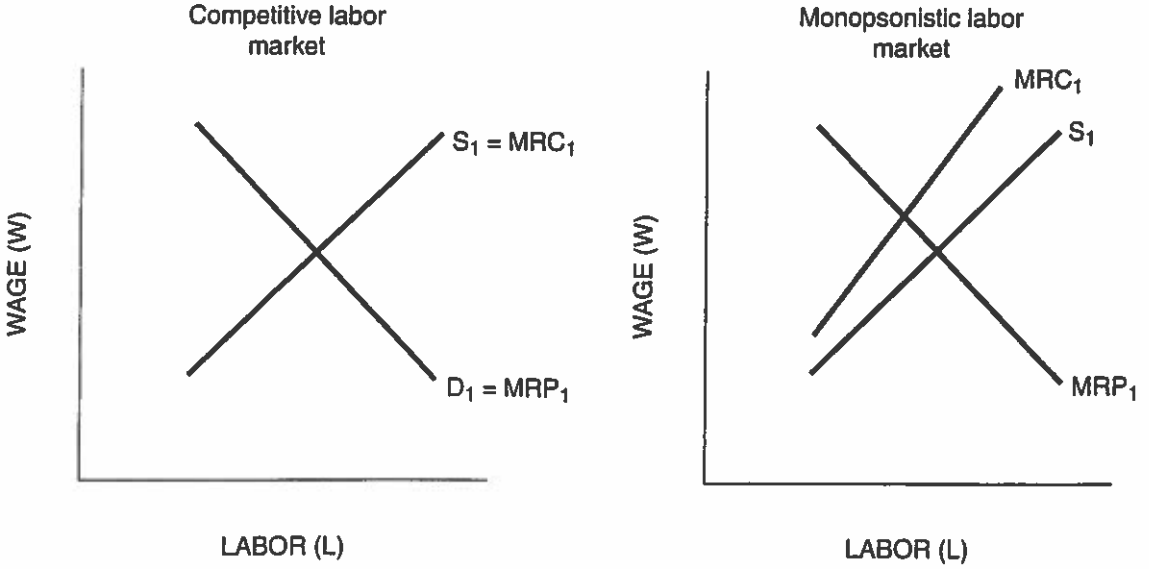
6. Event: The state passes legislation requiring new teachers to pass a competency test in order to be employed by any school in the state. (The graphs refer to the labor market for teachers.)



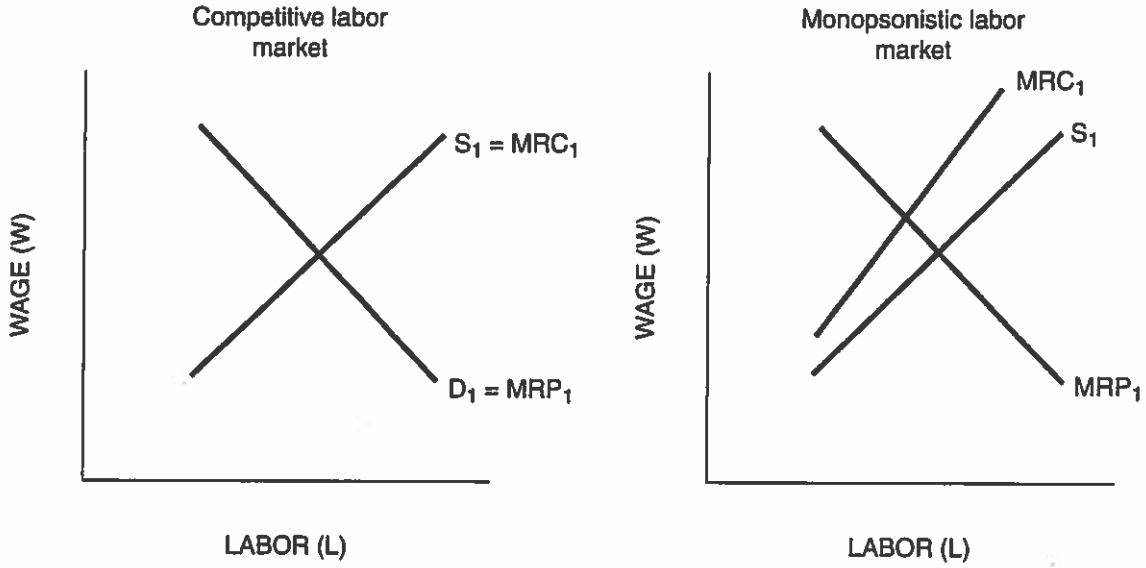
7. Event: New training methods increase the productivity of workers in the automobile industry. (The graphs refer to the labor market for automobile workers.)



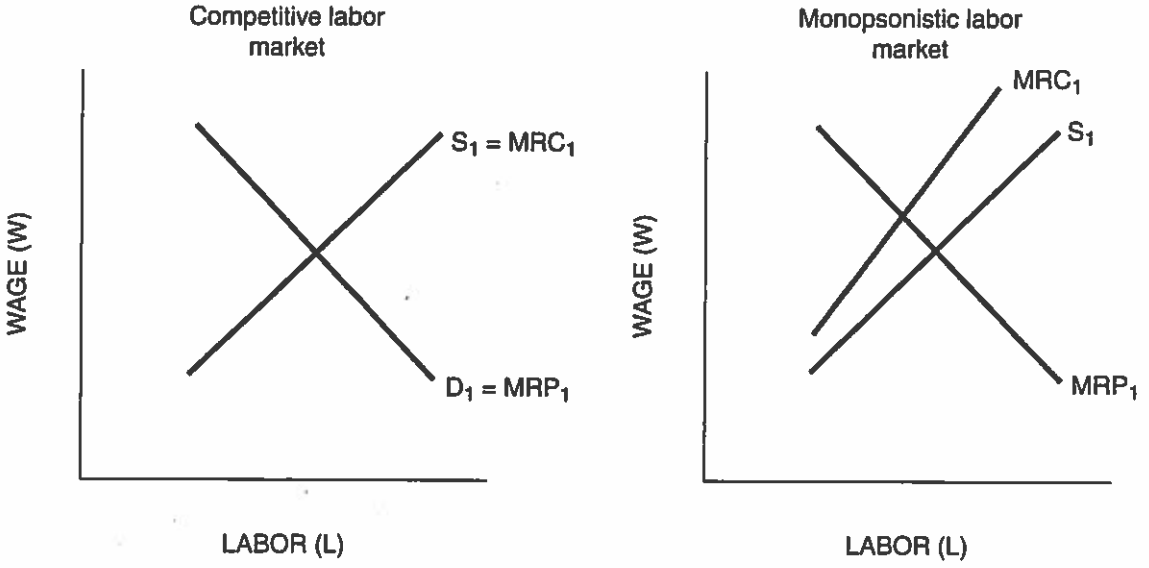
8. Event: The U.S. government relaxes a tough immigration law, making it easier for construction workers from other countries to enter the United States. (The graphs refer to the American labor market for construction workers.)



9. Event: The German government lowers tariffs on shoes imported into Germany. (The graphs refer to the labor market for shoe workers in Germany.)



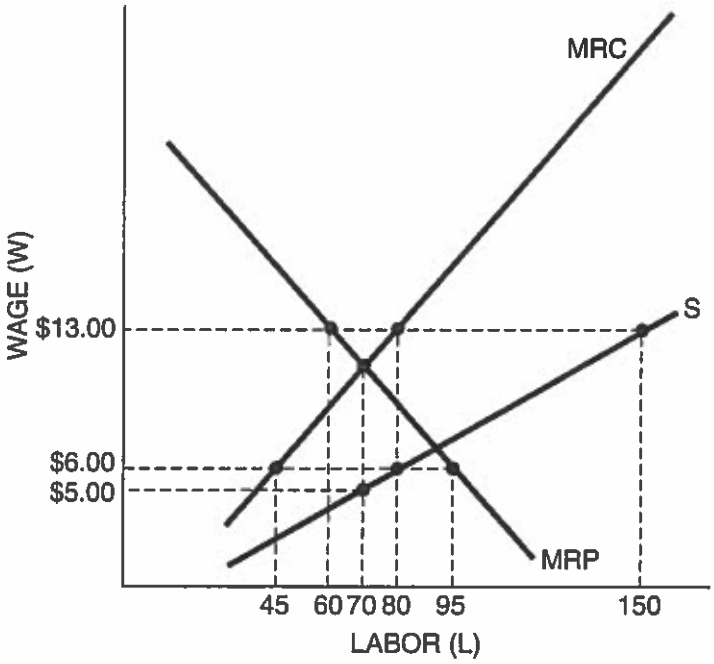
10. Event: Labor unions conduct a successful advertising campaign urging people to buy goods and services produced by American workers. (The graphs refer to the labor market for all American workers.)



Part B: Monopsony and a Minimum Wage

Figure 4-6.2 illustrates the labor market in which there is only one employer. This monopsonist sells its good in a perfectly competitive product market.

Figure 4-6.2
A Monopsonistic Labor Market



1. What is the profit-maximizing amount of labor for this monopsonistic firm? Why?

2. What wage will it pay each unit of labor? Why?

3. If the government sets a minimum wage of $13.00, how many units of labor would be hired? How many units of labor will be unemployed with this minimum wage? Explain.

4. If the government sets a minimum wage of $6.00, how many units of labor would be hired? How many units of labor will be unemployed with this minimum wage? Explain.