Problem Set Nine Solutions

Chapter 13

1. Mountain Breeze supplies air filters to the retail market and hires workers to assemble the components. An air filter sells for $26, and Mountain Breeze can buy the components for each filter for $1. Sandra and Bobby are two workers for Mountain Breeze. Sandra can assemble 60 air filters each month, and Bobby can assemble 70. If the labor market is perfectly competitive, how much will Sandra and Bobby be paid?

Answer: Sandra's marginal product is 60 air filters per month, and the value of her marginal product is VMP = ($25/filter) (60 filters/mo) = $1,500/mo. Bobby's marginal product is 70 air filters per month so his VMP is ($25/filter) (70 filters/mo) = $1,750/mo. Since the labor market is competitive, Sandra and Bobby will earn exactly their respective VMPs each month.

2. Stone, Inc., owns a clothing factory and hires workers in a competitive labor market to stitch cut denim fabric into jeans. The fabric required to make each pair of jeans costs $5. The company's weekly output of finished jeans varies with the number of workers hired, as shown in the following table:

Number of workers	Jeans (pairs per week)	MP (pairs per worker)	VMP ($/wk)
0	0		
1	25	25	750
2	45	20	600
3	60	15	450
4	72	12	360
5	80	8	240
6	85	5	150

a. If the jeans sell for $35 a pair, and the competitive market wages is $250 per week, how many workers should Stone hire? How many pairs of jeans will the company produce each week?

Answer: After deducting the $5 cost of the fabric, the company receives $30 from the sale of each pair of jeans. The marginal product of labor and the value of the marginal product of labor are shown on the table. Since the market wage is $250/wk, it is not worthwhile to hire the fifth worker, whose VMP is only $240/wk. The firm hires 4 workers and produces 72 pairs of jeans per week.

b. Suppose the Clothing Workers Union now sets a weekly minimum acceptable wage of $230 per week. All the workers Stone hires belong to the union. How does the minimum wage affect Stone's decision about how many workers to hire?

Answer: Stone's decision is not affected, since the equilibrium wage is higher than the minimum wage.

c. If the minimum wage set by the union had been $400 per week, how would the minimum wage affect Stone's decision about how many workers to hire?

Answer: This time, the union wage is higher than the equilibrium wage. Stone will no longer hire the fourth worker.

d. If Stone again faces a market wage of $250 per week but the price of jeans rises to $45, how many workers will the company now hire?

Answer: The final column of the table now has VMPs of 1000, 800, 600, 480, 320, and 200. Stone will now hire a fifth worker.

6. Jones, who is currently unemployed, is a participant in three means-tested welfare programs: food stamps, rent stamps, and day care stamps. Each program grants him $150 per month in stamps, which can be used like cash to purchase the good or service they cover.

a. If benefits in each program are reduced by 40 cents for each additional dollar Jones earns in the labor market, how will Jones's economic position change if he accepts a job paying $120 per week?

Answer: Jones's benefits will go down by (.40)($120/wk) = $48/wk in each program, for a total benefit reduction of $144/wk.

b. In light of your answer to part a, explain why means testing for welfare recipients has undesirable effects on work incentives.

Answer: When means testing in multiple programs results in effective marginal tax rates above 100 percent, as in part a), a person's net income goes down as a result of earning money in the labor market – a powerful incentive not to work.

7. Sue is offered a job reshelving books in the University of Montana library from noon until 1pm each Friday. Her reservation wage for this task is $10 per hour.

a. If the library director offers Sue $100 per hour, how much economic surplus will she enjoy as a result of accepting the job?

Answer: When the $100/hr is paid directly to Sue, she accepts the job and enjoys an economic surplus of $100 - $10 = $90.

b. Now suppose the library director announces that the earnings from the job will be divided equally among the 400 students who live in Sue's dormitory. Will Sue still accept?

Answer: If the $100 were divided equally among the 400 residents of Sue's dorm, however, each resident's share would be only 25 cents. Accepting the job would thus mean a negative surplus for Sue of $0.25 - $10 = -$9.75, so she will not accept the job.

c. Explain how your answers to parts a and b illustrate one of the incentive problems inherent in income redistribution programs.

Answer: The income sharing arrangement in b is income redistribution of the most extreme form. Such measures reduce the amount of income available by reducing Sue's incentive to accept employment that would have generated an economic surplus.

8. Suppose the demand and supply curves for unskilled labor in the Corvallis labor market are shown in the figure below. By how much will the imposition of a minimum wage at $12 per hour reduce total economic surplus? Calculate the amounts by which employer surplus and worker surplus change as a result of the minimum wage.

Answer: Without a minimum wage, both employers and workers would enjoy economic surplus of $10 (100,000/day)/2 = $500,000/day. With a minimum wage set at $12/hr, employer surplus falls to ($20 - 12) (80,000/day)/2 = $320,000/day, and worker surplus rises to $8 (80,000/day)/2 + $4 (80,000/day) = $640,000/day. The minimum wage thus reduces employer surplus by $180,000/day, and increases worker surplus by $140,000/day. The net reduction in surplus is a deadweight loss of $14,000 - $18,000/day = ($12 - $8) (100,000 - 80,000/day)/2 = $40,000/day.

10. Describe an earned-income tax credit for workers (and a tax on employers that would raise enough money to pay for it) that would make both workers and employers better off than under the minimum wage.

Answer: The government would have to offer a tax credit worth at least $1.40/hr for each of the 100,000 person-hours of employment to match the additional $140,000/day of worker surplus. Because employer surplus is $180,000/day lower under the minimum wage than under the earned-income tax credit, employers would be willing to pay a tax up $180,000 to avoid the reduction in their surplus due to the minimum wage, an amount sufficient to finance the earned-income tax credit required and make workers and employers better off.