How to Study for Chapter 22 The Labor Market

Chapter 22 introduces the demand for labor, the elasticity of the demand for labor, and the supply of labor. The analysis is similar to that of product markets.

1. Begin by looking over the Objectives listed below. This will tell you the main points you should be looking for as you read the chapter.
2. New words or definitions and certain key points are highlighted in italics and in red color. Other key points are highlighted in bold type and in blue color.
3. You will be given an In Class and Homework Assignment to illustrate the main concepts. There are a few new words in this chapter. Be sure to spend time on the various definitions. There are new graphs. They are based on the graphs that you have seen before. Go over each carefully to see how they are developed and also how they relate to previous graphs.
4. The teacher will focus on the main technical parts of this chapter. You are also responsible for the cases and the ways by which each case illustrates a main principle.
5. When you have finished the text, the Test Your Understanding questions, and the assignments, go back to the Objectives. See if you can answer the questions without looking back at the text. If not, go back and re-read that part of the text. When you are ready, take the Practice Quiz for Chapter 22.

Objectives for Chapter 22 The Labor Market

At the end of Chapter 22, you should be able to answer the following questions:

1. What are the characteristics of a perfectly competitive resource market?
2. What is the **"marginal revenue product"**? What is the **"marginal resource cost"**?
3. Explain how a profit-maximizing employer would choose the number of workers to hire. Show the situation on the relevant graph.
4. Why is the marginal revenue product curve the same as the demand curve for labor?
5. From the demand curve for labor by one employer, how is the demand for labor determined?
6. Draw the demand curve for labor. What will cause a movement along it?
7. What is the **"wage elasticity of demand for labor"**?
8. What are the factors that will determine if the demand for labor is relatively elastic or inelastic? Name four factors and explain each.
9. Use the answer to question 8 to analyze the effects of a minimum wage law or a comparable worth law.
10. What is the supply of labor to an employer? Why is this supply of labor perfectly elastic?
11. What is the supply of labor to a type of employment? How does it relate to the wage?
12. What is the **"labor force participation rate"**?
13. Draw the labor supply curve for an individual and explain the reasons for its shape.
14. What is the **"substitution effect"**? What is the **"income effect"**?
15. Why might the labor supply curve be **"backward bending"**?
16. Use the concepts of the substitution effect and the income effect to explain (a) the decline in the average workweek; (b) the falling labor force participation rate of males over age 60; and (c) the rising labor force participation rate of married women and teenagers

Chapter 22 The Labor Market (latest revision July 2004)

Part 1: The Demand for Labor

We now shift our attention to the labor market. Even though we are considering human beings, we treat our analysis of the labor market as similar to any other market. We analyze the labor market by **looking at the demand for labor on the part of employers and the supply of labor on the part of workers**. The resulting price we shall call the **"wage"** (the "wage" will include all forms of compensation to the workers, including health benefits and social security). Let us begin our analysis by examining the demand side of the labor market.

As we did with products, **we begin by assuming that the labor market operates under perfect competition**. Remember that there are four characteristics to a perfectly competitive market. ***First, and most important, there are so many buyers (employers) and also sellers (workers) that no one can affect the price (the wage) alone*.** All employers hire labor in a market in which the wage is given to them. They can hire as many or as few workers as they desire at that wage. Similarly, all workers search for jobs at the market wage. If a person desires a higher wage, no employer will hire that person. And the person will never ask for a lower wage since it is not necessary to do so to find employment. ***Second, there is perfect information***. All workers and all employers know what the market wage is and also know all other important information. The workers know the characteristics of all jobs while the employers know the characteristics of all prospective workers. ***Third, there are no barriers to entry or exit***. All workers are free to leave their current employment and can easily find other employment. All employers are free to fire a worker and can easily find other workers to hire. ***Fourth, there are identical "products"***. All employers are essentially the same and all workers are essentially the same. The model of perfect competition was developed at a time when most workers were unskilled. With large numbers of unskilled workers and employers hiring people who were basically unskilled, the conditions for perfect competition could hold. Of course, for other types of workers, perfect competition is not realistic. But this simplification does allow us to understand much about the way labor markets work. We shall make our analysis more realistic later.

How many workers will an employer choose to hire? Remember that, using **rational decision-making**, we do not ask the question this way. The question is: should we hire one worker? If yes, should we hire a second worker? And so on. We continue asking this question until the answer is that we should not hire an additional worker. So, should we hire one worker? To answer this, we must answer two questions: what is the **marginal benefit** and what is the **marginal opportunity cost** of that worker? ***If we have perfect competition, the marginal opportunity cost is equal to the wage***. This means that, if the wage for a construction worker is $20,000 per year, the employer can hire as many construction workers as desired at that wage. Each additional worker will cost the employer an additional $20,000 per year. This is commonly called the ***"marginal resource cost"***. (Do not confuse "marginal resource cost" with the "marginal cost".) What is the marginal benefit from hiring an additional worker? Each additional worker adds to production. In the example of our construction company, each

additional construction worker contributes to the building of an additional number of houses. However, the employer is not interested in just houses. The employer is interested in revenues. So we must multiply the additional number of houses produced by the price received for those homes. We shall call the marginal benefit from hiring an additional worker the ***"marginal revenue product"***. (Do not confuse the "marginal revenue product" with the "marginal revenue".) ***It is calculated as the marginal physical product times the price.*** (Remember that ***the marginal physical product is the additional production resulting from the hiring of an additional worker***.) Assume that I am the additional worker. If the company hires me, I add ten units to production. If each of those ten units sells for $1, I am responsible for adding $10 of new revenue for the company. (In this example, it is assumed that the company also sells its product in perfect competition --- no matter how many units of the product have already been sold, each additional unit will sell for $1.)

First, let us examine this procedure with a simplified case. Consider the following situation:

Labor	Total Physical Product	Marginal Physical Product	Price	Marginal Revenue Product
1	10	10	$1	$10
2	21	11	1	11
3	33	12	1	12
4	44	11	1	11
5	54	10	1	10
6	63	9	1	9
7	71	8	1	8

Notice that this production function has similar properties to the one developed in Chapter 14. Marginal physical product (the change in the Total Physical Product from hiring each additional worker) rises from worker #1 to worker #3. This is ***increasing marginal returns*** and results from specialization and division of labor. After worker #3, the marginal physical product falls. This is ***the law of diminishing marginal returns*** and results from the limited amount of capital goods. Notice also that this company sells its product in perfect competition. We know this because, whether it sells 10 or 71, the price of the product is still $1. If the company also hires in a perfectly competitive labor market and **the market wage is $9**, how many workers should the company hire? The first worker adds 10 units to production, each of which sells for $1. Therefore, the first worker adds $10 to the company's revenues while adding only $9 to the company's costs (his or her wage). The company's economic profits rise by $1 if worker #1 is hired. Having made the decision to hire worker #1, go on to worker #2. This worker adds 11 units to production, each of which sells for $1. Therefore, this worker adds $11 to the company's revenues while adding only $9 to the company's costs (his or her wage). The company's economic profits rise by $2 if this worker is hired. You can continue in this manner. ***As long as the addition to revenue (marginal revenue product) is greater than the addition to cost (marginal resource cost and equal to the wage), the company is better off hiring that worker***. When the process is completed, this company will hire 6 workers. ***The company should hire workers up to the point at which the marginal revenue product equals the marginal resource cost (which is equal to the wage)***. Remember that we do count in the worker for which the marginal revenue product and the marginal resource cost are equal. The company would surely not hire the seventh worker. This worker would add only $8 to the company's

revenues (8 additional units of the product with each selling for $1) while adding $9 to its costs (his or her wage).

Now let us return to the case of our construction company developed in earlier chapters. Go back and review this example. In Chapter 14, the following **production function** for our company was developed:

Number of Workers	Average Physical Product	Marginal Physical Product
7	.14	.14
13	.15	.16
18	.17	.20
24	.17	.16
31	.16	.14
39	.15	.12
48	.14	.11
58	.13	.10
69	.13	.09
81	.12	.08
94	.11	.077
108	.11	.071
123	.10	.067

In our example, the construction company sold houses in a perfectly competitive market at a price of $200,000 each. However, the addition to profit from selling another home would only be $180,000. This is so because, while the price was $200,000, each house also had $20,000 of natural resource costs. Our construction company also hired workers in a perfectly competitive labor market at a wage of $20,000. (Review Chapter 14.) The company's decision would be based on the following calculations:

Number of Workers	Marginal Physical Product	Price	Marginal Revenue Product
7	.14	$180,000	$25,200
13	.16	180,000	30,000
18	.20	180,000	36,000
24	.16	180,000	28,800
31	.14	180,000	25,200
39	.12	180,000	21,600
48	.11	180,000	20,000
58	.10	180,000	18,000
69	.09	180,000	16,200
81	.08	180,000	14,400
94	.077	180,000	13,860
108	.071	180,000	12,780
123	.067	180,000	12,000

The first group of seven workers produces .14 of a house (since the group of seven workers produces one house together). Because a house adds $180,000 of revenue, **each member of this group** is adding $25,200 (the number has been rounded off) to the revenues of the company (**the marginal revenue product**). Since each of the workers adds only $20,000 to the costs of the company (**the marginal resource cost equal to that worker's wage**), the company's profits rise if it hires the first seven workers. Go on to the second group. The second group involves workers 8 through 13. These six workers produce another house. Remember that it takes fewer workers to produce the second house because of **increasing marginal returns** (specialization and division of labor). Therefore, each worker adds 1/6 of a house (.16). Because each house adds $180,000 to profits, each of these workers adds $30,000 to the revenues of the company (.16 times $180,000) --- **the marginal revenue product**. Since each of the workers adds $20,000 to the costs of the company (**the marginal resource cost equal to that worker's wage**), the company's profits rise by hiring workers 8 through 13. Go on to the third group --- workers 14 through 18. Each of these five workers is necessary to build an additional house. Therefore, each worker contributes 1/5 (.2) of a house. Because the house adds another $180,000 to the profits, each of these workers contributes $36,000 (.2 times $180,000) to the revenues of the company --- **the marginal revenue product**. As each of these workers also add $20,000 to the costs of the company (**the marginal resource cost equal to that worker's wage**), the company's profits rise by hiring the fourth group. Go on to the next group. And so forth. Go over these numbers carefully. Be sure you see how they were derived.

Let us jump ahead to workers 40 through 48. These nine workers are necessary to produce one house. Remember that it now takes more workers to produce an additional house because of **diminishing marginal returns** (caused by the limited amount of capital goods). Each of the nine workers adds 1/9 (.11) of a home. Because each home adds $180,000 to profits, each of these workers adds $20,000 (.11 times $180,000) to the revenues of the company --- **the marginal revenue product**. As each of these workers adds $20,000 to the costs of the company --- **the marginal resource cost** --- the profits are the same whether these workers are hired or not. Remember though that we do count this group. ***We hire workers up to the point at which the marginal revenue product is equal to the marginal resource cost (which is equal to the wage)***. Therefore, the company will hire 48 workers. The 48th worker adds just the same amount to the revenues of the company ($20,000) as this worker adds to the costs of the company ($20,000). But the company should not hire any additional workers. The next house requires ten workers (worker 49 to 58). Each of these workers increases production by 1/10 of a home (.1). Because the home adds $180,000 to the profits of the company, each of these workers contributes only $18,000 (.1 times $180,000) to the revenues of the company --- **the marginal revenue product**. As each worker adds $20,000 to the costs of the company --- **the marginal resource cost** --- they should not be hired. It would not pay the company to hire worker 49 and pay that person $20,000 in wages when that person will only add $18,000 to the company's revenues.

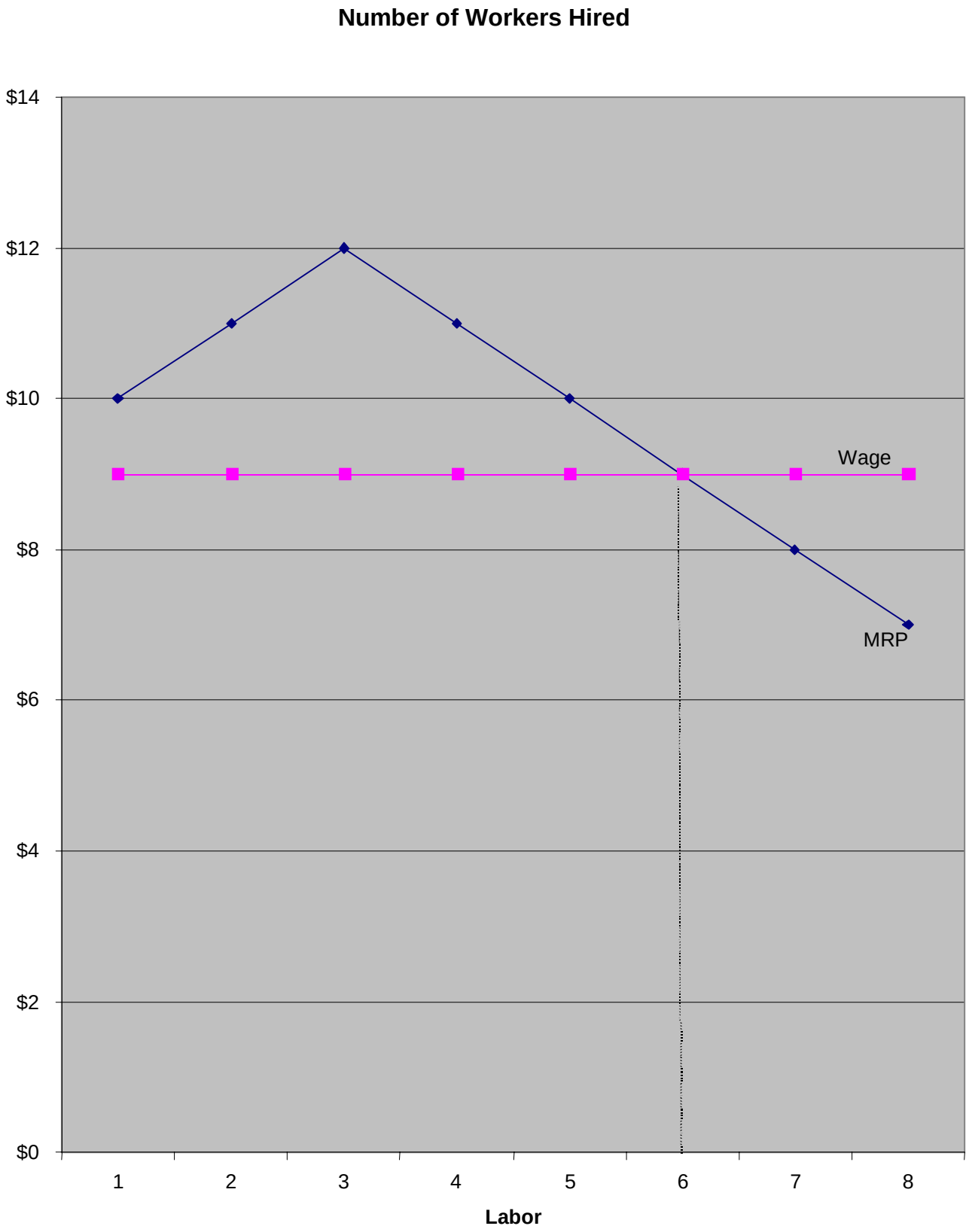
In order to be consistent with the case of the construction company developed in earlier, some of the numbers used here have been complicated. Go over them carefully. Be sure you see where each number comes from and why 48 workers will be hired. ***Remember that 48 workers are necessary to build seven homes; in Chapter 16, we determined that seven homes are the number that would maximize the company's profits***. In Chapter 14, we began our analysis by stating that the company hired 48 workers. Now you can see why it does so. A case with

simpler, made-up numbers is given in the homework to check your understanding. But first, let us determine if this approach to the hiring decision is realistic.

The terms "marginal revenue product" and "marginal resource cost" are not used in everyday talk. If I ask your employer to tell me what your marginal revenue product is, he or she will probably not know what I am talking about. But, even without using the language, employers do think in these terms. This is easiest to see in the case on entertainers and athletes. For example, it has been said that Ray Romano is paid $1.8 million for each episode of his television show. Why would anyone pay him that much to one person for one episode of a half-hour show? The answer, of course, is that they expect him to bring in a large number of viewers --- his marginal physical product. The large number of viewers allows the television network to charge higher prices to advertisers. Consider the large number of viewers and the high prices charged to advertisers, the television network expects Ray Romano to contribute at least $1.8 million in additional revenue each episode --- his marginal revenue product. Why would the New York Yankees pay one player $25 million per year to play baseball? The answer, of course, is that this player is expected to help win many games. Team victories contribute to increased attendance at baseball games and an increased number of viewers on television. The increased number of people attending the games and the increased number of television viewers represent his marginal physical product. Each of these pays a price. For those attending the games, the price is the price of the ticket plus the team's share of parking and concessions. For viewers on television, the price involves the extra amount that can be charged to advertisers. The New York Yankees must expect that this player will contribute more than $25 million per year in additional revenue --- his marginal revenue product --- for it to be willing to pay him this much each year.

Notice that there is an implied value judgment in this line of reasoning (normative economics). A person's wage is equal to his or her marginal revenue product. **If you earn more than I earn, it must be because your marginal revenue product is greater.** This could only occur for two reasons: **(1) you are physically more productive than I am or (2) you produce a product of greater value to society than I do, as evidenced by the higher price it commands**. If this is so, then you deserve to be paid more than I do. We shall consider the reasons for earnings differentials more fully in Chapter 23.

Go back to the number set above. If the wage were $20,000, we said that 48 workers would be hired. Had the wage been $25,200 or higher per year, how many workers would have been hired? The answer is 31. Had the wage been $28,800 or higher, how many workers would have been hired? The answer is 24. And had the wage been $36,000, how many workers would have been hired? The answer is 18. ***Notice that the marginal revenue product tells us how many workers will be hired ("bought") at any given wage ("price")***. The number of workers hired at any given wage is the definition of the demand for labor. ***Therefore, the demand for labor curve is the same as the marginal revenue product curve.*** This is shown in the graph on the next page.


Number of Workers Hired
$14
$12
$10
$8
$6
$4
$2
$0
Wage
MRP
1
2
3
4
5
6
7
8
Labor

Notice that the marginal revenue product rises (due to increasing marginal returns) and then falls (due to diminishing marginal returns). ***The marginal resource cost (equal to the wage) is shown as a horizontal line. This represents the supply of labor to one employer and is perfectly elastic:*** the employer can hire as many workers as he or she desires at the going wage of $20,000. If the employer offered a lower wage, no one would be employed. A higher wage would never be offered because it is not necessary to do so.

If the marginal revenue product curve shows the demand for labor for one employer, it is easy to calculate the **demand for labor curve for all employers** (the market demand). Simply add together the demand for labor on the part of all companies who hire the same type of worker (these may or may not be in the same industry). **The demand for labor basically slopes down and to the right because of the law of diminishing marginal returns**. If you turn the graph upside down, it will look very much like the graphs developed for the company in Chapter 16. Remember that **the supply of labor curve for one company is the same as its marginal cost curve (above average variable cost)**. When the marginal revenue product on Page 7 is rising, it is because the marginal physical product is rising. We know (from Chapter 14) that **when the marginal physical product is rising, the marginal cost must be falling.** And when the marginal revenue product on Page 7 is falling, it is because the marginal physical product is falling. We know that **when the marginal physical product is falling, the marginal cost must be rising.** So the marginal revenue product curve (the demand for labor) is related to the marginal cost curve (the supply of the product).

In this chapter, the company is the buyer (employer); in Chapter 16, the company was the seller of the product. As we have seen, the graphs should look similar since they are related. ***Therefore, anything that causes the marginal cost to shift up (down) will cause the marginal revenue product to shift down (up). Also, anything that causes the price of the product to rise (fall) will cause the marginal revenue product to shift up (down).***

Test Your Understanding

In the following simplified case, fill in the table:

Labor	Total Product	Marginal Physical Product	Price	Marginal Revenue Product
1	**100**		**$10**	
2	**220**		**$10**	
3	**320**		**$10**	
4	**400**		**$10**	
5	**460**		**$10**	

If this company hires workers in a perfectly competitive labor market at a market wage of $800, how many workers will it choose to hire? _____

Test Your Understanding

In Chapter 14, you were given a case concerning an orange grove. The following table described the relation between the number of pounds of oranges sold per year and the number of workers hired. This was the **production function**. You were asked to calculate the marginal physical product (MPP). Refer back to that case in Chapter 14. The calculation of the Marginal Physical product is repeated below.

Number of Workers	Number of Pounds Per Year	Marginal Physical Product
0	0	
1	10,000	10,000
2	40,000	30,000
3	90,000	50,000
4	130,000	40,000
5	160,000	30,000
6	180,000	20,000
7	192,000	12,000
8	198,000	6,000
9	200,000	2,000
10	200,000	0

You were also given that the price of oranges was $0.60 per pound and that the wage paid to each worker was $12,000 per year. Assume that oranges are sold in a perfectly competitive product market and that the workers are hired in a perfectly competitive labor market. In the table below, calculate the **marginal revenue product** & the **marginal resource cost.**

Workers	Marginal Physical Product	Price	Marginal Revenue Product	Wage	Marginal Resource Cost
1	10,000	$0.60		$12,000	
2	30,000	$0.60		$12,000	
3	50,000	$0.60		$12,000	
4	40,000	$0.60		$12,000	
5	30,000	$0.60		$12,000	
6	20,000	$0.60		$12,000	
7	12,000	$0.60		$12,000	
8	6,000	$0.60		$12,000	
9	2,000	$0.60		$12,000	
10	0	$0.60		$12,000	

This company will hire _____ workers because _____.
(Compare this to the number hired in the homework in Chapter 14.)

Part 2: The Elasticity of the Demand for Labor

Notice again that the demand for labor is a downward-sloping line. But, as with the demand for products, knowing this is not enough. We want to know the amount the demand for labor will change if there is a given change in the wage paid to workers. In other words, we want to know ***the wage elasticity of demand for labor***. This concept is no different than the elasticity concepts developed earlier. ***The wage elasticity of the demand for labor is the percentage change in the quantity demanded of labor (in the number of people hired) if there is a given percentage change in the wage.*** As a formula, it is:

$$\frac{\textit{Percentage Change in Demand for Labor}}{\textit{Percentage Change in the Wage}}$$

We use the same terminology as we did earlier. If this number is more than zero but less than one, the demand for labor is ***relatively inelastic***. If this number is more than one, the demand for labor is ***relatively elastic***. If the number equals one, the demand for labor is ***unit elastic***. If the number equals zero, the demand for labor is ***perfectly inelastic***. And if the number is infinitely large, the demand for labor is ***perfectly elastic***. As we draw the graph, ***the more inelastic (elastic) is the demand for labor, the steeper (flatter) is the demand curve***.

The factors that determine whether the demand for labor will be relatively elastic or relatively inelastic are basically the same as for any product. Suppose those who work at your college obtain a wage increase of a given percent. What will happen to the number of people employed by the college? Will it decline greatly (relatively elastic) or will it decline only slightly (relatively inelastic)?

The first factor that determines whether the demand for labor is relatively elastic or relatively inelastic is the existence of substitutes. When the workers at your college obtain their wage increase, are there substitutes for them? If yes, than many of the current workers will lose their jobs and the demand for labor will be relatively elastic. **One main substitute might be capital goods**. It is possible that the employer may buy machines to replace the workers. Computers could be added to replace clerical people and even to replace teachers. Or take the case of our construction company. Procedures to build houses in factories and assemble them easily on the site may be developed. **Another substitute might be different workers**. For example, as union workers obtain wage increases, employers often try to hire non-union workers to replace them. This practice has been common among construction workers and musicians. Many American companies have located plants in Mexico to be able to substitute low-wage, unskilled workers for higher-wage, unskilled American workers. **And yet a third "substitute" might be to simply reduce the number of workers and let the remaining workers try to produce more**. For example, teachers might lose their jobs if their wages rose; there would be fewer classes offered for students and each class section would be larger.

The second factor affecting the elasticity of the demand for labor is time. This refers to the time to develop substitutes. If the wage rises today, the employer may have no option but to pay the higher wage today. But the employer may try to develop substitutes for the workers. This may take considerable time to accomplish. **Therefore, the demand for labor is more elastic the longer is the time under consideration**. As one example, the wages of coal miners rose greatly during the 1920s as a result of a very strong labor union. Employers had no option at the time but to pay the higher wages. However, the looked for a technology to replace the miners. It took many years to be able to put the new technology into operation. When the new technology --- strip mining --- began to be used after World War II, a very large number of coal miners lost their jobs in a relatively short time. As another example, in the 1960s, farm workers attempted to unionize. Believing that the workers would be successful and would be able to raise wages, growers began to search for machines that would replace workers in the picking of fruits and vegetables. The problem was that the machines did not know which fruit or vegetable to pick --- they would simply pick everything. Overcoming this required genetically developing a plant so that all of the fruit or vegetables would be in the same stage of ripeness at the same time. This was indeed done for tomatoes. With all tomatoes in the same stage of ripeness, the machine could pick all of them. The tomatoes are picked green so that they will be hard enough that the machine will not squash them. A gas is then injected into the tomato to turn it red before taking

it to the market. Similar attempts have been made for grapes and bananas without success.

The third factor affecting the elasticity of the demand for labor is the cost of labor in relation to the total cost of production (how expensive is the labor to the employer). This is analogous to "price in relation to income" that we considered for products. For the employer, is labor expensive or inexpensive? **The more expensive labor is, the more workers will lose their jobs as their wages rise**. Let us return to the college example. If all workers obtain a 10% increase in their wages, the cost would be very expensive for the employer. Labor represents between 80% and 90% of the total cost of a college. Many of the workers would lose their jobs. The demand for labor would be relatively elastic. Now suppose that only Economics teachers obtain a 10% increase in their wages. Since there are few Economics teachers, the cost to the college would be only a few thousand dollars. This would be inexpensive to a college that has a total cost in the tens of millions. The college would just pay the wage increase. Very few, if any, Economics teachers would lose their jobs. The demand for labor in this case would be relatively inelastic. This example explains a phenomenon that causes much dissension in companies --- the workers get a small wage increase while the Chief Executive Officer (CEO) gets a very high wage increase. In total, the workers represent a high portion of the total cost because there are so many of them. The CEO represents only a small portion of the total cost because there is only one CEO --- even though the CEO may earn many millions of dollars per year.

The final factor affecting the elasticity of the demand for labor is the price elasticity of the demand for the product. If the company must pay higher wages to its workers, it would like to get the money back by raising its prices to buyers. If the demand for the product is very inelastic, the quantity demanded of the product will fall very little as the price rises. Because the quantity demanded of the product falls very little, the demand for labor will also fall very little. The demand for labor will be relatively inelastic. On the other hand, if the demand for the product is relatively elastic, the quantity demanded of the product will fall greatly as the price rises. Because the quantity demanded of the product has fallen so much, the number of workers employed will also fall greatly. The demand for labor would be relatively elastic. What would happen if, because the workers at your college obtained higher wages, the college raised the fees that you pay? If you would simply pay the higher fees and continue on as before, then few college employees will lose their jobs (relatively inelastic demand for labor). But if you would significantly reduce the number of classes that you take or not attend the college altogether because of the higher fees, then many employees of the college will lose their jobs (relatively elastic demand).

In summary, the demand for labor will be relatively inelastic if: (1) there are few substitutes for the workers; (2) there is a shorter time under consideration; (3) the labor represents only a small portion of the total cost of production; and (4) the demand for the product produced by the company is relatively inelastic. The demand for labor will be relatively elastic if: (1) there are many substitutes for the workers; (2) there is a longer time under consideration; (3) the labor represents a large portion of the total cost of production; and (4) the demand for the product produced by the company is relatively elastic.

Case: The Increase in the Minimum Wage

Until 1996, the national minimum wage was set at $4.25 per hour. This is a ***wage floor***; it was illegal to pay a wage below this. In 1996, the national minimum wage was raised so that it reached $5.75. The California minimum wage is $6.75 per hour. Many economists have debated the effects of the minimum wage on the labor market. Our analysis above tells us that some workers will lose their jobs, or not be able to find jobs, as the minimum wage is increased. This results from the downward slope of the demand for labor curve. But the question is how many people will lose their jobs? Is this a small or large number? And what happens to the amount the companies must pay in total to their workers? To answer these questions, we need to know the wage elasticity of the demand for workers who are paid the minimum wage. Those affected, of course, are those currently earning less than $5.75 per hour (or $6.75 in California). (There is no evidence that raising the minimum wage has an effect in raising wages for those already paid above the minimum wage.)

In California in 1994, 5.7% of all workers earned at or below the existing minimum wage of $4.25 per hour. However, an additional 11.6% of all workers earned less than $6.75 and therefore were affected by the new law. Of the California minimum wage workers, 22.1% were age 16 to 19, 21.4% were age 20 to 23, and the rest (56.5%) were age 24 and up. California minimum wage workers are older than those in the rest of the nation. Other data describing minimum wage workers in California are that 46.1% of them had less than 12 years of education and 56% were Hispanic. These workers tend to be found as food service workers, sales workers, domestic workers, laborers, or farm workers. In general, those affected by the new law tend to be young, less educated, minority, and less skilled. However, a large number of those affected did not fall into these categories.

Would the demand for these workers be relatively elastic or relatively inelastic? To answer these questions, consider the factors that determine the wage elasticity of the demand for labor. **Are there many substitutes for these workers?** If so, who would they be? **Do these workers represent a high percent or a low percent of the total cost of production? Is the demand for the products produced by these workers relatively elastic or inelastic?** (That is, if the minimum wage rises and, as a result, all companies that are affected raise their prices, will the demand for these products fall greatly or relatively little?) One would guess that the demand for minimum wage workers is relatively inelastic. **In general, you will find few substitutes for them.** Immigrants may provide one substitute. But, since these are low paying jobs, there will not be a rush of other people to take these jobs. And since many of these jobs are in some form of service, such as retail trade (48% of minimum wage workers are in retail jobs), there are not many machines to replace them. **They likely represent a low percent of the total cost of production** --- in large part because their wages are so low. **And the demand for the products would be relatively inelastic** because the prices of the products are low in relation to buyers' incomes and because all of the companies involved would be raising prices at the same time (reducing the number of substitutes).

Empirical studies tend to confirm the guesses of the last paragraph. ***Most estimates of the elasticity of demand for minimum wage workers put the number at 0.2 or 0.3*****.** This is very inelastic (relatively inelastic goes from 0 to 1). One recent study estimated the elasticity for California workers at 0.349 for people age 16 to 19, 0.252 for people age 20 to 23, and 0.112 for

people age 24 and over. Using the estimated elasticities, the increase in the California minimum wage would cause employment of people age 16 to 19 would fall 4.4%, employment of people age 20 to 23 would fall 1.6%, and employment of people age 24 and older would fall only 0.75%. These declines are quite small.

If the demand for minimum wage workers is indeed relatively inelastic, what happens to the total amount the companies must pay for their workers? **Since the wages paid rises more than the number of workers employed falls (since this is how the demand for labor can be relatively inelastic), the total amount the companies must spend on their workers must rise**. This, of course, would be an increase in a variable cost. This is one of the cases for your homework.

Test Your Understanding

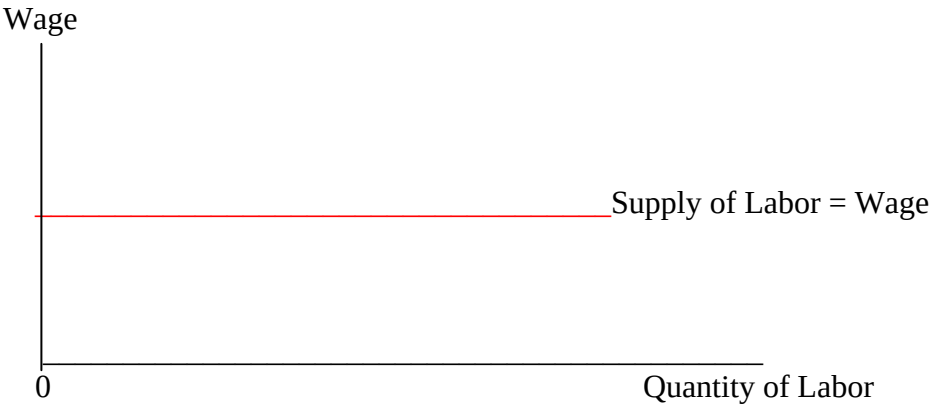
In the early 1990s, **comparable worth** was an important political issue. This meant that workers should not only be paid the same wage for doing the same job, they should be paid the same wage if they did comparable jobs. The courts found that jobs done by men and women were often comparable (as they measured this) but that the wages were commonly higher for jobs done by men. Had comparable worth become national law, **the effect would have been to significantly raise the wages paid to women who work**. Analyze this case. What would be the results of passing comparable worth laws? In doing your analysis, notice that this case is similar to the case of the increase in the minimum wage.

Part 3: The Supply of Labor

Now that we have considered the demand side of the labor market, let us shift to the supply side. The supply of labor involves the decisions of the workers. We can look at the supply of labor in three ways. One is to examine the supply of labor from the point of view of one particular employer. The second is to examine the supply of labor to one particular type of employment --- for example, the supply of engineers, the supply of plumbers, the supply of musicians, and so forth. The third is to examine the supply of labor to the economy as a whole --- that is, the number of people who work and the number of hours they choose to work (regardless of where they work or what they do).

(1) The Supply of Labor to One Employer

We have already examined the supply of labor to one employer if that employer hires workers in a perfectly competitive labor market. ***That supply of labor was perfectly elastic***. This means that the employer can hire as many workers as desired at the going market wage. In the first example above, the supply of labor was perfectly elastic at the market wage of $9 per hour. In the example of the construction company, the supply of labor was perfectly elastic at the going wage of $20,000 per year. See the graph on the next page.



(2) The Supply of Labor to a Type of Employment

The supply of labor to a type of employment involves similar reasoning. Generally, the supply of workers with low skills or whose skills are easily acquired would likely be perfectly elastic. Thus, the supply of unskilled factory workers and possibly the supply of secretaries might seem unlimited. All employers who desire to hire these workers would be able to hire as many as desired at the market wage. The graph is the same as the one above.

On the other hand, the supply of workers who are more skilled would likely be upward-sloping. If wages rise for engineers, accountants, plumbers, and so forth, more people would likely undertake the training to qualify for that type of work. Put differently, to induce more people to become doctors, lawyers, teachers, and so forth, the wage paid to people in these occupations must rise. The graph is this case is the typical upward-sloping supply curve.

(3) The Supply of Labor to the Economy

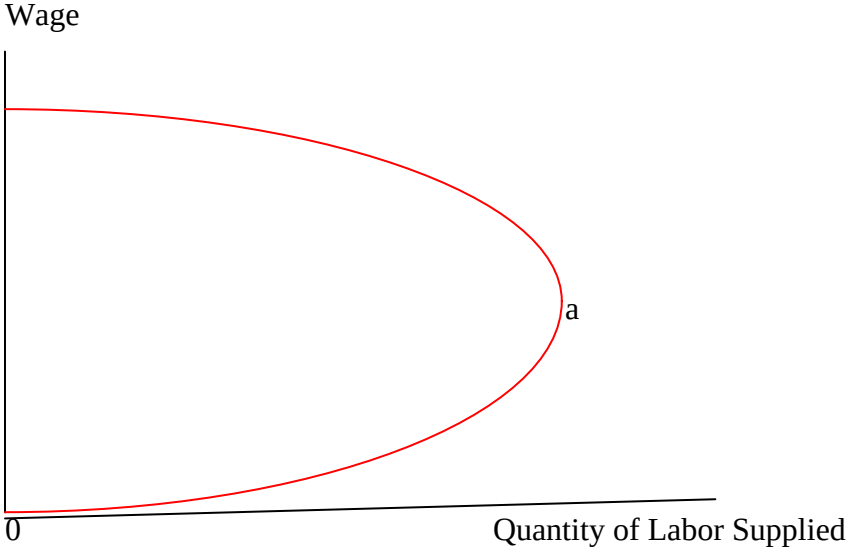
The supply of labor to the economy refers to the decision to work or to not work as well as the choice of the number of hours to work. (Workers do have a choice as to the number of hours to work. While you cannot bargain with your employer to have every Friday off, you can adjust your hours of work by your choice of job.) We measure the supply of labor to the economy by the Labor Force Participation Rate. ***The Labor Force Participation Rate is the percent of the relevant group that is in the labor force. One is in the labor force if one is employed or if one is unemployed but searching for a job.*** In general, the term "labor force participation rate" refers to the percent of all people between the ages of 16 and 74 who are in the labor force. But, in this section, we will consider certain subgroups: men over age 60, teens, and married women with young children.

Before examining these subgroups, let us consider how the labor force participation rate would respond to a change in wages. As wages rise, would people be more likely or less likely to work? The answer depends on two effects. ***The first effect is called the substitution effect. The substitution effect says that, as wages rise, the opportunity cost of "not working for pay rises. As a result, people will choose to work more (either being more likely to work or choosing to work more hours).*** If you can earn $1.00 per hour, each hour spent not working for pay costs you $1.00. This is not very much. On the other hand, if you can earn $500 per hour,

each hour not working costs you $500. Choosing not to work for pay would be very expensive. People would be more likely to work at the wage of $500 per hour. Therefore, the supply of labor to the economy would be upward-sloping. ***The second effect is called the income effect. The income effect says that, as wages rise, income rises and the demand for leisure (as well as working at home) rises. Leisure and working at home are what we called "normal goods" --- the demand for them rises as income rises. Since people desire more leisure time and more time to work at home, the will spend less time working for pay***. Assume that you could earn $10,000 per hour in today's prices. How many hours do you want to work? I would like to work one ten-hour day per month. I would then have $100,000 per month with which I could live quite well. Someone else might choose to work 60 hours per week for 52 weeks per year --- but only for a few years. How nice to retire wealthy at age 25. Most people would want the time to enjoy this large amount of income. Therefore, the supply of labor to the economy would be downward-sloping.

Most economists believe that ***the supply of labor to the economy is backward-bending***, as shown in the following graph:

A BACKWARD BENDING SUPPLY OF LABOR



As wages rise, people find that it is too expensive to choose not to work for pay. They respond by working more (the substitution effect). But as wages become very high, people desire more leisure time. As a result, they work less (the income effect).

Case: The Average Workweek

As one example of these two effects, consider **the average workweek**. At the beginning of the twentieth century, the average workweek for a factory worker could be up to 66 hours --- six days a week at eleven hours per day. By the late 1950s, the average workweek had reached 40 hours. What explains this fall in the average workweek? Clearly, ***the answer is that the income effect was stronger than the substitution effect***. As wages rose, people did not desire to work as many hours at the higher wages. Instead, they desired more leisure time. First, they desired

Saturdays off --- the six-day week became a five-day week. Then, the workday was gradually reduced until it reached eight hours, with both a later start and an earlier end. As the workweek hit forty hours in the 1950s, some people became worried. Extrapolating into the future, they predicted a very short workweek by the end of the century. Perhaps people would work only two days per week? (TGIT) Perhaps people would only work two or three hours per day? What would we do with all of our free time? As we know, of course, these fears were not realized. The average workweek is still about 40 hours. At this number of hours, the substitution effect is just balanced by the income effect (point a on the backward-bending supply curve). If people find their hours reduced, a common response is to get a second job to make up the difference. People would like more leisure. But they also would like more income. They seem unwilling now to sacrifice the income in order to have more leisure time.

Case: Men over Age 60

As another example of these two effects, consider the situation for **men over age 60**. (Many women who are currently over age 60 generally did not work consistently in their younger days. Therefore, we shall not consider them here.) In the late 1950s, over 50% of men age 65 to 74 and over 80% of men age 60 to 64 were in the labor force. Today, fewer than 25% of men age 65 to 74 and fewer than 70% of men age 60 to 64 are still in the labor force. Clearly, this is a major change. What explains it? In our language, ***we say that the income effect has been stronger than the substitution effect for men age 60 and older***. Incomes have risen, allowing these men to save more for retirement. And social security and other pensions provided by employers have increased the ability to retire. People are more likely to choose leisure in these ages because they can now afford to do so. They are retiring even though each hour of work they are giving up would have generated more income than would have been true in the past. The social effects of this change have been enormous. Until the 1960s, most men continued to work until their health deteriorated to the point at which they could not work. As income rose, a whole new stage of life arose for these people. Men who reach age 60 can now expect ten to fifteen healthy years of life. Men who first entered this phase of life in the 1960s and 1970s encountered problems in determining just what they would do with themselves. Many who have encountered this phase of life more recently or will enter it in the future are preparing now for a major adjustment in their lives. Many are returning to college or beginning entirely new areas of activity.

Case: The Labor Force Participation Rate of Married Women

In this section, we can also analyze one of the more significant social changes in recent years. **This is the increase in the labor force participation rate of married women**. Actually, there are two events here. The first event began just after World War II. This involved an increase in the labor force participation rate of married women age 35 and up. In this situation, the youngest child had reached an age at which the mother was not needed in the home as much. These women then turned to the labor market. (In previous generations, people were more likely to live in rural areas. Women whose children had grown had major family roles as grandparents.) The second event began around 1970. **This involved a large increase in the labor force participation rate of married women age 25 to 35 who have at least one small child.** In 1970, barely 20% of this group was in the labor force. Today, almost 2/3 are in the labor force.

The role of women within the family has changed greatly in the last quarter century.

A similar social change, with similar causes, is the increase in the labor force participation rate of people age 16 to 22. College students, and also high school students, are more likely to work (and also are likely to work more hours) than students in the 1960s. In this section, let us analyze the reasons for the rise in the labor force participation rate of married women age 25 to 35 with small children. The analysis for people age 16 to 22 is similar.

There are many theories to explain why the labor force participation rate of married women age 25 to 35 with small children has risen so greatly since 1970. ***The most cited explanation is that, on average, the incomes (adjusted for inflation) of men in these ages fell***. They fell partly as ***a result of the baby boom*** --- there was an increase in the supply of young male workers entering the labor force in the 1970s and early 1980s causing the wages to decrease. ***This would be the income effect (in reverse) --- as wages for the family fall, people would be more likely to work***. One way to increase work is for the male to take a second job or to work overtime. But the opportunities for this are limited. Another way for the family to increase work is to have other family members enter the labor force. This included both wives and teenagers.

For this explanation to be reasonable, **we must assume that a person's desired standard of living is based on the standard of living one had when growing up**. According to this explanation, middle class people growing up took certain goods for granted --- a car, a home, a television set, and so forth. As incomes fell when they became adults, they were unwilling to accept a reduced standard of living. So they responded by having their wives and children work.

Those with historical perspective will appreciate what a major social change this is. Prior to the 1970s, a wife working was considered a major family tragedy --- to be avoided if at all possible. For the women, it meant that she was not a good mother. For the man, it meant that he was not a good provider. Today, it is common for married women to be in the labor force. What a major change in family life has taken place in just one generation.

A second explanation for the rising labor force participation rate of married women is the shift in the economy. ***We classify jobs as primary (agriculture, mining, fishing, etc.), secondary (manufacturing), and tertiary (services)***. Until World War II, there was a major shift in the economy away from primary jobs (agriculture) and into manufacturing. Manufacturing jobs were, and still are, held overwhelmingly by men. ***Since World War II, there has been a major shift away from manufacturing jobs and into service jobs***. Today, over three-fourths of all jobs are in services. Many of these jobs --- especially in retailing, clerical, education, and health care --- are major employers of women. ***Therefore, the demand for the labor of women has risen as the structure of the economy has changed. As the demand rises, wages also rise***. The higher wages encourage women to work more since the opportunity cost of not working for pay is now greater. This, of course, is ***the substitution effect***.

Using these two explanations, the substitution effect and the income effect operate in the same direction. ***The rising wages paid to women who work (substitution effect) and the falling real wages of younger men (income effect) both led married women to increase their participation in the labor force***.

There have also been events that did not **cause** the increased labor force participation for

married women but which **reinforced** it. ***First, the education of women has changed***. This has most likely been a response to the changes in the economy. Women are more likely to have a college education today. But, more importantly, the subjects studied by women in college have changed. Women college students used to prepare for careers in either teaching or nursing. Now, they prepare for a full range of careers. This change has allowed the income they can earn to rise. Because of the substitution effect, the higher wages have caused women to work more. ***Second, anti-discrimination laws have opened access to higher paying jobs for women***. Again, as the wage that can be received has risen, women are more likely to work (the substitution effect). We will consider the role of education and anti-discrimination laws in later chapters. ***Third, attitudes toward married women working have changed greatly***. Where once women working was considered undesirable (women who worked once were expected to quit at the time of marriage), working is now seen as normal behavior. It is not likely that the change in attitudes was the cause of the change in labor force participation. If attitudes were the cause, one would have to explain why the women's movements earlier in history, such as the women's suffrage movement, did not cause the labor force participation rate for married women to rise then. But the changes in attitudes that made labor force participation by married women socially acceptable have certainly reinforced the trends that were started by the changes in the economy discussed above. ***Finally, the rise in the divorce rate has increased the labor force participation rate of married women***. Since there is almost a 50% chance of divorce, married women who do work are better protected financially in case divorce does occur. (Has the rise in the divorce rate contributed to have more women work or has the fact that more women work contributed to the rise in the divorce rate?)

One hypothesis we can dismiss is that the labor force participation rate for married women has risen because, with recent technological changes, housework has become much easier. Today, women spend as much time doing housework as they have ever done. A full-time housewife today (as well as a woman who works and then does housework) has a workweek that averages over 55 hours.

Test Your Understanding

In this chapter, the rising labor force participation rate for married women was explained. As noted, there has also been **a significant increase in the labor force participation rate of young people --- ages 16 to 22** --- especially those still attending school. Use the explanations developed in this chapter to explain this increase. In your answer, be sure to **consider both the substitution effect and the income effect**.

Practice Quiz on Chapter 22

1. Which of the following concepts represents the extra revenue a firm receives from the services of an additional unit of a factor of production?
   a. total revenue b. marginal revenue product c. marginal product of a factor d. marginal revenue

2. For the case of a perfectly competitive product market, the **marginal revenue product** equals:
   a. total revenue times marginal physical product c. price times total physical product
   b. marginal revenue times average physical product d. price times marginal physical product

3. A profit-maximizing competitive firm will hire labor in a competitive labor market up to the point at which the _____ equals the _____ .
   a. average revenue product; price c. marginal resource cost; wage
   b. total product; wage d. marginal revenue product; wage

4. The **demand curve for labor** is the same as:
   a. the demand curve for the product
   b. its marginal cost curve above average variable cost
   c. the marginal factor cost curve
   d. the marginal revenue product curve

5.

Workers	Total Product
1	15
2	28
3	39
4	48
5	55
6	60

This company is a profit-maximizing firm selling in a competitive product market and hiring in a competitive labor market. It uses semi-skilled labor to produce dampers used in office building ventilation systems. Assume that the current market price per damper is $50 and that the prevailing weekly salary per semi-skilled worker is $550. This company should employ _____ workers.
a. 2 b. 3 c. 4 d. 5 e. 6

6. The demand for labor will be **more inelastic** if:
   a. there are few substitutes for labor
   b. there is a short time under consideration
   c. labor is a small part of the total cost of production
   d. the demand for the product is relatively inelastic
   e. all of the above

7. Which of the following results if the **minimum wage** is raised?
   a. unemployed workers
   b. higher wages for those still employed
   c. an increase in the total wage bill paid to workers
   d. all of the above

Use the following for Questions 8-10:

a. As wages rise, the opportunity cost of "not working for pay" rises; as a result, people choose to work more hours.
b. As wages rise, income rises; since leisure is a normal good, people choose to work fewer hours.
c. The proportion of the group that is either working for pay or is actively seeking work.
d. The value of extra leisure time given up for work
e. The extra income received from work, including any non- monetary satisfaction

8. Which of these defines **"labor force participation rate"**?
9. Which of these is defines **"substitution effect"**?
10. Which of these defines **"income effect"**?

11. If the income effect is greater than the substitution effect, the supply of labor will be:
    a. upward-sloping b. downward-sloping c. vertical d. horizontal

12. A perfectly elastic supply of labor to an employer would be drawn as:
    a. upward-sloping b. downward-sloping c. vertical d. horizontal

13. Normally, we expect the supply of labor curve for the economy to be
    a. upward-sloping b. downward-sloping c. backward-bending d. vertical

14. For which of the following groups has the **labor force participation rate fallen**?
    a. men 25 to 50 b. men 60 to 74 c. workers age 16 to 21 d. married women with children

15. Which of the following is responsible for the change in the labor force participation rate of married women with small children?

a. falling real incomes for men under age 35
b. higher desired standards of living
c. higher wages due to increased demand for women
d. all of the above

Answers: 1. B 2. D 3. D 4. D 5. B 6. E 7. D 8. C 9. A 10. B 11. B 12. D 13. C 14. B 15. D