labor force participation rate for women

Using the concepts of the reservation wage and the implications of the household model, explain why the participation rate for men is higher when young children are present and why the participation rate for women is lower when young children are present.

2. Go to <http://www.census.gov/population/www/socdemo/fertility.htm1>

Under the Historical Time Series heading, select the table that details the labor force participation rate of women ages 15–44 who had a child in the previous year (in 2002, this was “Table H-5.—Women 15 to 44 Years Old Who Have Had a Child in the Last Year and Their Percentage in the Labor Force: Selected Years, June 1976 to Present”). How might the trend in labor force participation illustrated in this table reflect the opportunities in the labor market made available to women over the past 20 years? A reference to the relationship between the market wage and the reservation wage of these women and how that relationship has changed over time would be in order.

Answers to Review Questions

1. The reservation wage is the amount of money a person must be paid to induce him or her to work the first hour in the market. An important determinant of the reservation wage is the value of the person’s time in nonmarket activities—the higher this value, the greater the reservation wage. It is likely in turn, that the value of time spent in non-market activities is much greater for a married women with children than for a single women with no children because of the feeding, caring, and many other household responsibilities that go with childrearing.

2. Over time the wage rate available for market work has risen for both men and women. This rise in the wage increases the price of non-market activities, causing a substitution effect in the direction of market work. Since men have traditionally worked full-time in the market and have done relatively little housework, there is only one channel for this substitution effect—from leisure to market work. Women, on the other hand, have historically devoted much less time to market work but have done the major share of housework. For women, therefore, there are two channels for the substitution effect—from housework to market work and from leisure to market work, making the substitution effect larger relative to that of men.

An increase in the husband’s income represents an increase in the wife’s nonlabor income. If leisure is a normal good, the resulting negative income effect should cause the wife to have a lower probability of labor force participation.

3. The household model explains the division of labor in the traditional family of forty years ago as the result of a rational allocation of the time of each family member to the activity in which they had a comparative advantage. There are two aspects to this decision. The first is that the wage rate men could earn for an hour of market work was higher than that women could earn. This, in turn, reflected the greater physical strength of men and their higher level of education and training. (Men had an incentive to obtain more education since as full-time workers they would earn a higher return on their investment.) The second is that women had a higher level of productivity in household activities such as childrearing than did men. This again reflected biological differences between men and women, as well as prior training as boys and girls. The result was that the total amount of market and nonmarket goods available to the family was maximized by having the husband specialize in market work and the wife in housework.

Critics of this view believe that the division of labor in the traditional family had less
to do with comparative advantage than with bargaining lower. From a bargaining perspective, the spouse that earns the largest amount of income is also the least dependent on the other, giving him or her more bargaining power. The reason that men specialized in market work, therefore, was that it gave them a superior power position relative to women. Several factors were used by men to discourage women from breaking the monopoly of men in the job market. One was legislation that restricted the ability of women to work in certain occupations. A second was discrimination by employers who refused to hire women into many types of work, or who refused to pay women a wage equal to that of men's. A third was the inability of women to obtain training and education in a wide range of skilled craft and professional occupations. A fourth was the forces of custom and tradition which made it socially unacceptable for women to work. Finally, critics of the household model do not believe that women have an innate productivity edge over men in doing housework. Other than childbirth, it is believed that either sex could perform food preparation, cleaning, and other such duties with equal productivity.

4. The basis of the added worker effect is that when the primary breadwinner (presumed to be the husband) loses his job, the resulting drop in family income causes the nonworking wife or teenage children to enter the labor force in search of market work. The result is a growth in the size of the labor force since there are now two people working, or seeking work, rather than just one as before. The basis of the discouraged worker effect is that during a recession jobs may become so difficult to find that some of the unemployed give up their job search, causing them to no longer be counted in the official statistics as in the labor force. It is likely that the discouraged worker effect is quantitatively larger than the added worker effect. The added worker effect occurs only for that subset of the unemployed where the primary earner loses the job and another family member has the ability to enter the workforce. The discouraged worker effect, on the other hand, affects all the unemployed, as well as persons who are contemplating entering the labor force, such as high school graduates.

5. To answer this question, it is necessary to look at three different persons, represented in Figure 3.5, (a)-(c), respectively. In each graph the pre-Social Security budget constraint is $AB$ and the post-Social Security-budget constraint (with the earnings test) is $ACDEB$. In graph (a), the person is working $H_1$ hours (point $X$), shown by the tangency of the indifference curve $I_1$ and the line segment $CD$. The effect of eliminating the earnings test is to make the budget constraint the line $ACDF$. For this person, removing the earnings test results in no change in labor supply since neither total income nor the price of leisure were affected.

A different situation is depicted in graph (b). This person’s indifference curve $I_1$ is tangent to the line segment $DE$, causing him or her to work $H_1$ hours (point $X$). Removal of the earnings test is equivalent to a wage increase, setting off, therefore, an income effect and a substitution effect. The net impact on labor supply can not be predicted in this case; it depends on which effect is larger. In the graph, the new equilibrium is at point $Y$ and hours of work have increased from $H_1$ to $H_2$. The opposite could have occurred, however.

In graph (c), before the elimination of the earnings test the person was working $H_1$ hours (point $X$) shown by the tangency between the indifference curve $I_1$ and the line segment $EB$. Because this person’s hours of work were large, he or she was beyond the break even point and thus did not qualify for any payments from Social Security. Removal of the earnings test, however, makes the budget constraint $ACF$, and the person now qualifies for a monthly Social Security payment. The result is a drop in hours of work to $H_2$ (point $Y$). In this case, hours of work decline because of a negative income effect; the wage
per hour, however, remains unaffected and, thus, there is no substitution effect.

The net effect on labor supply of eliminating the Social Security earnings test is, therefore, indeterminate—it could either lead to a net decrease or increase.

6. a. The budget constraint in Figure 3.6 (a) is ABC and the indifference curve is $I_1$.

Equilibrium hours of work are 20 (point $X$).

b. With child care costs, the budget constraint now has two discrete segments. If the woman works zero hours, the relevant portion of the budget constraint is $AB$. If she works in the market, however, the line segment $DE$ becomes the relevant part of the budget constraint. Point $D$ shows that total income is reduced by $46$ if the woman works one hour in the market—the net result of $-50$ of fixed costs, $-2$ of variable cost and $6$ of earnings. The slope of the line, segment $DE$ is also reduced from $-6$ to $-4$ since the woman's net earnings from each hour of work are no longer $6$ but only $4$ because of the variable component of child care cost.

c. The indifference $I_2$ is tangent to the line segment $DE$ at point $Y$. Point $Y$ is not the highest level of utility, however. Were the women to work zero hours, she would obtain point $B$, putting her on a higher indifference curve (not shown). For a women contemplating relatively few hours of work, childcare costs are likely to make nonparticipation a superior option.

If the women were already working many hours, the imposition of childcare costs could result in an increase in labor supply. This is illustrated in graph (b). The initial equilibrium is 50 hours of work (point $X$), given by the budget constraint $ABC$ and the indifference curve $I_1$. The existence of child care costs again makes the budget constraint the two discrete parts $AB$ and $DE$. Equilibrium hours of work increase to 55 (point $Y$), shown by the tangency of $I_2$ and $DE$. In this case, the woman does not drop out of the labor force because point $B$ would place her on a lower indifference curve than $I_2$. Given
that she continues to work, the fixed component of child care costs leads to an income effect pulling her towards more hours of work, the variable component reduces the net wage and leads to both an income effect (more work) and substitution effect (less work). In graph (b), the net result is greater hours of work, although the opposite result could also occur.

7 The less desirability of night jobs indicates that people's indifference curves are shaped differently (have different slopes) for day and night jobs. The indifference curve for day jobs is flatter than the indifference curve for night jobs; it takes much more income to compensate a worker for giving up an hour of leisure at night than it would take to give up an hour of leisure during the day. These indifference curves are represented in the figure by \( I_D \) (representing the indifference curve for day jobs) and \( I_N \) (representing the indifference curve for night jobs). The implication is that the reservation wage for night jobs is much higher than for day jobs (workers require a much higher wage to take a night job than a day job). This is illustrated by the fact that at the going day-job wage rate (reflected by the slope of the budget constraint equal to \( -W_D \)), a worker will choose to work \( H_1 \) number of hours during the day, but if this were a night job, the "day wage" would not be great enough to overcome the worker's night reservation wage.

8. The decision to participate in the labor market involves an evaluation of the market wage and the value of one's time out of the labor market. So, from an individual perspective, the woman who is not participating in the labor market is not demonstrating that she has nothing to offer employers, but that the value of her time exceeds what she would earn in the market; she may have a very high value of non-market time, which might arise in circumstances where the woman provides very valuable production in the home, such as taking care of children or elderly parents. The household model of labor supply gives us yet an additional source for a very productive (in the labor market) women not working in the labor market. While she may even earn a higher wage than her husband in the labor market, the value of her time at home may exceed the value of her husband's time at home by a greater amount than the value of what she could earn in the labor market exceeds what he could earn; marriage allows specialization and the person who works in the labor market has a comparative advantage with regard to that activity (regardless of their absolute advantage).
Internet Assignments

1. Go to <http://www.bls.gov/1pc>
   Select the link to “Productivity and Costs” under the Economic News Releases heading. Select the link to any of the tables listed; print out the table (make sure all columns print—you may need to reduce the size or print landscape). Identify on that table what has been defined in Chapter 4 as “total product,” “average product,” and “wage.”

2. In order to complete this internet assignment, you will need to have Adobe Acrobat Reader installed on your computer. To obtain a free copy of Adobe Acrobat Reader:
   Go to <http://www.adobe.com/prodindex/acrobat/readstep.html>
   Scroll down to the bottom of the page and follow the directions for downloading Adobe Acrobat Reader. Downloading this software will allow you to read files that are in PDF format. After successfully downloading this software, complete the internet assignment below.

3. Go to <http://www.ustr.gov/>
   This is the homepage of the U.S. Trade Representative. Select the tab on the top of the page labeled “Trade Sectors.” Select the link to “Labor.” Under the heading, “Document Library,” select a document that interests you. This will open or download an Adobe file. Print the file. What is the significance of what the business the U.S. Trade Representative is undertaking?

Answers to Review Questions

1. a. A decrease in the wage rate from $W_1$ to $W_2$ will cause an increase in employment from $L_1$ to $L_2$. This is shown in Figure 4.1, (a) as a movement down the demand curve from point $X$ to $Y$. According to the marginal productivity theory, a firm should hire workers up to the point the wage equals the $MRP_L$ of the last worker. At $W_1$ the demand curve shows this to be the $L_{1st}$ worker. At a lower wage of $W_2$, however, it pays to expand employment to $L_2$, since all workers between $L_1$ and $L_2$ now have a $MRP_L$ larger than the wage.

![Figure 4.1, (a)](image-url)
b. An increase in product demand will lead to an increase in employment. In graph (b), at the existing level of production the firm hires $L_1$ workers (point $X$) at the wage $W_1$. An increase in product demand shifts the labor demand curve to the right from $D_1$ to $D_2$, and at the wage $W_1$ employment rises from $L_1$ to $L_2$ (point $X$ to $Y$). The reason is that the increase in product demand causes an increase in the price of the product, which in turn increases the $MRP_L$ of each worker. Since each worker's $MRP_L$ is higher, the firm maximizes profit by expanding employment until the equilibrium condition $W = MRPL$ again holds.

c. A lower tariff on imported goods will cause a decrease in domestic employment. This would be represented by a leftward shift of the labor demand curve, such as from $D_2$ to $D_1$ in Figure 4.1, (b). The reason is that a lower tariff will result in lower prices on imported goods and, thus, reduce sales of domestically made goods. At any given wage, therefore, less domestic labor will be demanded.

d. A change in market structure from perfect competition to monopolistic competition will cause the individual firm to decrease employment. In perfect competition, product price and marginal revenue are constant as a firm expands output and employment because its product demand curve is perfectly elastic. In monopolistic competition, however, the firm's product demand curve slopes downward. This implies, in turn, that marginal revenue is less than price, and it declines with additional output. The effect is to reduce the $MRP_L$ of the last worker hired relative to the case of perfect competition, and to make the $MRP_L$ schedule decline more quickly as employment expands. Thus, as shown in the graph (c), the labor demand curve shifts to the left and becomes steeper. At the wage $W_1$, the monopolistically competitive firm hires only $L_2$ workers (point $Y$) relative to $L_1$ for the perfectly competitive firm (point $X$).
2. a. False. Diminishing marginal productivity begins when the total product curve enters the area of diminishing returns—that is, when the increase in production obtained from each additional worker hired becomes smaller. Graphically, this is to the right of the inflection point on the total product curve.

b. True. If demand is inelastic this implies that the percentage increase in employment will be smaller than the percentage decrease in the wage rate. Since the wage bill is measured as \( W \cdot L \), the result will be that the size of the wage bill becomes smaller.

c. False. It is likely that firms have invested more funds in skilled workers for hiring and training than for unskilled workers, making their fixed costs of employment higher. During a recession, therefore, firms will be less likely to lay off skilled workers lest they suffer a loss on their investment.

d. Uncertain. For election to office in student government to be a useful signal in the screening process, it is necessary that there be an inverse relation between a person's innate ability (and productivity on the job) and probability of electoral success. If the more able are also the ones more likely to win student elections, this condition is fulfilled.

3. For a wage concession to be approved it must gain a 50 percent plus one vote of the membership. If only 30 percent of the membership is threatened with layoff, a proposed concession would be voted down by the 70 percent of the membership who would remain employed. The necessary condition for a wage concession, therefore, is that a majority of the union membership be threatened with layoff if the concession is not granted.

A wage concession, by lowering the cost of labor to the firm, results in increased jobs. The extent of the increase in jobs, however, depends on the elasticity of labor demand—the more inelastic is demand, the bigger the wage cut necessary to save a given number of jobs. If demand were highly inelastic, this might well cause the union membership to vote against a concession even if a majority were threatened with layoff at the prevailing wage. The reason is because the wage cut necessary to save the jobs of 50 percent plus one of the membership might be so large that it would place the wage below the worker's reservation wage or, alternatively, below the wage available at other firms in the local area.

4. The demand curve for government workers is likely to be inelastic with respect to the wage rate. The primary reason is because there are few substitutes for the goods and services produced by government. A rise in the wage for government workers, therefore, will cause an increase in the price of government goods and services but only a modest cutback in product demand and labor demand since consumers have few alternative sources of supply.
The income elasticity of demand for many types of government goods and services, on the other hand, is likely to be relatively high. As consumers' income grows over time, demand for items such as health services and recreation facilities will increase substantially, resulting in large employment growth in government. A third factor favoring rapid employment growth in government is that product demand in this sector is largely unaffected by the rise and fall of aggregate demand over the business cycle. This in part reflects the essential nature of many government produced goods and services, such as defense, sanitation, and hospital care.

5. The labor demand curve of Harley Davidson before the imposition of the tariff is \( D_1 \). At the prevailing wage of \( W_1 \), employment was \( L_1 \) (point \( X \)). The tariff raises the price of imported motorcycles, causing a shift to the right in the product demand curve of Harley Davidson. Since labor demand is a derived demand, the increase in motorcycle sales will shift the labor demand curve of Harley Davidson to the right to \( D_2 \). At the wage \( W_1 \), employment increases to \( L_2 \) (point \( Y \)). The tariff, therefore, has created additional jobs in the U.S. motorcycle industry.

![Figure 4.5](image)

The winners from the tariff are the workers, managers and stockholders of Harley Davidson. The losers are consumers of large motorcycles, as well as society at large because of the inefficient use of resources engendered by the tariff.

6. A key consideration in how sensitive the demand for labor is to changes in the wage rate (how elastic is the demand for labor) is the ease of substitution available both to consumers in their choice of what firm to buy from and the ease of substitution available to business firms in their choice of labor, capital, and other inputs to use in producing the product. If a firm is restricted in where it can hire its labor from, substitution possibilities are reduced. So, if a firm can only hire workers who live in the city, there is no possibility of substituting workers who live in the suburbs for the labor of inner-city workers. The result is that the elasticity of demand for city employees is less than if this restriction were not in place. The implication, of course, is that city employees can gain larger wage increases without very large reductions in employment.
(a) The table below is constructed using the new production function:  \[ Q = 5L + 10L^2 - L^3 \]

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<th>Labor Input L</th>
<th>Quantity of Output Q</th>
<th>Average Product AP_L</th>
<th>Marginal Product MP_L</th>
<th>Marginal Revenue MR</th>
<th>Marginal Revenue Product MRP_L</th>
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(b) To produce 150 units (Q=150), the firm has to hire 5 workers.

(c) The firm is willing to pay a wage that does not exceed MRP. Since MRP for the fifth worker is $68, this is the maximum wage the firm is willing to pay.

(d) The decline in employment in manufacturing likely came from two sources. One was the increase in productivity experience in that industry; it takes fewer workers to produce the same amount of output now than it used to. But over this time period we've also seen a drop in overall production in the manufacturing sector in the US as textile and other imports have replaced domestic production in meeting demand. In contrast, educational services is a fairly labor-intensive "production" process and the amount of output per worker has stayed fairly constant over time. The result is that more workers are needed to supply the greater demand for this product.