

This is the last chapter that introduces standard principles of economics; the remaining chapters of this text will largely apply the concepts of the first eight chapters to economic inequality, poverty, and discrimination. Recall that in factor markets, households are sellers of factor **services**—labor time, entrepreneurial risk taking, land services, and the services of capital goods (for business owners) or the services of money used to buy capital goods (stockholders and bondholders).¹ We assume that households supply resource services to maximize their satisfaction, subject to the constraints of scarce time and net worth (wealth minus debt). Firms buy factor services in the hope that revenue exceeds opportunity cost, resulting in profit—which “belongs” to the firm’s owner(s).

Household Allocation of Time Decisions

In Chapter 7, we considered household decisions and the critical choice of how much housing a household buys and where the household locates. Because household decisions affect the well-being of related people, we need some way to compare the preferences of household members. One convenient analytical approach is for one member of the household to function as dictator. In a **patriarchal** system, the father decides; in a **matriarchal** household, the mother is decisive. The democratic family reaches a consensus and acts. If the dictator is a perfect **altruist**, who values the well-being of each family member as equivalent to her own,² then dictatorial and democratic decisions would reach the same outcome, assuming perfect knowledge.

We can imagine a family whose harmony springs from the famous dictum “from each according to ability, to each according to need.” While this rule is a very inefficient means of social economic organization (as so-called *communist* countries have discovered), it works reasonably well in a functional family with altruistic members or with an altruistic dictator.³ We’ll call the dictator “Mom”⁴ and imagine that Mom oversees the family welfare, W , which increases whenever at least one member of the family is made better off without making any other member of the family worse off.⁵ In Chapter 6, we saw how two adults would consider the opportunity cost of market time in deciding how much time to spend in **household production**, and vice versa. For simplicity, assume that each adult has 80 hours per week available for production work, meaning they each spend 88 hours per week in personal maintenance (say, 70 hours) and leisure (18 hours). Adding an hour to working time increases household income by w_d for Dad and w_m for

¹ Technically, stockholders “own” shares of the company, but in practice they are merely residual claimants—that is, they have the right to the firm’s assets if the firm is liquidated (they stand last in line), and they have the expectation of dividends (depending on the decision of the Board of Directors). They do not have the right to exclude employees from the business’s premise (in fact, they will probably be arrested for trespass if they wander about the premises) or sell the business outright.

² Note how difficult it is to imagine a perfect male altruist. Only Buddha and Jesus Christ come to mind, but not to the minds of paternalistic religious fundamentalists.

³ In his *Treatise on the Family*, economic Nobel laureate Gary S. Becker developed his “rotten kid theorem.” According to Becker, if family resource allocation decisions are under the control of an altruistic dictator (the mom) who adjusts the consumption levels of each family member to compensate for cheating (i.e., sibling rivalry), the egoistic (or even malevolent) rotten kid will seek to maximize the total resources of the family, since any action on his part that reduced a sibling’s consumption more than it increased his own would result in his sharing the net loss.

⁴ What does that tell you about decisions in the Carroll household?

⁵ This is the Pareto criterion that economists typically use for **social welfare functions**, presumably because to dissent from this criterion implies that one is *malevolent*.

Mom, their respective market wage rates, and reduces the labor input in household production by 1 hour. The optimal allocation of time occurs when the increase in family welfare from the last hour of household production is exactly equal to w_d or w_m , whichever is less. We can easily extend this analysis whereby personal maintenance time and leisure time are both increased until the value of last hour of each type of time by each individual i is equal to his or her wage rate w_i .⁶

Each member of the household will develop a labor supply function. Since w is the opportunity cost of non-labor time, we would expect labor time, L , to increase with the wage rate. This tendency is called the **substitution effect** of a wage rate change. Since the wage rate is the opportunity cost of leisure, workers tend to reduce their leisure (i.e., substitute income for leisure) as that wage rate increases. However, leisure is considered a **normal good**, meaning that, as household income tends to increase, the time devoted to leisure pursuits tends to decrease, **ceteris paribus**. Consider the impact of **non-labor** income on labor time. When was the last time you heard of a happy lottery winner proclaiming “I’m glad I won a quadrillion dollars, because now I can take a second job!”⁷ First, as non-labor earnings increase, there is more money to be spent in the same amount of time, so households tend to buy more appliances or hire household help to economize on time allocated to household production. Second, they tend to substitute **commodity-intensive** consumption for **time-intensive** consumption activities. For instance, a lawyer billing \$100 per hour (and paid \$51.23 per hour) tends to have a much nicer television than does a professional dishwasher who earns \$10.16 per hour. However, the dishwasher probably watches more hours of television per week, since he only works 28.32 hours per week, compared to 44.61 hours for the lawyer. Table 8-1 shows the average wage rate, average hours of work, and the change in hours worked as the wage rate changes⁸ for eight occupations.

Table 8-1

Occupation	Average Wage	Hours per Week	$\frac{dw}{dh}$
dishwasher	\$9.88	28.11	0.55
hotel clerk	\$15.16	34.73	0.47
carpenter	\$21.44	38.14	0.38
social work	\$20.81	38.55	0.39
professor	\$22.88	36.94	0.36
economist	\$24.75	41.75	0.34
lawyer	\$33.89	44.29	0.21
physician	\$40.65	49.17	0.11

⁶ In her professional paper for her UNLV master’s degree, economist Meron Tilahun documented how the worked performed by boys on family farms in her native Ethiopia actually rose as family wealth increased. That is, as the family acquire more livestock, boys become more productive, which increases the *opportunity cost* of sending them to school. Eventually, when the family acquired sufficient wealth, the father became sufficiently productive, families could afford to send their sons to school.

⁷ One quadrillion = $1000 \times 1 \text{ trillion} = 10^{15}$.

⁸ The data in Table 8-1 were drawn from the Monthly Earner Study of the *Current Population Survey*, January 2012 to December 2012. Using all occupations, I confirmed that hours worked increased at a decreasing rate as the wage offer increased.

Figure 8-1 plots the typical **market supply curve**, taken from the 2012 Monthly Earner Study of the *Current Population Survey*. Note that, contrary to economic theory, the predicted quantity of labor supplied at a wage rate of zero is positive; this reflects the fact that some workers – volunteers, interns, and “employees” in family businesses actually work despite their lack of pay. All of the occupations depicted in Table 8-1, except for physicians, fit the curve well. It appears that physicians feel a sense of obligation to their patients, and increase their hours worked at their average wage rate of \$40.65.

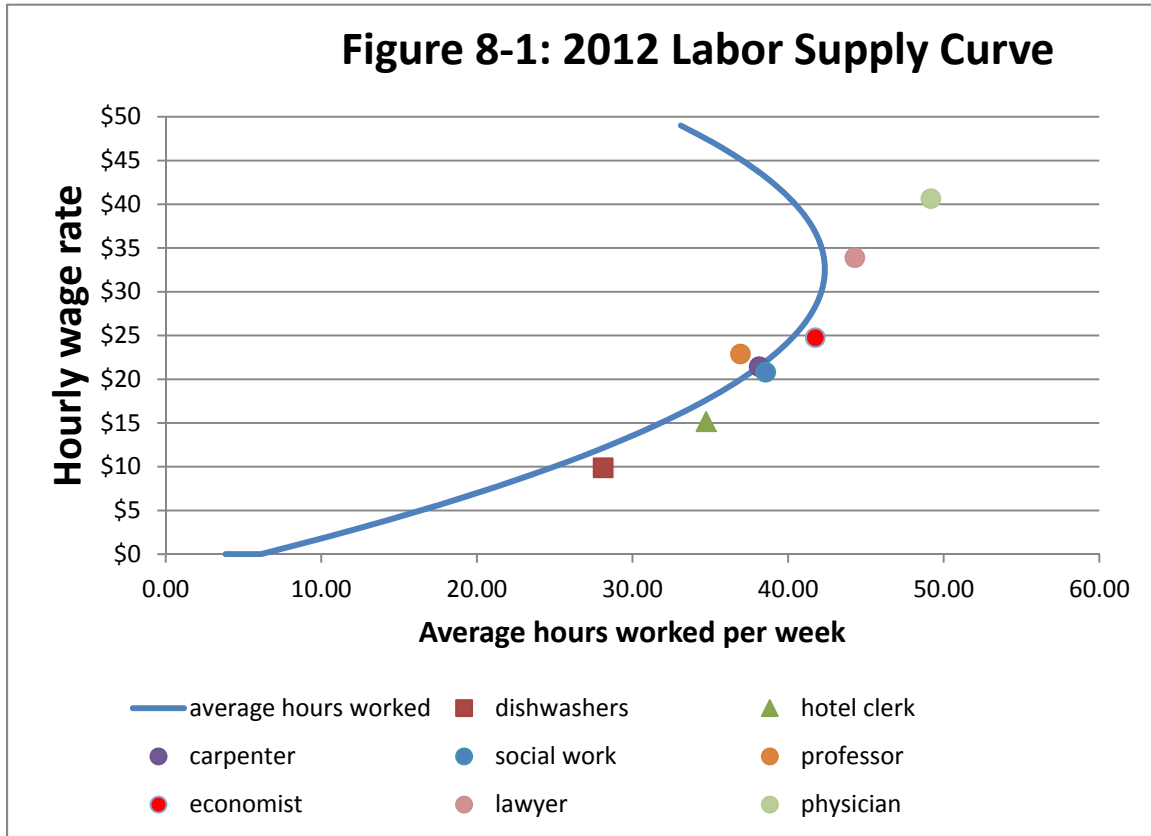


Figure 8-2 juxtaposes the individual labor supply curve with the market supply curve for a particular occupation. The left-hand diagram shows the individual labor supply curve, which shows a net substitution effect as the wage rate approaches w^* and then a net income effect for wage rates above w^* . The right-hand diagram shows two hypothetical labor supply curves. The labor supply curve ΣS_{ic} is the sum of backward bending supply curves that assumes a **closed labor market**; there are n (identical) individuals in the labor market, so that $\Sigma L_{ic} = nL_i$. Below w^* each member of the labor force increases the quantity of labor supplied as the wage rate increases. As the wage rate increases, the income effect becomes stronger until, at w^* , each individual supplies less labor, so that the quantity of labor supplied to the market also decreases. By contrast, the labor supply curve ΣS_{io} is the labor supply curve for an open labor market. At low wage rates, some people who are willing to work for low wage rates (they have low **reservation wages**) supply labor services, while the individual depicted on the left would not supply labor services until his or her minimum wage was reached. At wage rate w_{min} , this individual **enters** this labor market; at very low wage rates, a person with a medical degree might prefer a less stressful job, like washing dishes. As the wage rate continues to rise, the

quantity of labor supplied increases for two reasons: (1) individuals offer more labor hours as long as the substitution effect is stronger than the income effect, and (2) more individuals enter this labor market when the market wage exceeds their (minimum) reservation wage.

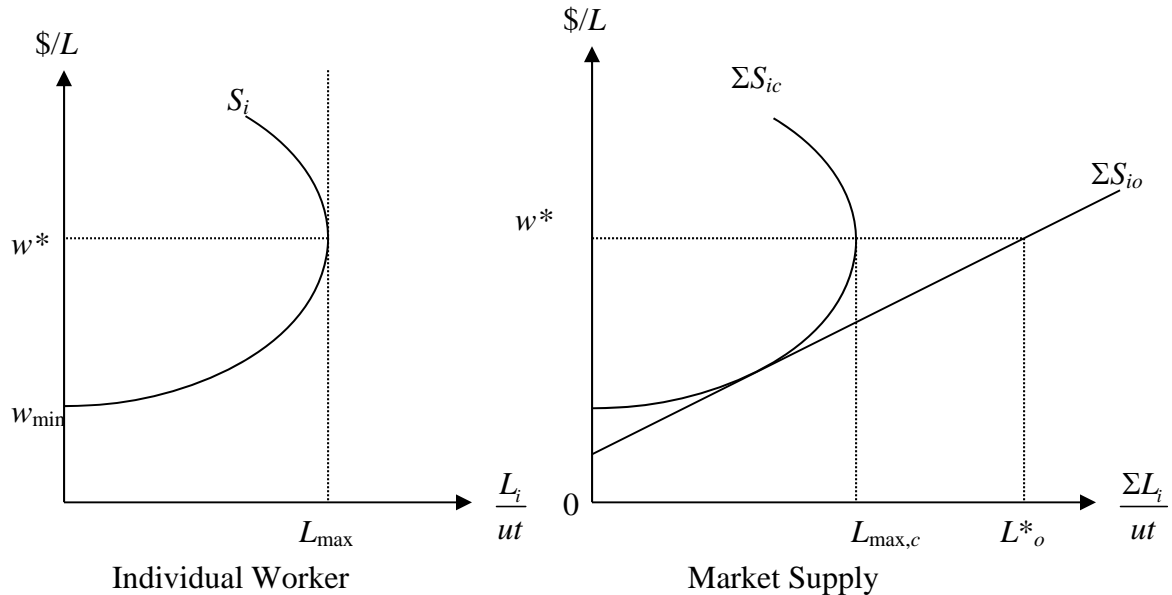


Figure 8-2

The Firm's Demand for Labor

Now we turn our attention to the buyers' side of the labor market—the profit-maximizing firm's decision of how much labor to hire. Table 8-2 shows the relation between labor time (in 40-hour increments) and the total weekly output for a price-taking and wage-taking firm.⁹ Note that total output would be maximized were the firm to hire 500 labor hours (12 full-time workers and 1 half-time worker). It is impossible to produce more than 2,000 units of output per week, no matter how many workers were hired, because of diminishing returns to the variable input, labor. Recall that average product measures output per worker, while marginal product is the more relevant change in output due to the last unit (hour) of labor. Note that the wage rate is a constant \$10.00 per hour, and the price is a constant \$4.00 per unit. The value of marginal product is the product of the price times marginal product, and indicates to the employer the revenue generated by the last labor hour hired. It follows that hiring 500 labor hours (maximizing output) would result in a marginal product of labor equal to zero. Although revenue (\$8,000) exceeds labor cost (\$5,000), resulting in a positive producer surplus¹⁰ of \$3,000, hiring 500 labor hours would not maximize profit because the marginal cost of labor (\$10) would exceed labor's marginal revenue product (\$0).

⁹ The production function used for this example is $q = 8L - .008L^2$, where L is measured in hours/week. It follows that $MP_L = \frac{\partial q}{\partial L} = 8 - .016L$.

¹⁰ Gross profit is revenue minus variable cost (in this case, revenue minus labor cost). Economic profit is gross profit minus the opportunity cost of "fixed" factors.

Table 8-2

Labor	Output	Average Product	Marginal Product	Value of Marginal Product	Wage Rate	Price	Marginal Cost	Revenue	Labor Cost	Gross Profit
0	0							\$0	\$0	\$0
40	307	7.68	7.36	\$29.44	\$10.00	\$4.00	\$1.36	\$1,229	\$400	\$829
80	589	7.36	6.72	\$26.88	\$10.00	\$4.00	\$1.49	\$2,355	\$800	\$1,555
120	845	7.04	6.08	\$24.32	\$10.00	\$4.00	\$1.64	\$3,379	\$1,200	\$2,179
160	1075	6.72	5.44	\$21.76	\$10.00	\$4.00	\$1.84	\$4,301	\$1,600	\$2,701
200	1280	6.4	4.8	\$19.20	\$10.00	\$4.00	\$2.08	\$5,120	\$2,000	\$3,120
240	1459	6.08	4.16	\$16.64	\$10.00	\$4.00	\$2.40	\$5,837	\$2,400	\$3,437
280	1613	5.76	3.52	\$14.08	\$10.00	\$4.00	\$2.84	\$6,451	\$2,800	\$3,651
320	1741	5.44	2.88	\$11.52	\$10.00	\$4.00	\$3.47	\$6,963	\$3,200	\$3,763
343.8	1805	5.2496	2.4992	\$10.00	\$10.00	\$4.00	\$4.00	\$7,219	\$3,438	\$3,781
360	1843	5.12	2.24	\$8.96	\$10.00	\$4.00	\$4.46	\$7,373	\$3,600	\$3,773
400	1920	4.8	1.6	\$6.40	\$10.00	\$4.00	\$6.25	\$7,680	\$4,000	\$3,680
440	1971	4.48	0.96	\$3.84	\$10.00	\$4.00	\$10.42	\$7,885	\$4,400	\$3,485
480	1997	4.16	0.32	\$1.28	\$10.00	\$4.00	\$31.25	\$7,987	\$4,800	\$3,187
500	2000	4	0	\$0.00	\$10.00	\$4.00	undefined	\$8,000	\$5,000	\$3,000
520	1997	3.84	-0.32	-\$1.28	\$10.00	\$4.00		\$7,987	\$5,200	\$2,787
560	1971	3.52	-0.96	-\$3.84	\$10.00	\$4.00		\$7,885	\$5,600	\$2,285
600	1920	3.2	-1.6	-\$6.40	\$10.00	\$4.00		\$7,680	\$6,000	\$1,680
640	1843	2.88	-2.24	-\$8.96	\$10.00	\$4.00		\$7,373	\$6,400	\$973
680	1741	2.56	-2.88	-\$11.52	\$10.00	\$4.00		\$6,963	\$6,800	\$163
720	1613	2.24	-3.52	-\$14.08	\$10.00	\$4.00		\$6,451	\$7,200	-\$749
760	1459	1.92	-4.16	-\$16.64	\$10.00	\$4.00		\$5,837	\$7,600	-\$1,763

Instead of maximizing output, the firm should hire labor only to the point where the marginal revenue from labor equals the marginal cost of labor. Hiring 343.8 labor hours (8 full-time workers, 320 hours; plus one college student working part time, 23.8 hours) would maximize profit. When we divide the wage rate (the cost of one more worker) by the marginal product of labor, we get the marginal cost of output.¹¹ Hiring 343.8 labor hours implies producing 1,804 units of output, which is where marginal cost equals price.

Figure 8-3 presents the firm's demand for labor. The marginal revenue product (the green line) shows the addition to revenue the firm receives from hiring an additional worker. The marginal cost of labor (the red line) shows the addition to cost of hiring another worker. It follows that the firm maximizes its gross profit (revenue minus variable cost) when it hires labor up to the point where the firm breaks even on the last labor hour hired.

¹¹ $MC = \frac{dC}{dq} = \frac{dC/dL}{dq/dL} = \frac{MP_L}{w}$

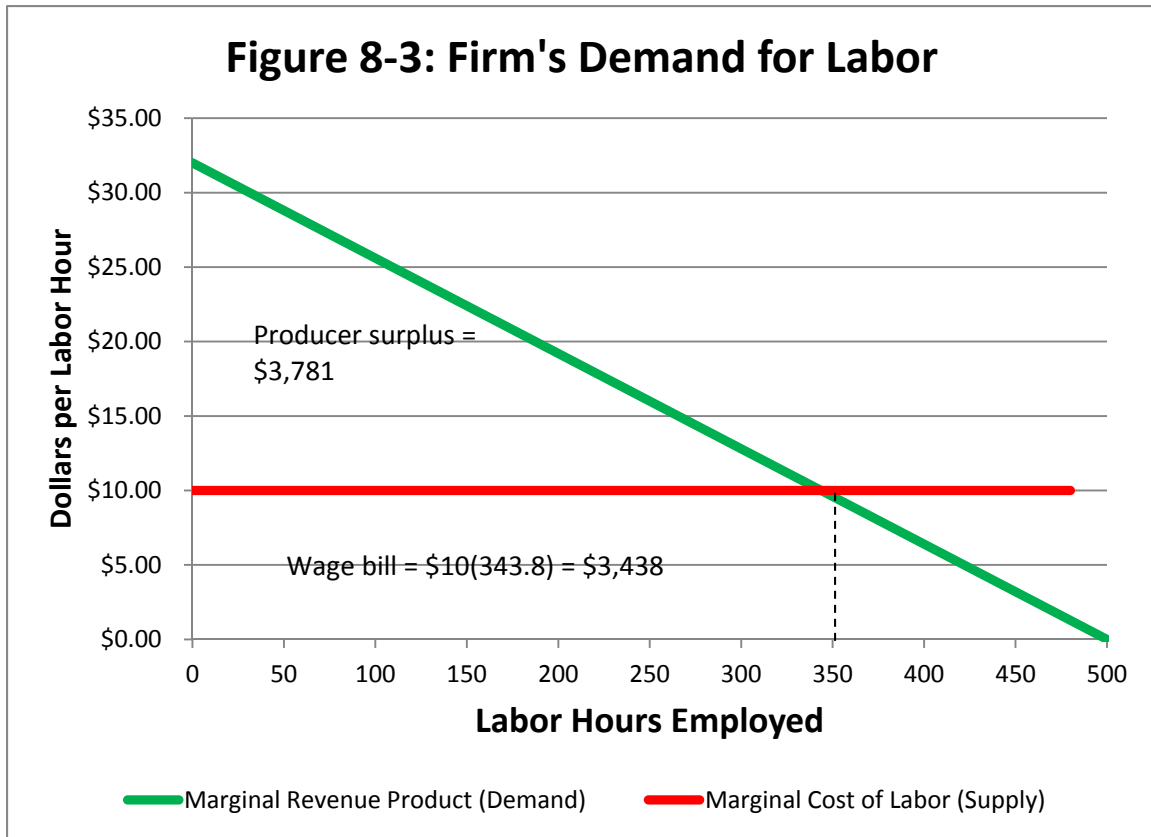


Figure 8-4 traces the impact of a wage rate change on the firm's simultaneous output and employment decisions. Note that the value of marginal product curve is the price times the marginal product of labor. If the wage rate changes, there is no direct impact on the marginal product or the product price; the labor demand curve does not shift. However, after the wage increases from w_0 to w_1 , the firm is no longer maximizing profit with L_0 workers, and the owner cuts employment to L_1 to maximize profit. In the right-hand panel, the increase in the wage rate shifts the marginal cost curve from MC_0 to MC_1 . Although the price did not change, a decrease in the firm's supply curve reduces the quantity produced from q_0 to q_1 . A change in the wage rate shifts the supply curve in the product market.

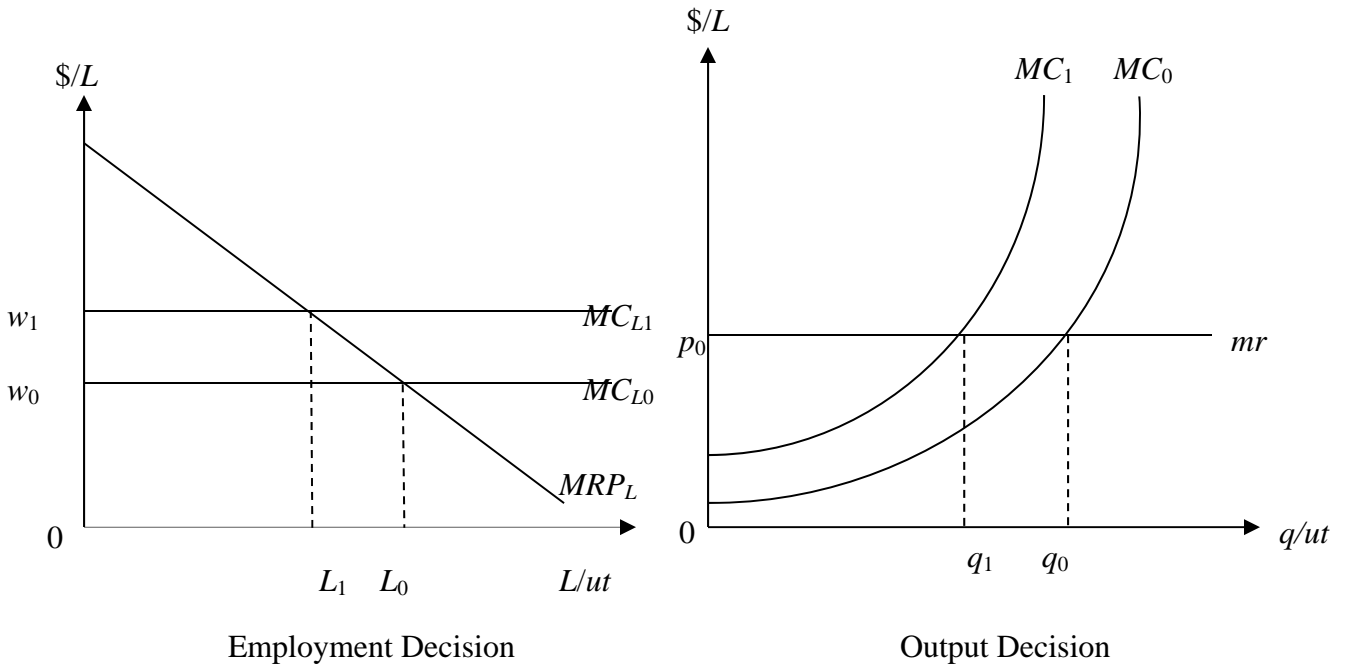


Figure 8-4

In Figure 8-5, we trace the effect of a price increase on the employment and output decisions, under the assumptions that the wage rate and marginal product schedule do not change. In this case, the increase in the price of the output shifts the firm's demand for labor curve to the right (upwards proportional to the change in p), resulting in an increase in employment, even when the price remains unchanged. This is consistent with moving to the right along the firm's supply curve in response to a price change.

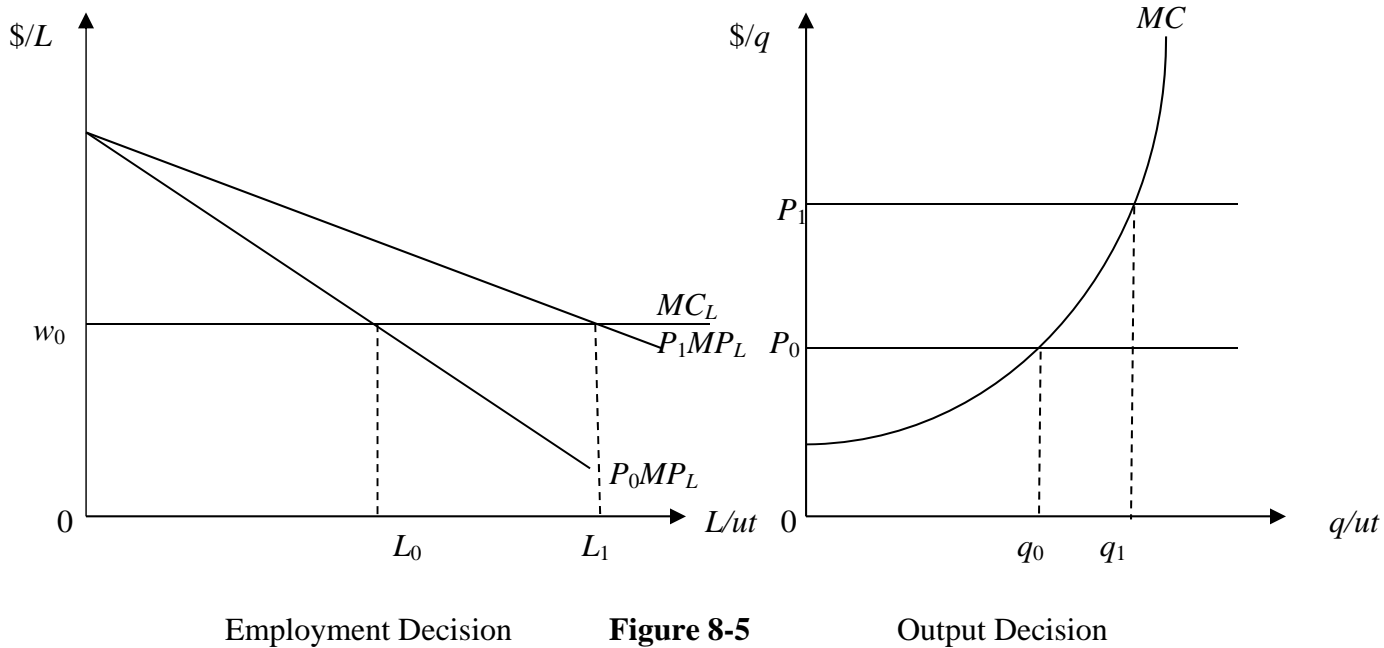


Figure 8-5

Market Equilibrium Wage Rate

By now you should understand that after we develop the demand for labor by the individual firm and the supply of labor for the individual household, we next combine these concepts to arrive at market equilibrium. Figure 8-5 repeats the long-run competitive equilibrium in the product market for apples, showing the market in the middle panel, with the representative firm on the left and the representative household on the right. Recall that the negatively sloped market demand curve results from summing the quantities demanded by all households at each price. In equilibrium, $\sum_{i=1}^N q_i = Q_d = Q_e$ there are N households in the population.¹² Similarly, the positively sloped market supply curve results from adding up the profit-maximizing output for each firm at each price; at equilibrium, $\sum_{i=j}^n q_i = Q_s = Q_e$. Furthermore, in long-run equilibrium, total revenue is just sufficient to cover all variable cost (the area underneath the marginal cost curve) and fixed costs (the area between price and the marginal cost curve). Ultimately, the competitive market maximizes consumer surplus, the difference between the total value households place on the good (the area beneath the demand curve) and what they actually pay for the good.

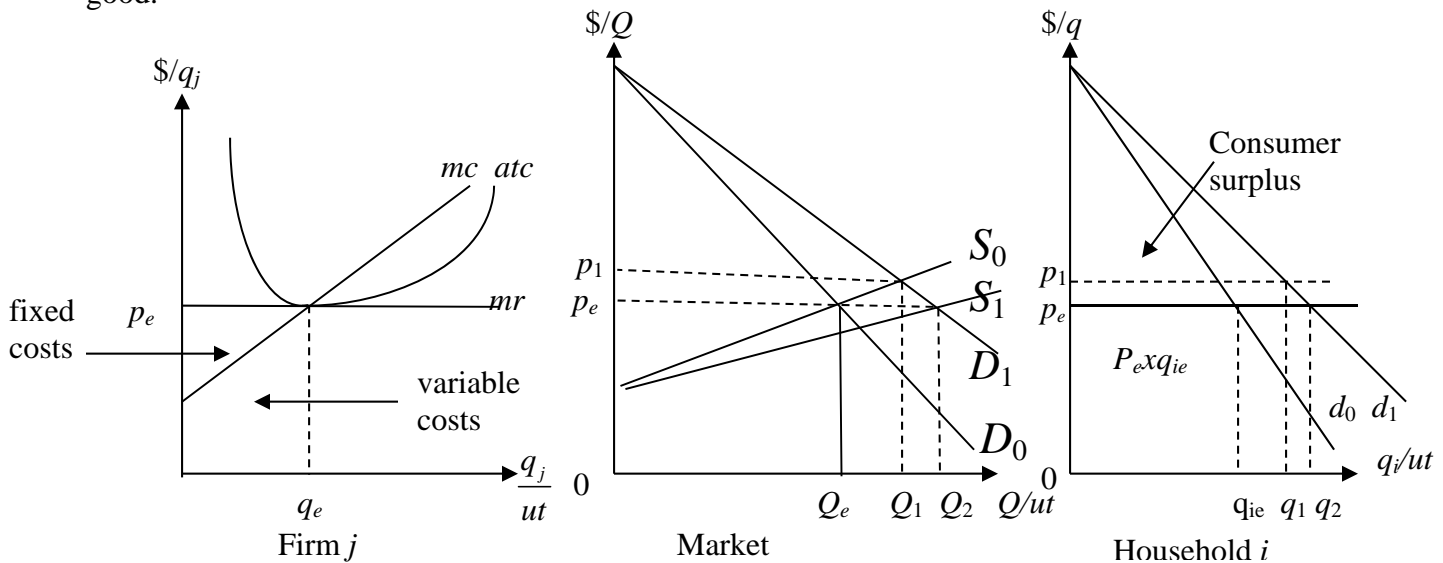


Figure 8-6

If the typical household demand for apples were to increase, say from d_0 to d_1 , price would rise to p_1 in the short run, but in the long run, more firms would enter the market, and price would return to p_e . Figure 8-7 shows the parallel events in the labor market for apple pickers. In this case the firm's demand curve for labor is the apple price times the marginal product of labor. The negatively sloped market demand curve reflects

¹² An econometrician (an economist who uses statistics to estimate numerical relationships to test the validity of economic theory) would select a random sample of households, and relate quantity demanded from each household to household characteristics (e.g., number of family members, household income), and market variables (e.g., price of apples, prices of other types of fruit), then use the statistical equation to estimate the population equation.

the negatively sloped demand curves at the firm level. The positively sloped market supply curve reflects (1) the substitution effect whereby hours of market work increase as the wage rate increases and (2) the tendency for more workers to offer labor services in the apple market (instead of other labor markets requiring similar skills) as the wage rate increases. The equilibrium wage rate results where the market demand curve intersects the market supply curve, meaning that there is a job available for all potential apple workers.¹³ In the household, the wage rate w_0 compensates the worker for the opportunity cost of (1) taking a job in another market, (2) spending an additional hour in household production, (3) enjoying more leisure time, or (4) allocating more time to personal maintenance (e.g., sleep, non-enjoyable exercise). For the firm, the last (marginal) worker hired exactly earns his or her wage; the difference between the value of output (the area under the VMP_L curve) and wage payments are just sufficient to cover the opportunity cost of fixed (i.e., non-labor) factors of production.

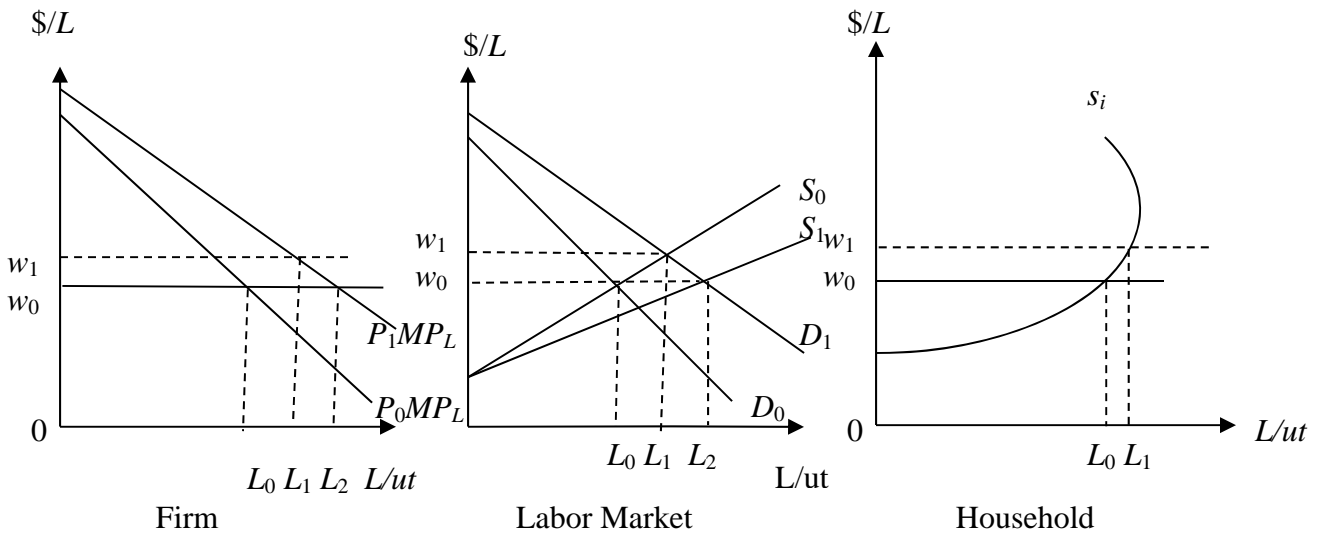


Figure 8-7

If the demand for apples increases, the resulting shortage of apples causes the price of apples to increase from P_e to P_1 in Figure 8-5. In Figure 8-7 the change in the price of apples shifts the value of labor’s marginal product from P_0MP_L to P_1MP_L —that is, the demand for labor at the firm level increases. The resulting increase in the price of apples also increases the market demand for apple pickers from D_0 to D_1 in the center diagram. The shortage of apple pickers increases the wage rate from w_0 to w_1 ; this causes the worker depicted in the typical household to increase hours of work (from L_0 to L_1), since the substitution effect of the change is stronger than the income effect. However, the resulting economic profit at price P_1 causes an increase in the number of firms in the market. Although the resulting price decrease reduces the firm’s demand curve back to P_0MP_L , the fact that there are more firms in the industry keeps the labor demand curve at D_1 .

¹³ Realistically, **frictional** unemployment might exist while job seekers (who may have recently entered this labor market) are matched with available jobs (from new firms or to replace workers who exited the apple-picker market).

However, in order for the price to return to P_0 and firms continue to receive normal profits, the wage rate must eventually return to w_0 .¹⁴ If the market supply of labor reflects the number of labor hours offered by all *available* workers, an increase in labor supply means an **increase in the number of available workers**. For instance, as new apple orchards are planted, job opportunities develop for workers who previously had lived too far to profitably commute. Further, some workers could migrate to apple orchards, either intranationally (from one state to another) or internationally (crossing international borders). As more workers become available, the labor supply curve shifts from S_0 to S_1 , ultimately reducing the wage rate to w_0 , and the market has once again achieved long-run equilibrium.

Imperfect Competition in the Product Market

While an agricultural product like apples, and a generic skill like apple picker may fit the competitive model (free entry of labor and firms, a uniform price for the product, and a uniform wage rate for labor), not all markets are quite so simple. We will list some real-world complications now, deciding which of these complications render our competitive model irrelevant. Recall from Chapter 1 that economists make assumptions to simplify the analysis; a simplifying assumption is one that can be relaxed without changing the predictions of the model.

Suppose that the product in question isn't produced under perfect competition, but under monopolistically competitive conditions. If the firm faces a negatively sloped demand curve for its product, the firm sets output where marginal revenue equals marginal cost. In Figure 8-8, we depict a restaurant with a negatively sloped demand curve, and the associated marginal revenue curve that declines twice as fast as price. The firm sets output at q_m where $MC = MR$ and price at p_m , the market-clearing price of q_m . If we assume that restaurant workers are hired in a competitive labor market, the firm still faces a horizontal supply of labor at the market wage rate, w_0 . Producing where $mc = mr$ implies hiring labor so that $MR(MP_L) = w_0$. The firm is shown in long-run equilibrium because the average cost curve is tangent to the firm's demand curve. So, while workers are paid less than the market value of what they produce, this "excess revenue" for the employer ultimately covers the costs of product differentiation (e.g., persuasive advertising, special uniforms for employees). As long as there is free entry into the market, whether the product is homogenous or differentiated has no material effect on the nature of equilibrium.

¹⁴ Notice, all discussions are in **real**, that is, constant dollar terms. In other words, the wage rate must return to w_0 after adjusting for changes in the cost of living, just as the price P_0 is also adjusted for changes in the cost of living.

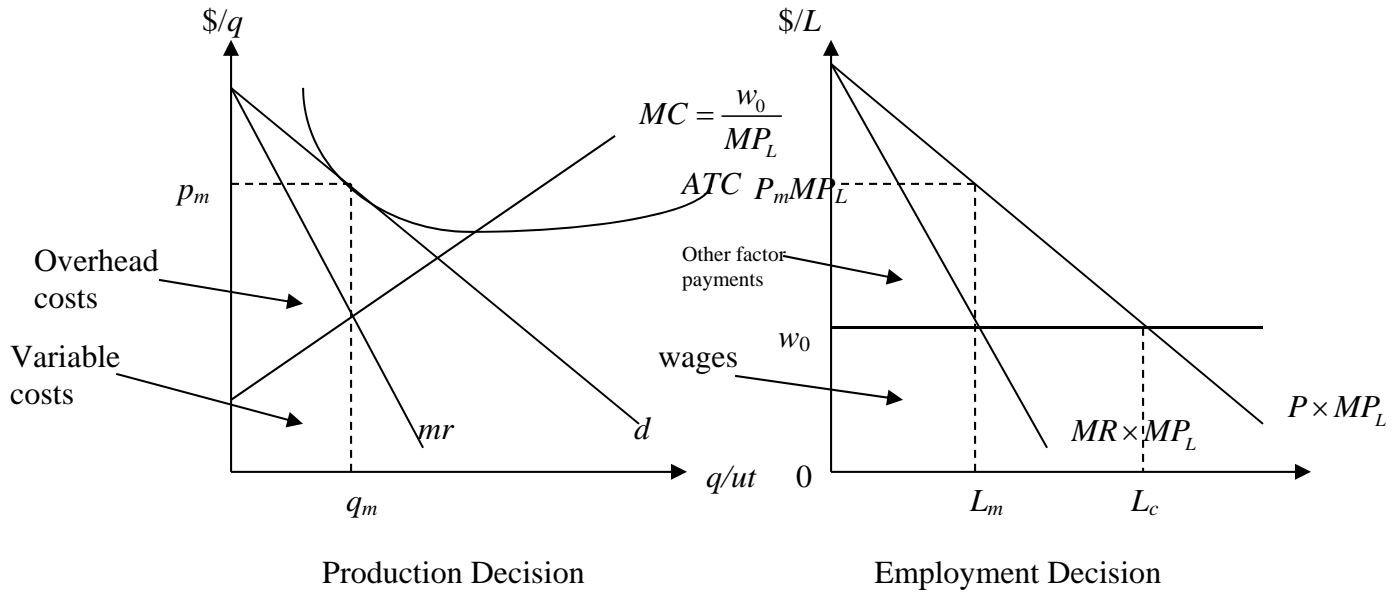


Figure 8-8

Imperfect competition in the product market reduces the quantity of labor demanded at each wage rate, given the demand for the product. This result is not really surprising. Since imperfect competition in the product market causes the firm to produce less output (in order to charge a higher price), it follows that the firm will also hire fewer workers.

Labor Cartels

Imperfect competition in the labor market occurs when either buyers or sellers are not wage takers. **Monopoly** occurs when there is only one *seller* in a labor market. Two examples of labor-market monopoly are labor unions and professional associations. Often labor market monopoly stems from **occupational licensing**, whereby established members of a profession screen new entrants into that profession. Recall that the essence of monopoly is that a single seller is able to exclude competitors from the market.

In Figure 8-8, we present a market for carpenters. Under competitive conditions, the wage rate would be W_c and employment would settle at L_e . Suppose the carpenters decide that they want a higher wage rate. Like any monopoly, a carpenters' union—aka a carpenters' cartel—could set the wage at any level up to W_u by controlling the number of carpenters *certified* to provide labor services. For instance, carpenters might succeed in passing a restriction that only carpenters graduating from the union's apprenticeship program could legally hold carpenter's jobs. What wage would the carpenters' union wish to set? If it wished to maximize the number of carpenters, the union need do nothing—the competitive market would already maximize employment at L_e when the wage rate equaled W_c .¹⁵ The union might wish to maximize **economic rent**, the difference between the wage rate paid and the lowest wage rate the worker would accept to perform that job. Indeed, the difference between the union wage and the workers' reservation wages could be a lucrative source of union dues.

¹⁵ At any wage above W_c , employment would contract because $L_d < L_e < L_s$. At any wage below W_c , employment would contract because $L_s < L_e < L_d$.

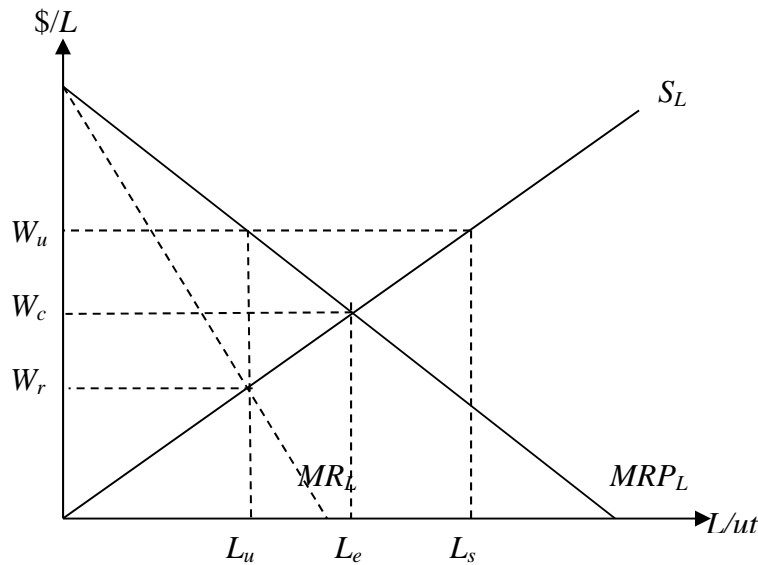


Figure 8-9

In Figure 8-9 we imagine that the carpenters' union wishes to set the wage rate at W_u , which is where the marginal wage intersects the supply curve for labor (whose height is the reservation wage of the last worker). The problem for the union is that, at W_u , L_s workers wish to supply labor, while employers will only hire L_u workers. Free entry of labor would result in a surplus and wage competition would eventually cause wage rate W_c to prevail. That is why a labor cartel must control labor supply. One approach would be to increase union dues so that the net wage would exactly clear the market. In this case, union dues would be set equal to $W_u - W_r$, so that the last worker hired, worker L_u , would be indifferent between holding a union job or working in an alternative market. Of course, with a net wage of W_r , carpenters would be worse off with a union than without one. Another approach would be to screen union members by gender, religion, race, or some other characteristic. That is, **job discrimination** is one basis by which a labor cartel can clear the market. However, discrimination would not maximize the income of the union bosses.

Figure 8-9 could also be used to evaluate a professional association. Before the turn of the twentieth century, many physicians learned their trade through an apprenticeship to an experienced physician. This type of training resulted in considerable variability in physician skill and a competitive wage for physicians. In fact, some physicians earned so little, they actually made house calls! About that time, the American Medical Association lobbied state medical boards to require that physicians possess degrees from accredited medical schools. Since the AMA accredited medical schools, the AMA had a direct control over the number of physicians. Reducing the number of physicians from L_c (where an investment in medical school generates a "normal" rate of return), to L_u increases the market-clearing physicians' wage rate. However, the higher wage increases the labor supply. In this case, L_s college graduates apply for medical school, while only L_u students are admitted. Medical schools could charge market-clearing tuition, but instead, medical schools typically set high qualifications for applicants without connections, and lower qualifications for the sons of physicians and alumni. Discrimination has

long been an issue in medical school admissions, going back to the famous Bakke case, which we will discuss in Chapter 11. However, there have been few allegations of discrimination in admissions to Ph. D. programs in economics.

Monopsony Employers

The opposite of **labor monopoly** (one seller) is **employer monopsony**, literally, one buyer. The classic case of monopsony is local government, which is the only employer of police, fire fighters, garbage collectors, or elementary educators. Table 8-3 presents the hypothetical market for garbage collectors. With limited information about workers' reservation wages, the city sanitation department naively requests volunteers to collect garbage for no pay. After all, hospitals recruit candy strippers to carry bed pans for a pleasant "Thank you." According to Table 8-3, the quantity of labor supplied when the hourly wage rate is 0 is precisely 0. By offering \$1.00 per hour,¹⁶ the sanitation department attracts 100 job applicants. If the department hires the 100 applicants, the total wage bill will be \$100 per hour (100 workers at \$1 each). By focusing work on the most productive garbage removal, the marginal revenue product of the 100th worker is \$23.00 per hour. Obviously, it is efficient to hire at least 100 workers. But, if workers can be hired at only \$1.00 per hour, the employer wishes to hire 2,300 workers. There is a shortage of 2,200 workers. When the employer faces a positively sloped labor supply curve, the only way to increase the quantity of labor hired is to offer a higher wage rate.

Now we imagine that the sanitation department offers to pay the second batch of workers \$2.00 per hour. An additional 100 workers come forward and agree to work for \$2.00 per hour. What do you suppose the first 100 workers do? They demand \$2.00 per hour, or else. If the employer says, "Okay, take a hike," the sanitation department loses 100 workers, worth \$22 per hour (remember diminishing marginal revenue product), who could have been retained for \$2 per hour. An efficient employer would acquiesce and pay the first 100 workers \$2 per hour as well.

Because hiring the second 100 workers increases the wage bill from \$100 to \$400; it actually costs more than \$2 per worker because hiring the additional workers implies giving raises to workers who otherwise would have accepted a lower wage.¹⁷ What distinguishes a monopsonist from a wage-taking employer is that the marginal factor cost exceeds the wage rate. Through trial and error, the employer discovers that when the wage offer is \$8.00, 800 workers apply for jobs, and after adjusting the wages of the previous workers hired, the employer breaks even on the 800th worker, whose marginal factor cost is \$16 per hour, and whose marginal revenue product is also \$16 per hour. At that wage, the employee surplus is the difference between the wage offer (\$8 per hour) and each worker's reservation wage (from \$0.01 to \$8)—the area of the triangle formed between the wage offer and the labor supply curve. At \$8.00 per hour, labor's surplus (also called economic rent) is \$3,200. Ordinarily, the employer's surplus would be the area between the marginal revenue product line and the marginal cost of labor (which,

¹⁶ Pretend there is no minimum wage law.

¹⁷ Mathematically, the labor supply function is $L_s = 100W$, where W is the hourly wage rate. Hence,

$W = .01L$, and $WL = .01L^2$. The marginal factor cost of labor is $MFC_L = \frac{\partial(WL)}{\partial L} = .02L$. So, while it costs \$300 to hire the second 100 workers, the cost of hiring the 200th worker is $.02(200) = \$4$.

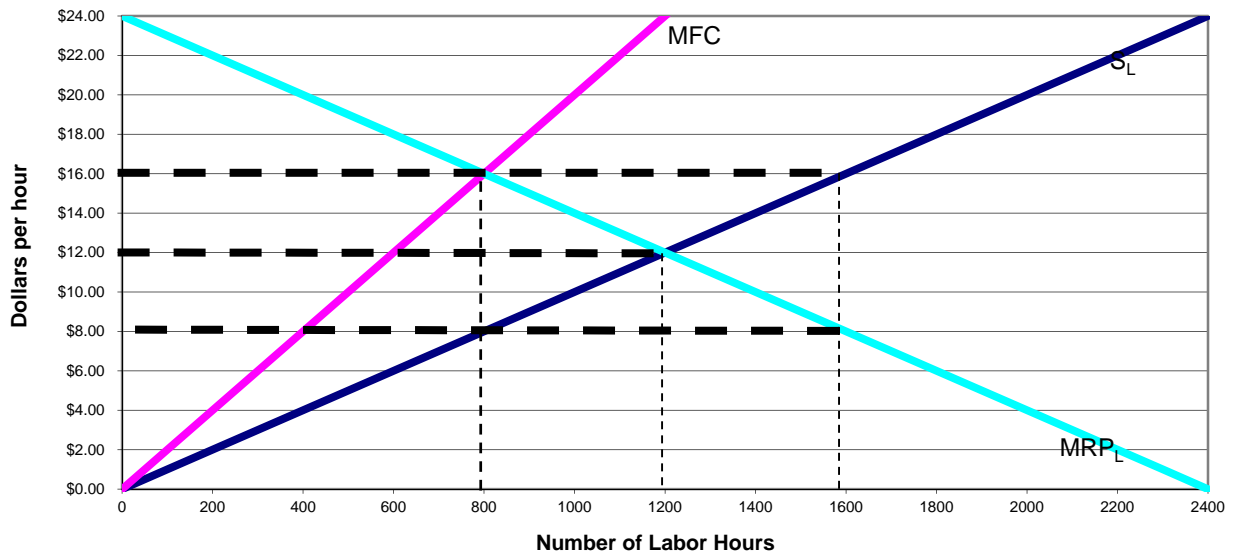
under competitive conditions, would be the market wage). However, by virtue of the monopsonist's control over the wage rate paid to workers, monopsony profits equal the difference between the marginal revenue product of labor and the wage rate, times the quantity of labor hired. In this case, monopsony profit is $(\$16 - 8)(800) = \$6,400$ per hour, in addition to the usual monopsony profit of $(\$24 - 16)(800)/2 = \$3,200$.

Table 8-3

Wage Offer	Labor Hours Supplied	Wage Bill	Marginal Revenue Product	Marginal Factor Cost	Employer Surplus	Employee Surplus	Total Surplus
\$0.00	0	\$0	\$24.00	\$0.00	\$0	\$0	\$0
\$1.00	100	\$100	\$23.00	\$2.00	\$2,250	\$50	\$2,300
\$2.00	200	\$400	\$22.00	\$4.00	\$4,200	\$200	\$4,400
\$3.00	300	\$900	\$21.00	\$6.00	\$5,850	\$450	\$6,300
\$4.00	400	\$1,600	\$20.00	\$8.00	\$7,200	\$800	\$8,000
\$5.00	500	\$2,500	\$19.00	\$10.00	\$8,250	\$1,250	\$9,500
\$6.00	600	\$3,600	\$18.00	\$12.00	\$9,000	\$1,800	\$10,800
\$7.00	700	\$4,900	\$17.00	\$14.00	\$9,450	\$2,450	\$11,900
\$8.00	800	\$6,400	\$16.00	\$16.00	\$9,600	\$3,200	\$12,800
\$9.00	900	\$8,100	\$15.00	\$18.00	\$9,450	\$4,050	\$13,500
\$10.00	1000	\$10,000	\$14.00	\$20.00	\$9,000	\$5,000	\$14,000
\$11.00	1100	\$12,100	\$13.00	\$22.00	\$8,250	\$6,050	\$14,300
\$12.00	1200	\$14,400	\$12.00	\$24.00	\$7,200	\$7,200	\$14,400
\$13.00	1300	\$16,900	\$11.00	\$26.00	\$6,050	\$8,250	\$14,300
\$14.00	1400	\$19,600	\$10.00	\$28.00	\$5,000	\$9,000	\$14,000
\$15.00	1500	\$22,500	\$9.00	\$30.00	\$4,050	\$9,450	\$13,500
\$16.00	1600	\$25,600	\$8.00	\$32.00	\$3,200	\$9,600	\$12,800
\$17.00	1700	\$28,900	\$7.00	\$34.00	\$2,450	\$9,450	\$11,900
\$18.00	1800	\$32,400	\$6.00	\$36.00	\$1,800	\$9,000	\$10,800
\$19.00	1900	\$36,100	\$5.00	\$38.00	\$1,250	\$8,250	\$9,500
\$20.00	2000	\$40,000	\$4.00	\$40.00	\$800	\$7,200	\$8,000
\$21.00	2100	\$44,100	\$3.00	\$42.00	\$450	\$5,850	\$6,300
\$22.00	2200	\$48,400	\$2.00	\$44.00	\$200	\$4,200	\$4,400

Figure 8-9 is a graphical depiction of Table 8-3. The marginal factor cost line intersects the marginal revenue product line where 800 workers are willing to work. The firm pays a wage of \$8.00 per hour and reaps the normal employer surplus (used to cover non-labor costs) plus a monopsony profit. Although the firm would like to hire 1,600 labor hours at this wage, the firm settles for 800, since hiring even one more worker would mean giving 800 workers already employed a wage increase.

Figure 8-9
Employment Decision Under Monopsony



Is monopsony “fair”? Obviously, the answer depends on whom one asks. The employer receives greater profit under monopsony than it would under competition, so the employer believes the system is fair (more for me!). All 800 workers are paid their reservation wage or more and, while workers always prefer more, are they really being cheated? Economists are less concerned with the issue of fairness than they are with the issue of **efficiency**. Is monopsony efficient? Most economists would say no, because, under monopsony, too few workers are hired. As shown in the table and the diagram, the last worker hired has a marginal revenue product of \$16 per hour, but is only paid \$8 per hour. Under competitive conditions, employers would be wage takers, and a situation where the last worker hired produced \$8 more than he was paid would generate wage competition among employers. Eventually the wage rate would be set at \$12 per hour, and the marginal revenue product of the last (1,200th) worker hired would also be \$12. While competition would reduce the employer’s surplus to \$7,200, competition would increase labor’s surplus by more, up to an identical \$7,200.¹⁸ As we saw in product markets, the competitive solution maximizes the sum of both seller (employee) and buyer (employer) surpluses.

So, on efficiency grounds, economists prefer competitive markets to either employee monopoly (which raises employee surplus by less than it reduces employer surplus) or employer monopsony. But the necessary **structural** condition for a competitive market to exist is that there are many buyers and sellers in the market due to free entry. Workers may be able to prevent entry by controlling the labor certification process. Employers may exercise market power because of structural conditions (there is only one local government hiring sanitation workers and city employees are required by law to re-

¹⁸ The symmetry of the employers’ and workers’ surpluses is a result of the fact that the slopes of the labor supply and demand curves have the same slope (in absolute value). We would not expect this coincidence of surpluses in most cases.

side within city limits), or because of legal restrictions. One criticism of the Bush administration's recently proposed migrant labor reforms is that allowing Mexicans into the country under the sponsorship of employers give those employers undue control over the worker's fate—"Either take what I offer, or I'll call the Department of Homeland Security and have you deported."

Bilateral Monopoly: The Economics of Collective Bargaining

About 50 years ago, American economist and future ambassador John Kenneth Galbraith coined the term *countervailing power*, to describe a market in which a single monopoly union would bargain with a single employer association. His conclusion, formalized by other economists as **the general theory of the second best** was that collective bargaining in a bilateral monopoly setting could actually result in more efficient economic outcomes than would occur either under one-sided monopoly or one-sided monopsony.

Returning to Table 8-3, suppose that the 800 workers decide to form a labor union, which actually is a labor cartel in which workers say, "Pay us the wage rate we demand or we strike—the quantity of labor supplied will be zero."¹⁹ Note that the wage rate that would maximize the workers' surplus would be \$16 per hour, which just happens to be the highest wage rate that the sanitation department would pay for 800 workers. Being self-interested, the workers' bargaining representatives are told to "Obtain the highest wage possible, consistent with the 800 union members retaining their jobs."

In Figure 8-9, the **bargaining range** for collective bargaining would range from \$8.00 (the monopsony profit-maximizing wage) and \$16 (the workers' maximum surplus wage). Suppose, for sake of argument, that the union totally caved; then the employer would welcome the 800 workers back at the pre-union wage of \$8.00. Any threat to pay less than \$8 per hour as punishment would not be a credible threat, since the employer would end up reducing profit. On the other hand, suppose the employer gave the union everything it wanted. A contract wage of \$16 per hour would confront the employer with a horizontal marginal factor cost line at \$16; since the marginal factor cost of labor did not change, the employer's profit-maximizing employment level would still be 800 workers. Only, after collective bargaining, the employer's surplus would decline to \$3,200, and labor's surplus would increase to \$9,600. All that changes is that monopsony profits are transformed into monopoly (union) profits. The union would be confronted with a problem; with a contract wage of \$16 per hour, 1,600 workers want jobs, while only 800 are hired. This helps explain why unions prefer seniority agreements, which give preferential employment to union members who bear (potential) costs of organization and/or strikes. The union bosses might raise union dues to the point where the union bureaucracy, rather than the workers, reaps the monopoly profit; this result would be stable, since those who worked for \$8 per hour before the union are the only ones willing to

¹⁹ Not long after the passage of the Sherman Anti-Trust Act of 1890 that outlaws "conspiracies in restraint of trade," pro-business administrations used the provisions the act to prosecute labor conspiracies (labor unions). In 1914, under the Democratic Wilson administration, Congress passed the Clayton Antitrust Act, which exempted labor unions from antitrust prosecution. However, courts weakened the act, and it was not until the National Labor Relations Act of 1935 that employers were required to bargain with labor unions in good faith. The National Labor Relations Board now governs employer-union issues for the federal government.

work for a net wage of \$8 per hour after the union. Of course, the union may have difficulty explaining to workers exactly why they should vote “No” in a union-decertification election.

In a typical collective bargaining situation, it is unlikely that either the employer or the union will completely prevail in the negotiating process.²⁰ Bargaining typically means compromise. The stronger the union’s threat of shutting down operations and reducing employer profits is, the higher the likely wage. The stronger the employer’s threat of securing strike breakers and imposing economic hardship on union members, the lower the likely wage. Unlike the competitive equilibrium wage rate, the contract wage is unpredictable, although it is bounded by the monopsony profit-maximizing wage below and the labor-surplus maximizing wage above. It is when collective bargaining achieves an intermediate, compromise outcome that bilateral monopoly gets interesting.

Suppose that, after a protracted strike that imposes costs on unions and the employer alike, a deal is finally struck to set the union wage at \$12 per hour. Note that workers gain \$4 per hour, increasing labor’s surplus (economic rent) by \$3,200 per hour for the 800 striking workers. It follows that the employer loses \$3,200 in monopsony profit, so the result appears to be a **zero sum game**; that is, the gain to the winner equals the loss to the loser. However, by confronting the employer with a horizontal labor supply curve at \$12 per hour, the marginal factor cost actually falls from \$16 to \$12. Consequently, the employer could increase profit by hiring an additional 400 workers, since $MRP_L = \$12$ for the 1,200th worker. Furthermore, there happen to be 400 additional workers who apply for jobs at \$12 per hour. Hiring those workers would, as if by magic (actually by coincidence), result in the competitive-labor market outcome. Returning to Table 8-3, collective bargaining has the potential of maximizing the total surplus at \$14,400.

Many economists, some of whom put ideology ahead of professional competence,²¹ have a difficult time with the competing theories of labor unionism. The general theory of the second best (aka the **theory of countervailing power**) states that the best outcome is typically a competitive market.²² Hence, monopolizing an otherwise competitive labor market will result in inefficiency: While workers may attain higher wages,²³ the increase in labor’s surplus is smaller than the loss of employer’s surplus—another case of

²⁰ One important issue in the bargaining process is whether all workers to be covered by the contract in fact belong to the union. So called “right-to-work” (RTW) laws prohibit mandatory union membership clauses in collective bargaining contracts. The National Labor Relation Act requires that all workers in a bargaining unit receive contract benefit, regardless of whether they belong to unions or not. Unions argue that mandatory union membership clauses are necessary because otherwise non-union workers will *free-ride*, receiving benefits without paying for them with dues or engaging in strikes. Economists have documented that fewer workers belong to unions in right-to-work states, although they continue to debate whether this is because of RTW laws themselves, or that the population was already hostile to unions before RTW passed, since the enabling legislation was the 1947 Taft-Hartley Amendments to the National Labor Relations Act. (Taft-Hartley was passed by a Republican Congress over President Harry S. Truman’s veto).

²¹ One such colleague once proclaimed “An open mind is an empty mind.” He refused to answer what a closed mind is full of.

²² John Kenneth Galbraith would seem to dissent from this prospect, because he believed that ideally competitive markets are rarely achieved in practice.

²³ Although these wages may be absorbed in excessive union dues.

excess burden. Further, if fewer workers are hired (e.g., by competitive supermarkets), then consumer prices would increase, making consumers worse off.

Unions and Non-Union Wage Rates

However, if the pre-union state of the labor market were a monopsony, then introducing collective bargaining *probably*²⁴ will improve the economic efficiency of that market. Economic theory is neither consistently pro-union nor anti-union. In fact, most economists would argue that unionizing grocery clerks is probably inefficient, since there would be sufficient competition among grocery stores to achieve a competitive outcome. On the other hand, introducing collective bargaining and free-agency into professional sports (whose stars can make millions of dollars a year) is efficiency enhancing because it spreads the talent around and increases the number of professional baseball players.

The ultimate test of the efficiency impact of labor unions on labor market efficiency is how union wages affect the wages received by non-union workers. If collective bargaining increases employment in the union sector, it follows that non-union wages would increase as the migration of labor into union jobs reduced the quantity of non-union labor supplied. On the other hand, if unions reduced employment in an otherwise competitive labor market, non-union workers would be crowded into non-union jobs, reducing the wage rate as the surplus of labor was absorbed.

To test the impact of unionization on non-union wages, I recently completed a paper that compares union and non-union wages in right-to-work states (where the extent of unionization is weak), and union-shop²⁵ states (where unionization is stronger). If non-union wages are higher in right-to-work states, then the competitive model is supported, and we can conclude that unions are, on balance, inefficient. If non-union wages are lower in right-to-work states, other factors constant, then the evidence supports the bilateral monopoly model. Figure 8-10²⁶ shows a map of the states which have passed right-to-work laws, including Indiana and Michigan, which passed right-to-work laws after Tea-Party Republicans took over the state legislatures in those states. Essentially right-to-work laws allow workers to receive union benefits (as mandated by the National Labor Relations Act of 1935) without paying union dues or supporting union-sanctioned strikes. By allowing free riding, right-to-work laws reduce union membership, making it more difficult for unions to win employer concessions through collective bargaining or to increase union wage rates through controlling labor supply.

Note that most of the right-to-work states are concentrated in the southeast, the agricultural states, and the mountain west; with the exception of Michigan, which passed

²⁴ I say “probably” because (1) we could have the extreme outcomes of monopoly or monopsony inefficiency, and (2) the transaction costs for employers (maintaining personnel knowledgeable about collective bargaining) and for workers (union dues and strike-related costs) could exceed the efficiency gains of collective bargaining.

²⁵ A *union-shop* is a job site (bargaining unit) where employers agree to discharge any worker who refuses to join the union that represents him or her after some probationary period. Mandatory union membership is not automatic in union-shop states; the absence of right-to-work laws means the courts in those states will enforce the contract (e.g., find against a worker discharged for not joining a union, if that worker brings a *wrongful termination* suit). In practice, governments rarely agree to mandatory union membership requirements, even in union-shop states that allow such contracts.

²⁶ The source for Figure 8-10 is the National Right-to-Work Committee, <http://www.nrtw.org/rtws.htm>.

its right-to-work law after the 2012 election, the only right-to-work states voting for Barack Obama were Nevada, Iowa, Virginia, and Florida; the only union-shop states voting for Romney were Montana, Missouri, Kentucky and West Virginia. Republicans tend to represent the interest of employers, and hence are anti-union. Democrats rely on union support to counteract the spending of the rich and corporations, and tend to support unions. What is interesting is the attitude of non-union workers toward right-to-work laws. If unions increase union pay by operating as labor cartels, increased unionization would tend to decrease non-union wage rates; anti-union sentiment among working class red-state residents would be consistent with self-interest. If, however, unions tend to counteract employer monopsony, then increasing unionization would increase the average wage rate received by non-union workers. In this case, anti-union workers would sacrifice their income in support of an ideology contrary to their economic self-interest.

Figure 8-10

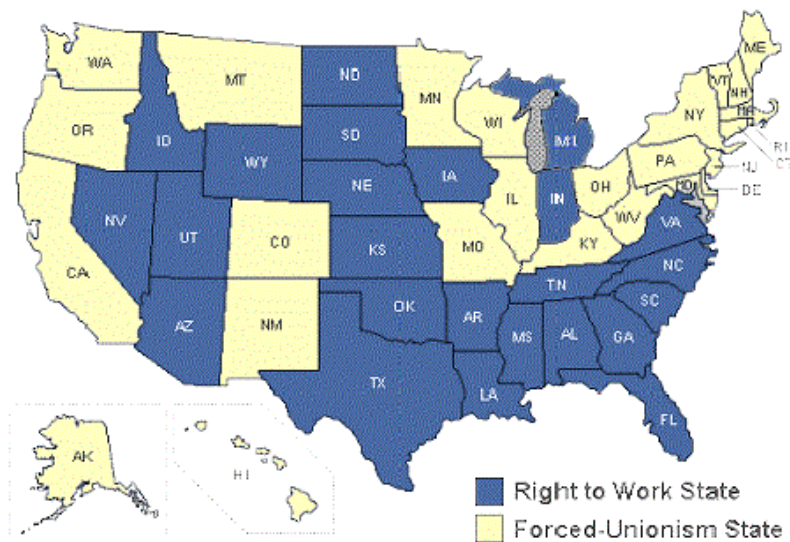


Figure 8-11 presents the trends in union membership among workers in union-shop states and right-to-work states.²⁷ Two conclusions are obvious: (1) the proportion of adults who belong to labor unions is about twice as great as the proportion for RTW states, and (2) both proportions are decreasing through time. Less obvious, but nonetheless significant, is the fact that union membership is declining more rapidly in union-shop states (0.18 percent per year) than in RTW states (0.13 percent per year). At these rates, union membership would fall to zero in 2050 in right-to-work states and would fall to zero in 2090 in union-shop states.

²⁷ Data come from the outgoing rotation of the *Current Population Survey*, January 1983 to December 2012. The samples contain 3,275,825 residents of union-shop states and 1,925,409 residents of right-to-work states. Indiana and Michigan each passed right-to-work laws in 2012; the impact of those laws will not show up until they take effect in 2013.

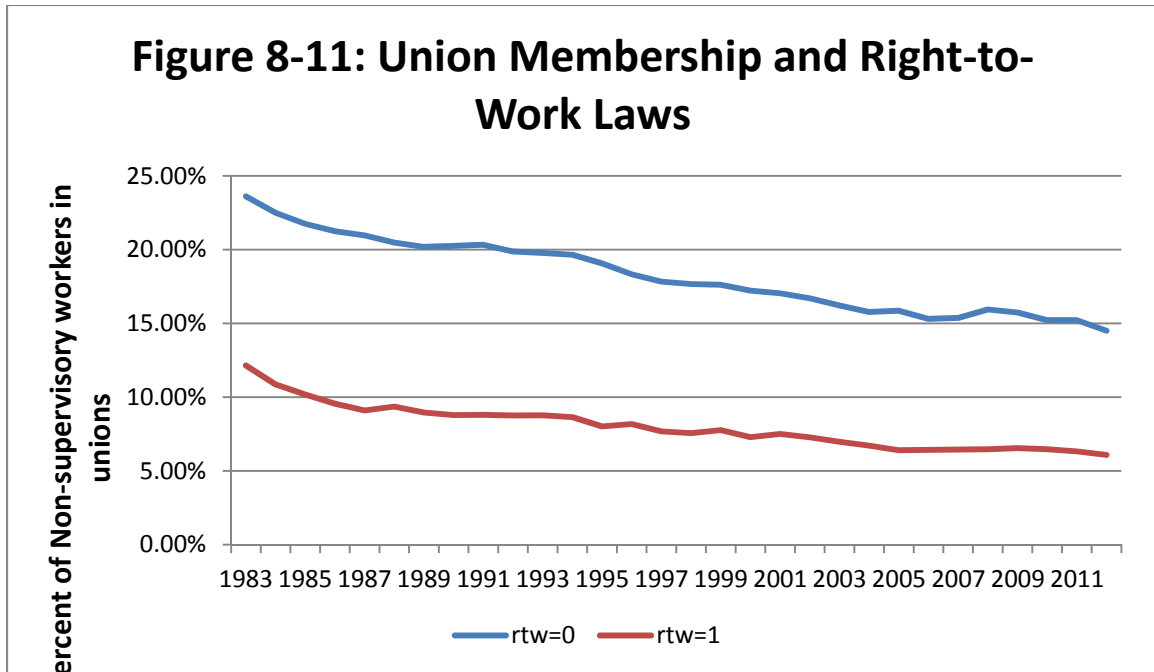


Figure 8-12 presents the relation between the strength of union membership and the average, inflation-adjusted wage rate received by workers who belong to unions. Since union organizing is more difficult in right-to-work states – unions cannot bargain for mandatory union membership contracts – we expect unions to be in a weaker bargaining position. Indeed we find that union workers in right-to-work states earn about \$0.53 less per hour than they earn in union-shop states.

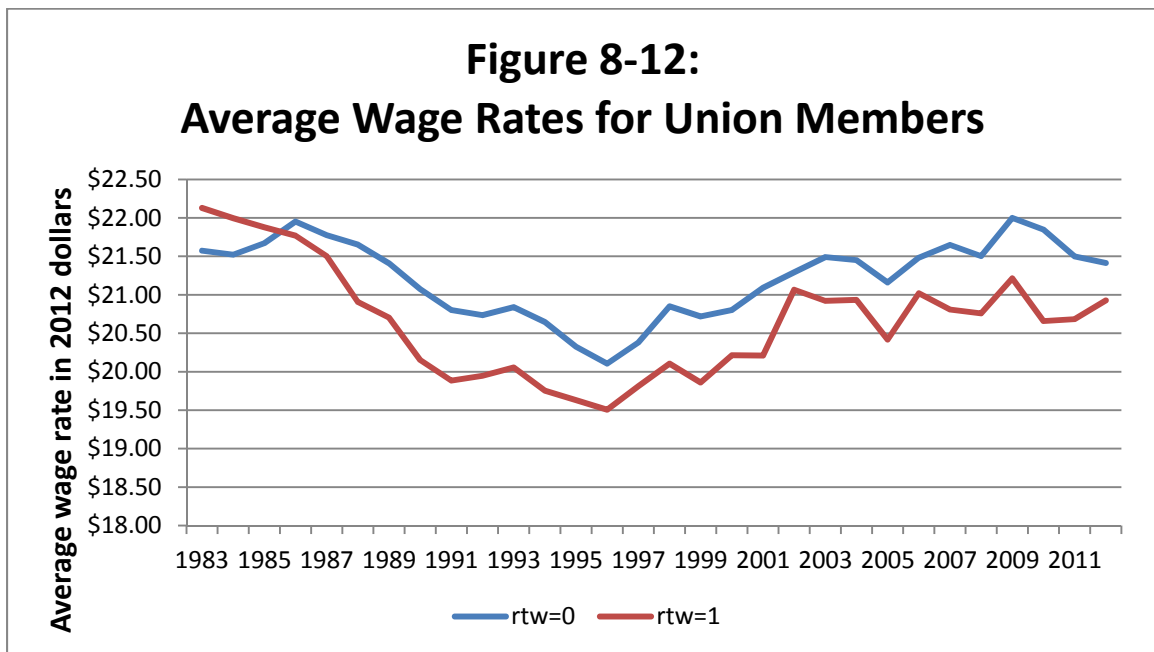
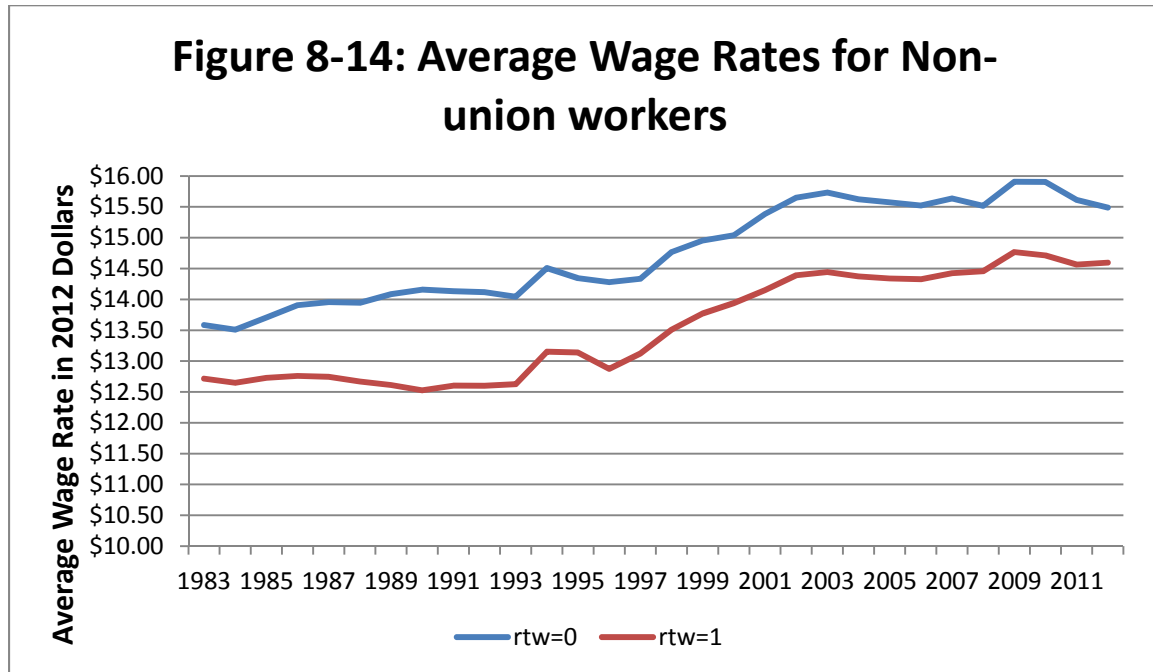


Figure 8-13 addresses the ultimate issue of this natural experiment: how does union bargaining strength, as measured by the proportion of workers who belong to unions, affect the average wage rate received by *nonunion* workers. The labor-cartel theory im-

plies that unionizing an otherwise competitive labor market crowds reduces employment in the unionized sector, crowding workers into non-union jobs. This increase in the supply of non-union labor would depress non-union wages. Hence, if the labor-cartel theory is generally true, we should find that non-union wages are higher in right-to-work states relative to union-shop states. By contrast, the collective-bargaining theory implies that if unions counteract employer monopsony power, collective bargaining increases both the union wage and employment in the unionized sector. As a result of workers migrating from the non-union to the unionized sector of the economy, average wage rates should be higher in union-shop states relative to right-to-work states.



The evidence in Figure 8-13 is fairly clear. Non-union workers in right-to-work states consistently earn \$1.23 per hour less in right-to-work states than in union-shop states.²⁸ As in many other issues involving “red”(right-to-work) and “blue” (union-shop) states, workers in states with anti-union laws suffer lower wage rates as a result of their prejudice against “collective” activity.

Summary

1. In factor markets, households sell the services of factors of production—labor, capital, land, and entrepreneurship—to firms in exchange for income—wages, interest, rent, and profit (dividends). Households allocate resources between market and household production to maximize satisfaction; firms allocate resources to maximize profit.
2. In allocating time between market production (a job), personal maintenance, household production, and leisure, individuals tend to increase the quantity of time working as the wage rate increases (the substitution effect) until, at some point, further in-

²⁸ Controlling for age, gender, education, and occupation, the inflation-adjusted wage difference is \$1.12 per hour lower in right-to-work states.

creases in the wage rate tend to reduce the number of hours worked (the income effect).

3. Market supply curves tend to be positively related to the wage rate for two reasons: (1) as wage rates increase, individuals increase the number of hours they work, and (2) higher wage offers attract additional individuals into the market. Even if the individual labor supply curves eventually bend backward, migration into an open labor market keeps the market labor supply curve positively sloped.
4. The demand for labor is negatively sloped because of the law of diminishing marginal productivity; as more workers are hired, the output generated by the last worker hired gets smaller and smaller. The price-taking firm maximizes profit when it hires labor so that the value of labor's marginal product ($P \times MP_L$) equals the wage rate (including fringe benefits and employer-imposed taxes).
5. A competitive factor market reaches equilibrium when the price of the factor (e.g., wage rate, rental rate, or interest rate) equates the quantities supplied and demanded. The competitive market maximizes employment in that market, as well as the sum of the employers' surplus and the factor owners' surplus (economic rent).
6. Since producers in imperfectly competitive product markets produce less output (where $MC = MR$) than they would if those markets were competitive (where $MC = P$), those employers tend to higher less labor than they would if they functioned in a competitive product market.
7. **Labor monopoly** exists when a trade union or professional association controls labor supply to create a higher market wage. If employment and wages would have been set by a competitive market, labor monopoly reduces employment, while increasing the quantity of labor supply. The job rationing problem can give rise to excessively high dues (reducing the after-dues pay to the reservation wage of the last worker hired), or require nepotism or some other form of job discrimination to determine what applicants acquire the high-paying jobs.
8. **Employer monopsony** exists when an employer faces a positively sloped supply curve for labor. Unless the employer can practice wage discrimination, the marginal expense of labor will exceed the wage rate. The monopsonist will maximize profit by setting the marginal expense of labor equal to labor's marginal revenue product, then pay the market-clearing wage rate for that quantity of labor.
9. **Bilateral monopoly** exists when the wage rate is set through negotiation between a monopoly labor union and a monopsony employer (or employers' association). The wage negotiation we take place in a bargaining range between the monopsony wage and the marginal revenue product for the last worker hired. In the case of a compromise solution within this range, the average cost of labor will rise, but the marginal expense of labor will fall, causing employment to expand.
10. How labor unions affect the wages of non-union labor depends on whether unions counteract competitive markets—job-crowding from workers displaced from unionized markets decreases non-union wages—or if unions operate under conditions of bilateral monopoly—higher union wages reduces the supply of labor in the competitive sector, raising the wages received by non-union workers.

11. Empirical evidence indicates that non-union wages are significantly higher in union-shop states (states where unions can bargain for mandatory union membership contracts) than in right-to-work states, where unions tend to be weak. This evidence supports the bilateral monopoly model and contradicts the competitive model of unionism.

Glossary

Patriarchal system: A social system in which men (fathers) function as (benevolent) dictators

Matriarchal system: A social system in which women (fathers) function as benevolent dictators

Household production: The allocation of time, capital (appliance) services, and land to turn market goods into final goods and services consumed jointly by household members.

Market production: The allocation of time to a job in exchange for wages used to purchase commodities from the business sector.

The substitution effect: As wage rates increase, households tend to offer more labor time as the price of leisure (and household production) increases.

The income effect: Since leisure is a normal good, eventually higher wage rates tend to result in fewer labor hours offered by individuals and households.

Commodity-intensive consumption: Consumption activities that economize on time by using many market goods—a restaurant meal is more commodity-intensive than a home-cooked meal.

Time-intensive consumption: The opposite of commodity-intensive consumption, consumption activities that use much time and little market goods; reading is more time-intensive than watching a play (since the actors' time are commodities for the audience).

Backward-bending labor supply: The tendency for the quantity of labor supplied to eventually decrease at high wage rates, caused by the income effect overtaking the substitution effect of the wage increase.

Closed labor market: A labor market that has restrictions to entry, such that the market supply curve may actually display backward-bending characteristics.

Competitive labor-market equilibrium: The wage rate that equates the quantities of labor supplied and demanded, maximizing employment and the sum of the employers' surplus (gross profit) and workers' surplus (economic rent).

Value of marginal product – a worker's marginal product times the price of the product; the worker's contribution to the revenue of a price-taking firm.

Marginal revenue product: A worker's marginal product times the marginal revenue from the units produced; the contribution to the revenue of the price-searching firm.

Labor cartels: Imperfections in labor markets where sellers can set the market wage by limiting labor supply

Monopsony: A market with one buyer, who sets wages below competitive levels in order to obtain monopsony profit

Bilateral monopoly: A market, such as collective bargaining, with one buyer and one seller, where the market price is set within the bargaining range between the monopsony and monopoly prices, and may result in more efficiency than markets dominated by market power on one side and competition on the other

The general theory of the second best, or, countervailing power: Names given to the prospect that bilateral monopoly is more efficient than unchallenged labor cartels or employer monopsony

Wage discrimination: Paying unequal wages to equally productive workers. Wage discrimination is unlikely in a competitive market since it would reduce employer profits. Wage discrimination is more likely under employer monopsony if one group (e.g., men) can be hired at a higher wage rate without paying higher wages to another group (i.e., women).

Job discrimination: Using gender, ethnicity, or other irrelevant characteristic to ration jobs in the face of a labor surplus, typically encountered in markets dominated by labor cartels.

Union shop: An employment agreement whereby all covered employees must join the union that represents them as a condition of continued employment

Right-to-work laws: State laws that render union-shop contract clauses unenforceable.

Closed shops: Employment situations in which only union members can be hired, which were declared illegal by the 1947 Taft-Hartley Amendments to the National Labor Relations Act.

Union-threat effect: The prediction that non-union employers may pay closer to union-scale wages as a strategy to prevent their employees from ratifying a union to represent them in collective bargaining.