

LABOR ECONOMICS (EE 471)

☺☺ Optional practice questions ☺☺

1. Figure 10-3 demonstrates some of the tradeoffs involved when deciding to join a union.

(a) Provide a graph that shows how the presence of union dues affects the decision to join a union. (Assume all workers pay a flat rate for dues.) Show on your graph how the presence of union dues may lead the worker to be less inclined to join the union.

(b) Suppose in addition to higher wages the union negotiates a 10 percent employer contribution to a defined contribution pension plan. Provide a graph that incorporates this retirement benefit into the decision of whether to join a union. Show on your graph how additional fringe benefits such as a retirement plan may cause the worker to be more inclined to join the union.

2. Consider a firm that faces a constant per unit price of \$1,200 for its output. The firm hires workers, E , from a union at a daily wage of w , to produce output, q , where

$$q = 2E^{1/2}.$$

Given the production function, the marginal product of labor is $1/E^{1/2}$. There are 225 workers in the union. Any union worker who does not work for the firm can find a non-union job paying \$96 per day.

(a) What is the firm's labor demand function?

(b) If the firm is allowed to specify w and the union is then allowed to provide as many workers as it wants (up to 225) at the daily wage of w , what wage will the firm set? How many workers will the union provide? How much output will be produced? How much profit will the firm earn? What is the total income of the 225 union workers?

3. Suppose the economy consists of a union and a non-union sector. The labor demand curve in each sector is given by $L = 1,000,000 - 20w$. The total (economy-wide) supply of labor is 1,000,000, and it does not depend upon the wage. All workers are equally skilled and equally suited for work in either sector. A monopoly union sets the wage at \$30,000 in the union sector. What is the union wage gap? What is the effect of the union on the wage in the non-union sector?

4. In Figure 10-7, the contract curve is PZ.

(a) Does point P represent the firm or the workers having all of the bargaining power? Does point Z represent the firm or the workers having all of the bargaining power? Explain.

(b) Suppose the union has the power to be a monopoly union in setting wages if it chooses, but it doesn't have the power to force a wage and an employment level on the firm. On what portion of the contract curve PZ would you expect the bargained wage-employment contract to occur?

Answers

1. Figure 10-3 demonstrates some of the tradeoffs involved when deciding to join a union.

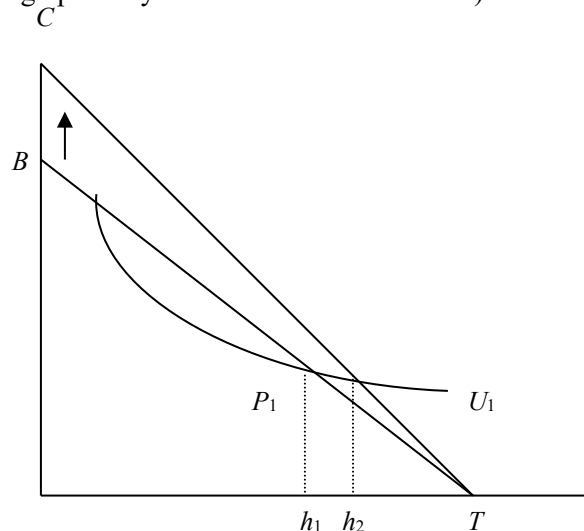
(a) Provide a graph that shows how the presence of union dues affects the decision to join a union. (Assume all workers pay a flat rate for dues.) Show on your graph how the presence of union dues may lead the worker to be less inclined to join the union.

If workers pay a flat hourly rate in union dues, the budget line (BT) in Figure 10-3 will rotate downward, but still intersect the hours of leisure axis at T. If workers pay a flat amount for union dues, then the new budget line (BT) shifts in, so that at point T on the hours of leisure axis, the new budget line is actually negative. Either case has the same implication – for any new hours or work (or hours of leisure) that the firm chooses, the worker’s utility is lower because he or she is on a lower budget line and therefore on a lower indifference curve. In Figure 10-3, for example, if the firm chooses hours of work at h_1 following unionization (and note that the firm doesn’t care what the level of union dues are), the worker will end up on an indifference curve between that indicated by U and U_1 . Thus, the worker is less inclined to join the union. (The graph is omitted here, but it is a straightforward extension of Figure 3.)

If union dues are a lump sum, then the new budget line (shifted down from BT), might land the worker above AT but below the original indifference curve (U), which would certainly make the worker worse off than had he or she not joined a union. The space for this in Figure 10-3 is very small (on the dotted vertical line at h_0 between U and AT), but it exists.

(b) Suppose in addition to higher wages the union negotiates a 10 percent employer contribution to a defined contribution pension plan. Provide a graph that incorporates this retirement benefit into the decision of whether to join a union. Show on your graph how additional fringe benefits such as a retirement plan may cause the worker to be more inclined to join the union.

Negotiating a 10% employer contribution to a defined contribution pension plan is almost the same as negotiating an additional 10% increase in the wage. Thus, the budget line (BT) in Figure 10-3 will rotate out. As long as the firm does not respond by cutting hours too much (such as to h_0 in Figure 3), workers will have more incentive to join the union as they will receive higher hourly compensation (though possibly asked to work fewer hours).



The graph above is a simplified version of Figure 10-3 from the text. The negotiated contribution rotates the budget line from BT to CT. As long as the firm does not reduce hours from h_1 to less than h_2 , the worker is better off.

2. Consider a firm that faces a constant per unit price of \$1,200 for its output. The firm hires workers, E , from a union at a daily wage of w , to produce output, q , where

$$q = 2E^{1/2}.$$

Given the production function, the marginal product of labor is $1/E^{1/2}$. There are 225 workers in the union. Any union worker who does not work for the firm can find a non-union job paying \$96 per day.

(a) What is the firm's labor demand function?

The labor demand function, or the marginal revenue product of labor, is

$$MRP_E = MR \times MP_E = 1200 / E^{1/2}.$$

(b) If the firm is allowed to specify w and the union is then allowed to provide as many workers as it wants (up to 225) at the daily wage of w , what wage will the firm set? How many workers will the union provide? How much output will be produced? How much profit will the firm earn? What is the total income of the 225 union workers?

If the firm offers $w < \$96$, no workers will be provided. This would leave the firm with no output and no profit. The workers would all receive \$96 per day, making their total daily income \$21,600.

If the firm offers a wage of $w > \$96$, all 225 workers will be provided. These 225 workers would produce 30 units of output. The firm would then earn a profit of $30(\$1,200) - 225w$. Profit, therefore, is maximized when w is minimized subject to the constraint. If the union would supply all 225 workers at a wage of \$96, for example, the firm would offer $w = \$96$ and earn a daily profit of \$14,400. The total daily income of the 225 workers would remain at \$21,600.

If the firm needs to offer strictly more than \$96 per day to attract workers, it would offer a daily wage of \$96.01. All 225 workers would work for the firm, making 30 units of output. The firm's daily profit would be \$14,397.75. And the total daily income of the 225 workers would be \$21,602.25.

3. Suppose the economy consists of a union and a non-union sector. The labor demand curve in each sector is given by $L = 1,000,000 - 20w$. The total (economy-wide) supply of labor is 1,000,000, and it does not depend upon the wage. All workers are equally skilled and equally suited for work in either sector. A monopoly union sets the wage at \$30,000 in the union sector. What is the union wage gap? What is the effect of the union on the wage in the non-union sector?

In a competitive economy, the wage would be the same in the two sectors, and its value would be such that the total labor demand $L_D = 2 \times (1,000,000 - 20w_C)$ equaled total labor supply. The solution to the equation $2 \cdot (1,000,000 - 20w_C) = 1,000,000$ is $w_C = \$25,000$.

If the union wage is set at \$30,000, the union sector employs 400,000 workers. The remaining 600,000 must be employed in the non-union sector, which will happen if the wage in the non-union sector is $(1,000,000 - 600,000)/20 = \$20,000$.

Hence, the wage gap between the union and the non-union sectors equals \$10,000, or 50 percent of the non-union wage. The effect of the union wage gap is that more people than otherwise would have now work in the non-union sector, which depresses wages there. In particular, although the union only negotiated a pay raise of \$5,000 above the competitive wage, the wage gap is \$10,000 as the workers who no longer work in the union sector compete wages down in the non-union sector.

4. In Figure 10-7, the contract curve is PZ.

(a) Does point P represent the firm or the workers having all of the bargaining power? Does point Z represent the firm or the workers having all of the bargaining power? Explain.

The firm's isoprofit curves improve as it hires the same number of workers at a lower wage, which means improvements are achieved by moving down (to the south). So, from the firm's perspective, $\pi^* > \pi_M > \pi_Z$. From the union's point of view, indifference curves increase to the northeast (as more people are hired at the same wage or when the same number of people are hired at a higher wage). Thus, from the union's perspective, $U^* < U_M < U_R < U_Z$. Thus, point *P* represents the firm having all of the bargaining power, and point *Z* represents the union having all of the bargaining power.

(b) Suppose the union has the power to be a monopoly union in setting wages if it chooses, but it doesn't have the power to force a wage and an employment level on the firm. On what portion of the contract curve PZ would you expect the bargained wage-employment contract to occur?

The union sets the wage, but not the employment level. Thus, for any wage set, the firm "sees" a horizontal line at w and maximizes its profit by choosing an employment level that gives the firm a position on its highest possible isoprofit line. Thus, the firm will choose a point on the line described by *PM*. Knowing this, the best the firm can do is to set wage w_M as the firm will then choose E_M (not drawn in Figure 10-7, but associated with point *M*) which puts the outcome at point *M* and gives the union U_M . At any other wage, the firm chooses a different employment level according to *PM*, all of which are associated with indifference curve levels lower than U_M .