8

Trade Unions and the Labour Market

The purpose of this chapter is to discuss the following issues:

1. What models of trade union behaviour exist, and what do they predict about unemployment?
2. What do we mean by corporatism and how can it explain some of the stylized facts about the labour market?
3. How can so-called insider-outsider models be used to explain hysteresis?
4. How does taxation affect unemployment in trade union models?
5. How do trade unions affect investment by firms?

8.1 Some Models of Trade Union Behaviour

The typical layman's sentiment about trade unions probably runs as follows. Powerful trade unions are just like monopolists. They sell labour dearly, cause high real wages, and hence are really to blame for low employment and high unemployment. In this section we evaluate this sentiment within the context of several partial equilibrium models of trade union behaviour. The typical setting is one where a single representative union interacts with a single representative firm.

Suppose that the representative trade union has a utility function $V(w, L)$ with the following form:

$$V(w,L) \equiv \left(\frac{L}{N}\right) u(w) + \left[1 - \left(\frac{L}{N}\right)\right] u(B), \tag{8.1}$$

where N is the (fixed) number of union members, L is the number of employed members of the union ($L \leq N$), w is the real wage rate, B is the pecuniary value of being unemployed (referred to as the unemployment benefit), and $u(.)$ is the indirect utility function of the representative union member.[1] Equation (8.1) can be interpreted in two ways. First, L/N can be interpreted as the probability that a union member will be employed, in which case the union cares about the expected utility of its representative member. This is the probabilistic interpretation. The second, utilitarian, interpretation runs as follows. The union calculates the average utility attained by its employed and unemployed members, and takes that as its index of performance.

The representative firm is modelled in the standard fashion. The production function is $Y = AF(L, \bar{K})$, where Y is output, $\bar{K}$ is the fixed capital stock, A is a productivity index, and $F(.,.)$ features constant returns to scale and positive but diminishing marginal labour productivity ($F_L > 0 > F_{LL}$). The (short-run) real profit function is defined as:

$$\pi(w, L) \equiv AF(L, \bar{K}) - wL. \tag{8.2}$$

All models discussed in this section can be solved graphically. In order to do so, however, a number of graphical schedules must be derived. First, the labour demand schedule is obtained by finding all (w, L) combinations for which profit is maximized by choice of L. Formally, we have $\pi_L \equiv \partial\pi/\partial L = 0$, which yields:

$$\pi_L = AF_L(L, \bar{K}) - w = 0 \quad \Leftrightarrow \quad L^D = L^D(w, A, \bar{K}), \tag{8.3}$$

where $L_w^D < 0$, $L_A^D > 0$, and $L_{\bar{K}}^D > 0$. The labour demand curve is downward sloping in (w, L) space.

The second graphical device that is needed is the *iso-profit curve*. It represents the combinations of w and L for which profits attain a given level. It can be interpreted as the firm's indifference curve. The slope of an iso-profit curve can be determined in the usual fashion:

$$d\pi = 0: \quad \Rightarrow \quad \pi_w dw + \pi_L dL = 0 \quad \Rightarrow \quad \left(\frac{dw}{dL}\right)_{d\pi=0} = -\frac{\pi_L}{\pi_w}. \tag{8.4}$$

We know from equation (8.2) that $\pi_w = -L < 0$, so that the slope of an iso-profit line is determined by the sign of π_L. But $\pi_L \equiv AF_L - w$, and $F_{LL} < 0$, so that π_L is positive for a low employment level, becomes zero (at the profit-maximizing point), and then turns negative as employment increases further. Hence, in terms of Figure 8.1, the iso-profit curves are upward sloping to the left of the labour demand schedule, downward sloping to the right of labour demand, and attain a maximum for points on the labour demand schedule. In Figure 8.1 a number of iso-profit curves have been drawn, each associated with a different level of profit. Obviously, for a given

[1] An indirect utility function differs from the usual, direct, utility function in that it depends on prices and income rather than on quantities. The two are intricately linked, however. Indeed, the indirect utility function is obtained by substituting the optimal quantity choices of the household back into the direct utility function.

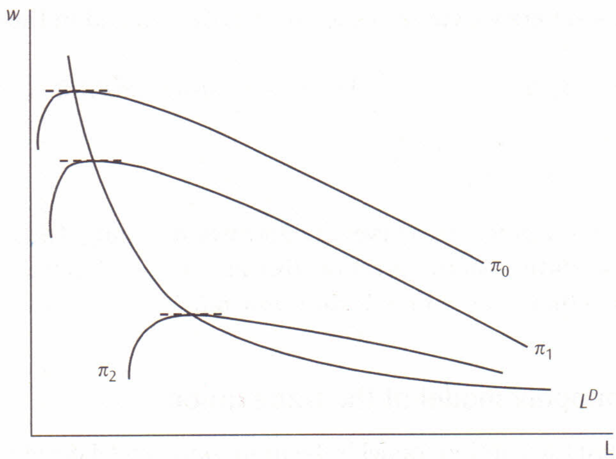

Figure 8.1. The iso-profit locus and labour demand

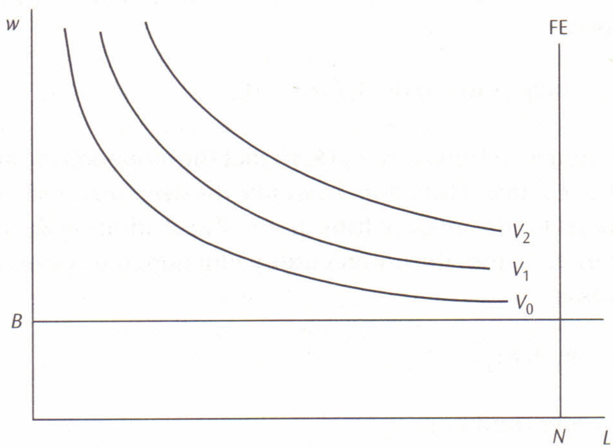

Figure 8.2. Indifference curves of the union

level of employment L, the level of profit is increased if the wage rate falls, i.e. $d\pi/dw = \pi_w < 0$. Hence, the level of profit increases the further down the demand for labour curve the firm operates, i.e. $\pi_0 < \pi_1 < \pi_2$.

Trade union behaviour can also be represented graphically. The third schedule to be derived concerns the union's indifference curve. Obviously, the union will not supply any workers to the firm at a wage rate below the unemployment benefit. Hence, in terms of Figure 8.2, the restriction $w \geq B$, translates into the horizontal line BB. Furthermore, the union is unable to supply any more workers than its current membership. Hence, there is an additional restriction $L \leq N$, which is the full employment line FE in Figure 8.2. Within the feasible region ($w \geq B$ and $L \leq N$), the slope of an indifference curve of the union is determined in the usual way:

$$dV = V_w dw + V_L dL = 0 \;\Rightarrow\; \left(\frac{L}{N}\right) u_w dw + \frac{1}{N}\left[u(w) - u(B)\right] dL = 0 \;\Rightarrow$$

$$\left(\frac{dw}{dL}\right)_{dV=0} = -\left(\frac{u(w) - u(B)}{Lu_w}\right) < 0. \tag{8.5}$$

Hence, the union's indifference curves are downward sloping. Furthermore, union utility rises in a north-easterly direction (because $V_w \equiv (L/N)u_w > 0$ and $V_L \equiv (u(w) - u(B))/N > 0$), i.e. $V_2 > V_1 > V_0$ in Figure 8.2.

8.1.1 The monopoly model of the trade union

Perhaps the oldest trade union model is the monopoly model developed by Dunlop (1944). The trade union is assumed to behave like a monopolistic seller of labour. It faces the firm's demand for labour (defined implicitly in (8.3)) and sets the real wage such that its utility (8.1) is maximized. Formally, the problem facing a monopoly union is as follows:

$$\max_{\{w\}} V(w, L) \quad \text{subject to} \quad \pi_L(w, A, L, \bar{K}) = 0, \tag{8.6}$$

where the restriction $\pi_L = 0$ ensures (by (8.3)) that the monopolistic union chooses a point on the labour demand function. In words, the demand for labour acts like the "budget restriction" for the monopolistic union. By substituting the labour demand function (given in (8.3)) into the union's utility function, the optimization problem becomes even easier:

$$\max_{\{w\}} V\left[w, L^D(w, A, \bar{K})\right], \tag{8.7}$$

so that the first-order condition is:

$$\frac{dV}{dw} = 0: \quad V_w + V_L L_w^D = 0, \tag{8.8}$$

which implies that $V_w/V_L = -L_w^D$. The slope of the union's indifference curve should be equated to the slope of the demand for labour.[2]

The monopoly union solution is illustrated in Figure 8.3. The wage rate is set at w^M, the union attains a utility level V^M, and employment is L^M. The union has $(N - L^M)$ of its members unemployed. How does this unemployment level compare to the competitive solution? If there were no unions, the forces of the free market would force the wage rate down to $w = B$, so that point C in Figure 8.3 represents the competitive point. Employment is equal to L^C which is greater than employment

[2] It is possible that the union cannot choose this interior solution because the firm would make too little profit there. In such a case a corner solution is attained, and (8.8) does not hold with equality. We ignore this case here.

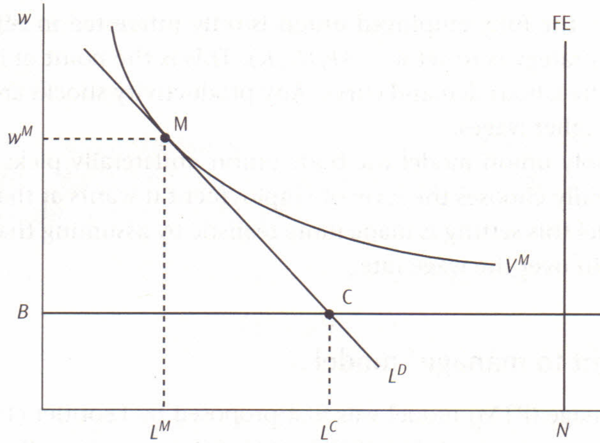

Figure 8.3. Wage setting by the monopoly union

with monopoly unions, i.e. $L^C > L^M$. Hence, the monopoly union causes more unemployment than would be the case under perfect competition, and the layman's sentiments mentioned in the introduction are confirmed.

Recall that one of the reasons for being interested in models of union behaviour is to investigate their potential in explaining the (near) horizontal real wage equation (see Figure 7.9). What happens if there is a productivity shock in the monopoly model? In the competitive solution (point C in Figure 8.3) there is only an effect on real wages if the productivity shock (dA) is very large, i.e. if the new labour demand equation intersects with the FE line at a wage rate above B. Something similar happens in the monopoly union model. In order to derive the real wage effects of a productivity shock, we first rewrite (8.8) in a more intuitive form:

$$
\begin{aligned}
V_w + V_L L_w^D &= \left(\frac{L}{N}\right) u_w + \frac{1}{N}\left[u(w) - u(B)\right] L_w^D = 0 \\
&= \left(\frac{L}{wN}\right)\left[w u_w + \left[u(w) - u(B)\right] w L_w^D / L\right] = 0 \\
&\Rightarrow \quad \frac{u(w) - u(B)}{w u_w} = \frac{1}{\epsilon_D},
\end{aligned}
\tag{8.9}
$$

where $\epsilon_D \equiv -wL_w^D/L$ is the absolute value of the labour demand elasticity. If this demand elasticity is constant (as is the case for a Cobb–Douglas production function), then a productivity shock has no effect on the real wage rate chosen by the monopoly union. Only employment reacts to a productivity shock, and the model indeed predicts a rigid real wage.

Obviously, as for the competitive case, this conclusion must be qualified if the union is fully employed ($L = N$). In that case the union's effective utility function is (via (8.1)) equal to $V(w, L) = U(w)$, which no longer depends on the employment level. As a result, the fully employed union is only interested in high real wages, and its optimal strategy is to set $w = AF_L(N, \bar{K})$. This is the point of intersection of the FE line and the labour demand curve. Any productivity shocks are immediately translated into higher wages.

In the monopoly union model the trade union unilaterally picks the wage and the firm unilaterally chooses the level of employment it wants at that wage. In the next union model this setting is made more realistic by assuming that the firm and the union bargain over the wage rate.

8.1.2 The "right to manage" model

The right to manage (RTM) model was first proposed by Leontief (1946). The firm still has "consumer sovereignty" in the sense that it can unilaterally determine the employment level (hence the name "right to manage"), but there is bargaining between the firm and the union over the real wage. The outcome of the bargaining process is modelled as a so-called generalized Nash bargaining solution (see e.g. Binmore and Dasgupta, 1987, and Booth, 1995, pp. 150–151). According to this solution concept, the real wage that is chosen after bargaining maximizes the geometrically weighted average of the gains to the two parties. In logarithmic terms we have:

$$\max_{\{w\}} \Omega \equiv \lambda \log \left[V(w,L) - \bar{V} \right] + (1-\lambda) \log \left[\pi(w,L) - \bar{\pi} \right]$$

$$\text{subject to } \pi_L(w, A, L, \bar{K}) = 0, \tag{8.10}$$

where $\bar{V} \equiv U(B)$ is the fall-back position of the union, $\bar{\pi}$ is the fall-back position of the firm, and λ represents the relative bargaining strength of the union ($0 \leq \lambda \leq 1$). Obviously, the monopoly union model is obtained as a special case of the RTM model by setting $\lambda = 1$. We have already argued that the union has no incentive to accept wages lower than the unemployment benefit B, where utility of the union is at its lowest value of $V(w,L) = V(B,L) = U(B)$. This rationalizes the fall-back position of the union. For the firm a similar fall-back position will generally exist. To the extent that the firm has fixed costs, minimum profit must be positive, i.e. $\bar{\pi} > 0$.

By substituting the labour demand function (8.3) into (8.10), the problem is simplified substantially:

$$\max_{\{w\}} \Omega \equiv \lambda \log \left[V(w, L^D(w, A, \bar{K})) - \bar{V} \right] + (1-\lambda) \log \left[\pi(w, L^D(w, A, \bar{K})) - \bar{\pi} \right], \tag{8.11}$$

for which the first-order condition is:

$$\frac{d\Omega}{dw} = \lambda \left(\frac{V_w + V_L L_w^D}{V - \bar{V}} \right) + (1-\lambda) \left(\frac{\pi_w + \pi_L L_w^D}{\pi - \bar{\pi}} \right) = 0. \tag{8.12}$$

The numerator of the first term on the right-hand side of (8.12) can be simplified to:

$$V_w + V_L L_w^D = \left(\frac{L}{wN} \right) \left[w u_w - \epsilon_D \left[u(w) - u(B) \right] \right]. \tag{8.13}$$