Jean Monnet Module:
Labour Economics
in an European Perspective

UNIONS AND WAGE BARGAINING

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❖ Outline

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- **Theory: some preliminary issues**

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- The monopoly union model
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❖ Unions and the labour market

- **Labour (or trade) unions** are organizations of workers whose primary objectives are to improve the pecuniary and non-pecuniary conditions of employment among their members

- Unions bargain with employers practically on all aspects of the employment contract (e.g., pay and employees benefits, conditions of work, hiring, job assignment, promotion, layoff, etc.)

- Unionization can differ across countries according to the degree of **union membership (or density)**, **collected bargaining coverage** and **wage (de)centralization or coordination**

- **Union density (or membership) rate:** the fraction of workers registered with some trade union

- **Coverage of trade unions:** the percentage of the eligible workforce (employees with bargaining rights) whose contract is regulated by the collective agreements signed by the unions

- **Bargaining (de)centralization:** it refers to the level (plant, firm, industry, country) at which labour contracts are negotiated

- It is also important to distinguish between formal centralization and **implicit coordination**, which could result also from informal (tacit) coordination between independent unions and employers

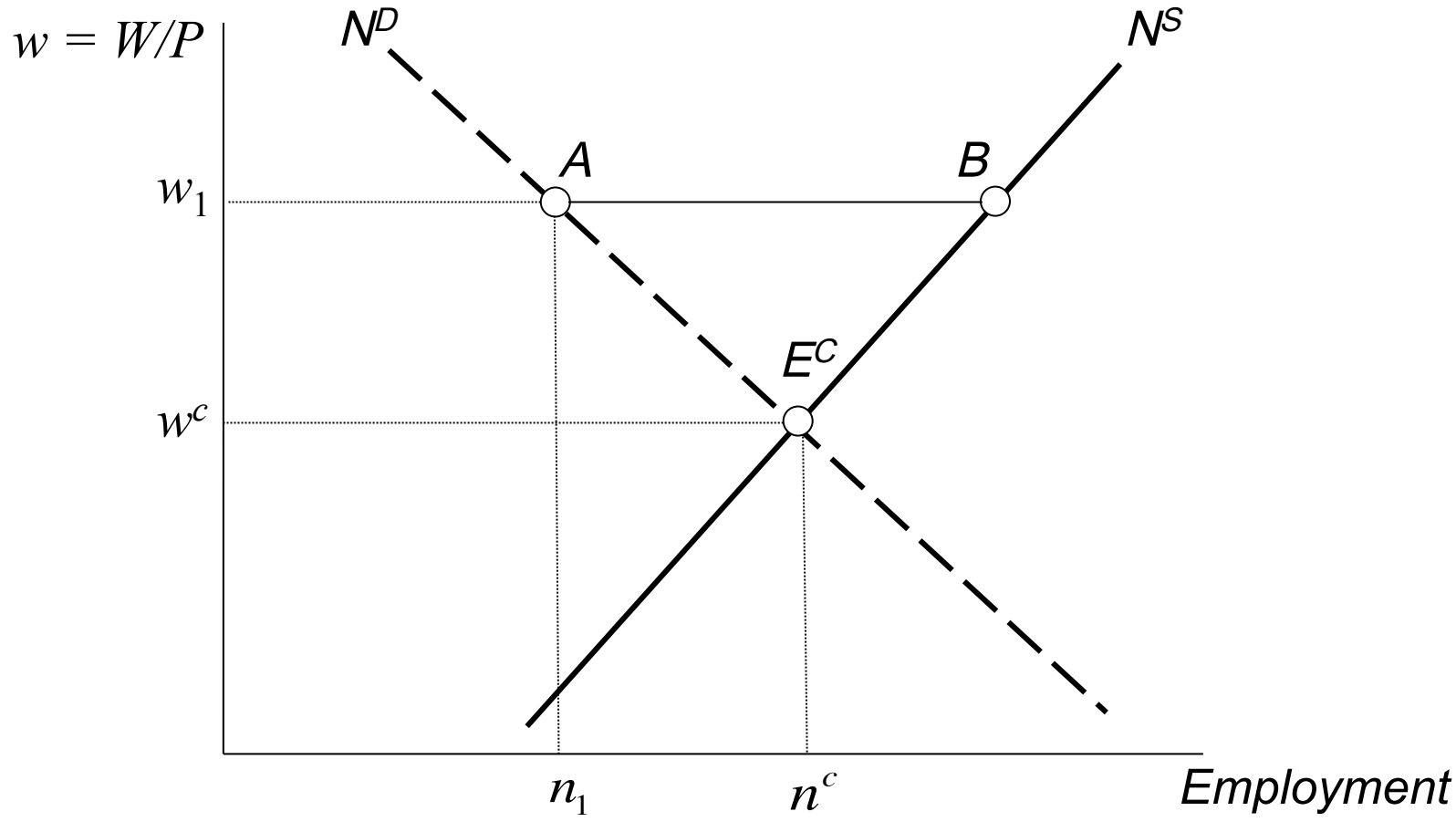
Membership (density), coverage and centralization (Boeri and van Ours, 2008)

	% Workers in firm joining employer association (%) (1)	% Workers covered by collective agreements (%) (2)	Workers joining trade unions market sector (%) (3)	Excess coverage (2) – (3)	Centralization	Coordination
Austria	96	97	34	63	3	4
Australia	–	80	35	45	2	2
Belgium	72	82	44	38	3	4
Canada	–	35	36	−1	1	1
Denmark	48	52	68	−16	2	4
Finland	58	67	65	2	5	5
France	74	75	10	65	2	2
Germany	72	80	25	55	3	4
Italy	40	81	36	45	2	4
Netherlands	79	79	19	60	3	4
Norway	54	62	44	18	4	4
Portugal	34	80	30	50	4	4
Spain	72	67	16	51	3	3
Sweden	56	72	77	– 5	3	3
Switzerland	37	50	22	28	2	4
United Kingdom	54	35	19	16	1	1
United States	–	13	10	3	1	1

Sources: Ebbinghaus and Visser (2000); Boeri, Brugiavini, and Calmfors (2001); OECD (2006a).

❖ Theory: some preliminary issues

- According to the standard view, unions are frequently able to push wages above the competitive level (what is called the "monopoly role" of trade unions)



However, there are some questions that remain unanswered (hence, they should be investigated more in detail)

- What conditions should be met for the union to be able to raise wages over and above the competitive level?

- What are the union's objectives in bargaining vis-à-vis firms?

- What factors determine the magnitude of the "union wage-effect"?

Conditions under which a trade union can achieve a wage rate higher than the non-union (competitive) wage

- Economic rents or surplus must exist in the product market. For instance, in a **perfectly competitive product market**, firms must be making positive profits. However, in the long-run (with freedom of entry), profits would be eroded …

"Thus one would expect a higher probability of union organisation in non-competitive industries than in competitive product markets" (Booth, *The Economics of the Trade Union*, 1995, p. 53)

➢ Surplus alone, however, does not guarantee union success. Union success also rests on the presence of one or both the following conditions:

- union must have sufficient **bargaining power** vis-à-vis firm, so to force the latter to concede a share of the surplus to workers, and/or

- the firm must be willing to share some of the surplus with the union since its presence (behaviour) can permit to obtain a larger surplus (i.e., there are ways through which the union can increase **labour market efficiency**)

How does union obtain monopoly (bargaining) power?

- A union or group of workers is able to achieve power primarily through the **threat of strike** (that we will analyse later in greater detail)

- However, during a strike, it is important for the union to be able to prevent the firm from employing alternative workers not belonging to the union (i.e., union density matters!), hence acting as a **monopolist in the supply of labour**

Three forms of institutional arrangement

- In an **open shop**, workers have the right to be employed by the firm without joining the union. There is no union restriction over who can work in the “shop” (firm)

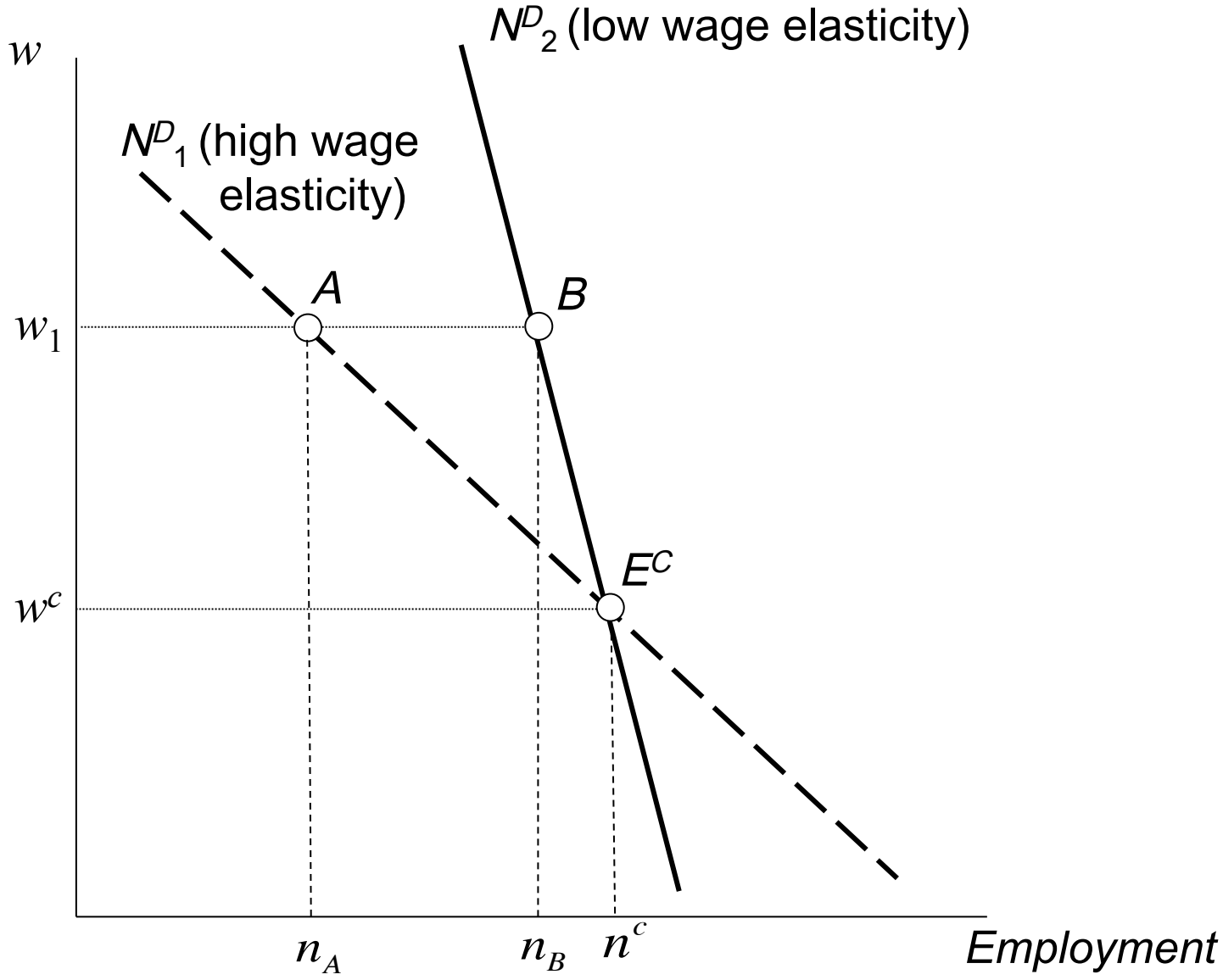
- In a **closed shop**, workers must be union members in order to be employed by the company (even if such arrangement is generally illegal, it is assumed to be in place in most formal models of trade union)

- In a **union shop** the firm may hire non-union workers but the workers must join the union within a brief period of time after being hired

- Furthermore, we have also to consider that, even if a union control all the labour supplied to a particular sector, it will not necessarily be able (willing) to negotiate a large wage increase relative to the competitive level

- If the union cares about both wages and employment, the magnitude of the union wage effect will depend crucially on the **wage elasticity of labour demand** in the particular sector ➔ when labour demand is (*in*)*elastic*, the union wage-effect is likely to be smaller (larger)

Wage elasticity, wage effect and employment

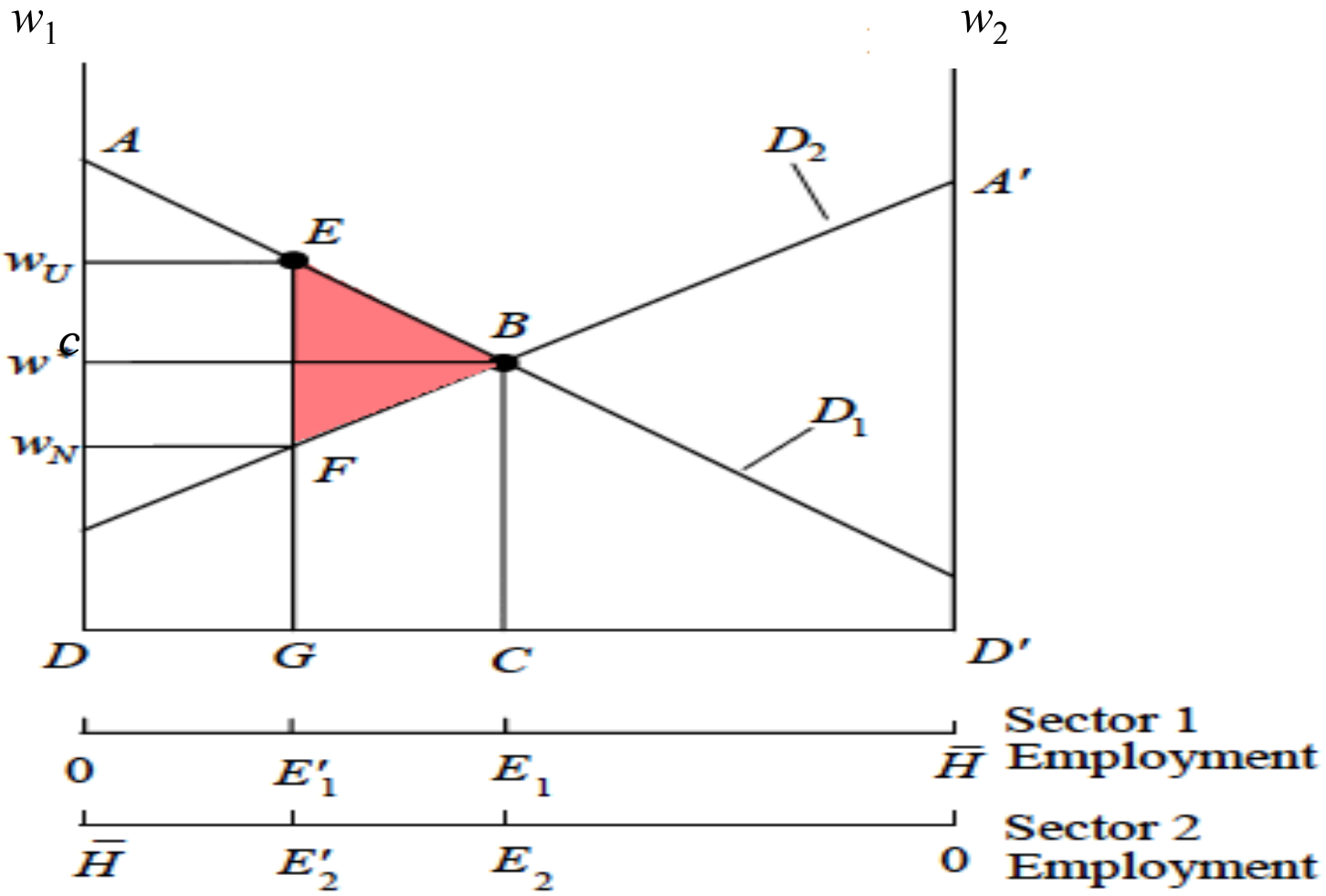


Unions and labour market efficiency

- According to the orthodox monopoly view of trade unions, the presence of a unionized sector imposes allocative costs, hence it reduces efficiency

- **Allocative inefficiency** relates to the fact that *too few* workers are employed in the union sector (with higher wages), while *too many* workers are employed in the non-union sector (with lower wages)

Unions and labour market inefficiency in a two-sector labour market



- The red triangle EFB represents the **efficiency (deadweight) loss** due to introducing unionization in Sector 1 and, formally, it is given by:

$$\text{Deadweight loss} = (1/2) \times (w_U - w_N) \times (E_1 - E_1^{'})$$

- Also notice that the **wage gap** $(w_U - w_N)$ is different from the so-called **wage gain**, which is given by $(w_U - w^C)$. Due to the presence of **spillover effects**, the wage gap is higher than the wage gain

- Moreover, the union can also harm **technical efficiency** by, for instance, deterring firms' investments (the *hold-up problem*)

- In a world of *imperfect information* and *uncertainty*, however, the presence of unions can improve efficiency (the *good face* of unions):

  - providing workers with a "voice", instead of an "exit" (which disrupts production), option;

  - reducing transaction (negotiation) costs and exploiting economies of scale;

  - contributing to make legally unenforceable contracts between employers and employees (self-)enforcing

❖ Formal union models

The union objective function

- The ortodox union models assume that trade unions are concerned only with the economic welfare of their workers:

$$\text{The union objective funtion}: U = U(w, n)$$

with

$$\partial U/\partial w > 0 \quad \text{and} \quad \partial U/\partial n > 0$$

- However, the union utility function $U(w,n)$ can assume different structural forms, which correspond to different **union objectives**, such as:

$$a)\ \text{Total wage bill maximizing union}: U = wn$$

$$b)\ \text{Rent maximizing union}: U = (w - w^c)n$$

$$c)\ \text{Weighted preferences over wage (rent) and employment}:$$

$$U = (w - w^c)^{\theta} n^{1-\theta}$$

- Another approach in modelling union preferences refers to an *utilitarian* or *expected utility* function:

$$d) \text{ Utilitarian :}$$

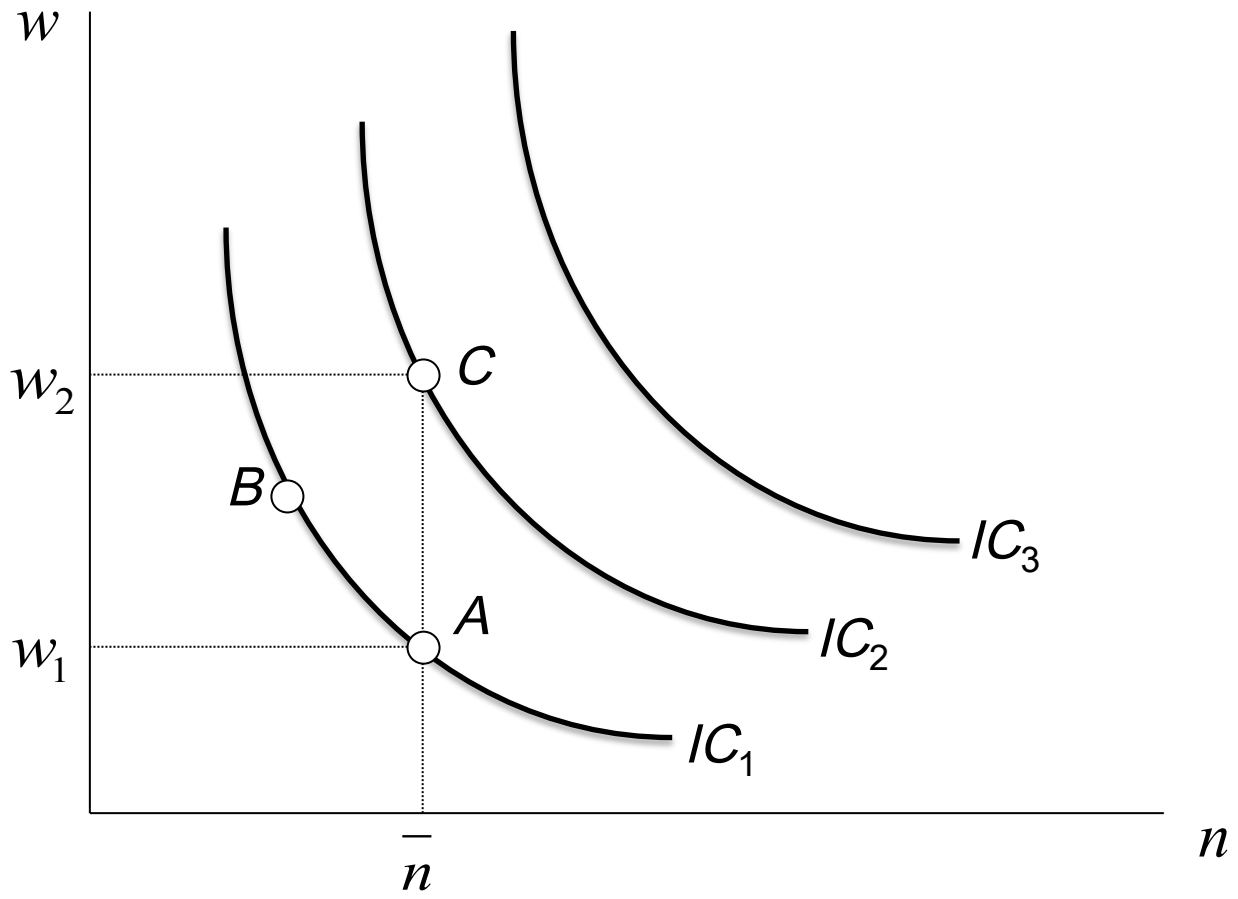
$$U = nu(w) + (t - n)u(b)$$

$$e) \text{ Expected utility :}$$

$$\text{EU} = \frac{n}{t}u(w) + \frac{t - n}{t}u(b)$$

with $w > b$; $0 < n \leq t$; $u'(.) > 0$; $u''(.) \leq 0$

- Union preferences $U(w,n)$ can also be represented by a **union indifference map** in (w,n) space:



The monopoly union model

- In the **monopoly union model**, the union is assumed to set the wage level unilaterally, subject to the firm's labour demand curve

- Imagine a union which runs a *closed shop* and can control either entry into the profession or the wage rate

- Moreover, assume that product markets are perfectly competitive (but without free entry), hence firms take the price (and the wage) as given and choose employment to maximize their profits

The behaviour of the firm

$$\max_n \pi = q(n) - wn$$

which leads to:

$$q'(n) = w$$

that, by considering that profit maximisation requires $q''(n) < 0$, also implies a *downward sloping* labour demand curve of the firm

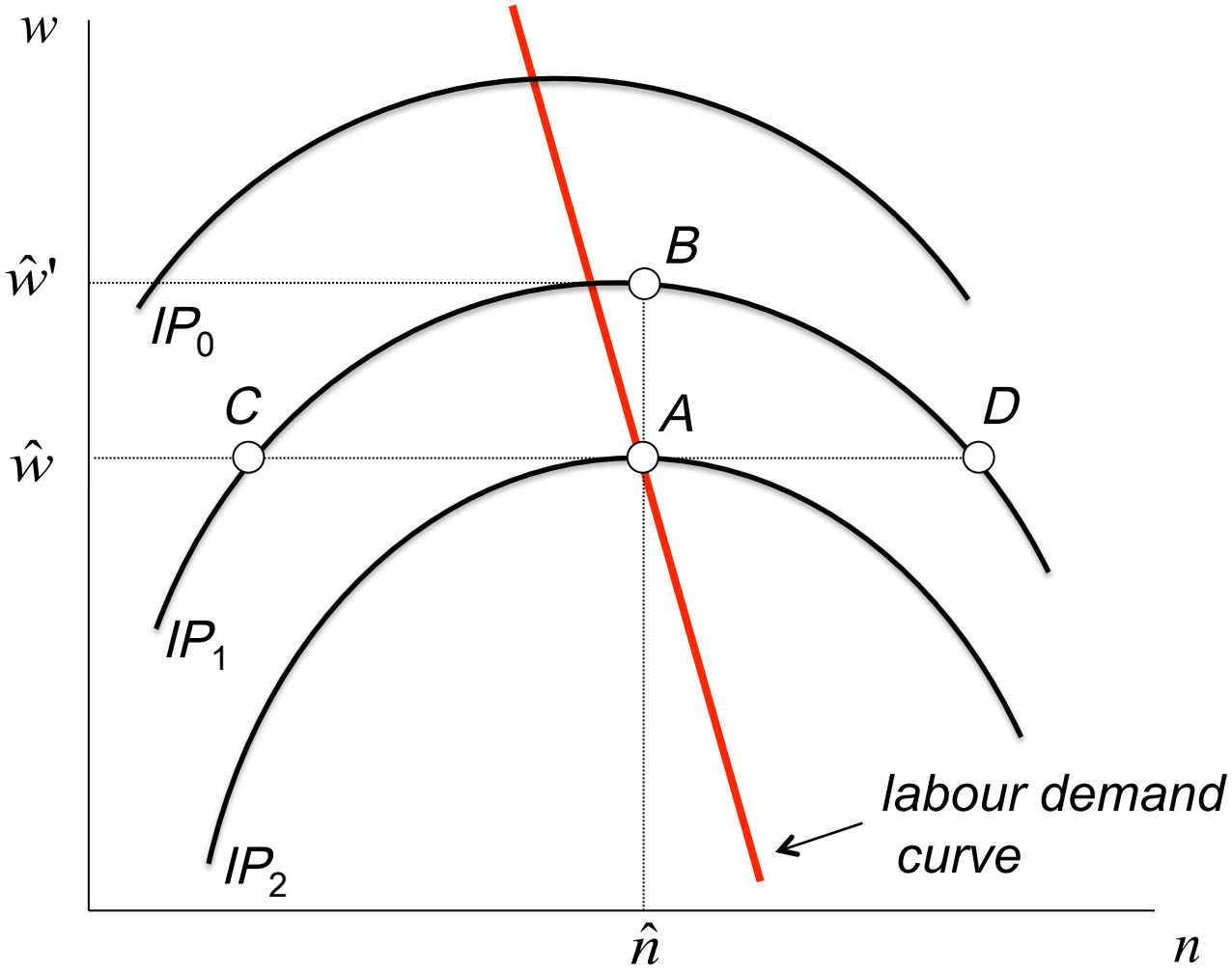
- Moreover, by totally differentiating the firm's profit equation with respect to w and n, holding profits fixed, we get:

$$d\pi = 0 = \frac{\partial \pi}{\partial n} dn + \frac{\partial \pi}{\partial w} dw =$$
$$= \left[q'(n) - w \right] dn - n dw$$

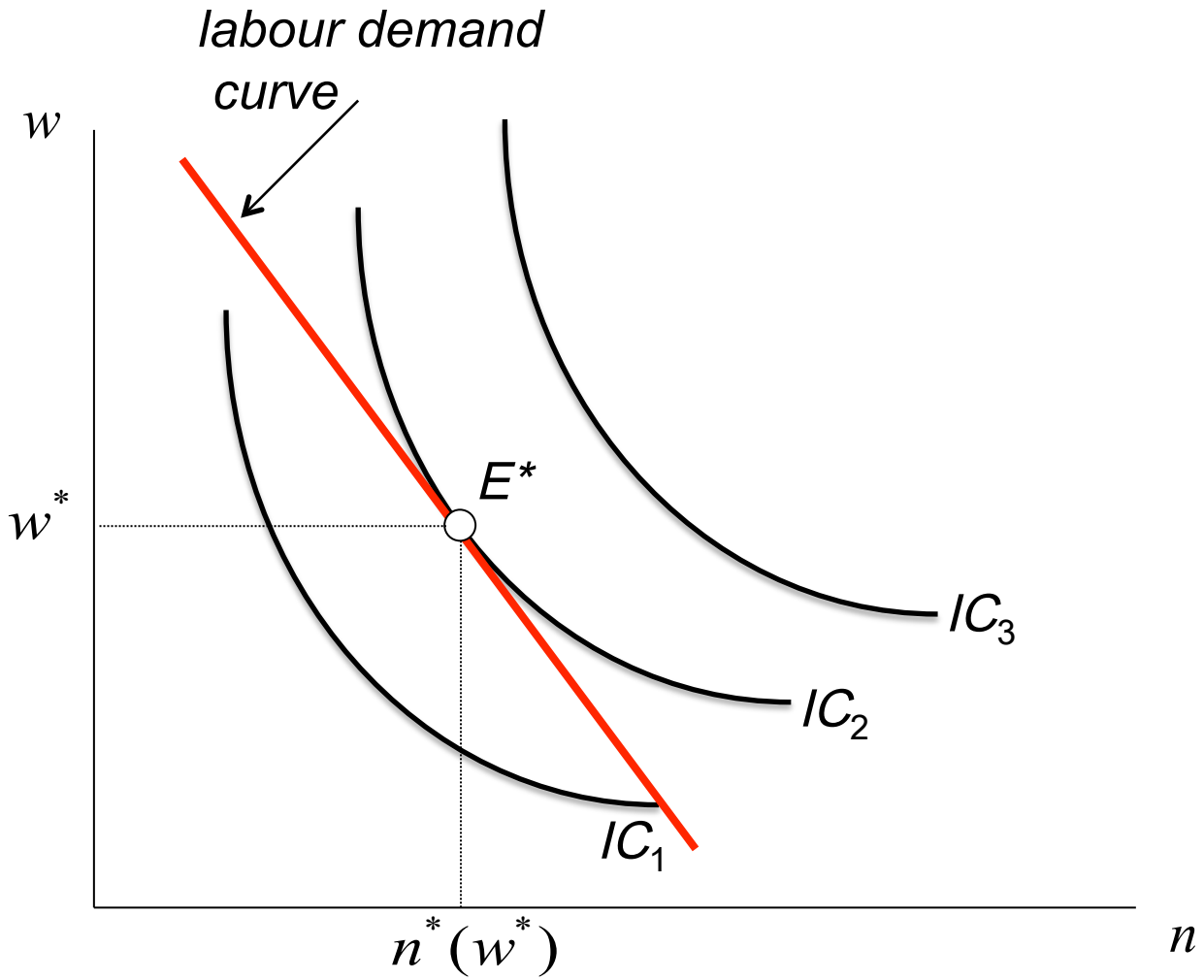
and, by rearranging, we get the slope of the firm's **isoprofit curve**:

$$dw / dn = \left[q'(n) - w \right] / n$$

Isoprofit curves



Monopoly union outcome: a graphical analysis



The monopoly union problem

$$\max_w \text{EU} = (n/t)w + (1 - n/t)b$$

subject to:

$$q'(n) = w$$

- Notice that (to simplify a bit the following analysis) we are considering now the special case with $u(w) = w$ and $u(b) = b$, which refers to *risk-neutral* workers

- By solving the monopoly union maximization problem, we get the following result:

Wages will be set by the union such that the percentage marginal benefit due to a percentage increase in wages is exactly equal to the percentage marginal cost, hence the following condition is satisfied:

$$\varepsilon = \frac{w}{w - b}$$

where $\varepsilon = -n'(w)w/n$

- Accordingly, we can also deduce that in the monopoly union model:

- the more elastic the labour demand, the lower the wage set by the union. Moreover, if elasticity is constant all along the labour demand curve (i.e., labour demand is *isolastic*), when labour demand shifts (e.g., due to a change in product demand), the union wage does not change and only employment varies;

- an improvement in alternative opportunities (b) increases the union wage (hence, reduces employment);

- an increase in membership (union density) has no effect on wages and employment.

Bargaining and the Right-to-Manage (RTM) model

- The idea underlying the monopoly union model is generally considered excessively simple: “The union never gets everything it wants” (Layard et al. 1991)

- A more realistic characterization of wage determination is one in which unions and firms (or employers’ organizations) **bargain over wages**, while individual employers maintain the *right to manage* the decision about employment

How to modelling bargaining?

- There are two broad different approaches (*axiomatic* and *strategic*) to modelling bargaining behaviour in economic theory

- We will consider here the axiomatic approach originally proposed by Nash (1950, 1953) –not to be confused with the Nash equilibrium concept for non-cooperative games– according to which the bargaining outcome must satisfy certain principles or axioms

- Under given hypotheses about the nature of parties' alternative opportunities, this is also consistent with strategic bargaining theory

Nash bargaining solution (NBS)

- According to Nash (1950, 1953), the bargaining solution $v^*(v_1^*, v_2^*)$ satisfying the relevant axioms is obtained from:

$$\max_{v_1, v_2} \Phi = (v_1 - \bar{v}_1) \cdot (v_2 - \bar{v}_2) \quad \text{[Nash bargain product]}$$

or

$$\max_{v_1, v_2} \Phi = (v_1 - \bar{v}_1)^{\beta} \cdot (v_2 - \bar{v}_2)^{1-\beta} \quad \text{[generalized Nash bargain product]}$$

$$\text{with } v_i \geq \bar{v}_i \text{ for } i = 1,2, \text{ and } 0 \leq \beta \leq 1$$

- By applying Nash bargaining to the union-firm bargaining problem, we get:

$$\max_w B = \left\{ \frac{n}{t} w + \left(1 - \frac{n}{t}\right) b - b \right\}^{\beta} \cdot \left\{ \underbrace{\left[q(n) - wn \right]}_{\pi} - 0 \right\}^{1-\beta} =$$

$$= \left\{ \frac{n}{t} \left(w - b \right) \right\}^{\beta} \cdot \left\{ \pi \right\}^{1-\beta}$$

- By maximizing the Nash product, we obtain the following result:

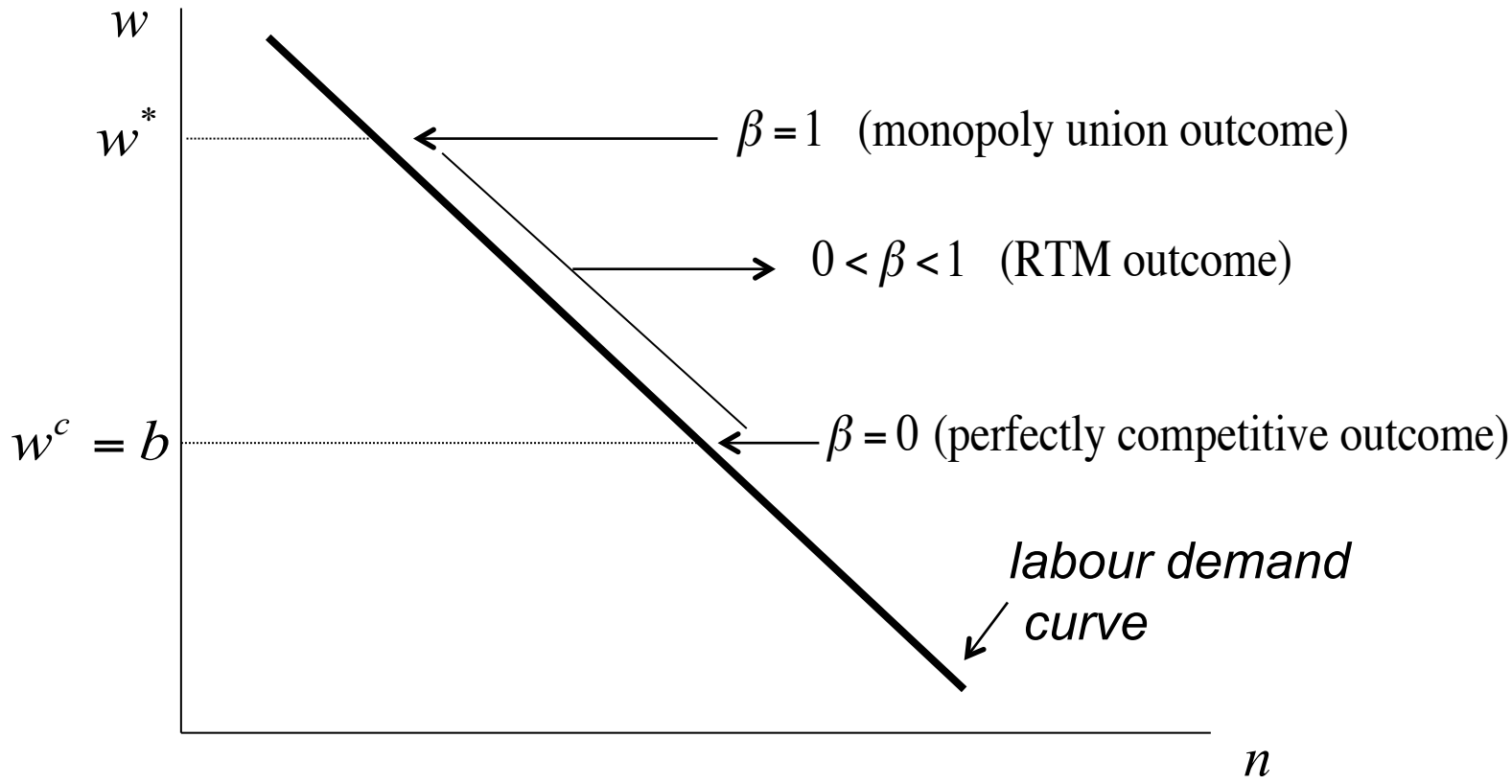
Bargained wages are such that the proportional marginal benefit to both parties from a unit increase in wages is exactly equal to the proportional marginal cost to each party, weighted by each party's (relative) bargaining strength. Hence, the following condition is satisfied:

$$\beta\varepsilon + (1-\beta)\varepsilon_{\pi,w} = \frac{\beta w}{w-b}$$

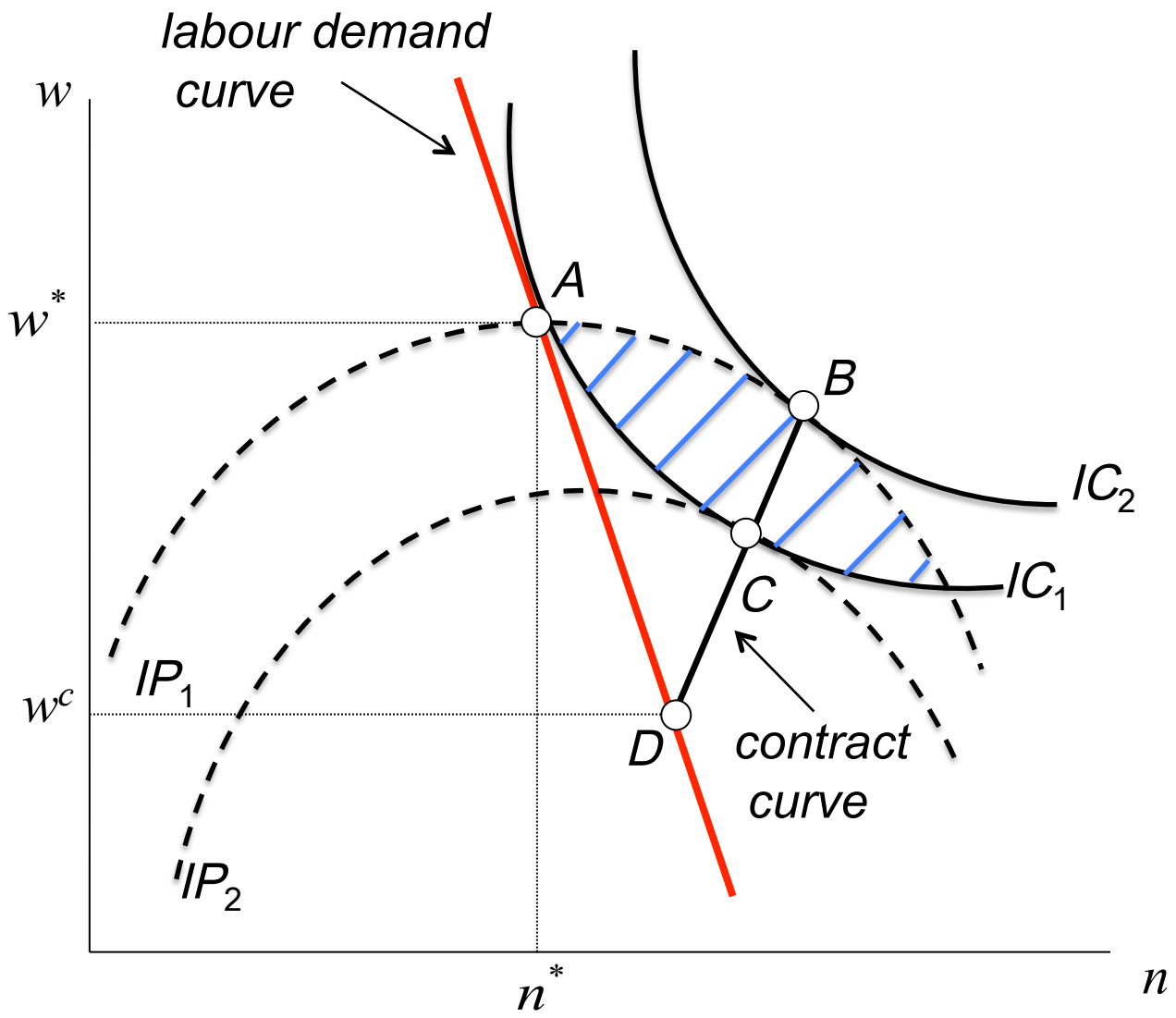
where $\varepsilon_{\pi,w} = -\pi'(w)w/\pi$

- Generally, the main results (highlighted before) predicted by the monopoly union model are confirmed under the RTM model. Moreover:

- (as expected) the higher the union relative bargaining power, the higher (lower) the wage (employment)



Are union contracts really efficient?



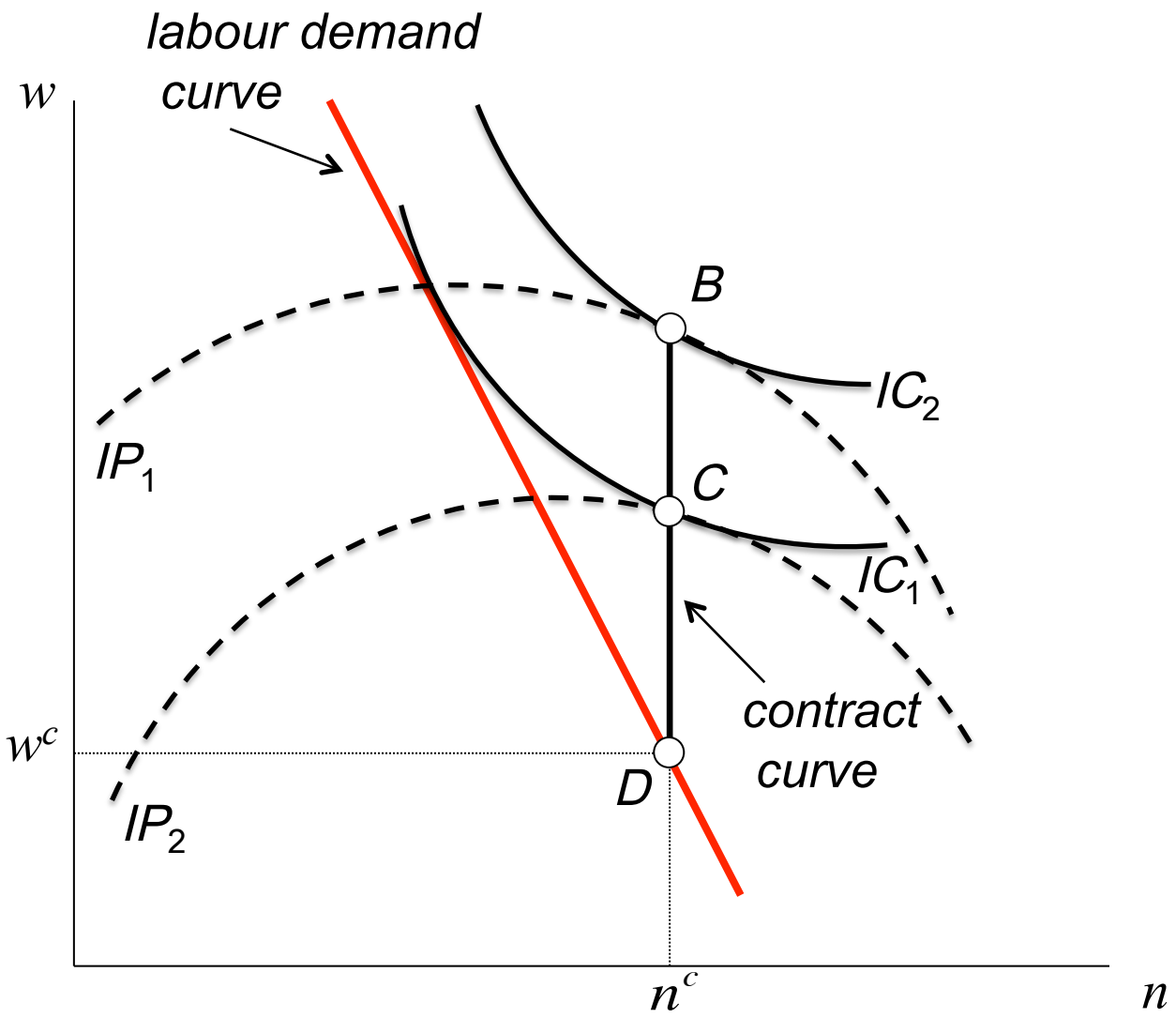
- Each efficient wage-employment pair (such as the points B and C in the figure) lies on the so-called **contract curve** and is given by maximising one's party welfare (or payoff) subject to any arbitrarily fixed level of welfare of the other

- Alternatively, since any efficient (n,w) pair refers to a point of tangency between isoprofit and union indifference curve, it is also given by equating the *marginal rates of substitution* between employment and wage for the union and the firm, that is:

$$\left(\frac{dw}{dn}\right)_{IP} = \frac{q'(n)-w}{n} = -\frac{u(w)-u(b)}{u'(w)n} = \left(\frac{dw}{dn}\right)_{IC} \Rightarrow$$

$$\Rightarrow q'(n)-w = -\frac{u(w)-u(b)}{u'(w)}$$

Contract curve with "strongly" efficient contracts



- **Strongly efficient contracts** not only require that all wage-employment bargaining opportunities between union and firm are exhausted but employment is also optimally allocated (i.e., it is at the competitive level)

- While efficient bargaining model predicts that there are efficiency gains from extending bargaining from wages alone to both wages and employment, empirical evidence suggests that bargaining over employment is rare

- A possible reasons is that uncertainty about future product demand can make a contract over both wages and employment no longer *incentive-compatible*

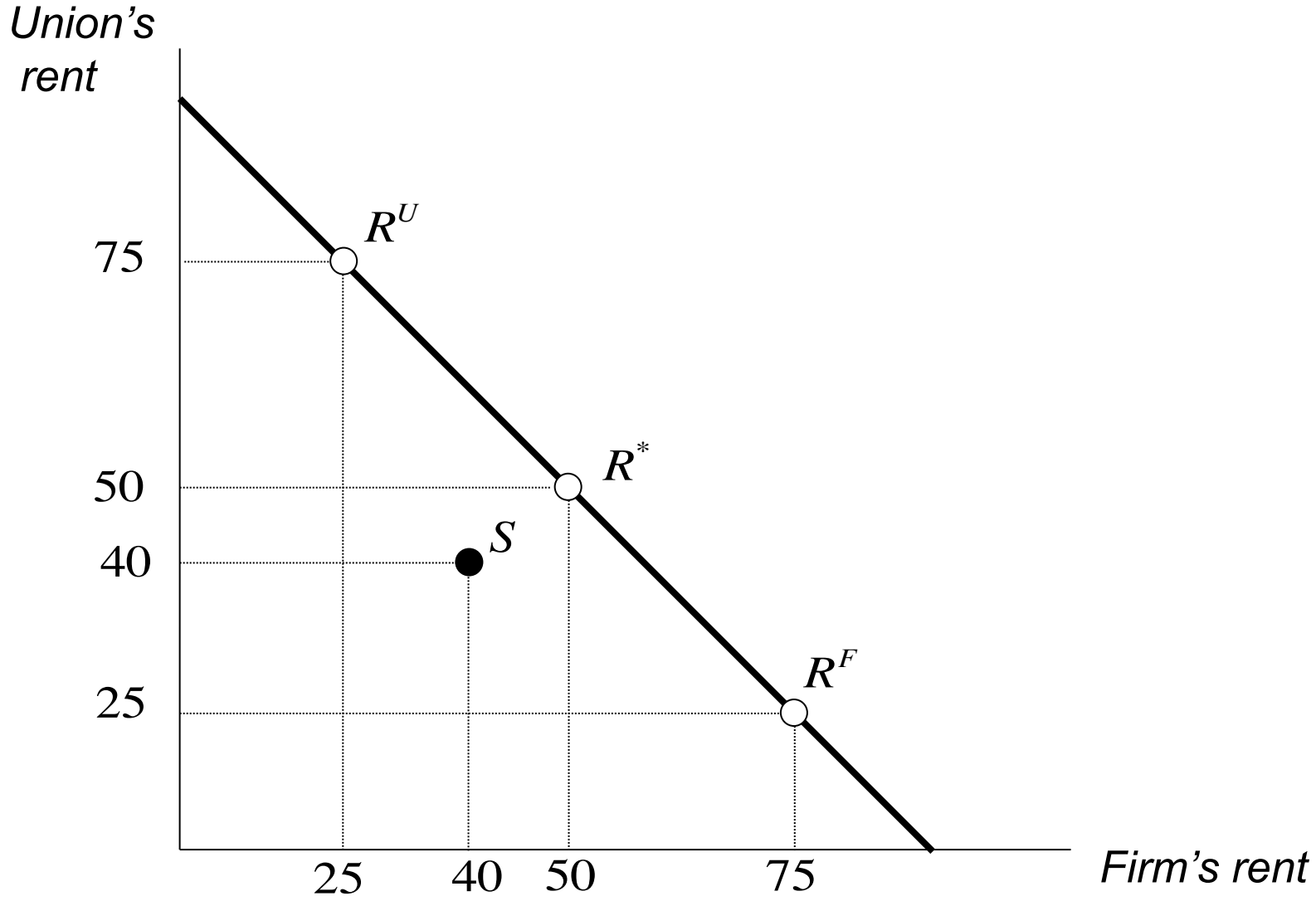
Strikes

- As already discussed, a **strike** -or a threat of a strike- represents a strategy unions can adopt to increase their market power in bargaining and obtain higher wages for their workers (remind: this threat is credible only if the firm cannot immediately replace its striking workforce)

- However, economists have had a very difficult time explaining why strikes occur ➔ the **Hicks paradox**:

since strike is costly for firms and also for workers (i.e., the strike is not Pareto-optimal ex-ante), if parties are rational and there is perfect information, they should reach an agreement ex-ante, thereby avoiding the strike and its related costs

The Hicks paradox: strikes are not Pareto optimal

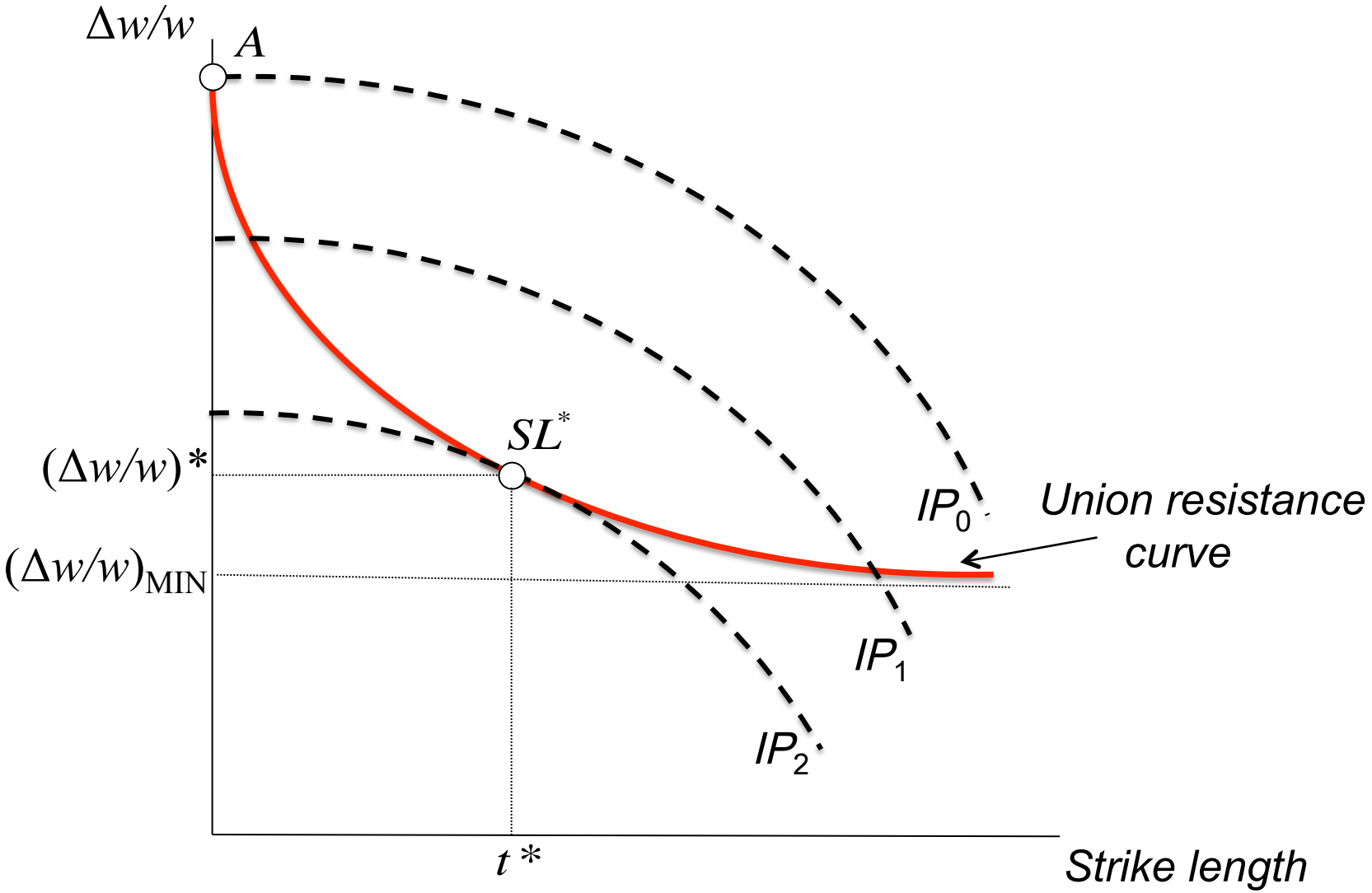


- However, if we introduce **asymmetric information** into the analysis, it becomes possible to explain the presence and the (optimal) duration of strikes

- Unions may be uninformed about the true firm's financial condition (or profits) and use strike to infer some information on that

- A longer strike duration signals to the union that perhaps the firm is not as profitable as the union initially thought it was (in addition, a longer strike also increase the costs for workers) ➔ the longer the strike, the lower the wage increase claimed by the union

Wage increase and strike length under asymmetric information



❖ Further readings

- A.L. Booth (1995). *The Economics of the Trade Union*, Cambridge University Press (especially Chs. 3, 4, 5).
- G.J. Borjas (2016). *Labor Economics*, McGraw-Hill, Ch. 10.
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- H.S. Farber (1986). The Analysis of Union Behaviour, in *Handbook of Labor Economics*, Vol. II, Ch. 18, edited by O. Ashenfelter and R. Layard, Elsevier.