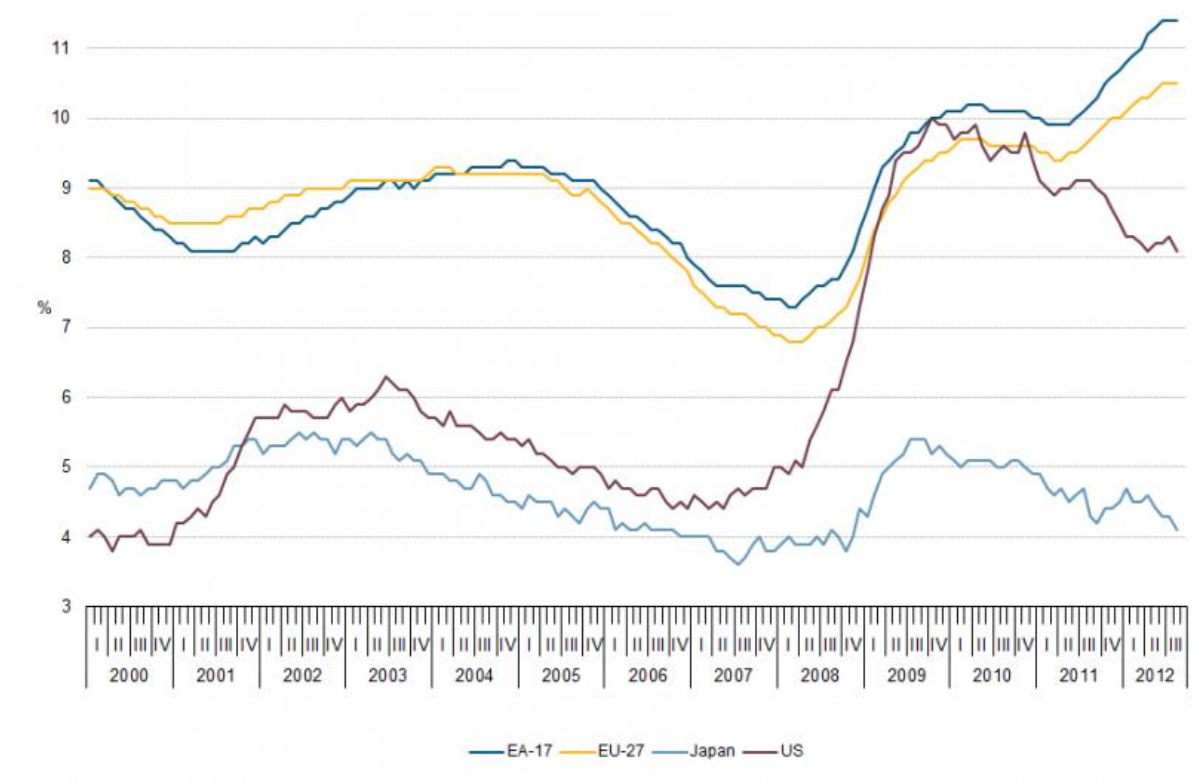
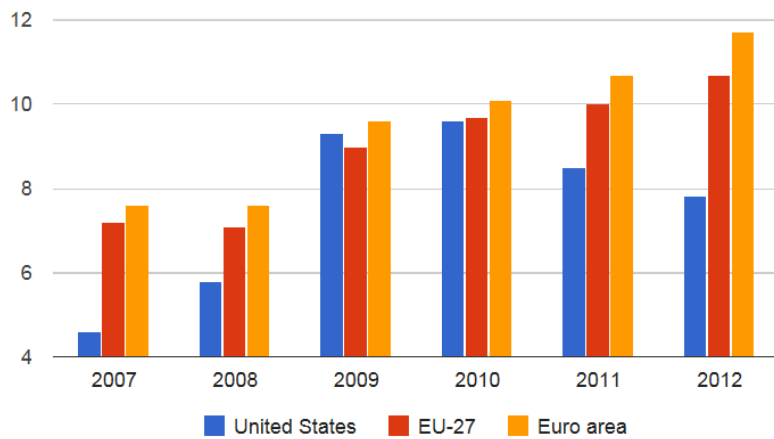


Trade Union, Unemployment, Economic Growth and Income Inequality

(a) Observations

● European countries have higher unemployment rates and union densities





Percent **Chart 2. Unemployment rates unadjusted by BLS, 10 European countries or areas, seasonally adjusted, June 2011-October 2012**

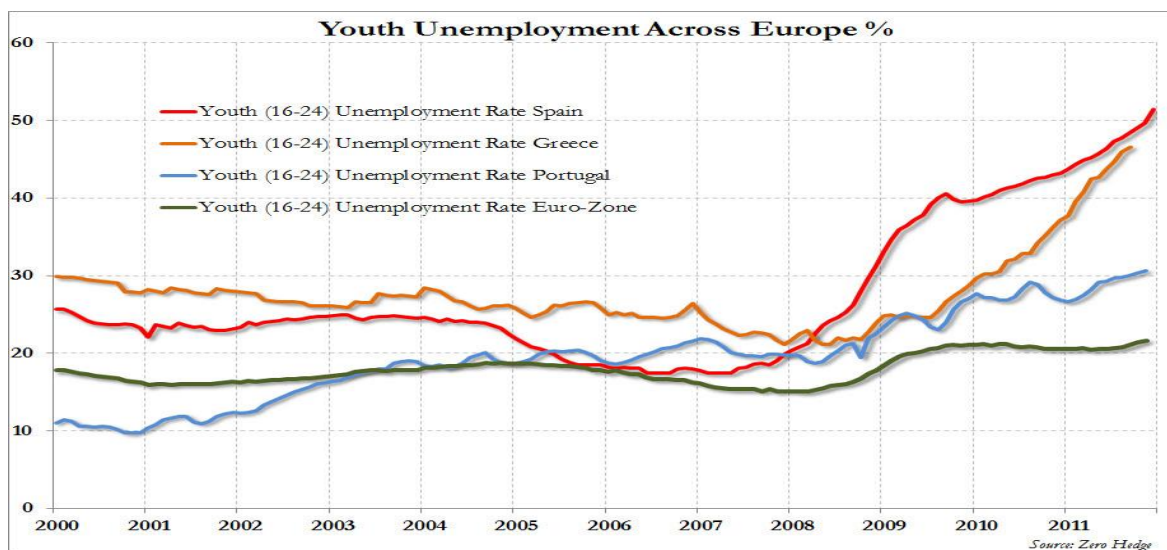
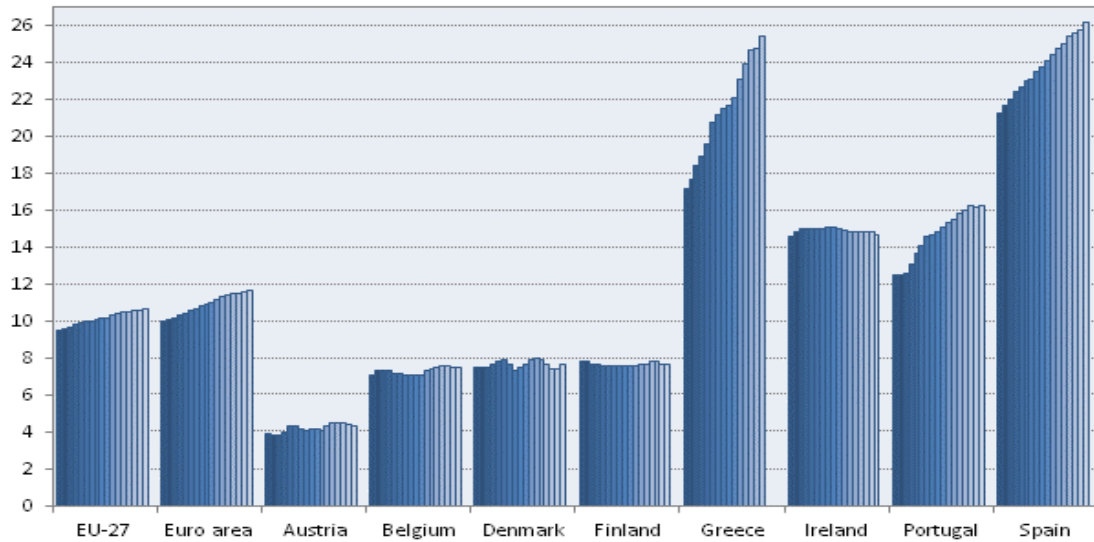


Table 4.1 Trade union density and collective bargaining wage coverage, 1970–2000 (%)

	Trade union density				Collective bargaining coverage		
	1970	1980	1990	2000	1980	1990	2000
Australia	44	48	40	25	80+	80+	80+
Austria	63	57	47	37	95+	95+	95+
Belgium	41	54	54	56	90+	90+	90+
Canada	32	35	33	28	37	38	32
Czech Republic	..	..	46	27	..	..	25+
Denmark	60	79	75	74	70+	70+	80+
Finland	51	69	72	76	90+	90+	90+
France	22	18	10	10	80+	90+	90+
Germany	32	35	31	25	80+	80+	68
Greece	..	39	32	27	..	..	..
Hungary	..	..	63	20	..	..	30+
Iceland	..	75	88	84	..	..	..
Ireland	53	57	51	38	..	..	..
Italy	37	50	39	35	80+	80+	80+
Japan	35	31	25	22	25+	20+	15+
Korea	13	15	17	11	15+	20+	10+
Luxembourg	47	52	50	34	..	..	60+
Mexico	..	..	43	18	..	..	..
Netherlands	37	35	25	23	70+	70+	80+
New Zealand	56	69	51	23	60+	60+	25+
Norway	57	58	59	54	70+	70+	70+
Poland	..	..	33	15	..	..	40+
Portugal	..	61	32	24	70+	70+	80+
Slovak Republic	..	..	57	36	..	..	50+
Spain	..	7	11	15	60+	70+	80+
Sweden	68	80	80	79	80+	80+	90+
Switzerland	29	31	24	18	50+	50+	40+
Turkey	..	..	27	33	..	..	..
United Kingdom	45	51	39	31	70+	40+	30+
United States	27	22	15	13	26	18	14
OECD unweighted average	42	47	42	34	67	66	60
OECD weighted average	34	32	27	21	45	38	35

.. Data not available.

Notes: For detailed notes, see Table 3.3, OECD, *Employment Outlook* (2004).

Figures with a + sign represent lower-bound estimates.

For the purposes of calculating averages, the indicated value was increased by 2.5 percentage points.

Source: Table 3.3, OECD, *Employment Outlook* (2004).

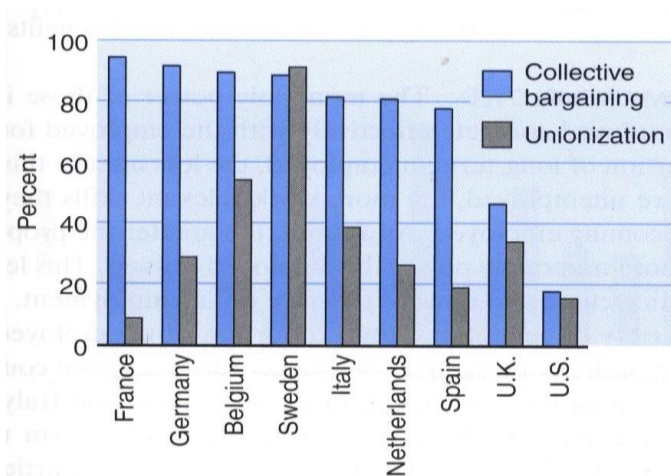


FIGURE 7.10 Union membership and coverage amongst OECD economies, 1994. The significance of labor unions differs substantially across countries. Source: OECD, *Jobs Study* (1994).

- Both Europe and the USA had sharp rises in unemployment in the early 1980s. But, in Europe the unemployment stayed high, while in the USA it has fallen sharply.

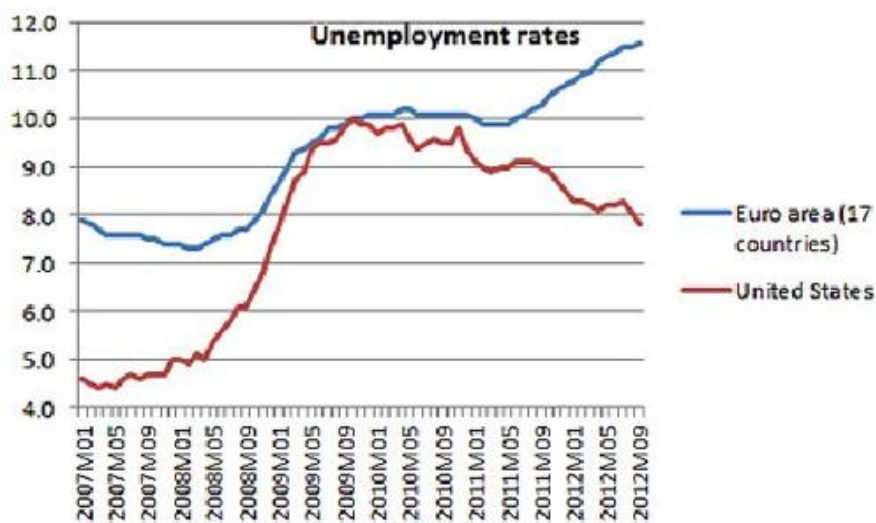


Figure 1.2 Monthly unemployment rate for the USA 1948 to 2003 and comparison of the unemployment rates for the USA and Europe, 1960 to 2003

Source: Federal Reserve Economic Data: St. Louis Fed and US Bureau of Labor Statistics: Foreign Labor Statistics.

Note: EUR is average of France, Italy, UK, and Germany (West Germany before 1991).

Similarly,



<https://www.gfmag.com/global-data/economic-data/worlds-unemployment-ratescom>

● A Simple Concluding Remark

These pieces of evidence seem pretty unfavorable to unions.

Unions are often blamed for the rise of unemployment and the deterioration of economic growth.

● Two further observations against this simple conclusion.

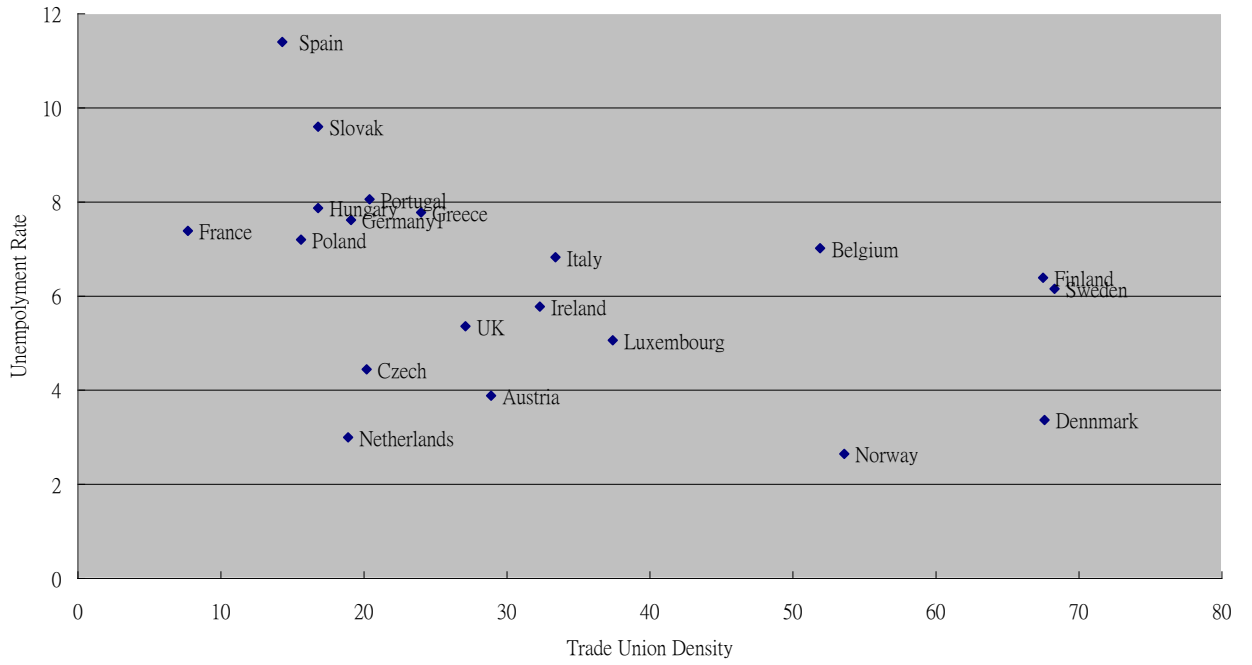
(a) In the 1980s European unions have lost significant legal rights in some countries, especially France, Britain, Spain, and Hungary, but unemployment has not fallen.

(b) A second key piece of evidence comes from the experience of Sweden, Norway, and Austria — countries with the highest unionization in the Western world and some of the lowest unemployment.

Country	Trade Union Density	Unemployment rate	Covered by collective bargaining (%)
Austria	28.9	3.8	98
Belgium	51.9	7.0	96
Czech Republic	20.2	4.4	50
Denmark	67.6	3.3	80
Finland	67.5	6.3	90
France	7.7	7.3	98
Germany	19.1	7.6	61
Greece	24	7.7	65
Hungary	16.8	7.8	25
Ireland	32.3	5.7	44
Italy	33.4	6.8	80
Luxembourg	37.4	5.0	60
Netherlands	18.9	2.9	79
Norway	53.6	2.6	70
Poland	15.6	7.1	30
Portugal	20.4	8.0	90
Slovak Republic	16.8	9.5	35
Spain	14.3	11.4	70
Sweden	68.3	6.1	90
United Kingdom	27.1	5.3	34

Source: OECD.Stat and ETUI in 2008

Unemployment Rate and Trade Union Density(2008, unit:%)



Unemployment Rate and Covered by Collective Bargaining(2008, unit:%)

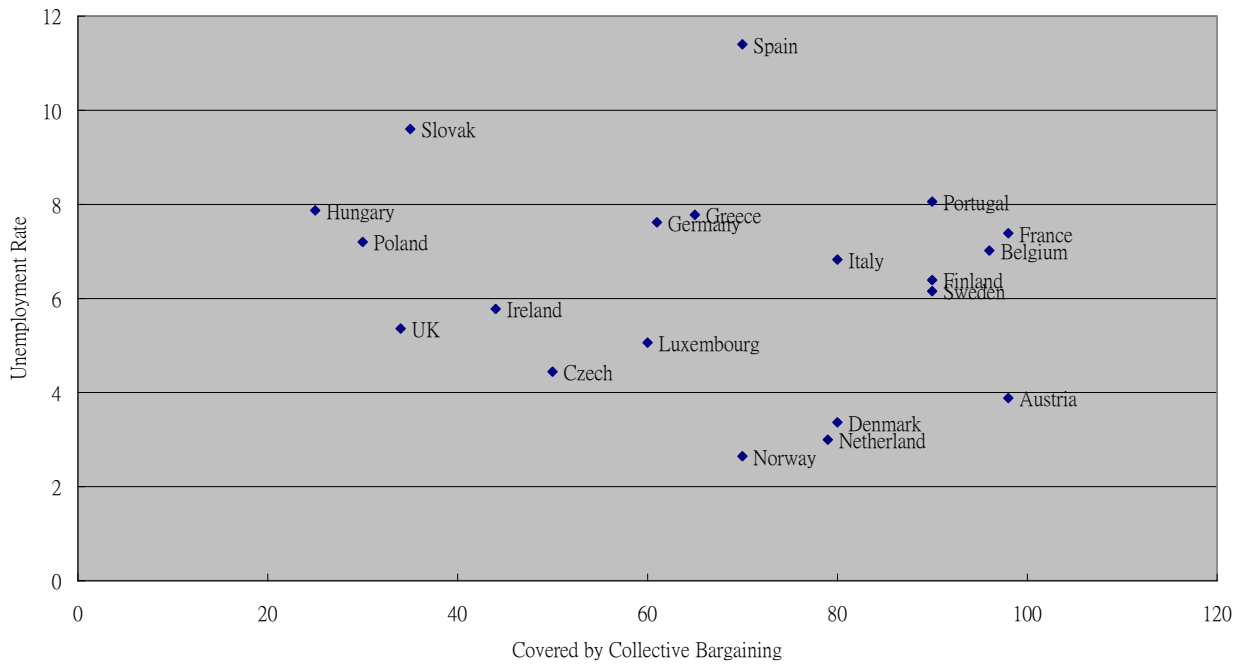
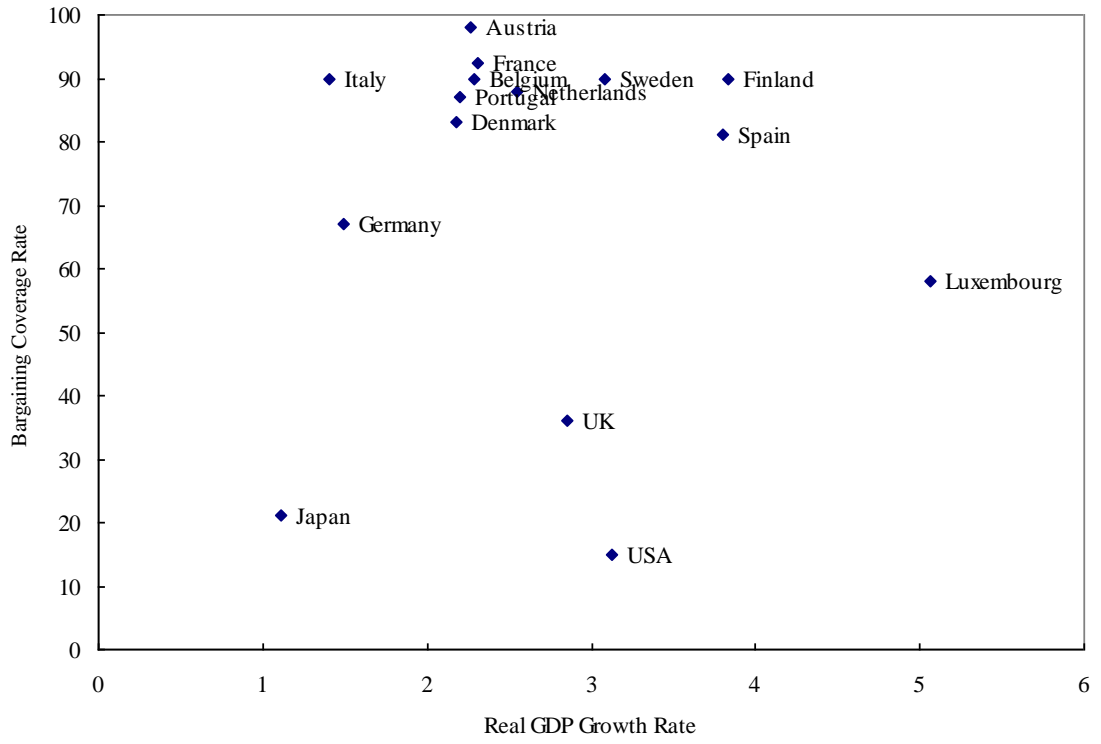


Figure 2: Real GDP Growth Rate and Bargaining Coverage Rate (unit:%)



B. Basic Models (Trade Unionism and Unemployment)

■ Background:

1. Utilitarian objective function : 工會追求成員效用總和的極大，即

$$\max \sum_{i=1}^{\bar{L}} U_i(Y_i) \quad (1)$$

式中 \bar{L} 為工會會員的總數， Y_i 是會員 i 的實質所得， U_i 是會員 i 的效用函數。假定每個成員是相同的(identical)，他們有相同的效用函數；據此，上述的標的函數可改寫成：

$$\max \sum_{i=1}^{\bar{L}} U(Y_i) \quad (1a)$$

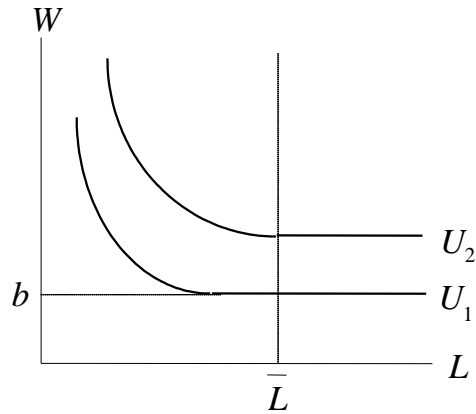
假定工會成員中有 L 是就業者，則 $\bar{L} - L$ 為工會成員失業的人數。同時，進一步假定工會會員就業者的工作時間限制為一單位，失業者則未提供任何的勞動。令 b 代表失業津貼(unemployment benefits)， w 為單位時間的實質工資，則式(1a)可改寫成：

$$\max LU(W) + (\bar{L} - L)U(b) \quad (2)$$

工會的無異曲線，該線符合以下的關係：

$$U^0 = LU(W) + (\bar{L} - L)U(b); \text{ if } L \leq \bar{L}$$

$$\Rightarrow \frac{\partial W}{\partial L}_{U=U^0} = -\frac{U(W) - U(b)}{LU'(W)} < 0; \text{ if } L \leq \bar{L}$$



以上圖形有三點必須注意：

- (1).工作所得 w 必定大於失業津貼，否則工會成員不會去工作。
- (2).於 $L < \bar{L}$ 時，工會面臨提高工資及降低就業、增加就業及壓低工資的選擇。
- (3).於 $L \geq \bar{L}$ 時，工會不必再藉由犧牲工資來換取較高的就業量；因而，無異曲線呈一水平線。

(2) 廠商的利潤函數：

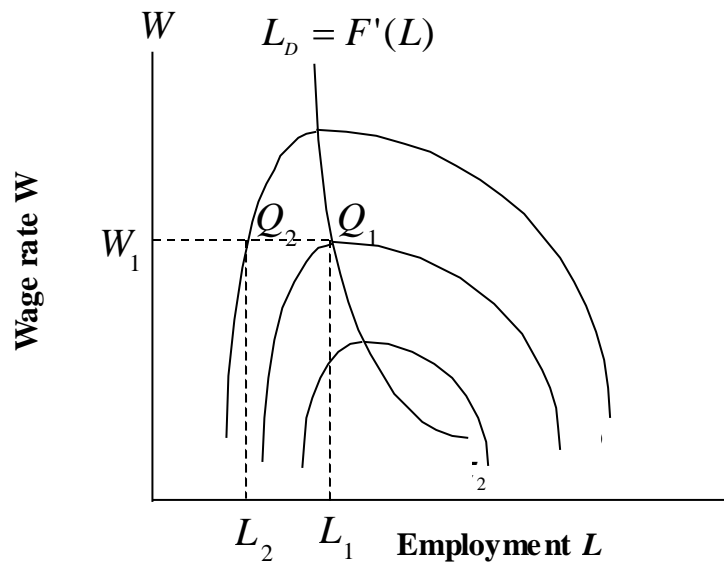
$$\pi = F(L) - WL \quad (5)$$

式中 π 為廠商的實質利潤。

由上式可求導廠商的等利潤曲線，它必須滿足下式：

$$\pi^0 = F(L) - WL$$

$$\Leftrightarrow \frac{\partial W}{\partial L}_{\pi=\pi^0} = \frac{F' - W}{L} \begin{matrix} \geq 0 \\ < 0 \end{matrix}; \text{ if } \begin{matrix} F' \geq W \\ F' < W \end{matrix}$$



於 L_1 時， $F'(L_1) = W_1$ ，故 Q_1 點等利潤線的斜率為零；

於 L_2 時， $F'(L_2) > W_1$ ，故 Q_2 點等利潤線的斜率大於零。

■ Three important models of trade union

- A. Simple monopoly union model
- B. Right to manage model
- C. Efficient bargaining model

(A). Simple monopoly union model

The union acts as a simple monopolist setting the money wage unilaterally and allowing the employer discretion over employment.

$$\max LU(W) + (\bar{L} - L)U(b) \quad (7)$$

$$s.t. \quad F'(L) = W \quad \text{and} \quad W \geq b \quad (8)$$

根據式(7)及(8)，可設定一Lagrange函數：

$$\Lambda = LU(W) + (\bar{L} - L)U(b) + \lambda[W - F'(L)] \quad (9)$$

由式(9)可求得最適條件：

$$\Lambda_w = LU'(W) + \lambda = 0 \quad (9a)$$

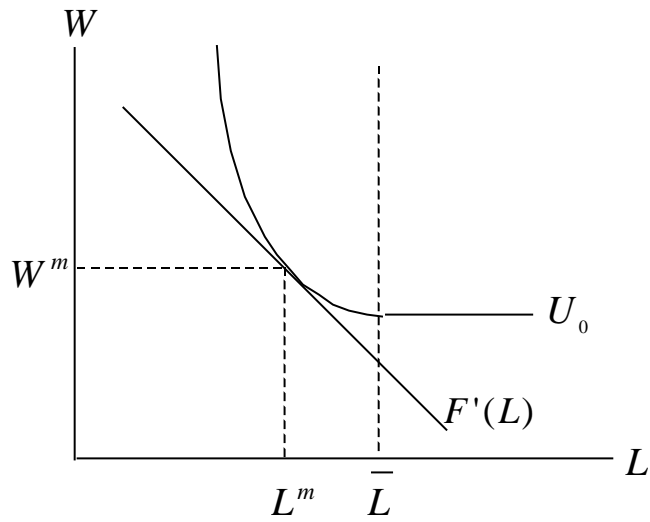
$$\Lambda_L = U(W) - U(b) - \lambda F''(L) = 0 \quad (9b)$$

$$\Lambda_\lambda = W - F'(L) = 0 \quad (9c)$$

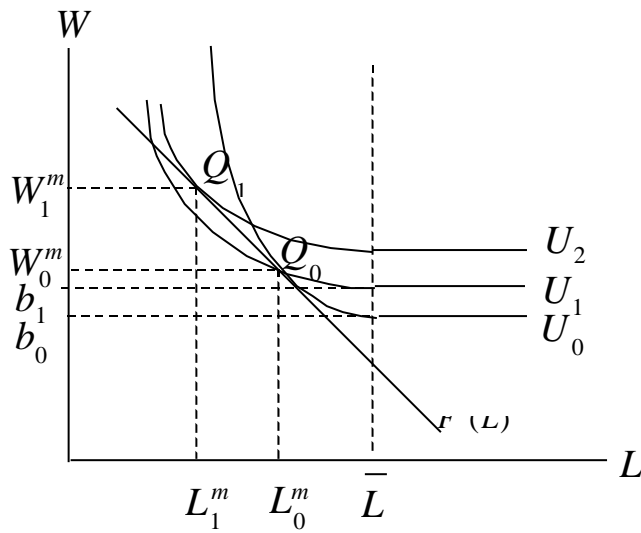
由式(9a)及(9b)可得：

$$-\frac{U(W) - U(b)}{LU'(W)} = F''(L) \quad (10)$$

式(10)等號左邊代表工會無異曲線的斜率，等號右邊代表廠商勞動需求線的斜率。因此，該式明確地顯示，Simple monopoly union模型的均衡點位於工會無異曲線與廠商勞動需求曲線的交點。



Note 1: Unemployment benefits



Note 2: Wage Rigidity (McDonald and Solow, 1981, AER)

$$Y = F(L) = A \cdot L^a, \quad 0 < a < 1.$$

(B). Right to Manage Model

The wage is jointly determined by the union and the firm through bargaining, while the employer retains unilateral control over employment.

Model :

$$\max_{L,W} (U - U_0)^\alpha (\pi - \pi_0)^\beta ; \alpha + \beta = 1 \quad (14)$$

$$s.t. F'(L) = W; W \geq b \quad (15)$$

式中 U_0 及 π_0 分別為廠商與工會沒有簽訂合約時的工會效用水準及廠商利潤水準。在沒有簽訂契約時， $L=0$ ，準此，由式(4)及(5)可知 $U_0 = \bar{L}U(b)$ 及 $\pi_0 = 0$ 。另外， α 及 β 分別為工會及廠商的談判力量。

由式(14)及(15)可設定底下的Lagrange函數 Λ ：

$$\Lambda = \{L[U(W) - U(b)]\}^\alpha [F(L) - WL]^\beta + \lambda[W - F'(L)] \quad (16)$$

一階條件分別為：

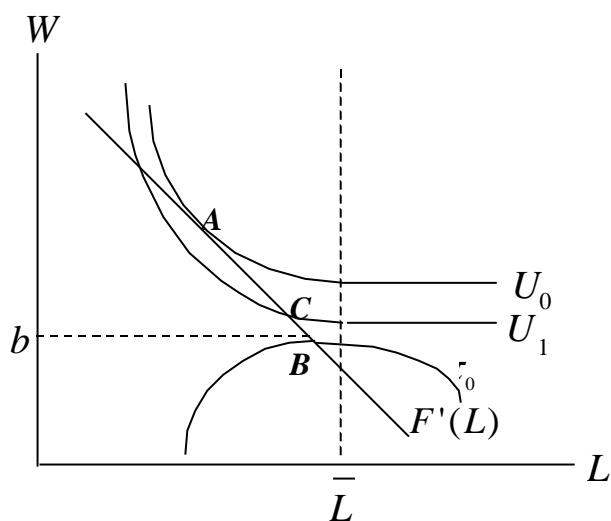
$$\begin{aligned} \Lambda_L &= \alpha L^{\alpha-1} [U(W) - U(b)]^\alpha [F(L) - WL]^\beta \\ &+ L^\alpha [U(W) - U(b)]^\alpha \beta [F(L) - WL]^{\beta-1} [F'(L) - W] - \lambda F''(L) = 0 \end{aligned} \quad (16a)$$

$$\begin{aligned} \Lambda_W &= L^\alpha \alpha [U(W) - U(b)]^{\alpha-1} U'(W) [F(L) - WL]^\beta \\ &+ L^\alpha [U(W) - U(b)]^\alpha \beta [F(L) - WL]^{\beta-1} (-L) + \lambda = 0 \end{aligned} \quad (16b)$$

$$\Lambda_\lambda = W - F'(L) = 0 \quad (16c)$$

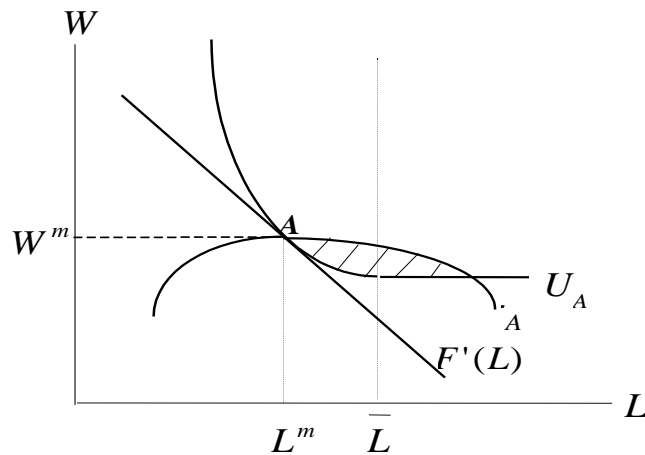
Right to manage model 主張工資是由工會與廠商共同議定，如果工會談判力量主導一切，則均衡點為A（工會的效用最大，廠商的利潤最小）；如果廠商談判力量主導一切，則均衡點為B（工會的效用最小，廠商的利潤最大）。

由於 w 的值域被限制於 $w \geq b$ ，故對廠商而言，B點所對應的利潤 π_0 是它最大的利潤。



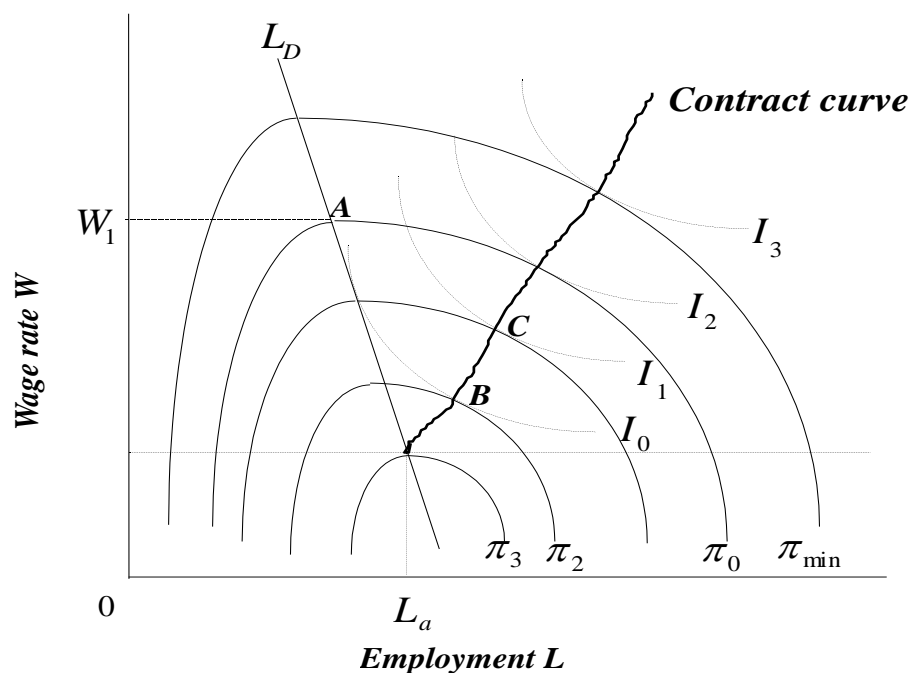
(C). Efficient Bargaining Model

(i) Simple monopoly union 及 right to manage model 最遭到批評的是，從 Pareto optimum 觀點而言，它們是沒有效率的(inefficient)。



如上圖所示，於simple monopoly union均衡點A，廠商獲得 π_A 的利潤，工會獲得 U_A 的效用。顯然，只要廠商及工會透過談判移往斜線區域，則不僅廠商可增加利潤，工會也可增加效用水準，因而A點是沒有效率的。

(ii) contract curve: 工會無異曲線與廠商等利潤線切點所構成的軌跡。



(iii) The model

Efficient bargaining model: generalized Nash-bargaining solution :

$$\max_{L,W} (U - U_0)^\alpha (\pi - \pi_0)^\beta ; \alpha + \beta = 1 \quad (19)$$

$$s.t. \quad W \geq b \text{ and } \pi \geq 0$$

式(19)的 $U_0 = \bar{L}U(b)$ 且 $\pi_0 = 0$ 。 Efficient bargaining model 與 Right to manage model 最大的差異在於，前者工會與廠商同時談判工資及就業的決定，後者工會與廠商只談判工資的決定。

式(19)可改寫成：

$$\max_{W,L} \Lambda = \{L[U(W) - U(b)]\}^\alpha [F(L) - WL]^\beta ; \alpha + \beta = 1 \quad (20)$$

則 efficient bargaining 模型的一階最適條件為：

$$\Lambda_W = L^\alpha \alpha [U(W) - U(b)]^{\alpha-1} U'(W) [F(L) - WL]^\beta + L^\alpha [U(W) - U(b)]^\alpha \beta [F(L) - WL]^{\beta-1} (-L) = 0 \quad (20a)$$

$$\Lambda_L = \alpha L^{\alpha-1} [U(W) - U(b)]^\alpha [F(L) - WL]^\beta + L^\alpha [U(W) - U(b)]^\alpha \beta [F(L) - WL]^{\beta-1} [F'(L) - W] = 0 \quad (20b)$$

● **Contract Curve:** 從式(20a)及(20b)可得：

$$\frac{\alpha L^{\alpha-1} [U(W) - U(b)]^\alpha [F(L) - WL]^\beta}{L^\alpha \alpha [U(W) - U(b)]^{\alpha-1} U'(W) [F(L) - WL]^\beta} = \frac{-L^\alpha [U(W) - U(b)]^\alpha \beta [F(L) - WL]^{\beta-1} [F'(L) - W]}{L^\alpha [U(W) - U(b)]^\alpha \beta [F(L) - WL]^{\beta-1} L}$$

$$\frac{U(W) - U(b)}{LU'(W)} = \frac{F'(L) - W}{L} \quad (21)$$

$$\Rightarrow \frac{\partial W}{\partial L_{U^0}} = \frac{\partial W}{\partial L_{\pi^0}}$$

式(21)表示 efficient bargaining model 的解必然滿足無異曲線與等利潤線相切的條件。

● **Power Locus**: 由式(20b)可得：

$$L^{\alpha-1} [U(W) - U(b)]^{\alpha} [F(L) - WL]^{\beta-1} \{ \alpha [F(L) - WL] + \beta L [F'(L) - W] \} = 0$$

$$\alpha [F(L) - WL] + \beta L [F'(L) - W] = 0$$

$$\Leftrightarrow W = \frac{\alpha F(L) + \beta L F'(L)}{(\alpha + \beta)L} = \alpha \frac{F(L)}{L} + \beta F'(L) \quad (23)$$

式(23)顯示，效率談判模型的工資是平均勞動生產力與邊際勞動生產力的加權平均數。

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■ Concluding Remarks:

● There are two competing approaches:

(i) Labor demand models:

the simple monopoly union and right to manage union models:

- the union and the employer federation bargain over wage and employment is determined unilaterally by firms as part of their “right to manage,” leading to a *Pareto inefficient* on the labor demand curve.
- equilibrium is located on the downward-sloping demand curve, the relationship between wages and employment is hence negative.

(ii) Optimal contract models:

Efficient wage-employment bargaining

- Under the efficient bargaining, in contrast, the union and the employer federation jointly bargain over wage and employment, leading to a *Pareto efficient* outcome on the contract curve.
- optimal contracts model predicts that equilibrium is located on the Pareto-optimal contract curve. If workers are risk averse, the curve is upward sloping, thus the relationship between wages and employment is positive.

(iii) The decision as to which is the appropriate model of the unionized sector is an important issue because the models have different implications for unemployment, with the efficiency bargaining model predicting over-employment and the other models predicting unemployment.

● Which one is appropriate? This problem refers to empirical studies.

(i) What is the relationship between wages and employment?

Several test of these two models exist, the results they yield are inconclusive. See Brown and Ashenfelter (1986, JPE), Eberts and Stone (1986, Southern EJ), and MaCurdy and Pencave (1986, JPE) for related evidence.

(ii) Whether employment is a subject of routine negotiation?

In response to an increase in the extent of unionization, employment will increase if the union and the firm bargain over employment and wages, but it will decrease if they bargain only over wages.

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◆ Layard, Nickell, and Jackman (1991, Unemployment, pp. 90-91)

claim that all bargains certainly cover wages, while employment is rarely a subject of routine negotiation. To find the facts on this, Oswald (1987, Discussion paper in London School of Economics Centre) wrote to the largest 60 US and 60 British unions. His questionnaire began, “Does your union normally negotiate over the number of job as well as over wages and conditions? Only 2 US respondents said yes (out of 19) and only 3 British respondents said yes (out of 18). Therefore, Layard, Nickell, and Jackman conclude that the assumption of bargaining over employment between the union and the firm is not supported by the evidence.

In general, unions do not bargain routinely about the level of total employment in the firm or sector level ... Except in special cases, it is the employer who has the unilateral right to fix the total number of jobs.
[OSWALD AND TURNBULL (1985)]

◆ More Discussions:

The level of employment is relatively low in a labor demand model, such as simple monopoly union model. But Kidd and Oswald (1987, *Economica*) and Jones (1987, *Economics Letters*) argue that the static union model overstates the distortion effects caused by union rationing of jobs.

When union membership is endogenized, they suggest that equilibrium employment level is higher in the intertemporal monopoly union than in the conventional static model. In other words, the distortion effect of the trade union is less serious in a dynamic trade union model.

A Dynamic Model of Trade Union Behavior

[Kidd and Oswald (1987, *Economica*) and Jones (1987, *Economics Letters*)]

(1) Post-entry closed shop:

The most recent British study (e.g., Barker, Lewis, and McCann, 1984, *British Journal of Industrial Relations*) argues that, except in very special cases, those workers who lose their job go on to leave their trade unions.

$$\begin{aligned}m_{t+1} &= n_t \\m_{t+1} - m_t &= n_t - m_t \\ \dot{m} &= n - m\end{aligned}\tag{1}$$

(2) A dynamic optimization problem

$$\begin{aligned} & \text{Max}_n \int_0^{\infty} \{nu(w) + (m-n)u(b)\}e^{-rt} dt \\ & \text{s.t. } w = pf'(n) \\ & \dot{m} = n - m \end{aligned} \quad (2)$$

$$H = [nu(pf'(n)) + (m-n)u(b)] + \lambda[n-m] \quad (3)$$

From equation (3), the first order conditions are

$$H_n = \beta(n) - u(b) + \lambda = 0 \quad (3a)$$

$$H_m = -\dot{\lambda} + r\lambda \Rightarrow -\dot{\lambda} = u(b) - (1+r)\lambda \quad (3b)$$

$$H_\lambda = \dot{m} \Rightarrow \dot{m} = n - m \quad (3c)$$

In eq. (3a), $\beta(n) = u(pf') + nu'pf''$. Accordingly, $\beta' = 2u'pf'' + nu''(pf'')^2 < 0$, and $\beta'' = 3u''(pf'')^2 < 0$ as $f''' = u''' = 0$.

From eq. (3a), we obtain

$$\lambda = -[\beta(n) - u(b)] \quad (4)$$

Differentiating the above equation with respect to time yields

$$\dot{\lambda} = -\beta' \dot{n} \quad (5)$$

Substituting eqs. (4) and (5) into (3b), the time path form employment can be represented by

$$\begin{aligned} \beta' \dot{n} &= u(b) + (1+r)[\beta(n) - u(b)] \\ \dot{n} &= \frac{1}{\beta'} [(1+r)\beta(n) - ru(b)] \end{aligned} \quad (6)$$

We then can work with the simultaneous differential eqs. (3c) and (6) to trace out the dynamic behavior m and n . However, since our purpose is concerned with the level of steady-state employment, in what follows we only focus on the stationary

situation.

In the steady state, $\dot{m} = \dot{n} = 0$ holds. Thus, from eqs. (3c) and (6), we have

$$n^* = m^* \quad (7)$$

$$(1+r)\beta(n^*) = ru(b) \quad (8)$$

(3) A static result

$$\max_n \{nu(pf'(n) + (m-n)u(b))\}$$

The first order condition is

$$\beta(n_s) = u(b)$$

where n_s is the level of employment in the static model.

(4) The comparison

(a) static model: $\beta(n_s) = u(b)$

(b) dynamic model: $\beta(n^*) = \frac{r}{1+r}u(b)$

$$\because u(b) > \frac{r}{1+r}u(b), \text{ and } \beta' < 0 \quad \longrightarrow \quad n^* > n_s.$$

Intuition:

The union pursuing intertemporal optimization is concerned about the sum of utilities of current and future members. Given that current employment will join and become future members as well, the trade union will be inclined to expand membership through boosting the current employment level.

◆ Social custom models

Booth, A.L. (1985) The Free Rider Problem and a Social Custom Model of Trade Union Membership. Quarterly Journal of Economics 100(1):253-61.

Booth, A.L. (1984) A Public Choice Model of Trade Union Behaviour and Membership.
Economic Journal 94, 883-898.

Naylor, R. (1989) Strikes, Free Riders, and Social Customs, [Quarterly Journal of Economics](#)
[104\(4\)](#): 771-785.