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EERI Research Paper Series No 06/2002

ISSN: 2031-4892

EERI
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* Part of this research was presented at the Economics Department of Catholic University of Portugal seminar and at EALE Conference meetings at Maastricht. I am grateful for the comments made by participants in both seminars.

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ABSTRACT

Unemployment Insurance and Union Behavior: Comparison of Some Paradigms and Endogenous Membership

This paper discusses the sensitivity of the labor market outcome in the standard bargaining paradigms - monopoly union and efficient bargaining - to the existence of a budget constraint pending on the financing of the unemployment benefit.

Consequences of how the unions value members and members' status (employed or unemployed) in their collective maximand, implications of union having control over membership, and, hence, of unemployment insurance coverage, are also considered, as well as of different fiscal scenarios on the form of financing the unemployment benefit bill.

JEL Classification: J51, J65, E24, H55, H39.

Keywords: Unions, Wage Determination Models, Unemployment Benefit, Unemployment Insurance, Union Wage Bargaining, Union Membership.

Unemployment Insurance and Union Behavior:
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CONTENTS

Unemployment Insurance and Union Behavior: Comparison of Some Paradigms and Endogenous Membership.

Introduction.

This paper discusses some extensions of the standard union model of wage determination in order to analyze the existence of internal transfers among employed and unemployed members. The results would also apply to the case where these transfers are operated through the tax system. The conclusions may be adequate for Portugal, where all private sector employment discounts for the general unemployment fund.

Some unions may provide payments to unemployed members; or may also bargain over severance pay in contract settlements. Additionally - once union internal transfers seem to be quite small -, it is likely that unions, especially if they engage in centralized or coordinated behavior, consider that the unemployment benefit is, after all, a compensation the burden of which falls on employed workers - obtained indirectly through taxation [1]. Moreover, particularly with centralized bargaining, the union may have the power to determine the size of the unemployment benefit., i.e., it has full control over the insurance policy.

It is the purpose of this research to evaluate the modifications in union behavior implied by the inclusion of such hypothesis in the standard model.

This analysis has been previously pursued - for the monopoly utilitarian union, see Oswald (1982a), Holmlund and Lundborg (1988 and 1989), and Kiander (1993) in a model with job search; efficient bargaining is considered by Hart and Moutos (1995), p. 110-116 (there, the benefit rate is always exogenously determined) and right-to-manage by Booth (1995a); recently, Holmlund and Lundborg (1999) introduced endogenous membership. Most authors are interested in analyzing the impact of the unemployment benefit on the labor market outcome; we focus on the comparison of labor market outcomes in the several scenarios.

We generalize the way the implicit collective decision process values employed members, total membership and/or unemployed members and consider the case where the union can affect membership [2]. We compare the labor market solution for different

[1] As noted by Calmfors and Driffill (1988).

[2] See Martins (1998) for some implications for the wage-employment mix outcome. There, closed-shop environment is assumed; hence, the membership function stems from labor supply.

situations assuming a budget constraint which may or may not be recognized by either unions or firms and confront several fiscal schemes.

Firstly, in section I, we analyze the simple effect of the possibility of compensating unemployed members under a balanced budget constraint. This has special relevance when there is centralized bargaining and complete coverage of wage set in negotiations to both union members and non-members (as is the case in Portugal). We compare the labor market equilibrium for three different situations: exogenous unemployment benefit; exogenous but recognized by the union as falling on employed members under a budget constraint; and, finally, endogenous unemployment benefit.

Secondly, we consider - a sort of insider-outsider environment - the case where the union can choose membership size - section II. Notice that outsiders are not necessarily unemployed labor: with certain unemployment compensation schemes, outsiders will be non-members. With exogenous unemployment benefit, if union members increase, we expect equilibrium wages to be depressed and unemployment to rise [3]. When the union can decide membership – for instance, it has control or bargaining power over unemployment insurance coverage -, the labor market outcome depends on how the union collectively values size, i.e., number of members – see Martins (2002); endogenous unemployment benefit may alter union size as well as the equilibrium wage-unemployment mix.

Finally, we note that the labor market outcome is not independent of the form of financing of the unemployment compensation payment. Oswald (1982a) deals with the subject in the standard union model for the case of exogenous unemployment benefit level; he concludes that if it rises, in general, a rise in unemployment is to be expected. Holmlund and Lundborg (1989) explore the sensitivity of the labor market outcome to fiscal parameters under different financing schemes and the assumption of exogenous unemployment benefit. These same authors (1988) deal with union financed unemployment benefit bill; they conclude that an increase in unemployment benefits has an ambiguous effect on wages and unemployment. In some systems, only part of the unemployment compensation burden falls on employed members, having similar implications to profit-sharing schemes – as noted in previous literature; then, some severance pay theory results – as those of Booth (1995a) - may or may not apply; also, final incidence may diverge from the direct taxpaying unit. This is the theme of section III.

Membership in or open shop has been discussed by Naylor and Cripps (1993), Booth and Chatterji (1993 and 1995) and Naylor and Raaum (1993), for example.

[3] This is not the case for an utilitarian union: see Oswald (1982).

In all sections, reference is made to the result of the monopoly union problem, the efficient bargaining outcome and features of the solution of some special cases of the union's utility function. The sign of the relation implicit in the wage bargaining curve - see Carlin and Soskice (1990), and empirical evidence on the wage-unemployment relation in Blanchflower and Oswald (1994) -, and its existence in this setting are also inspected issues.

The modeling is kept as simple and general as possible in order to focus on the special mechanism in study.

The exposition ends with a brief summary in section IV.

I. Internal Transfers among Union Members.

I.1. Monopoly Union.

Take the case where union membership is exogenous and given by M. Let b denote the unemployment benefit and s the contribution of a working member. It is, thus, reasonable to assume that the utility function of the union is a function of the net wage received by employed members, W - s, the number of employed members, L, of the amount received by unemployed members, b, and the number of unemployed members, M - L. Eventually, union size, M, may be, per se, an argument of the utility function:

(I.1) $U(L, W - s, M - L, b, M)$

$U_1 > 0$; $U_2 > 0$; $U_4 > 0$. We also expect that $U_3 > 0$, but not necessarily. U_5 may be positive or negative [4]. $U_L = U_1 - U_3$ and $U_M = U_3 + U_5$; then $U_3 = U_1 - U_L = U_M - U_5$.

As a monopoly union, it maximizes its utility function constrained by labor demand, that determines employment, $L = L(W)$, with slope $L_W < 0$ and inverse form related to the value of marginal product of labor, $P\,F_L(L) = W$, where P denotes the output price level.

Model I. If internal transfers are unavailable or if the unemployment benefit mechanism is ignored – i.e. if b and s are seen as exogenous and unrelated -, then we observe that F.O.C., involving only optimization of:

(I.2)
$$\max_{L,\,W}\; U[L, W - s, M - L, b, M]$$
$$\text{s.t.:} \quad L = L(W)$$

that would lead to the general solution [5]:

(I.3) $U_1 L_W + U_2 - U_3 L_W = 0$ or $(U_1 - U_3) L_W = - U_2$

[4] See Martins (1998) for considerations on the subject.

[5] We will always assume that SOC hold around it.

Once $L_W < 0$ and $U_2 > 0$, in the interior solution $U_1 > U_3$.

Model II. An equilibrium budget constraint requires that:

$$\text{(I.4)} \qquad b\,(M - L) = L\,s \qquad \text{or} \qquad b\,u = (1-u)\,s$$

where $u = (M - L) / M$ denotes the unemployment rate. If the monopoly union cannot control s nor b but recognizes the budget constraint, it will solve:

$$\text{(I.5)} \qquad \underset{L,\,W}{\text{Max}}\ U[L, W - s, M - L, s\,L / (M - L), M]$$

$$\text{s.t.:} \qquad L = L(W)$$

F.O.C. originate:

$$\text{(I.6)} \qquad U_1\,L_W + U_2 - U_3\,L_W + U_4\,L_W\,M\,s / (M - L)^2 = 0$$

Given that L_W is negative, and $U_4 > 0$, for the same levels of b and the optimal solution (L^*, W^* and implicit u^* and s) of (I.3), i.e., of **Model I**, the left hand-side of (I.6) is negative - utility is already decreasing. This means that, regardless of the sign of U_3, we expect the wage to be higher - employment lower - if there is a failure from the part of the union to recognize the budget constraint [6]. Intuitively, this would be the expected result: if the burden of the unemployment insurance bill is recognized as feedbacking to employed labor, the union will try to reduce it to some extent, cutting back on wages and hence, unemployment.

Model III. Finally, assume the union can also control the unemployment benefit, or an equivalent severance payment, b - and, through the budget constraint, s. Then the union solves:

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[6] The left hand-side of (I.6) by SOC decreases with W, and it is negative at the wage level satisfying (I.3); hence, to restore equality to 0 W must decrease relative to that level.

(I.7) $\max_{L, W, s} U[L, W - s, M - L, s L / (M - L), M]$

s.t.: $L = L(W)$

F.O.C. originate (I.6) and:

(I.8) $- U_2 + U_4 L / (M - L) = 0$ or $U_2 - U_4 L / (M - L) = 0$ and
$U_2 / U_4 = L / (M - L) = (1 - u) / u$

Consider the s chosen by the government and the wage set in (I.6) in **Model II**. For such solution, if $U_2 < U_4 L / (M - L)$, we expect s chosen by the union to be now higher. Also, for the s, W and L of **Model II**, and again if $U_2 < U_4 L / (M - L)$:

(I.9) $U_1 L_W + U_2 - U_3 L_W + U_4 L_W M s / (M - L)^2 <$
$< U_1 L_W - U_3 L_W + U_4 [L / (M - L) + L_W M s / (M - L)^2]$

The right hand-side is – once the left hand-side is zero -, positive at the solution of **Model II**. As it must equal zero for an internal solution of **Model III**, we expect wages to be higher than in **Model II**. That is, if s imposed by the government – in **Model II** - was low compared to what the union wants to set, wages and unemployment (and s) will be higher [7] – and b will also be higher [8].

Conversely, if s set by the government is larger than the one that would have been chosen by the union, the wage chosen by the union will likely be lower when s and b become endogenous.

This result can be explained as follows: if the union prefers or sets a higher s – or b -, net wages will decrease; to compensate workers, it must raise gross wages, and will have to cope with higher unemployment.

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[7] Provided $\partial^2 U[L, W - s, M - L, s L / (M - L), M] / \partial W \partial s > 0$. Around the solution of (I.6), that is guaranteed by a positive U_4 if also $U_{1s} L_W + U_{2s} - U_{3s} L_W + U_{4s} L_W M s / (M - L)^2$ is 0 or negligible compared to $U_4 L_W M / (M – L)^2$.

[8] For the budget constraint to hold, $(1-u)\, db = u\, ds + (s * b)\, du$; if $du, ds > 0$, then $db > 0$.

If in the optimal solution the union's marginal utility derived from employed and unemployed members is the same, i.e., $U_1 = U_3$ - say, that individually they have the same weight in the collective decision of the union - then, because from (I.8), we arrive, from (I.6), at the expression:

$$\text{(I.10)} \qquad \eta_{L,W} = u\, W / s = (1\text{-}u)\, W / b$$

$$\text{or} \qquad W = \eta_{L,W}\, s / u = \eta_{L,W}\, b / (1\text{-}u)$$

where $\eta_{L,W}$ denotes the (absolute value of the) wage-elasticity of the demand for labor. If b is fixed primarily by the union, we observe a positively sloped wage bargaining curve – from $W = \eta_{L,W}\, b / (1\text{-}u)$, and (for constant $\eta_{L,W}$) $\partial W/\partial u > 0$; however, it is arguable that (I.10) yields the bargained real wage curve, once b is endogenous. In net wages:

$$\text{(I.11)} \qquad W - s = b\,(\eta_{L,W} - u) / (1\text{-}u) = s\,(\eta_{L,W} - u) / u$$

Employed members will be better-off than unemployed members iff $\eta_{L,W} > 1$. In this case, $\partial(W\text{-}s)/\partial u > 0$ (positively sloped net wage bargaining curve).

I.2. Efficient Bargaining.

Model I. Consider the traditional model. The efficient contract locus can be obtained from [9]

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[9] See Earle and Pencavel (1990) - the "canonical bargaining form". The Nash maximand solution

$$\max_{L,\,W}\ [U(L,W) - \bar{U}]^{\beta}\ [\Pi(L,W) - \bar{\Pi}]$$

considered to arise in a bargaining where alternatives to agreement are $\bar{U}$ and $\bar{\Pi}$ for the parties involved, would complicate some of the mathematics - and gives the same efficient combinations (L,W). β corresponds to the ratio of the firm discount rate to the union's discount rate, and will, therefore, be higher the higher the relative bargaining power of the union. See Layard, Nickell and Jackman (1991), for example.

$$\text{(I.12)} \qquad \max_{L,\,W} \; U[L, W\text{-}s, M\text{-}L, b, M] + B\,[P\,F(L) - W\,L]$$

F.O.C. originate:

$$\text{(I.13)} \qquad U_1 - U_3 + B\,(P\,F_L - W) = 0$$

$$\text{(I.14)} \qquad U_2 - B\,L = 0$$

The efficient contract locus will be on:

$$\text{(I.15)} \qquad (U_1 - U_3) / U_2 = (W - P\,F_L) / L$$

In this case, if $U_1 = U_3$, the contract curve coincides with labor demand.

Model II. If the budget constraint is recognized by the union, then:

$$\text{(I.16)} \qquad \max_{L,\,W} \; U[L, W\text{-}s, M\text{-}L, sL/(M\text{-}L), M] + B\,[P\,F(L) - W\,L]$$

F.O.C. originate (I.14) and:

$$\text{(I.17)} \qquad U_1 - U_3 + U_4\,M\,s / (M - L)^2 + B\,(P\,F_L - W) = 0$$

The efficient contract locus will be:

$$\text{(I.18)} \qquad [U_1 - U_3 + U_4\,M\,s / (M - L)^2] / U_2 = (W - P\,F_L) / L \quad \text{or}$$

$$[U_1 - U_3 + U_4\,b / (u\,L)] / U_2 = (W - P\,F_L) / L$$

As long as U_4 is positive, the contract curve is expected to be to the right of (I.15) in space (L,W). It is straightforward to see it for $U_1 = U_3$; then, $W > P\,F_L$, i.e., the contract curve will be to the right of the labor demand schedule – the contract curve of **Model I**. The recognition of the budget constraint leads to an outward shift of the contract curve and a demand for higher wages at previously level of bargained employment.

Model III. If the union can control the unemployment benefit, it solves

$$\text{(I.19)} \qquad \underset{L,\, W,\, s}{\text{Max}}\ U[L, W\text{-}s, M\text{-}L, sL/(M\text{-}L), M] + B\, [P\, F(L) - W\, L]$$

F.O.C. originate (I.14), (I.17) and (I.8) of the monopoly union problem:

$$\text{(I.20)} \qquad - U_2 + U_4\, L / (M - L) = 0$$

Given that (I.20) - reproducing (I.8) - holds, the efficient locus will be such that

$$\text{(I.21)} \qquad (W - P\, F_L) / L = (U_1 - U_3) / U_2 + s / (L\, u)$$

If, again, in the optimal solution $U_1 = U_3$:

$$\text{(I.22)} \qquad W - P\, F_L = s / u = b / (1\text{-}u)$$

In net wages:

$$\text{(I.23)} \qquad W - s - P\, F_L = b = s\, (1 - u) / u$$

An implication is that, regardless of form of the utility function, provided that $U_1 = U_3$, and that in the final outcome $P\, F_L > 0$, employed members are necessarily better-off than unemployed, i.e., $W - s > b$.

Proposition 1. If the unemployment benefit budget constraint is recognized by the union:

1. The monopoly union wage is lower than if the budget constraint is ignored by the union.

2. If in the optimal solution the union's marginal utility derived from employed and unemployed members is the same, the contract curve will lie to the right of labor demand, the contract curve when the budget constraint is not recognized by the union.

Proposition 2. If internal transfers are available or the unemployment benefit is seen as controlled by the union and financed by union members:

1. When the unemployment benefit level chosen by the government is lower than the unions´s choice, the monopoly union wage is higher and employment lower when its level becomes endogenous and conversely.

2. If in the optimal solution the union's marginal utility derived from employed and unemployed members is the same:

2.1. monopoly union will originate:

$$W = \eta_{L,W}\, s / u = \eta_{L,W}\, b / (1-u) \quad \text{and}$$

$$W - s = s\,(\eta_{L,W} - u) / u = b\,(\eta_{L,W} - u) / (1-u)$$

Unemployed members will be better-off than employed members, i.e., $W - s < b$, iff $\eta_{L,W} < 1$. The net wage bargaining curve will be negatively sloped in that case, but will be positively sloped if $\eta_{L,W} > 1$.

2.2. in the efficient bargaining locus:

$$W - P\,F_L = s / u = b / (1-u) \quad \text{and}$$

$$W - s - P\,F_L = b = s\,(1 - u) / u$$

In this case, unemployed members will never be better-off than employed members, i.e., $W - s \geq b$ - as long as $P\,F_L \geq 0$. The bargaining curve will be positively sloped.

I.3. A Special Case.

Consider the widely used utilitarian union - u(.) denotes the utility of a member, increasing and concave in its argument, net income from labor - that maximizes:

(I.24) $$L\,u(W\text{-}s) + (M - L)\,u(b)$$

Then, $U_1 = u(W\text{-}s)$; $U_2 = L\,u'(W\text{-}s)$; $U_3 = u(b)$; $U_4 = (M - L)\,u'(b)$; and $U_5 = 0$.

A. Exogenous Membership.

1. Take the monopoly union.

Model I. If internal transfers are unavailable or if the unemployment benefit mechanism is ignored then, we observe that F.O.C., involving only optimization in L and W of:

(I.25) $$\max_{L,\,W} \; L\,u(W\text{-}s) + (M - L)\,u(b)$$

$$\text{s.t.:} \quad L = L(W)$$

F.O.C. originating the well-known solution

(I.26) $$L(W)\,u'(W\text{-}s) + [u(W\text{-}s) - u(b)]\,L_W = 0$$

For an interior solution u(W-s) > u(b) - that is, $U_1 > U_3$ - and unemployed members will be worse-off than employed ones: W - s > b which implies W (1 - u) > b.

Model II. Then the union solves:

(I.27) $$\max_{L,\,W} \; L\,u(W\text{-}s) + (M - L)\,u[s\,L/(M\text{-}L)]$$

$$\text{s.t.:} \quad L = L(W)$$

F.O.C. generate:

(I.28) $$L(W)\,u'(W\text{-}s) + [u(W\text{-}s) - u(b)]\,L_W + (s\,/\,u)\,u'(b)\,L_W = 0$$

At the solution that satisfies (I.26), (I.28) is negative: wages will be lower than if the budget constraint was not recognized.

Model III. Then the union solves:

(I.29) $$\max_{L,\,W,\,s} \; L\,u(W\text{-}s) + (M - L)\,u[s\,L/(M\text{-}L)]$$

$$\text{s.t.:} \quad L = L(W)$$

F.O.C. originate (I.28) and:

(I.30) $$- L\,u'(W\text{-}s) + L\,u'[s\,L/(M\text{-}L)] = 0$$

From here we conclude that in the optimal solution the utility of employed and unemployed members will be the same. Notice that then, $U_1 = U_3$ and W -s = b. Therefore:

(I.31) $$W = s / u \quad \text{or} \quad W = b / (1-u)$$

Also, if s chosen by the union is larger than the one set by the government in **Model II**, (I.28) is negative at the b, u and W of **Model III** and s set by the government in **II**; the maximand of **Model II** is already decreasing. The wage chosen by the union in **Model III** is higher than if it cannot control b.

The wage/unemployment relation (with b) will be positive for unions that choose the same unemployment compensation.

Rearranging the expression $\partial\Pi/\partial W = 0$, where Π denotes the objective function where labor demand has been incorporated (or considering that when $U_1 = U_3$, (I.10) holds), we arrive at

(I.32) $$\eta_{L,W} = 1$$

Recall that is the solution of the monopoly union that maximizes the wage bill W L, and this solution is what we would expect in an utilitarian environment with income transfers among members [10].

2. Consider now efficient bargaining.

Model I. If internal transfers are unavailable or if the unemployment benefit mechanism is ignored then, we observe the traditional case, involving only optimization in L and W of:

(I.33) $$\max_{L,\,W} \; L\, u(W-s) + (M - L)\, u(b) + B\, [P\, F(L) - W\, L]$$

F.O.C. originate:

[10] An analogous result is advanced in McDonald and Solow (1981) when they analyze an union as a "commune". They consider an utilitarian union - see special case below - where employed members have disutility from work.

$$u(W\text{-}s) - u(b) + B\,(P\,F_L - W) = 0 \qquad \text{(I.34)}$$

$$L\,u'(W\text{-}s) - B\,L = 0 \qquad \text{(I.35)}$$

from which we can derive the standard contract curve:

$$[u(W\text{-}s) - u(b)] \,/\, u'(W\text{-}s) \;=\; W - P\,F_L \qquad \text{(I.36)}$$

Then $U_1 \geq U_3$ iff $W \geq P\,F_L$ (i.e., as long as the wage is larger than on the labor demand schedule - the contract curve is to the right of labor demand - on space (L, W)). In the optimal solution, then, $u(W\text{-}s) \geq u(b)$ and employed members will be better-off than unemployed ones.

Notice that (I.35) determines W - s [11]:

$$u'(W - s) \;= B \qquad \text{(I.37)}$$

Ex-post, s is subject to the budget constraint and we can write that $u'[W - b\,u \,/\, (1 - u)] \;= B$. For fixed B, and b, which is exogenous in this case, W increases with the unemployment rate.

Model II. If internal transfers are available and the unemployment benefit is exogenously determined:

$$\max_{L,\,W} \; L\,u(W\text{-}s) + (M - L)\,u[s\,L/(M\text{-}L)] + B\,[P\,F(L) - W\,L] \qquad \text{(I.38)}$$

F.O.C. originate (I.35) and:

$$u(W\text{-}s) - u[s\,L/(M\text{-}L)] + u'[s\,L/(M\text{-}L)]\,sM/(M\text{-}L) + B\,(P\,F_L - W) = 0 \qquad \text{(I.39)}$$

[11] Again, recall that this result derives from the form of the canonical bargaining problem - but not the efficient bargaining locus. Nevertheless, (I.36) would hold if the standard Nash maximand was used instead.

For the W* of **Model I**, defined by (I.35), and L* that guarantees (I.34), the left hand-side of (I.39) is positive, implying a higher level of employment for that same wage level in **Model II**, when the budget constraint is recognized. Then we conclude that the contract curve shifts to the right.

Again, (I.37) holds. The contract curve will be given by:

$$\text{(I.40)} \qquad [u(W\text{-}s) - u(b) + u'(b)\, b / M] / u'(W\text{-}s) = W - P\, F_L$$

In the interior solution, U_1 may be larger or smaller than U_3 if $W \geq P\, F_L$. If $U_1 = U_3$, then

$$\text{(I.41)} \qquad b / M = W - P\, F_L \qquad \text{or} \qquad s / M = (W - P\, F_L)\, u / (1 - u)$$

Model III. Finally, if the union has control over the unemployment benefit, it solves:

$$\text{(I.42)} \qquad \underset{L,\, W,\, s}{\text{Max}} \quad L\, u(W\text{-}s) + (M - L)\, u[s\, L/(M\text{-}L)] + B\, [P\, F(L) - W\, L]$$

F.O.C. give rise to (I.35), (I.39) and:

$$\text{(I.43)} \qquad - L\, u'(W\text{-}s) + L\, u'[s\, L/(M\text{-}L)] = 0$$

We derive that, because $U_1 = U_3$, (I.22) and (I.23) hold, and, once (I.31) holds:

$$\text{(I.44)} \qquad P\, F_L = 0$$

Again, it corresponds to the efficient locus of the wage bill maximizer union, which is vertical in L(0) = L*; and u* = (M - L*) / M. So, using (I.31), efficient bargaining originates:

$$\text{(I.45)} \qquad s = u^*\, W \qquad ; \qquad b = (1 - u^*)\, W$$

Whatever the wage set in the negotiations, the unemployment benefit and the tax deduction will be proportional to it.

Notice that (I.35) and (I.43) originate:

(I.46) $$u'(W - s) = u'(b) = B$$

Therefore, $b = W\text{-}s$ depends on the form of u(.) and the size of B [12], with - because u(.) is concave -

(I.47) $$db^*/dB < 0.$$

The level of the unemployment benefit varies negatively with the employers relative strength.

3. Suppose that apart from internal transfers unemployed union members receive also a compensation W_0 - for example, apart from internal transfers among union members the public sector provides a compensation of that amount, the members not employed in the union get this wage for a temporary nonunion job, or that level represents the money value of leisure "consumed" by unemployed members -, i.e., we can write the union's utility function as:

(I.48) $$L\, u(W\text{-}s) + (M - L)\, u[s\, L/(M\text{-}L) + W_0]$$

Admit a monopoly union context and consider only the version of **Model III**. The optimal solution is such that $U_1 = U_3$ and (I.28) is replaced by:

(I.49) $$W - W_0 = s / u = b / (1\text{-}u) \qquad \text{or}$$
$$W = W_0 + s / u = W_0 + b / (1\text{-}u)$$

and (I.32) by:

(I.50) $$\eta_{L,W} = W / (W - W_0)$$
$$\text{or} \qquad W = W_0 / (1 - 1/\eta_{L,W})$$

[12] Again, we would expect, however (I.45) to hold if the standard Nash maximand was used instead.

So, the utilitarian monopoly union will pick the same solution as the rent maximizer, i.e., the union that maximizes $(W - W_0) L$. Using (I.49) and (I.50) we can derive:

$$\text{(I.51)} \qquad s = W_0\, u / (\eta_{L,W} - 1) \qquad \text{and}$$
$$b = W_0\, (1-u) / (\eta_{L,W} - 1)$$

The unemployment compensation, b, varies negatively with the unemployment rate and the wage-elasticity of demand. It varies positively with W_0.

For the efficient bargaining solution, (I.22) is replaced by:

$$\text{(I.52)} \qquad W - P\, F_L = s / u = W - W_0$$

and

$$\text{(I.53)} \qquad P\, F_L = W_0$$

It corresponds to the efficient locus of the rent maximizer union, which is vertical in $L(W_0) = L^*$; and $u^* = (M - L^*) / M$. So, using (I.53), efficient bargaining originates:

$$\text{(I.54)} \qquad s = u^* (W - W_0) \qquad ; \qquad b = (1-u^*) (W - W_0)$$

B. Endogenous Membership.

1. Consider that $M = M(W, b, s, u)$ and again, **Model III**. Notice that a potential member may look at the expected wage and take into account the budget constraint - his expected wage will be $W(1-u)$. He might then have $M = M[W (1-u)]$, which allows us to derive $M = M(W, L)$. For simplicity we may assume that $M = M(W)$ [13], with $M_W > 0$.

$$\text{(I.55)} \qquad \max_{M, L, W, s} \; L\, u(W-s) + (M - L)\, u[s\, L/(M-L)]$$

$$\text{s.t.:} \quad L = L(W) \qquad ; \qquad M = M(W)$$

[13] For further developments and insights on this function see Martins (1998).

Again, denoting by Π the objective function where both restrictions have been replaced, from $\partial\Pi/\partial s = 0$,

(I.56) $$W = s / u \quad ; \quad b = W - s = s\, L/(M - L) = s\,(1 - u) / u$$

We will have also, from $\partial\Pi/\partial W = 0$, that:

(I.57) $$L\, u'(b) + L_W\, u'(b)\, b\, M / L + M_W\, [u(b) - b\, u'(b)] = 0$$

If for the solution corresponding to the exogenously considered M problem, $u(b) - b\, u'(b) > 0$ - i.e., the elasticity of members utility u(.) with respect to its argument in the optimal solution is smaller than one -, for the same b, the wage will be higher when membership is endogenous, and lower if the opposite occurs.

2. The efficient contract solution yields:

(I.58) $$(W - P\, F_L) / L = u'(b)\, b\, (M / L) /\{L\, u'(b) + M_W\, [u(b) - b\, u'(b)]\}$$ or

$$W - PF_L = u'(b)\, b\, M /\{L\, u'(b) + M_W\, [u(b) - b\, u'(b)]\}$$

If individuals are risk neutral and $u(W) = W$, then we achieve the same solution for both problems as with exogenous membership (provided internal solutions allow $L > M$ in the optimal solution).

Summarizing:

Proposition 3. If internal transfers are available or the unemployment benefit is seen as controlled by an utilitarian union and financed by union members:

1. Regardless of the form of the utility function of its members, the union will pick the wage/employment solution:

- of the wage bill maximizer union if there is no exogenous alternative (complementary) compensation in case of unemployment (i.e., $\eta_{L,W} = 1$ for the monopoly union solution; $P\, F_L = 0$ in efficient bargaining).

- of the collective rent maximizer union if there is an exogenous complementary compensation W_0 in case of unemployment (i.e., $W = W_0 /(1 - 1/\eta_{L,W})$ for the monopoly union solution; $P F_L = W_0$ in efficient bargaining).

2. In the optimal solution, members´ utility (of employed and unemployed members) is equalized [14].

3. With endogenous membership, and assuming that membership demand responds positively to the wage set in union negotiations, if the elasticity of members utility is smaller than one, the wage chosen is higher than in the case where membership is taken as exogenous.

[14] 2. has been noticed by Oswald (1982).

II. Internal Transfers and Optimal Membership.

II.1. Monopoly Union.

1. Assume the previous general problem of **Model III**. If the union can also set membership - through, say, membership fees; or has bargaining power over coverage of unemployment insurance -, i.e., if it faces the problem

(II.1) $$\max_{L,\, M,\, W,\, s} U[L, W - s, M - L, s L / (M - L), M]$$

$$\text{s.t.:} \quad L = L(W)$$

F.O.C. will require (I.6) and (I.8) to hold, as well as:

(II.2) $$U_3 - U_4 \, s L / (M - L)^2 + U_5 = U_M - U_4 \, s L / (M - L)^2 = 0$$

This condition holds in **Model II** as well, but for **Model I**, it is replaced by $U_M = 0$. This suggests, as expected, that when the budget constraint, for exogenous level of b, is realized by the union – the left hand-side of (II.2) becomes negative at the previous optimal solution –, membership set by the union decreases.

If we have the settings of **Model II**, (I.6) holds as before; provided U_1, U_2, U_3 and U_4 do not change much with M, as $M / (M - L)^2$ decreases with M, we conclude that if union membership is higher than the level the union would choose, wages are higher when membership is endogenized and restricted – the left hand-side of (I.6) is positive at previous W* and new M. Say, if unions gain control over the unemployment insurance coverage – but not over the benefit level -, we expect to see coverage move in the opposite direction to wages.

2. Assume that instead the union maximizes U/M [15]. Then, (I.6) and (I.8) still hold. (II.2) is now replaced by:

(II.3) $$[U_3 - U_4 \, s L / (M - L)^2 + U_5] M - U = 0$$

[15] This point was made in Martins (1998).

M* is, therefore smaller than in the previous case.

II.2. Efficient Bargaining.

The efficient bargaining solution will yield the same configuration as in section I, requiring additionally that (II.2) holds in the case where U is maximized and (II.3) in the case in which U/M is maximized.

II.3. Special Cases.

1. Take a union that maximizes an utility function which has an utilitarian part and also a membership argument in the following way

$$\text{(II.4)} \qquad \max_{M,\,L,\,W,\,s} \; L\, u(W-s) + (M - L)\, u[s\, L/(M-L)] + G(M)$$

$$\text{s.t.:} \quad L = L(W)$$

F.O.C. originate (I.28) and (I.30) as before and:

$$\text{(II.5)} \qquad u[s\, L/(M-L)] - u'[s\, L/(M-L)]\, s\, L/\,(M-L) + G_M = 0$$

G_M may be positive or negative, but we assume concavity of G(.) – which favors S.O.C.

The monopoly union is going to obey the same principles as the example of the previous section [16]; (I.31) holds and the optimal hiring (and wage, W*) level, L*, are the same as of the wage bill maximizer, i.e., we get that the choice corresponds to the solution where $\eta_{L,W} = 1$, (I.32).

Using the maximization condition with respect to M,

$$\text{(II.6)} \qquad u(b) + G_M - b\, u'(b) = 0 \quad \text{or} \quad G_M = b\, u'(b) - u(b)$$

---

[16] Oswald (1982) points out that with an utilitarian union, wages of the monopoly union setting are independent of the number of members.

Notice that if $G_M = 0$, say, we have a pure utilitarian union, this expression gives us b* [17]. If not, (II.6) will originate

(II.7) $b = b(M)$

and b(M) will be such that

(II.8) $G_{MM}\ dM = b\,u''(b)\ db$

Given that G and u are concave, in b(M)

(II.9) $db/dM > 0$

The unemployment benefit will increase with union size. From (II.7) and the budget constraint, we can obtain M from.

(II.10) $b(M)\,M = W^*\,L^*$.

s and u are straightforwardly obtained.

The efficient bargaining solution comes from:

(II.11) $$\max_{M,\,L,\,W,\,s}\ L\,u(W-s) + (M-L)\,u[s\,L/(M-L)] + G(M) + B\,[P\,F(L) - W\,L]$$

F.O.C. give rise to (I.35), (I.39) and (I.43) and (II.5). We derive (I.45) and (I.44) - $P\,F_L = 0$ -: in the optimal contract, L = L* that maximizes employment.

(II.5) and b = b(M) is indistinguishable from the relation found for the monopoly union (II.6). Technically, b* is set according to (I.46), u´(b) = B. b, and therefore M - M is determined according to b = b(M) -, will be higher the lower is B (the employer relative bargaining strength). Given L*, u* is determined, and, with b*, s*. W* = s*/u*.

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17 Consider for example $u(c) = (c - c_0)^{\alpha}$. Then $b^* = c_0/(1-\alpha)$.

2. If we have a pure utilitarian union, we will have a corner solution because u´(b) = B determines b and also (II.7)...

3. Suppose the union maximizes average utility of members U/M. Then employment and wage are going to be the same as in the wage bill maximizer. M will be lower than if U was maximized and therefore the unemployment rate will be lower - because (I.45) holds, s will be lower and b higher. (II.6) will be replaced by:

$$\text{(II.12)} \qquad [u(b) + G_M - b\,u'(b)] = U / M$$

The left hand-side is, thus, positive, which - because $G_{MM} < 0$ and $u''(b) < 0$ - is consistent with the statements of the previous paragraph.

Proposition 4. 1. If membership is unilaterally decided by the union, **2.** of **Proposition 2.**, **1.**, **2.** and **3.** of **Proposition 3.** hold.

2. A monopoly union that has no control over the unemployment benefit level but recognizes the budget constraint, if it gains control over membership, it increases wages as it lowers membership and conversely.

3. A monopoly union that has no control over the unemployment benefit level but can control membership or coverage, when it recognizes the budget constraint, it decreases membership.

4. If the union's utility function has the properties of (II.4) and the union can decide membership, we expect to observe that the unemployment benefit increases with union size or membership. In efficient bargaining, both will decrease with the employers´ relative strength.

5. When the utilitarian union maximizes average utility, the wage and employment levels chosen will be the same as in the case where the union maximizes total utility. However [18], the membership chosen is smaller (therefore, also unemployed members) than if total utility was maximized.

[18] This second point was made in Martins (1998).

III. Distribution of the Unemployment Compensation Burden.

In this section we present some generalizations of **Models II** and **III**. Consider that only a share of the tax burden is paid by the working members. Let $s\,\delta\,L$, $0 \leq \delta \leq 1$, be the share paid by working members. Firms have to pay $s\,(1-\delta)\,L$.

III.1. Earnings or Employment Tax.

Consider this tax assumes for firms the form of a proportional tax on L, (or firms endogenize this recognition) i.e.:

$$\text{(III.1)} \qquad P\,F(L) - W\,L - s\,(1-\delta)\,L = P\,F(L) - [W + s\,(1-\delta)]\,L$$

The firm's demand for labor will thus have the configuration such that:

$$\text{(III.2)} \qquad L = L[W + s\,(1-\delta)]$$

Rewriting the monopoly union problem (for **Model II**),

$$\text{(III.3)} \qquad \max_{L,\,W}\; U[L,\, W - s\,\delta,\, M - L,\, s\,L / (M - L),\, M]$$

$$\text{s.t.:} \quad L = L[W + s\,(1-\delta)]$$

F.O.C. originate:

$$\text{(III.4)} \qquad U_1\, L_W + U_2 - U_3\, L_W + U_4\, L_W\, M\, s / (M - L)^2 = 0$$

Consider the union is able to determine s - that is, the environment of **Model III**. Then, also

$$\text{(III.5)} \qquad U_1 (1-\delta)\, L_W - \delta\, U_2 + U_3\, (1-\delta)\, L_W +$$
$$+ U_4\, L / (M - L) + U_4\, (1-\delta)\, L_W\, M\, s / (M - L)^2 = 0$$

With (III.4), this yields that

(III.6) $U_4 L / (M - L) = U_2$

This means that the typical solution is equal to the one depicted in section I, i.e., let W* be the solution for $\delta = 1$. Say the union chooses W and s such that

(III.7) $W^* = W + s\,(1-\delta)$

Then demand by firms, L, in the optimal solution will be the same. As, because of (III.7),

(III.8) $W^* - s = W - s\,\delta$

the same s as before will satisfy the F.O.C. (III.4) and (III.5).

Consider the union cannot choose s but can bargain over δ. Then, F.O.C. require (III.4) and:

(III.9) $- [U_1 L_W + U_2 - U_3 L_W + U_4 L_W M s / (M - L)^2] s = 0$

The union will be again indifferent – now to the size of δ –, once (III.9) is equivalent (III.4).

We conclude, therefore that the union is indifferent to the distribution of the tax burden if it is seen as a tax proportional to employment - firms reaction through demand implies we arrive at the same solution and final incidence is the same; there is only a switch from wage to the payment of employed members.

It is straightforward to show that the same conclusions hold for the efficient bargaining locus.

III.2. Lump-Sum Tax.

Now, let us say the share paid by the firms is obtained through a lump-sum tax. Then, labor demand is independent of s and δ, i.e., L = L(W).

III.2.A. Monopoly Union.

Then, the union solves (**Model II**):

$$\text{(III.10)} \qquad \max_{L,\,W} \; U[L,\, W - s\,\delta,\, M - L,\, s\,L / (M - L),\, M]$$

$$\text{s.t.:} \qquad L = L(W)$$

F.O.C. give

$$\text{(III.11)} \qquad U_1 L_W + U_2 - U_3 L_W + U_4 L_W M s / (M - L)^2 = 0$$

If of the five partial derivatives of U only U_2 depends on δ, and U is concave, the left hand-side of (III.11) will increase with δ. This means that a rise in δ, the share paid by workers, will raise gross wages and decrease employment [19].

Consider the union is able to determine s - the generalization of **Model III**. Then, also

$$\text{(III.12)} \qquad U_4 L / (M - L) = \delta U_2$$

If in the optimal solution $U_1 = U_3$, then:

$$\text{(III.13)} \qquad \eta_{L,W} = u W / s \delta = (1-u) W / b \delta \qquad \text{or}$$

$$W = \eta_{L,W} s \delta / u = \eta_{L,W} b \delta / (1-u)$$

In net wages:

$$\text{(III.14)} \qquad W - \delta s = \delta b (\eta_{L,W} - u) / (1 - u) = \delta s (\eta_{L,W} - u) / u$$

[19] This reproduces the findings of Holmlund and Lundborg (1988): they report that a tax on profits to finance the u.b. bill, equivalent to a shift of the payment to firms, increases employment.

Employed members will be better-off than unemployed members iff $\delta > (1-u) / (\eta_{L,W} - u)$. The reverse will happen necessarily if $\eta_{L,W} < 1$: unemployed members will be better-off than employed members.

Needless to say, if the union could also pick δ, it would choose 0.

III.2.B. Efficient Bargaining.

The efficient contract locus in the generalization of **Model III** can be obtained from

$$\text{(III.15)} \qquad \max_{L,\, W,\, s} \; U[L, W - \delta s, M - L, s L / (M-L), M] + B [P F(L) - W L]$$

F.O.C. originate:

$$\text{(III.16)} \qquad U_1 - U_3 + U_4 M s /(M - L)^2 + B (P F_L - W)= 0$$

$$\text{(III.17)} \qquad U_2 - B L = 0$$

$$\text{(III.18)} \qquad - \delta U_2 + U_4 L / (M - L) = 0$$

Therefore

$$\text{(III.19)} \qquad (W - P F_L) / L = (U_1 - U_3) / U_2 + \delta s / (L u)$$

If, again, in the optimal solution $U_1 = U_3$, then

$$\text{(III.20)} \qquad W - P F_L = \delta s / u = \delta b / (1 - u)$$

In net wages:

$$\text{(III.21)} \qquad W - \delta s - P F_L = \delta b = \delta s (1 - u) / u$$

An implication is that in the optimal solution, regardless of form of the utility function, if $U_1 = U_3$, employed members will only be better-off than unemployed members iff $P F_L > (1 - \delta) b$.

III.2.C. Special Case.

1. Consider an utilitarian union that maximizes

$$\text{(III.22)} \qquad \max_{L,\,W,\,s} \; L\, u(W - \delta s) + (M - L)\, u[s L/(M-L)]$$

$$\text{s.t.:} \qquad L = L(W)$$

Denoting by Π the objective function where the restriction has been replaced, F.O.C. originate, from $\partial\Pi/\partial s = 0$,

$$\text{(III.23)} \qquad - L\, \delta\, u'(W - \delta s) + L\, u'[s L/(M-L)] = 0$$

For the optimal W (L and s) of the problem with $\delta = 1$, (III.23) will now be positive, suggesting that a higher s should correspond to the optimum when δ decreases.

Also, in the optimal solution the marginal utility of employed members will be higher than those unemployed and $U_1 = U_3 / \delta$.

$$\text{(III.24)} \qquad \delta\, u'(W - \delta s) = u'[s L/(M-L)] = u'(b)$$

Therefore, employed members have lower utility than unemployed members:

$$\text{(III.25)} \qquad W - \delta s \; < \; s L/(M-L) \; = b$$

Therefore:

$$\text{(III.26)} \qquad W \; < \; s\,[1 - (1-\delta)\, u] / u \; < \; s / u$$

$$\text{or} \qquad W \; < \; b\,[1 - (1-\delta)\, u] / (1-u) \; < \; b / (1-u)$$

From $\partial\Pi/\partial W = 0$,

$$\text{(III.27)} \qquad L\, u'(W - \delta s) + L_W \{u(W - \delta s) - u[s L/(M-L)]\} + $$
$$+ L_W\, u'[s L/(M-L)]\, s M/(M-L) = 0$$

Considering (III.24) and (III.25) we conclude that in the optimal solution

(III.28) $$W < s\,\delta\,\eta_{L,W} / u = b\,\delta\,\eta_{L,W} / (1-u)$$

wages and unemployment would probably - but we could not prove that necessarily - be smaller than when $\delta = 1$.

2. The efficient bargaining solution will result in

(III.29) $$u(W-\delta s) - u[s\,L/(M-L)] + u'[s\,L/(M-L)]\,s\,M/(M-L) = B\,(W - P\,F_L)$$

(III.30) $$L\,u'(W-\delta s) - B\,L = 0$$

(III.31) $$-\delta\,L\,u'(W-\delta s) + L\,u'[s\,L/(M-L)] = 0$$

From (III.30) we get that

(III.32) $$u'(W-\delta s) = B$$

Therefore, in efficient bargaining, employed members net earnings are solely determined by B - and negatively related with it - and the shape of members utility function. It is invariant to the value of δ. Using (III.31) and (III.32):

(III.33) $$\delta\,u'(W-\delta s) = \delta\,B = u'[s\,L/(M-L)] = u'(b)$$

The lower δ, (the lower $u'(b)$) the higher b^*: The lower the share paid by the unions, the more they will be willing to choose a high benefit level. As in the monopoly union solution:

(III.34) $$W-\delta s < s\,L/(M-L) = b$$

and

(III.35) $$W < s\,[1-(1-\delta)u] / u < s/u$$

or $$W < b\,[1-(1-\delta)u] / (1-u) < b/(1-u)$$

III.3. Proportional Profit Tax.

Consider the share paid by the firms is obtained through a proportional profit tax. We have two possible cases: either the firms do or do not recognize the budget constraint:

$$\text{(III.36)} \qquad t\,[P\,F(L) - W\,L] = s\,(1 - \delta)\,L$$

III.3.A. Monopoly Union.

1. If firms do not recognize the budget constraint, if capital is not involved - or, in the short-run when capital is fixed -, labor demand is independent of s and δ, i.e., L = L(W) still holds. This means that the monopoly union problem will be the same as in III.2.A. In the long run, demand may decline - once K decreases and also the labor marginal product is expected to fall.

2. If the firms recognize (III.36), it is easy to show that we have a similar situation to the earnings tax problem.

III.3.B. Efficient Bargaining.

1. If firms do not recognize the budget constraint, the efficient bargaining problem, becomes:

$$\text{(III.37)} \qquad \max_{L,\,W,\,s}\; U[L,\, W - \delta\,s,\, M - L,\, s\,L/(M-L),\, M] + B\,(1 - t)\,[P\,F(L) - W\,L]$$

Then the solution works as in the lump-sum tax problem with B replaced by (1 - t) B. For the special case of the utilitarian union:

$$\text{(III.38)} \qquad u(W - \delta\,s) - u[s\,L/(M-L)] + u'[s\,L/(M-L)]\,s\,M/(M-L) = (1 - t)\,B\,(W - P\,F_L)$$

$$\text{(III.39)} \qquad L\,u'(W - \delta\,s) - (1 - t)\,B\,L = 0$$

$$(III.40) \qquad - \delta L u'(W- \delta s) + L u'[s L/(M-L)] = 0$$

Using (III.40) we get (III.24). As in the monopoly union solution, inequalities (II.25) and (II.26) hold.

From (III.39) and (III.24) we get that

$$(III.41) \qquad u'(W- \delta s) = (1 - t) B = u'(b) / \delta$$

A rise in t will coincide with an increase in employed members welfare. And the lower δ, (the lower $u'(b)$) the higher b^*.

Ex-post, the budget constraint (III.36) will hold. Then:

$$(III.42) \qquad u'(W- \delta s) = B \{1 - [s (1 - \delta) L / (P F(L) - W L)]\}$$

2. Or the firms recognize (III.36). Then it is easy to show that we have a similar situation to the earnings tax problem.

Proposition 5. If the unemployment compensation expenses are split between workers and firms and the budget constraint is recognized by both (as in an earnings or employment tax, or profit taxes on and recognized by the firm as derived from the budget constraint), unions being able to control the size of the unemployment compensation:

1. Employment, unemployment compensation and the after-tax wage is invariant to the way the expenses are split if taxes paid by firms are proportional to employment.

2. (Before-tax) wages vary positively with the proportion of taxes paid by workers.

Proposition 6. If the unemployment compensation expenses are split between workers and firms, unions being able to control the size of the unemployment compensation, provided that labor demand is independent of the way expenses are financed (e.g., in the case of lump-sum or profit taxes on and not recognized by the firm as associated to the budget constraint), and for the case of a utilitarian union, for both the monopoly union and efficient bargaining solution:

1. the utility of working members will be lower than of those unemployed.

2. the wage-unemployment benefit trade-off will favor workers relative to the case of **Proposition 5**.

IV. Summary and Conclusions.

This paper gathers some notes on the introduction of the possibility of internal compensation to unemployed members.

1. As expected, the fact that such mechanism is in place - or employed members realize they must be taxed in order to pay for the unemployment benefit - leads to lower monopoly union gross wages than if we considered otherwise. With efficient bargaining, we may have an outward shift of the contract curve with the recognition of the budget constraint by the union.

The comparison of endogenous and exogenous (but recognized by the union) unemployment benefit cases depends upon the size of the unemployment compensation. For instance, if a monopoly union prefers a higher unemployment benefit than the government sets, then, if allowed to raise it, it will require a higher wage level and increase unemployment.

2. Utilitarian unions that control the unemployment benefit choose the outcome of wage bill - or, in some cases, collective rent - maximizer union. This will also be the case if unions can control membership. As noted before in the literature, employed and unemployed members will have the same utility.

If the budget constraint is not recognized by the utilitarian union, then unemployed members will be worse-off than employed members - both in monopoly union as in efficient bargaining solution.

3. Monopoly unions that recognize the budget constraint, as they gain control over coverage or membership, are expected to raise wages when decreasing coverage. Monopoly unions that can decide coverage (membership) and become aware of the budget constraint will lower membership.

If the union’s utility function has an utilitarian part and an additional argument depending only on union membership, provided this is concave, if the union can decide membership, we expect to observe that the unemployment benefit increases with union size or membership. In efficient bargaining, both will decrease with the employers´ relative strength.

4. If the unemployment benefit bill is split between unions and firms, as long as they recognize the budget constraint, the labor market outcome remains (in net wages and

employment) unaffected relative to the case where union (working) members pay the unemployment benefit bill in full.

5. If the unemployment benefit bill is split between unions and firms and the budget constraint is not recognized by the firm, working members of a utilitarian union will be worse-off than unemployed ones. The wage-unemployment benefit trade-off will favor workers relative to the previous case.

Bibliography and References.

Blair, Douglas H. & David L. Crawford. (1984) "Labour Union Objectives and Collective Bargaining." *The Quarterly Journal of Economics*, Vol 99: 547-66.

Blanchflower, David G. & Andrew J. Oswald. (1994) *The Wage Curve.* M.I.T. Press, Cambridge.

Booth, Alison L. (1995) *The Economics of the Trade Union.* Cambridge University Press.

Booth, Alison L. (1995a) "Layoffs with Payoffs: A Bargaining Model of Union Wage and Severance Pay Determination." *Economica*, Vol 62, 551-64.

Booth, Alison L & Monojit Chatterji. (1995) "Union Membership and Wage Bargaining when Membership Is Not Compulsory." *Economic Journal*, Vol 105, 345-360.

Booth, Alison L & Monojit Chatterji. (1993) "Reputation, Membership and Wages in an Open Shop Trade Union." *Oxford Economic Papers*, Vol 45, 23-41.

Calmfors, Lars & John Driffill. (1988) "Bargaining Structure, Corporatism and Macroeconomic Performance." *Economic Policy*, Vol 6: 13-61.

Carlin, Wendy & David Soskice. (1990) *Macroeconomics and the Wage Bargain.* Oxford University Press.

Dunlop, John T. (1944) *Wage Determination Under Trade Unions.* New York: Macmillan Co.

Earle, John S. & John Pencavel. (1990) "Hours of Work and Trade Unionism." *Journal of Labor Economics*, Vol 8, N. 1, Part II: S150-74.

Farber, Henry S. (1986) "The Analysis of Union Behavior." In *Handbook of Labor Economics*., Vol II, edited by O. Ashenfelter and R. Layard.

Fleisher, Belton M. & Thomas J. Kniesner. (1984) *Labor Economics: Theory, Evidence, and Policy.* Prentice-Hall, Inc.

Garoupa, Nuno and Ana Paula Martins. (2002) "Crime and Punishment Re-Awakened – Insights on a Risky Business from the Worker's." *EERI Research Paper Series* No 2002/07, Economics and Econometrics Research Institute, Brussels.

Grossman, G.M. (1983) "Union Wages, Temporary Lay-offs, and Seniority." *American Economic Review*. Reprinted in *Economic Models of Trade Unions*, edited by P. Garonna, P. Mori and P. Tedeschi. Chapman & Hall, 1992.

Hart, Robert A. & Thomas Moutos. (1995) *Human Capital, Employment and Bargaining.* Cambridge University Press.

Hart, Robert A. & Thomas Moutos. (1994) "Tax Structure and the Choice of Compensation System." *European Journal of Political Economy*, Vol 10, N. 2, 765-81.

Holmlund, Bertil & Per Lundborg. (1999) "Wage Bargaining, Union Membership, and the Organization of Unemployment Insurance." *Labour Economics*, Vol 6, 397-415.

Holmlund, Bertil & Per Lundborg. (1988) "Unemployment Insurance and Union Wage Setting." *Scandinavian Journal of Economics*, Vol 90, N. 2, 161-172.

Holmlund, Bertil & Per Lundborg. (1989) "Unemployment Insurance Schemes for Reducing the Natural Rate of Unemployment." *Journal of Public Economics*, Vol 38, 1-15.

Kaufman, Bruce E. (1991) *The Economics of Labor Markets.* The Dryden Press, 3rd. edition.

Kiander, Jaakko. (1993) "Endogenous Unemployment Insurance in a Monopoly Union Model When Job Search Matters." *Journal of Public Economics*, Vol 52, N. 1, 101-115.

Layard, Richard, Stephen Nickell & Richard Jackman. (1991) *Unemployment: Macroeconomic Performance and the Labour Market.* Oxford University Press.

Lever, Marcel & Tom van Veen. (1991). "Union Wage Setting, Employment and Investment: a Survey of Theory and Empirical Evidence." *Labour*, Vol 5, N. 3: 25-61.

Lewis, H. Gregg. (1959). "Competitive and Monopoly Unionism." In P. Bradley, ed., *The Public Stake in Union Power.* Charlottesville, Virginia: University of Virginia Press, 181-208.

Lindbeck, Assar & Dennis J. Snower. (1990) *The Insider-Outsider Theory of Employment and Unemployment*. Macmillan.

Martins, Ana Paula. (2002) "Reconciling the Nash and Kalai-Smorodinsky Cooperative Solutions: Generalized Maximands of CES Form." *EERI Research Paper Series* No 2002/05, Economics and Econometrics Research Institute, Brussels.

McDonald, I.M. & R.M. Solow. (1981) "Wage Bargaining and Employment." *American Economic Review*, Vol 71, N. 4: 896-908.

Mori, Pier Angelo & Piero Tedeschi. (1992) "Economic Models of Trade Unions: An Introduction." In *Economic Models of Trade Unions*, edited by P. Garonna, P. Mori and P. Tedeschi. Chapman & Hall, 1992.

Naylor, Robin & Martin Cripps. (1993) "An Economic Theory of the Open Shop Trade Union." *European Economic Review*, Vol 37, 1599-1620.

Naylor, Robin & Oddbjørn Raaum. (1993) "The Open Shop Union, Wages, and Management Opposition." *Oxford Economic Papers*, Vol 45, 589-604.

Oswald, Andrew J. (1982) "The Microeconomic Theory of the Trade Union." *Economic Journal*, Vol 92: 576-95.

Oswald, Andrew J. (1982a) "Trade Unions, Wages and Unemployment: What Can Simple Models Tell Us?" *Oxford Economic Papers*, Vol 34 (3): 526-45.

Rees, Albert. (1989) *The Economics of Trade Unions*. University of Chicago Press, 3rd edition.

Rubinstein, A. (1982) "Perfect Equilibrium in a Bargaining Model." *Econometrica*, Vol 50, N. 1, 97-109.

Tantarelli, Ezio. (1986) "The Regulation of Inflation and Unemployment." *Industrial Relations*, Vol 25, N. 1.

Ulph, Alistair & David Ulph. (1990) "Union Bargaining: A Survey of Recent Work." In *Current Issues in Labour Economics*, edited by D. Sapsford & Z. Tzannatos, Macmillan.