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BARGAINING STRUCTURE AND REGIONAL UNEMPLOYMENT INSURANCE

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Abstract

This study examines how the size of trade unions relative to the labor force impacts on the desirability of different organizational forms of self-financing unemployment insurance (UI) for workers, firms, and with reference to an efficiency criterion. For this purpose, we respectively numerically compare the outcome of a model with a uniform payroll tax to a model where workers pay taxes according to their systematic risk of unemployment. Our results highlight the importance of the bargaining structure for the assessment of a particular UI scheme. Most importantly, it depends on the size of the unions whether efficiency favors a uniform or a differentiated UI scheme.

Keywords: Unemployment insurance; Wage bargaining; Size of unions
JEL classification: C78; J51; J65

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1 Introduction

The risk of a specific worker to become unemployed depends among other things on the branch of industry, age, education, and on the region, where he or she supplies labor. These characteristics can in principle be observed by the unemployment insurance (UI) authority. Nonetheless, it is customary to levy obligatory UI taxes or to pay UI benefits regardless of the specific risk a worker bears. This implies that workers with a relatively low risk of becoming unemployed (involuntarily) cross subsidize high-risk workers. Such a subsidy leads to a distorsion of workers‘ decisions, e.g. where and in which industry labor is supplied. This may call for a reform of UI leading to differentiated contributions which reflect the systematic risk of workers. The present paper investigates the effects of such a rating system in an idealized model framework with two groups of workers, characterized by a systematically different employment probability. Intuition suggests that the measure would enhance welfare (because the distorsion is removed), and that low-risk workers would profit to the disadvantage of high-risk workers.

If contributions are adjusted to balance the UI´s budget, they depend on the rate of unemployment, and thus on the bargained wages. The extent to which unions take into account the interplay between wages and taxes crucially depends on the size of a union relative to the workforce. The larger a union is, the more of the negative impact of a higher wage on employment is internal and is thus taken into account. With decentralized bargaining the effect of the bargained wage on taxes is totally external. Thus, it is important to consider the size of a union if differentiation of UI is at issue because the way UI is organized has an effect on how elastic UI contributions react on variations of wages / unemployment.

Our results may be applied to at least two major issues. First, the differentiation of UI taxes may be interpreted as a regionalization of UI. Many countries, like e.g. Germany and Italy, are characterized by a regional dichotomy of the

economy. Here, our results may explain to some extent, what happens if the centralized UI scheme we have today in these countries is changed such that every relatively homogenous region has its own UI budget. If this view of the results is reversed, the policy application at hand is rather what effects arise from a centralization of currently differentiated UI at a supra-national (European Union) or federal (United States) level. Second, our results may be related to a reform of UI such that there are differentiated UI taxes for branches of the industry characterized by systematic differences of unemployment risk. For instance, many workers in the building sector periodically receive benefits from the UI system in winter. After a reform leading to differentiated tax rates, they would have to pay a higher tax rate than others during the rest of the year. If our results are applied to this issue, "migration costs" between regions would have to be interpretated as "schooling costs" for workers changing the sector of industry. Yet, throughout this paper we employ the former interpretation, i.e. central vs. regional financing of UI.

Due to formal complexity most results can only be derived numerically, which may give rise to criticism because the assumed functions and parameters hardly correspond with any real-world economy. However, we do think that the exercise is worth being carried out for two reasons. First, the emergence of some results which stand in contrast to the intuition mentioned above hints at the necessity to derive the conditions under which one or the other result holds. The mere possibility of our results shows that sweeping judgements regarding this issue are not appropriate. Second, many results can be expected to hold with other numerical specifications since they can be traced back to plausible interactions within the paper. In particular, we derive the following: (i) Workers from both regions (sectors of industry) are always in favor of uniform UI taxes and firms from the rich region (low unemployment sector) are always better off with differentiated UI taxes. In contrast, firms from the poor region (high unemployment sector) prefer a uniform UI scheme with decentralized wage bargaining, and prefer a rating system when unions are relatively large. The

efficiency criterion favors uniform UI in the former case and rating in the latter. (ii) The more workers a union represents relative to the labor force, the lower is the equilibrium wage rate for a given organizational form of UI. (iii) The effect of the bargaining structure on the resulting wage is stronger in the case of differentiated UI than in the case of uniform UI.

Our study is related to a number of papers which also deal with the question how the negative externality of lay-offs on the financing of social security can be internalized. First, there has been an extensive discussion on experience rating in the United States, following Feldstein [1976] and [1978]. In contrast to our study, this literature focusses on the externality one firm imposes on others by (temporary) lay-offs. Second, some work has been done on the effects of the so-called Gent system, i.e. where UI is run by unions (see e.g. Holmlund and Lundborg [1999]). The externality which is internalized through such an institution is the same that we consider in our study. However, some differences arise since we take into account different degrees of centralization of the bargain, which means that also the extent to which the externality is internalized varies.

Since the effects of differentiating UI are subject to a complex interplay of wages, UI taxes and migration, a formal model is an adequate mean to simplify the matter. In the following section, an analytical framework is established to analyze the effects of differentiating UI for different degrees of centralization of the bargain. A numerical comparison of the models is undertaken in section 3. Our results confirm the importance of the degree of centralization of wage bargaining for the assessment of the introduction of a rating system for UI by workers and employers, and for the efficiency of the measure. Section 4 contains some concluding remarks.

2 Formal analysis

We employ the following simplifying assumptions and standardizations:

A1 A federal state consists of two regions ($i \in 1, 2$) which differ only with respect to the endowment with an immobile, inelastically and costlessly supplied factor of production subsequently referred to as infrastructure, x_i. Region 1 is assumed to possess more infrastructure than region 2, $x_1 > x_2$, without loss of generality. Region 1 is referred to as the *rich* region, whereas region 2 is named *poor*.

A2 In each region, K identical firms produce a single homogeneous good which is taken as a numeraire. K is assumed to be sufficiently large that firms behave as price-takers on every market. The technology of a representative firm is described by the production function

$$f_i = f(n_i, x_i), \tag{1}$$

where n symbolizes labor input. Denoting derivatives with subscripts, it is assumed that $f_{n_i} > 0$, $f_{x_i} > 0$, $f_{n_i n_i} < 0$. Infrastructure enhances the productivity of labor, expressed by a positive cross-derivative, $f_{n_i x_i} > 0$. There are no fixed costs, so that the profits of a firm can be written as

$$\pi_i = f(n_i, x_i) - n_i w_i, \tag{2}$$

where w represents the gross wage rate per unit labor. Profit maximization yields the inverse labor demand function:

$$f_{n_i} = w. \tag{3}$$

A3 M identical workers inelastically supply one unit of labor. They share the same concave utility function:

$$u_i = u(c_{i,j}), \tag{4}$$

where c stands for consumption of the homogenous good, and where the subscript j with $j \in e, u$, indicates whether a worker is employed ($j = e$) or not ($j = u$). Consumption before the deduction of eventual migration costs is $c_{i,e} = (1 - \tau_i)w_i$ in the case of employment, where τ is the proportional UI tax rate, and $c_{i,u} = \beta_i \overline{w}_i$, with $\overline{w}$ denoting the wage level used to calculate UI benefits, and β standing for the benefit rate, in the case of unemployment. Workers maximize expected utility by choosing the region where they supply labor.

A4 Ex ante, half of the workers live within each region. Migration occurs only in one direction, namely, from the poor to the rich region. If a worker migrates, costs corresponding to an annuity of k arise. In both regions, workers are distributed equally over firms, sharing the same employment probability. The number of workers per firm is denoted by m.

A5 All (employed and unemployed) workers are members of a trade union. The gross wage rate is subject to a bargain between a union and pK firms, where the exogenous variable $p \in (0, 1]$ is the degree of centralization of the bargain, or, put differently, the size of a union. If $p \to 0$, the share of workers represented by a specific union is negligable (atomistic structure or decentralized bargain). If $p = 1$, one single union represents all workers of a region. It is assumed, that the degree of centralization is equal in both regions. Firms retain control over employment (right-to-manage approach, see e.g. Oswald [1993], and Blanchflower, Oswald and Sanfey [1996] and, for adaptions of the model with UI, e.g. Pissarides [1998]).

A6 Unions maximize the expected utility of a representative member, acknowledging the budget constraint of UI, as well as employment and wages elsewhere in the federal state, while migration is neglected. We employ the symmetric Nash solution to the bargaining problem which maximizes the product of a union´s and the corresponding firms´ payoff. Firms attain zero profits if the bargain breaks down, so that the payoff of an agreement

equals the value of the profits. The 'threat point' of a union is given by the situation when all of its members receive UI benefits. The payoff to a union, G, is thus the difference between the expected utility of a representative worker in the case of an agreement, and the utility of an unemployed worker:

$$\begin{aligned} G &= \frac{n}{m}u[(1-\tau)w] + \left(1-\frac{n}{m}\right)u[\beta\overline{w}] - u[\beta\overline{w}] \\ &= \frac{n}{m}\left\{u[(1-\tau)w] - u[\beta\overline{w}]\right\}. \end{aligned} \tag{5}$$

A7 The UI is obliged to be self-financing. Taxes (not benefits) are adjusted to equilibrate the budget(s) alternatively within each region (regional or differentiated UI), or on the whole (central or uniform UI).

The cases of regionally, and centrally equilibrated UI budgets are considered separately within the following two subsections.

2.1 Uniform UI

UI budget constraint

Since all firms as well as all unions are identical, the outcome of the bargains is uniform within each region ex post. Then, the wage level used to calculate UI benefits equals the wage rate within each region, $\overline{w}_i = w_i$. Ex post, the UI budget constraint in the case of central UI can be written as

$$n_1 K\tau w_1 + n_2 K\tau w_2 = (m_1 - n_1)K\beta w_1 + (m_2 - n_2)K\beta w_2. \tag{6}$$

The left-hand side of equation (6) collects the revenues, and the right-hand side stands for the expenditures of the UI, for the two regions respectively.

The reaction of UI taxes on variations of wages and / or employment is transparent to the unions, i.e. they are aware of the UI´s budget constraint. But, in contrast to the UI authority, unions have an influence on wages and employment of some part of the workforce. Consequently, each union differentiates between pKm workers represented by itself, and $(1-p)Km$ workers

represented by other unions. Ex ante, unions regard the wage rate for the represented workers as being subject of the bargain, while the wage rate elsewhere is taken as exogenous. In analogy, employment within corresponding firms is viewed as being dependent on the wage rate to be negotiated, while employment elsewhere in the region and in the other region are taken as being given by each union. The UI budget constraint from the point of view of a union from region 1 is thus

$$\begin{aligned} & \tau\overline{n}_1(1-p)K\overline{w}_1 + \tau n_1 pKw_1 + \tau\overline{n}_2 K\overline{w}_2 \qquad (7) \\ = \;& \beta(m_1-\overline{n}_1)(1-p)K\overline{w}_1 + \beta(m_1-n_1)pK\overline{w}_1 + \beta(m_2-\overline{n}_2)K\overline{w}_2, \end{aligned}$$

where n and w carry a bar if they are exogenous from the point of view of the respective union. The first term on either side of equation (7) symbolizes the revenues and expenditures related to workers from region 1, which are not member of the considered union. The second term stands for the respective values related to the members of the union. The third term represents UI revenues and expenditures within region 2. A parallel consideration yields the UI budget constraint from the point of view of a union from region 2:

$$\begin{aligned} & \tau\overline{n}_2(1-p)K\overline{w}_2 + \tau n_2 pKw_2 + \tau\overline{n}_1 K\overline{w}_1 \qquad (8) \\ = \;& \beta(m_2-\overline{n}_2)(1-p)K\overline{w}_2 + \beta(m_2-n_2)pK\overline{w}_2 + \beta(m_1-\overline{n}_1)K\overline{w}_1. \end{aligned}$$

Equations (7) and (8) are equivalent to (6) ex post, i.e. if $\overline{w}_1 = w_1$, $\overline{w}_2 = w_2$, $\overline{n}_1 = n_1$ and $\overline{n}_2 = n_2$.

The bargaining problem

If the wage is determined by the Nash solution to the bargaining problem, the Lagrangian to be maximized for region 1 is

$$\begin{aligned} \max_{n_1,\tau,w_1,\lambda_1,\mu_1} \mathcal{L}_1 \;=\; & G_1 \cdot pK\pi_1 + \lambda_1 \left[f_{n_1}(n_1,x_1) - w_1\right] \qquad (9) \\ & + \mu_1 \left[\tau\overline{n}_1(1-p)\overline{w}_1 + \tau n_1 p w_1 + \tau\overline{n}_2\overline{w}_2 \right. \\ & \left. - \beta(m_1-\overline{n}_1)(1-p)\overline{w}_1 - \beta(m_1-n_1)p\overline{w}_1 - \beta(m_2-\overline{n}_2)\overline{w}_2\right]. \end{aligned}$$

The product of the payoffs to a union and to the corresponding pK firms, defined in equations (2) and (5), is maximized subject to two constraints. The first constraint is the labor demand curve to be met, given by equation (3). This must be the case because firms are free to choose the profit maximizing amount of labor (right-to-manage approach). The second constraint is that of UI being self-financing. The union recognizes thus, that a higher wage leads to a smaller number of employed workers (first constraint), and that this smaller number of workers increases the UI tax rate to be payed by its members (second constraint). A parallel consideration yields the Lagrangian for a representative union in region 2

$$\begin{aligned} \max_{n_2,\tau,w_2,\lambda_2,\mu_2} \mathcal{L}_2 &= G_2 \cdot pK\pi_2 + \lambda_2 \left[f_{n_2}(n_2, x_2) - w_2 \right] \\ &\quad + \mu_2 \left[\tau \overline{n}_2 (1-p) \overline{w}_2 + \tau n_2 p w_2 + \tau \overline{n}_1 \overline{w}_1 \right. \\ &\quad \left. - \beta(m_2 - \overline{n}_2)(1-p)\overline{w}_2 - \beta(m_2 - n_2)p\overline{w}_2 - \beta(m_1 - \overline{n}_1)\overline{w}_1 \right]. \end{aligned} \tag{10}$$

Migration

Starting point is a situation where workers are distributed equally across regions. Workers from the poor region emigrate to the rich region, enhancing thereby expected utility. Expected utility in turn depends on the probability of being employed, i.e. on the number of workers applying for a given number of jobs. The more workers immigrate in region 1, the smaller is the chance of becoming employed there on the one hand. On the other hand, emigration raises the probability of employment in region 2. Migration thereby aligns the expected utilities of workers from region 2 in the cases of emigration and of remaining. In equilibrium, workers from region 2 are indifferent between emigrating and resting in their home region. The condition for a migration equilibrium is thus

$$\begin{aligned} &\frac{n_1}{m_1} u[(1-\tau)w_1 - k] + \left(1 - \frac{n_1}{m_1}\right) u[\beta w_1 - k] \\ = \; &\frac{n_2}{m_2} u[(1-\tau)w_2] + \left(1 - \frac{n_2}{m_2}\right) u[\beta w_2]. \end{aligned} \tag{11}$$

The left-hand side of equation (11) represents the expected utility of a worker from the poor region in the case of emigration to the rich region. The right-hand side of the equation stands for the expected utility of a worker from the poor region in the case of resting there. The model is closed by the condition that the number of workers within the federal state is given, i.e. each immigrant in region 1 is an emigrant from region 2:

$$(m_1 + m_2)K = M. \tag{12}$$

Equations (11) and (12) jointly determine the number of workers per firm within each region, m_1 and m_2, for given wages, w_i, for given employment, n_i, and for a given UI tax rate, τ. The equilibrium values of these variables result from the first-order conditions of the maximization problems (9) and (10) together with the information that the bargain solutions within each region are identical.

2.2 Differentiated UI

UI budget constraints

With regional UI, the revenues of UI correspond with the respective expenditures within each region. This circumstance is expressed by the following equations:

$$\tau_1 n_1 K w_1 = \beta(m_1 - n_1)K w_1 \tag{13}$$

and

$$\tau_2 n_2 K w_2 = \beta(m_2 - n_2)K w_2 \tag{14}$$

If a union from region 1 differentiates between members and workers who are represented by other unions, the budget constraint becomes

$$\begin{aligned} & \tau_1 \overline{n}_1(1-p)K\overline{w}_1 + \tau_1 n_1 p K w_1 \qquad (15) \\ = \;& \beta(m_1 - \overline{n}_1)(1-p)K\overline{w}_1 + \beta(m_1 - n_1)pK\overline{w}_1. \end{aligned}$$

The constraint for a union from region 2 is

$$\begin{aligned} & \tau_2 \overline{n}_2(1-p)K\overline{w}_2 + \tau_2 n_2 p K w_2 \qquad (16) \\ = \;& \beta(m_2 - \overline{n}_2)(1-p)K\overline{w}_2 + \beta(m_2 - n_2)pK\overline{w}_2. \end{aligned}$$

Ex post, equations (13) and (15), as well as equations (14) and (16) are equivalent.

The bargaining problem

The Nash product to be maximized consists of the expected utility function of a representative member of a union, and the profit function multiplied by the number of firms per union. The maximization is subject to two constraints. First, a point on the (inverse) labor demand function (3) must be realized. Second, the resulting combination of wage rate and employment must be compatible with an equilibrated UI budget for the given values of employment and wages elsewhere in the economy. The maximization problems are

$$\begin{aligned} \max_{n_1,\tau_1,w_1,\lambda_1,\mu_1} \mathcal{L}_1 \;=\; & G_1 \cdot pK\pi_1 + \lambda_1 \left[f_{n_1}(n_1, x_1) - w_1 \right] \\ & + \mu_1 \left[\tau_1 \overline{n}_1 (1-p) \overline{w}_1 + \tau_1 n_1 p w_1 \right. \\ & \left. - \beta(m_1 - \overline{n}_1)(1-p)\overline{w}_1 - \beta(m_1 - n_1) p \overline{w}_1 \right] \end{aligned} \tag{17}$$

and

$$\begin{aligned} \max_{n_2,\tau_2,w_2,\lambda_2,\mu_2} \mathcal{L}_2 \;=\; & G_2 \cdot pK\pi_2 + \lambda_2 \left[f_{n_2}(n_2, x_2) - w_2 \right] \\ & + \mu_2 \left[\tau_2 \overline{n}_2 (1-p) \overline{w}_2 + \tau_2 n_2 p w_2 \right. \\ & \left. - \beta(m_2 - \overline{n}_2)(1-p)\overline{w}_2 - \beta(m_2 - n_2) p \overline{w}_2 \right]. \end{aligned} \tag{18}$$

The first-order conditions of these Lagrangians yield the equilibrium values of n_i, w_i and τ_i, while the distribution of workers on regions is determined as follows.

Migration

With regionally independent UI budgets, the only economic interaction between the two regions is migration. The condition for an equilibrium with respect to migration decisions of workers from the poor region remains nearly unchanged. Merely regarding the subscripts of τ some differences emerge:

$$\frac{n_1}{m_1} u[(1-\tau_1)w_1 - k] + \left(1 - \frac{n_1}{m_1}\right) u[\beta w_1 - k] \tag{19}$$

$$= \frac{n_2}{m_2} u[(1-\tau_2)w_2] + \left(1 - \frac{n_2}{m_2}\right) u[\beta w_2].$$

The interpretation of this equilibrium condition is analogous to equation (11). Again, the model is closed by a condition stating that each immigrant in region 1 is at the same time emigrant from region 2:

$$(m_1 + m_2)K = M. \tag{20}$$

Equations (19) and (20) simultaneously determine the number of workers attached to firms in region 1 and region 2.

The model determines the equilibrium values of n_i, w_i, τ_i and m_i. The equations necessary to solve for these variables are the first-order conditions of the maximization problems (17) and (18), as well as equations (19) and (20). As a by-product, the Lagrange multiplier λ_i and μ_i can be calculated. They show how the respective value of the Nash product reacts if the marginal productivity of labor rises (λ_i) or if the UI is marginally subsidized (μ_i). The complexity of the equations brings about that the solutions can be derived numerically only, which is subject of the following section.

3 A numerical specification

There are two demands on the functions and parameter values used to calibrate a model. On the one hand, they should be in a plausible range for the results and predictions of the model to have a weight. On the other hand, they should be as simple as possible. Here, the specifications are mainly due to the second demand. The chosen utility function and production function are:

$$\begin{array}{ll} \text{utility function} & u(c) = \sqrt{c}, \\ \text{production function} & f(n,x) = \frac{1}{a}\left(nx - \frac{1}{2}n^2\right), \end{array}$$

where a is a positive parameter. Both functions have the assumed properties, i.e. positive first derivatives, and negative second derivatives with respect to consumption and employment, respectively[1]. The cross-derivative of the production function is positive, so that infrastructure has a positive effect on the

productivity of labor. Partially differentiating $f(\cdot)$ and rearranging gives the labor demand function: $n = x - aw$. The assumed values for the exogenous variables are: $a = 0.6$; $\beta = 0.57$; $k = 0.27$; $K = M = 1$; $x_1 = 1$; $x_2 = 0.6$.

Uniform UI

With the assumed functions and parameters it is possible to calculate the values of the endogenous variables for different degrees of centralization of the bargain. Table 1 gives the results for wages, number of workers and employment per firm in both regions, as well as the UI tax rate necessary for an equilibrated budget. The calibration is performed for a degree of centralization of the bargain of $p = 0.00, 0.05, 0.10, 0.15$ and 0.20. The case $p \to 0$ corresponds with decentralized bargaining, which is standard in bargaining theory. If $p > 0.20$, no inner solution can be found for the assumed functions and parameter values (the number of employed exceeds the number of workers in region 1).

Table 1 shows that a higher degree of centralization of the bargain leads to lower wages in both regions. This implies higher employment and, thereby, lower UI contributions. Equilibrium migration from the poor to the rich region is slightly lower when unions are larger. This result is due to the fact that wage differences are higher in the rich region. A union has more members in region 1 because there are more workers in region 1, while the number of unions is equal. Therefore, the concession a union from region 1 makes with respect to the wage rate has more influence on the UI tax rate than a reduction of the wage rate in region 2. This causes wages in region 1 to react more elastically on variations of p. The employment effect which works in the opposite direction with respect to migration does not compensate the former effect. In the case of a monopoly union, the positive effect of a higher wage rate exactly corresponds with the negative effect of lower employment at the margin. With wage bargaining, the wage rate must be lower, so that the positive effect of a higher wage rate over-compensates the negative effect of a lower employment probability on expected utilities. This means that before migration, the expected utility decreases more

in region 1 with an increasing size of the unions, so that migration is lower.

Differentiated UI

Table 2 states the corresponding results for the endogenous variables in the case of regional UI budgets. If the size of the union exceeds 20% of the labor force, no inner solution can be found for the given functions and parameter values (again, the number of employed in region 1 would exceed the number of workers).

Qualitatively, the results are the same as in the case of uniform UI. Equilibrium wages negatively depend on the degree of centralization of the wage bargain because unions take into account that a higher wage rate has a negative influence on aggregated employment, which in turn tends to raise the regional equilibrium UI tax rate. The larger a union is, the more of this effect is internal from its point of view. Lower equilibrium wages yield higher employment, which leads to lower UI taxes in both regions. However, one important difference with reference to the model with central UI emerges: Migration is almost not affected by the size of the unions. This result is due to the fact that wages in region 2 react much more elastically on variations of p in the case of a regional UI scheme, so that there is less difference between the processes evolving in both regions.

Comparison of the models

Figure 1 shows the preferences of firms and workers concerning the organization of UI for different sizes of the unions relative to the total labor force. Positive values signify that the expected utility or the profits are higher with uniform UI taxes, negative values signify that differentiated UI taxes are prefered. The definitions and interpretations of the curves are:

$$Fi \equiv \quad \pi_i^C - \pi_i^R \quad \begin{cases} > 0 & \text{firms from region i prefer central UI} \\ < 0 & \text{firms from region i prefer regional UI} \end{cases} \tag{21}$$

$$Wi \equiv \quad Eu_i^C - Eu_i^R \quad \begin{cases} > 0 & \text{workers from region i prefer central UI} \\ < 0 & \text{workers from region i prefer regional UI,} \end{cases}$$

where the subscripts C and R stand for "model with central UI" and "model with regional UI", respectively.

Apart from the preferences of the agents, an efficiency criterion, z, is used to assess the measure. For this aim the total production in both regions has to be calculated, lowered by the total costs of migration. Related to one firm from each region, the variable is defined as follows:

$$z \equiv f(n_1, x_1) + f(n_2, x_2) - k\left(m_1 - \frac{M}{2K}\right). \tag{22}$$

The number of workers per firm is $M/2K$ ex ante since workers are distributed evenly across all firms (see assumption A4). To find out under which arrangement more income rests for consumption, the difference between z in the case of central UI and z in the case of regional UI is calculated:

$$\begin{aligned} \Delta z = z^C - z^R \quad &= \quad f^C(n_1, x_1) + f^C(n_2, x_2) \\ &\quad - \left[f^R(n_1, x_1) + f^R(n_2, x_2)\right] - k\left(m_1^C - m_1^R\right). \end{aligned} \tag{23}$$

Again, positive values signify an advantage of central UI and negative ones that regional UI is preferable. If, for instance, the value of Δz is positiv, it is *potentially* possible that all workers and firms are better off with uniform UI taxes if the excess of production is distributed appropriately.

The results depicted in figure 1 underline the importance of the bargaining structure for an assessment of the question whether UI should differenciate between regions or not. With small unions, firms from the poor region prefer UI at the central level, whereas regional UI allows higher profits when a union comprises more than 15% of the labor force. The efficiency criterion also advocates uniform UI taxes if p is small and differenciated UI if p is above a certain point (0.07). In contrast, workers from both regions are always better off with a central UI scheme, and firms from the rich region make higher profits with a regional UI scheme.

The described results can be explained by the functional courses of the wages, given in tables 1 and 2. Equilibrium wages are lower if unions are larger. The reason is that unions take the negative effect of wages on aggregated employment into account and consider thus that higher wages cause the UI tax rate(s) to rise. This effect is stronger if UI is regional because there are only half as many unions relevant for the budget constraint of UI. Therefore, regional UI is the more advantagous for firms, the higher the degree of centralization of the bargain is. The inverse accounts for workers. Ex ante, lower wages are to the disadvantage of all workers because the expected utility is lowered. Some workers can yet be better off because the number of employed rises. Preferences of workers from both regions must be parallel because of the compensating effect of migration. A smaller wage rate leads to higher employment and enhances thus total production, which causes the efficiency criterion to favor regional UI when p is relatively high. The fact that efficiency is higher with central UI when p is small is due to the more intense migration in the case of regional UI. The additional migration costs lower consumption possibilities so that firms from region 2 and workers from both regions could potentially compensate firms from region 1 for the disadvantage they suffer from federal UI.

4 Conclusions

The role of the bargaining structure on wages is analyzed in a well-known paper by Calmfors and Driffill [1988]. In that study, the so-called "hump-shape hypothesis" is put forward. According to Calmfors and Driffill, centralization of the wage bargain has two contrary effects on net wages. On the one hand, more of an increase of nominal wages can be shifted by raising output prices if the bargain is more central. This causes firms to accept higher wages. On the other hand, the aggregated price level rises more if the bargain is relatively central, which reduces real profits. Our study is related to that approach in that centralization of the bargain can be viewed as an internalization of externalities which results in lower wages. Among other things, the main difference is that

the source of wage differences in that paper has to do with the extent to which firms can shift higher wages to output prices. In contrast, the key mechanism in this contribution arises is caused by the behavior of the unions, i.e. it lies on the labor supply side.

This study examines the effects of the bargaining structure on the assessment of uniform vs. differentiated UI contributions. The main applications are a comparison of budgeting at different levels of a federation (in geographic terms), and along industry lines. For the indicated aim, two models are contrasted, one with either organizational form of UI. Due to the requirement to include a rather elaborated bargaining setup, UI budget(s), and migration (schooling) decisions of workers, the models are relatively complex. On the one hand, an obvious objection is thus that the results can only be derived numerically. On the other hand, the findings are traced back to plausible interactions between the endogenous variables so that they can be expected to hold with other reasonable numerical specifications. Our main results are:

1. With the assumed functions and parameter values, workers from both regions (sectors of the industry) are always in favor of uniform UI taxes and firms from the rich region are always better off with differentiated UI taxes. In contrast, firms from the poor region (high-unemployment sector) prefer a uniform UI scheme with relatively decentral wage bargaining, and prefer differentiated UI taxes with relatively central wage bargaining. The efficiency criterion favors uniform UI taxes in the former case and differentiated UI taxes in the latter case.

2. The more workers a union represents in relation to the total number of workers, the lower is the equilibrium wage rate for a given organizational form of UI.

3. The effect of the bargaining structure on the resulting wage rate is stronger in the case of differentiated UI contributions than in the case of uniform contributions.

Result 1 contradicts the initial intuition that high-risk agents prefer uniform UI taxes, whereas low-risk agents prefer differentiated UI taxes in general, and that differentiation of UI generally enhances efficiency. Even though other specifications of the models may alter the results to some extent, the mere possibility of our results shows that sweeping and intuitive judgements are not appropriate when dealing with this complex subject [see also Sanner, 2002].

The effects of the bargaining structure on profits and expected utilities of workers can be explained by differences of wages. In the considered framework, the preferability of higher wages is reduced because they come along with higher UI taxes. Hence, a union which internalizes this effect is ready to agree on lower wages than a union neglecting it. Consequently, the standard assumption of decentralized bargaining seems to be inadequate when self-financing UI is at issue. This argument is even more important in a comparison of different ways of UI budgeting because the influence of an agreement on wages between a union and the corresponding firms on UI parameters is stronger in the case of regionally or sectorally differentiated UI. Put differently, the rating of UI taxes acts as a discipline on union wage demands if the bargain concerns a non-negligable portion of the total workforce.

Endnotes

1. The signs of the derivatives only follow if $x > n$, which is guaranteed by the choice of the parameters made hereafter.

References

Blanchflower D.G., Oswald A.J. and Sanfey P. [1996] "Wages, Profits and Rent-Sharing". *Quarterly Journal of Economics*, Vol. 111, No. 1: 227–251.

Calmfors L. and Driffill J. [1988] "Bargaining Structure, Corporatism and Macroeconomic Performance". *Economic Policy*, 3: 13–47.

Feldstein M. [1976] "Temporary Layoffs in the Theory of Unemployment". *Journal of Political Economy*, 84: 937–957.

Feldstein M. [1978] "The Effect of Unemployment Insurance on Temporary Layoff Unemployment". *American Economic Review*, 65: 834–846.

Holmlund B. and Lundborg P. [1999] "Wage Bargaining, Union Membership, and the Organization of Unemployment Insurance". *Labour Economics*, 6: 397–415.

Oswald A.J. [1993] "Efficient Contracts Are on the Labour Demand Curve: Theory and Facts". *Labour Economics*, 1: 85–113.

Pissarides C.A. [1998] "The Impact of Employment Tax Cuts on Unemployment and Wages: The Role of Unemployment Benefits and Tax Structure". *European Economic Review*, 42: 155–183.

Sanner H. [2002] *Regionalisierung der Arbeitslosenversicherung: Eine Theorie unter Einbezug von Lohnverhandlungen und Migration.* Aachen: Shaker Verlag.

p	0.00	0.05	0.10	0.15	0.20
n_1	0.578	0.585	0.591	0.597	0.602
m_1	0.612	0.609	0.607	0.606	0.604
w_1	0.703	0.692	0.682	0.672	0.664
n_2	0.347	0.350	0.352	0.354	0.356
m_2	0.388	0.391	0.393	0.394	0.396
w_2	0.422	0.417	0.414	0.410	0.407
τ	0.042	0.035	0.029	0.024	0.019

Table 1: Numerical results, uniform UI taxes

p	0.00	0.05	0.10	0.15	0.20
n_1	0.582	0.590	0.598	0.605	0.612
m_1	0.617	0.616	0.616	0.615	0.615
w_1	0.697	0.683	0.670	0.658	0.646
τ_1	0.034	0.025	0.017	0.009	0.002
n_2	0.337	0.344	0.349	0.354	0.359
m_2	0.383	0.384	0.384	0.385	0.385
w_2	0.438	0.427	0.418	0.410	0.402
τ_2	0.078	0.066	0.057	0.049	0.042

Table 2: Numerical results, differentiated UI taxes

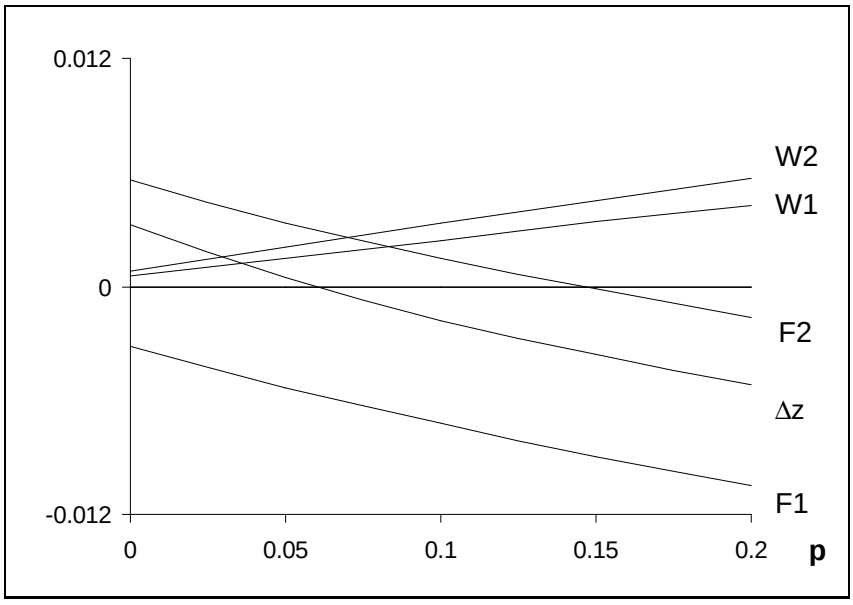

Figure 1: Preferences for uniform / differentiated UI taxes

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