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REGIONALLY HETEROGENEOUS PREFERENCES AND VOTING ON AN UNEMPLOYMENT INSURANCE: PROPORTIONAL VS. MAJORITY VOTE

INTRODUCTION

One of the most important questions in the field of fiscal federalism is how to account for regional heterogeneity in preferences. On the one hand, Oates' **decentralization theorem** makes a plausible recommendation: "the level of welfare will always be at least as high (and typically higher) if Pareto-efficient levels of consumption of the good are provided in each jurisdiction than if any single, uniform level of consumption is maintained across all jurisdictions"[1]. In addition, Tullock points out that the frustration cost of those who are, in an election, outvoted by the majority will be lower in the case of decentralization[2]. On the other hand, regional spillovers and economies of scale strengthen the case of centralization. Whenever economies of scale or spillovers are large, centralization is recommended[3]. Yet a centralized solution can draw on different mechanisms – the proportional and the majoritarian voting rule – to aggregate individual preferences. This paper will show how the two mechanisms differ in the results they produce when used to decide about the main parameters of an unemployment insurance (UI). Section 2 introduces the basic concept of an UI and interregional heterogeneity in preferences. Section 3 compares the

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[1] W. E. Oates, *Fiscal Federalism*, Harcourt Brace Jovanovich, New York–Chicago 1972, p. 54.

[2] G. Tullock, *Federalism: Problems of Scale*, "Public Choice" 1969, vol. 6 (1), p. 19–29.

[3] E.g. I. Bischoff, S. Schaefer, *Unemployment Insurance and Micro-level Labor Market Policy in a Federalist State*, Paper presented at the University of Lodz, Poland April 23, 2004.

decisions made under the proportional and the majoritarian voting rule, respectively. Section 4 illustrates implications of different voting rules for different forms of interregional heterogeneity in preferences.

1. UNEMPLOYMENT INSURANCE AND HETEROGENEITY IN PREFERENCES

1.1. Introducing the Basic Mechanism of a Central Unemployment Insurance

Most countries have installed a scheme of unemployment benefits to cushion the loss of income that people face when losing their job. In order to grant unemployment benefits, an insurance premium must be collected from the employed. Let b denote the insurance premium the employed have to pay (expressed in per cent of their income). λ denotes the so called replacement rate. It states the percentage of unit wage a person receives when he is unemployed. Beyond this definition of the UI's main parameters, let us assume that we have a very crude economy in which labor is the only source of income. Let us furthermore assume that every individual earns the same wage when he is employed. Thus the individuals are only different with respect to the probability of having a job. Every individual i has an individual probability p_i to be employed and thus a probability to be unemployed of $(1 - p_i)$.

The average employment probability is denoted by p. This also represents the level of employment. Therefore $(1 - p)$ is the unemployment rate. The total income achieved in our economy is given by

$$Y^{tot} = p \cdot Y \tag{1}$$

where: Y = income at full employment. (hereafter $Y = 1$)
Due to the budget restriction, the following relationship between λ and b must hold:

$$p \cdot b = (1 - p)\lambda \tag{2}$$

1.2. Describing an Individual I's Attitude towards The Basic Parameters b and ν

Individual i's expected disposable income is:

$$E(Y_i) = p_i(1 - b) + (1 - p_i)\lambda \tag{3}$$

In equation (3), the first summand describes the disposable income of an employed individual weighed with this individual's employment probability, while the second one describes an unemployed's income weighed with this individual's probability of being unemployed. Assuming that the individual's utility is best described by a logarithmic function of his expected disposable income, we get

$$U_i = p_i \times \ln(1-b) + (1-p_i) \times \ln \lambda \tag{4}$$

Applying the *Lagrange*-algorithm leads to the utility-maximizing combination of b and λ preferred by individual i:

$$L = p_i \times \ln(1-b) + (1-p_i) \times \ln \lambda - \Lambda [p \times b - (1-p) \times \lambda] \tag{5}$$

Solving $dL/db = 0$, $dL/d\lambda = 0$ and $dL/d\Lambda = 0$ yields the combination of b and λ which maximizes individual i's utility:

$$b = 1 - \frac{p_i}{p} \frac{1-p}{1-p_i} \lambda, \quad \lambda = \frac{p}{(1-p)(1+\frac{p_i}{1-p_i})} \tag{6}$$

Individual i's attitude towards the policy parameters b and λ crucially depends on its individual employment probability p_i. The higher p_i, the lower the preferred values of b and λ. Due to individual differences in skills or mobility, p_i and thus the preferred values of b and λ can be expected to differ across individuals. The broader the spectrum of p that the individuals in one region are applied with, the more heterogeneous the preferences for b and λ are within the region.

1.3. Integrating Interregionally Differring Preferences into the Analysis

In an economy consisting of different regions, different types of heterogeneity in preferences can be identified. First, heterogeneity may be large within regions (*intra*-regional heterogeneity), second, the regions may differ in their average preferences (*inter*-regional heterogeneity). Given these two options, 4 different cases have to be considered. From a fiscal federalism point of view, only the two cases with large inter-regional heterogeneity in preferences are of importance. Figure 1 illustrates the remaining two cases that are characterized by low *intra*-regional heterogeneity (case A) or high *intra*-regional heterogeneity (case B), respectively – given high *inter*-regional heterogeneity in each case.

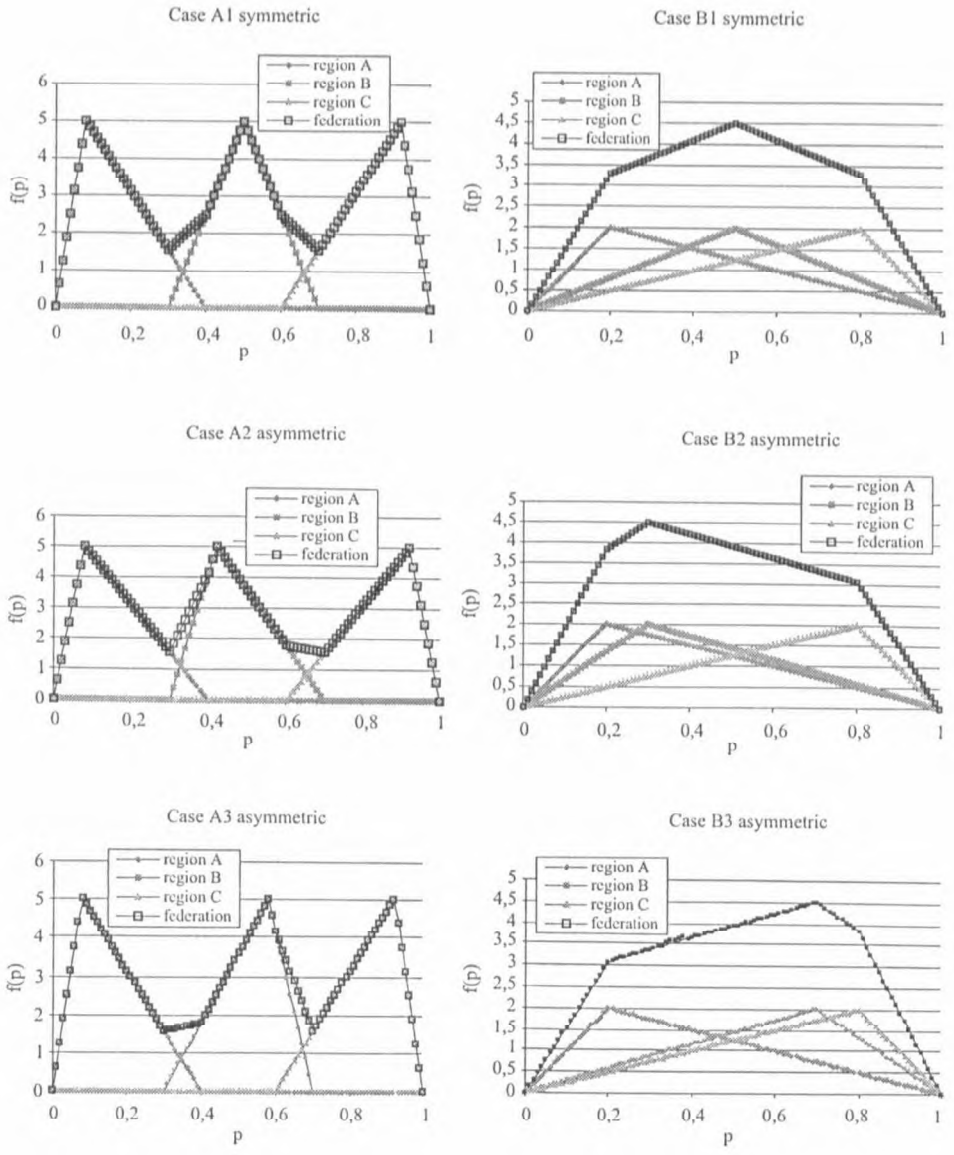

Fig. 1. *Intra*-regional and *inter*-regional heterogeneity in preferences

Within each region, a triangular distribution of preferences is assumed. The parameters describing this form of distribution are the minimum value of p (α), the length of the base segment (β) and a parameter for the skewedness (γ). The value of β measures the intraregional heterogeneity in preferences. Interregional differences can be described in terms of differences in all three parameters.

In case A, the preferences of each regional population cover approximately one half the political spectrum; intraregional heterogeneity is low. In contrast, the intraregional heterogeneity in case B ist very high: In all three regions there are individuals with values of p close to zero as well as individuals with the maximum value of p close to 1. So in all three regions the individuals' preferences cover nearly the entire political spectrum.

In addition, both cases are characterized by different forms of interregional heterogeneity (see figure 1). In case A, the bases of the triangular distributions hardly overlap. Almost every person in region A is applied with a lower value of p than each person in region B or C. The interregional difference concerns all inhabitants. Case B is more complicated, since in all three regions the individual values of p cover almost the entire political spectrum. Here, the *inter*-regional heterogeneity results from different forms of *intra*-regional heterogeneity due to different values of γ. In region A, the distribution of p is skewed to the left, while in region C it is skewed to the right.

2. AGGREGATION OF PREFERENCES IN A REPRESENTATIVE DEMOCRACY

Whenever the unemployment insurance is a public institution, the decisions concerning its major parameters are made politically. In order to benefit from economies of scale and cope with shocks in unemployment, an unemployment insurance system should be provided by a central agency[4]. Thus citizens of all regions pay the same premium and – in the case of unemployment – receive the same unemployment benefits. Regional differences in preferences cannot be accounted for by regionally differing parameters of the UI. Consequently, the parameters are set by the federal parliament – usually by a simple majority vote. In order to derive predictions concerning the outcome of the political decision making process, the following passages draw on a broader discussion that focusses on how different

[4] E.g. *ibidem*.

institutional settings affect the political design of a UI[5]. Neugart's analysis[6] is motivated by the empirical observation according to which proportional voting and the replacement rate are positively related; on average, in countries with a majoritarian electoral system the replacement rate is lower than in countries with a proportional electoral system. The question Neugart poses is whether the differences in the voting system cause the observed differences in the UI. As a complete formalization of these aspects would exceed the confined spatial limits of this paper, we have to concentrate on the intuition that lies behind Neugart's reasoning. The cardinal question is: What characterizes the decisive voter in case of a proportional election or, respectively, in case of a majoritarian election?

2.1. The Median Voter Approach

Anthony Downs[7] has provided a simple yet powerful model which can derive the parameter values set by the parliament from the distribution of preferences of the underlying electorate. This model became known as the median voter model[8]. The median voter model assumes that two parties compete for the majority of votes of a given electorate. The voters are fully informed about all relevant issues and will certainly make use of their right to vote. There is only one political issue – in our case the parameters of the UI. Due to the budget restriction, the voters and politicians are left with only one degree of freedom when setting these parameters. Hereafter, we will assume that the replacement rate is the variable parameter. The voters differ in their preferences concerning this parameter – depending on their individual value of p: Following (6), the relationship is strictly anti-proportional. Each voter has a so-called bliss point which describes the value of λ which maximizes his individual utility. He will vote for the party which offers a value of λ that is closest to this bliss point.

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[5] R. Wright, *The Redistributive Roles of Unemployment Insurance and the Dynamics of Voting*, "Journal of Public Economics" 1986, vol. 31, p. 377–399; G. Saint-Paul, *Exploring the Political Economy of Labour Market Institutions*, "Economic Policy" 1996, vol. 23, p. 265–315; T. Persson, G. Tabellini, *Federal Fiscal Constitutions: Risk Sharing and Redistribution*, "Journal of Political Economy" 1996, vol. 104, p. 979–1009; T. Persson, G. Tabellini, *Constitutional Rules and Fiscal Policy Outcomes*, "American Economic Review" 2004, vol. 4, 94, p. 25–45.

[6] M. Neugart, *Unemployment Insurance: the Role of Electoral Systems and Regional Labor Markets*, Paper presented at the EPCS-Conference in Berlin, 2004.

[7] A. Downs, *An Economic Theory of Democracy, Harper and Row*, New York 1957.

[8] D. Mueller, *Public Choice III*, Cambridge University Press, Cambridge 2003; I. Bischoff, *Party Competition in a Heterogeneous Electorate: the Role of Dominant Issue Voters*, "Public Choice", forthcoming.

The parties can be assumed to differ in the preferred replacement rates. During the election race, they are forced to change the replacement rates offered to the voters in order to attract the majority of votes. In this race for political power, the party offering a low replacement rate will be forced to increase the latter, while the party initially offering a high replacement rate has to reduce it. Thereby their policy platforms converge until, finally, they are identical. Both parties offer the replacement rate which is favored by the voter with the median value of p. Regardless of which party finally wins the election, it will set the parameter values for the UI in accordance with the preferences of the median voter.

2.2. Median Voter under Proportional and Majoritarian Vote

Under proportional vote, the entire national electorate is regarded as one unit. Within this electorate, the person with the median value of p is the decisive voter. Both political parties' policy platforms will propose parameter values which suit this national median voter ($\lambda = f(p_{Med}^{nat})$). Thus, proportional voting completely neglects *inter*-regional heterogeneity of preferences. The median voter is characterized according to his individual unemployment risk, not according to his home region.

With majority voting, the interregional heterogeneity of preferences matters. The analysis requires a three-stage consideration. First, within each election district all voters have to be lined up according to their individual employment probability. This procedure allows for the identification of each district's median voter. Second, all election regions have to be lined up in ascending order of the individual employment probability of the region's median voter. This leads us to the determination of the median region, i.e. the district whose representative is the decisive one in the parliamentary vote. Finally, in order to determine the outcome of the election, the preferences of the median region's median voter have to be identified. The main difference between the proportional voting system and the majoritarian one is quite obvious: While in the latter the political decision follows the preferences of the median region's median voter ($\lambda = f(p_{Med}^{Medreg})$), the former results in the whole nation being considered as one voting region and thus ($\lambda = f(p_{Med}^{nat})$).

Returning to the question posed by Neugart: how can the majoritarian electoral system's bias towards higher replacement rates be accounted for? Neugart's formal framework does not offer a definite answer[9]. Instead, the result depends on the underlying assumptions concerning the relative level

[9] M. Neugart, *op. cit.*, p. 15–17.

of the national median voter's employment probability compared with that of the median voter in the decisive region. If $p_{Med}^{Medreg} > p_{Med}^{nat}$, a majoritarian electoral system yields lower replacement ratios than a proportional one et *vice versa*.

3. HETEROGENEITY IN PREFERENCES AND THE ROLE OF VOTING RULES: SOME ILLUSTRATIONS

The triangular distribution of preferences put forth in section 3 provides a valuable framework to show under which conditions $p_{Med}^{Medreg} > p_{Med}^{nat}$. Due to the lack of space, the following illustrations can merely give some intuition. For this purpose, consider the six hypothetical scenarios in figure 1. For three regions A, B, C of identical size, there are three scenarios for case A (small *intra*-regional heterogeneity, β = small, different α) and three for case B (large *intra*-regional heterogeneity, β = large, similar α). Within these cases, scenario 1 assumes that region A and C are – in terms of modus and γ – symmetric in their differences to region B, while the other scenarios assumes region B to be closer to region A (scenario 2) respectively region C (scenario 3). In the symmetric cases, $p_{Med}^{Medreg} > p_{Med}^{nat}$ and thus both voting rules lead to the same parameter values of the UI. The same result holds for the asymmetric cases A2 and A3. Thus, only in the case of asymmetric distribution of preferences across regions AND large *intra*-regional heterogeneity does the voting rule matter. The relationship between voting rule and replacement rate postulated by Neugart will only occur if the distribution of preferences across and within regions resembles case B2. The opposite is true in case of scenario B3. Empirical research has to be conducted to determine which of the described distribution is given in reality.

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REGIONALNIE NIEJEDNORODNE PREFERENCJE I GŁOSOWANIE NAD UBEZPIECZENIEM PRZED BEZROBOCIEM: GŁOSOWANIE PROPORCJONALNE A WIĘKSZOŚCIOWE

W artykule przedstawiono problematykę politycznych decyzji, dotyczących podstawowych parametrów ustalania ubezpieczenia od bezrobocia na poziomie centralnym. Porównano skutki, wynikające z większościowego i proporcjonalnego głosowania. Wyniki stopy zastąpienia bezrobocia zależą od rozłożenia indywidualnych preferencji w ramach i pomiędzy okręgami wyborczymi.