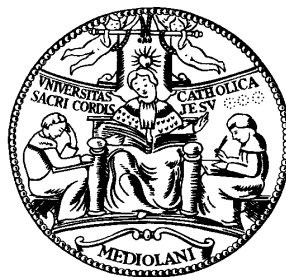UNIVERSITA' CATTOLICA DEL SACRO CUORE
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and Constitutional Rules

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Redistribution, Decentralization

and Constitutional Rules[1]

by

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Abstract

The paper discusses the redistribution objectives in a countries where public activities are assigned to different levels of government. The literature on fiscal federalism has indicated a variety of circumstances that produce inefficient allocations because of inappropriate assignments of functions and powers and because of the incentive effects of redistribution policies designed by the central government to reduce the consequences of interregional differences in tax bases. We develop a simple two region models with local public goods and redistribution and study different pseudo-constitutional arrangements, ranging from regional independence and no central government to fully centralized management of income equalization and regional public good production. The main results can be summarized as follows: 1) both centralization and decentralization can achieve a first best allocation of resources if the central government can redistribute personal income via central progressive taxes and enforce interregional financial transfers (of regional tax revenue) for regional public good provision; 2) a constrained centralization in which the central government can only redistribute personal income (alternatively, regional tax revenue) induces a perfect redistribution of income (alternatively, equalization of local public expenditure) but maintains differentiation in public good provisions (net after-tax incomes); 3) a constrained decentralization in which the central government can only redistribute personal income (alternatively, regional tax revenue) induces perfect redistribution of income and perfect equalization of local public expenditure but overprovision (underprovision) of public goods; 4) a constrained decentralization is socially preferred to a constrained centralization if and only if income inequality between the regions is great enough; 5) a House of Regions where the redistributive policy is decided by bargaining induces efficient policies but attains only partial redistribution; 6) a transition from constrained centralization to a decentralization is supported by both regions if and only if the central government accepts incomplete redistribution, which represents a form of trade-off between decentralization and redistribution.

I.   Introduction

Most developed countries pursue the objectives of budgetary policy, provision of public goods and redistribution of incomes, in a multi-level governmental setting. Institutional arrangements vary, but almost everywhere countries are structured on three levels of governments. A central, federal or national government, a layer of regional, departmental, Lander, state or provincial governments and a layer of municipal governments. In a few cases the layers of government are in number of four or more. The distribution of powers and functions among different levels of government varies greatly among countries; it is also changing over time, with a discernible pattern of increasing decentralization of spending and taxing powers. By and large, and in line with Musgrave's recommendations, redistribution policies are assigned - by tradition, Constitutions or political decisions - to the central government. This is so, both in national unitary states and in federal states. Recent Constitutional innovations in Italy have changed the distribution of powers between the central and regional governments but have not modified this general tenet.

Reasons for decentralization of taxing and spending powers are well known. Budgetary decisions at the regional-local level allow to take better account of differences in preferences, increase the accountability of the budgetary processes and improve the working of political decision makings. Of lesser nobility, but of stronger political impact – at least in the Italian case – is the notion that national unitary states (a) have a tendency to enforce uniform supply of public goods (even goods with limited regional or local spillover effects) over the entire national territory and, (b) have a penchant for enforcing redistribution policies directed to reduce the after tax differentials in per capita income. The distribution of regional tax burden and public spending benefits may become a matter of political debate together with the analysis of fiscal surpluses

and deficits. The matter is a daily source of discussion even in the European Union.

Progressive income taxes, uniformity in the distribution of public services and spending program specifically designed to reduce per capita income differentials define the redistributive stance of a political community. As fiscal regional accounting is a somewhat sophisticated field of analysis, it is no surprise that the full extent of interregional redistribution is not always well understood or measured. Politicians tend, on the other side, to show greater interest in specific redistributive programs rather than in the complexity of fiscal residua.

It cannot be denied, however that the stronger political support for reforms aiming at more decentralization of powers (taxing and spending) have come from lobbying groups from the richer regions, avowedly keen for a reduction of regional taxes and of interregional fiscal transfers.

A widespread view claims that there is a *trade-off between redistribution and decentralization*: a centralized state can (a) generate stronger redistribution of incomes among individual and among regions and, (b) redistribute income in a more effective and efficient way than a decentralized state.

Many Constitutions define the frame of a multi-level governmental structure by stating the degree of fiscal (tax and spending) autonomy assigned to the sub-national governments. They also propose some statement as to the acceptable degree of income inequality (for example by mandating progressivity of the tax system). In many cases they also identify goods or services (such as health care or education) for which the central or the regional governments are expected to enforce uniform supply in the whole country.

Should regions operate unabated by constitutional rules, they would adjust tax rates and level of outputs of private and government supplied regional goods to tastes and incomes prevailing in the regional territory. Under full decentralization allocation patterns would reflect differences in tastes and income. Central governments may want to reduce ex-ante or ex-post personal

income differences and generate or induce uniformity in the provision of regional public goods. The policies and the programs appropriate for the different objective depend upon the distribution of power that Constitutions or legislations have set up; they depend upon the degree of tax autonomy that is assigned to regions and on the practical working of intergovernmental fiscal relations in any single country. Of utmost importance are the practical rules that the constitution or the legislator defines for the working of the budgetary decisions at the regional or federal level, whether priority is given to regional or central government in the reading of the redistributional objectives written in the Constitution. We will show that if regional governments are allowed to take the first step in the setting of regional budgets, inefficient allocation of resources may be produced.

This paper provides – with the aid of a sequence of highly stylised models – some preliminary analysis of the effect of redistribution policies on the efficiency of resource allocation under different institutional (pseudo-Constitutional) arrangements on taxing powers, on uniformity in the supply of regional public goods, on regional redistribution objectives and on budgetary procedures. Different equalization plans are evaluated – in welfare terms – against two alternative efficient bench-mark situations: the case of independent regions and the case of a centralized country able to implement a first best allocation of resources.

Given the objective of maximizing a national welfare function, two basic institutional settings are tested against the polar case of a no central government setting. In the first (the centralization case), the central government sets a uniform (national) tax rate policy, while in the second (the decentralization case) each region autonomously decides on its own tax rate. In both cases we allow the central government to design the appropriate redistribution program between regions but the outcomes depend on the set of redistributive transfers available to the central government.

The main results can be summarized as follows:

- both centralization and decentralization can achieve a first best allocation of resources if the central government can redistribute personal income via central progressive taxes and enforce interregional financial transfers (of regional tax revenue) for regional public good provision;

- a constrained centralization in which the central government can only redistribute personal income (alternatively, regional tax revenue) induces a perfect redistribution of income (alternatively, equalization of local public expenditure) but maintains differentiation in public good provisions (alternatively, net after-tax incomes);

- a constrained decentralization in which the central government can only redistribute personal income (alternatively, regional tax revenue) induces perfect redistribution of income and perfect equalization of local public expenditure but over-provision (under-provision) of public goods;

- a constrained decentralization is socially preferred to a constrained centralization if and only if income inequality between the regions is great enough;

- a House of Regions where the redistributive policy is decided by bargaining induces efficient policies but attains only partial redistribution;

- a transition from constrained centralization to a decentralization is supported by both regions if and only if the central government accepts incomplete redistribution, which represents a form of trade-off between decentralization and redistribution.

The paper is organized as follows. Section II reviews some of the contributions on fiscal federalism relating to redistribution issues and equalization plans. Section III presents a sequence of simple maximization models of income redistribution under different institutional or constitutional setting. A country with two regions, one central government and two regional governments is considered. Section IV deals with some of the formal answers that the model can provide on questions of strong practical importance such as

the relationship between different institutional solution and the degree of inequality of incomes, the conditions that have to be met for decentralization reforms to be accepted, the consequences of Regions taking joint and coordinate action on the redistribution outcomes and, finally, the relationship between transparency of the equalization plans (horizontal versus vertical equalization plans) and redistribution objectives. Section V concludes.

II.   Redistribution and Fiscal Federalism

Spending and taxing power in a system of fiscal federalism are allocated to different layers of government. As it is well known, policies with high spillovers between regions or public goods under a regime of economies of scale should be centralized so as to internalise the externalities within the boundaries of a central government. Heterogeneity between regions in economic bases and in citizens (or political) preferences are factors pushing toward delegation to the regional level. For instance, in the European Union, trade and monetary policy are delegated to the highest level of government – the supra-national – because they imply high externalities between the European countries. Foreign policy and defence also imply economies of scale and, according to this criterion, should also be centralized, but probably because of the great heterogeneity of views on this subject between European nations, they are not.

The mapping of the decision powers on taxing and spending on the different layers of government is an essential feature of the theory of fiscal federalism. When a decision is to be taken as to whether a certain public activity is to be centralized (or decentralized) the economic benefits (costs) from the reform are to evaluated against the costs (or gains) of the loss of independent policymaking. This is at the basis of the political economy of federations. The literature has however investigated many different ways in which a federation – or a union of countries – should be organised in order to generate economic

benefits. The literature relevant for the tradition of public economics focuses on fiscal unions. The issues that are raised concern the provision of public goods, pure redistribution and risk sharing. This paper is concerned mainly on redistribution activities in the responsibility of a central government. On this subject an early fundamental reference is Musgrave (1961). More recently the papers by Bolton and Roland (1997), Bordignon, Manasse, Tabellini (2001) and Alesina, Angeloni and Etro (2001) by are to be noted: the first two papers focus on redistribution between regions with heterogeneity in economic fundamentals while the last one focuses on the political economy of local public goods provision when there are spillovers between regions and heterogeneity in preferences. The ever increasing literature on fiscal federalism and its relations with institutional arrangements will be discussed in an enlarged version of this paper.

For the time being we shall refer to Musgrave's 1961 paper which stresses that the central government interference in regional finances may be based on two sets of objectives. On set of objectives relates the central fisc to regional government decisions with respect to the level of public services, the terms at which public services are provided by the regions, the reduction of inequalities in performance indicators in the different regions. A second set of objectives relates the central fisc to the individual citizens of the federation, the idea being that the central government should neutralize the individual citizen against the fiscal operations of the region in which he resides. Prominent in this respect is the objective of "vertical equity", i.e. the reduction in the inequality in the pre-tax income distribution. The first approach requires financial transaction between the central and regional governments (vertical equalization plans) or between rich and poor regions (horizontal equalization plans). The second approach requires taxation of individual at differential rates to reduce after-tax income inequalities.

Recent literature on this same or related arguments stresses the role of the working rules of federations and also suggests that a number of questions can

find an answer by referring to simple utility maximization models. Bordignon, Manasse and Tabellini (2001) study federal redistribution between two regions with different productivity. They assume that redistribution is implemented with transfers from the richer region to the poorer one to finance the local public good provision of the latter. The optimal taxation structure implies equalization of public expenditure in the two regions. Under decentralization of the tax policy in the two regions, part of the regional tax revenue is employed in redistribution by the national government since equalization of public expenditure is still optimal ex post. However, both regions have lower incentives to tax income to finance their public expenditure since higher tax revenue is associated to higher transfers to the poorer region for the rich region or smaller transfers from the rich region for the poor one, hence the federation is characterized by sub-optimal taxation and under-provision of local public goods.[2]

As Musgrave stressed 40 years ago, policies directed to equalize performances of regional governments and tax policy directed to reduce personal income inequality can be adopted together. In a variety of countries, Constitution mandate policies in both directions. The Italian Constitution requires progressivity of the over-all tax system and also requires equalization plans in favour of poor regional governments or territories. Furthermore, it has to be noted that the notion of a just income distribution has been taken to imply that the consumption of certain goods be equalized over all individuals. Redistribution of income is thus realized via a variety of instruments tax progressivity, uniform supply of some goods considered of particular social value, equalization of fiscal capacities or of fiscal performances in regional governments.

Efforts to reduce income related inequalities have a tendency to run into incentive problems. If regional governments have tax autonomy, then the

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[2] BMT also introduce endogenous labour supply so that taxation is distorsive, without changing the nature of the result. More importantly they extend the model to incomplete information deriving the optimal federal redistribution under adverse selection.

knowledge that the central government is going to do something to change the pre-tax income distribution may generate adverse incentive effects. Labour supply may be affected by progressive taxes. Regional governments may lose interest in the efficient production of public goods at the regional level; they will tend to settle for lower than efficient tax rates and may even lose interest in the growth of their regional economic base. Adverse incentive effects (and tax competition) have marked the decline of the popularity of the personal progressive income tax. A lot of attention is given in the system of intergovernmental fiscal relations to avoid (or reduce) the impact of equalization plans on efficiency in budgetary processes at the regional level.

III. A Model on Redistribution under Centralization and Decentralization

Let us consider a country composed of two regions, of equal population normalized to one, with different incomes, w for the poorer region B and kw for the richer region A, with $k \geq 1$. Hence the higher is the parameter k, the higher is inequality between the regions. Utility in region $i=A,B$ is given by:

$$U_i = u_i(y_i) + H_i(g_i)$$

where the sub-utilities of the two regions over net income (or private consumption) y_i and expenditure on a regional public good g_i are given by the same functions. For the sake of simplicity we will focus on the particular case in which $u_i(x) = H_i(x) = \log x$, so as to obtain closed form solutions. The public good is financed through proportional income tax at rate t_i. Since income is exogenous, the tax does not generate loss of efficiency. With this model we will study different organizations of the budgetary policy. While the degree of centralization differs between these organizations, we will always assume that the Constitution sets a social welfare function of the Bentham

variety for the country as a all, that is an un-weighted sum of the regional utility functions[3]:

$$W = u_A(y_A) + H_B(g_A) + u_B(y_B) + H_B(g_B)$$

The Appendix describes the first best solution of this model.

III.1. Two independent regions with no central government.

If the two regions are completely separated in their decision making, region A would choose t_A to maximize $U_A = u_A[kw(1-t_A)] + H(kwt_A)$ and region B would choose t_B to maximize $U_B = u_B[w(1-t_B)] + H_B(wt_B)$, from which:

$$t_A^I = t_B^I = 1/2$$

which implies $y_A = g_A = kw/2$ and $y_B = g_B = w/2$ with regional utilities:

$$U_A^I = 2\log\left(\frac{kw}{2}\right) \qquad U_B^I = 2\log\left(\frac{w}{2}\right)$$

and country utility:

$$W^I = 2\log\left(\frac{kw^2}{4}\right)$$

where *I* stands for independence (a possible bench-mark) situation with no inter-regional redistribution.

III.2. Regions with no autonomy and a strong central government with the full set of instruments

Let us now consider the two regions as members of a federal or unitary state country. The Constitution assigns the production of the public good to regions, it requires a uniform income tax rate in all regions and no regional or central government deficit spending. Furthermore, it entitles the central government: (i) to levy a lump sum tax on citizens in the rich regions to finance a negative tax program in favour of citizens

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[3] The first example of such a welfare function in the analysis of fiscal regional problems is Pantaleoni (1891). The discussion takes up the first 8 pages of a lengthy article on regional distribution of wealth and tax revenues in Italy.

in the poor regions and, (ii) to set up a transfer programs by which rich regions are "forced" to transfer financial resources to poor regions. The parameter θ_1 represents the instrumental fiscal variable used to generate the rich citizen-to-poor citizen transfer; the parameter θ_2 represents a financial transfer from region A to region B required to ensure that regional spending on public goods is fully financed (by tax revenue and interregional transfer). The distribution branch is assigned to the central government. Rich regions finance the excess of spending over tax yields in poor regions. Though it may look like a case of horizontal equalization plans, there is no bargaining between regions: the rule is set and enforced by the central government.

Formally, the central government thus maximizes:

$$W = u_A[kw(1-t) - \theta_1] + u_B[w(1-t) + \theta_1] + H_A[kwt - \theta_2] + H_B[wt + \theta_2]$$

The first order conditions for the optimum centralized redistribution (with respect to t, θ_1 and θ_2) are:

$$u'_A[kw(1-t) - \theta_1] = u'_B[w(1-t) + \theta_2] = H'_A[kwt - \theta_2] = H'_B[wt + \theta_2]$$

from which:

$$t = 1/2$$

$$\theta_1 = \theta_2 = \frac{(k-1)w}{4}$$

and utility:

$$U_A^{FC} = U_B^{FC} = \log\left(\frac{(k+1)^2 w^2}{16}\right)$$

where *FC* stands for full centralization.

Note that $W^{FC} = 4 \log w(1+k)/4 = W^I + 2 \log w \frac{(1+k)^2}{4} > W^I$

In this new setting, welfare in region A is lower than in the no-central government case and is higher in region B. The poor region benefits from redistribution (it obtains more private consumption and more public good), whereas the rich region loses both private consumption and public goods. Due to the shape of the SWF function, private and public consumption are fully equalized across regions.

Of course, there is no reason why region A, if given the choice, should have chosen to sign a founding contract for a federation or an unification with region B. Nor that it should be glad to stay in the contract. In any case, the model has nothing to do with birth or death of federations.

Comparing the results with those of the first best solution, it is clear that the new setting represents an efficient allocation (first-best) of resources. This is possible because a wide enough set of instruments is available for the central government.

A situation where the central government has still all the decision power but is more constrained in the set of instruments available seems reasonable and it is explored in the two following subsections.

III.3. Regions with no autonomy and a central government controlling only the parameters of the tax system (alternatively, only the program of interregional transfers)

Let us start considering the environment III.3.a where the central government can only choose the parameters of the personal income tax (the tax rate t and the lump-sum transfer θ_1 from rich to poor citizens). Local public expenditure is financed by each region through its own tax revenue as the central government does not have the power to enforce financial transfers from rich to poor Regions; in other words $\theta_2 = 0$. The new objective function (where, for simplicity, θ stands for θ_1), is:

$$W = u_A[kw(1-t) - \theta\ ] + u_B[w(1-t) + \theta\ ] + H_A[kwt] + H_B[wt]$$

The first order conditions (with respect to t and θ) are:

$$u'_A[kw(1-t) - \theta\ ] = u'_B[w(1-t) + \theta\ ] = \frac{kH'_A[kwt] + H'_B[wt]}{k+1}$$

from which:

$$t^C = 1/2$$

$$\theta^C = \frac{(k-1)w}{4}$$

where C stands for centralization.

The outcome implies a right allocation of resources between private and public consumption in the country, but while we obtain perfect equalization of private consumption at the first best level for both regions, there is no equalization of public expenditure, which is the same as in the independent regions case. This inefficiency is due to the lack of enough redistributive instruments which is constraining the central government. The utilities of the two regions are:

$$U_A^C = \log\left(\frac{(k+1)kw^2}{8}\right) \qquad U_B^C = \log\left(\frac{(k+1)w^2}{8}\right)$$

and country utility is:

$$W^C = 2\log\left(\frac{(k+1)kw^2}{8\sqrt{k}}\right) \quad \text{less than} \quad Wfc$$

where C stands for centralization.

The alternative environment III.3.b would be one where the central government can only choose the uniform tax rate and the inter-regional transfer directed to finance public expenditure in the poor region. In this case the situation is symmetric to the previous one with perfect equalization of public expenditure (at the first best level), but not of private consumption (which comes out equal to the value computed in the independent regions case).

Summarizing, *a centralized setting in which the central government can only redistribute personal incomes (or, alternatively, enforce interregional transfers) generates equalization of incomes after taxes (alternatively, equalization of local public expenditure) but differentiation in public good provisions (alternatively, incomes after-taxes).*

The welfare results of the two alternatives are exactly the same. In later pages this solution will be referred to as the case of constrained centralization.

III.4. Regions with tax autonomy

Consider now the case where the Constitution, while maintaining the same social welfare function, assigns tax autonomy to regional governments and states

that private consumption and regional public goods production be regulated by with lump-sum (positive and negative) central government taxes and with financial transfers from rich to poor regional governments. Regional tax rates, central redistributive tax and financial interregional transfers are defined by maximization of the welfare function which incorporates a functional relationship between the four policy instruments t_A, t_B, θ_1, θ_2 that will concur to compute their optimising values. This relationship is known to each regional government and to the central government.

The allocation of fiscal powers to regional and federal governments poses some problems of timing and of budgetary procedures. It is possible to envisage at least two alternatives. Remember that budgetary decisions by regional and central governments are interdependent. This is a common practical issue. When the budgetary session begins, in Italy in June-September, the central government would like to know regional governments decisions in order to implement the comprehensive budget policy; the regional governments would like to know the central government stance, as its decisions are going to constrain their budgetary decisions. Somehow, one of the two levels of governments has to make a first step. Consequently, in our model it is possible to envisage at least two alternatives. In the first alternative, the central government chooses the redistributive policy first and the regions choose their regional tax rates afterwards. In the second alternative, the regions move first and choose their tax rates and the central government steps in a second stage to decide on the redistributive policy. These two different time sequences can be taken to describe two different budgetary procedures.

Alternative A. Regional governments make a first *cautious* individual move. Each region reveals the functional relationship that makes its "demanded tax rate", t_A or t_B, a function of the, still unknown, values of θ_1 and θ_2. The central government uses these two independently revealed functions to condition the maximizing search for optimal values of θ_1 and θ_2. Once this optimal values are computed, the central

government announces its budget. On this basis, each regional government transforms its own "demanded tax rate" into the optimal individual tax rate and construct its final budget.

Alternative B. Regional governments make a contemporaneous (if not joint) move. They observe the functional relationship imbedded in the welfare function between t_A, t_B, θ_1, θ_2 and decide to go for a joint determination of t_A, t_B maximising their utility given that relationship. A major part of the regional budgets is thus determined directly by regional governments (using only knowledge of the Constitution). Once t_A, t_B are determined by regional budgetary processes, regional and central governments can independently proceed to compute redistributive taxes and interregional transfers. In a sense, Regions totally condition the choice of central government fiscal parameters.

The two alternatives define different budgetary procedures and also different distribution of political power between Regions and the central government. Consider them in turn, under the simplifying assumption that the central government has only one instrument at its disposal, the central government (positive and negative) tax, represented by parameter θ_1 (written as θ in the rest of the Section). Thus the central government will not enforce interregional financial transfers among the regions. The whole and only instrument for redistributing welfare in the nation is the central government progressive income tax. Section IV.4 discusses some of the possible (non positive) consequences arising when also interregional transfers to finance public expenditure are considered.

III.4.a. Regions with tax autonomy and a central government leader in the budgetary process.

Consider first the case described by <u>alternative A</u>. The central government has a full leadership in the formulation of budgetary policy. It has to respect each Regions preferences with respect to regional tax rates. Otherwise, the budgetary process is under

its full control.[4] In formal terms, alternative 1 can be described by the following sequence of decisions:

1) the central government chooses the tax-transfer θ.

2) each region chooses its own tax rate t_A and t_B

- taking the choice of the other region as given,

- knowing the tax-transfer θ chosen in stage 1).

The central government knows that the regions maximize:

$$U_A = u_A\big[kw(1-t_A)-\theta\big] + H_A\big(kwt_A\big)$$

and

$$U_B = u_B\big[w(1-t_B)+\theta\big] + H_B\big(wt_B\big)$$

Notice that the regions are choosing autonomously their level of public spending by choosing their tax rates. The optimality condition for the two regions:

$$u'_A\big[kw(1-t_A)-\theta\big] = H'_A\big(kwt_A\big)$$

$$u'_B\big[w(1-t_B)+\theta\big] = H'_B\big(wt_B\big)$$

define two reaction functions $t_i = t_i(\theta)$ for $i=A,B$.[5] The central government foresees these functions and chooses the transfer to maximize:

$$W = u_A[kw(1-t_A(\theta))-\theta] + u_B[w(1-t_B(\theta))+\theta] + H_A\big[kwt_A(\theta)\big] + H_B\big[wt_B(\theta)\big]$$

The first order condition of the central government (applying the envelope theorem) is:

$$u'_A[kw(1-t_A(\theta))-\theta] = u'_B[w(1-t_B(\theta))+\theta]$$

Given our functional form assumptions, the central government obtains first:

$$\theta = \frac{(k-1)w}{2}$$

and then:

$$t_A = \frac{k+1}{4k}$$

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[4] Under this type of decentralization it does not matter if the government uses transfers to equalize private or public consumption, as the final allocation of resources is the same in both cases. The situation described in the text under Alternative A is equivalent to what Bordignon, Manasse and Tabellini (2001, BMT hence on) describe as a situation where the central government has a credible commitment on the choice of the redistributive policy as represented by θ.

[5] By totally differentiating these conditions we have that $\partial t_A / \partial\theta > 0$ and $\partial t_B / \partial\theta < 0$.

$$t_B = \frac{k+1}{4}$$

Utilities are:

$$U_A = U_B = \log\left(\frac{(k+1)^2 w^2}{16}\right) \qquad W = 2\log\left(\frac{(k+1)^2 w^2}{16}\right)$$

In this case, the equilibrium implies a tendency toward lower tax rates in the richer region ($t_A < 1/2$) and higher taxes in the poorer region ($t_B > 1/2$) than under centralization. However, the central government with its redistributive tax-transfer θ succeeds to obtain a first best allocation of resources.

III.4.b. Regions with tax autonomy and with a joint political representation or voice.

Consider now <u>Alternative B</u>. Regions are given the opportunity to make autonomous use of the knowledge they (together with the central government) have of the Constitutional provisions. They are entitled to do so either because the Constitution so states or because they have captured some portion of the power on budget making. Some literature has proposed the notion of soft-budget constraint as a general tendency in multi-level governmental structures. It is not necessary, however, to think of this as a degeneration of some otherwise noble situation. It simply describes a different institutional setting. The case is interesting because it will be shown that this particular type of decentralization cannot achieve the first best. In formal terms, Alternative B can be described by the following sequence of decisions:

1) each region chooses its own tax rate t_A and t_B:

- taking the choice of the other region as given,

- knowing that the central government is bound by the Constitutional objectives as defined in 2).

2) the tax-transfer θ is chosen that maximize the social welfare function.

Each region knows that the government maximizes:

$$W^D = u_A[kw(1-t_A) - \theta] + u_B[w(1-t_B) + \theta] + H_A[kwt_A] + H_B[wt_B]$$

where D stands for decentralization (with strong regional political power). For given tax rates, the first order conditions imply:

$$u'_A \left[kw(1 - t_A) - \theta \right] = u'_B \left[w(1 - t_B) + \theta \right]$$

which generates equalization of private consumption in the two regions through the following transfer as a function of the regional tax rates:

$$\theta^D (t_A, t_B) = \frac{kw(1 - t_A) - w(1 - t_B)}{2}$$

Each region takes this in consideration so as to maximize:

$$U_A = u_A \left[kw(1 - t_A) - \theta^D (t_A, t_B) \right] + H_A (kwt_A) = u_A \left[\frac{kw(1 - t_A) + w(1 - t_B)}{2} \right] + H_A (kwt_A)$$

and

$$U_B = u_B \left[w(1 - t_B) + \theta^D (t_A, t_B) \right] + H_B (wt_B) = u_B \left[\frac{kw(1 - t_A) + w(1 - t_B)}{2} \right] + H_B (wt_B)$$

Taking in consideration the optimality condition for the central government tax-transfer, the first order conditions of the two regions imply:

$$\frac{1}{2} u'_A \left[\frac{kw(1 - t_A) + w(1 - t_B)}{2} \right] = H'_A (kwt_A) = \frac{1}{2} u'_B \left[\frac{kw(1 - t_A) + w(1 - t_B)}{2} \right] = H'_B (wt_B)$$

Given our functional form assumptions, Regions compute first:

$$t_A^D = \frac{k + 1}{3k}$$

$$t_B^D = \frac{k + 1}{3}$$

Then, either the central government or the Regions compute:

$$\theta^D = \frac{(k - 1)w}{2}$$

Utilities are:

$$U_A^D = U_B^D = \log \left(\frac{(k + 1)^2 w^2}{18} \right) \qquad W^D = 2 \log \left(\frac{(k + 1)^2 w^2}{18} \right)$$

The allocation of resources is inefficient since public expenditure is now higher than in the first best:

$$g^D = \frac{(k+1)w}{3}$$

while private consumption is lower than in the first best:

$$y^D = \frac{(k+1)w}{6}$$

The nature of this inefficiency is interesting. Each region is now taking in consideration the effect of its own tax rate on the redistributive policy adopted by the nation state government. The higher is the taxation of the poorer region, the higher will be the negative tax assigned to this region. Hence, the incentive to set a higher tax rate. The opposite happens to the richer region. Given the SWF, everybody knows that this is going to happen, as the optimal θ is tied in with t_A and t_B. In BMT terminology, this result arises because of the lack of a firm commitment on the degree of redistribution (or because of a regional soft-budget constraint). We suggest that it is better to think of the situation as a consequence of specific legal provision on the working of the budgetary process in a decentralized setting. The result is over-production of regional public goods and is in contrast to the one derived by BMT, who find a tendency toward under-provision of regional public goods.

It is to be noted that the BMT result would be obtained if case III.4.b were constructed on a the central government with the possibility to enforce interregional transfers - θ_2 - to finance public goods production but without the possibility to apply the tax-transfer θ_1 on individuals of Regions A and B. The model would generate perfect equalization of public expenditure and private consumption, but with under-provision of public goods. Utilities would remain U_A^D and U_B^D as previously defined and country utility would remain W^D. The BMT model assumes that the central government can only force an interregional financial transfer that equalizes public expenditure in both regions, thus proportional to the difference in tax revenues (or rates ?). As a consequence, both the rich and the poor region have small incentives to tax: higher local taxes for the rich region are lost in part to increase transfers to the poor one and higher local taxes in the poor region are lost in a partial reduction of the transfer from the rich region. Both regions reduce taxation – compared to the optimal level obtained under centralization – and public expenditure is sub-optimal.

Our model <u>III.4.b</u>, instead, focuses on redistribution of personal income, in the sense that the richer region finances, with the yield of the central government tax, part of the private consumption of the poor region. Hence, the central government chooses a tax-transfer so as to equalize private consumption in both regions (that is to implement a perfect redistribution) and it chooses a transfer which is proportional to the difference in net income. As a consequence, the two regions have now different incentives. For the poor region there is an incentive to increase local tax rates since this increases the net income differential between the regions, and hence it increases redistribution from the rich region. This effect determines the increase in local taxation and hence the overprovision of public goods in equilibrium.

Summarizing, *a decentralized setting in which the central government only controls its tax parameters (or, alternatively, can only enforce interregional financial transfers) obtains perfect redistribution of income and equalization of local public expenditure but generates over-provision (alternatively, under-provision) of public goods. It is important to remember that this result rests on the institutional assumption that regional governments are assigned a prominent role in the making of the economy-wide budgetary policy.* In later pages this solution will be referred to as a case of <u>constrained decentralization</u>.

It is important to notice that, if the central government could choose both a transfer of income and an inter-regional financial transfer, the first best allocation of resources could also be achieved since the government would be always able to chose a combination of the two programs described by θ_1 and θ_2 that will generate a first best allocation.[6] Once again the lack of a full set of policy instruments is crucial for the emergency of inefficiencies.

It is interesting to notice that, in the real world, redistribution is implemented with different programs, with the central government involved primarily in personal income redistribution via taxation of income at differentiated rates and with richer regions forced to participate in equalization plans directed to the financing of local public goods in poorer regions. If the central government has priority in the making of budgetary allocation, then even

with the complete loss of one of the instruments, decentralization would generate the desired degree of redistribution without welfare losses. If Regional government are assigned by the Constitution a strong power in the making of budgetary policies, there would be a tendency for decentralization to generate not only a loss of efficiency, since redistribution is harder to implement, but also overprovision of local public goods . Thus, not all decentralizations are alike.[7]

IV. Some related questions

This section takes up a few practical issues and institutional problems that can be illustrated by extensions of the basic model. It discusses the role of the degree of income inequality on the welfare ranking of the various solutions and the conditions that have to be met for decentralization reforms to be accepted. It also begins to discuss, under highly simplified assumptions, what happens when regional governments are allowed to take coordinated decisions on nation-wide budgetary matters. Finally, a few paragraphs on the relationship between redistributive objectives and the transparency of different types (*horizontal* versus *vertical)* of equalization plans. With a word of caution: the material in this Section is intended only to suggest the opportunities a simple model provides to integrate models of fiscal federalism with reference to some institutional rules.

IV.1. Inequality and decentralization

The first question is about the relationship between income inequality and decentralization. It is interesting to investigate under what conditions the transition from the independent regions setting to a centralized or a decentralized system will be

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[6] Details are available from the authors.

[7] Our result seems to be relevant not only for the constitutional design of fiscal federalism in countries, but also for the organization of unions of countries. For instance, the European Union is exactly characterized by a group of countries with large autonomy on their policies of taxation and expenditure in public goods, while a net of transfers between countries is managed at the union level with redistributive purposes: our model emphasizes that in this environment countries may engage in excessive expenditures on local public goods.

accepted. Since the function of the central government in the model is to implement income redistribution, it is likely that the degree of inequality will play a crucial role in answering the question.

In the previous section we have shown that both centralization and decentralization can implement the first best allocation when enough policy instruments are available to the central government (or, under decentralization, when proper constitutional rules are introduced of a type that give the central government priority in the making of the economy-wide budget). Comparisons of models with the same (first-best) welfare results promise not to be very interesting. Furthermore, in the real world, full flexibility in the use of policy instruments is not really the rule; ideal institutions are not likely to exist. Hence, we will focus on the cases in which centralization and decentralization do not achieve the first best, because the set of instruments adopted by the central government is constrained and/or because high is the power of the regions in the making of the national budget; reference is thus made to cases III.3.a and III.4.b.

We start considering <u>constrained centralization</u>. On the one side, the rich country always prefers a no-central government setting to a centralized system. Indeed:

$$U_A^C - U_A^I = \log\left(\frac{(k+1)}{2k}\right) < 0 \ \text{ for any } k$$

since in the constrained centralization case rich region A not only redistributes income toward por region B, but it does it in an inefficient way. On the other side, the poorer region, that is benefiting from a partial redistribution, is always in favour of centralization, no matter how inefficient. In fact:

$$U_B^C - U_B^I = \log\left(\frac{(k+1)}{2}\right) \geq 0 \ \text{ for any } k$$

The rich region always prefers the constrained centralized outcome to full centralization outcome (since redistribution is lower in the former case). The opposite holds for the poor region.

The most important comparison is between the nation-wide utilities under independency and under centralization. It shows that a centralized system is always preferred to independency:

$$W^C - W^I = \log\left(\frac{(k+1)^2}{4k}\right) \geq 0 \ \text{ for any } k$$

Though the allocation of resources may be inefficient under centralization, a move from independency to centralization makes poor region B better off enough to compensate the losses of rich region A.

Now let us move to the Case III.4.b of constrained decentralization. First of all it is immediate to verify that both regions prefer the first best allocation of resources to the one obtained under decentralization since the latter implies a loss of efficiency. Again, the rich region always prefers the no-central government situation to this decentralized system. Indeed:

$$U_A^D - U_A^I = \log\left(\frac{2(k+1)^2}{9k^2}\right) < 0 \qquad \text{for any } k$$

since rich region A not only redistributes income toward poor region B, but is does it in an inefficient way.

More interestingly, poor region B, that is benefiting from redistribution, is not always in favour of decentralization, since this implies some inefficiency. More exactly we have:

$$U_B^D - U_B^I = \log\left(\frac{2(k+1)^2}{9}\right) \geq 0 \qquad \text{if and only if } k \geq \left\lceil \sqrt{18}/2 - 1 \right\rceil$$

that is, the poorer region prefers the fiscal federalism structure if and only if income inequality is great enough. The reason is that in this case the benefits from redistribution are higher than the costs of inefficient allocation of resources.

The comparison of the nation-wide utilities under independency and decentralization shows that:

$$W^D - W^I = \log\left(\frac{4(k+1)^4}{81k^2}\right) \geq 0 \qquad \text{if and only if } k \geq 2$$

Again, only a great enough degree of income inequality justifies a transition from regional independence to fiscal federalism.

Finally let us compare the model of constrained centralization with the model of unconstrained decentralization. From the point of view of rich region A, centralization is always better:

$$U_A^C - U_A^D = \log\left(\frac{9k}{4(k+1)}\right) > 0 \qquad \text{for any } k$$

the reason being that centralization allows to limit redistribution. Instead, poor region B prefers centralization if and only if the degree of inequality is low enough:

$$U_B^C - U_B^D = \log\left(\frac{9}{4(k+1)}\right) > 0 \qquad \text{if and only if } k \in [1, 1.25]$$

This result derives from the trade-off between the lower redistribution under centralization and the higher but inefficient redistribution under decentralization.

Finally, centralization is the efficient choice if and only if the degree of inequality is low enough and decentralization is better when inequality is very high:

$$W^C - W^D = 2\log\left(\frac{9\sqrt{k}}{4(k+1)}\right) > 0 \qquad \text{if and only if } k \in [1, \frac{43}{18}]$$

Inequality must be very high for the gains from redistribution guaranteed by decentralization to compensate the losses in efficiency associated to it. Thus, *there are some good reasons for a very heterogeneous country to be organized in a decentralized way, while the opposite holds for a relatively homogeneous country.*

IV.2. Transition from centralization to decentralization

In this section we analyse an issue of transition. We consider a reform which moves the organization from a centralized setting to a decentralized one, as many countries have recently experienced or are experiencing. The question is: does a reform towards decentralization limit the extent to which the central government can redistribute income? We will show that for such a reform to be supported by the whole country, the level of redistribution must be lower than it would be required by the maximization of the SWF. This result shows that a trade-off between decentralization and redistribution emerges especially in transitions towards decentralization.

We assume that for the reform to be adopted, both regions must agree. Hence they must be both better off under decentralization than under centralization. However, we know that if the equilibrium decentralization is implemented, the rich region is certainly worse off (and the poor region better off) if a first best allocation is produced by the specific institutional choice, or is worse off if inequality is great enough under an inefficient (constrained) decentralisation. Hence, the only way to implement

decentralization is to limit redistribution in such a way that both regions benefit from it. The previous functional values of θ known to central and regional governments must be substituted by a fixed value of θ designed to limit the extent of redistribution in the decentralized system.

Assume this constraint is given by the cap on the redistributive tax-transfer $\bar{\theta}$. The decentralized equilibrium will imply that regions consider $\bar{\theta}$ as not affected by their choices. The two regions maximize:

$$U_A = u_A\left[kw(1-t_A)-\bar{\theta}\right] + H_A\left(kwt_A\right)$$

and

$$U_B = u_B\left[w(1-t_B)+\bar{\theta}\right] + H_B\left(wt_B\right)$$

from which we obtain the optimality conditions:

$$u'_A\left[kw(1-t_A)-\bar{\theta}\right] = H'_A\left(kwt_A\right)$$

$$u'_B\left[w(1-t_B)+\bar{\theta}\right] = H'_B\left(wt_B\right)$$

that is the functions $t_i = t_i(\bar{\theta})$ for $i=A,B$.

A credible value of the cut-off $\bar{\theta}$ is actually such that the rich region is just indifferent between centralization and decentralization. More precisely $\bar{\theta}$ is defined by the indifference relationship:

$$u_A\left[kw(1-t_A(\bar{\theta}))-\bar{\theta}\right] + H_A\left(kwt_A(\bar{\theta})\right) = u_A\left[kw(1-t)-\theta_1\right] + H_A\left(kwt\right)$$

Under our functional form assumption we have:

$$\log\left(\frac{kw-\bar{\theta}}{2}\right)^2 = \log\left[\frac{(k+1)kw^2}{8}\right] \qquad \bar{\theta} = w\left[k - \sqrt{\frac{(k+1)k}{2}}\right]$$

To make sure that this is a right equilibrium we need to verify that also the poor region is always better off under such a form of partial decentralization, and that $\bar{\theta} < \theta^{DNC}$ so that the constraint is indeed binding; these two conditions can be easily verified to always hold.

Finally notice that this form of partial redistribution implies tax rates

$$t_A = \sqrt{\frac{(k+1)k}{8}} \text{ and } t_B = \frac{k+1}{2} - \sqrt{\frac{(k+1)k}{8}} \quad \text{from which we derive the allocations:}$$

$$y_A = g_A = \frac{w}{2}\sqrt{\frac{(k+1)k}{2}} \qquad y_B = g_B = \frac{w}{2}\sqrt{\frac{(k+1)k}{8}}\left[\sqrt{\frac{2(k+1)}{k}} - 1\right]$$

This makes clear that an efficient allocation of resources is realized in each region, but redistribution from the rich to the poor is only partial. It is important to notice that the limit to redistribution is beneficial because it avoids the problem emerging under decentralization with Alternative B of previous paragraph III.4: $\bar{\theta}$ is clearly independent from the tax rates chosen by the two regions): for this reason, despite the fact that best allocation of resources under constrained decentralization improves on constrained centralization only when inequality is high (as shown in the previous section), the feasible decentralization with partial redistribution always improves on centralization.

Summarizing, we have shown that *a transition from constrained centralization to a decentralization is supported by both regions if and only if the central government abandons the objective of complete redistribution. This can thought as a form of trade-off between decentralization and redistribution.*[8]

IV.3. Decentralization with a representative House of Regions.

In model III.4.b it was shown that poor region B takes advantage from an institutional setting that gives priority to Regions in the reading of the Constitutional provision on budget making and chooses an own tax rate - t_B - capable to pay for higher level of spending on regional public goods. The result derives from the notion that the central government redistributive tax is based upon the actual tax rates chosen by the two regions. Regions know the central government attitude and transfer upon it their preferences for higher public spending. The institutional rule of Alternative A, transmits a message to regions with the wrong incentives structure.

In model III.4.b it was assumed that regions jointly (and at the same time) determine their (and the central government's) fiscal parameters. Consider now the situation in which joint-ness is substituted by coordination of regional choices with the central government affects regional coordination so as to enlarge the set of possible

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[8] This result is similar to the one obtained by Bolton and Roland (1997) who have shown how the threat of secession limits the redistribution in a country with heterogeneity in economic fundamentals. However, our result is about the transition from a centralized system to a

outcomes of a federal organization. This paragraph describes a system of fiscal federalism in which a **House of Regions** has the power to decide the redistributive parameter of the central government income tax (in previous notation, the parameter θ_1). Let us consider the decentralization system modified according to the following timing:

    1) the regions decide on the redistributive transfer θ by bargaining;

    2) each region chooses its own tax rate t_A and t_B

- taking the choice of the other region as given,

- knowing the transfer θ chosen in stage 1).

Given the transfer, the two regions maximize:

$$U_A = u_A\left[kw(1-t_A)-\theta\right] + H_A\left(kwt_A\right)$$

and

$$U_B = u_B\left[w(1-t_B)+\theta\right] + H_B\left(wt_B\right)$$

from which we obtain the optimality conditions:

$$u'_A\left[kw(1-t_A)-\theta\right] = H'_A\left(kwt_A\right)$$
$$u'_B\left[w(1-t_B)+\theta\right] = H'_B\left(wt_B\right)$$

that is the functions $t_i = t_i(\theta)$ for $i=A,B$. This implies the utilities:

$$U_A = u_A\left[kw(1-t_A(\theta))-\theta\right] + H_A\left(kwt_A(\theta)\right)$$
$$U_B = u_B\left[w(1-t_B(\theta))-\theta\right] + H_B\left(kwt_B(\theta)\right)$$

We now assume that the redistributive policy is chosen by Generalized Nash Bargaining, assuming that the relative bargaining power of the rich region is β. Hence the equilibrium transfer solves the problem:

$$\max(U_A)^{\beta}(U_B)^{1-\beta}$$

Under our functional form assumptions, the problem becomes:

$$\max \beta\left[2\log\left(\frac{kw-\theta}{2}\right)\right] + (1-\beta)\left[2\log\left(\frac{w+\theta}{2}\right)\right]$$

whose solution is:

$$\theta(\beta) = w\left[(1-\beta)k-\beta\right]$$

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decentralized one and in our model secessions are always in the interest of the rich region (which would be better off alone) but are excluded by assumption.

Notice that when the bargaining power of the two regions is the same ($\beta = 1/2$), the transfer obtained under unconstrained decentralization emerges and the first best solution follows; when the relative bargaining power of the two regions is k ($\beta = k/(k+1)$), the bargained transfer is zero and the independence outcome follows. The final utilities are:

$$U_A = \log\left(\frac{(k+1)^2 w^2 \beta^2}{16}\right) \quad \text{and} \quad U_B = \log\left(\frac{(k+1)^2 w^2 (1-\beta)^2}{16}\right)$$

and they depict the set of efficient outcomes. The country's utility is:

$$W = 2\log\left(\frac{(k+1)^2 w^2 \beta(1-\beta)}{16}\right)$$

and it describes the welfare frontier. The bargaining index is likely to range between the lower bound of β = ½ (equal regional power) and the upper bound of $\beta = k/(k+1)$ (power proportional to income). The first case delivers the welfare of the full centralization case (the first best solution $W(\beta) = W^{FC}$); the second delivers the welfare of the independency situation $W(\beta) = W^I$ with no redistribution. Within the interval, values of β generate cases of partial redistribution.

Notice that this system of extreme budget decentralization solves the time inconsistency problem generated when the regions do not bargain. An extreme decentralization setting integrated by interregional bargaining (as it might happen if a House of Regions were in effect) induces efficient policies with redistribution outcomes depending upon distribution of powers among the bargaining agents. In a representative democracy, distribution of power in a House of Regions will depend on population size, electoral rules and, behind them, on the relative wealth of the regions[9].

IV.4 On transparency and redistribution

In section III.4.a. we studied a model of decentralization with a central government in full control that uses only one policy instrument, a progressive income tax. It shows that redistribution is attained and that resource allocation is

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[9] For early discussions of such matters, see again Pantaleoni (1991).

efficient. Efficient redistributional outcomes can be reached, more generally, by employing a linear combination of central government tax rate (θ_1) and interregional transfers (θ_2). In equilibrium $\theta_1 + \theta_2 = w(k-1)/2$. Depending upon central government choices on θ_1 and θ_2, different values of t_A and t_B are generated. If $\theta_1 = \theta_2$, each equals $w(k-1)/4$ and $t_A = t_B = 1/2$. If $\theta_2 = 0$, the burden of equalization is put entirely on central government taxation which becomes $\theta_1 = w(k-1)/2$, the situation described in section III.4.a. If $\theta_1 = 0$ the burden of efficient equalization is put entirely on interregional transfer which becomes equal to $\theta_2 = w(k-1)/2$. This latter situation requires that regional governments adopt different tax rates from those they would choose in the two previous cases.

With $\theta_1 = 0$ the tax rate in the rich region A would be higher than ½ and higher than in the case $\theta_2 = 0$. However, in the model, the three possible cases, implying the same allocation of resources, are welfare equivalent.

Abstracting from the model, one may try to evaluate the two polar situations from the point of view of rich region A: in one extreme case taxes are low in rich region A and high in poor region B, with the central government raising positive taxes in region A and negative taxes in region B. In the other extreme case taxes are high in rich region A and low in poor region B, with high interregional transfers from A to B. In the first case the Parliament of central government bears the burden of high taxes in rich region A; in the second case, the burden is on the Governor of region A.

Let us briefly consider a real world situation where politics and the public have a positive evaluation on a quid-pro-quo balance of regional taxes and regional public goods output. It is likely that rich region A will show stronger opposition to the interregional equalization program (that forces it to levy high regional taxes) than to the transfer of income via progressive taxation (that belongs to the powers of the central government).

In our model, the interregional equalization transfer – θ_2 – can be thought of as an ideal representation of the so called "*horizontal equalization plans*" discussed in the

literature on fiscal federalism. These plans require that the regions themselves decide on the extent of equalization by setting up the rules according to which money is going to be transferred from rich to poor regions.

In the model, the central government tax-transfer $-$ θ_1 $-$ can be taken to represent the family of equalization plans that go under the heading of "*vertical equalization plans*", plans whereby the central government decides on the extent of equalization by raising taxes on rich region citizens to finance central transfers (grant programs) to poor regions.

Horizontal equalization plans are more transparent than vertical equalization plans. They are often considered to be better than vertical plans, because they impose a sort of peer control upon the way poor regions spend money that comes from interregional transfer programs. Non-tax revenue is suspected to be used less efficiently than tax revenue. The incentive to use it efficiently is expected to be greater when the grant comes from the neighbour region than when it comes from a presumably distant central government. According to this view, transparency of the relationship between donor and recipient $-$ via peer control $-$ will improve technical efficiency, lower production costs of local public goods and produce more value for money in the execution of expenditure programs. At least according to this optimistic view, transparency promotes efficiency.

However, for the reasons outlined above, popular sentiments against equalizion objectives are likely to be of bigger relevance under "horizontal equalization plans" than under "vertical equalization plans". In the real world, it is rich regions that more loudly call for programs of interregional transfer to substitute for central government equalizing grants: they want to show that it is their generosity that makes solidarity rules working. It is rich regions that call attention to regional fiscal residua.

In intergovernmental fiscal relations, transparency (as it attained with horizontal equalization plans) may limit the scope of equalization as tax rates autonomously determined in rich region tend to be lower than optimal values as the donor region (a) will determine the size of the grant on unrealistic assumptions on the cost savings it expects the recipient region to generate and, (b) will resist levying the required taxes and not want to bear explicitly the full cost of equalization, though the same taxes might be imposed by the central government.

To my knowledge, no country involved in regional equalization plans relies entirely on horizontal equalization plans. Even where House of Regions exist (as in Germany), the Constitution provides strict rules for the concrete construction of equalization plans. In practice, transparency and its offspring – horizontal equalization plans based on direct interregional transfers – have left the pace to more obfuscated vertical equalization plans based on central government grants financed by (progressive) income taxes.

V. Conclusions

This paper has discussed the relationship between income redistribution and the organization of a system of intergovernmental fiscal relations. It relies on a model in which two regions producing distinct regional public goods and with different income belong to a country with a central government (federal or national). The purpose of the latter is redistribution. Our main results can be summarized as follows:

1) both centralization and decentralization can achieve a first best allocation of resources if the central government can (a) redistribute personal income via central progressive taxes and, (b) enforce interregional financial transfers (of regional tax revenue) for regional public good provision;

2) a constrained centralization in which the central government can only redistribute personal income (alternatively, regional tax revenue) induces a perfect redistribution of income (alternatively, equalization of local public expenditure) but maintains differentiation in public good provisions (net after-tax incomes);

3) a constrained decentralization in which the central government can only redistribute personal income (alternatively, regional tax revenue) induces perfect redistribution of income and perfect equalization of local public expenditure but overprovision (underprovision) of public goods;

4) a constrained decentralization is socially preferred to a constrained centralization if and only if income inequality between the regions is great enough;

5) a House of Regions where the redistributive policy is decided by bargaining among regions induces efficient policies but attains only partial redistribution, the less so the more power is related to income;

6) a transition from constrained centralization to a decentralization is supported by both regions if and only if the central government accepts incomplete redistribution.

All these results suggest the existence of a trade-off between decentralization and redistribution.

Finally, we want to briefly mention the possible extensions of the simple model of section III designed to tackle a variety of interesting questions: what happens when regional population size and preferences differ among regions; when different public goods are supplied at the national and regional level or when a regional public good exert spillovers on to the other region; when the decision process entitles one (or a sub-group of) the regions to acquire a leader role. A mention should be made to the case of distorsive taxation.

The assumption of equal population in the two regions can easily be relaxed introducing a bias in the composition of public expenditure: indeed, in this case the production of the public good becomes more convenient in the region with higher population, because of greater scale economies

The assumption of equal preferences in the two regions can also be relaxed: such a further heterogeneity would create a new advantage for decentralized systems compared to the centralized ones as long as decentralization allows the regions to adapt their policies to their preferences.

When a national public good is considered, the choice between independence, centralization and decentralization becomes more sophisticated: indepencence would generate benefits associated to the complete decisional

autonomy, but also a cost associated to the loss of scale economies in the production of the public good (since independence would require the production of two separate public goods in each region). Between the extreme assumptions of two local public goods and a national public good there is a set of intermediate situations in which each public good is regional but exerts spillovers on the other region. In this more general case (in part investigated by Alesina, Angeloni and Etro, 2001) a further coordination issue emerges because independence and decentralization imply that the regions take their choices without considering the externalities induced on the other region.

The assumption that all regions have equal opportunity to participate in the economy-wide budget making may be substituted by the assumption that one of the two regions is a first mover. A substantial leadership of certain regions is often realistic. In our model of constrained decentralization such an hypothesis would shift the burden of the inefficiency on the follower region inducing higher public expenditure and higher utility in the leader region and lower welfare for the country than in the case of regional parity. In decentralized settings, care must thus be taken to preserve regional parity in the decision process and in budget making.

Finally, the assumption of non-distorsive taxation can be relaxed by introducing endogenous labor supply or exogenous costs of tax collection, so that a second best solution becomes the benchmark to compare with the third best outcomes available under constrained centralization and decentralization. Bordignon, Manasse and Tabellini (2001) have already explored issues of optimal regional redistribution in a similar context, but the approach presented in this paper will probably allow a more general treatment.

All together, a case can be made for analysing institutional rules of fiscal federalism systems in stylised models such as the one presented in the paper. Forcing legal provisions into simple analytical models may provide fresh insights onto old questions.

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Appendix

As a benchmark for our model, we establish what is the first best allocation of resources in this model. Let us choose two lump sum taxes T_A and T_B and two local public expenditures g_A and g_B to maximize:

$$W = u_A[kw - T_A] + u_B[w - T_B] + H_A[g_A] + H_B[g_B]$$
$$s.v. T_A + T_B = g_A + g_B$$

The first order conditions for the optimum centralized redistribution are:

$$u'_A[kw - T_A] = u'_B[w - T_B] = H'_A[g_A] = H'_B[T_A + T_B - g_A]$$

which imply equalization of private consumption and public spending across the regions. In particular, under our functional form assumptions we obtain:[10]

$$y_A = y_B = g_A = g_B = \frac{(k+1)w}{4}$$

$$U_A^{FB} = U_B^{FB} = \log\left[\frac{(k+1)^2 w^2}{16}\right]$$

$$W^{FB} = 2\log\left[\frac{(k+1)^2 w^2}{16}\right]$$

where *FB* clearly stands for first best.

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[10] Such a smoothing is clearly due to the high level of symmetry imposed on the model and to the absence of distorsions.

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