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Tactical transfers in a federal institutional setting

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Abstract

One of the main scope for studying political economy is to understand how income redistribution is determined. In the paper tactical redistribution, through which candidates aim at maximizing the share of votes obtained in an election, is analyzed in a federal institutional setting, where different level of government coexist. Dixit & Londregan (1996) model is taken as a starting point; their model is extended in order to allow the analysis of the interactions between the different government levels. Four institutional settings are considered, entailing different rules and a different degree of decentralization in the policy and transfer determination process: fully localized and fully centralized governments, federal government with transfers among regions and federal government with transfers among social groups.

1 Introduction

One of the main scope for studying political economy is to understand how income redistribution is determined. There are at least two forces driving redistribution, one is ideological and the other is tactical. On one hand (ideological component) redistribution from among different classes of citizens (ie.: from the rich to the poors) is desirable in order to reach some social objective (ie.: total welfare maximization). On the other hand (tactical component) redistribution may serve, in a political system, parties' objective of gaining citiziens' support and maximizing the share of votes obtained in an election. Usually the two components coexist and it could be hard to distinguish the real driver of redistribution. Moreover, as pointed out in the literature, tactical redistribution may take different forms: the ideal recipients of tactical transfers may be either relatively neutral citizens (swing voters) or parties' constituencies. Swing voters may be attractive since they are more reactive to monetary promises, being ideologically quite indifferent between the two parties. Parties' constituencies will

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almost surely cast their vote for their strictly preferred party, so that transfers towards them are less effective; anyway parties may be generous towards them since they know better their needs and they are more able to deliver transfers towards them.

These two forms of tactical transfers are represented and analyzed by two milestone contributions of the literature on tactical transfers: Cox & McCubbins (1986) and Dixit & Londregan (1996)[1].

Dixit & Londregan (1996) propose a model in which two parties compete in an electoral campaign and citizens care both about their consumption possibilities and about the political position of the two parties: certain groups are more concerned about monetary transfers, certain groups more about ideology. They obtain some important results that will become standard in great part of the literature related to tactical transfers. First, less ideological groups are more able to attract transfers, being more pliable to parties promises. Second, groups that are more numerous at the cutoff point, where citizens of a certain group are indifferent between the two parties, are favoured since a higher proportion of them is willing to change its voting decisions in response to a monetary promise. Finally, groups with lower (pre-transfers) income are more reactive to monetary transfers since they exhibit an higher marginal utility of consumption and hence they value more the possibility of increasing consumption possibilities. These conclusions hold, in general, if the two parties are equally able to deliver transfers to the different groups of citizens. However, if a party is more able to deliver transfers to certain groups, a "core support" equilibrium, in which each party favors its constituency, will emerge. The model is extended by Dixit & Londregan (1998) where, in addition to consumption and votes, citizens and parties also care about income distribution.

The same conclusions as in Dixit & Londregan (1996)were previously (partially) attained by Lindbeck & Weibull (1987). Their paper analyze the balanced-budget redistribution between socio-economic groups as the outcome of electoral competition between two political parties, under different hypothesis concerning administrative costs of redistribution and different policy strategies; also in their model, both parties favor moderate voters.

Cox & McCubbins (1986), vice versa, propose a model in which candidates choose redistributive policies in order to maximize their electoral results (in term of votes obtained) and citizens vote the candidate that assure them the greater utility. They show that parties will invest little effort (or zero at all) in order to gain the votes of opposition groups, a bit more in order to convince swing voters, while the bigger effort will be concentrated in satisfying the requests of their supporters.

This paper analyzes tactical transfers in a federal setting, where parties compete in order to maximize the share of votes in different rounds of elections at various levels of government (central and local). The aim of the model is to provide a general framework to analyze the issues of policy and monetary trans-

[1] Myerson (1993) analyze the incentives for candidates to creates inequalities among voters. His model, however, considers homogeneous voters and therefore does not provide useful predictions for the purpose of our analysis.

fers determination under federal institutions. As in Dixit & Londregan (1996)'s model, parties set down a tactical transfers' schedule in order to maximize the share of votes obtained in the electoral races, both at a local and at a central level; citizens care both about ideology and about the transfers' promises of each party. Four institutional settings will be considered, entailing different rules and a different degree of decentralization in the policy and transfer determination process: fully localized and fully centralized governments, federal government with transfers among regions and federal government with transfers among social classes. Fully localized and fully centralized governments, with both policy and transfers setted at a local and central level respectively, will be considered as benchmark cases. In federal governments, policies are the result of a bairgaining between local and central government. In a federal government with transfers among regions, the central government performs transfers among regions, and local governments perform transfers among different social classes within their regions. In a federal government with transfers among social classes both the local and the central governments perform transfers among social classes, the central government at a national and the local government at a regional level.

Dixit & Londregan (1996)'s model is chosen as a starting point for two reasons. First, the evidence available in the literature tends to confirm the prediction of this model as compared to Cox & McCubbins (1986)'s one. Dahlberg & Johansson (2002), analyzing the behavior of the Sweedish government before 1998 elections, finds that municipalities with more swing voters and with lower per capita income were more effective in attracting transfers, therefore confirming the predictions in Dixit & Londregan (1996). Second, this model might, under special circumstances, lead to similar conclusions as Cox & McCubbins (1986)'s one. If parties are better able to deliver benefits to their constituency, a core support equilibrium, with parties favoring their own constituencies, may emerge.

The paper proceeds as follows. Section 2 describes the elements of the model; Section 3 analyzes political equilibria under the different institutional settings; Section 4 concludes.

2 Elements of the model

A country formed by different regions is considered; within each region there are groups of citizens with different income per capita. Citizens have preferences over the implemented policy and over their private consumption. Two levels of government coexist: a local and a central one. The final policy outcome is a function of the policy implemented at the two levels of government and of the institutional rules adopted in the country. Parties compete both at the central and at the local level, and are allowed to use monetary transfers in order to attract votes. Also the transfers are subject to rules that depend on the institutional scenario.

In detail, the elements of the model are as follows.

Two parties, L and R, run an electoral competition and aim at maximizing their share of votes at a local and at a central level[2]. Parties have a fixed political position (ideology) that we consider given and publicly known in the temporal lenght of an electoral cycle (for simplicity L and R will denote both the parties and their political platforms). Tactical redistibution is allowed according to different rules depending on the institutional setting and parties pursue it in order to maximize the number of votes obtained. Parties are fully committed to what proposed during the electoral campaign and there are no voting costs.

Citizens care about private consumpion and have ideological preferences over the different policies proposed by the parties. As in Dixit & Londregan (1996) voters are considered as a continuum distributed along the real line, where a voter located at X has an (ideological) preference of X for party R over party L. The utility over consumption is increasing and strictly concave (eg.: $U'(c) > 0$, $U''(c) < 0$).

The country is formed by F regions denoted by i. Each region has a population N_i, and N is the total population of the country (ie.: $N = \sum_{i=1}^{F} N_i$). No mobility is allowed among regions.

Citizens belong to G different social groups, denoted by j. Every citizen belonging to group j has an income (before any transfer happens) of y_j. No social mobility is allowed (i.e.: the composition of the groups is given and not subject to changes).

Citizens belonging to a certain group exhibit etherogeneous ideological positions, but it's realistic to suppose some kind of "political orientation" (ie.: the poor may be more left oriented and the rich more right oriented). This phenomenum is modelled by considering different distributions of X among different classes. $\Phi_j(.)$ denotes the cumulative frequency distribution (and $\phi_j(.)$ the density function) of voters of class j over the range of X (i.e.: $\Phi_j(X')$ denotes the proportion of voters of group j with $X \leq X'$). $\Phi_j(.)$ is not based on regional location (eg.: citizens of group j living in two different regions exhibit preferences with the same cumulative distribution function). Notice that the possibility of a group being absent from some regions is not ruled out. The formulation we propose is just the most general one and is comprehensive of different possible sub cases. Two restrictions will be imposed on the distribution functions. Each density function $\phi_j(.)$ must be single peaked and, for each group, there must be at least one citizen strictly preferring each of the two parties' political platform (eg.: $0 < \Phi_j(0) < 1$).

The policy outcome is identifiyed by a vector $P = (P_1, P_2, ..., P_F)$ representing the policies implemented in each region. Policy outcome and monetary transfers will be determined following different rules depending on the institutional setting adopted. These rules will be described in detail in the following section.

[2]The precise objective function of the parties will depend on the institutional setting and will be specified in detail in the following section.

3 Political equilibria

Four different political settings are considered, entailing a different degree of centralization.

The first two settings are used as a benchmark and will consist in a fully decentralized and a fully centralized context, in which both policies and transfers are determined at a local and at a central level, respectively.

In the other two settings the policy outcome is the result of a bairgaining game between the local and the central government, while transfers will be determined according to specific rules. In a federal government with transfers among regions, the central government determines an initial transfer among regions, and then the local government decide transfers, inside the region, among different social groups. In the setting defined as "federal government with transfers among social groups" both the central and the local governments may perform transfers among different social groups (the former at a national and the latter at a local level).

3.1 Equilibrium in a fully localized government

This paragraph analyzes the equilibrium in the case of a fully localized government, in which all the power is exercised at a local level and there is no role for the central government.

The results obtained in this framework (as well as the ones obtained in the case of completely centralized governments) largely reflect the results obtained in Dixit & Londregan (1996). Going through these results is necessary to allow a comparison with the two federal arrangement considered afterwards.

In a fully localized government only the local electoral campaign and the local elections matter, being central government absent. The game develops as follows: in stage 1 the local electoral campaign takes place and each party propose a transfer schedule among different social groups in each region; in stage 2 the local elections are held; in stage 3 the policy and the transfer schedule of the winning party are implemented in each region.

In particular, during the electoral campaign (stage 1) parties in region i propose a vector of transfers $t_i^k = (t_{i1,}^k ..., t_{iG}^k)$, $k = L, R$ towards each social group. Transfers are subject to the budget constraint: $\sum_{j=1}^{G} t_{ij}^k \times N_{ij} \leq B_i$, $k = L, R$, where t_{ij}^k is the transfer proposed by party k to a citizen of region i and group j and B_i is an exogeneously given monetary amount available to the government of region i. Notice that the consumption enjoyed by a citizen of region i and class j is $c_{ij} = y_{ij} + t_{ij}$.

Denoting V_i^k as the share of votes obtained in region i by party k, $k = L, R$, the policy implemented in region i is L iff $V_i^L \geq V_i^R$, otherwise the policy implemented is R. Similarly, the *tra*nsfers implemented in region i are t_i^L iff $V_i^L \geq V_i^R$, (t_i^R otherwise).

Therefore, a political equilibrium for region i in a fully localized setting is characterized by two sets of transfers $t_i^k = (t_{ij}^k, ..., t_{ij}^k)$, $k = L, R$ and a set of voting decisions by citizens such that, in stage 1, $t_i^L(t_i^R)$ maximizes party L (R) shares of votes in region i given $t_i^R(t_i^L)$ and, in stage 2, every citizen Z votes for party L iff $U_Z(L) \geq U_Z(R)$ (and for party R otherwise). Each party chooses a transfer proposal that maximizes its own share of votes (tactical redistribution) and each citizen casts his vote for the preferred party (considering both ideological position and transfer proposals). The assumptions that, when indifferent, a citizen chooses L and that, in case of $V^L = V^R$, the policy and the transfer proposal of party L are implemented will not have any effect on equilibrium implications.

In order to find a closed form equilibrium the following specification of the utility function, as in Dixit & Londregan (1996), will be assumed:

$$U_{ij}(c_{ij}) = k_j \times \frac{c_{ij}^{1-\epsilon}}{1-\epsilon} \tag{1}$$

where k_j is a group dependent parameter on the relative importance of consumption with respect to ideology. This specification will be maintained through the rest of the paper.

We will look for subgame perfect equilibria (SPE from now on).

Proposition 1 describes the equilibrium in a fully localized institutional setting.

Proposition 1. In a fully localized government there exists a unique SPE in which:

(1) Both parties propose, in each region i, the following transfers' schedule

$$t_{ij} = \frac{[k_j \times \phi_j(0)]^{1/\epsilon}}{\sum_{j=1}^{G} N_{ij}[k_j \times \phi_j(0)]^{1/\epsilon}} \times (Y_i + B_i) - y_j \tag{2}$$

where $\phi_j(0)$ is the density of group j at $X = 0$ and $Y_i = \sum_j N_{ij} \times y_{ij}$ represents the total income of region i citizens;

(2) All citizens positioned on the real line of ideological positions at a point $X \leq 0$ vote for party L, all citizens positioned at $X > 0$ vote for R.

See also Dixit and Londregan (1996).

Proof: *see Appendix I.*

The equilibrium consumption of each citizen belonging to goup j is therefore

$$c_{ij} = y_{ij} + t_{ij} = \frac{[k_j \times \phi_j(0)]^{1/\epsilon}}{\sum_{j=1}^{G} N_{ij}[k_j \times \phi_j(0)]^{1/\epsilon}} \times (Y_i + B_i) \tag{3}$$

Notice that, in equilibrium, the transfers proposed by the two parties are the same, but zero transfers would not be an equilibrium since each party would have an incentive to deviate. Moreover, groups with higher k and higher $\phi_j(0)$ obtain better results in the redistribution game. Groups with higher k perform better because they give more relative importance to consumption with respect to ideology and hence they are more propensous to cast their vote to the party offering higher monetary transfers; groups with an higher $\phi_j(0)$ perform better because there are more citizens, among these groups, indifferent between the two parties and hence more reactive to economic benefits (swing voters). The final consumption enjoyed by each group is, in some sense, an average of the total consumption of the population of the region, weighted for k and $\phi_j(0)$.

3.2 Equilibrium in a fully centralized government

In this section the equilibrium in the case of a fully centralized government, in which all the power is exercised at a national level and there is no role for the local government, will be characterized and solved.

In a fully centralized government only the national electoral campaign and the national elections matter, being local government absent, and the game develops as follows: in stage 1 the national electoral campaign takes place and each party propose a transfer schedule among different social groups; in stage 2 the national elections take place; in stage 3 the policy and transfer schedule of the winning party are implemented.

In particular, during the national electoral campaign (stage 1) parties propose two transfers' vectors $t^{N,k} = (t_{1,}^{N,k} ..., t_G^{N,k})$, $k = L, R$ where $t_j^{N,k}$ represents the transfer proposal of party k towards each citizen belonging to social group $j$at a national level. Transfers are subject to the budget constraint$\sum_{i=1}^{F}\sum_{j=1}^{G} t_{ij}^{N} \times N_{ij} \leq B$, where B is an exogeneously given amount available to the central government for transfers.

Denoting $V^{N,k}$ as the share of votes obtained at a national level by party k $(k = L, R)$, the policy implemented in region i is L iff $V^L \geq V^R$, otherwise the policy implemented is R. The transfers implemented are $t^{N,L}$ iff $V_i^{N,L} \geq V_i^{N,R}$ ($t_i^{N,R}$ otherwise).

Similarly to the local government case, a political equilibrium for region i in a fully centralized setting is characterized by two sets of transfers $t_i^{N,k} = (t_1^{N,k}, ..., t_i^{N,k})$, $k = L, R$ and a set of voting decisions by citizens such that, in stage 1, $t_i^{N,L}(t_i^{N,R}$) maximizes party L (R) shares of votes in region i given $t_i^{N,R}(t_i^{N,L}$) and, in stage 2, every citizen Z votes for party L iff $U_Z(L) \geq U_Z(R)$ (and for party R otherwise).

Proposition 2. In a fully centralized government there exists a unique SPE, in which:

(1) both parties propose the following transfers' schedule

$$t_{ij}^{N} = \frac{[k_j \times \phi_j(0)]^{1/\epsilon}}{\left\{\sum_{i=1}^{N}\sum_{j=1}^{G} N_{ij}[k_j \times \phi_j(0)]^{1/\epsilon}\right\}} \times (Y+B) - y_j \tag{4}$$

where $\phi_j(0)$ is the density of group j at $X = 0$ and $Y = \sum_i \sum_j N_{ij} \times y_{ij}$ represents the total income of the country;

(2) All citizens positioned on the real line of ideological positions at a point $X \leq 0$ vote for party L, all citizens positioned at $X > 0$ vote for R.

Proof: *the proof is similar to the case of fully localized government, it is sufficient to consider the whole nation as a unique region.*

The equilibrium consumption for each citizen belonging to group j is

$$c_{ij} = y_{ij} + t_{ij} = \frac{[k_j \times \phi_j(0)]^{1/\epsilon}}{\sum_{i=1}^{F}\left\{\sum_{j=1}^{G} N_{ij}[k_j \times \phi_j(0)]^{1/\epsilon}\right\}} \times (Y+B) \tag{5}$$

As in the case of completely centralized government groups with an higher k and $\phi_j(0)$ perform better in the redistribution game.

3.3 Equilibria in federal governments

In federal governments, policies are the result of a bairgaining between local and central government. In a federal government with transfers among regions, the central government performs transfers among regions, and local governments perform transfers among different social groups within their regions[3]. In a federal government with transfers among social groups both the local and the central governments perform transfers among social groups, the central government at a national and the local government at a regional level[4]. In order to maintain the analysis tractable, the discussion will be limited, from now on, to the case in which two regions and two income groups exist.

In particular, in a federal government with transfers among regions, the game develops as follows: in stage 1 the national electoral campaign takes place and parties propose an inter-regional transfer schedule; in stage 2 national elections are held; in stage 3, the local electoral campaign takes place and parties propose transfer among different social groups at a regional level; in stage 4 local elections are held; in stage 5 policies and transfers are implemented accoring with the rules that will be described below.

[3]This model might stylize the E.U. context in which, at a federation level, there is a certain degree of redistribution among different member states while each country implements redistribution policies among the different groups of citizens.

[4]In the U.S. both at a federal and at a national level there are policy programs that entail a certain degree of redistribution among social classes

During the national campaign (stage 1) parties propose a transfer vector $M^k = (M^k_{1,}, M^k_2)$, $k = L, R$ where M^k_i represents the transfers proposed by party k towards region i. Transfers are subject to the budget constraint $\sum_{i=1}^{2} M_i \leq 0$.

The inter-regional transfers vector implemented is M^L iff $V^L_i \geq V^R_i$ in the national elections, otherwise the implemented transfers are M^R.

During the local electoral campaign (stage 3) parties in region i propose a vector of transfers $t^k_i = (t_{i1,}, t_{i2})$, $k = L, R$. Transfers are subject to the budget constraint $\sum_{j=1}^{2} N_{ij} \cdot t^k_{ij} \leq B_i + M_i$, $k = L, R$, where t^k_{ij} is the transfer proposed by party k to a citizen of region i and class j and B_i is an exogeneously given amount available to government of region i for transfers. Notice that, in fact, the real amount of resources available to the regional government for transfers include M_i, the transfer operated by the central government towards region i.The intra-regional implemented transfers are represented by t^L_i iff $V^L_i \geq V^R_i$ (t^R_iotherwise).

The final policy implemented in each region will be a linear combination of the policy platforms of the party governing at a central and at a local level, $P_i = \gamma \cdot P^{Cen} + (1 - \gamma) \cdot P^{Loc}_i$, where γ can be seen as a "measure of government centralization". If γ is small the local government will have more power in the decision making process while, viceversa, if γ is higher the central government will be predominant in the policy determination process.

Parties aim at maximizing their share of votes in the two levels of elections, but they can assign different weights to the national versus the local election and, for what concerns the latter, different weights to the share of votes obtained in each regional race. Party k objective function is then

$$Max \ \Omega^k = \varphi(\gamma) \cdot V^{N,k} + \sum_{i=1}^{2} \mu_i(\gamma) \cdot V^k_i \tag{6}$$

with

$$\varphi(\gamma) + \sum_{i=1}^{2} \mu_i = 1 \tag{7}$$

where φ is the weight given to the national elections, μ_i is the weight given to the local election in region i, $V^{N,k}$and $V^k_i$are the shares of votes obtained by party k in the national and in region i local election, respectively. The importance given to each electoral round is allowed to depend on the degree of centralization γ: it is likely that in presence of a highly delocalized government parties will give more importance to the local elections, and vice versa.

A political equilibrium in a federal government with transfers among regions is characterized by two proposed sets (one for each party) of inter-regional transfers $M^k = (M^k_{1,}..., M^k_F)$, two sets (for each region) of intra-regional transfers $t^k_i = (t_{i1,}..., t_{iG})$, $k = L, R$ and two sets of voting decision by citizens (both in the central both in the local elections) such that:

1. In stage 3 (local electoral campaign), in each region, $t_i^L(t_i^R)$ maximizes party L (R) objective function value given t_i^R, M^R $(t_i^L, M^L$)and $M^L(M^R)$;
2. In stage 1 (national electoral campaign),M^L (M^R) maximizes party L (R) objective function given M^R (M^L) and assuming agents' rational behaviour in the following stages of the game;
3. In stage 2 (national elections) and in stage 4 (local elections) every citizen Z votes for party L iff $U_Z(L) \geq U_Z(R)$, vice versa votes for party R.

On the other side, in a federal government with transfers among social classes the game develops as follows: in stage 1 the national electoral campaign takes place and parties propose transfer schedules among different social groups at a central level; in stage 2 national elections are held; in stage 3, the local electoral campaign takes place and in each region parties propose transfer schedules among different social groups at a local level; in stage 4 local elections are held; in stage 5 policy and transfers are implemented in accordance with the rules that will be described below. Transfers at a national level will be denoted with t^N and transfers at a local level with t.

During the national electoral campaign parties propose a vector of transfers $t^{N,k} = (t_{1,}^{N,k} t_2^{N,k})$, $k = L, R$. Transfers are subject to the constraint $\sum_{i=1}^{2}\sum_{j=1}^{2} N_{ij} \cdot t_j^{N,k} \leq 0$; $k = L, R$, where $t_j^{N,k}$ is the transfer proposed by party k to all the citizens of the country belonging to class j. The transfers implemented by the central government are $t^{N,L}$ iff $V^L \geq V^R$ in the national elections, otherwise the proposed transfers are represented by $t^{N,R}$.

During the local electoral campaign parties in region i propose a vector of transfers $t_i^k = (t_{i1}, t_{i2})$, $k = L, R$. Transfers are subject to the budget constraint $\sum_{j=1}^{2} N_{ij} \cdot t_{ij}^k \leq B_i + \sum_{j=1}^{2} N_{ij} \cdot T_j^{N,k}$, $k = L, R$, where t_{ij}^k is the transfer proposed by party k to a citizen of region i and class j and B_i is an exogeneously given amount available to government of region i for transfers. Notice that, in fact, the real amount of resources available to the regional government for transfers include $\sum_{j=1}^{2} N_{ij} \cdot T_j^{N,k}$, the sum of the transfer operated by the central government towards citizens of region i.

The policy implemented in each region i is determined according to the same rules as in the case of a federal government with transfers among regions; parties' objective functions are, as well, the same as in the previous setting.

A political equilibrium in a federal government with transfers among social groups is characterized by two proposed sets (one for each party) of transfers $t^{N,k} = (t_1^{N,k}, t_2^{N,k})$, two sets (for each region) of intra regional transfers $t_i^k = (t_{i1}^k, t_{i2}^k)$, $k = L, R$ and two sets of voting decision by citizens (both in the central both in the local elections) such that:

1. In stage 3 (local electoral campaign), in each region, t_i^L (t_i^R) maximizes party L (R) objective function value given $t_i^R, t^{N,R}$ and $t^{N,L}$;

2. In stage 1 (national electoral campaign) $t^{N,L}$ ($t^{N,L}$) maximizes party L (R) objective function given $t^{N,R}$ ($t^{N,L}$) and assuming agents' rational behaviour in the following stages of the game;

3. In stage 2 (national elections) and in stage 4 (local elections) every citizen Z votes for party L iff $U_Z(L) \geq U_Z(R)$, viceversa votes for party R.

Proposition 3. In federal governments with transfers among regions and social groups there exists a SPE, in which:

(1) Equivalence result - A citizen of region i and group j receives a transfer

$$T_{ij} = \frac{[k_j \times \phi_j(0)]^{1/\epsilon}}{\sum_{j=1}^{G} \left\{ \sum_{i=1}^{M} N_{ij} [k_j \times \phi_j(0)]^{1/\epsilon} \right\}} \times (Y + B) - y_j \tag{8}$$

where $T_{ij}$is the final monetary transfer (including transfers from local and central government), $\phi_j(0)$ is the density of group j at $X = 0$,$Y = \sum_i \sum_j N_{ij} \times y_{ij}$ represents the total income of the country and $B = \sum_i B_i$;

(2) All citizens positioned on the real line of ideological positions at a point $X \leq 0$ vote for party L, all citizens positioned at $X > 0$ vote for R both in the elections for the central government and in the elections of the local one.

Proof: *see Appendix I.*

Some remarks on the results of the model

The basic version of the model, analyzed so far, though relying on quite simple assumptions, provide some interesting results.

First, an equivalence result is obtained. In fact, for what concerns the distributional effects, the equilibria obtained in a context of centralized government and in a context of federal government with transfers (among regions or among social classes) are equivalent. That is: whitin these equilibria, given the same initial global endowment of resources, the transfer schedules implemented are the same.

Three assumption were basic in the derivation of this result.

First, the timing of the game is crucial. Given that the national electoral campaign preceed local ones, candidates to the central government have a higher commitment ability and can correctly anticipate the behavior of parties and citizens in the local electoral cycle. Moreover, given that its impossible for the winner of the national elections to influence local electoral results (see discussion on sincere voting below), the optimal behaviour for candidates to the central government is to choose transfers so to maximize the total share obtained in the national elections. Therefore the transfers proposed during the national electoral caimpaign are the ones that will lead to the same consumption vectors for each group of citizens as in the centralized government setting.

Second, parties have the same redistributive abilities and differ only in their political position, so that, in equilibrium, both parties propose the same set of transfers. This assumption will be relazed in the following section.

Third, given the structure of citizens' political preference and given that, in equilibrium, candidates propose the same set of transfers in both electoral cycles, sincere voting will always be optimal. This is due to the fact that preferences are specified only over the policy platforms of the two parties, L and R, so that, if equilibrium transfers are the same, everyone will vote for the preferred party in term of proposed platform. If the preferences were specified also over linear combinations of the two policies, a balancing effect (similar to divided government effect pointed out in Alesina & Rosenthal (1996)) between central and local elections would have emerged, with someone voting strategically in the local election in order to promote a policy platform intermendiate beween L's and R's ones. Sincere voting implies that the equivalence result holds only as concern the tactical transfers' allocation; policies may differ between the centralized government equilibrium and the federal government ones. In the first the policy platform of the party winning the national election is implemented without compromises, in the case of federal governments a final policy which is a llinear combination of the policy platforms of the parties winning the local and the central government emerges.

Comparing the equilibria obtained in the case of localized government two settings (localized and centralized) we observe that a citizen of region i and group j obtain higher consumption opportunities in a context of localization, with respect to centralization and federal government institutional settings, if

$$\frac{Y_i + B_i}{Y + B} > \frac{\sum_{j=1}^{G} N_{ij}[k_j \times \phi_j(0)]^{1/\epsilon}}{\sum_{i=1}^{F} \left\{ \sum_{j=1}^{G} N_{ij}[k_j \times \phi_j(0)]^{1/\epsilon} \right\}} \tag{9}$$

(being indifferent if equality holds and preferring central government viceversa).

Citizens living in high income regions tend to prefer, *ceteris paribus*, localization over centralization. Citizens living in regions with an higher value of $A = \sum_{j=1}^{G} N_{ij}[k_j \times \phi_j(0)]^{1/\epsilon}$ tend to prefer, *ceteris paribus*, centralization since regions with a greater "average" reactivity and with more swing voters become more attractive and are ideal recipients of tactical transfers.

This is realistic and consistent with what commonly observed: poorer regions and "swing" regions tend to prefer more centralization while richer regions tend to push towards a more decentralized institutional arrangements.

Note that group related variables factor out in establishing preferences between local or central government, that is, either all citizens in region i prefer a localized government or all of them prefer a centralized government.

4 Final remarks

We analyzed a model in which, in a federal country, redistribution may occur at different level and towards different social or geographical groups. Local and central governments interact in order to determine the implemented policy and the transfer schedule, parties compete in order to maximize their share of votes in local and central elections and citizens vote so to maximize their utility, given by consumption possibilities and political preferences. In the basic model parties behaviour towards social-geographical groups was in some way symmetric. An equivalence result was obtained: for what concerns the distributional effects, the equilibria obtained in a context of centralized government and in a context of federal government with transfers (among regions or among social classes) are equivalent. That is: whitin these equilibria, given the same initial global endowment of resources, the transfer schedules implemented are the same. At least two steps may lead to further interesting research: the theoretical model may be developed so to include more developed mechanism of electoral campaign and policy determination rules and empirical analysis is necessary so to test the main theoretical results.

Appendix I - Proofs of the propositions in the text

Proof of proposition 1

The proof is basically derived from Dixit & Londregan (1996). An equilibrium is subgame perfect if it is a Nash Equilibrium of every subgame.

Solving backward, in stage 2 (local elections) a voter of region i and group j, with ideological position X, votes for party L iff $U_j(c_{ij}^L) - U_j(c_{ij}^R) \geq X$. Notice that the assumption that, if indifferent, a citizen votes for L does not prejudicate this strategy being a Nash Equilibrium.

We can determine the cutoff point for citizens of region i and group j, such that all citizens to the left will vote for L and all citizens to the right will vote for R.

$$\widehat{X}_{ij} = U_j(c_{ij}^L) - U_j(c_{ij}^R)$$

In the local electoral campaign (stage 3) parties propose a set of (tactical) transfers so to maximize the share of votes in local election.

Party L solves the following maximization problem:

$$\underset{t_{i1}^L,\dots,t_{iG}^L}{Max} \sum_{j=1}^{G} N_{ij} \times \Phi_j(\widehat{X}_{ij})$$

subject to

$$\sum_{j=1}^{G} N_{ij} \times t_{ij}^L \leq B_i$$

where $\Phi_j(X_{ij})$ is the cumulative distribution function of citizens of class j.

Similarly, party R solves the following maximization problem:

$$\underset{t_{i1}^R,\ldots,t_{iG}^R}{Max}\sum_{j=1}^{G}N_{ij}\times\left[1-\Phi_i(\widehat{X}_{ij})\right]$$

subject to

$$\sum_{j=1}^{G}N_{ij}\times t_{ij}^R\leqq B_i$$

Party L Lagrangian is then

$$L=\sum_{j=1}^{G}N_{ij}\times\Phi_j(\widehat{X}_{ij})-\lambda_i^L(\sum_{j=1}^{G}N_{ij}\times t_{ij}^L-B_i)$$

F.O.C.S. for party L are

$$\phi_j(\widehat{X}_{ij})\times U_j^{'}(c_{ij}^L)=\lambda_i^L\text{ , all }j$$

and

$$\sum_{j=1}^{G}N_{ij}\times t_{ij}^L=B_i$$

Similarly F.O.C.S. for party R are

$$\phi_j(\widehat{X}_{ij})\times U_j^{'}(c_{ij}^R)=\lambda_i^R\text{, all }j$$

and

$$\sum_{j=1}^{G}N_{ij}\times t_{ij}^R=B_i$$

Define $H_j(.)$ the inverse of the marginal utility function and rewrite the party L F.O.C.S as

$$c_{ij}^L=H_j\left[\frac{\lambda_i^L}{\phi_j(\widehat{X}_{ij})}\right]$$

and sum the amount of consumption over different groups to obtain

$$\sum_{j=1}^{G}c_{ij}^L=\sum_{j=1}^{G}H_j\left[\frac{\lambda_i^L}{\phi_j(X_{ij})}\right]=Y_i+B_i$$

Given that $H_j(.)$ is monotonic the equation defines a unique solution for λ_i^L. Moreover, since λ_i^L is the unique variable related to parties, λ_i^L has to be equal to λ_i^R, that implies $c_{ij}^L=c_{ij}^R$ and $X_{ij}=0$ in equilibrium. Using the specified utility function $U_{ij}(C_{ij})=k_j\times\frac{c_{ij}^{1-\epsilon}}{1-\epsilon}$ we have that $c_{ij}=\left[\frac{k_j\times\phi_j(0)}{\lambda_i^L}\right]^{1/\epsilon}$.

Summing consumptions of citizens of all groups and using the budget constraint we obtain that

$$\lambda_i^L = \lambda_i^R = \left[\frac{\sum_{j=1}^{G} [k_j \times \phi_j(0)]^{1/\epsilon} \times N_{ij}}{Y_i + B_i} \right]^{\epsilon}$$

Substituting λ_i^L in the consumption formula we obtain that

$$c_{ij} = \frac{[k_j \times \phi_j(0)]^{1/\epsilon}}{\sum_{J=1}^{G} N_{ij} [k_j \times \phi_j(0)]^{1/\epsilon}} \times (Y_i + B_i)$$

and, therefore,

$$t_{ij} = c_{ij} - y_j = \frac{[k_j \times \phi_j(0)]^{1/\epsilon}}{\sum_{j=1}^{G} N_{ij} [k_j \times \phi_j(0)]^{1/\epsilon}} \times (Y_i + B_i) - y_j$$

Proof of proposition 3

Federal government with transfers among regions

Solving backward, in stage 4 (local elections) a voter of region i and group j, with ideological position X, votes for party L iff $U_j(c_{ij}^L) - U_j(c_{ij}^R) \geq (1-\gamma) \times X$.

We can determine the cutoff point for citizens of region i and group j, such that all citizens to the left will vote for L and all citizens to the right will vote for R in the local elections.

$$\widehat{X}_{ij} = \frac{U_j(c_{ij}^L) - U_j(c_{ij}^R)}{(1-\gamma)}$$

During the local electoral campaign (stage 3) parties propose a set of (tactical) transfers so to maximize the share of votes in local election.

Party L solves the following maximization problem:

$$\underset{t_{i1}^L, t_{i2}^L}{Max} \sum_{j=1}^{2} N_{ij} \times \Phi_j(\hat{X}_{ij})$$

subject to

$$\sum_{j=1}^{2} N_{ij} \times t_{ij}^L = B_i + M_i$$

where M_i is the amount of transfers received by region i by central government and B_i is an exogeneously given monetary amount available to the government of region i.

Party R problem is symmetric to party L one.

The context is similar to the one solved in the case of fully localized government, except for the fact that the total sum available for transfers among citizens of region i is $B_i + M_i$. Therefore, following the same steps, it is possible to derive the optimal transfers and the final consumption schedule of a citizens living in region i and belonging to social group j. The consumption schedule, in particular, will be

$$C_{ij} = \frac{[k_j \times \phi_j(0)]^{1/\epsilon}}{\sum\limits_{J=1}^{G} N_{ij}[k_j \times \phi_j(0)]^{1/\epsilon}} \times (Y + B_i + M_i)$$

where $M_i$is the transfer received by region i by the central government.

It is now possible to proceed with the analysis of the national electoral cycle (stage 1 and stage 2).

The cutoff point for citizens of region i and group j in stage 2 (national elections) is

$$X_{ij} = \frac{U_j(c_{ij}) - U_j(c_{ij}^R)}{\gamma}$$

In stage 1 (national electoral campaign), parties aim at maximizing the nation wide share of votes (they cannot influence local elections results).Party L solves, then, the following problem:

$$\underset{M_1,M_2}{Max} \sum_{i=1}^{2}\sum_{j=1}^{2} N_{ij} \times \Phi_j(\hat{X}_{ij})$$

subject to

$$\sum_{i=1}^{2} M_i \leq 0$$

Solving F.O.C.S. and looking for symmetric solutions we find that

$$M_i = \frac{\sum\limits_{j=1}^{2} [k_j \times \phi_j(0)]^{1/\epsilon}}{\sum\limits_{i=1}^{2}\left[\sum\limits_{j=1}^{2} N_{ij}[k_j \times \phi_j(0)]^{1/\epsilon}\right]} \times (Y + \sum_{i=1}^{2} B_i) - \sum_{j=1}^{2} N_{ij}Y_j - B_i$$

where Y represents the income of all the citizens of the country.

This result, together with the equilibrium consumption derived in stage 3, proves the proposition.

Federal government with transfers among social groups

Solving backward, in stage 4 (local elections) a voter of region i and group j, with ideological position X, votes for party L iff$U_j(c_{ij}^L) - U_j(c_{ij}^R) \geq (1-\gamma) \times X$.

We can determine the cutoff point for citizens of region i and group j, such that all citizens to the left will vote for L and all citizens to the right will vote for R.

$$\widehat{X}_{ij} = \frac{U_j(C_{ij}^L) - U_j(C_{ij}^R)}{(1-\gamma)}$$

In the local electoral campaign (stage 3) parties propose a set of (tactical) transfers so to maximize the share of votes in the local election.

Party L solves the following maximization problem:

$$\underset{T_{i1}^L, T_{i,2}^L}{Max} \sum_{j=1}^{2} N_{ij} \times \Phi_j(\widehat{X}_{ij})$$

subject to

$$\sum_{j=1}^{2} N_{ij} \times t_{ij}^L \leq B_i + \sum_{j=1}^{2} N_{ij} \times t_{ij}^{N,L}$$

Similarly party R solves the following maximization problem:

$$\underset{t_{i1}^{N,R}, t_{i,2}^{N,R}}{Max} \sum_{j=1}^{G} N_{ij} \times \left[1 - \Phi_i(\widehat{X}_{ij})\right]$$

subject to

$$\sum_{j=1}^{G} N_{ij} \times t_{ij}^R \leq B_i + \sum_{j=1}^{2} N_{ij} \times t_{ij}^{N,R}$$

The problem is similar to the one solved in the case of fully localized government, except that the income of each citizen before local elections take place is $y_j + t_j^{N,k}$ where $t_j^{N,k}$ is the transfer performed by central government towards citizens of class j. Therefore, following the same steps, it is possible to derive the optimal transfers and the final consumption schedule of a citizens living in region i and belonging to social group j. The consumption schedul, in particular, will be

$$C_{ij} = \frac{[k_j \times \phi_j(0)]^{1/\epsilon}}{\sum_{J=1}^{G} N_{ij}[k_j \times \phi_j(0)]^{1/\epsilon}} \times (Y_i + B_i + \sum_{j=1}^{G} N_{ij} \times t_{ij}^N)$$

Proceding with the analysis of the national electoral cycle (stage 1 and stage 2), the cutoff point for citizens of region i and group j in stage 2 (national elections) is

$$\widehat{X}_{ij} = \frac{U_j(C_{ij}^L) - U_j(C_{ij}^R)}{\gamma}$$

In stage 1 (national electoral campaign, parties aim at maximizing the nation wide share of votes (they cannot influence local elections results). Party L solves the following problem:

$$\underset{T_1^L, T_2^L}{Max} \sum_{i=1}^{2} \sum_{j=1}^{2} N_{ij} \times \Phi_j(X_{ij})$$

subject to

$$\sum_{i=1}^{2} \sum_{j=1}^{2} N_{ij} \times T_j^L \leq 0$$

an party R solves

$$\underset{T_1^R, T_2^R}{Max} \sum_{i=1}^{2} \sum_{j=1}^{2} N_{ij} \times [1 - \Phi_j(X_{ij})]$$

subject to

$$\sum_{i=1}^{2} \sum_{j=1}^{2} N_{ij} \times t_j^{N,R} \leq 0$$

The solution of this maximization problem leads to the result. Since it involves some long algebraic steps we do not summarize it here, but it's available upon request.

References

Alesina, A. & Rosenthal, H. (1996). A Theory of Divided Government. *Econometrica*, 64(6), 1311–1341.

Cox, G. & McCubbins, M. (1986). Electoral Politics as a Redistributive Game. *Journal of Politics*, 48, 370–389.

Dahlberg, M. & Johansson, E. (2002). On the Vote Purchasing Behavior of Incumbent Governments. *American Political Science Review*, 96(1), 27–40.

Dixit, A. & Londregan, J. (1996). The Determinants of Success of Special Interests in Redistributive Politics. *Journal of Politics*, 58(4), 1132–1155.

Dixit, A. & Londregan, J. (1998). Ideology, Tactics, and Efficiency in Redistributive Politics. *Quarterly Journal of Economics*, 113, 497–529.

Lindbeck, A. & Weibull, J. (1987). Balanced-Budget Redistribution as the Outcome of Political Competition. *Public Choice*, 52(3), 273–297.

Myerson, R. (1993). Incentives to Cultivate Favored Minorities Under Alternative Electoral Systems. *American Political Science Review*, 87(4), 856–869.