DOES CENTRALIZATION INCREASE THE SIZE OF GOVERNMENT? THE EFFECTS OF SEPARATION OF POWERS AND LOBBYING[†]

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ABSTRACT

Difficulties faced by the Economic and Monetary Union have strengthened the position of those who advocate a process of (further) political integration in the European Union (EU). A widespread fear is, though, that such a process would favor powerful interest groups able to lobby the EU policymakers. Persson and Tabellini (1994) argue that political centralization will increase the size of the government through lobbying because of free-riding incentives created by federally funded programs with localized benefits. We extend their analysis by presenting a model where the budgeting process is divided into two stages, instead of one, which better captures the EU institutional framework. A federal legislator (the Council) chooses the size of the budget at one stage, while a federal agency (the Commission) chooses the allocation of the budget at the next stage. We show that separation of powers in the budgeting process restricts free riding and, therefore, reduces the incentives to lobby. The result is an unchanged budget under centralization. Moreover, it is shown that if the lobbying activity is directed to both policymakers, competitive lobbying may actually *reduce* the size of the public sector under centralized policymaking.

Keywords: lobbying, centralization, size of government, separation of powers, European Union decision-making.

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1. INTRODUCTION

In the last decade, the European Union (EU) has experienced a substantial process of integration. The recent creation of a monetary union has raised some doubts about its viability without a further process of political integration [The Economist (1999)]. One argument is that, in the absence of a flexible and integrated labor market, the Economic and Monetary Union would require a (con)federal government having the financial resources to compensate the limitation of national fiscal instruments and support the economies hit by localized negative shocks [De Grauwe (1997)]. The issue of fiscal stabilization has provoked a large debate about the necessity of increasing the size of the EU budget [see Kletzer and von Hagen (2000)]. This possibility is likely to be opposed by those countries, like Germany and the Netherlands, that consider their relative contributions already high [The Economist (1998)]. Moreover, there is a fear that an expanded 'European Transfer Union' would become a Leviathan uncontrolled by the national governments [Obstfeld and Peri (1998)].

An influential study by Persson and Tabellini (1994) suggests that centralization of fiscal programs, producing localized benefits with federation wide costs, would generate an evident free-riding problem and give an incentive to local interests to lobby the central government for an increase of the federal budget. That study shows that competitive lobbying by the states leads to an expansion in the provision of state public goods beyond the level selected in a decentralized system, where each state pays for its own public good. This outcome offers a political justification for decentralization that has to be balanced against spillovers and scale economies. According to their study, when we take the incentives for lobbying the central policymaker into account, the reasons for decentralization become stronger when benefits are more locally concentrated.

The goal of this paper is not to dispute this fiscal common pool argument in general. For the debate regarding the EU budget we think it is important, though, to scrutinize the strength of the argument when due account is taken of relevant existing institutions. In the EU, the Council and the

Commission have different roles. The former has a decisive legislative role and the latter has mainly the role of initiating and implementing legislation, securing the observance of the EU Treaties. As for the EU budget, this has to be approved by the Council, at least for what regards compulsory expenditure [resulting from the Treaties or Community legislation; see Barrass and Madhavan (1996)]. However, the allocation of structural funds used to finance national projects, is in the hands of the Commission.

Consistent with this political economic framework, we therefore extend the stylized Person and Tabellini model to two decision-making tiers at the federal level. At the first tier, a legislator determines the total amount of revenue (budget) for the provision of local public goods in each state. At the second tier, the executive (a federal agency) determines the share of revenue going to the different states. As two policymaking tiers are introduced, it is sensible to allow for lobbying by local communities (the states) at both tiers, for an increase in the amount of local public goods. Therefore, the analysis of Persson and Tabellini is generalized in two ways: first, by introducing separation of powers and, second, by allowing for two-tier lobbying.[1] The aim of this short paper is to explore the effects of lobbying and centralization of expenditure decisions on the size of government, within this (for the EU, at least) more realistic institutional framework.[2]

Our study shows that, when only the federal legislator can be lobbied, overexpansion is no longer implied by centralization. In fact, in that event, delegation of the revenue allocation to an independent agency produces an *equally* sized public sector. Although this consequence of the institutional structure seems neglected in the EU debate referred to above, the intuition behind it is rather straightforward: a lobbyist can no longer simultaneously bargain over the size *and* allocation of the budget. Because the agency assigns a share of the budget to each state, free riding is

[1] Lobbying directed towards the Commission is empirically well established. Ten years ago the number of professional lobbyists based in Brussels was already considered to be in the range of 3000 and quickly rising [Mazey and Richardson (1994)].

[2] More generally, government policies are typically the result of decisions taken by different agents. In democratic systems, a separation of powers between a legislative and an executive tier is common. There are technical justifications for such a separation (e.g. specific competence or scarcity of time and resources needed to perform a task) as well as political reasons related to avoiding selfish behavior of political representatives to go against the interest of the voters [see Persson et al. (1997)].

restricted, which checks the incentive to lobby for an increase in the size of the federal budget. A perhaps more striking result is obtained if also the agency can be lobbied. In that case, it turns out that centralization of policymaking may in fact lead to a *smaller* government size than decentralization. The reason is that the legislator dislikes lobbying directed towards the agency, because of the costs it implies for the local communities, and can discourage it by reducing the stakes at the agency level. The federal budget, in that case, represents a form of (low-powered) incentive scheme to limit lobbying expenditure for agency capture. Paradoxically as it may seem, this result suggests that a substantial autonomy of the EU Commission, dealing with the allocation of the EU funds, would in fact function as an effective constraint on the expansion of the Union budget.

Our paper fits into the steadily growing public finance literature on the fiscal common pool problem and the impact of separation of powers. For example, Weingast et al. (1981) argue that the number of legislative districts has a positive effect on public overspending. On the other hand, Chari et al. (1997) show that the separation of powers in presidential systems may curb overall government spending through split-ticket voting, with one of the votes going to a fiscal conservative president. Many papers have investigated this issue both from a theoretical and empirical point of view. A recent survey of these studies is offered by Bradbury and Crain (2001), where it is shown that the division of a legislature into two chambers lessens the common pool problem and has a negative impact on the government size.[3] Our paper contributes to this literature by introducing a formal analysis of two-tiered lobbying. The results show that this new element can have important consequences for the common pool problem and may function as an effective restraint on fiscal expansion.

From a more general perspective, the dangers of merging tax and spending powers in the hands of one ruler have been investigated by Grossman and Noh (1994). They show that a self-interested

[3] Although this result is consistent with our findings, we should be cautious to consider it as an empirical support for our model, as it refers to bicameral legislatures where policymaking presents substantial differences with policymaking in the EU. The same holds for the empirical evidence of a negative effect of two-stage budgeting suggested by the

ruler sets a higher tax-rate and invests a lower level of resources in productive services than would be optimal. The gap decreases when tax and spending policy becomes more closely linked up with the probability of political survival. Migué (1997) analyzes a federal system where functions overlap and different levels of government compete for the same voters by choosing the supply of public goods in a territory. In such a system, there are two forces operating in opposite directions: one in favor of more spending due to the political dynamics and one against because of factor mobility. In line with that paper, our model could be applied to analyze a situation where two different levels of governments with overlapping functions serve the same constituency in the same territory. Also our framework of divided government presents two counteracting forces: one in favor of spending, due to lobbying, and one reducing that effect, due to institutional division of decision power.

The paper is organized as follows. Section 2 extends the basic model in Persson and Tabellini (1994) by introducing two levels of decision-making and, at a later stage, lobbying activity directed at each tier. Section 3 concludes.

2. THE MODEL

We consider a federation formed by two states, where each state m is populated by one individual consuming a public good G_m, financed by a proportional tax t_m on income. Income is for convenience normalized to one. Preferences are symmetric and the utility of the representative individual of state m is represented by:

$$V_m=h(G_m)+1-t_m \tag{1}$$

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analysis of Ferejohn and Krehbiel (1987).

where $h(G_m)$ is a strictly concave function. In a decentralized setting, state m chooses G_m in order to maximize (1) subject to the balanced budget constraint $G_m=t_m$. In equilibrium:

$$h_{Gm}=1 \qquad\qquad m=1,2 \tag{2}$$

where the subscript indicates the derivative. The level of the public good selected by each state is such that $G_m^s=h_{Gm}^{-1}(1)$, where the superscript s indicates the outcome under decentralization. Without spillovers or economies of scale, the decentralized choices are optimal: G_m^s equals the level of federal provision, G_m^f, that would be obtained by maximizing joint welfare $\Sigma_m V_m(G_m,t)$ subject to the balanced budget constraint $\Sigma_m G_m=2t$. Clearly, each state has an incentive to free-ride and lobby for an increase in the provision of the local public good that is to be paid by the whole federation. Not surprisingly, then, Persson and Tabellini (1994) show that non-cooperative lobbying by the states at the federal level increases the size of the budget: $G_m^f>G_m^s$, with lobbying.

In reality, however, government output typically results from the activity of different agents with more or less discretionary power. In that respect, the above result applies to the polar institutional case where the agent deciding on the size of the budget keeps full control over its use. In this study, we consider the opposite benchmark case of complete separation of powers, where elected representatives deciding on the total amount of resources for a specific program do not control its allocation. As discussed in the Introduction, this case would seem to better fit the present situation in the EU, for example.

Centralized policymaking with a divided government

In this section, we introduce a political economic model where the local public good provision is decided at the federal level, through a two-stage budgeting process. First, a legislator chooses the federation-wide tax rate t and, subsequently, a federal agency selects the revenue shares (s for state 1) determining the public good level in each state, with $G_1=2ts$ and $G_2=2t(1-s)$. In such a framework, local interest groups have two potential targets. A state may obtain favorable redistribution by lobbying the legislator for a change in the tax rate and/or by trying to influence the agency's policy and increase its revenue share.[4] In order to distinguish the effect of separation of powers from that of two-tiered lobbying, we neglect for the moment the latter generalization of the model. At this stage, we assume that the agency is fully benevolent and immune to lobbying.

Lobbying aimed at the federal legislator is modeled using the Bernheim and Whinston (1986) common agency framework.[5] Each state representative lobbies the legislator by submitting, in a non-cooperative fashion, a menu of contributions $C_m(t)$ contingent on the tax rate that will be selected by the latter. Contributions can be anything that is costly for the supplier and beneficial for the receiver (such as monetary transfers or endorsement efforts to be used for campaigning, for example).

We solve the game starting from the last stage, where the bureaucratic agency selects s^f to maximize $\Sigma_m V_m(G_m)$ taking t as given. After substituting for G_m in (1), in equilibrium: $h_{G1}= h_{G2}$, for any given t and C_m. Thus, s^f=½; that is, the agency distributes the budget equally, since states have the same political weight.

Given the contributions offered by the states, the balanced budget constraint, and the agency's optimal choice, the legislator selects a tax rate t^f that maximizes an objective function including social welfare as well as contributions, namely:

$$P_L=(L-1)\Sigma_m C_m(t)+\Sigma_m V_m(t) \tag{3}$$

where the coefficient L denotes the relative importance of contributions to the legislator ($L>1$ is assumed to allow for lobbying, otherwise the legislator would evaluate contributions negatively).

[4] Lobbying by local communities is evidenced by the substantial lobbying activity of regional authorities at the European Union level. For example, Mazey and Mitchell (1993, p.95) emphasize how "since the mid-1980s there has been a sharp increase in the European Community (EC) lobbying activities of regions eager to secure EC funds for economic-development programmes and a more prominent role in the formulation of Community policies".

[5] This framework is also applied by, among others, Grossman and Helpman (1994), Persson and Tabellini (1994),

From Lemma 2 in Bernheim and Whinston (1986), it can be shown that, in equilibrium: h_{G1}=1=h_{G2} (see Appendix). Consequently, $G_m^f=G_m^s$: that is, the federal public sector has the same size under centralization and decentralization.

This result is in fact quite intuitive. As the budget is allocated in equal proportion by the agency, state representatives have no room to free ride. An increase in the local public good is obtained through an equivalent increase in the tax payment by the state.[6] In such a situation it is also evident that lobbying is useless since there is no advantage from changing the amount of tax revenue; thus, C_m=0 in equilibrium.

Two-tier lobbying

Separation of powers brings with it the possibility of multi-tiered lobbying. The question we will now address is whether allowing for lobbying at the agency level will restore the result of Persson and Tabellini (1994) that the size of the federal budget increases with centralization. Assume, therefore, that the agency can be lobbied as well, through contributions E_m contingent on the agency's policy, *s*. Again, contributions can be interpreted as anything useful for the policymaker and costly for the state representatives.[7] The net utility of the state representatives is now V_m-C_m-E_m. Consequently, the objective function of the legislator and the agency become, respectively:

$$P_L=(L-1)\Sigma_m C_m(t)+\Sigma_m[V_m(s,t)-E_m(s)] \quad \text{and} \quad P_A=(A-1)\Sigma_m E_m(s)+\Sigma_m[V_m(s,t)-C_m(t)] \quad (4)$$

where *A* denotes the relative importance of contributions to the agency (and $A>1$ in order to allow for lobbying towards the agency). Including lobbying at each decision-making stage, the sequence of events is the following: first, each state representative *m* non-cooperatively offers a schedule

Bennedsen (2000).

[6] A similar result holds if the countries have different population sizes. In this case, the larger country would produce larger revenue and get a larger share of the budget according to its tax contributions.

[7] The bureaucratic agency may also receive campaign contributions, if elected. Contributions may alternatively have the form of job opportunities (revolving-doors), gifts, perquisites, or valuable information, for example.

$C_m(t)$ to the legislator, who then chooses the income tax. Subsequently, each representative m offers a schedule $E_m(s)$ to the agency, which then determines the allocation of the federal budget for the provision of the local public goods. We solve this game starting from the last (bureaucratic) stage.[8] To establish the effect that lobbying at the agency level has on the size of the budget selected by the federal legislator, it is further assumed that $h(G_m)$ is a homogeneous function (of degree $k<1$).

Following the procedure used before, it can be shown that s^f, maximizing $\Sigma_m V_m(s)$, represents the Nash equilibrium for the agency, for any given t and C_m (see Appendix). The state representatives pay contributions to the agency, but lobbying influences just offset each other, since the utility functions and contributions of the different representatives are evaluated equally by the agency. Therefore, in equilibrium $h_{G1}=h_{G2}$ and $s^f=½$, as in the case of no lobbying at the bureaucratic level. Consequently, from the result in the previous paragraph it follows that G_m^f is larger, equal or smaller than G_m^s if and only if the optimal tax rate is larger, equal or smaller than t^f.

Solving for the contributions of each state representative to the agency, E_m^f, and going backward to the legislator's stage, the optimal tax rate for the legislator (τ^f) is determined. It turns out that, in equilibrium, the selected tax rate τ^f is different from t^f, obtained under one-tier lobbying, even though the choice of the agency (s^f) is unchanged. Specifically, we obtain that $\tau^f<t^f$ and, thus, $G_m^f<G_m^s$ (see Appendix).

The reason is the effect of the contribution E_m^f on the legislator's objective function: E_m^f enters negatively in P_L and it can be shown that $\partial E_m^f/\partial t>0$. This effect leads to a decrease in the tax rate selected by the legislator. The government size thus reduces with centralization. Bureaucratic capture induces the legislator to reduce the stakes for the lobbies. The budget provided to the agency can be considered as a (low-powered) incentive to reduce lobbying.[9]

3. CONCLUSION

[8] Clearly, solutions for $C_m(t)$ will generally depend on s; similarly, $E_m(s)$ may depend on t although it is designed for any given t.

In this paper we have extended the analysis of Persson and Tabellini (1994) which suggests that the centralization of local public good provision in the EU will increase the size of the federal budget. The extension concerns the introduction of two decision-making tiers at the federal level: one concerning the size of the budget and the other one concerning the allocation of the budget among the states in the federation. We have argued that this generalization better fits the specific decision-making process in the EU, although a more complete political economic model would be needed to account for other aspects, such as the bargaining process within the Council. Our analysis shows that the separation of powers may actually discipline the growth of the public sector with centralization for two reasons. First, because it mitigates the fiscal common pool problem, thereby reducing the incentive to lobby for a larger budget. Second, because separation of powers introduces the possibility of multi-tiered lobbying, a reaction by the legislator is triggered in the direction of reducing the size of the federal budget.

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[9] It should also be clear that, in this framework, the same result holds when only the bureaucrat is lobbied.

APPENDIX

Policymaking with a divided government and single-tier lobbying

At the second stage of the budgeting process, for any given C_m ($m=1,2$) and $t \in \boldsymbol{T} \equiv [0,1]$, the bureaucratic agency maximizes the sum of utilities and selects, in equilibrium, a distribution s^f, such that $h_{G1}= h_{G2}$; thus, $s^f=½$.

Going backwards to the first stage, where the states 1 and 2 may lobby the legislator through the offer of contributions, define with $\boldsymbol{C}$ the set of feasible contribution strategies for each state, i.e. $\boldsymbol{C} \equiv \{C / C(t) \geq 0\}$ for all the tax rates $t \in \boldsymbol{T}$ to be selected by the legislator. From Lemma 2 in Bernheim and Whinston (1986), $\left(\left\{C_h^f\right\}_{h=1}^2, t^f\right)$ is a Nash equilibrium if and only if:

a) $C_m{}^f \in \boldsymbol{C}$ *for all m*

b) t^f *maximizes* $P_L\left(\left\{C_h^f(t)\right\}_{h=1}^2, t\right)$ *on* $\boldsymbol{T}$

c) t^f *maximizes* $P_L\left(\left\{C_h^f(t)\right\}_{h=1}^2, t\right) + [V_m(t) - C_m{}^f(t)]$ *on* $\boldsymbol{T}$ *for all m*

d) *there exists* $t_m°$ *that maximizes* $P_L\left(\left\{C_h^f(t)\right\}_{h=1}^2, t\right)$ *on* $\boldsymbol{T}$ *such that* $C_m{}^f=0$ *for all m* (A.1)

Condition (A.1a) restricts the analysis to nonnegative schedules without implying a loss of generality [cf. Bernheim and Whinston (1986, Lemma 1)]. Given the contribution schedules, the policy selected in any Nash-equilibrium has to maximize the objective of the legislator (A.1b) and, in addition, the joint payoff of the policymaker and each single lobby (A.1c).[10] Condition (A.1d) indicates that group *m* offers a contribution of zero for some unfavorable policy. Otherwise, it could

[10] If the latter would not hold then lobby *m* could compensate the policymaker for switching to a preferred *t* and still be better off.

clearly be better off by reducing its *schedule* for the policies satisfying (A.1b), without changing the legislator's choice. Assuming differentiable contribution schedules, from (A.1b), recalling (1) and (3), and that $G_1=2ts$ and $G_2=2t(1-s)$, we obtain at t^f:

$$(L-1)\Sigma_m C_{mt}+2h_{G1}[s^f+t(ds^f/dt)]+2h_{G2}[(1-s^f)-t(ds^f/dt)]=2 \qquad \text{(A.2)}$$

moreover, from the combination of (A.1b) and (A.1c), it turns out that t^f maximizes the net utility of each state representative, i.e. in an interior equilibrium:

$$2h_{G1}[s^f+t(ds^f/dt)]-1=C_{1t} \qquad \text{and} \qquad 2h_{G2}[(1-s^f)-t(ds^f/dt)]-1=C_{2t} \qquad \text{(A.3)}$$

Substituting (A.3) into (A.2) we see that $\Sigma_m V_{mt}=0$. The influences of the two states offset each other: competitive lobbying induces the legislator to choose a policy that maximizes the sum of the gross utilities of the state representatives. Recalling that, at s^f, $h_{G1}= h_{G2}$ for any $t\in\boldsymbol{T}$, we obtain that $h_{Gm}=1$ and, comparing with (2), $G_m^f=G_m^s$ for all m. The sufficient condition for an equilibrium is satisfied, as $\Sigma_m V_m(t^f;s^f)$ is strictly concave in t.[11]

The equilibrium policy t^f can be supported by globally truthful contribution schedules, where differences in contributions reveal the net willingness of a state to pay for t^f compared to an alternative policy. The alternative policy is that selected by the legislator when the state does not contribute. Now, define with t_2 the policy selected when state 1 does not lobby the legislator and state 2 does. It is easy to see from (A.1b) and (A.1c), using (3), that t_2 maximizes $LV_2(t)+V_1(t)$. However, after substituting for $s^f=½$, such that $h_{G1}= h_{G2}$, it is easy to see that $ds^f/dt=0$ and $h_{Gm}=1$ and, thus, $t_m=t^f$ for all m. Consequently, each state has no incentive to offer a positive contribution to the legislator.

[11] After differentiating $\Sigma_m V_{mt}(t^f;s^f)$ with respect to t, we obtain: $4h_{G1G1}[s^f+t^f(ds^f/dt)]^2 + 2h_{G1}[2(ds^f/dt)+t^f(d^2s^f/dt^2]+ 4h_{G2G2}[(1-s^f)-t(ds^f/dt)]^2+2h_{G2}[-2(ds^f/dt)-t^f(d^2s^f/dt^2]$. Recalling that $h_{G1}= h_{G2}$, we clearly see that $\Sigma_m V_{mtt}(t^f;s^f)<0$.

Policymaking with a divided government and two-tier lobbying

Recall that, if lobbying can take place at both levels of decision making, the net utility of the state representatives is $U_m=V_m(s,t)-C_m(t)-E_m(s)$, for $m=1,2$, where $E_m(s)$ is the contribution schedule offered by state m to the agency, while $C_m(t)$ is the contribution schedule offered to the legislator. The objective functions of the legislator and the agency are as in (4). It is assumed that $h(G_m)$ is a homogeneous function of degree $k<1$ in its argument.

Starting from the second stage, the bureaucratic agency selects $s\in\boldsymbol{S}=[0,1]$ to maximize P_A (4). For any given t and $C_m(t)$, from Lemma 2 in Bernheim and Whinston (1986), we can define a Nash equilibrium $\left(\{E_h^f\}_{h=1}^2, s^f\right)$ in a way similar to (A.1); then, in equilibrium, the agency selects a policy that maximizes $P_A\left(\{E_h^f(s)\}_{h=1}^2, s\right)$ and $P_A\left(\{E_h^f(s)\}_{h=1}^2, s\right)+U_m(s)$ for each state m that offers contributions to the agency. As shown in the previous section for the legislator, competitive lobbying induces again the agency to maximize $\Sigma_m V_m(s)$ for any given t and C_m. Therefore, $s^f=½$: the allocation of the budget is unchanged by lobbying.

To derive the contributions for the agency, define with s_m the allocation chosen by the agency when is lobbied by state m (with schedule E_m) and not lobbied by state i ($i\neq m$).

Applying the same reasoning as in the definition of the Nash equilibrium, but with only one state lobbying, it turns out that s_m maximizes $AV_m(s)+V_i(s)$, i.e. the lobbying state 'buys' a larger weight through its contribution. It is straightforward to verify that $s_1>s^f>s_2$, from concavity of the objective function.

Now, we can derive the truthful Nash equilibrium contributions offered to the agency that support s^f. In particular, E_m^f represents a truthful strategy relative to s^f if and only if for all $s\in\boldsymbol{S}$: either $V_m(s)-E_m^f(s)=V_m(s^f)-E_m^f(s^f)$ or $V_m(s)<V_m(s^f)-E_m^f(s^f)$ and $E_m^f(s)=0$. In this way, s^f represents a truthful Nash equilibrium.[12] Corollary 1 to Theorem 2 in Bernheim and Whinston (1986) offers a unique solution

[12] Bernheim and Whinston show (Theorem 1) that the set of best responses to any strategy played by the opponent lobby contains a truthful strategy. Therefore, there is no cost for the lobbies from playing truthful strategies.

for the truthful Nash equilibrium contributions when there are only two lobbies. The intuition is as follows.[13] Taking as given the schedule of the other state, each state sets its contribution schedule such that it maximizes its net utility, subject to the constraint that the policy contingent offer should be sufficiently large for the agency to accept the offer. In equilibrium, these schedules are consistent and support the policy s^f. Then, in order to induce the agency to choose s^f, state 1 has to offer a contribution that does not make the agency worse off with respect to s_2. Since each state chooses the contributions optimally, minimizing the cost of influence, state representative m contributes such that, for any given t and C_m, and $i=1,2$:

$$P_A(s^f)=P_A(s_i)=(A-1)E_i(s_i)+\Sigma_m[V_m(s_i)-C_m] \qquad \text{(A.4)}$$

Take, for example, $i=2$. Then (A.4) can be rearranged as follows: $(A-1)E_1^f(s^f)=\{(A-1)[E_2^f(s_2)-E_2^f(s^f)]+V_1(s_2)-V_1(s^f)+[V_2(s_2)-V_2(s^f)]\}$. Meanwhile, from global truthfulness, we know that: $V_2(s^f)-E_2^f(s^f)=V_2(s_2)-E_2^f(s_2)$.[14] After substituting and applying the same procedure to the other state, we have the following solution for the contributions to the agency:

$$E_m^f = (A-1)^{-1}\{A[V_i(s_i)-V_i(s^f)]+[V_m(s_i)-V_m(s^f)]\} \qquad (m\neq i) \qquad \text{(A.5)}$$

From the definition of s_m ($s_m \neq s^f$) it is evident that $E_m^f>0$ for any given tax rate. From (A.5): $V_m(s^f)-E_m^f(s^f,s_i)=[A/(A-1)]\Sigma_m[V_m(s^f)-V_m(s_i)]+V_m(s_i)$, with $m\neq i$.

Substituting in P_L and following the same definition for a Nash equilibrium as in (A.1), we derive a Nash equilibrium $\left(\{C_h^f\}_{h=1}^{2},\tau^f\right)$ at the legislative stage. Similarly to what we have seen before, since

[13] For a description of the derivation of truthful contribution schedules, see Grossman and Helpman (1994), sect.4.

[14] We know from the equilibrium definition that s^f maximizes state 2 utility, i.e.: $V_2(s^f)-E_2^f(s^f)\geq V_2(s_2)-E_2^f(s_2)$. To see that the equality sign holds, notice that $V_2(s^f)-E_2^f(s^f)<V_2(s_2)$, as $V_2(s_2)>V_2(s^f)$. Then state 2 has an incentive to lobby the agency by offering a positive contribution for s_2, as an alternative to s^f. Recalling the definition of global truthfulness, this contribution is made just equal to the net gain from having s_2 instead of s^f and the equality sign holds.

an equilibrium tax rate τ^f maximizes both $P_L\left(\left\{C_h^f(\tau)\right\}_{h=1}^2, \tau\right)$and $P_L\left(\left\{C_h^f(\tau)\right\}_{h=1}^2, \tau\right)+U_m(\tau)$, it turns out that τ^f maximizes $\Sigma_m[V_m(s^f(t),t)-E_m^f(s^f(t),s_i(t),t)]$ on $\boldsymbol{T}$, with $m\neq i$. Therefore, at τ^f:

$$[A/(A-1)]\ \{2[V_{1t}(s^f)+V_{2t}(s^f)] - [V_{1t}(s_2)+V_{2t}(s_2)] - [V_{1t}(s_1)+V_{2t}(s_1)] + 2[V_{1s}(s^f)+ V_{2s}(s^f)](ds^f/dt) - [V_{1s}(s_2)+V_{2s}(s_2)](ds_2/dt) - [V_{1s}(s_1)+V_{2s}(s_1)](ds_1/dt)\} + V_{1t}(s_2) + V_{2t}(s_1) + V_{1s}(s_2)(ds_2/dt) + V_{2s}(s_1)(ds_1/dt)=0$$

recalling that $\Sigma_m V_{ms}(s^f)=0$, that $V_{1s}(s_2)-[A/(A-1)][V_{1s}(s_2)+V_{2s}(s_2)]=0$, because s_2 maximizes $V_1(s)+AV_2(s)$, and that $V_{2s}(s_1)-[A/(A-1)][V_{1s}(s_1)+V_{2s}(s_1)]=0$, because s_1 maximizes $AV_1(s)+V_2(s)$, the above equation becomes:

$$[A/(A-1)]\{2[V_{1t}(s^f)+V_{2t}(s^f)]-[V_{1t}(s_2)+V_{2t}(s_2)]-[V_{1t}(s_1)+V_{2t}(s_1)]\}+V_{1t}(s_2)+V_{2t}(s_1)=0$$

or

$$A\{2[V_{1t}(s^f)+V_{2t}(s^f)]-V_{2t}(s_2)-V_{1t}(s_1)\}-V_{1t}(s_2)-V_{2t}(s_1)=0$$

Using (1), we have:

$$A\{2[s^f h_{G1}(s^f)+(1-s^f)h_{G2}(s^f)-1]-(1-s_2)h_{G2}(s_2)-s_1 h_{G1}(s_1)+1\}-s_2 h_{G1}(s_2)-(1-s_1)h_{G2}(s_1)+1=0$$

Taking into account that $s^f=½$, $h_{G1}(s_2)=Ah_{G2}(s_2)$ and $Ah_{G1}(s_1)=h_{G2}(s_1)$, we obtain, in equilibrium:

$$A\Sigma_m h_{Gm}(s^f;\tau^f)-h_{G1}(s_2;\tau^f)-h_{G2}(s_1;\tau^f)-(A-1)=0 \tag{A.6}$$

To verify that the second-order sufficient condition for an equilibrium holds, first note that $ds^f/dt=0$ and, because of homogeneity, $ds_m/dt=0$. To see that take, for example, the first order condition for

s_2: h_{G1}-Ah_{G2}=0. By total differentiation we obtain that $sign(ds_2/dt)=sign[2s_2h_{G1G1}-A2(1-s_2)h_{G2G2}]$. Since $h(G_m)$ is a homogeneous function of degree $k<1$, from Euler's law, $G_mh_{GmGm}= -(1-k)h_{Gm}$. After rearranging the above equation, we see that $sign(ds_2/dt)=sign[Ah_{G2}-h_{G1}]$. Since Ah_{G2}-h_{G1}=0 at $s=s_2$, the claim follows.

Then, differentiating the left-hand side of (A.6) with respect to the tax rate, we obtain: $A[2s^fh_{G1G1}(s^f,\tau^f)+2(1-s^f)h_{G2G2}(s^f,\tau^f)]-2s_2h_{G1G1}(s_2,\tau^f)-2(1-s_1)h_{G2G2}(s_1,\tau^f)$. After multiplying and dividing by τ^f, and using Euler's law [such that $G_mh_{GmGm}= -(1-k)h_{Gm}$] this expression is equivalent to: $[(1-k)/\tau^f]\ \{-A\ [h_{G1}(s^f,\tau^f)+h_{G2}(s^f,\tau^f)] + h_{G1}(s_2,\tau^f) + h_{G2}(s_1,\tau^f)\}$. It is straightforward to verify that this expression is strictly negative by substituting $Ah_{G2}(s_2)$ for $h_{G1}(s_2)$ and $Ah_{G1}(s_1)$ for $h_{G2}(s_1)$. In fact, for strictly concavity of $h(G_m)$, and recalling that $G_1(s_1)>G_1(s^f)>G_1(s_2)$ [i.e. $G_2(s_1)<G_2(s^f)<G_2(s_2)$] for any given tax rate, we have that, at τ^f: $A[h_{G1}(s^f)-h_{G1}(s_1)]<0$ and $-A[h_{G2}(s^f)- h_{G2}(s_2)]<0$.

Finally, in order to prove that $\tau^f<t^f$ we first show that $\partial E_m{}^f/\partial\ t>0$. We have seen that, with homogeneity of $h(G_m)$, $ds^f/dt=0=ds_m/dt$. Therefore, differentiating $E_1{}^f$ (A.5) with respect to t, we obtain: $sign(\partial E_1{}^f/\partial\ t) = sign\{A[2(1-s_2)h_{G2}(s_2) - 2(1-s^f)h_{G2}(s^f)] + 2s_2h_{G1}(s_2) -2s^fh_{G1}(s^f)\}$. From the homogeneity assumption, we also have that $G_mh_{Gm}(G_m)=kh(G_m)$ (Euler's law). Then multiplying and dividing the right-hand side of the above equation by τ^f and adding and subtracting $(1+A)(1-\tau^f)(k/\tau^f)$, using (1), we obtain: $sign(\partial E_1{}^f/\partial\ t)=sign\{A[V_2(s_2)-V_2(s^f)]+[V_1(s_2)-V_1(s^f)]\}$ which is positive by the definition of s_2 since $s_2\neq s^f$. Similarly, $\partial E_2{}^f/\partial\ t>0$.

Now, notice that $\partial E_m{}^f/\partial t>0$ implies that $\tau^f\neq t^f$. In fact, for $s=s^f$, the first-order condition for t^f is $\Sigma_mV_{mt}(s^f(t),t)=0$ whereas the first-order condition for τ^f is $\Sigma_m[V_{mt}(s^f(t),t)-E_{mt}{}^f(s^f(t),s_i(t),t)]=0$ (for $m\neq i$). This implies that $\Sigma_mV_{mt}(s^f(\tau^f),\tau^f)>0=\Sigma_mV_{mt}(s^f(t^f),t^f)$. Using the assumption of strict concavity of $\Sigma_mV_m(s^f(t),t)$, we see that $\tau^f<t^f$. Recalling that, with a tax rate t^f, each state receives an amount of local public good equal to $G_m{}^s$, we ascertain that $G_m{}^f<G_m{}^s$ for all m.

REFERENCES

BARRASS R. and MADHAVAN S., *European Economic Integration and Sustainable Development*, McGraw-Hill, London, 1996.

BENNEDSEN M., “Political Ownership”, *Journal of Public Economics*, 76, 2000, 559-581.

BERNHEIM D.B. and WHINSTON M.D., "Menu Actions, Resource Allocation, and Economic Influence", *Quarterly Journal of Economics*, 101, 1986, 1-31.

BRADBURY J.C. and CRAIN W.M., “Legislative Organization and Government Spending”, *Journal of Public Economics*, 82, 2001, 309-325.

CHARI V.V., JONES L.E. and MARIMON R., “The Economics of Split-Ticket Voting in Representative Democracies” , *American Economic Review*, 87, 1997, 957-976.

DE GRAUWE P., *The Economics of Monetary Integration*, Oxford University Press, 1997.

FEREJOHN J. and KREHBIEL K., “The Budget Process and the Size of the Budget”, *American Journal of Political Science*, 31, 1987, 296-320.

GROSSMAN G.M. and HELPMAN E., "Protection for Sale", *American Economic Review*, 84, 1994, 833-850.

GROSSMAN H.I. and NOH S.J., “Proprietary Public Finance and Economic Welfare”, *Journal of Public Economics*, 53, 1994, 187-204.

KLETZER K. and von HAGEN J., “Monetary Union and Fiscal Federalism”, *ZEI Working Paper* B1, 2000.

MAZEY S. and MITCHELL J., “Europe of the Regions? Territorial Interest and European Integration: The Scottish Experience”, in: S. Mazey and J. Richardson (Eds.), *Lobbying in the European Community*, Oxford University Press, 1993, 95-121.

- and - , Interest Groups in the European Community”, in: J. Richardson (Ed.), *Pressure Groups*, Oxford University Press, 1994 (reprint), 191-213.

MIGUÉ J.-L., “Public Choice in a Federal System”, *Public Choice*, 90, 1997, 235-54.

OBSTFELD M. and PERI G., “Regional Non-Adjustment and Fiscal Policy” *Economic Policy*, 26, 1998, 207-47.

PERSSON T. and TABELLINI G., "Does Centralization Increase the Size of Government?", *European Economic Review*, 38, 1994, 765-773.

PERSSON T., ROLAND G and TABELLINI G., “Separation of Powers and Political Accountability”, *Quarterly Journal of Economics*, 112, 1997, 1163-1202.

THE ECONOMIST, *EMU Survey*, April 11th, 1998.

\- , *Gambling on the Euro*, January 2nd, 1999.

WEINGAST B., SHEPSLE K. and JOHNSEN C., “The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics”, *Journal of Political Economy*, 89, 1981, 642-664.