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# Voting, Lobbying, and the Decentralization Theorem

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## Abstract

This paper revisits the fiscal "decentralization theorem", by relaxing the role of the assumption that governments are benevolent, while retaining the assumption of policy uniformity. If instead, decisions are made by direct majority voting, (i) centralization can welfare-dominate decentralization even if there are no externalities and regions are heterogenous; (ii) decentralization can welfare-dominate centralization even if there are positive externalities and regions are homogenous. The intuition is that the insensitivity of majority voting to preference intensity interacts with the different inefficiencies in the two fiscal regimes to give second-best results. Similar results obtain when governments are benevolent, but subject to lobbying, because now decisions are *too* sensitive to the preferences of the organised group.

Keywords: Decentralization, majority voting, lobbying, local public goods.

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## 1. Introduction

The fiscal decentralization theorem, formalized in Oates(1972), provides an answer to one of the fundamental problems in public finance: to which level of government should the authority to tax and provide public goods be allocated? The theorem shows that, under certain assumptions, this choice depends on the size of regional or local public good spillovers and differences in preferences for (or costs of provision of) public goods between regions. If spillovers are small, and differences across regions large, then decentralization is preferred, and if the reverse holds, centralization is preferred. This simple theory has an enduring appeal.

However, in the recent past, the assumptions of the decentralization theorem have come under increasing scrutiny. As is well-known, two key assumptions are made: firstly, that each level of government is *benevolent*; that is, whether central or sub-central government maximizes the welfare of citizens in its jurisdiction. The second assumption is that with centralization, per capita levels of public good provision are *uniform* across jurisdictions<sup>1</sup>.

Besley and Coate(2003) and Lockwood(2002) relax *both* of these assumptions simultaneously by supposing that with centralization, local public good provision need not be uniform, and moreover, levels of public good provision are determined by bargaining between regional or district delegates to a legislature. The paper of Besley and Coate(2003) explicitly focusses on whether the decentralization theorem extends to this setting. They find that it does not, due to strategic delegation effects<sup>2</sup>. Specifically, they show that even with identical districts and some public good spillovers, centralization may generate less aggregate surplus than decentralization, because with centralization, voters in a district may have an incentive to vote for a delegate with a higher preference for the public good than their own in order to tilt the balance of public good provision towards their region and away from the other one.

This note asks whether it is really necessary to relax both fundamental assumptions in order to invalidate the decentralization theorem. In one direction, the answer to this

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<sup>1</sup>Oates did not provide a very explicit justification of his assumption in his 1972 book: all he says is that "If public goods are supplied by a central government, one should expect a tendency towards uniformity in public programs across all communities." (p11). But, recently, several different explanations as to why regions might agree ex ante to uniformity at a constitutional stage have been proposed. For example, Harstad(2007) argues that it can prevent wasteful delay in bargaining in the national legislature, and Hindriks and Lockwood(2005) argue that it may constrain rent-seeking politicians.

<sup>2</sup>Note that they only show that the theorem fails in one "direction" i.e. in their model, it is still true that with heterogenous regions and no spillovers, it is still true that decentralization is always preferred.

question is rather trivial. If uniformity is relaxed, while retaining benevolence, then centralization obviously at least weakly dominates decentralization, and strictly dominates unless there are no spillovers. This is also true, quite generally, even if only regional government can observe citizen preferences for the public goods<sup>3</sup>. So, the interesting question<sup>4</sup> is what happens when the benevolence assumption is relaxed (or changed) while retaining policy uniformity.

There are of course, a large number of ways of replacing the benevolence assumption. But, the most interesting of these, because it is so simple and widely used<sup>5</sup>, is to assume that decisions by each level of government are made by majority voting<sup>6</sup>. In other words, to replace the assumption of a benevolent dictator with that of a direct democracy. In this paper, we show that generally, with this simple change, the decentralization theorem fails in both "directions". That is, examples can be found where (i) decentralization welfare-dominates centralization even with externalities and identical preferences across regions, and (ii) centralization welfare-dominates decentralization with no externalities and different preferences across regions.

The intuition is that these are *second-best* results. Either fiscal regime has one source of inefficiency, and at the same time, majority voting has a well-known inefficiency, that it does not measure intensity of preference. This inefficiency can interact with the inefficiencies in the two fiscal regimes in such a way as to overturn the Decentralization Theorem. For example, it is easy to construct examples (see Example 1 below) where the median voter has a higher preference for the public good than the average voter. This tendency towards overprovision offsets the underprovision with decentralization arising from failure to internalize positive externalities, and can make decentralization superior,

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<sup>3</sup>If citizen preferences are linear in the private good, then from standard mechanism design results (e.g. Mas-Collel, Whinston, and Green((1995), p885), it is possible for central government to choose taxes so as induce citizens to truthfully reveal their preferences for the public good, while balancing the budget and without distorting public good supply.

<sup>4</sup>An additional reason why this is the most interesting line of enquiry is that while there is some debate over whether the uniformity assumption is approximated in practice (see e.g. Knight(2004)), there is a certainly a consensus in economics that "benevolent dictators" do not describe real processes of political decision-making.

<sup>5</sup>A very partial list of papers in fiscal federalism that assume majority voting (along with policy uniformity) would include Alesina, Angeloni, and Etro(2005), Alesina and Spolare(1997), Bolton and Roland(1997), (1998), Cremer and Palfrey(1996),(2000), Gilbert and Picard(1996), Oberholzer-Gee and Strumpf(2002).

<sup>6</sup>Note that because we retain the uniformity assumption, a determinate outcome with unrestricted majority voting is assured.

even with externalities and identical preferences. It is somewhat more difficult - but possible - to construct examples (see Example 2 below) where majority voting magnifies the heterogeneity across regions, thus leading to levels of public good provision under decentralization that are too heterogeneous. Then, uniform provision under centralization can dominate, even with no externalities and different preferences across regions.

These results can be contrasted with those of Besley and Coate(2003). In particular, this note shows that it is *not necessary to introduce representative democracy and non-uniformity of public good provision* in order to invalidate the decentralization theorem: direct democracy is enough, even with uniformity. Moreover, the mechanism at work in our setting is completely different than in Besley and Coate. As democracy is direct, there is no strategic delegation by voters. Finally, we get invalidation of the decentralization theorem in both "directions", whereas as already remarked, in their model, with heterogeneous regions and no spillovers, it is still true that decentralization is always preferred.

This paper also considers another popular way of relaxing the benevolence assumption; to assume, following Grossman and Helpman(1994), and Dixit, Grossman and Helpman(1997), that each level of government is benevolent, but also values payments from special interest groups. Again, we retain the assumption of policy uniformity. To avoid trivial results, we are careful to keep the structure of special interest groups the same in the two fiscal regimes. In this case, we also get a failure of the Decentralization Theorem in both directions. The key point is that with special interests, decision-making is too sensitive to the preferences of the organized group. This inefficiency can interact with the inefficiencies in the two fiscal regimes to produce second-best results of a similar kind to with majority voting.

Related literature, other than that already mentioned, is as follows. First, there are a number of well-known papers that, as part of their analysis, compute the outcome with some form of fiscal centralization, assuming policy uniformity to reduce the policy space down to one dimension, and then assuming majority voting (Alesina, Angeloni, and Etro(2005), Alesina and Spolare(1997), Bolton and Roland(1996), (1997), Cremer and Palfrey(1996),(2000), Oberholzer-Gee and Strumpf(2002))). But, the main focus of these papers is typically on more positive issues (e.g. secessions, size of international unions, etc), and so none of these papers specifically deals with the normative issue addressed in this paper.

Second, there is a recent literature on special interest groups and fiscal decentralization (Bardhan and Mookherjee(2000), Bordignon, Colombo, and Galmarini (2003), Redoano(2003), Ruta(2006)). However, again, this literature really focusses on positive issues, such as the number of lobbies and size of lobby payments under different fiscal

regimes. So, the simple point noted in this paper does not seem to have been made before.

The layout of the remainder of this paper is as follows: Section 2 presents the model, Section 3 contains examples and results, and Section 4 concludes.

## 2. The Model

The model is a somewhat more general version of Besley and Coate(2003), henceforth BC. The economy comprises two geographical regions  $i = 1, 2$ . Each is populated by a set of citizens of size unity. There are three goods in the economy, a single private good, and two public goods. Each citizen is endowed with some amount of the private good. One unit of the private good produces one unit of the public good.

Each citizen in district  $i$  is characterized by a public good parameter  $\theta$ . Preferences over the private and public goods for this citizen are given by

$$\theta[(1 - \sigma)v(g_i) + \sigma v(g_j)] + x_i, \quad 0 \leq \sigma \leq 0.5 \quad (2.1)$$

So,  $\sigma$  measures the degree of spillovers<sup>7</sup>. In each district,  $\theta$  has support  $\Theta$  (where  $\Theta$  can be discrete or an interval), and has a mean  $\bar{\theta}_i$  and median  $m_i$ . Unlike BC, we do *not* assume  $\bar{\theta}_i = m_i$ ; this assumption is definitely restrictive, as we show below.

Under a decentralized system,  $g_i$  is chosen by the government of region  $i$ , and public expenditures are funded by a uniform head tax on regional residents. That is, each citizen pays  $g_i$ . Under a centralized system,  $g_1, g_2$  are both determined by a national government. In this case, there is a uniform head tax on all citizens, so each citizen pays  $(g_1 + g_2)/2$  i.e. cost-sharing. So with centralization there is uniformity of both the taxes and expenditures<sup>8</sup>.

Following BC, and most other contributions in this area, we will rank fiscal regimes using the criterion of the sum of utilities, which, due to the quasi-linearity of preferences, is equivalent to aggregate surplus from provision of the public good. That is defined as

$$S(g_1, g_2) = [\bar{\theta}_1(1 - \sigma) + \bar{\theta}_2\sigma]v(g_1) + [\bar{\theta}_2(1 - \sigma) + \bar{\theta}_1\sigma]v(g_2) - (g_1 + g_2) \quad (2.2)$$

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<sup>7</sup>BC assume  $v(g) = \ln g$ .

<sup>8</sup>This last assumption captures in a crude way the widely observed fact that centrally determined tax rates e.g. income tax rates, are the same across regions. Under the assumption of quasi-linear preferences, the assumption is not needed for the Decentralization Theorem to hold, but it is helpful when considering majority voting, as otherwise the policy space is multidimensional and there may be voting cycles.

The efficient level of public good provision that maximizes aggregate surplus therefore satisfies the Samuelson condition

$$[\bar{\theta}_i(1 - \sigma) + \bar{\theta}_j\sigma]v'(g_i^*) = 1 \quad (2.3)$$

### 3. Analysis

#### 3.1. The Decentralization Theorem

We begin by briefly stating our benchmark decentralization theorem. Under decentralization,  $g_i^D$  must maximize the surplus in region  $i$  only, i.e.  $\bar{\theta}_i[(1 - \sigma)v(g_i) + \sigma v(g_j)] - g_i$ , taking  $g_j$  as given. The outcome under decentralization is therefore described by the first-order condition to this problem:

$$\bar{\theta}_i(1 - \sigma)v'(g_i^*) = 1 \quad (3.1)$$

Comparing (2.3) and (3.1), it is obvious that decentralization is generally inefficient because spillovers are not internalized.

Under centralization,  $g_i^C$  must maximize the aggregate surplus(2.2), subject of course to the constraint that  $g_i^C = g_2^C = g^C$ . The outcome under decentralization is therefore given by the first-order condition to this problem:

$$\frac{\bar{\theta}_1 + \bar{\theta}_2}{2}v'(g^C) = 1 \quad (3.2)$$

Comparing (2.3) and (3.2), it is generally the case that centralization is inefficient because uniformity is imposed. So, we can state:

**Proposition 1.** *Suppose that the benevolence and uniformity assumptions are satisfied.*

(i) *If the average preference for the public good is the same in both regions ( $\bar{\theta}_1 = \bar{\theta}_2$ ) and spillovers are present ( $\sigma > 0$ ) a centralized system produces a higher level of surplus than a decentralized system.*

(ii) *If the average preferences are different in both regions ( $\bar{\theta}_1 \neq \bar{\theta}_2$ ), and no spillovers are present ( $\sigma = 0$ ) a decentralized system produces a higher level of surplus than a centralized system.*

As is well-known, as long as the basic benevolence and uniformity assumptions are made, this result is much more general than the model i.e. it does not depend on the specific assumptions made above, e.g. the form of preferences, only two regions, and even the uniform taxation assumption.

### 3.2. Majority Voting and the Decentralization Theorem

We now show that if we replace the assumption of a benevolent policy-maker with decision-making via majority voting over the set of possible public good levels, while retaining the policy uniformity assumption, both parts of the decentralization theorem can fail.

**Example 1:** *Decentralization welfare-dominates centralization with externalities and identical preferences across regions.* Assume  $\theta_i \in \{\theta_l, \theta_h\}$   $\theta_l < \theta_h$  and let  $\lambda > 0.5$  be the share of type- $h$  in region,  $i = 1, 2$ . Then, the median voter is a type- $h$  both in each region and the entire economy.

So, equilibrium public good supply under decentralization in each region must be the most preferred supply of the type- $h$  : that is,  $g_1^D = g_2^D = g^D$  must solve (3.1), except that  $\bar{\theta}_i$  is replaced by  $\theta_h$  :

$$(1 - \sigma)\theta_h v'(g^D) = 1 \quad (3.3)$$

As the median voter is high-preference in the whole economy, equilibrium public good supply with centralization must be the most preferred supply of the type- $h$  citizen, taking into account the uniformity constraint  $g_1 = g_2$ , which forces the median voter to internalize the spillover. That is,  $g^C$  must solve (3.2), where  $\bar{\theta}_1, \bar{\theta}_2$  are replaced by  $\theta_h$ ;

$$\theta_h v'(g^C) = 1 \quad (3.4)$$

Finally, from (2.3), efficient supply is

$$\bar{\theta} v'(g^*) = 1, \quad \bar{\theta} = \lambda\theta_h + (1 - \lambda)\theta_l \quad (3.5)$$

Now assume that  $(1 - \sigma)\theta_h = \bar{\theta}$  : then  $g^D = g^* < g^C$  : in this case, decentralization must generate higher aggregate surplus than centralization.  $\square$

The intuition is that majority voting biases the outcome in the direction of too high a level of the public good: this offsets the bias in the direction of too low a level of the public good with decentralization, making it more efficient.

To get an example where the opposite can occur, i.e. where centralization welfare-dominates decentralization with no externalities and different preferences across regions is considerably more work. The following example is constructed so that the median voter in each region is an "extremist". Thus, under decentralization, public good provision is too heterogenous across regions. Of course, under centralization, public good provision is too uniform across regions. But under some conditions, excessive heterogeneity can be worse than excessive uniformity.

**Example 2:** *Centralization welfare-dominates decentralization with no externalities and different preferences across regions.* Assume  $\theta \in \{\gamma - \delta, \gamma, \gamma + \delta\}$ . Call these preferences



low, medium, high ( $L, M, H$ ) respectively. In region 1, the shares of population with  $L, M, H$  are  $\frac{1+\varepsilon}{2}, \frac{1-\varepsilon}{2}, 0$  respectively. In region 2, the shares of population with  $L, M, H$  are  $0, \frac{1-\varepsilon}{2}, \frac{1+\varepsilon}{2}$ , where  $\varepsilon < 1$ . Moreover, the utility functions<sup>9</sup> are

$$\begin{aligned} u(g, \theta) &= g(1 + \theta) - \frac{g^2}{2}, \quad \theta = \gamma - \delta, \gamma + \delta \\ u(g, \theta) &= g(1 + \theta) - \frac{g^4}{4}, \quad \theta = \gamma \end{aligned} \quad (3.6)$$

Note that  $M$  agents care more about deviations from their ideal point,  $\gamma$ , than do  $L$  or  $H$  agents.

The equilibrium supplies with decentralization are easy to find. In region 1, the L-type is the median voter, so his most preferred level of public good provision is chosen i.e. the maximizer of  $u(g_1, \gamma - \delta) - g_1$ , implying from (3.6),  $g_1^D = \gamma - \delta$ . In region 2, the H-type is the median voter, so his most preferred level of public good provision is chosen, which in the same way, can be calculated at  $g_2^D = \gamma + \delta$ .

With centralization, as  $\varepsilon < 1$ , overall, the  $M$  type is the median voter, so his most preferred level of public good provision  $g_1 = g_2 = g$  is chosen. This maximizes  $u(g, \gamma) - g$ , i.e.  $g^C = \gamma$ .

We now need to show that  $g^C, g^C$  yields higher aggregate surplus than  $g_1^D, g_2^D$ . Surpluses in regions 1 and 2 are  $S_1(g_1), S_2(g_2)$  where

$$\begin{aligned} S_1(g) &= \frac{1+\varepsilon}{2}[(\gamma - \delta) - \frac{g^2}{2}] + \frac{1-\varepsilon}{2}[g\gamma - \frac{g^4}{4}] \\ S_2(g) &= \frac{1+\varepsilon}{2}[(\gamma + \delta) - \frac{g^2}{2}] + \frac{1-\varepsilon}{2}[g\gamma - \frac{g^4}{4}] \end{aligned}$$

So, we need to show that  $S_1(\gamma) + S_2(\gamma) > S_1(\gamma - \delta) + S_2(\gamma + \delta)$ . Because of symmetry of the model,  $S_1(\gamma) = S_2(\gamma)$ ,  $S_1(\gamma - \delta) = S_2(\gamma + \delta)$ , so it is sufficient to show  $S_1(\gamma) > S_1(\gamma - \delta)$ .

Note that there are two opposing forces determining the relative size of  $S_1(\gamma) - S_1(\gamma - \delta)$ . First, L-agents are in a majority, and they get what they want with decentralization. Opposing this is the fact that M-agents dislike deviations from their ideal point,  $\gamma$ , more than do L-agents. This latter intensity of preference is not taken into account by majority voting, but for a wide range of parameter values, dominates the first effect, implying that  $S_1(\gamma) > S_1(\gamma - \delta)$ .

This is shown in Table 1 below, where we allow the two key parameters, the size of the majority of the extreme -preference agents,  $\varepsilon$ , and the difference in ideal points,  $\delta$ , to vary.

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<sup>9</sup>These utility functions do not quite fit the form (2.1), but the Decentralization Theorem certainly holds for preferences of the form (3.6).

Table 1: Welfare under Different Fiscal Regimes

$\delta$	0.5	0.9	0.1	0.5	0.5	0.5
$\varepsilon$	0.1	0.1	0.1	0.2	0.3	0.4
$S_1(\gamma)$	0.338	0.118	0.558	0.300	0.263	0.225
$S_1(\gamma - \delta)$	0.287	0.048	0.554	0.269	0.251	0.233

This table indicates that quite uniformly, centralization is welfare preferred: decentralization only dominates when  $\varepsilon = 0.4$  i.e. nearly 70% of the citizens in each region are extremists.  $\square$

So, we have seen that the Decentralization Theorem may fail in both "directions" when utility-maximisation is replaced by majority voting. But, careful inspection of both examples reveals that in each case, preferences within a region are asymmetrically distributed, so that  $\bar{\theta}_i \neq m_i$ . One might guess that with a symmetric distribution of preferences within each region, Proposition 1 might continue to hold even with majority voting, and this is indeed the case. To prove this, just note first that with either fiscal regime, the outcome under majority voting is the same as that with utility maximization. So, we can state:

**Proposition 2.** *Suppose that the benevolence assumption is replaced by decision making by majority voting. Then the Decentralization Theorem continues to hold if  $\bar{\theta}_i = m_i$ ,  $i = 1, 2$ .*

At this point, more comparison with BC's results might be helpful. First, our model in this section is one of direct, rather than representative, democracy: the latter is assumed in BC. Moreover, BC assume  $\bar{\theta}_i = m_i$ ,  $i = 1, 2$ . So, the overall conclusion is that if preference distributions are asymmetric, the Decentralization Theorem can fail even with direct democracy, due to "second-best" effects, but if preference distributions are symmetric, the Decentralization Theorem can only fail with representative democracy, due to "strategic delegation" effects.

### 3.3. Special Interests and the Decentralization Theorem

We now modify the assumption of a benevolent policy-maker in a different way. We continue to assume that the policy-maker maximises the sum of utilities of the citizens in his jurisdiction, but we now assume that some of the citizens in each jurisdiction are organized into a special interest group (SIG). We model the influence of the SIG using

the well-known common agency model of lobbying (Grossman and Helpman(1994), Dixit, Grossman and Helpman(1997)).

In this case, the appropriate welfare criterion is more problematic: should the welfare of the policy-maker be included in any way when evaluating regimes? Previously, the use of total surplus as a criterion implies that only the welfare of citizens matters, and so for consistency, we also assume that here. This means that the welfare of the SIG must be calculated net of any contributions made in equilibrium.

The key point is that with special interests, the preferences of the organized group are overrepresented. This inefficiency can interact with the inefficiencies in the two fiscal regimes in such a way as to overturn the Decentralization Theorem, again, a kind-of second-best result. Again, we show that the Decentralization Theorem fails in both directions by presenting two examples.

**Example 3:** *Decentralization welfare-dominates centralization with externalities and identical preferences across regions.* There are two preference groups in the population, i.e.  $\theta_i \in \{\theta_l, \theta_h\}$ ,  $\theta_l < \theta_h$  and  $\lambda_i$  is the share of type- $h$  in region  $i$ , with  $\lambda_1 = \lambda_2 = \lambda$ . In each region, group  $h$  is organized as a SIG and group  $l$  is not i.e. there are two SIGs, one in each region. Efficient supply of the public good is the same in both regions, and is given by

$$(\lambda\theta_h + (1 - \lambda)\theta_l) \theta v'(g^*) = 1 \quad (3.7)$$

Equilibrium supply under decentralization is as follows . Let  $u_{i,j} = \theta_j[(1 - \sigma)v(g_i) + \sigma v(g_j)] - g_i$ ,  $j = h, l$ . The policy-maker in  $i$  is benevolent i.e. maximises aggregate surplus in region  $i$ ,  $\lambda u_{i,h} + (1 - \lambda)u_{i,l}$  but also takes contributions  $c_i$  from the special interest group<sup>10</sup> in  $i$ , which he weights at  $\gamma$ . The equilibrium<sup>11</sup> contribution of this group can be calculated (see Dixit, Grossman and Helpman(1997), and it is well-known that given the equilibrium contribution, the policy-maker then maximizes aggregate surplus in region  $i$ , plus  $\gamma\lambda u_{i,h}$  i.e.

$$\lambda(1 + \gamma)u_{i,h} + (1 - \lambda)u_{i,l} \quad (3.8)$$

taking  $g_j$  as given. Given that both regions are the same, it can easily be calculated that the  $g^D$  that maximises (3.8) solves

$$\frac{(1 - \sigma)(\lambda(1 + \gamma)\theta_h + (1 - \lambda)\theta_l)}{\lambda(1 + \gamma) + 1 - \lambda} v'(g^D) = 1 \quad (3.9)$$

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<sup>10</sup>So, we assume that a SIG in one region cannot lobby the policy-maker in another region. For a model where such "cross-regional lobbying" can occur, see Bordignon, Colombo, and Galmarini (2003).

<sup>11</sup>Here and what follows, by "equilibrium" we mean the (unique) equilibrium in truthful or compensating contributions (Dixit, Grossman and Helpman(1997)).

Finally, the equilibrium contribution fully compensates the policy-maker for the deviation from  $g^*$  in (2.3). In the case of one SIG, it is well-known that this contribution (denoted  $c_D$ ) is the money equivalent of the loss in welfare for the policy-maker from setting  $g^D$  instead of  $g^*$ . Note for future reference that if  $\gamma \rightarrow \infty$ , so that the policy-maker puts a very high weight on money payments, then  $c_D \rightarrow 0$ .

Equilibrium with centralization is as follows. The structure of the SIGs is the same as with decentralization i.e. the  $h$ -types are organized separately in each region. But now, each makes an independent contribution  $c_1, c_2$  to the national policy-maker. This policy-maker is benevolent i.e. maximizes  $\sum_{i=1,2} \lambda u_{i,h} + (1 - \lambda)u_{i,l}$  but also weights total contributions  $c_1 + c_2$  at  $\gamma$ . The equilibrium contribution of each group can be calculated, and it is well-known that given the equilibrium contribution, the policy-maker then maximizes

$$\sum_{i=1,2} \lambda(1 + \gamma)u_{i,h} + (1 - \lambda)u_{i,l}$$

subject to  $g_1 = g_2 = g$ . The solution  $g^C$  to this problem solves

$$\frac{(\lambda(1 + \gamma)\theta_h + (1 - \lambda)\theta_l)}{\lambda(1 + \gamma) + 1 - \lambda} v'(g^C) = 1 \quad (3.10)$$

Note from (3.7)-(3.10), that  $g^C > g^* > g^D$ . that is, with centralization, there is oversupply, due to the influence of the SIG.

Now, assume that  $(1 - \sigma)\theta_h = \bar{\theta}$ : then, for  $\gamma \rightarrow \infty$ ,  $g^D \simeq g^* < g^C$ , and as just argued,  $c_D \rightarrow 0$ . So, as SIG contributions under centralization are non-negative, decentralization welfare-dominates for  $\gamma$  high enough.  $\square$

Note that the intuition behind the example is very similar to Example 1: namely, lobbying biases the outcome in the direction of too high a level of the public good: this offsets the bias in the direction of too low a level of the public good with decentralization, making decentralization more efficient than centralization.

**Example 4:** *Centralization welfare-dominates decentralization with no externalities and different preferences across regions.* This is like Example 3, except:  $\sigma = 0$ ,  $\lambda_1 > \lambda_2 = 0.5$ , and the  $h$ -types are only organized in a SIG in region 2. Note that because there is only one SIG in each fiscal regime, for  $\gamma$  high enough, the contributions by the SIG will be vanishingly small, and we can ignore them and just focus on aggregate surplus (2.2) when comparing welfares under the two regimes.

Efficient supply is again given by (3.7). Following the argument of Example 3, and recalling that  $\lambda_2 = 0.5$ ,  $\sigma = 0$ , equilibrium supply under decentralization is

$$(\lambda_1\theta_h + (1 - \lambda_1)\theta_l) v'(g_1^D) = 1, \quad \frac{(1 + \gamma)\theta_h + \theta_l}{2 + \gamma} v'(g_2^D) = 1 \quad (3.11)$$

Supply is efficient in region 1 i.e.  $g_1^D = g_1^*$ , as no SIG is organized there. Also, assume that  $\frac{1+\gamma}{2+\gamma} = \lambda_1$ , i.e. the lobby power of  $h$ -types in region 2 just offsets their reduced numbers relative to region 1. Then from (3.7,3.11),  $g_1^D = g_2^D = g^D = g_1^*$ .

Equilibrium with centralization is as follows. The policy-maker is benevolent but also takes contributions  $c_2$  from the special interest group in region 2 only, which he weights at  $\gamma$ . So, following the argument of Example 3, and recalling that  $\lambda_2 = 0.5$ ,  $\sigma = 0$ ,  $g^C$  must maximize

$$\lambda_1 u_{1,h} + (1 - \lambda_1) u_{1,l} + 0.5(1 + \gamma) u_{2,h} + 0.5 u_{2,l}.$$

The first-order condition is

$$\frac{(\lambda_1 + 0.5(1 + \gamma))\theta_h + (1 - \lambda_1 + 0.5)\theta_l}{2 + 0.5\gamma} v'(g^C) = 1 \quad (3.12)$$

So, by comparing (3.11), (3.12), we see that  $g_2^* < g^C < g^D = g_1^*$ . That is, expenditure is uniform under both fiscal regimes, but with centralization, the outcome is strictly between the optimal levels in the two regions.

We can now show that welfare is higher with centralization. Note from (2.3) that aggregate surplus from an arbitrary uniform level of provision  $g$  is proportional to:

$$S(g, g) = ((\lambda_1 + 0.5)\theta_h + (1 - \lambda_1 + 0.5)\theta_l)v(g) - 2g \quad (3.13)$$

This is concave in  $g$ , and by inspection of (3.12),(3.13), has a maximum at  $\hat{g}$ ,  $\hat{g} < g^C < g^D$ . So, it follows immediately that  $S(g^C, g^C) < S(g^D, g^D)$  for all  $\gamma$ , which is the required result.  $\square$

One question which then arises is whether there is a simple condition (similar to that in Proposition 2) such that the decentralization theorem holds, even with lobbying. There is such a condition, which is that both preference groups in each region are organized into separate SIGs. Then, taking into account contributions, the policy-maker in  $i$  under decentralization maximizes

$$\lambda(1 + \gamma)u_{i,h} + (1 - \lambda)(1 + \gamma)u_{i,l}$$

which is just a linear transformation of total surplus in region  $i$ , and thus he will behave just like a benevolent policy-maker. A similar argument applies under centralization. So, we can state:

**Proposition 3.** *Suppose that the benevolence assumption is replaced by decision making by a benevolent policy-maker subject to lobbying by SIGs. Then the Decentralization Theorem continues to hold if both preference groups are organized into SIGs in each region.*

## 4. Conclusions

This paper has revisited the fiscal "decentralization theorem", by relaxing the role of the assumption that governments are benevolent, while retaining the assumption of policy uniformity. We find that if instead, decisions are made by direct majority voting, (i) centralization can welfare-dominate decentralization even if there are no externalities and regions are heterogeneous; (ii) decentralization can welfare-dominate centralization even if there are positive externalities and regions are homogeneous. The intuition is that the insensitivity of majority voting to preference intensity interacts with the different inefficiencies in the two fiscal regimes. Thus, strategic delegation effects are not necessary to invalidate the theorem. But, these counter-examples do depend on asymmetric preference distributions within regions: when the mean and median willingness to pay is the same within every region, the decentralization theorem generalizes to majority voting. Similar results obtain when governments are benevolent, but subject to lobbying.

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