

DISCUSSION PAPER SERIES

No. 3631

**THE POLITICAL ECONOMY OF
POLICY CENTRALIZATION: DIRECT
VERSUS REPRESENTATIVE
DEMOCRACY**

Michela Redoano and Kimberley Ann Scharf

PUBLIC POLICY



Centre for Economic Policy Research

www.cepr.org

Available online at:

www.cepr.org/pubs/dps/DP3631.asp

THE POLITICAL ECONOMY OF POLICY CENTRALIZATION: DIRECT VERSUS REPRESENTATIVE DEMOCRACY

Michela Redoano, University of Warwick
Kimberley Ann Scharf, University of Warwick and CEPR

Discussion Paper No. 3631
November 2002

Centre for Economic Policy Research
90–98 Goswell Rd, London EC1V 7RR, UK
Tel: (44 20) 7878 2900, Fax: (44 20) 7878 2999
Email: cepr@cepr.org, Website: www.cepr.org

This Discussion Paper is issued under the auspices of the Centre's research programme in **PUBLIC POLICY**. Any opinions expressed here are those of the author(s) and not those of the Centre for Economic Policy Research. Research disseminated by CEPR may include views on policy, but the Centre itself takes no institutional policy positions.

The Centre for Economic Policy Research was established in 1983 as a private educational charity, to promote independent analysis and public discussion of open economies and the relations among them. It is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions. Institutional (core) finance for the Centre has been provided through major grants from the Economic and Social Research Council, under which an ESRC Resource Centre operates within CEPR; the Esmée Fairbairn Charitable Trust; and the Bank of England. These organizations do not give prior review to the Centre's publications, nor do they necessarily endorse the views expressed therein.

These Discussion Papers often represent preliminary or incomplete work, circulated to encourage discussion and comment. Citation and use of such a paper should take account of its provisional character.

Copyright: Michela Redoano and Kimberley Ann Scharf

ABSTRACT

The Political Economy of Policy Centralization: Direct Versus Representative Democracy*

This Paper analyses policy centralization outcomes in a two-jurisdiction model of public good provision choices with heterogeneous policy preferences and inter-jurisdictional policy spillovers under two alternative political procedures: direct referendum and representative democracy. We show that policy centralization is more likely to occur if the choice to centralize is made by elected policymakers rather than by referendum. In these situations, centralized policies converge to the preferred level of the jurisdiction that least favours centralization, rather than to a compromise between the two jurisdictions' preferred levels.

JEL Classification: H00, H20 and H70

Keywords: centralization and harmonization

Michela Redoano
Department of Economics
University of Warwick
Coventry
CV4 7AL
Tel: (44 2476) 523 474
Fax: (44 2476) 523 032
Email: m.redoano-coppede@warwick.ac.uk

Kimberley Ann Scharf
University of Warwick
Department of Economics
Coventry
CV4 7AL
Tel: (44 2476) 523 742
Fax: (44 2476) 523 032
Email: k.scharf@warwick.ac.uk

For further Discussion Papers by this author see:
www.cepr.org/pubs/new-dps/dplist.asp?authorid=157746

For further Discussion Papers by this author see:
www.cepr.org/pubs/new-dps/dplist.asp?authorid=127385

*The first draft of this Paper was prepared in February 1999.

Submitted 27 September 2002

I Introduction

Different countries adopt different political procedures to determine whether or not to participate in policy coordination agreements. Entry into the European Union was put to a popular vote (referendum) in Scandinavian countries, whereas in some larger European countries it has remained a matter for the national government or legislature to deliberate on. Whether voters should have a direct input into the choice to participate in international agreements is still hotly debated—a current example being the political battle in the UK over participation in the European Monetary Union.

This paper compares direct and representative democracy with respect to their implications for policy centralization. We describe a two-jurisdiction model of public good provision choices with heterogeneous individuals and interjurisdictional policy spillovers. These are modelled as positive cross-boundary externalities stemming from locally provided public goods, which are funded by a general tax paid by residents. Individuals differ with respect to their intensity of preferences for public consumption, and disagreement within jurisdictions is resolved by majority voting over political candidates. Spillovers can be internalized by policy centralization, which—consistently with recent literature on union formation—is modelled here in terms of policymakers in the two jurisdictions each being appointed to select a common tax for both jurisdictions with equal probability.

The process of policy centralization under a referendum system is represented as a three-stage game: citizens in each region first decide whether or not to centralize by referendum, with centralization occurring if a majority of voters in each region support it; then, following the outcome of the centralization decision at the previous stage, citizens elect candidates to represent them; finally, the elected policymakers make policy choices, either noncooperatively or cooperatively depending on the outcome of the referendum. In contrast, under representative democracy policy centralization involves citizens delegating the policy centralization decision to elected policymakers: first, citizens in both regions elect a representative; then, elected policymakers decide whether or not to centralize policy making, with centralization occurring if policymakers in both regions opt for it; finally, the elected policymakers make policy choices, either noncooperatively or cooperatively depending on their earlier centralization choices.

If the majorities of both jurisdictions share the same policy preferences, policy centralization will (trivially) occur under either procedure. But when the two jurisdictions are dominated by majorities with different policy preferences, and if the divergence in

policy preferences is large enough, policy centralization may not take place. With heterogeneous majorities in the two jurisdictions, direct and representative democracy fare differently as a means of supporting policy centralization. Specifically, we show that policy centralization is more likely to occur if the choice to centralize policy making remains with elected policymakers rather than being taken by direct referendum. In other words, representative democracy can support policy centralization even when the difference in policy preferences across jurisdictions makes it impossible to achieve centralization by referendum.¹

The reason for this result is that, in a representative democracy, voters in a jurisdiction can induce another jurisdiction to centralize policies by electing a representative that is of the same type as the majority in that jurisdiction. In this way, a pro-centralization jurisdiction can—and may find it attractive to—induce cooperation by a jurisdiction that would not otherwise agree to centralize policies (a ‘reluctant partner’). Thus, delegation of centralization choices to policymakers can act as a policy commitment device by a pro-centralization jurisdiction, making centralization possible. A feature of representative democracy that has been highlighted by the recent literature on citizen-candidate voting models (Osborne and Slivinski, 1996; Besley and Coate, 1997) is that elected policymakers cannot credibly commit to a platform that is not consistent with their own policy preferences. Here voters can actually exploit the inability of policymakers to deviate from their own preferred choice in order to achieve commitment under delegation. While the idea that delegation can be used strategically under noncooperation is not new, its application to the delegation of coordination decisions is—as far as we can tell—new.²

As a corollary of this result, when only representative democracy makes it possible to support policy centralization it will result in policies converging towards the choice preferred by the reluctant partner, rather than in a ‘dilution’ (averaging) of policy preferences as predicted by earlier analyses of union formation such as Besley and Coate (1998b). If this occurs, however, the jurisdiction gaining from policy coordination will be the accommodating partner, not the partner whose preferences are prevailing: by electing a representative of the same type as the majority in the reluctant jurisdiction, the majority in the accommodating jurisdiction can force an outcome which they prefer to noncooperation, with the reverse possibly being the case for the reluctant partner. Nevertheless, we show that even when the centralization mechanism is inflexible—giving equal decision-making weight to each partner, with no bargaining being possible over this arrangement—in some situations a move from referendum to a representative

system can raise welfare for all individuals in both jurisdictions. Thus, where policy centralization choices are involved, it is possible that the citizens' interest may be better served by elected representatives than by a direct referendum.

The predictions of our model are consistent with the European experience, where the decisions taken by governments on policy centralization (e.g. joining ECC, EU, EEA, EMU, or ratifying other treaties) have not always appeared to be supported by a majority of voters.³ Evidence at the local government level is also consistent with this. In an empirical study testing the predictions of the theoretical model we describe here, Feld and Schaltegger (2001) show that the degree of centralization is lower in a referendum regime than in a regime where budgetary decisions are only taken by representatives.⁴

The remainder of our paper is structured as follows: In Section II, we describe the economic environment and policy outcomes under both noncooperation and policy centralization; in Section III and Section IV we analyze policy centralization outcomes under direct democracy and representative democracy respectively; Section V provides a comparison of the two procedures on welfare grounds, and discusses the implications of bargaining over central decision-making rules; Section VI explores the implications of interjurisdictional asymmetries; Section VII presents our conclusions and discusses possible extensions.

II Technology, preferences, and policy outcomes

We cast our argument in a stylized two-region model of public provision choices with interjurisdictional spillovers, where policy preferences are heterogeneous in the population and policymakers are elected by majority voting. For simplicity, we model spillovers as a direct positive cross-border externality from local public good provision, although our arguments and proofs also apply, with some modification, to situations where the policy externality is indirect—such as is the case, for example, with interjurisdictional tax competition. This section will describe the economic environment and policy outcomes with and without policy centralization, for given types of policymakers in two regions. The analysis of political equilibria and centralization outcomes follows in later sections.

II.1 The economic environment

Consider two independent regions of identical population size, n , indexed by $i = A, B$. Within each region all individuals have identical income levels (normalized to unity)

and consume a private good and a public good or service.

Output in the i th region, Y_i , is produced from labour, which is inelastically supplied by each individual in an amount equal to unity. The production technology is assumed to be linear in total labour inputs, and without loss of generality, units are normalized so that the wage rate is unity, i.e., $Y_A = Y_B = n$. Output in region i is used for private consumption and for the *local* provision of the public good. The marginal rate of transformation between the private good and the public good in production is assumed to be the same across regions and, without loss of generality, equal to unity.

In each region, local public good provision, g_i , is funded by a proportional income tax levied at rate t_i , which is assumed to be the only fiscal instrument available in each region.⁵ The level of private consumption for an individual residing in jurisdiction i is then

$$c_i = 1 - t_i, \quad i = A, B, \tag{1}$$

and public good provision in each jurisdiction is

$$g_i = nt_i, \quad i = A, B. \tag{2}$$

The total amount of public consumption available in region i will not generally coincide with the amount locally provided, because of the presence of inter-regional spillovers. We assume the positive spillover experienced by residents in a certain region simply to be proportional to the level of public provision in the other region by a factor $\gamma \in (0, 1)$.⁶ Thus, *effective* public consumption in each jurisdiction is

$$S_i = g_i + \gamma g_j, \quad j \neq i. \tag{3}$$

This formulation provides a very stylized (and tractable) representation of interjurisdictional policy spillovers. Assuming equal size and symmetric spillovers between the two jurisdictions also improves tractability. (The implications of asymmetries are discussed in Section VI.)

Even though population size is the same size across regions, populations may differ with respect to their preferences for private and public consumption. These preferences are represented by a quasilinear utility function

$$u(c_i, S_i | \theta) = c_i + \theta S_i^\eta, \quad \theta \in \{\underline{\theta}, \bar{\theta}\}, \quad i = A, B. \tag{4}$$

with $\eta \in (0, 1)$ and $\theta > 0$.⁷ This specification implies a constant value for the elasticity of the marginal valuation for the public good equal to $\eta - 1 < 0$.⁸

Preference heterogeneity can then be captured simply by assuming that there exist two individual types, each characterized by a preference parameter θ , with $\theta \in \{\underline{\theta}, \bar{\theta}\}$ and $\bar{\theta} \geq \underline{\theta}$.

11.2 Noncooperative policy outcomes

In the absence of cooperation, taxes in jurisdiction i are chosen by elected policymakers in that region, who maximize their own utility given the other region's choice of tax rate and subject to conditions (1)-(3). Let $\theta_i^N \in \{\underline{\theta}, \bar{\theta}\}$ represent the policymaker's type in jurisdiction i under decentralization (the superscript N denotes a noncooperative scenario). Then, solution to the above problem yields best-response functions

$$t_i^*(t_j | \theta_i^N) = \alpha(\theta_i^N)^{1/(1-\eta)}/n - \gamma t_j, \quad j \neq i, \quad (5)$$

where $\alpha = (\eta n)^{1/(1-\eta)}$. The first term on the right-hand side of the above expression reflects the policy preferences of the policymaker—the stronger the policymaker's preference for public consumption, the higher the tax—as well as the private opportunity cost of local public good provision—which is decreasing with population size—while the second term reflects how easily the policymaker can free-ride on the other region—the higher the degree of spillover and the larger the amount provided in a region, the lower the preferred tax in the other region. Also note that

$$S_i^N(\theta_i^N, \theta_j^N) = n [t_i^*(t_j, \theta_i^N) + \gamma t_j] = \alpha(\theta_i^N)^{1/(1-\eta)}, \quad j \neq i. \quad (6)$$

Thus, while the policy choice in each jurisdiction depends on the policy choice in the other, the effective level of public consumption in a given jurisdiction is independent from the taxes selected by the other.

A noncooperative equilibrium is represented by tax rates, $t_i^N(\theta_A^N, \theta_B^N)$, $i = A, B$, that are best responses to each other. With a constant-elasticity marginal valuation for public consumption, (5) can be solved to obtain explicit expressions:

$$t_i^N(\theta_i^N, \theta_j^N) = \frac{\alpha}{n(1-\gamma^2)} [(\theta_i^N)^{1/(1-\eta)} - \gamma(\theta_j^N)^{1/(1-\eta)}], \quad j \neq i. \quad (7)$$

When both policymakers are of the same type, noncooperative equilibrium tax rates are also identical across regions (with higher taxes if the policymakers are of the high-preference type than if they are of the low-preference type). If policymakers are of different types, then the region with the higher-preference policymaker will have a higher tax rate in equilibrium.⁹

Noncooperative equilibrium payoffs, as experienced by individuals of type $v_i \in \{\underline{\theta}, \bar{\theta}\}$ residing in jurisdiction i , are

$$\Pi_i^N(\theta_i^N, \theta_j^N | v_i) = 1 - t_i^N(\theta_i^N, \theta_j^N) + v_i S_i^N(\theta_i^N)^\eta, \quad j \neq i. \quad (8)$$

II.3 Policy outcomes under centralization

We shall assume that when policymaking is centralized the policymaker of each region is appointed to select a common tax for both jurisdictions with a probability of 1/2 (as in Besley and Coate (1998b)).¹⁰ A policymaker of type θ^C will then select a common tax $t = t_A = t_B$ so as to maximize

$$1 - t + \theta^C [(1 + \gamma)nt]^\eta. \quad (9)$$

Solution to the above problem yields the preferred harmonized rate for a policymaker of type θ^C as

$$t^C(\theta^C) = \frac{\alpha(1 + \gamma)^{\eta/(1-\eta)}}{n} (\theta^C)^{1/(1-\eta)}. \quad (10)$$

This yields a level of public good consumption equal to

$$S^C(\theta^C) = (1 + \gamma)nt^C(\theta^C) = \alpha[(1 + \gamma)\theta^C]^{1/(1-\eta)}. \quad (11)$$

Expected payoffs as experienced by individuals of type $v_i \in \{\underline{\theta}, \bar{\theta}\}$ residing in jurisdiction i , if policymakers of types θ_i^C, θ_j^C are elected in i and in $j \neq i$, are

$$\Pi_i^C(\theta_i^C, \theta_j^C | v_i) = \left[2 - t^C(\theta_i^C) - t^C(\theta_j^C) + v_i \left(S^C(\theta_i^C)^\eta + S^C(\theta_j^C)^\eta \right) \right] / 2, \quad j \neq i. \quad (12)$$

III Centralization by direct referendum

Under direct democracy the decision to centralize policy is taken by direct referendum rather than being delegated to elected representatives, and policymakers cannot renege on a coordination agreement once it is in force. We model this case as a three-stage game. In the first stage, voters in each region decide, by majority voting, whether or not the region should agree to centralize policy; for centralization to occur, it must be supported by a majority of voters in both regions. In the second stage, voters elect representatives, again by majority voting. In the third stage, the elected representatives in both regions select policies, either noncooperatively or cooperatively depending on whether or not policy is centralized.

Focusing on subgame-perfect equilibria, we analyze the game backwards, starting from the second stage (the last stage has been examined in the previous section). At this stage, voters in the two regions choose between high-preference type and low-preference type candidates.¹¹ In the rest of our analysis, we shall assume, without loss of generality, that the majority of individuals in region A (the *high-preference region*) are individuals with high-type preferences and the majority in region B (the *low-preference region*) are individuals with low-type preferences.

If in the first stage of the game the majorities of both regions have chosen to support policy centralization, then, in the second stage, the majority in each region can do no better than electing a candidate of their own type; thus, the elected policymaker in A will be a high-type individual and the elected policymaker in B will be a low-type individual (proofs are in the Appendix):

Lemma 1: Under direct referendum and policy centralization, the elected policymaker in each jurisdiction, in a voting equilibrium involving weakly undominated strategies, will be of the same type as the majority in that jurisdiction.

Without policy centralization, however, the representatives elected in the two jurisdictions will not be necessarily be of the same type as the majorities' types in their respective jurisdictions. Once centralization has been rejected, the majorities in both regions decide whom to elect by comparing the noncooperative payoffs when voting for a policymaker of their own type and when voting for a policymaker that is not of their own type. These comparisons are, in our model, independent of the type of policymaker in the other region,¹² and are represented by the differences $\Pi_A^N(\bar{\theta}, \theta_B^N | \bar{\theta}) - \Pi_A^N(\underline{\theta}, \theta_B^N | \bar{\theta}) \equiv \Delta_A$ and $\Pi_B^N(\underline{\theta}, \theta_A^N | \underline{\theta}) - \Pi_B^N(\bar{\theta}, \theta_A^N | \underline{\theta}) \equiv \Delta_B$, for the majorities in A and B respectively, where θ_A^N, θ_B^N represent the policymakers' types in the two jurisdictions. Note that both expressions are zero if $\bar{\theta} = \underline{\theta}$. Furthermore, Δ_B is monotonically increasing in $\bar{\theta}$, implying $\Delta_B \geq 0$.¹³ Thus, electing a low-preference type representative is a dominant strategy for the majority in the low-preference region B . In contrast, the corresponding difference for the high-preference jurisdiction, Δ_A , can be positive or negative, depending upon both the amount of preference heterogeneity and the absolute value of elasticity of the marginal valuation for the public good (represented by $1 - \eta$) relative to the square of the spillover parameter (γ^2). A relatively inelastic marginal valuation for public consumption (a relatively small $1 - \eta$) in the high-preference region will facilitate free-riding by the low-preference region. The majority in the high-preference region can prevent excessive free-riding by the other region

by voting for a low-preference candidate, and, when $1 - \eta - \gamma^2 \leq 0$, will always do so independently of the amount of preference heterogeneity. They may also do this when the elasticity of the marginal valuation for public consumption is small in absolute value compared to the spillover parameter, but there is little preference heterogeneity across types. However, when preference heterogeneity is large, the high-preference majority in A will be willing to allow the other jurisdiction to free-ride in order to secure a sufficiently high level of public consumption, and will elect a high-preference representative.

Lemma 2: Under direct referendum and no policy centralization, the elected representative in the low-preference region will always be a low-preference individual. (i) if $1 - \eta - \gamma^2 \leq 0$ the elected representative in the high-preference jurisdiction is a low-preference individual; (ii) if $1 - \eta - \gamma^2 > 0$, then, for any $\underline{\theta}$, there exists a $\bar{\theta}' > \underline{\theta}$ such that for $\bar{\theta} \in [\underline{\theta}, \bar{\theta}')$ the elected representative in high-preference region is a low-preference individual, and for $\bar{\theta} \geq \bar{\theta}'$ the elected representative in the high-preference region is a high-preference individual.

When the majorities in the two jurisdictions are of the same type ($\bar{\theta} = \underline{\theta}$), they will prefer centralization to decentralization. It is evident upon comparing condition (7) with (10) that policy centralization leads to higher tax rates, and a higher common payoff, than decentralized policy making, i.e., and no disagreement will occur under a symmetric centralization rule when there is no preference heterogeneity. When the majorities in the two jurisdictions are of different types, however, whether policy centralization can improve the payoffs of both regions' majorities again depends upon the amount of preference heterogeneity.

The majority in a region will support centralization in the first stage of the game if this yields a higher continuation payoff than decentralization does. Focusing first on the low-preference region, if the elected representative in the high-preference region under noncooperation is of the high-preference type ($\Delta_A \geq 0$), then, because of Lemmas 1 and 2, the relevant comparison between cooperative and noncooperative payoffs for the majority in B is

$$\Pi_B^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) - \Pi_B^N(\underline{\theta}, \bar{\theta} | \underline{\theta}) \equiv \hat{\Omega}_B; \quad (13)$$

whereas if a low-preference representative is elected in A under noncooperation ($\Delta_A < 0$), the relevant comparison is

$$\Pi_B^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) - \Pi_B^N(\underline{\theta}, \underline{\theta} | \underline{\theta}) \equiv \tilde{\Omega}_B. \quad (14)$$

For a given $\underline{\theta}$, let $\hat{\theta}$ and $\tilde{\theta}$ be the values of $\bar{\theta}$ (if they exist) that respectively make (13) and (14) equal to zero.

It can be shown that if preference heterogeneity is sufficiently small, then the majority in the low preference region prefer cooperation to noncooperation, but if preference heterogeneity is large, the majority in the low-preference region prefer noncooperation to cooperation:

Lemma 3: *Under direct referendum, for any given $\underline{\theta}$ there exist a $\bar{\theta}^D = \max\{\hat{\theta}, \min\{\bar{\theta}', \tilde{\theta}\}\}$ such the majority in the low-preference region (weakly) prefer centralization to decentralization for all $\bar{\theta} \in [\underline{\theta}, \bar{\theta}^D]$, and decentralization to centralization for all $\bar{\theta} > \bar{\theta}^D$.*

The intuition for this result is that the more heterogeneous preferences are across types, the more likely the high-preference region is to elect a high-preference representative under decentralization; and if this happens, there is more scope for the low-preference region to free ride on region A the higher is the intensity of preferences for public consumption in A , which makes decentralization comparatively more attractive for the majority in B . On the other hand, the more heterogeneous preferences are across types, the higher will be the tax rate chosen by a high-preference representative in A under centralization, which makes centralization comparatively less attractive for the majority in B .

Note that the interval $[\underline{\theta}, \bar{\theta}^D]$ will be smaller the larger is the spillover parameter γ . This is because the noncooperative payoff for a low-preference majority in B is increasing in the type of policymaker in the other region as well as in γ : in a noncooperative equilibrium, the level of effective public good consumption in a region is independent of policy choices in the other region, which implies that the low-preference majority in B will experience the same level of public consumption but a lower level of private consumption—and thus will be worse off—when paired with a low-type policymaker than with a high-type policymaker in region A ; *ceteris paribus*, if a high-preference representative is elected in A , free-riding opportunities are higher the larger is the spillover. Then, if the spillover is large, noncooperation will be relatively more attractive to the low-preference majority in B when a high-preference representative is elected in A , implying that $\hat{\theta}$ will be smaller. At the same time, if the spillover is large, electing a low-preference candidate will be more attractive to the high-preference majority in A , implying that $\bar{\theta}'$ will be smaller. Hence, $\bar{\theta}^D$ will be smaller the larger is γ .

Policy centralization will only take place if the majorities of both regions agree to it; but it can be shown that the low-preference region will always be pivotal with respect to the centralization choice:

Lemma 4: Under direct referendum, the majority in the high-preference region will always prefer policy centralization to noncooperation if the majority in the other region does.

Combining Lemmas 3 and 5 allows us to state the following result:

Proposition 1: Under direct referendum, policy centralization will occur if and only if $\bar{\theta} \in [\underline{\theta}, \bar{\theta}^D]$.

Under direct democracy, policy centralization can still occur even when the two regions are different with respect to the policy preferences of their respective majorities; and, if it does, it will result in a dilution of policy preferences—which is represented in our model as a randomization between the preferred tax rates of the two jurisdictions. But, if preference heterogeneity is too large, policy centralization will not take place, either because the majority of the low-preference region can always do better by free-riding on the other region, or because the policy choice of the high-preference region’s policymaker under centralization is too far from that preferred by the majority of the low-preference region.

IV Centralization by representative democracy

Suppose that voters delegate the decision of whether or not to centralize policy making to the elected politicians themselves. This can be modelled in terms of a sequential game where, in the first stage, citizens in both regions elect a representative by majority voting. In the second stage of the game, elected candidates decide whether or not to centralize policies, with centralization only occurring if it is supported by the policymakers of both regions. In the final stage, the elected representatives make fiscal choices as above.

In this case, if centralization is rejected by the elected representatives, these same representatives will be in charge of making noncooperative policy choices, without having the option of delegating noncooperative policy choices to policymakers of a different type. This implies that the conditions under which elected policymakers of types θ_i^R ,

$i = A, B$, will support centralization are simply $\Pi_A^C(\theta_A^R, \theta_B^R | \theta_A^R) - \Pi_A^N(\theta_A^R, \theta_B^R | \theta_A^R) \geq 0$ and $\Pi_B^C(\theta_B^R, \theta_A^R | \theta_B^R) - \Pi_B^N(\theta_B^R, \theta_A^R | \theta_B^R) \geq 0$.

However, unlike in the case of a direct referendum, the preference types who make centralization choices will not necessarily be the same as the majority types in the two jurisdictions, since the majority in each jurisdiction can choose to elect a representative of either type. As in the direct democracy case, it can be shown that electing a low-preference type representative is a dominant strategy for the majority of the low-preference jurisdiction:

Lemma 5: Under representative democracy, the representative elected in the low-preference region will be a low-preference individual.

Given that a low-preference policymaker is always elected in region B , if the high-preference majority in region A elect a high-preference representative, they will either experience the cooperative payoff $\Pi_A^C(\bar{\theta}, \underline{\theta} | \bar{\theta})$ if $\bar{\theta} \leq \hat{\theta}$ —since in that case the low-preference representative in B will choose centralization, which the high-preference representative in A will also agree to¹⁴—or they will experience the noncooperative payoff $\Pi_A^N(\bar{\theta}, \underline{\theta} | \bar{\theta})$ if $\bar{\theta} > \hat{\theta}$. If, on the other hand, the high-preference majority in region A elect a low-preference representative, this will result in harmonization at the cooperative tax rate preferred by the low-preference majority in B , giving the majority in A the payoff $\Pi_A^C(\underline{\theta}, \underline{\theta} | \bar{\theta})$.

Then, if the majority in A can achieve centralization by electing a high-preference representative ($\bar{\theta} \leq \hat{\theta}$), they will always do so. Moreover, if the highest payoff the majority in A can achieve under noncooperation is by electing a low-preference policymaker (i.e., $\bar{\theta} \leq \bar{\theta}'$) then the high-preference majority in A will always prefer cooperation at the rate favoured by low-preference type individuals to noncooperation, given that the latter produces, at best, a lower common tax rate and a lower level of provision than the former. Thus, for $\bar{\theta} < \bar{\theta}'$, centralization will always take place—either with a dilution of policy preferences or with convergence to the policy favoured by the low-preference jurisdiction. Since $\bar{\theta}' \geq \bar{\theta}^D$ (by Lemma 3), we can then conclude that, for a given $\underline{\theta}$, the range of values of $\bar{\theta}$ for which a representative system supports centralization is at least as large as the range over which centralization occurs by referendum. Furthermore, it can be shown that, centralization by representative democracy can also occur if $\bar{\theta}$ lies in a certain range above $\bar{\theta}'$. The following proposition summarizes our results for a representative system:

Proposition 2: *Under representative democracy: (i) when $1 - \eta - \gamma^2 \leq 0$, policy centralization will occur for all values of $\bar{\theta} > \underline{\theta}$; (ii) when $1 - \eta - \gamma^2 > 0$, for any given $\underline{\theta}$, there is a $\bar{\theta}^R$, with $\bar{\theta}^R > \bar{\theta}'$ and $\bar{\theta}^R \geq \bar{\theta}^D$, such that policy centralization will occur for all $\bar{\theta} \in [\underline{\theta}, \bar{\theta}^R]$.*

Thus, delegation of policy centralization choices to elected policymakers in a representative democracy can make it possible to support centralization even in situations where it would not be supported by referendum. In some cases (when $1 - \eta - \gamma^2 \leq 0$ or when $1 - \eta - \gamma^2 > 0$ and $\bar{\theta} \in (\hat{\theta}, \bar{\theta}^R]$), it will not result in policy dilution but in convergence towards the reluctant partner's preferred rate. Here, the pro-harmonization region prefers centralization even at the cost of harmonizing policies at their least preferred rate, and it can achieve this by delegating all policies—both those elected under centralization and those selected under decentralization—to a low-preference policymaker, thereby credibly committing to select low taxes in either case. In contrast, under direct referendum commitment through delegation is not possible, and thus the majority of a low-preference region cannot count on the representative of the high-preference region to be willing to harmonize at a low level of taxation if centralization occurs, and may rely on being able to free-ride on a high-type policymaker if centralization is rejected. Thus, if centralization is decided by representatives, a pro-coordination jurisdiction can induce a reluctant jurisdiction to opt for policy centralization even in cases where this would not be possible if centralization choices were made by referendum.¹⁵

V Welfare comparison of direct and representative democracy outcomes

Centralization is not necessarily desirable for both regions. Thus, moving from a referendum system to a representative system may well hurt the majority in one jurisdiction while benefiting the other.

When $\bar{\theta} < \hat{\theta}$ the outcome is exactly the same under both systems. When $\bar{\theta} \in (\hat{\theta}, \bar{\theta}^D]$, centralization will take place under both direct and representative democracy, but it will feature policymakers of different types under direct democracy and low-type policymakers under representative democracy. This implies a lower payoff for high-preference individuals and a higher payoff for low-preference individuals under representative democracy in both jurisdictions—independently of whether they belong to the majority in their respective jurisdictions (since policy outcomes are the same across jurisdictions).

For $\bar{\theta} \in (\bar{\theta}^D, \bar{\theta}^R]$ (with $\bar{\theta}^R$ being plus infinity in the case $1 - \eta - \gamma^2 \leq 0$), centralization only occurs under representative democracy. Our previous analysis has already established that the majority of the high-preference region will benefit from accommodating the low-preference region in this case—and so will the low-preference minority in the high-preference region, since they achieve their most preferred cooperative outcome. But it is not clear if individuals in the low-preference region always benefits from this. If the outcome under direct democracy is noncooperation with two low-preference policymakers ($\bar{\theta} \leq \bar{\theta}'$) then cooperation will always benefit the low-preference region; but if a high-preference policymaker is elected under noncooperation in the high-preference region ($\bar{\theta} > \bar{\theta}'$) and preferences are sufficiently heterogeneous, the low-preference region may fare better by free riding on a high-preference policymaker under noncooperation than by cooperating with a low-preference policymaker. On the other hand, if preferences are not too heterogeneous, it is possible for all individuals in both regions to be made better off by a move to representative democracy:

Proposition 3: *For any given $\underline{\theta}$, there exists a $\bar{\theta}^P \in (\bar{\theta}^D, \bar{\theta}^R]$, such that if $\bar{\theta} \in (\bar{\theta}^D, \bar{\theta}^P]$ a move from direct referendum to representative democracy raises the payoffs of all types in both regions.*

Clearly, the opposite move—from representative democracy to direct democracy—can never benefit all individuals: for $\bar{\theta} \in (\bar{\theta}^D, \bar{\theta}^P]$, all individuals are made worse off by such move, and for $\bar{\theta} \in (\bar{\theta}^P, \bar{\theta}^R]$ at least one preference type in one of the two regions is made worse off; otherwise payoffs are the same under the two systems.

How should we interpret the comparison between the two procedures in situations where there is a direct opposition of interests between the majorities of the two jurisdictions? Since the two jurisdiction are fully independent from each other to begin with, which procedure to adopt would be a matter for each individual region to decide—an agreement to harmonize procedures would just push the centralization problem up one level. We could then think of an initial constitutional stage where voters in each region select one of the two procedures by majority voting. Note that the centralization outcome and the associated payoffs are the same independently of whether the procedure selected in the low-preference region is direct democracy or representative democracy: in either case, a low-type policymaker will be elected, whose posture towards centralization is the same as that of the majority. Thus, the majority in the low-preference region are indifferent between the two procedures—although they may be affected by a change of procedure in the other region.

The following result immediately follows from our previous analysis:

Proposition 4: *Centralization by direct referendum will be preferred to centralization by representative democracy by the majority in the high-preference region if $1 - \eta - \gamma^2 \leq 0$ and $\bar{\theta} \in (\hat{\theta}, \bar{\theta}^D]$; otherwise representative democracy will be (weakly) preferred.*

Our model therefore predicts that, other things being equal, we should observe delegation of centralization choices in those countries that are more likely to be the losers in a noncooperative environment, either because of their size, income levels, or composition, or because they cannot profitably counter free-riding by strategically delegating policy choices to a minority-type policymaker under noncooperation ($1 - \eta - \gamma^2 > 0$).

Before concluding, some comments are in order with respect to the possibility of bargaining over policies taking place between jurisdictions. Our analysis has focused on a very inflexible model of centralization, namely an arrangement where the two regions' policymakers are appointed to choose a common policy with equal probabilities. More could be achieved by bargaining. Clearly, if full contracting (with side payments) is possible, centralization could always be supported. But with full contracting the distinction between regions would effectively become meaningless: the two jurisdictions could then just as well merge and combine their two political systems into a single system that accounts for the preference diversity within its borders. We are concerned here with a situation where the two regions remain distinct entities and have limited opportunities for compensation outside the narrow confines of the policy coordination decision; after all, by focusing on majority voting—which typically leads to Pareto inefficient outcomes—we are already considering an incomplete-contracting environment.

But even when full contracting is not feasible, some limited form of bargaining may be possible. Consider, for example, an arrangement whereby the probability with which each of the two regions is appointed to select taxes under centralization is not the same for the two regions. If the two regions can bargain over this central policy selection rule, then achieving policy centralization under direct democracy will be easier (in other words, $\bar{\theta}^D$ will be larger). Furthermore, bargaining will exclude the possibility that a Pareto improvement could be achieved by a change in the political system: by construction, all of the payoff combinations that can be supported under representative democracy can also be supported under direct democracy by an appropriate choice of probabilities in the policy selection rule, implying that any joint payoff improvement

that can be achieved by moving to a representative system under an equal-probabilities rule could also be achieved through bargaining under direct democracy. Thus, with bargaining, a move from one system to the other will always either leave all individuals indifferent or make some individuals better off and others worse off.

VI Size and spillovers asymmetries

The model described in the previous sections assumes symmetry across jurisdictions in all respects other than in the preferences of the majority types. In the following, we shall briefly discuss the implications of cross-jurisdictional asymmetries for centralization outcomes.

As long as we maintain the assumption of quasilinear preferences, income differentials have no effect on the analysis. Size differentials, however, do, because a larger size translates into a lower per-capita opportunity cost of public consumption, and thus into a higher unilaterally optimal level of public provision. As noted earlier, however, with quasilinear preferences the unilaterally optimal level of effective public provision is independent of the level of provision in the other jurisdiction. The level of public *provision* in a certain jurisdiction does depend on public provision in the other, but not directly on the number of individuals in the other. Specifically, noncooperative tax rates can be written as

$$t_i^N(\theta_i^N, \theta_j^N) = \frac{\eta^{1/(1-\eta)}}{n_i(1-\gamma^2)} \left[(n_i\theta_i^N)^{1/(1-\eta)} - \gamma(n_j\theta_j^N)^{1/(1-\eta)} \right], \quad j \neq i. \quad (15)$$

Thus, an increase in n_i has the same effect on the noncooperative level of public provision in region i , $n_i t_i^N(\theta_i^N, \theta_j^N)$, as an increase in θ_i does. Asymmetries in size, on the other hand, do not operate like preference heterogeneity with respect to the preferred levels of provision under policy centralization. Cooperative rates can be written as

$$t_i^C(\theta_i^C) = \frac{\eta^{1/(1-\eta)}(1 + n_j/n_i\gamma)^{\eta/(1-\eta)}}{n_i} (n_i\theta_i^C)^{1/(1-\eta)}, \quad j \neq i; \quad (16)$$

in this case an increase in n_i raises the preferred level of provision under centralization by less than an equiproportional increase in θ_i . The reason for this is difference is that, for a given tax rate, a larger n_i results in larger tax revenues and higher public provision in jurisdiction i but not outside of its borders; thus, the effect of a larger n_i on the per-capita opportunity cost of public consumption in i is not the same as that of an equiproportional increase in the number of individuals across jurisdictions (which would

have the same effect as an increase in θ_i). Moreover, unlike in the decentralization case, an increase in n_i also raises the level of provision preferred by the policymaker in $j \neq i$. What this all implies is that if we compare a scenario where jurisdiction A is twice as large as B to one where the preference parameter of the policymaker in A is twice as large as that of the policymaker in B , the gap between cooperative and noncooperative rates in A and the gap between the cooperative rates favoured by the policymakers in A and B will both be smaller in the latter scenario than in the former.

If we combine size asymmetries with preference heterogeneity within the same scenario, in order to examine how the possibility of delegation affects centralization choices, payoff comparisons are generally ambiguous unless the size asymmetry and the asymmetry in preferences operate in the same direction — i.e. if the policymaker in A is the higher-preference policymaker and n_A is larger than n_B . What carries through from our earlier analysis, however, is the general conclusion that representation can make centralization possible in situations where direct referendum cannot. This can be understood by focusing on a scenario where there are two preference types, but the majorities in both jurisdictions are of the high-preference type, and where $n_A > n_B$.¹⁶ As discussed earlier, delegation to a low-preference policymaker can occur under decentralization, and if it does it will make the majority in at least one of the two jurisdictions worse off, and therefore more willing to opt for centralization, in comparison with a scenario where delegation is not possible. Consider now a move from a referendum system to a representative system. If delegation did not occur under direct democracy and the outcome then was decentralization, a representative system simply offers either partner a device for committing to a different (lower) policy choice under centralization — something which is not available under a referendum system. One of the two partners may then be able to induce centralization by electing a low-preference policymaker and may prefer this outcome to decentralization. If, on the other hand, the high-preference majority in a jurisdiction was delegating decentralized policy choices to a low-preference representative under direct democracy, then a move to a representative system could make centralization less appealing for its partner. In this case, if centralization cannot take place with two high-preference policymakers, the majority in the jurisdiction where delegation was taking place under direct democracy would always prefer to induce centralization by delegation to a low-preference policymaker under a representative system, if this is feasible.¹⁷

The following example illustrates how a move to a representative system may trigger centralization when jurisdictions are of different size. In this example (and in all

the others that follow) pre-tax disposable income per capita is assumed to be 100, and $\eta = 0.75$. All individuals in B are of the high preference type, with $\bar{\theta} = 1$. The majority in A is also of the high-preference type but there are individuals in A who are low-preference individuals with $\theta = \underline{\theta}$. Let $\gamma = 0.2$, $n_A = 15$, $n_B = 10$, $\underline{\theta} = 0.75$. In this case, the noncooperative payoffs with two high-preference policymakers are $\Pi_A^N(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 455$, $\Pi_B^N(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 526$; the corresponding cooperative payoffs are $\Pi_A^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 578$, $\Pi_B^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 286$. With a low-preference policymaker in B , noncooperative payoffs for the majorities in A and B are $\Pi_A^N(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 392$, $\Pi_B^N(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 298$, and the noncooperative payoff for the low-preference policymaker in A is $\Pi_A^N(\bar{\theta}, \underline{\theta} | \underline{\theta}) = 242$, the corresponding cooperative payoffs are $\Pi_A^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 510$, $\Pi_B^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 327$, $\Pi_A^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) = 259$. Under decentralization, the majority in A elects a high-preference policymaker (since $\Pi_A^N(\bar{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_A^N(\underline{\theta}, \bar{\theta} | \bar{\theta})$ in this case). Under a referendum system, the majority in B opts for decentralization ($\Pi_B^N(\bar{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_B^C(\bar{\theta}, \bar{\theta} | \bar{\theta})$). With a representative system, the majority in A can achieve centralization by electing a low-preference candidate (since $\Pi_B^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_B^N(\underline{\theta}, \bar{\theta} | \bar{\theta})$, and $\Pi_A^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) > \Pi_A^N(\underline{\theta}, \bar{\theta} | \underline{\theta})$) and will prefer this outcome to decentralization since $\Pi_A^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_A^N(\bar{\theta}, \bar{\theta} | \bar{\theta})$.

Introducing spillover asymmetries can also affect the analysis. When $\gamma_A \neq \gamma_B$, noncooperative tax rates can be written as

$$t_i^N(\theta_i^N, \theta_j^N) = \frac{\alpha}{n(1 - \gamma_A \gamma_B)} \left[(\theta_i^N)^{1/(1-\eta)} - \gamma_i (\theta_j^N)^{1/(1-\eta)} \right], \quad j \neq i. \quad (17)$$

The effective level of public consumption in either jurisdiction is unaffected by changes in the spillover parameters;¹⁸ however, if we consider an increase in γ_A that leaves the product $\gamma_A \gamma_B$ unchanged, this will lower the level of public provision in A and increase the level of public provision in B , and thus make the policymaker in A comparatively better off and the policymaker in B comparatively worse off. On the other hand, spillover asymmetries will affect cooperative levels of taxes in the opposite direction. Preferred harmonized rates in this case are

$$t_i^C(\theta_i^C) = \frac{\alpha(1 + \gamma_i)^{\eta/(1-\eta)}}{n} (\theta_i^C)^{1/(1-\eta)}, \quad j \neq i, \quad (18)$$

which is increasing in γ_i ; the payoff experienced by a jurisdiction under centralization is also increasing in γ_i . Then, the policymaker of a jurisdiction experiencing a comparatively higher spillover will select a comparatively lower tax and experience a comparatively higher payoff under decentralization than the policymaker in the other jurisdiction; but she will also select a comparatively high tax and experience a comparatively higher payoff under centralization. Thus, the effect of a larger γ_i on the

comparative difference between cooperative and noncooperative payoffs in jurisdictions i and j is generally ambiguous. Nevertheless, the same arguments apply here; representation can make centralization possible in situations where direct referendum cannot, as the following example will show.

Let us focus again on a scenario where the majority types are the same in both jurisdictions, and assume $\gamma_B > \gamma_A$. Let $\gamma_A = 0.75$, $\gamma_B = 0.2$, $n = 10$, $\underline{\theta} = 0.9$. In this case, the noncooperative payoffs with two high-preference policymakers are $\Pi_A^N(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 428$, $\Pi_B^N(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 224$; the corresponding cooperative payoffs are $\Pi_A^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 593$, $\Pi_B^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 195$. With a low-preference policymaker in B , noncooperative payoffs for the majorities in A and B are $\Pi_A^N(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 442$, $\Pi_B^N(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 198$, and the noncooperative payoff for the low-preference policymaker in A is $\Pi_A^N(\underline{\theta}, \bar{\theta} | \underline{\theta}) = 412$; the corresponding cooperative payoffs are $\Pi_A^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 578$, $\Pi_B^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 256$, $\Pi_A^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) = 447$. Under decentralization, the majority in A elects a low-preference policymaker (since $\Pi_A^N(\underline{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_A^N(\bar{\theta}, \bar{\theta} | \bar{\theta})$ in this case). Under a referendum system, the majority in B opts for decentralization ($\Pi_B^N(\underline{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_B^C(\bar{\theta}, \bar{\theta} | \bar{\theta})$). With a representative system, the majority in A can achieve centralization by electing a low-preference candidate (since $\Pi_B^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_B^N(\underline{\theta}, \bar{\theta} | \bar{\theta})$, and $\Pi_A^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) > \Pi_A^N(\underline{\theta}, \bar{\theta} | \underline{\theta})$) and will prefer this outcome to decentralization since $\Pi_A^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_A^N(\bar{\theta}, \bar{\theta} | \bar{\theta})$.

Size and spillover asymmetries raise a possibility that is absent from a scenario where the only asymmetry is in the majority types' preferences, namely that the majority type may be unable to induce centralization by delegation. In the symmetric case analyzed in the previous sections, delegation to a low-preference policymaker under a representative system will always result in centralization. In the asymmetric scenarios with identical majority types that we have just described, a high-preference majority who is delegating decentralized policy choices to a low-preference policymaker under a referendum system will always choose to induce centralization by delegation under a representative system, if this is feasible; but this may be infeasible if the low-preference representative prefers decentralization. In this case, it is possible for a move to a representative system to trigger a switch from centralization to decentralization, as the following example illustrates. Suppose that $\gamma = 0.5$, $n_A = 15$, $n_B = 10$, $\underline{\theta} = 0.7$. The noncooperative payoffs with two high-preference policymakers are $\Pi_A^N(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 241$, $\Pi_B^N(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 1,168$; the corresponding cooperative payoffs are $\Pi_A^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 924$, $\Pi_B^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 644$. With a low-preference policymaker in A , noncooperative payoffs for the majorities in A and B are $\Pi_A^N(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 387$, $\Pi_B^N(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 356$, and the noncooperative payoff for the low-preference policymaker in B is $\Pi_B^N(\underline{\theta}, \bar{\theta} | \underline{\theta}) = 241$, the correspond-

ing cooperative payoffs are $\Pi_A^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 777$, $\Pi_B^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 602$, $\Pi_A^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) = 228$. Under decentralization, the majority in A elects a low-preference policymaker (since $\Pi_A^N(\underline{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_A^N(\underline{\theta}, \bar{\theta} | \underline{\theta})$ in this case). Under a referendum system, both majorities opt for decentralization ($\Pi_B^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_B^N(\underline{\theta}, \bar{\theta} | \bar{\theta})$ and $\Pi_A^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_A^N(\underline{\theta}, \bar{\theta} | \bar{\theta})$). With a representative system, the majority in A cannot achieve centralization by electing a high-preference candidate (since $\Pi_B^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) < \Pi_B^N(\bar{\theta}, \bar{\theta} | \bar{\theta})$), nor can they achieve it by electing a low-preference candidate (since $\Pi_A^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) < \Pi_A^N(\underline{\theta}, \bar{\theta} | \underline{\theta})$).

However, in the presence of size or spillover asymmetries, it seems more difficult to justify the adoption of a symmetric policy making rule under centralization, i.e. a rule dictating that the policymakers in the two jurisdictions are appointed to select policy with equal probabilities irrespective of asymmetries. While preferences are typically unobservable (or nonverifiable), size is measurable, and spillover asymmetries may also be (at least to the extent that they arise from physical or institutional factors). Then one would expect such asymmetries to be reflected in the policy choice rule under centralization. Federal systems, for example, typically assign more power to larger regions.¹⁹ Then, if the larger jurisdiction has comparatively more decision power under centralization, centralization would be less attractive for the smaller partner—implying that *ceteris paribus* it is less likely to take place under a referendum system—and it would be more attractive for a low-preference policymaker—implying that *ceteris paribus* it is more likely to take place by delegation under a representative system. Thus, if asymmetries are accounted for by the decision rule under centralization, the possibility just described (a move to a representative system triggering decentralization) becomes less likely. Consider our previous example, but suppose now that the decision rule under centralization is amended to take size into account as follows: the policymaker in i is appointed to make choices with probability $n_i/(n_i + n_j)$. Cooperative payoffs become $\Pi_A^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 928$, $\Pi_B^C(\bar{\theta}, \bar{\theta} | \bar{\theta}) = 639$, $\Pi_A^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 751$, $\Pi_B^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) = 590$, $\Pi_A^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) = 243$. The higher weight on A raises the cooperative payoff for a low-preference policymaker to $\Pi_A^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) = 243 > \Pi_A^N(\underline{\theta}, \bar{\theta} | \underline{\theta})$, making it possible for A to achieve centralization by delegation under a representative system—which the majority in A will take advantage of since $\Pi_A^C(\underline{\theta}, \bar{\theta} | \bar{\theta}) > \Pi_A^N(\bar{\theta}, \bar{\theta} | \bar{\theta})$.

VII Concluding remarks

We have examined policy centralization outcomes in a two-jurisdiction political-economy model with heterogeneous policy preferences and interjurisdictional policy spillovers, under alternative democratic choice procedures, namely, direct democracy and representative democracy. We have shown that policy centralization is more likely to occur if the choice of whether or not to centralize is made by elected policymakers rather than by referendum. The reason for this result is that delegation of the harmonization choice to elected policymakers can effectively act as a policy commitment device by a pro-centralization jurisdiction and induce a reluctant partner to cooperate. In these situations, policy centralization will result in policies converging towards the choice preferred by the reluctant partner, rather than in a dilution of policy preferences. We have also shown that, when no bargaining is possible, a move from direct democracy to representative democracy can raise welfare for all individuals in all regions. Our analysis has focused mainly on a scenario where jurisdictions are symmetric with respect to size and the spillovers they experience. Predictions become less sharp when asymmetries are introduced, but the possibility that a representative system may facilitate centralization remains.

Although our model is highly stylized, it can be used to generate some predictions on how the characteristics of the policies concerned should map into centralization outcomes. For example, the model predicts that the larger is the spillover (resulting in a negative $1 - \eta - \gamma^2$), the more likely is a move to representative democracy to trigger a switch to centralization. Thus, our analysis predicts that the system under which the choice to coordinate public provision is made is more likely to matter when the goods provided are close to being pure public goods for the regions concerned (γ close to unity)—in European case, examples would be expenditures on national defence, security, and border controls—but less so if the goods provided are closer to being local in nature. Similarly, the more elastic is the marginal valuation of the good provided to changes in the level of provision (reflected in a smaller η)—i.e. the more difficult it is for agents to find private substitutes for public provision—the less likely is the choice of political system to affect policy centralization outcomes; deafens spending again comes to mind.

Our analysis can be extended in several directions. First, different forms of spillovers requiring policy coordination—such as fiscal externalities, transboundary environmental externalities, externalities in trade policies—could be explicitly modelled and examined. The multi-stage setup we have considered could be extended to consider a

situation where a once-and-for-all decision to centralize policies by referendum gives rise to a long-lived centralization commitment, whereas a renewable agreement maintains flexibility. If there is ex-ante uncertainty about the preference composition of the polities in the two regions, a long-lived commitment may insure individuals against the risk associated with the possible fluctuations in centralization outcomes resulting from changes in preferences across regions.²⁰ Finally, in a multi-stage setting, a once-and-for-all decision to centralize policies would involve additional strategic considerations for policymakers in office, as it could affect the outcome of future elections.²¹

Notes

¹The idea that a representative system implies a pro-centralization bias has also been (informally) suggested by Blankart (2000). In attempting to explain why, after World War II, tax centralization has progressively increased in Germany while it has decreased in Switzerland, he argues that budgetary referenda have been an important barrier to increasing centralization in Switzerland.

²Strategic delegation arguments have been made elsewhere in the industrial organization and international trade literatures (Gatsios and Karp, 1995, 1991; Fershtman and Judd, 1991), as well as in the political economy literature. For example, Persson and Tabellini (1992) have shown that under interjurisdictional tax competition voters will vote for candidates whose policy preferences do not coincide with their own. In a different paper, Persson and Tabellini (1994) also compare direct and representative democracy with respect to their commitment properties in the context of capital tax competition. But to the best of our knowledge, this comparison has not been made with respect to policy centralization decisions.

³In 1961 four countries started negotiations to join the European Community: Denmark, Ireland, United Kingdom and Norway. In 1972 the national parliaments of Denmark, Ireland, and the United Kingdom ratified the treaty, whereas a national referendum in Norway rejected the treaty. A few years later, Greece (1975), Portugal and Spain (1977) applied to join the EC; in all three cases the treaty was ratified by parliament. In 1982 a referendum resulted in Greenland exiting the Community. In 1992 Denmark rejected the ratification of the Maastricht Treaty by referendum (the treaty was subsequently ratified through another referendum). France and Ireland also used a referendum in this case: in both cases it passed. The remaining countries ratified the treaty through their national parliaments. In the same year, in Switzerland, a referendum decided against the ratification of the agreement that created the EEA (European Economic Area). In 1994 three Scandinavian countries, Sweden, Finland, and Norway, held national referenda about whether or not to join the EU; Norway voted against and the other two in favour. In 2000, in Denmark, a referendum rejected membership in the EMU. The following year Ireland, again by referendum, decided against the ratification of the Nice Treaty. In Switzerland, where the introduction of a new federal tax requires a mandatory referendum, citizens have had to express their opinion about new central taxes no less than twenty-three times (since 1917), and two-thirds of these proposals have been rejected in the first round (Blankart, 2000).

⁴To test this hypothesis, they use Swiss data at the cantonal level and at the local level. The 26 Swiss cantons have different rules about budget referenda. In some cantons budget decisions are taken mainly by elected bodies, while other cantons rely more on direct democracy. The main finding is that the more cantons allow for fiscal referenda in their constitutions, the less spending and taxation are centralized at the cantonal level.

⁵Although, as we discuss below, our model accounts for preference heterogeneity, preferences are unobservable and thus taxes cannot be conditioned on them, even though policy-makers may have full information about the distribution of preferences.

⁶Spillovers are assumed to be bilateral and symmetric (γ is not differentiated between regions).

⁷Quasilinearity simplifies the analysis by removing income effects.

⁸The marginal valuation for public good consumption is $\theta\eta S_i^{(\eta-1)}$. A constant-elasticity formulation imposes constraints on the global properties of this valuation schedule, which in turn enables us to obtain closed-form solutions for cooperative and noncooperative payoffs. Also note that in this specification both goods are essential and (weakly) normal, and the marginal rate of substitution is increasing in θ .

⁹Necessary conditions for positive tax rates in both regions when $m_i^N > m_j^N$ are $\gamma < (\theta_i^N/\theta_j^N)^{1/(1-\eta)} < 1/\gamma$.

¹⁰We thus restrict our attention to coordination arrangements in which policies are harmonized to a common level. Coordination arrangements in which policies are differentiated by jurisdiction, to account for the different characteristics of the participating jurisdictions, can generally do better for all involved, but may run against problems of information or verification (see Dhillon, Perroni, and Scharf (1999) on this point). We also assume that the levels of public good provision cannot be determined and pre-committed to at the centralization stage.

¹¹We assume that candidates of both types are able and willing to stand for election.

¹²This is because the effective amount of public good consumption within a region is independent of the policymaker's type in the other region.

¹³Expanding these expressions, we get

$$\Delta_B = -\frac{\alpha}{n} \left\{ \underline{\theta} \left[\frac{\bar{\theta}^{\eta/(1-\eta)} - \underline{\theta}^{\eta/(1-\eta)}}{\eta} \right] - \left[\frac{\bar{\theta}^{1/(1-\eta)} - \underline{\theta}^{1/(1-\eta)}}{(1-\gamma^2)} \right] \right\}, \quad (19)$$

and $\partial\Delta_B/\partial\bar{\theta} = -\left[\alpha\bar{\theta}^{\eta/(1-\eta)}/n(1-\eta)\right] \left[\underline{\theta}/\bar{\theta} - (1/(1-\gamma^2))\right]$, which is positive for all $\bar{\theta} > \underline{\theta}$.

¹⁴This is shown as part of the proof of Lemma 4.

¹⁵While the feature that the reluctant jurisdiction is always the low-preference jurisdiction relies on the monotonicity properties of the assumed functional forms, the conclusion that a representative democratic system can facilitate decentralization through delegation is more general, and would also apply to environments where the reluctant partner is the high-preference jurisdiction.

¹⁶Restricting our attention to a scenario where the majority types are the same in both jurisdictions enables us to isolate the effect of size asymmetries while still retaining the

possibility of strategic delegation. The case where the majorities are of the high-preference type is the more relevant one with respect to delegation choices.

¹⁷This is because, by assumption, the cooperative payoff that the low-preference policymaker obtains is greater than the noncooperative payoff (given that the policymaker willing to centralize); the corresponding cooperative payoff the high-preference majority obtains when choices are made by a low-preference representative must then also be higher than the noncooperative payoff, since the majority value public consumption comparatively more. The latter noncooperative payoff, in turn, is less than that which the majority would obtain under a direct referendum system, again by assumption. Hence, if delegation in a jurisdiction occurs under direct referendum and the majority in that jurisdiction can induce centralization by delegation under representative democracy, they will always choose to do so.

¹⁸One can verify that $n[t_i^N(\theta_i^N, \theta_j^N) + \gamma_i t_i^N(\theta_i^N, \theta_j^N)] = \alpha(\theta_i^N)^{1/(1-\eta)}$.

¹⁹In some cases, representative systems contain both institutions in which all regions have equal powers (e.g. the US Senate) and institutions where power is proportional to size (e.g. the US House of Representatives).

²⁰Even when coordination has an asymmetric impact on regional payoffs ex-post, a coordination agreement that allows for such asymmetries may still be desirable ex-ante for both regions. On this point, see Dhillon, Perroni, and Scharf (1999), who analyze optimal incentive-compatible tax coordination agreements in the presence of preference heterogeneity when preferences are unknown ex-ante and unobservable ex-post.

²¹The strategic implications of such dynamic electoral linkages for the policy choices of incumbents have been explored by Besley and Coate (1998a); their analysis focuses on public investment, but analogous strategic considerations could arise with respect to policy centralization choices.

References

- Besley, T., and S. Coate (1997) "An economic model of representative democracy," *Quarterly Journal of Economics* 112, 85-114.
- Besley, T., and S. Coate (1998a) "Sources of inefficiency in a representative democracy: a dynamic analysis," *American Economic Review* 88, 139-156.
- Besley, T., and S. Coate (1998b) "Centralized versus decentralized provision of local public Goods: a political economy analysis," mimeo, London School of Economics.
- Blankart, C.B. (2000) "The process of government centralization: a constitutional view," *Constitutional Political Economy* 11, 27-39.

- Dhillon, A., C. Perroni, and K. Scharf (1999) “Implementing tax coordination,” *Journal of Public Economics* 72, 243-268.
- Feld, L.P., and C.A. Schaltegger (2001) “On government centralization and budget referendums: evidence from Switzerland,” CESifo Working Paper No. 615, University of Munich.
- Fershtman, C., K. Judd, and E. Kalai (1991) “Observable contracts: strategic delegation and cooperation,” *International Economic Review* 32, 551.
- Gatsios, K., and L. Karp (1995) “Delegation in a general equilibrium model of customs unions,” *European Economic Review* 39, 319-334.
- Gatsios, K., and L. Karp (1991) “Delegation games in customs unions,” *Review of Economic Studies* 58, 391-397.
- Osborne M., and A. Slivinski (1996) “A model of political competition with citizen candidates,” *Quarterly Journal of Economics* 111, 65-96.
- Persson T., and G. Tabellini (1992) “The politics of 1992: fiscal policy and European integration,” *Review of Economic Studies* 59, 689-701.
- Persson T., and G. Tabellini (1994) “Does centralization increase the size of governments?” *European Economic Review* 38, 765-773.

Appendix

Proof of Lemma 1: In our setup, irrespectively of the number of candidates running, there can only be at most two types of candidates in each region. If we rule out weakly dominated strategies, voting will be sincere, i.e., citizens will never vote for their least preferred candidate (the proof of this is in Besley and Coate, 1997), and the elected candidate in each region will be of a type that is supported by the majority type in that region. Under policy centralization, with probability one-half the elected candidate has no influence on policy; with probability one-half she selects policy unilaterally. In the former case, her type is irrelevant; in the latter, by construction, the policy outcome preferred by a θ -type voter will be the one selected by a θ -type candidate. 2

Proof of Lemma 2: Footnote 13 shows that the elected representative in the low-preference region will always be a low-preference individual. This given, we can determine the conditions under which the majority in the high-preference region will vote for a representative of their own type or the other type. We can show that Δ_A is zero when $\bar{\theta} = \underline{\theta}$, negative for small changes in $\bar{\theta}$, and, depending upon the parameter values, strictly convex (when $1 - \eta - \gamma^2 > 0$) or concave (when $1 - \eta - \gamma^2 \leq 0$). In the latter case Δ_A is weakly negative for all $\bar{\theta} \geq \underline{\theta}$ implying the high-preference majority will never vote for a high-preference candidate. In the former case Δ_A is weakly negative for all $\bar{\theta} \leq \bar{\theta}'$ (where, by continuity, $\bar{\theta}'$ exists and is the value of $\bar{\theta} > \underline{\theta}$ such that $\Delta_A = 0$), and strictly positive for all $\bar{\theta} > \bar{\theta}'$. 2

Proof of Lemma 3: (a) If $\theta_A^N = \bar{\theta}$, then $\hat{\Omega}_B = \Pi_B^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) - \Pi_B^N(\underline{\theta}, \bar{\theta} | \underline{\theta})$ is the relevant condition for the majority in region B . It can be shown that this is positive when evaluated at $\bar{\theta} = \underline{\theta}$, and monotonically decreasing and concave in $\bar{\theta}$. By continuity then there exists a $\hat{\theta} > \underline{\theta}$ such that $\hat{\Omega}_B \geq 0$ for all $\bar{\theta} \leq \hat{\theta}$. (b) If $\theta_A^N = \underline{\theta}$, then condition $\tilde{\Omega}_B = \Pi_B^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) - \Pi_B^N(\underline{\theta}, \underline{\theta} | \underline{\theta})$ is the relevant comparison for the majority voters in B . As above, it can be shown that this is positive when evaluated at $\bar{\theta} = \underline{\theta}$, and monotonically decreasing and strictly concave in $\bar{\theta}$. By continuity then there exists a $\tilde{\theta} > \underline{\theta}$ such that $\tilde{\Omega}_B \geq 0$ for all $\bar{\theta} \leq \tilde{\theta}$. Note that, since $\Pi_B^N(\underline{\theta}, \underline{\theta} | \underline{\theta}) < \Pi_B^N(\underline{\theta}, \bar{\theta} | \underline{\theta})$, we have $\hat{\theta} < \tilde{\theta}$. Next, by Lemma 2, we know that the choice of representative in the high-preference jurisdiction can itself be a function of the amount of preference heterogeneity. In case (i) of Lemma 2, a low-preference representative will always be elected in A , implying that case (b) always applies, and $\hat{\theta}$ is the relevant upper bound. In case (ii) of Lemma 2, on the other hand, case (b) applies for values of $\bar{\theta}$ less than $\bar{\theta}'$, and case (a) applies for values of $\bar{\theta}$ above it. This means that, if $\bar{\theta}' > \tilde{\theta}$, then $\tilde{\theta}$ is the relevant upper bound; if $\bar{\theta}' < \hat{\theta}$, then $\hat{\theta}$ is the relevant upper bound; if $\bar{\theta}' \in [\hat{\theta}, \tilde{\theta}]$ then $\bar{\theta}'$ is the relevant upper bound (since, in this case, we have $\tilde{\Omega}_B \geq 0$ for $\bar{\theta} \leq \bar{\theta}'$ and $\hat{\Omega}_B < 0$ for $\bar{\theta} > \bar{\theta}'$). Thus, the relevant upper bound can be generally expressed as $\bar{\theta}^D = \max\{\hat{\theta}, \min\{\bar{\theta}', \tilde{\theta}\}\}$. 2

Proof of Lemma 4: (a) If $\bar{\theta}^D > \hat{\theta}$, then $\tilde{\Omega}_A \equiv \Pi_A^C(\bar{\theta}, \underline{\theta} | \bar{\theta}) - \Pi_A^N(\underline{\theta}, \underline{\theta} | \bar{\theta})$ is the relevant payoff difference for high-preference voters in A and $\hat{\Omega}_B = \Pi_B^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) - \Pi_B^N(\underline{\theta}, \underline{\theta} | \underline{\theta})$ is the relevant payoff difference for low-preference voters in B over the interval $[\underline{\theta}, \bar{\theta}^D]$. One can verify that $\tilde{\Omega}_A > \hat{\Omega}_B$ for all $\bar{\theta} > \underline{\theta}$ by noting that the positive difference in the levels of effective public good consumption under centralization and under noncooperation, and the corresponding negative difference in private consumption levels are the same for both regions; then, since the majority in A place a higher valuation on public good consumption than the majority in B does, it must be the case that $\tilde{\Omega}_A \geq \hat{\Omega}_B$. (b) If $\bar{\theta}^D = \hat{\theta}$, then $\hat{\Omega}_A \equiv \Pi_A^C(\bar{\theta}, \underline{\theta} | \bar{\theta}) - \Pi_A^N(\bar{\theta}, \underline{\theta} | \bar{\theta})$ is the relevant payoff difference for the majority in region A over the interval $[\bar{\theta}', \hat{\theta}]$ (where $\Delta_A \geq 0$). We can show that this is positive when evaluated at $\bar{\theta} = \underline{\theta}$, and (i) either monotonically increasing and convex; or (ii) strictly concave. In the former case, $\hat{\Omega}_A > \hat{\Omega}_B$ for all $\bar{\theta} > \underline{\theta}$. In the latter case strict concavity implies both that $\hat{\Omega}_A$ can cross $\hat{\Omega}_B$ only once and that there exists some $\hat{\theta}_A > \underline{\theta}$ such that $\hat{\Omega}_A = 0$. Finally, we can show that $\hat{\Omega}_A > 0$ when $\hat{\Omega}_B < 0$, implying that $\hat{\theta}_A > \hat{\theta}$. 2

Proof of Lemma 5: If $\bar{\theta} \leq \hat{\theta}$ and a high-preference policymaker is elected in region A , then centralization will occur regardless of the type of policymaker elected in B . With a high-preference policymaker in B , low-preference voters in B will receive a payoff $\Pi_B^C(\bar{\theta}, \bar{\theta} | \underline{\theta})$; with a low-preference policymaker, they will receive a payoff $\Pi_B^C(\underline{\theta}, \bar{\theta} | \underline{\theta})$. The latter is larger than the former, so the majority in B will elect a low-preference candidate. If $\bar{\theta} > \hat{\theta}$ and a high-type policymaker is elected in A , low-preference voters in B compare the noncooperative payoff $\Pi_B^N(\underline{\theta}, \bar{\theta} | \underline{\theta})$ with the cooperative payoff $\Pi_B^C(\bar{\theta}, \bar{\theta} | \underline{\theta})$. The former is greater than the latter, since, for all $\bar{\theta} > \hat{\theta}$, we have $\hat{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta}) < 0$, which implies $\Pi_B^N(\underline{\theta}, \bar{\theta} | \underline{\theta}) > \Pi_B^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) > \Pi_B^C(\bar{\theta}, \bar{\theta} | \underline{\theta})$. A similar chain of reasoning can establish that for all $\bar{\theta} \geq \underline{\theta}$, if a low-preference policymaker is elected in A , low-preference voters in B will elect a low-preference policymaker: when a low-preference policymaker is elected in A , then the low-preference majority in B receive $\Pi_B^C(\underline{\theta}, \underline{\theta} | \underline{\theta})$ by voting for their own type and either $\Pi_B^C(\bar{\theta}, \underline{\theta} | \underline{\theta})$ (when $\bar{\theta} \leq \tilde{\theta}$) or $\Pi_B^N(\bar{\theta}, \underline{\theta} | \underline{\theta})$ (when $\bar{\theta} > \tilde{\theta}$) otherwise; the former payoff is always larger than either of the latter two. 2

Proof of Proposition 2: Case (i) If $1 - \eta - \gamma^2 \leq 0$: If the majority in A elect a high-preference representative and centralization does not occur, they receive a payoff that is less than the payoff they could obtain if they delegated noncooperative policymaking to a low-preference representative (since we know that in this case they would opt to do so if they could); and this latter noncooperative payoff must be less than that which they can obtain by harmonizing policy at the tax rate preferred by low-preference individuals, since the latter yields more public good provision than does decentralization when the policymakers are both low-preference type individuals. Thus, for all $\bar{\theta} > \underline{\theta}$, the majority in A will always elect a low-preference representative, which will result in centralization.

Case (ii) If $1 - \eta - \gamma^2 > 0$: For $\bar{\theta} \leq \hat{\theta}$, the majority in A can obtain centralization with representatives of different types in the two jurisdictions (their preferred outcome over that range, as established in the proof of Lemma 3); so they will elect a high-preference representative in this case. If $\bar{\theta}' > \bar{\theta}^D = \hat{\theta}$, the argument used above for case (i) implies that there will be an additional range between $\bar{\theta}^D$ and $\bar{\theta}'$ over which centralization takes place by representative democracy but not by referendum. We further show that under a representative system, it can also take place for $\bar{\theta} > \bar{\theta}'$. As noted earlier, we know that at $\bar{\theta}'$, noncooperative payoffs for the majority in A are the same whether the policymaker in A is a high-preference or a low-preference individual; we also know that at $\bar{\theta}'$ centralization gives the high-preference majority in A a strictly larger gain in comparison with decentralization, i.e. $\Pi_A^C(\underline{\theta}, \underline{\theta} | \bar{\theta}') - \Pi_A^N(\bar{\theta}', \underline{\theta} | \bar{\theta}') = \Pi_A^C(\underline{\theta}, \underline{\theta} | \bar{\theta}') - \Pi_A^N(\underline{\theta}, \underline{\theta} | \bar{\theta}') > 0$. The former difference can be shown to be concave in $\bar{\theta}$, implying that there will be an $\bar{\theta}^R > \bar{\theta}'$ such that, for $\bar{\theta}^R \in [\underline{\theta}, \bar{\theta}']$ centralization will occur. If $\bar{\theta}' < \hat{\theta}$ (and therefore $\bar{\theta}^D = \hat{\theta}$), the comparison between the cooperative payoff $\Pi_A^C(\underline{\theta}, \underline{\theta} | \bar{\theta})$ (if the majority in A elects a low-preference policymaker) and the noncooperative payoff $\Pi_A^N(\hat{\theta}, \underline{\theta} | \bar{\theta})$ (if the majority in A elects a high-preference policymaker) at $\hat{\theta}$ is generally ambiguous. If it is positive at $\bar{\theta} = \hat{\theta}$, then, again by concavity, there will exist a $\bar{\theta}^R > \hat{\theta}$ such that, for $\bar{\theta}^R \in [\underline{\theta}, \bar{\theta}']$ centralization will occur. Otherwise—if $\check{\Omega}_A = 0$ at

$\bar{\theta} = \hat{\theta}$ —we shall have $\bar{\theta}^R = \hat{\theta}$.

2

Proof of Proposition 3: If $\bar{\theta} \in (\bar{\theta}^D, \bar{\theta}^R]$, a move to a representative system will induce a switch to policy centralization, and, by construction, will raise welfare for the majority in A relative to the noncooperative outcome (since the high-preference majority in A chooses it). It remains to be shown that welfare is also higher for the majority in B . Consider first the case $\bar{\theta}^D = \hat{\theta}$. The difference $\Pi_B^C(\underline{\theta}, \underline{\theta} | \underline{\theta}) - \Pi_B^N(\underline{\theta}, \bar{\theta} | \underline{\theta}) \equiv \check{\Omega}_B$ can be shown, as in earlier proofs, to be positive when evaluated at $\bar{\theta} = \underline{\theta}$, and decreasing and strictly concave in $\bar{\theta}$. Then, since the function is continuous, there exists $\bar{\theta}^P \in (\bar{\theta}^D, \bar{\theta}^R]$ such that the difference is positive for all $\bar{\theta} \leq \bar{\theta}^P$. Note that $\hat{\Omega}_B > 0$ when evaluated at $\bar{\theta}^P$, which implies $\bar{\theta}^P < \bar{\theta}^R$. Consider, next, the case $\bar{\theta}^D = \tilde{\theta} < \bar{\theta}^R$. In this case, the low-preference majority in B will also experience a gain from centralization occurring over the range $(\bar{\theta}^D, \bar{\theta}^R]$, since they now obtain their favoured cooperative tax rate rather than the noncooperative outcome that prevails with two low-preference policymakers. Finally, consider the case $\bar{\theta}^D = \bar{\theta}' < \tilde{\theta}$. The sign of $\check{\Omega}_B$ at $\bar{\theta} = \bar{\theta}'$ is generally ambiguous. If it is positive, since $\check{\Omega}_B$ is monotonically decreasing in $\bar{\theta}$, there will be a $\bar{\theta}^P > \bar{\theta}' = \bar{\theta}^D$ such that both majorities gain from a switch to a representative system; otherwise $\bar{\theta}^P = \bar{\theta}^R$. If the low-preference majority in B gain from a move to a representative system produces, then the high-preference minority in B must also gain: decentralization involves lower taxes in B than centralization; hence, if the low-preference majority in B prefers centralization, it must be the case that effective public effective good consumption in B is higher under centralization than under decentralization; and if this produces a gain for low-preference individuals a gain, it must also do so for high-preference individuals, who value collective consumption more.

2