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Abstract

This paper examines policy centralization outcomes in a two-jurisdiction, political economy model of public good provision choices with heterogeneous policy preferences and interjurisdictional policy spillovers, under alternative democratic choice procedures, namely, direct democracy 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. 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.

JEL Classification: H2, H7.

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I Introduction

Policy spillovers across countries create a need for policy co-ordination, which is usually achieved by means of international agreements in support of centralized policy making. Different countries, however, adopt different democratic procedures with respect to the choice of whether or not to participate in such 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 decide. 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.

In this paper we compare direct and representative democracy with respect to their implications for policy centralization outcomes. 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 spillovers stemming from locally provided public goods, which, in turn, are funded by a general tax paid by residents. Individuals differ with respect to their intensity of preferences towards the public good, 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 some positive probability.

Policy centralization under direct democracy is described 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. In the second stage, following the outcome of the centralization decision in the previous stage, citizens elect candidates to represent them. In the third stage, the elected policymakers make policy choices, either noncooperatively or cooperatively depending on the outcome of the referendum. In contrast, policy centralization under representative democracy is a three-stage game where citizens delegate the decision of whether or not to centralize policies to elected policymakers. In the first stage, citizens in both regions elect a representative. In the second stage, elected policymakers decide whether or not to centralize policy making, with centralization occurring if policymakers in both regions opt for it. In the third stage, the elected policymakers make policy choices, either noncooperatively or cooperatively depending on their earlier common choice.

If the majorities of both jurisdictions share common 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 made by referendum: representative democracy can support policy centralization even when the difference in policy preferences across jurisdictions makes it impossible to achieve centralization by referendum.

The reason for this result is that in a representative democracy the voters of a pro-coordination jurisdiction can induce a reluctant jurisdiction to centralize policies by elected representatives that are of the same type as the majority in the reluctant jurisdiction. This ensures that tax preferences between the two regions' elected politicians will coincide, resulting in harmonization at the tax rate preferred by the majority in the reluctant jurisdiction. Thus, delegation of centralization choices to policymakers can effectively act as a policy commitment device by a pro-centralization jurisdiction and induce a reluctant partner to cooperate. 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. Voters can exploit the inability of policymakers to deviate from their own preferred choice in order to achieve commitment under delegation.[1]

As a corollary of this result, when only representative democracy is able to support policy centralization, it will result in policies converging towards the choice preferred by the reluctant partner, rather than in a dilution of policy preferences as predicted by earlier analyses of union formation such as Besley and Coate (1998b). If this occurs, however, the winner from policy coordination will typically be the partner whose preferences are prevailing, not the accommodating partner: by electing a representative of the same type as the majority in the reluctant jurisdiction, the majority in the accommodating country can force an outcome that they prefer to noncooperation, with the reverse being true for the reluctant partner. Nevertheless, we show that if the centralization mechanism is inflexible—giving equal decision-making weight to each partner, with no bargaining being possible over the arrangement—in some situations a move from direct democracy to representative democracy can raise welfare for the majorities of both jurisdictions. Thus, when policy centralization choices are involved, the interest of both jurisdiction's majorities can be better served by elected representatives than by a direct referendum.

The rest 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, and Section V provides a comparison of the two procedures on welfare grounds, and discusses the implications of bargaining over decision-making rules, and Section VI presents our conclusions and

[1]Strategic 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 commitment properties in the context of capital tax competition. But to the best of our knowledge, this argument has not been made with respect to the comparison between direct and indirect democracy in the context of economic centralization.

discusses possible extensions.

II Technology, preferences and policy choices

We cast our argument in a stylized two-region model of policy spillovers with heterogeneous policy preferences and policymakers elected by majority voting. For simplicity, we model spillovers as a direct positive 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, for example, in the case of interjurisdictional tax competition. This section will describe the economic environment as well as policy outcomes with and without policy centralization, for given policymakers in each region. The analysis of political equilibria and centralization outcomes is subsequent in later sections.

The economic environment

Consider two independent regions of identical population size, n, indexed by $k = A; B$. 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 kth region Y_k, is produced from labor, which is inelastically supplied by each individual in an amount equal to unity. The production technology is assumed to be linear in total labor 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 k is used for private consumption and for **local** provision of the public good. The marginal rate of transformation between private consumption and the public good in production is assumed to be identical for both regions and, without loss of generality, equal to unity.

In each region, local provision of the public good, g_k is funded by a proportional income tax levied at rate t_k, which is assumed to be the only fiscal instrument available in each region.[2] The level of private consumption for an individual residing in

[2] Although, as we discuss below, our model accounts for preference heterogeneity, preferences are

jurisdiction k is then

$$c_k = 1 - t_k; \quad k = A, B. \tag{1}$$

and public good provision in each jurisdiction is

$$g_k = n t_k; \quad k = A, B. \tag{2}$$

The total amount of public consumption available in region k will not generally coincide with local provision due to the presence of inter-regional spillovers from the other region. We can capture spillovers by assuming that $\gamma \in (0, 1)$ represents the fraction of local public good in either region that spills over into the other region.[3] Thus, effective public consumption in each jurisdiction is

$$S_k = g_k + \gamma g_j; \quad j \neq k. \tag{3}$$

Even though populations are of the same size across regions, the cross-regional composition of the populations may differ in their preferences towards private and public consumption. These are represented by a quasilinear utility function

$$u(c_k, S_k | \theta) = c_k + \theta S_k^{\eta}; \quad \theta = \underline{\theta}, \overline{\theta}; \quad k = A, B. \tag{4}$$

with $\eta \in (0, 1)$ and $\theta > 0$. This specification implies a constant value for the elasticity of the marginal valuation of the public good equal to $\eta - 1 < 0$.[4]

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

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unobservable and thus taxes cannot be conditioned on them, even though policymakers may have full information about the distribution of preferences.

[3] Spillovers are assumed to be bilateral and symmetric since γ is not differentiated between regions.

[4] The marginal valuation is $\theta \eta S_k^{(\eta - 1)}$. Furthermore, both goods are essential and (weakly) normal, and the marginal rate of substitution is increasing in θ.

Noncooperative policy outcomes

In the absence of cooperation, taxes in jurisdiction k 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 $m_k^N \in \{\underline{\theta}, \overline{\theta}\}$ represent the policymaker's type in jurisdiction k (where the superscript N denotes a noncooperative scenario). Then, solution to the above problem yields best-response functions

$$t_k^*(t_j | m_k^N) = \alpha (m_k^N)^{1/(1-\eta)}/n - \gamma t_j, \quad j \neq k, \tag{5}$$

where $\alpha \equiv (\eta n)^{1/(1-\eta)}$. 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 how policy preferences account for the private opportunity cost of local public good provision—as reflected by 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 higher the amount provided in a region, the lower the preferred tax in the other region. Also note that

$$S_k^N(m_k^N, m_j^N) = n\left[t_k^*(t_j, m_k^N) + \gamma t_j\right] = \alpha (m_k^N)^{1/(1-\eta)}, \quad j \neq k. \tag{6}$$

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 symmetric noncooperative equilibrium is given by tax rates $t_k^N(m_A^N, m_B^N)$, $k = A, B$, that are best-responses to each other. With a constant-elasticity marginal valuation for public consumption (5) can be solved to obtain explicit expressions:

$$t_k^N(m_k^N, m_j^N) = \frac{\alpha}{n(1-\gamma^2)}\left[(m_k^N)^{1/(1-\eta)} - \gamma (m_j^N)^{1/(1-\eta)}\right], \quad j \neq k. \tag{7}$$

When both policymakers are of the same type, noncooperative equilibrium tax rates are also identical across regions, with rates being higher for high-type policymakers than they are for low-type policymakers. If policymakers are different types, then the region with the high-type policymaker will have relatively higher tax rates than the region with the low-type policymaker.[5]

Noncooperative equilibrium payoffs, as experienced by individuals of type $v_k \in \{\underline{\mu}, \bar{\mu}\}$ residing in jurisdiction k, are then

$$\Pi_k^N(m_k^N; m_j^N \mid v_k) = 1 - t_k^N(m_k^N; m_j^N) + v_k S_k^N(m_k^N)^\eta; \quad j \neq k. \tag{8}$$

Policy centralization outcomes

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)). A policymaker of type m^C will then select a common tax $t = t_A = t_B$ so as to maximize

$$1 - t + m^C[(1+\gamma)nt]^\eta. \tag{9}$$

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

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

This yields a level of public good consumption equal to

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

Expected payoffs as experienced by individuals of type $v_k \in \{\underline{\mu}, \bar{\mu}\}$ residing in jurisdiction k, if policymakers of types m_k^C, m_j^C are elected in the two jurisdictions, are

$$\Pi_k^C(m_k^C; m_j^C \mid v_k) = 1 - \frac{1}{2}\left[t_k^C(m_k^C) + t_k^C(m_j^C)\right] + \frac{1}{2}v_k\left[S^C(m_k^C)^\eta + S^C(m_j^C)^\eta\right]; \; k \neq j. \tag{12}$$

[5] Necessary conditions for positive tax rates in both regions when $m_k^N > m_j^N$ are $\gamma < (m_k^N/m_j^N)^{1/(1-\eta)} < 1/\gamma$.

III The harmonization choice: direct democracy

Under direct democracy the decision to centralize policy is made by referendum and not delegated to elected politicians, who cannot renege on a coordination agreement once it is in force. We model this scenario as a three-stage game: in the first stage, voters in each region decide whether or not to centralize policy making by majority voting; for centralization to occur, it must be supported by a majority of voters in both regions; in the second stage, citizens elect candidates to represent them, again by majority voting; in the third stage, the elected policymakers in both regions select policies.

Focusing on subgame-perfect equilibria, we analyze the game backwards, starting from the second stage (the last stage has been discussed in the previous section). In the second stage of the game, voters in the two regions vote for candidates who are either a $\overline{\mu}$-type or a $\underline{\mu}$-type.[6]

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.

Under policy centralization, the policymaker in A will be a high-type individual and the policymaker in B will be a low-type individual (proofs are in the Appendix):

Lemma 1: Under direct democracy and policy centralization, the elected candidate in each jurisdiction, in a voting equilibrium with weakly undominated strategies, will be of the same type as the majority in that jurisdiction, i.e., $m_A^C = \overline{\mu}$ and $m_B^C = \underline{\mu}$.

Without policy centralization, 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 com-

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

parisons are independent of the type of policymaker in the other region[7] and are represented by the differences, for the majority in A and B respectively as, $\Delta_A^N \equiv \Pi_A^N(\bar{\theta}, m_B^N \mid \bar{\theta}) - \Pi_A^N(\underline{\theta}, m_B^N \mid \bar{\theta})$ and $\Delta_B^N \equiv \Pi_B^N(\underline{\theta}, m_A^N \mid \underline{\theta}) - \Pi_B^N(\bar{\theta}, m_A^N \mid \underline{\theta})$ for all $m_A^N, m_B^N = \bar{\theta}, \underline{\theta}$. Notice that both of these expressions are zero if and only if $\bar{\theta} = \underline{\theta} = \theta$. Furthermore, Δ_B^N is monotonically increasing in $\bar{\theta}$.[8] Thus, the majority in region B will always elect a low-type candidate. Given this, a high-type voter in A will (weakly) prefer to vote for a high-type candidate if $\Delta_A^N \geq 0$ and a low-type candidate otherwise. Which type of candidate they choose to vote for will depend upon both the amount of preference heterogeneity and on 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 high preference region can essentially block this 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. But, for this scenario, when preference heterogeneity is large enough, high-types voters want much more public consumption relative to low-type voters and will incur the costs of free-riding by voting for a high-preference candidate.

Lemma 2: Under direct democracy and no policy centralization, if $1 - \eta - \gamma^2 > 0$, there

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

[8]Expanding obtains

$$\Delta_B^N \equiv -\frac{\alpha}{n}\underline{\theta}\left\{\left[\frac{\bar{\theta}^{\eta/(1-\eta)} - \underline{\theta}^{\eta/(1-\eta)}}{\eta}\right] - \left[\frac{\bar{\theta}^{1/(1-\eta)} - \underline{\theta}^{1/(1-\eta)}}{(1-\gamma^2)}\right]\right\}; \quad (13)$$

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

exists some $\bar{\theta}_A^N(\underline{\theta})$ such that for $\bar{\theta} \geq \bar{\theta}_A^N(\underline{\theta})$, the elected candidate in the high-preference region will be a high-type individual and the elected candidate in the low-preference region will be a low-type individual. If either $1 - \eta - \gamma^2 \leq 0$ or $1 - \eta - \gamma^2 > 0$ and $\bar{\theta} \in \left[\underline{\theta}, \bar{\theta}_A^N(\underline{\theta})\right)$, the elected candidates in both the high- and low-preference regions will be low-type individuals.

Whether or not the majority in a region will support harmonization in the first stage of the game then depends on a comparison of cooperative and noncooperative payoffs. Because of Lemmas 1 and 2, when $\Delta_A^N \geq 0$ the difference between cooperative and noncooperative payoffs for the majority-type voters in the two regions are

$$\hat{\Omega}_A(\bar{\theta}, \underline{\theta} | \bar{\theta}) \equiv \Pi_A^C(\bar{\theta}, \underline{\theta} | \bar{\theta}) - \Pi_A^N(\bar{\theta}, \underline{\theta} | \bar{\theta}), \tag{14}$$

$$\hat{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta}) \equiv \Pi_B^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) - \Pi_B^N(\underline{\theta}, \bar{\theta} | \underline{\theta}). \tag{15}$$

Whereas when $\Delta_A^N < 0$, the relevant comparisons are

$$\check{\Omega}_A(\bar{\theta}, \underline{\theta} | \bar{\theta}) \equiv \Pi_A^C(\bar{\theta}, \underline{\theta} | \bar{\theta}) - \Pi_A^N(\underline{\theta}, \underline{\theta} | \bar{\theta}), \tag{16}$$

$$\check{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta}) \equiv \Pi_B^C(\underline{\theta}, \bar{\theta} | \underline{\theta}) - \Pi_B^N(\underline{\theta}, \underline{\theta} | \underline{\theta}). \tag{17}$$

For the purpose of our following discussion, let $\hat{\theta}_B(\underline{\theta})$ and $\check{\theta}_B(\underline{\theta})$ be implicitly defined as the values of θ (if they exist) that make (15) and (17) respectively equal to zero, and let $\hat{\theta}_A(\underline{\theta})$ and $\check{\theta}_A(\underline{\theta})$ be implicitly defined as the values of θ (if they exist) that make (14) and (16) respectively equal to zero.

It is evident upon comparing condition (7) with (10) that, when the majorities in the two jurisdictions are of the same type, policy centralization leads to higher tax rates, and a higher common payoff, than decentralized policy making, i.e., noncooperative outcomes can be improved upon, and no disagreement will occur under a symmetric centralization rule when the majorities in the two jurisdictions are of the same type. When policymakers differ across regions, however, whether policy centralization can improve the payoffs of both regions' policymakers again depends upon the amount of preference heterogeneity as well as on the intensity of the spillovers:

Lemma 3: Under direct democracy: (i) if $\Delta_A^N \geq 0$, there exists an interval $\left[\underline{\theta}, \hat{\theta}_B(\underline{\theta})\right]$ such that policy centralization is (weakly) preferred to noncooperation by the majority of the low-preference region for all $\bar{\theta} \in \left[\underline{\theta}, \hat{\theta}_B(\underline{\theta})\right]$; (ii) if $\Delta_A^N < 0$, there exists an interval $\left[\underline{\theta}, \check{\theta}_B(\underline{\theta})\right]$ such that policy centralization is (weakly) preferred to noncooperation by the majority of the low-preference region for all $\bar{\theta} \in \left[\underline{\theta}, \check{\theta}_B(\underline{\theta})\right]$.

Note that since $\Pi_B^N(\underline{\theta}, \underline{\theta} \mid \underline{\theta}) < \Pi_B^N(\underline{\theta}, \bar{\theta} \mid \underline{\theta})$, we have $\hat{\theta}_B(\underline{\theta}) < \check{\theta}_B(\underline{\theta})$, which implies that $\hat{\theta}_B(\underline{\theta}) < \check{\theta}_B(\underline{\theta})$. But we need not worry about $\Delta_A^N = 0$ within the interval $[\hat{\theta}_B(\underline{\theta}), \check{\theta}_B(\underline{\theta})]$ since

Lemma 4: When there exists $\bar{\theta}_A^N(\underline{\theta})$ such that $\Delta_A^N = 0$, it must be the case that $\bar{\theta}_A^N(\underline{\theta}) < \hat{\theta}_B(\underline{\theta})$.

Both intervals will also be smaller the larger is γ. This is because a low-type policymaker's noncooperative payoff 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 a low-preference policymaker 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 policy maker than with a high-type policymaker; free-riding opportunities are higher the stronger the intensity of preferences for public consumption in the other region and the stronger is the spillover. Then, if preference heterogeneity is large, and the spillover is strong (γ is large), a low-preference policymaker may prefer noncooperation to centralization. If, however, the degree of preference heterogeneity is small and free-riding is limited (γ is small) the expected payoff to centralization will be close to the payoff that the low-type would receive if her own preferred harmonized rate were implemented, and thus the expected payoff to harmonization may still exceed the payoff from noncooperation. Both intervals will also be smaller the larger is η: a large η implies an inelastic marginal valuation for public consumption in the high-preference region, which facilitates free-riding by the low-preference region.

It can also be shown that the low-preference region will always be pivotal with respect to centralization choices:

Lemma 5: Under direct democracy, the majority in the high-preference region will always prefer policy centralization if the majority in the other region does.

Combining Lemmas 3 and 5 allows us to state our first proposition:

Proposition 1: Under direct democracy, policy centralization will occur if and only if $\bar{\mu} \in \left[\underline{\mu}; \hat{\mu}_B(\underline{\mu})\right]$.

Under direct democracy, policy centralization can still occur even when the two regions are heterogeneous 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 random realization of preferred harmonized tax rates. But, if preference heterogeneity is too large, policy centralization will not take place either because the majority of a low-preference region can always do better by free-riding on the other region, or because the policy choice by the other region's policymaker under policy centralization is too far from that which is preferred by the majority in the low-preference region.

IV The harmonization choice: representative democracy

Under representative democracy voters delegate the decision of whether or not to centralize policy making to the elected politicians themselves. 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. If we were to interpret this sequence in terms of real-world political procedures, it would correspond to a scenario where coordination agreements are not agreed upon once and for all, but must be continuously renewed by any newly elected policymakers.

In the second stage of this game, an elected policymaker of type m_k^R, $k = A; B$, will support centralization under the same conditions for which a majority of the same type as the policymaker would support it under direct democracy: even when noncooperation is chosen under direct democracy, the policymaker in a region remains the same type as the majority, which implies that noncooperation would involve the same policymakers' types whether the decision to centralize were made by elected policymakers or, at an earlier stage, by majorities of the same types as those policymakers. In contrast to direct democracy where it is possible for the policymaker in the high-preference region to be of a low type in the absence of centralization and of a high type with cooperation (Lemmas 1 and 2), it must be of the same type under representative democracy, since an elected representative, if cooperation is rejected, does not have the option of delegating noncooperative policy choices to a policymaker of a different type. Along with Lemma 4, this implies that, unlike in the direct democracy case, the conditions under which an elected policymaker of type m_k^R, $k = A; B$, will support centralization are given by conditions (14) and (15).

In a representative democracy, which type of policymaker does the low-preference majority in region B elect? If $\bar{\mu} \le \hat{\mu}_B(\underline{\mu})$ and a high-type policymaker is elected in region A, then centralization will occur regardless of the type of policymaker elected in B: with a high-type policymaker in B, low-preference voters in B will get a payoff $\Pi_B^C(\bar{\mu}; \bar{\mu} | \underline{\mu})$; with a low-type policymaker being elected, they will receive a payoff $\Pi_B^C(\underline{\mu}; \bar{\mu} | \underline{\mu})$. The latter is larger than the former so the majority in B will elect a low-type candidate. If $\bar{\mu} > \hat{\mu}_B(\underline{\mu})$ and a high-type policymaker is elected in A, low-type voters in B compare the noncooperative payoff they get from voting for a low-type candidate, $\Pi_B^N(\underline{\mu}; \bar{\mu} | \underline{\mu})$) with $\Pi_B^C(\bar{\mu}; \bar{\mu} | \underline{\mu})$. The former is larger than the latter.[9] A similar chain of reasoning can establish that for all $\bar{\mu} \ge \underline{\mu}$, if a low-type policymaker is elected in region A, low-type voters in region B will elect a low-preference policymaker.[10] Thus, the majority in

[9]For all $\bar{\mu} > \hat{\mu}_B$, $\hat{\Omega}_B(\underline{\mu}; \bar{\mu} | \underline{\mu}) < 0$ which implies that $\Pi_B^N(\underline{\mu}; \bar{\mu} | \underline{\mu}) > \Pi_B^C(\underline{\mu}; \bar{\mu} | \underline{\mu}) > \Pi_B^C(\bar{\mu}; \bar{\mu} | \underline{\mu})$.

[10]When a low-type policymaker is elected in region A, then the low-type majority in B receive

region B will always elect a low-type policymaker since it is a dominant strategy for them to do so.

Lemma 6: *In a representative democracy, the policymaker elected in the low-preference region will be a low-type candidate.*

In contrast, given that a low-preference policymaker is always elected in region B, the majority in the high-preference region cannot unilaterally support centralization by voting for a high-type policymaker. A high-type voter in region A must compare the payoffs between voting for a high-type policymaker and voting for a low-type one. If $\bar\theta \in \left[\underline\theta, \hat\theta_B(\underline\theta)\right]$, voting for a high-type policymaker yields a payoff of $\Pi^C_A(\bar\theta, \underline\theta \mid \bar\theta)$ while voting for a low-type policymaker yields $\Pi^C_A(\underline\theta, \underline\theta \mid \bar\theta)$. This difference is always positive since $\Pi^C_A(\bar\theta, \underline\theta \mid \bar\theta) > \Pi^C_A(\underline\theta, \underline\theta \mid \bar\theta)$ and so a high-type candidate will be elected in A with centralization and a dilution of policy preferences being the outcome. On the other hand, when $\bar\theta > \hat\theta_B(\underline\theta)$, whether or not a high-type candidate will be supported by the majority in the high-preference jurisdiction depends on a comparison of the high-type's payoff from harmonizing at their least preferred rate with the corresponding noncooperative payoff when the policymakers are of different types, i.e., on the difference $\tilde\Omega_A(\bar\theta, \underline\theta \mid \bar\theta) \equiv \Pi^C_A(\underline\theta, \underline\theta \mid \bar\theta) - \Pi^N_A(\bar\theta, \underline\theta \mid \bar\theta)$. Hence, even when voting is sincere, a high-type policymaker may not be able to support a high-type majority preferred outcome. Let $\tilde\theta_A(\underline\theta)$ be the value (if it exists) that makes $\tilde\Omega_A(\bar\theta, \underline\theta \mid \bar\theta) = 0$ and recall that $\hat\theta_A(\underline\theta)$ is the value (if it exists) of θ that makes $\hat\Omega_A(\bar\theta, \underline\theta \mid \bar\theta) = 0$. Then,

Lemma 7: *In a representative democracy: (i) if $1 - \eta - \gamma^2 > 0$, then there exists $\hat\theta_A(\underline\theta)$ and $\tilde\theta_A(\underline\theta)$ such that $\hat\theta_B(\underline\theta) < \tilde\theta_A(\underline\theta) < \hat\theta_A(\underline\theta)$ and such that $\tilde\Omega_A(\tilde\theta_A(\underline\theta), \underline\theta \mid \tilde\theta_A(\underline\theta)) \geq 0$ for all $\bar\theta \geq \tilde\theta_A(\underline\theta)$. (ii) if $1 - \eta - \gamma^2 \leq 0$ then $\tilde\Omega_A(\bar\theta, \underline\theta \mid \bar\theta) > 0$ for all $\bar\theta \geq \underline\theta$.*

The following result follows from Lemmas 6 and 7:

$\Pi^C_B(\underline\theta, \underline\theta \mid \underline\theta)$ by voting for their own type and either $\Pi^C_B(\underline\theta, \bar\theta \mid \underline\theta)$ (when $\bar\theta \leq \check\theta_B(\underline\theta)$) or $\Pi^N_B(\bar\theta, \underline\theta \mid \underline\theta)$ (when $\bar\theta > \check\theta_B(\underline\theta)$). The former payoff is always larger than either of the latter two.

Lemma 8: In a representative democracy: (i) if $1 - \eta - \gamma^2 > 0$ then the majority in the high-preference jurisdiction will elect a high-type candidate for all $\bar{\theta} \in \left[\underline{\theta}, \hat{\theta}_B(\underline{\theta})\right]$, and for all $\bar{\theta} \geq \tilde{\theta}_A(\underline{\theta})$. Otherwise the elected policymaker will be a low-type candidate; (ii) If $1 - \eta - \gamma^2 \leq 0$, the majority in the high-preference region will elect a low-type candidate for all $\bar{\theta} \geq \underline{\theta}$.

The following result immediately follows from the previous ones:

Proposition 2: Under representative democracy: (i) when $1 - \eta - \gamma^2 > 0$, harmonization will occur for all $\bar{\theta} \in \left[\underline{\theta}, \tilde{\theta}_A(\underline{\theta})\right] \supset \left[\underline{\theta}, \hat{\theta}_B(\underline{\theta})\right]$; (ii) when $1 - \eta - \gamma^2 \leq 0$, harmonization will occur for all $\bar{\theta} > \underline{\theta}$.

Thus, delegation of policy centralization choices to elected policymakers in a representative democracy makes 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 $\bar{\theta} \in \left(\hat{\theta}_B(\underline{\theta}), \tilde{\theta}_A(\underline{\theta})\right]$), it will not involve preference dilution but convergence toward the reluctant partner's preferred harmonized rate: here, the pro-harmonization region prefers centralization even at the cost of harmonizing policies at the least preferred rate. Under direct democracy, commitment through delegation is not possible, and thus the majority of a low-preference region can rely on being able to free-ride on a high-type policymaker if centralization is rejected. In contrast, under representative democracy, the majority of a high-preference, pro-coordination jurisdiction can "credibly commit" to low taxes by electing a low-type policymaker, thus inducing a low-preference policymaker in the other jurisdiction to opt for policy centralization.[11]

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

V Welfare comparison of direct and representative democracy outcomes

Centralization is not in itself necessarily desirable for both regions. Payoffs will generally be different under the two procedures, and we can expect that interests may be conflicting, i.e., that moving to one system may hurt the majority in one jurisdiction while benefiting the other.

For $\bar{\theta} \in \left(\hat{\theta}(\underline{\theta}), \tilde{\theta}_A(\underline{\theta})\right)$, policy centralization under representative democracy will take the form of the high-preference region converging towards the policy preferences of the low-preference region. Who benefits from this outcome?

In some cases it is the majority in the low-preference region that benefits from a move to representative democracy, while the majority in the other region are made worse off. When $1 - \eta - \gamma^2 \leq 0$ and $\bar{\theta} \in \left(\underline{\theta}, \check{\theta}_B(\underline{\theta})\right)$, 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; which will result in a lower payoff for high-preference individuals and a higher payoff for low preference individuals under representative democracy.

When $1 - \eta - \gamma^2 > 0$ and $\bar{\theta} \in \left(\underline{\theta}, \hat{\theta}_B(\underline{\theta})\right)$, if centralization takes place both under direct democracy and under representative democracy, it will have the same form, i.e., it will involve a high-type and a low-type policymaker in both cases. If it occurs only under representative democracy (i.e., $\bar{\theta} \in \left(\hat{\theta}_B(\underline{\theta}), \tilde{\theta}_A(\underline{\theta})\right)$), our previous discussion suggests that the majority of the high-preference region will benefit from accommodating the low-preference region. But it is not clear if the low-preference region always benefits from this accommodation: with $\bar{\theta} \in \left(\hat{\theta}_B(\underline{\theta}), \tilde{\theta}_A(\underline{\theta})\right)$, the outcome in a direct democracy is noncooperative with low-preference individuals free-riding on the high-preference region and receiving a payoff of $\Pi_B^N(\underline{\theta}, \bar{\theta} \,|\, \underline{\theta})$; in a representative democracy, low-preference individuals receive $\Pi_B^C(\underline{\theta}, \bar{\theta} \,|\, \underline{\theta})$. Let $\tilde{\Omega}_B(\underline{\theta}, \bar{\theta} \,|\, \underline{\theta}) \equiv \Pi_B^C(\underline{\theta}, \bar{\theta} \,|\, \underline{\theta}) - \Pi_B^N(\underline{\theta}, \bar{\theta} \,|\, \underline{\theta})$. If this is nonnegative, the low-preference majority in region B will do (weakly) better in a representative democracy.

As we have done before, let $\hat{\theta}_B(\underline{\theta})$ denote the value of $\underline{\theta}$ (if it exists) for which $\tilde{\Omega}_B(\underline{\theta}, \bar{\theta} \,|\, \underline{\theta}) = 0$. Then we can show that even when no bargaining over the form of the centralization arrangement is possible, it is nevertheless possible for both regions' majorities to be made better off by a move to representative democracy:

Proposition 3: *There exists a $\tilde{\theta}_B(\underline{\theta})$, with $\hat{\theta}_B(\underline{\theta}) < \tilde{\theta}_B(\underline{\theta}) < \tilde{\theta}_A(\underline{\theta})$, such that if $\bar{\theta} \in \left(\hat{\theta}_B(\underline{\theta}); \tilde{\theta}_B(\underline{\theta})\right)$ a move from direct democracy to representative democracy raises the payoffs of the majority types in both regions.*

Clearly, the opposite move—from representative democracy to direct democracy—can never benefit both regions' majorities: for $\bar{\theta} \in \left(\hat{\theta}_B(\underline{\theta}); \tilde{\theta}_B(\underline{\theta})\right)$, both majorities are made worse off by such move, and for $\bar{\theta} \in \left(\tilde{\theta}_B(\underline{\theta}); \tilde{\theta}_A(\underline{\theta})\right)$ the majority 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. Clearly, the choice of procedure is by definition a matter for the individual region to decide (an agreement to harmonize procedures would just push the problem up one level). We can then consider 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 are affected by a change of procedure in the other region).

The following proposition follows from our previous analysis:

Proposition 4: *Direct democracy will be preferred to representative democracy by the majority in the high-preference region if $1 - \eta - \gamma^2 \leq 0$ and $\bar{\theta} \in \left(\hat{\theta}(\underline{\theta}); \check{\theta}(\underline{\theta})\right)$; otherwise representative democracy will be (weakly) preferred.*

The prediction of our analysis is therefore 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 non-cooperative 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 implications of bargaining. Our analysis has focused on a very rigid model of centralization, namely an arrangement where the two regions are appointed to choose a common policy with equal probabilities. One could argue that the two countries involved may achieve more by bargaining. Clearly, if full contracting (with side payments) were possible, harmonization could always be sustained. But with full contracting, the distinction between regions would effectively become meaningless: the two jurisdictions could merge and combine their two political systems into a single one that accounts for 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 in an incomplete-contracting environment.

But, even when full contracting is not possible, a bargained outcome could still be supported by a different choice of policy selection weights, i.e., through an arrangement whereby the two regions are appointed to select harmonized taxes with different weights. If such an arrangement is possible, then it will make it easier to achieve policy centralization under direct democracy, i.e., it will increase the size of the region $\left[\theta; \hat{\theta}_B(\theta)\right]$. Furthermore, the possibility of bargaining over the harmonization rule will exhaust the scope for achieving a payoff improvement for the majorities of both countries: by construction, all of the payoff combinations that can be supported under representative democracy can also be supported under direct democracy with an appropriate choice of weights, implying that if a joint payoff improvement were possible by moving from one system to the other, it could be achieved through bargaining by the two majorities under direct democracy. Thus, with bargaining, a move from one system to the other will always either leave both majorities indifferent or make the majority in one region better off and the other worse off.

VI Conclusions

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 the majorities of both regions.

Our analysis can be extended in several directions. First, different forms of spillovers requiring policy coordination—such as fiscal externalities, transborder environmental externalities, externalities in trade policies—could be explicitly modelled and studied. 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 exante 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.[12] Finally, in a multi-stage setting, a once-and-for-all

[12] Even when coordination has an asymmetric impact on regional payoffs expost, a coordination agreement that allows for such asymmetries may still be desirable exante 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 exante

decision to centralize policies would involve additional strategic considerations for policymakers in office, as it could affect the outcome of future elections.[13]

and unobservable expost.

[13]The 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.

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Appendix

A1. Functions and derivatives

This section contains the expressions that are required for the proofs of all lemmas and propositions (which are contained in the next section of this Appendix).

A1.1 Δ expressions

The functions $\Delta_A^N = \Pi_A^N(\bar\theta;\underline\theta|\bar\theta) - \Pi_A^N(\underline\theta;\underline\theta|\bar\theta) = \Pi_A^N(\bar\theta;\bar\theta|\bar\theta) - \Pi_A^N(\underline\theta;\bar\theta|\bar\theta)$ and $\Delta_B^N = \Pi_B^N(\underline\theta;\underline\theta|\underline\theta) - \Pi_B^N(\bar\theta;\underline\theta|\underline\theta) = \Pi_B^N(\underline\theta;\bar\theta|\underline\theta) - \Pi_B^N(\bar\theta;\bar\theta|\underline\theta)$ can be expanded using expressions (6)-(8). We obtain

$$\Delta_A^N = \frac{\alpha}{n}\left\{\bar\theta\left[\frac{\bar\theta^{\eta/(1-\eta)} - \underline\theta^{\eta/(1-\eta)}}{\eta}\right] - \left[\frac{\bar\theta^{1/(1-\eta)} - \underline\theta^{1/(1-\eta)}}{1-\gamma^2}\right]\right\}. \tag{18}$$

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

Respectively differentiating each of the above with respect to $\bar\theta$ yields

$$\frac{\partial\Delta_A^N}{\partial\bar\theta} = = \frac{\alpha}{n}\left\{\frac{(\bar\theta^{\eta/(1-\eta)} - \underline\theta^{\eta/(1-\eta)})}{\eta} - \frac{\gamma^2\bar\theta^{\eta/(1-\eta)}}{(1-\eta)(1-\gamma^2)}\right\}. \tag{20}$$

$$\frac{\partial\Delta_B^N}{\partial\bar\theta} = -\frac{\alpha\bar\theta^{\eta/(1-\eta)}}{n(1-\eta)}\left(\frac{\underline\theta}{\bar\theta} - \frac{1}{(1-\gamma^2)}\right). \tag{21}$$

Differentiating expression (20) then yields

$$\frac{\partial^2\Delta_A^N}{\partial\bar\theta^2} = \frac{\alpha\bar\theta^{(2\eta-1)/(1-\eta)}}{n(1-\eta)}\left\{1 - \frac{\eta\gamma^2}{(1-\eta)(1-\gamma^2)}\right\}. \tag{22}$$

A1.2 Ω expressions

The functions $\hat\Omega_A(\bar\theta;\underline\theta|\bar\theta)$ and $\hat\Omega_B(\underline\theta;\underline\theta|\underline\theta)$ can be expanded by employing equations (6)-(8) and (10)-(12). We obtain

$$\hat\Omega_A(\bar\theta;\underline\theta|\bar\theta) = \bar\theta^{1/(1-\eta)}z + \underline\theta^{1/(1-\eta)}y + \underline\theta^{1/(1-\eta)}\underline\delta. \tag{23}$$

$$\hat{\Omega}_B(\underline{\theta},\bar{\theta}|\underline{\theta}) = \underline{\theta}^{1/(1-\eta)} z + \bar{\theta}^{1/(1-\eta)} y. \tag{24}$$

where

$$z = \frac{\alpha}{n}\left[\frac{(1+\gamma)^{\eta/(1-\eta)}}{2}\left(\frac{1}{\eta} - 1\right) + \frac{1}{1-\gamma^2} - \frac{1}{\eta}\right]. \tag{25}$$

$$y = \frac{\alpha}{n}\left[\frac{(1+\gamma)^{\eta/(1-\eta)}}{2}\left(\frac{\underline{\theta}}{\bar{\theta}\eta} - 1\right) - \frac{\gamma}{1-\gamma^2}\right]. \tag{26}$$

$$\delta = \frac{(\bar{\theta}^2 - \underline{\theta}^2)}{\eta\bar{\theta}\underline{\theta}}\frac{(1+\gamma)^{\eta/(1-\eta)}}{2}. \tag{27}$$

Differentiating each of (23) and (24) with respect to $\bar{\theta}$ then yields

$$\frac{\partial\hat{\Omega}_A(\bar{\theta},\underline{\theta}|\bar{\theta})}{\partial\bar{\theta}} = \frac{z\bar{\theta}^{\eta/(1-\eta)}}{1-\eta} + \frac{\alpha(1+\gamma)^{\eta/(1-\eta)}\underline{\theta}^{1/(1-\eta)}}{2n\eta\underline{\theta}}. \tag{28}$$

$$\frac{\partial\hat{\Omega}_B(\underline{\theta},\bar{\theta}|\underline{\theta})}{\partial\bar{\theta}} = -\frac{\alpha\bar{\theta}^{\eta/(1-\eta)}}{n(1-\eta)}\left[\frac{\underline{\theta}}{\bar{\theta}} - \frac{1}{1-\gamma^2}\right]. \tag{29}$$

The derivative of (28) with respect to $\bar{\theta}$ is

$$\frac{\partial^2\hat{\Omega}_A(\bar{\theta},\underline{\theta}|\bar{\theta})}{\partial\bar{\theta}^2} = \frac{z\eta\bar{\theta}^{(2\eta-1)/(1-\eta)}}{(1-\eta)^2}. \tag{30}$$

After employing the appropriate equations in the text and substituting them into $\breve{\theta}_B(\bar{\theta},\underline{\theta}|\underline{\theta})$, we can differentiate with respect to $\bar{\theta}$ to obtain

$$\frac{\partial\breve{\Omega}_B(\bar{\theta},\underline{\theta}|\underline{\theta})}{\partial\bar{\theta}} = \frac{\alpha(1+\gamma)^{\eta/(1-\eta)}\bar{\theta}^{(2\eta-1)/(1-\eta)}(\underline{\theta}-\bar{\theta})}{2n(1-\eta)}. \tag{31}$$

With the difference $\breve{\Omega}_A(\bar{\theta},\underline{\theta}) - \breve{\Omega}_B(\underline{\theta},\bar{\theta})$ being given by

$$\breve{\Omega}_A(\bar{\theta},\underline{\theta}) - \breve{\Omega}_B(\underline{\theta},\bar{\theta}) = (\bar{\theta}-\underline{\theta})\alpha\eta\left[\underline{\theta}^{\eta/(1-\eta)} + \frac{(1+\gamma)^{\eta/(1-\eta)}}{2}(\bar{\theta}^{\eta/(1-\eta)} + \underline{\theta}^{\eta/(1-\eta)})\right]. \tag{32}$$

After employing the appropriate equations in the text and substituting them we get

$$\tilde{\Omega}_A(\bar{\theta};\underline{\theta}|\bar{\theta}) = \frac{\alpha}{n}\underline{\theta}^{1/(1-\eta)}\left[(1+\gamma)^{\eta/(1-\eta)}\left(\frac{\bar{\theta}}{\underline{\theta}\eta}-1\right)-\frac{\gamma}{1-\gamma^2}\right] - \frac{\alpha\bar{\theta}^{1/(1-\eta)}}{n}\left[\frac{1}{\eta}-\frac{1}{1-\gamma^2}\right]. \tag{33}$$

Differentiating this with respect to $\bar{\theta}$ yields

$$\frac{\partial\tilde{\Omega}_A(\bar{\theta};\underline{\theta}|\bar{\theta})}{\partial\bar{\theta}} = \frac{\alpha}{n\eta}\left\{\underline{\theta}^{\eta/(1-\eta)}(1+\gamma)^{\eta/(1-\eta)} - \frac{\bar{\theta}^{\eta/(1-\eta)}(1-\eta-\gamma^2)}{(1-\eta)(1-\gamma^2)}\right\}. \tag{34}$$

And we can do the same experiment with $\tilde{\theta}_B(\underline{\theta};\bar{\theta}|\underline{\theta})$ to obtain the following

$$\tilde{\Omega}_B(\underline{\theta};\bar{\theta}|\underline{\theta}) = \frac{\alpha}{n}\underline{\theta}^{1/(1-\eta)}\left[(1+\gamma)^{\eta/(1-\eta)}\left(\frac{1}{\eta}-1\right)-\frac{1}{\eta}+\frac{1}{1-\gamma^2}\right] - \frac{\alpha\bar{\theta}^{1/(1-\eta)}\gamma}{n(1-\gamma^2)}. \tag{35}$$

$$\frac{\partial\tilde{\Omega}_B(\underline{\theta};\bar{\theta}|\underline{\theta})}{\partial\bar{\theta}} = -\frac{\alpha\gamma\bar{\theta}^{\eta/(1-\eta)}}{(1-\eta)(1-\gamma^2)}. \tag{36}$$

A.2 Proofs

Proof of Lemma 1: In our setup, no matter the number of candidates running, there can be at most only two types in each region. If we rule out the use of 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. With policy centralization, with probability one-half the elected candidate has no influence on policies; with probability one-half she selects policies 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. Q.E.D.

Proof of Lemma 2: $\partial\Delta_A^N/\partial\bar{\theta}$ (equation (20)) is negative when evaluated at $\bar{\theta} = \underline{\theta}$, becoming positive for some $\bar{\theta} > \underline{\theta}$. its derivative with respect to $\bar{\theta}$ (equation (22)) has a constant sign that is positive if $(1 - \eta - \gamma^2) > 0$ and nonpositive if $1 - \eta - \gamma^2 \le 0$. Thus, if $1 - \eta - \gamma^2 > 0$, the function Δ_A^N is strictly convex, and since all functions are continuous, there exists some $\bar{\theta}_A^N(\underline{\theta}) \ge \underline{\theta}$ for which $\Delta_A^N = 0$ and such that for all $\bar{\theta} > \bar{\theta}_A^N(\underline{\theta})$, $\Delta_A^N > 0$ and such that for all $\bar{\theta} < \bar{\theta}_A^N(\underline{\theta})$, $\Delta_A^N < 0$. Thus, the majority of voters in the high-preference region will vote for a high-type candidate if $\bar{\theta} > \bar{\theta}_A^N(\underline{\theta})$, and a low-type candidate otherwise. If $1 - \eta - \gamma^2 \le 0$, the function $\Delta_A^N \le 0$ for all $\bar{\theta} \ge \underline{\theta}$ implying that a high-type majority in the high-preference region will always vote for a low-type candidate. Q.E.D.

Proof of Lemma 3: Case (i): Suppose that $\Delta_A^N \ge 0$, then $\hat{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta})$ (equation (24) is the relevant condition for the majority in region B. This is positive when evaluated at $\bar{\theta} = \underline{\theta}$ and its derivative with respect to $\bar{\theta}$ (equation (29)) is negative for all $\bar{\theta} > \underline{\theta}$ implying that $\hat{\Omega}_B(\underline{\theta}, \bar{\theta} | \bar{\theta})$ is monotonically decreasing in $\bar{\theta}$. Since all functions are continuous, it must also be the case that there exists a $\hat{\theta}_B(\underline{\theta}) > \underline{\theta}$ such that $\hat{\Omega}_B[\underline{\theta}, \hat{\theta}_B(\underline{\theta}) | \underline{\theta}] = 0$, and such that $\hat{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta}) > 0$ for $\bar{\theta} < \hat{\theta}_B(\underline{\theta})$, and $\hat{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta}) < 0$ for $\bar{\theta} > \hat{\theta}_B(\underline{\theta})$. Case (ii): Suppose that $\Delta_A^N < 0$, condition then $\check{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta})$ is the relevant comparison for the majority voters in B. This is positive when evaluated at $\bar{\theta} = \underline{\theta}$. Furthermore, its derivative with respect to $\bar{\theta}$ (equation (31)) is negative so that $\hat{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta})$ is monotonically decreasing in $\bar{\theta}$. Then, since all functions are continuous, there exists a $\check{\theta}_B(\underline{\theta}) > \underline{\theta}$ such that $\check{\Omega}_B[\underline{\theta}, \check{\theta}_B(\underline{\theta}) | \underline{\theta}] = 0$, and such that $\check{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta}) > 0$ for all $\bar{\theta} < \check{\theta}_B(\underline{\theta})$, and such that $\check{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta}) < 0$ for all $\bar{\theta} > \check{\theta}_B(\underline{\theta})$. Q.E.D.

Proof of Lemma 4: When $\hat{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta}) = 0$, we have (by expression (24)) $\bar{\theta}^{1/(1-\eta)} = \underline{\theta}^{1/(1-\eta)}(-z/y)$ with $z > 0$ and $y < 0$. Substituting this into condition (18) implies that the sign of Δ_A^N is the same as the sign of $(1 - \gamma^2)[-z/y - \bar{\theta}/\underline{\theta}] - \eta[-z/y - 1]$. This is positive since $-z/y > \bar{\theta}/\underline{\theta} > 1$ and $1 - \eta - \gamma^2 > 0$ for existence of $\bar{\theta}_A^N(\underline{\theta})$. Q.E.D.

Proof of Lemma 5: Case (i): Suppose that $\Delta_N^A \ge 0$, then expression (23) is the relevant payoff difference for the majority in region A. This is positive when evaluated at $\bar{\theta} = \underline{\theta}$. The difference between conditions (23) and (24) is $(\bar{\theta}^{1/(1-\eta)} - \underline{\theta}^{1/(1-\eta)})(z - y) + \underline{\theta}^{1/(1-\eta)}\delta$, which is positive when evaluated at $\hat{\Omega}_B(\underline{\theta}, \bar{\theta} | \underline{\theta}) = 0$ (since at that value

z and y are of opposite sign with $|z| > |y|$ which implies $y < 0$ and $z > 0$). It remains to be shown that in the interval $\left(\underline{\theta}, \hat{\theta}_B(\underline{\theta})\right)$, condition (23) is positive. Expression (28) is positive when evaluated at $\bar{\theta} = \underline{\theta}$. Furthermore, expression (30) has a constant sign which is the same as that of z. Thus, if $z > 0$ we have $\hat{\Omega}_A(\bar{\theta}; \underline{\theta} | \bar{\theta})$ being strictly convex so $\hat{\Omega}_A(\bar{\theta}; \underline{\theta} | \bar{\theta}) > 0$ for all $\bar{\theta} > \underline{\theta}$. If $z < 0$ we have $\hat{\Omega}_A(\bar{\theta}; \underline{\theta} | \bar{\theta})$ being concave so, since all functions are continuous, there exists some $\hat{\theta}_A(\underline{\theta}) > \hat{\theta}_B(\underline{\theta})$ such that $\hat{\Omega}_A(\hat{\theta}_A(\underline{\theta}); \underline{\theta} | \hat{\theta}_A(\underline{\theta})) = 0$ and such that for all $\bar{\theta} > \hat{\theta}_A(\underline{\theta})$, $\hat{\Omega}_A(\bar{\theta}; \underline{\theta} | \bar{\theta}) < 0$, that is, the majority in A always prefer to centralize when the majority in B do. Case (ii) When $\Delta_A^N < 0$, $\check{\Omega}_A(\bar{\theta}; \underline{\theta})$ is the relevant payoff difference for high-type voters in A. And since expression (32) is positive for all $\bar{\theta} > \underline{\theta}$, high-type voters in jurisdiction A will always prefer centralization whenever low-type voters in B do. Q.E.D.

Proof of Lemma 7: The proof of Lemma 5 shows that if $\hat{\theta}_A(\underline{\theta})$ exists, it must be larger than $\hat{\theta}_B(\underline{\theta})$. Expression (34) is positive when evaluated at $\bar{\theta} = \underline{\theta}$ and always positive for $1 - \eta - \gamma^2 \leq 0$. The latter implies that a low-preference policymaker in the high-preference region can always support an outcome that is preferred by a high-type majority. If $1 - \eta - \gamma^2 > 0$, then it can be shown that $\partial^2 \tilde{\Omega}_A(\bar{\theta}; \underline{\theta} | \bar{\theta}) / \partial \bar{\theta}^2$ is negative, i.e, $\tilde{\Omega}_A(\bar{\theta}; \underline{\theta} | \bar{\theta})$ is concave and, since all functions are continuous, there exists $\tilde{\theta}_A(\underline{\theta})$ such that for all $\bar{\theta} \leq \tilde{\theta}_A(\underline{\theta})$ the function $\tilde{\Omega}_A(\bar{\theta}; \underline{\theta} | \bar{\theta})$ is positive and for all $\bar{\theta} > \tilde{\theta}_A(\underline{\theta})$ the function $\tilde{\Omega}_A(\bar{\theta}; \underline{\theta} | \bar{\theta})$ is negative. Proceeding as in the earlier proofs, it can also be shown that $\tilde{\Omega}_A(\bar{\theta}; \underline{\theta} | \bar{\theta})$ is negative when evaluated at $\hat{\theta}_A(\underline{\theta})$ implying $\tilde{\theta}_A(\underline{\theta}) < \hat{\theta}_A(\underline{\theta})$. Likewise, it can be shown that $\tilde{\Omega}_A(\bar{\theta}; \underline{\theta} | \bar{\theta})$ is positive when evaluated at $\hat{\theta}_B(\underline{\theta})$ implying $\tilde{\theta}_A(\underline{\theta}) > \hat{\theta}_B(\underline{\theta})$. Q.E.D.

Proof of Proposition 3: If $\bar{\theta} \in \left(\hat{\theta}_B(\underline{\theta}), \tilde{\theta}_B(\underline{\theta})\right) \subset \left(\hat{\theta}_B(\underline{\theta}), \tilde{\theta}_A(\underline{\theta})\right)$, policy centralization will occur, and, by construction, will raise welfare for the majority in the high-preference region relative to noncooperation (since the high-preference majority chooses it over the noncooperative outcome which could otherwise been achieved by electing a high-type policymaker). It remains to be shown that welfare is also higher for the majority in the low-preference region. Expression (35) is positive when evaluated at $\bar{\theta} = \underline{\theta}$ and its derivative with respect to $\bar{\theta}$ is negative for all $\bar{\theta} \geq \underline{\theta}$ (expression (36)). Then, since all functions are continuous, there exists $\tilde{\theta}_B(\underline{\theta})$ such that

$\tilde{\Omega}_{\mathsf{B}}(\underline{\mu};\tilde{\mu}_{\mathsf{B}}(\underline{\mu}) j\ \underline{\mu}) = 0$ and such that for all $\overline{\mu} < \tilde{\mu}_{\mathsf{B}}(\underline{\mu})$, $\tilde{\Omega}_{\mathsf{B}}(\underline{\mu};\overline{\mu} j\ \underline{\mu}) > 0$ and such that for all $\overline{\mu} > \tilde{\mu}_{\mathsf{B}}(\underline{\mu})$, $\tilde{\Omega}_{\mathsf{B}}(\underline{\mu};\overline{\mu} j\ \underline{\mu}) < 0$. next, it can be shown that $\hat{\Omega}_{\mathsf{B}}(\underline{\mu};\overline{\mu} j\ \underline{\mu}) < 0$ when evaluated at $\tilde{\mu}_{\mathsf{B}}(\underline{\mu})$ which implies that $\hat{\mu}_{\mathsf{B}}(\underline{\mu}) < \tilde{\mu}_{\mathsf{B}}(\underline{\mu})$. In a similar fashion, it can also be shown that $\hat{\Omega}_{\mathsf{A}}(\overline{\mu};\underline{\mu} j\ \overline{\mu}) > 0$ when evaluated at $\tilde{\mu}_{\mathsf{B}}(\underline{\mu})$, implying that $\hat{\mu}_{\mathsf{A}}(\underline{\mu}) > \tilde{\mu}_{\mathsf{B}}(\underline{\mu})$. Thus, if $\overline{\mu}\ 2\ (\hat{\mu}_{\mathsf{B}}(\underline{\mu});\tilde{\mu}_{\mathsf{B}}(\underline{\mu})]$, welfare is higher for the majority in the low-preference region. Q.E.D.