

Size versus scope: on the trade-off facing economic unions

Oliver Lorz · Gerald Willmann

© Springer Science+Business Media, LLC 2012

Abstract This paper analyzes the relationship between the size of an economic union and the degree of policy centralization. We consider a political economy setting in which elected representatives bargain over the degree of centralization within the union. In our model, strategic delegation affects the identity of the representatives, and hence the equilibrium policy outcome. We show that the relationship between the extensive and the intensive margin of centralization may be non-monotonic: Up to a certain threshold a larger size implies deeper integration, whereas beyond that threshold centralization declines with further increases in size. We also show that freezing the level of centralization and associate memberships can mitigate this trade-off.

Keywords Fiscal federalism · Policy centralization · Political economy

JEL Classification D78 · H77 · H87

1 Introduction

The recent rounds of enlargement of the European Union have highlighted the tension that may exist between the size and the scope of an international union. This topic has been featured prominently in the European public debate for many years, and the common perception seems to be that of a trade-off between widening and deepening

O. Lorz (✉)
School of Business and Economics, RWTH Aachen University, Templergraben 64, 52056 Aachen,
Germany
e-mail: lorz@rwth-aachen.de

G. Willmann
Department of Economics, KU Leuven, Naamsestraat 69, 3000 Leuven, Belgium
e-mail: gerald.willmann@econ.kuleuven.be

the union. Some observers are skeptical of further enlargement because they fear that it will hinder deeper integration or even endanger the level of cooperation already achieved. Others favor enlargement precisely because it is perceived as rendering further political centralization more difficult.

In a seminal paper, Alesina et al. (2005) analyze the relationship between size and scope of unions and identify a trade-off based on the increase in heterogeneity between member countries as the union increases in size.¹ This clearly plays an important role in the European context, as recent new members in the East tend to be poorer than and structurally different from existing member states. However, the public debate also stresses the sheer increase in the number of member states—even without any change in heterogeneity—as potentially aggravating problems of political decision making. In this paper, we analyze this second aspect focusing on the role of strategic delegation.

In our model, legislators bargain over which policies to centralize and about how to share the costs of centralized policies. Voters have an incentive to delegate representation to citizens who benefit less from policy centralization in order to improve the bargaining position of their own country and to obtain a favorable cost-share vis-à-vis other member states. Using this setup, we derive the effects of varying the number of member states in the union. This exercise enables us to analyze the relationship between the size of an economic union and its depth in terms of political integration.

We identify two countervailing effects which influence the degree of policy centralization: On the one hand, for a given set of representatives, the surplus from policy centralization increases with the number of countries, since more countries benefit from internalized policy spill-overs. Based on this effect alone, we should therefore observe more policy centralization in larger economic unions. On the other hand, the size of the union also affects the incentives for strategic delegation: if a union comprises more member states, the incentive to strategically delegate increases such that voters tend to elect politicians who are less keen on centralization. If the second effect dominates, there exists a trade-off between the extensive and the intensive margin of centralization. Using numerical methods, we show that the relationship between size and depth of a union may be nonmonotonic: For a large range of parameter values, we obtain a hump-shaped pattern: As long as the number of member states is small, an enlarged union also entails deeper integration in terms of policy centralization. Beyond a certain number of countries, however, the opposite happens and political centralization decreases as the union grows. Robustness checks show how the extent of centralization costs and the relative ease of side-payments affect the relationship between the number of countries and the degree of cooperation.

Our results have politically relevant normative and positive implications. From a normative viewpoint, the question as to the optimal size of an economic union arises. Our model simulations show how welfare changes with an increase in the number of countries—in the political economy equilibrium as well as in our normative bench-

¹Alesina and Spolaore (1997, 2003) analyze the role of heterogeneity in explaining the size of countries. Lockwood (2002) sets up a legislative bargaining model that explains as to why centralized policies may be insensitive to heterogeneous local policy preferences. Crémer and Palfrey (1996, 2000) study voter preferences for centralization in a setting with uniform policies and heterogeneous citizens.

mark, the utilitarian optimum. We show that the welfare gap between these two allocations is wider the larger the union. The benefits of a larger economic union are hence lower and, by consequence, the optimal size of the union is smaller than in the absence of the strategic delegation effect.

If one is willing to take the results of our comparative static exercise to stand for the effects of enlargement, we can consider how existing member states of an economic union may try to fend off potentially detrimental effects of enlargement on the degree of centralization by finding some institutional arrangements. For example, a union may invest sunk institutional costs into the extent of integration *before* it accepts additional members, or it may try to fix the existing extent of cooperation constitutionally to prevent a roll-back after an enlargement. There is also the possibility of different degrees of integration:² For example, new members may be integrated into the union only as associated countries that do not participate in policy centralization.

Our paper builds on earlier work on strategic delegation in economic unions.³ Persson and Tabellini (1992) analyze tax competition between two member states of an economic union. In their model, voters can reduce the intensity of tax competition by delegating decisions on tax rates to representatives with a stronger preference for public spending.⁴ Besley and Coate (2003) find an incentive for strategic delegation arising from a common pool effect: Citizens elect representatives with a strong preference for public goods in order to increase the local provision of local public goods, which are assumed to be financed from general taxation. Centralized policy making may then result in an overprovision of local public goods compared to the preferences of the median voter.⁵

Other contributions analyze the influence of strategic delegation on the centralization decision itself. In Redoano and Scharf (2004), for example, two heterogeneous regions decide on the common supply of a public good. The preference for the public good may either be weak or strong. Voters in the region with the strong preference can facilitate consensus with the weak-preference region on centralizing the public good by electing a weak-preference representative. Lorz and Willmann (2005) consider a continuum of public goods. Elected representatives bargain over policy centralization and the regional contributions necessary to finance the costs of public goods. Strategic delegation then results in too few policies being centralized.⁶ The analysis in Redoano and Scharf (2004) and Lorz and Willmann (2005) is, however, limited to

²See Schneider (2007) on a “discriminatory membership” and also Alesina et al. (2005). Berglöf et al. (2008) analyze how the threat to form an inner club in the union exerts pressure on some union members for more deepening.

³For recent surveys on the political economy of economic unions, see Ruta (2005) and Lockwood (2006).

⁴Janeba and Wilson (2005, 2011) determine the optimal degree of centralization in tax-competition models.

⁵On strategic delegation with respect to local public good provision, see also Chari et al. (1997), Cheikbossian (2000), Ferretti and Perotti (2002), and Dur and Roelfsema (2005).

⁶Related papers dealing with strategic delegation in a bargaining context are Segendorff (1998), Buchholz et al. (2005), Rota Graziosi (2009), and Harstad (2007, 2008, 2010). Another related strand of literature is that of strategic information transmission (see, e.g., Olofsgård 2005). None of these papers, however, deals with the issue of policy centralization.

the case of only two regions. This paper considers a multi-region framework, thereby allowing us to explore the important relationship between the number of member states and the degree of centralization in an economic union, which is the focus of analysis in this paper.

The paper by Alesina et al. (2005) mentioned above focuses on the role of country heterogeneity and how heterogeneity increases as a union grows in size. Our approach with symmetric countries is complementary to theirs in that we investigate the role played by the increasing difficulty inherent in the political process as the size of the union grows. Both studies thus identify a downside of increasing union size, heterogeneity in their case, more political difficulties in ours.

The remainder of the paper is organized as follows: Sect. 2 presents the model of policy centralization. In Sect. 3, we derive the political equilibrium. Section 4 provides the numerical simulations on the relationship between the size of the economic union and the degree of policy centralization, Sect. 5 examines institutional aspects of increasing the size of the union, and Sect. 6 concludes.

2 Centralization optimum

We model an economic union that consists of an arbitrary number n of symmetric countries. This set-up allows us to address the interaction between the extensive and the intensive margin of centralization, that is, between the number of member countries and the degree of policy centralization. There is a continuum of local public goods differing in the extent of positive spill-overs to other countries, measured by the term β . In particular, β is assumed to be distributed uniformly over the unit interval. It is along this continuous dimension that we measure the degree of integration, depending on what share of local public goods is centralized.

Each country is inhabited by a continuum of citizens who differ in their individual preference for local public goods. The preference intensity is captured by the parameter $\alpha \in [\alpha^{\min}, \alpha^{\max}]$. The utility of individual α in country i takes the form:

$$U_\alpha = c_i + \alpha \int_0^1 \left[\ln g_i(\beta) + \sum_{\substack{j=1 \\ j \neq i}}^n \beta \ln g_j(\beta) \right] d\beta, \quad (1)$$

where c is the consumption of a private good, $g(\beta)$ is a local public good with spill-over β , and j is the index for the other member states of the economic union.⁷ As Alesina et al. (2005), we assume that only member countries of the union send and receive spill-overs. Individual income y is assumed to be exogenously given, unit costs of transforming private income into public goods are normalized to 1, and governments can raise nondistortionary taxes to finance public goods. For expositional convenience, we also assume the average preference $\bar{\alpha}$ to be equal to the preference α of the median citizen. Under this weak symmetry assumption,⁸ the utilitarian optimum and the first-best solution from the perspective of the median voter coincide.

⁷In our specification of utility, public goods are imperfect substitutes, similar to Besley and Coate (2003).

⁸It is straightforward to relax this assumption.

The provision of each public good can be decided either by a central government or decentrally. Under decentralized decision-making, national governments set the quantity of public goods noncooperatively. They ignore the spill-over to the other member states of the union. Assuming that national governments maximize aggregate welfare of their jurisdiction, we can derive the quantity of a local public good in a decentralized setting as

$$g_i^d(\beta) = \bar{\alpha} \quad \forall \beta \in [0, 1] \text{ and } i = 1, \dots, n. \quad (2)$$

Under centralized decision making, a common government sets the level of the public good in each country to maximize aggregate welfare of the whole union. Note that centralized decision-making does not imply a uniform provision level, only that the (possibly different) provision levels in each country are decided centrally. The public good levels under centralized decision-making are then given by

$$g_i^c(\beta) = \bar{\alpha}[1 + (n - 1)\beta] \quad \forall \beta \in [0, 1] \text{ and } i = 1, \dots, n. \quad (3)$$

Comparing (2) with (3) shows that a central government supplies a larger quantity of the public good than a national government. The reason is that only the central government internalizes the positive spill-overs between member states. The higher the spill-over β the higher is the supplied level of the public good under centralization.

Due to the internalization of spill-overs, the member states of the union can benefit from centralizing the decision on public good supply. At the same time, however, policy centralization entails costs: The disadvantages of policy centralization may include information asymmetries with regard to local conditions, lack of interjurisdictional competition, the distance between subjects and decision-makers resulting in less democratic accountability, and finally the additional administrative costs at the center, because centralization of policies—at least in the European context—hardly ever leads to the down-sizing of local administrations. Formal models in the literature consider welfare costs of centralized policy that result, for example, from over or underprovision of public goods (Besley and Coate 2003; Dur and Roelfsema 2005; Janeba and Wilson 2011), from an insufficient sensitivity to regional preferences (Lockwood 2002), or from rent seeking expenditures by local interest groups (Cheikbossian 2008). The dependence of these costs on the size of the union can, in general, go either way.⁹ We remain agnostic on this point and assume a constant fixed cost of f per country for each public good that is decided on at the center. Note that the specifics of costs and benefits per se are not all that important. What matters in our context is the centralization surplus. As long as the surplus increases in n , our results will hold even if the cost of centralization also depends on n .

In addition, we consider an over-head cost of $h(n)$ for the operation of the union as a whole. Note that the latter does not influence the centralization decision. It only guarantees a finite welfare optimum later on in the paper.

Given these benefits and costs of centralization, we define a “centralization surplus” for public good β as the difference in utility between the centrally decided

⁹In a rent-seeking approach, for example, centralization costs per country tend to be decreasing in the number of countries whereas in a setting with policy uncertainty, the effect may have the opposite sign.

provision level and the nationally decided level net of the fixed centralization cost. The preceding equations yield a centralization surplus for citizen α of

$$s(\alpha, \beta) \equiv \alpha [1 + (n - 1)\beta] \ln(1 + (n - 1)\beta) - \bar{\alpha}(n - 1)\beta - f. \quad (4)$$

In this expression, the first term represents the benefits of a higher provision level, the second term the costs of the higher public good supply, and the last term the fixed cost of centralization. According to Eq. (4), the centralization surplus increases not only in the spill-over parameter β , but also in the preference for public spending, α . A citizen with a strong preference for public goods benefits more from centralization than a citizen with a weaker preference for public goods.

From a normative, utilitarian viewpoint, the optimal allocation of decision powers centralizes all public goods with a positive surplus for the average citizen. As the surplus increases in the spill-over β , we can determine a critical threshold $\tilde{\beta}^*$, which is implicitly given by $s(\bar{\alpha}, \tilde{\beta}^*) = 0$. The provision levels of all public goods with higher spill-overs than $\tilde{\beta}^*$ should be decided at the center by a central government whereas all public goods with a spill-over below $\tilde{\beta}^*$ should remain under the authority of national governments. With β being distributed uniformly, the difference $1 - \tilde{\beta}^*$ can be interpreted as the optimal degree of centralization.

Implicit differentiation of $s(\bar{\alpha}, \tilde{\beta}^*) = 0$ gives the influence of the number of member states on $\tilde{\beta}^*$:

$$\frac{d\tilde{\beta}^*}{dn} = -\frac{\partial s(\bar{\alpha}, \tilde{\beta}^*)/\partial n}{\partial s(\bar{\alpha}, \tilde{\beta}^*)/\partial \tilde{\beta}^*} = -\frac{\tilde{\beta}^*}{n - 1} < 0. \quad (5)$$

The optimal cut-off $\tilde{\beta}^*$ declines or, in other words, the optimal degree of centralization increases in n . The more member states participate in the economic union, the more public good spill-overs are produced and, therefore, the more attractive policy centralization becomes.¹⁰ The result of (5) is not necessarily confined to the case of public good supply with positive utility spill-overs. We expect that a similar relationship may also be derived in a tax competition framework. With tax competition, the costs of decentralization arise from an underprovision of public goods. As shown by Hoyt (1991), this underprovision problem becomes more severe as the number of countries increases, which makes centralization more beneficial.

After studying the optimal degree of centralization, let us emphasize that we view the normative outcome solely as a reference point. In what follows, we develop a political economy model that will provide a positive explanation of the degree of centralization. That is, we investigate how the political process determines the equilibrium cut-off level $\tilde{\beta}$.

3 Equilibrium degree of centralization

This section analyzes the centralization decision employing a political economy framework with the following three-stage structure: In the first stage, citizens in each

¹⁰Note that we are abstracting from country differences and in particular from core-periphery considerations. Otherwise, the spill-over term β would also depend on the size of the union, for example, if the union grows from the core to the periphery.

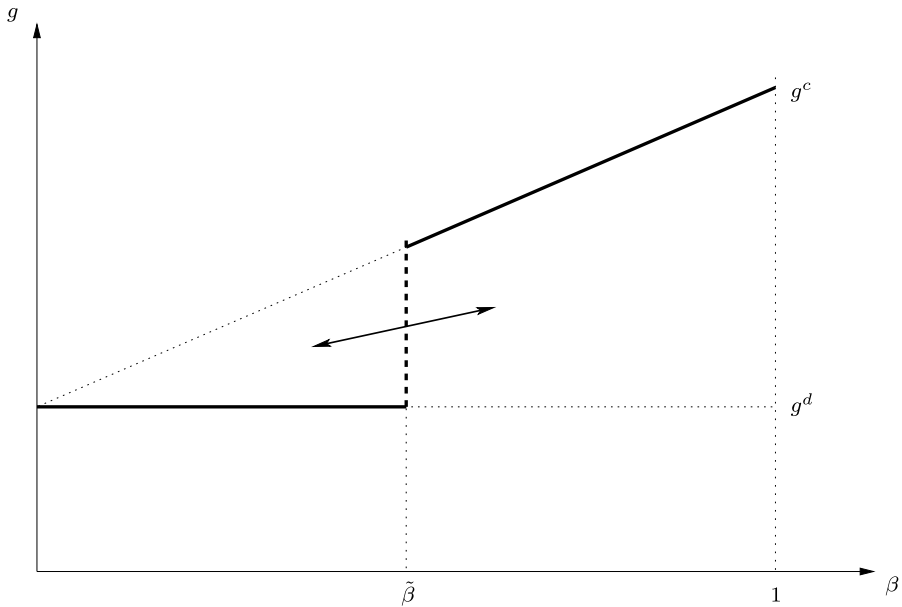


Fig. 1 Centralization decision and public good levels

country elect their national representative by majority vote. All elected representatives then bargain over centralization in the second stage of the model. The representatives jointly determine the extent of political cooperation and decide on how to share the cost of centrally decided policies. In the third stage, the quantities of the local public goods are set—at the center or at the national level—depending on the allocation of decision powers.

We solve the model by backward induction: In the last stage, policy-makers decide public good levels by allocating national funds to maximize the aggregate welfare of their respective jurisdictions. No delegation effects, agency problems, or other reasons for policy deviations from the welfare maximizing benchmark are considered at this stage, and the equilibrium public good levels are given by Eqs. (2) and (3), respectively. We maintain this—admittedly somewhat optimistic—assumption in order to focus on the centralization decision taken in the two previous stages of the game.

In the second stage, the allocation of decision powers is decided, taking as given the identities of the national representatives α_i^{rep} . The elected representatives jointly decide the centralization threshold $\tilde{\beta}$, and in doing so ultimately determine the public good levels set subsequently. This decision and its implication for the provision of public goods is depicted in Fig. 1. In addition, the elected representatives also determine redistributive side-payments between member states Z_i ($i = 1, \dots, n$). By including side-payments, we allow for the possibility that the costs of centralized policies are not shared uniformly. Instead, by negotiating side-payments, the representatives effectively bargain over how to share these costs. In order to solve for the

bargaining outcome at this stage, we use the n -player extension of the Nash-product:

$$\prod_{i=1}^n \left(\int_{\tilde{\beta}}^1 s(\beta; \alpha_i^{\text{rep}}) d\beta + Z_i \right), \quad (6)$$

where $s(\beta; \alpha_i^{\text{rep}})$ is the surplus of the representative α_i^{rep} from centralizing public good β .

With respect to the side payments, governments have to satisfy the following budget constraint:

$$\sum_{i=1}^n \left(Z_i + \frac{\gamma(Z_i)^2}{2} \right) = 0. \quad (7)$$

The quadratic term in the budget constraint is meant to capture efficiency costs of interregional transfer payments or it represents the political cost of unevenly sharing the financial burden of centralization. The term $\gamma \geq 0$ determines the extent of these additional costs. For $\gamma = 0$, all transfers occur lump-sum; a strictly positive γ represents potential distortionary costs of international transfers, which increase in γ . By changing γ , we can analyze in a continuous fashion how the availability of interregional transfers influences our results.¹¹ The quadratic specification is chosen for tractability. The equilibrium policy maximizes the Nash-product in (6) subject to the constraint from (7). The resulting first-order conditions for the equilibrium side-payments Z_i^e are given by

$$\prod_{\substack{j=1 \\ j \neq i}}^n \left(\int_{\tilde{\beta}^e}^1 s(\beta; \alpha_j^{\text{rep}}) d\beta + Z_j^e \right) + \lambda(1 + \gamma Z_i^e) = 0 \quad \forall i, \quad (8)$$

and the first-order condition for the equilibrium cut-off $\tilde{\beta}^e$ takes the form:

$$- \sum_{i=1}^n \left[s(\tilde{\beta}^e; \alpha_i^{\text{rep}}) \prod_{\substack{j=1 \\ j \neq i}}^n \left(\int_{\tilde{\beta}^e}^1 s(\beta; \alpha_j^{\text{rep}}) d\beta + Z_j^e \right) \right] = 0, \quad (9)$$

where λ is the Lagrangean multiplier and the superscript e stands for the equilibrium. Including the budget constraint, we thus have $n + 2$ equations that determine the $n + 2$ unknowns $\{Z_1^e, Z_2^e, \dots, Z_n^e\}$, $\tilde{\beta}^e$, and λ .

In what follows, we consider only symmetric equilibria in which the identity of the representative α_i^{rep} is identical for all countries; that is, we can drop the index i and simply write α^{rep} . Furthermore, in any symmetric equilibrium, all Z_i^e must clearly be zero. As the surplus from centralization is the same for all representatives, no side-payments are necessary to redistribute between member states. It is worth emphasizing that we do not *assume* them to be zero, only that costs are shared evenly in a symmetric equilibrium. The mere possibility of side-payments, however, influences

¹¹Harstad (2007, 2008) compares the limit cases of free transfers versus prohibitive transfer costs.

the outcome because it provides an incentive for strategic delegation. The cut-off level in the symmetric equilibrium $\tilde{\beta}^e$ is given by $s(\tilde{\beta}^e; \alpha^{\text{rep}}) = 0$, that is,

$$\alpha^{\text{rep}}[1 + (n - 1)\tilde{\beta}^e] \ln(1 + (n - 1)\tilde{\beta}^e) - \bar{\alpha}(n - 1)\tilde{\beta}^e - f = 0. \tag{10}$$

The identity of the elected representatives thus determines the degree of centralization.

Given the solution of the second stage, we are now in a position to analyze the first stage of our model, the election of national representatives. We do this by analyzing the voting-decision of the decisive median voter. The median citizen in country i with preference $\bar{\alpha}$ for public spending chooses α_i^{rep} to maximize her utility imputation, i.e., her indirect utility taking into account the second and third stage consequences:

$$V_i(\bar{\alpha}, \cdot) = y + Z_i^e + \bar{\alpha} \int_0^1 [1 + (n - 1)\beta] \ln \bar{\alpha} d\beta - \bar{\alpha} + \int_{\tilde{\beta}^e}^1 s_i(\bar{\alpha}, \beta) d\beta,$$

where $\tilde{\beta}^e$ and Z^e are determined from the Nash-bargaining solution in the second stage. The first-order condition of this optimization problem is given by $dV_i/d\alpha_i^{\text{rep}} = 0$, which takes the form:

$$\frac{dV_i(\bar{\alpha}, \cdot)}{d\alpha_i^{\text{rep}}} = \frac{dZ_i^e}{d\alpha_i^{\text{rep}}} - s_i(\bar{\alpha}, \tilde{\beta}^e) \frac{d\tilde{\beta}^e}{d\alpha_i^{\text{rep}}} = 0. \tag{11}$$

From the first-order conditions in the second stage, we can derive $d\tilde{\beta}^e/d\alpha_i^{\text{rep}} < 0$ and $dZ_i^e/d\alpha_i^{\text{rep}} < 0$ (see Appendix A). If the median voter in country i elects a representative with a higher preference for public goods, the cut-off for centralization declines and country i has to pay side payments to the other countries in the union. Noting the signs of these derivatives, Eq. (11) can only be satisfied if $s(\bar{\alpha}, \tilde{\beta}^e) > 0$, i.e., the centralization surplus of the average citizen is positive at $\tilde{\beta}^e$.

We can apply the median voter theorem in this context as the indirect utility function above exhibits the single-crossing property, which Gans and Smart (1996) have shown to be a sufficient condition. To establish single-crossing, it is sufficient to show that the derivative given by (11) is increasing in the voter’s α (not α^{rep}). To see this, note that only the surplus in (11) depends on α , and according to (4), it is increasing in α .

The fact that the centralization surplus is positive implies that $\tilde{\beta}^e > \tilde{\beta}^*$ —recall that the surplus is zero at $\tilde{\beta}^*$. Hence, the degree of centralization is inefficiently low in the political economy equilibrium. The reason for this inefficiency result is the strategic delegation effect mentioned in the Introduction: Voters are aware that the identity of the elected national representative influences the bargaining outcome. Specifically, as the equilibrium side-payment Z_i decreases in α_i^{rep} , the median voter of country i has an incentive to choose a representative with a weaker preference for public spending than herself in order to receive a positive side-payment from the other countries. In the symmetric equilibrium, all elected representatives then have a weaker preference for public goods than the median or average citizen, and the resulting degree of centralization is too low. Commemorating the British rebate and who obtained it, one might call this the “Thatcher” effect.

As an alternative to our modeling set-up, we could have assumed that the elected representatives do not only decide on the degree of centralization but also on the provision levels of public goods. If this is the case, voters will anticipate also the influence of their voting decision on the supply of public goods. A representative with a high preference for public spending will choose a high public good level under decentralization and will also influence the bargaining outcome under centralization in this direction. This also affects the centralization surplus given by (4). It can be shown that, given the identity of the foreign representatives, a high preference of the domestic representative for public spending reduces the centralization surplus from the perspective of domestic voters (see Appendix B). This, therefore, constitutes an additional motive for strategic delegation toward a representative with a lower preference for public spending. In this paper, we prefer to focus on the centralization decision and abstract from the biased supply of public goods.

4 Size versus scope of the union

This section analyzes how strategic delegation and the degree of centralization change with the number of member states in the union. The starting point for our analysis is the equilibrium condition (11), which can be written as follows (for a derivation, see Appendix A):

$$-\frac{n-1}{n} \cdot \frac{\int_{\tilde{\beta}^e}^1 \frac{\partial s_i(\alpha_i^{\text{rep}}, \beta)}{\partial \alpha_i^{\text{rep}}} d\beta}{1 + \gamma \int_{\tilde{\beta}^e}^1 s(\alpha_i^{\text{rep}}, \beta) d\beta} + s_i(\bar{\alpha}, \tilde{\beta}^e) \cdot \frac{\frac{\partial s_i(\alpha_i^{\text{rep}}, \tilde{\beta}^e)}{\partial \alpha_i^{\text{rep}}}}{n \cdot \frac{\partial s_i(\alpha_i^{\text{rep}}, \tilde{\beta}^e)}{\partial \tilde{\beta}^e}} = 0. \tag{12}$$

From Eq. (4), we obtain the following partial derivatives of $s_i(\alpha_i, \beta)$ with respect to α_i^{rep} and β :

$$\begin{aligned} \frac{\partial s_i(\cdot)}{\partial \alpha_i^{\text{rep}}} &= [1 + (n-1)\beta] \ln(1 + (n-1)\beta), \quad \text{and} \\ \frac{\partial s_i(\cdot)}{\partial \tilde{\beta}^e} &= \alpha_i^{\text{rep}}(n-1) \ln(1 + (n-1)\tilde{\beta}^e) + (n-1)(\alpha_i^{\text{rep}} - \bar{\alpha}). \end{aligned}$$

Moreover, Eq. (10) implies

$$s_i(\bar{\alpha}, \tilde{\beta}^e) = (\bar{\alpha} - \alpha^{\text{rep}})[1 + (n-1)\tilde{\beta}^e] \ln(1 + (n-1)\tilde{\beta}^e).$$

Inserting these expressions into (12) and solving for the integrals yields the first order condition for α^{rep} . Equations (10) and (12) then jointly determine α^{rep} and $\tilde{\beta}^e$. To gain one first insight, we analytically derive the influence of n on the incentive for strategic delegation in a situation without strategic delegation, i.e. for $\alpha^{\text{rep}} = \bar{\alpha}$. In this case, $s_i(\bar{\alpha}, \tilde{\beta}^e) = 0$ and, assuming for simplicity $\gamma = 0$, the LHS of (11) can be written as

$$\frac{dV_i(\bar{\alpha}, \cdot)}{d\alpha_i^{\text{rep}}} = -\frac{n-1}{n} \cdot \int_{\tilde{\beta}^e}^1 \frac{\partial s_i(\alpha_i^{\text{rep}}, \beta)}{\partial \alpha_i^{\text{rep}}} d\beta.$$

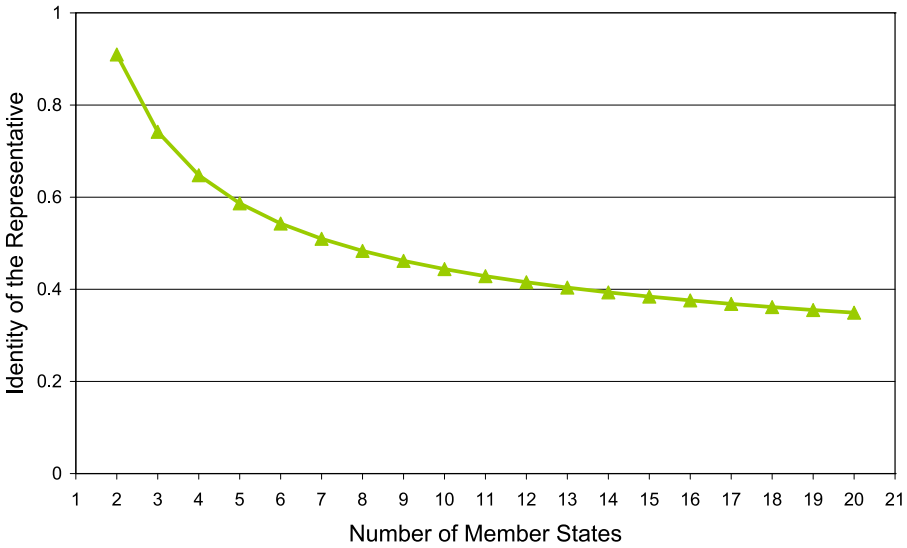


Fig. 2 Strategic delegation and the number of member states

Solving for the integral yields

$$\frac{dV_i(\bar{\alpha}, \cdot)}{d\alpha_i^{\text{rep}}} = \frac{[1 + (n - 1)\tilde{\beta}^e]^2 [2\ln(1 + (n - 1)\tilde{\beta}^e) - 1]}{4n} - \frac{n(2\ln n - 1)}{4}, \quad (13)$$

where $\tilde{\beta}^e = \tilde{\beta}^*$ for $\alpha^{\text{rep}} = \bar{\alpha}$. This expression decreases in n , establishing a positive effect of an increase in the number of countries on the incentives for strategic delegation.¹²

As one might have expected, the more countries bargain over centralization, the higher is the incentive for strategic delegation—resulting from additional transfers from other countries.

This analytical result, though not sufficient, suggests that strategic delegation increases in the number of countries n .¹³ Figure 2 shows how the size of the union affects strategic delegation. In the figure, we plot α^{rep} relative to $\bar{\alpha}$ over the range $n \in [2, 20]$. Strategic delegation increases in the number of countries, and the representative’s identity α^{rep} deviates further and further away from $\bar{\alpha}$ as the size of the union increases.

With respect to the equilibrium degree of centralization $1 - \tilde{\beta}^e$, we thus have two effects working in opposite directions: On the one hand, the centralization surplus

¹²Since $d\tilde{\beta}^*/dn = -\tilde{\beta}^*/(n - 1)$ from (5), we obtain $d[1 + (n - 1)\tilde{\beta}^*]/dn = 0$. Therefore, the first term in (13) decreases in n for $\tilde{\beta}^e = \tilde{\beta}^*$. In addition, the expression $n(2\ln n - 1)$ increases in n , such that the expression $dV_i(\bar{\alpha}, \cdot)/d\alpha_i^{\text{rep}}$ decreases in n .

¹³As the decision problem of the median voter is highly nonlinear, we are not able to go further and determine analytically the influence of n on the endogenous variables in our model. Our benchmark simulation uses ad hoc chosen values of $\bar{\alpha} = 3$, $f = 0.5$ and $\gamma = 0.5$.

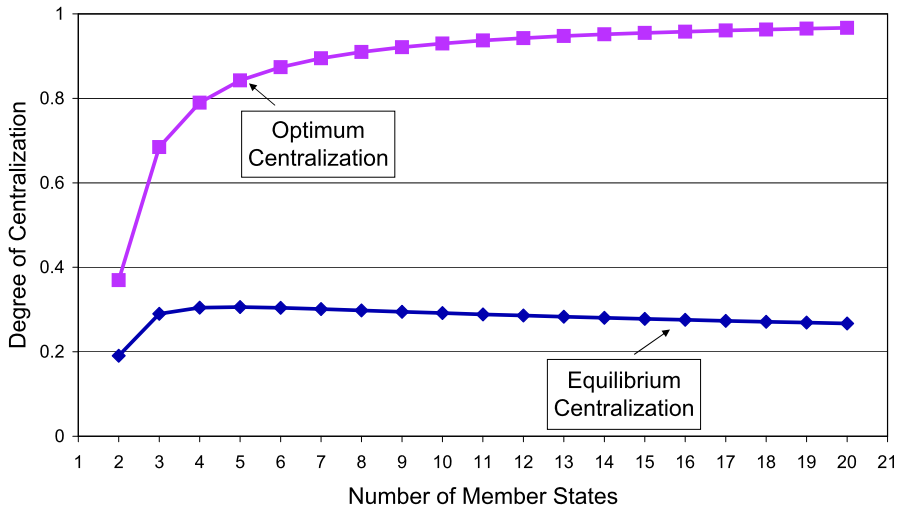


Fig. 3 Centralization and the number of member states

increases for given α_i^{rep} as more countries can benefit from the public good spill-over if n increases. On the other hand, α_i^{rep} declines in n . Figure 3 depicts simulations of the resulting degree of centralization in the political economy equilibrium and compares it to the normative benchmark. We see that the gap between the optimum and the equilibrium policy widens as the number of member states increases. Given our numerical specification, we obtain a hump-shaped pattern for the equilibrium degree of centralization. The union first becomes more integrated as the number of member states rises and then—in our example for $n \geq 5$ —the equilibrium centralization level declines in n . That is, eventually strategic motives cause a trade-off between further increases in size and a deepening of the union.

The numerical nature of our results calls for robustness checks. To see how the distortionary cost of interregional transfers affects the above results, Fig. 4 varies γ from 0.0 to 1.0. A high γ weakens the incentives for strategic delegation as interregional transfers become more costly. The decline in α^{rep} is less pronounced if γ increases. As Fig. 4 shows, the equilibrium degree of centralization then follows more closely the optimum. In fact, for $\gamma = 1.0$, the level of centralization monotonically increases over the whole range between $n = 2$ and $n = 20$ such that the trade-off between depth and size of a union vanishes.¹⁴

Figure 5 shows the influence of the centralization costs on the model's predictions. In this figure, we lower f compared to its benchmark value to $f = 0.1$. Not surpris-

¹⁴This clearly illustrates the fact that the inefficiency in our model results from the possibility of paying transfers between union members. Given this outcome, one may argue in favor of prohibiting such transfers in the first place. However, in a more general framework with heterogeneous countries, transfers also play a positive role as they facilitate cooperation (see, e.g., Harstad 2010). Moreover, if direct monetary transfers between regions were not possible, governments may resort to alternative ways of making concessions, for example, when deciding about the location of certain common institutions or the nationality of the decision-makers in the union.

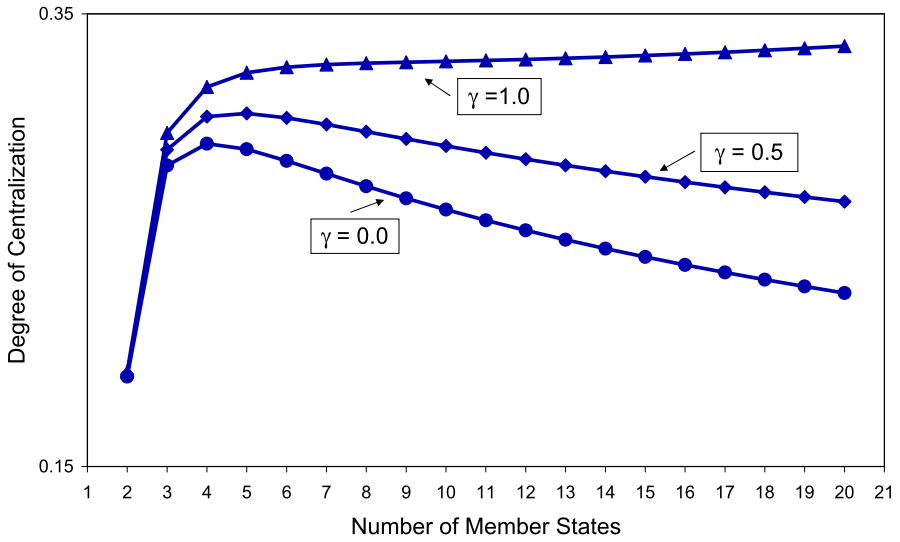


Fig. 4 Different redistribution costs

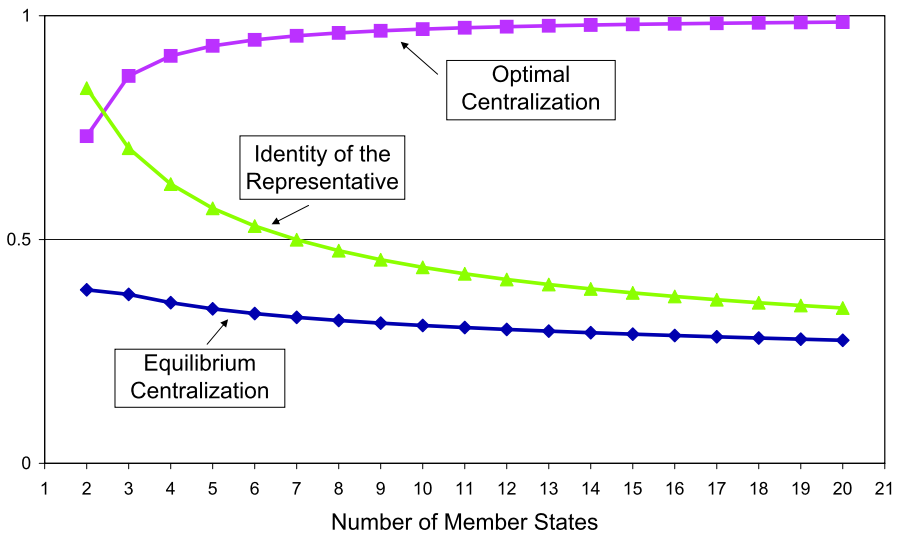
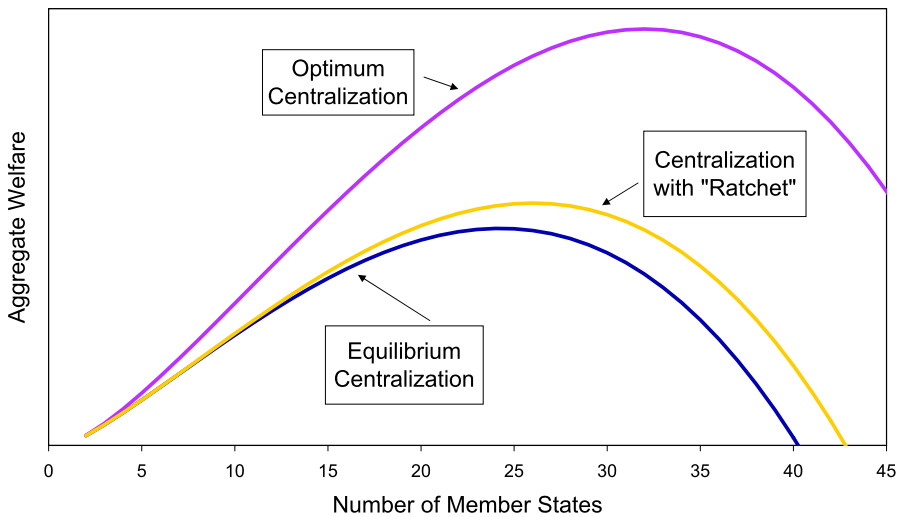


Fig. 5 Low fixed centralization costs

ingly, the optimal degree of centralization is quite high already at a low number of member countries. Consequently, the curve representing the optimum is flatter than in the benchmark case. Adding strategic delegation to the picture then results in a maximum for the degree of centralization already at $n = 2$. Conversely, for a higher f than in the benchmark case, the maximum level of centralization shifts to the right. A decline in f implies the disappearance of purely economic costs of centralization,

Table 1 Number of member states for maximum centralization

	$\gamma = 0.0$	$\gamma = 0.5$	$\gamma = 0.8$
$f = 0.3$	3	4	4
$f = 0.5$	4	5	6
$f = 0.7$	5	6	8

**Fig. 6** Enlargement with “ratchet” effect

leaving in the limit only the political-economy costs, resulting from strategic delegation. Since the latter are increasing in n , this tends to push the maximum degree of centralization in the equilibrium to the left.

Table 1 combines the influence of f and of γ on the equilibrium, reporting the number of member states which maximizes the degree of centralization for different values of f and γ .

From this table, we see that a trade-off emerges for a comparatively small number of member states if either the fixed costs f or the redistribution costs γ are low.

Figure 6 depicts the welfare effects of strategic delegation. We use the numerical values assumed so far and assume $h(n) = 0.002n^3$ for the overhead cost of centralization. In the figure, we compare the welfare of the average voter in the political economy equilibrium with the welfare in the utilitarian optimum—for the moment disregard the middle curve that we return to discuss in the next section. We see that as the number of member countries n rises, the welfare level in the political equilibrium increasingly falls short of the optimal level. In other words, the larger the political union becomes, the higher is the welfare loss due to strategic delegation. We also see from the diagram that there is an optimal size of the union that maximizes the aggregate welfare of each member state. Strategic delegation influences this optimal union size. Whereas the welfare of each member is maximized at 32 member countries in our numerical example if the optimal degree of centralization is

chosen, the welfare maximizing size of the union declines to 24 countries in the political economy equilibrium. The detrimental political effects stemming from strategic delegation thus reduce the optimal size of an economic union.

5 Institutional aspects of increasing size

Our analysis so far has considered a variation in the number of member countries. One could be tempted to view an increase in the size of a union as representing the process of enlargement. This is not as small a step as might appear at first sight. In the comparative static analysis, we have conducted so far, the outside option for each member of an (enlarged) union was always no union at all. This would imply that failed enlargement talks lead to a break-up of the union. However, when it comes to the sequential process of enlarging an existing union, the outside option is not necessarily “no union,” but could also be staying at the current union size for current members, and staying outside the existing union for the prospective new member. This asymmetry of outside options would no longer allow us to rely on the symmetry property when solving the model.¹⁵ Furthermore, endogenizing the sequence in which countries enter the union would be more natural in a set-up with heterogeneity between countries or regions.¹⁶ Finally, the two-stage political process of our model has the median select a representative in view of the centralization decision taken at the second stage. Adding a second policy issue to this process, namely whether to allow in one or several additional member countries, would raise the issue of dynamic interactions between these subsequent political decisions. The decision to centralize policies influences the outside options for members and non-members in the following enlargement process. There may also be an additional election between centralization and enlargement periods, such that not only representatives but also voters take into account the dynamic interactions. This said, we tend to expect that the desire to favorably influence the side-payments between countries that drives strategic delegation in our model would still be present in a richer model along these lines.

In this paper, we abstract from these complications and stay with our comparative static analysis. Doing so allows us to shed some light on possible ways of increasing the size of a union while avoiding detrimental effects on its scope. The resulting insights on constitutional design relate to recent events that took place in the European context. Consider the EU enlargement in 2004, for example, when ten mainly Eastern European countries entered the union. This round of enlargement was undertaken mainly—if not exclusively—for geo-political reasons, and can be thought of as a quasi-exogenous variation in union size. In what follows, we analyze the institutional aspects of such an increase in union size, keeping the above caveats in mind.

The negative welfare effect of increasing union size beyond a certain threshold is due to ever more conservative representatives coming to power because of strategic

¹⁵For the complications involved in analyzing an asymmetric setting even for the case of only two countries, see Lorz and Willmann (2005).

¹⁶In a recent paper, Desmet et al. (2011) study the sequence of the break-up of Yugoslavia using such an approach.

delegation. This raises the question whether there exist safeguards or alternative institutional arrangements that avoid this problem in the political arena. Consider an economic union of a certain size which decides about entry of new members. In order to prevent a roll-back of centralization, the existing members may try to preserve the status-quo degree of centralization before they take in new member states. This can be achieved, for example, by means of constitutional treaties—the treaties of Rome, Maastricht, and Lisbon are cases in point. The effects of such an institutional “ratchet” mechanism are depicted in Fig. 6. In constructing this figure, we assume that the centralization level, once it reaches the maximum, stays at that level as the union grows further.¹⁷ As Fig. 6 shows, such a rule raises the optimal size of the union compared to the benchmark case. The reason for this is that beyond the maximum level of centralization the institutional “ratchet” effect prevents the welfare loss associated with the decline in centralization that would otherwise take effect.

A second strategy to prevent a decline in centralization is to admit additional countries only as associated members of the union. An associated country receives and provides spill-overs just like a full member state, but it does not participate in policy centralization, that is, an associate member provides public goods at the level $\bar{\alpha}$. Compared to granting full membership, an associated membership keeps the degree of centralization of the union that has been enlarged in such a way unchanged. An additional advantage of an associated membership is that the membership costs are presumably lower for an associated country than for a full member. These potential benefits of an associated membership have to be compared to the disadvantage of not internalizing the spill-overs.

Figure 7 depicts the welfare gain from admitting a new member state as an associated member, given that the union has n full members.¹⁸ With regard to the membership cost, we consider $h = h(n + s)$, where $s \in [0, 1]$ measures the contribution of an associated member to the membership cost. If s equals zero the associated member does not cause additional costs, whereas $s = 1$ describes the (somewhat unrealistic) case that membership costs for an associated member are as high as for a full member. We see from Fig. 7 that the additional welfare from admitting an associated member may be higher than from admitting an additional full member if the number of member states is sufficiently high (to the right of the intersection point). This is only the case, however, if we assume that membership costs are sufficiently lower for an associated member than for a full member. In Fig. 7, we have used $s = 0.3$, whereas the case $s = 1.0$ is represented by the dotted line.

Notice one interesting alternative interpretation of the result just derived: Instead of viewing $s < 1$ (solely) as the result of the lower cost of an associated membership, we can also interpret (part of) the difference as a membership fee the associated country has to pay to the existing full members. This does not reduce the actual cost, but it does reduce its effect on the welfare of existing members, as part of the cost is recovered in form of the dues paid by the associated member. In practice, countries associated to the EU pay contributions and this renders associated membership more attractive for the incumbents as an alternative form of enlargement.

¹⁷Thus, the ratchet cannot completely eliminate strategic delegation, but it can prevent a possible decline in the degree of centralization.

¹⁸Note that similar graphs can be drawn for admitting more than one associated member.

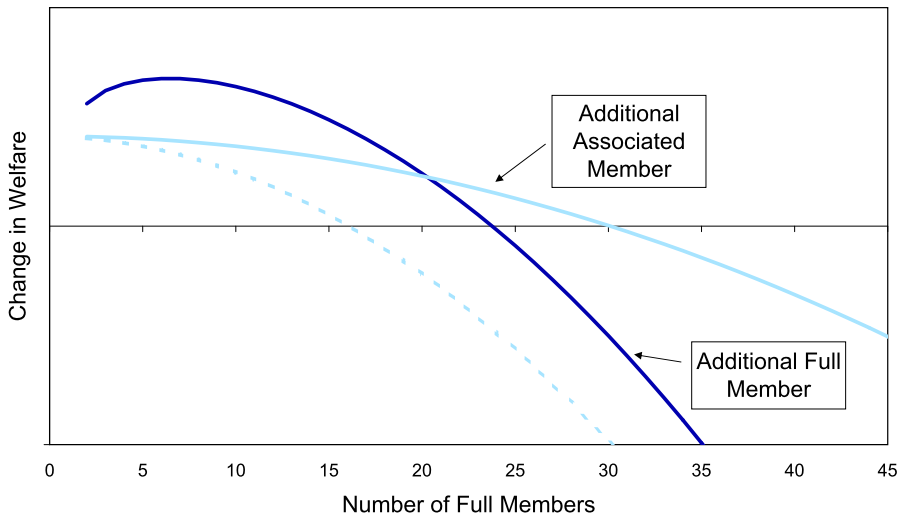


Fig. 7 Enlargement and associated membership

6 Concluding remarks

The nexus between the size of an international union and the extent of cooperation between its members is an important aspect of international policy coordination. In this paper, we set up a political economy model that allows us to analyze the relationship between the extensive and the intensive margin of centralization. Our model features symmetric countries with heterogeneous agents who strategically select national representatives. These representatives then bargain over the extent of policy centralization, and how much each member state should pay for centralized policies.

We show that strategic delegation gives rise to representatives with a low preference for public spending, and how this adverse political effect becomes worse as the number of member countries increases. The strategic delegation effect of an increase in union size counteracts and eventually dominates the increasing potential for the internalization of spill-overs. As a result, a hump-shaped pattern between the size of the union and the degree of policy centralization may emerge; that is, beyond a certain size we face a trade-off between further increases in size and deeper integration.

Our results complement the earlier work by Alesina et al. (2005) who analyze the role of an increase in heterogeneity between asymmetric member states if the union grows larger. We consider symmetric countries but propose a model of the political process in which an increase in union size aggravates inefficiencies in political decision making. Both hypotheses feature prominently in the public debate on further EU enlargement. Understanding and addressing both seems to be of utmost importance for European integration to continue.

We also discuss two extensions of our model: First, we let existing members of the union fix the degree of centralization at the status-quo level before they let in new members. With such a “ratchet” mechanism in place, the existing members of the union avoid a decline in the degree of centralization which would otherwise result

from an exogenous enlargement. Second, we analyze an associated membership as an alternative to admitting additional full members. An associated member country sends and receives spill-overs just as a full member, but does not participate in the centralization of public goods. Both possibilities can mitigate the trade-off between size and scope of an economic union, however, in the case of an associated membership at the cost of not internalizing spill-overs with these countries.

As for future work, we plan to develop a genuinely dynamic model of centralization and union expansion which treats enlargement as a sequential process. Such a sequential model will allow us to analyze the strategic interaction between decisions taken at different points in time. A second promising and potentially complementary avenue is to include asymmetric countries in order to analyze the interplay between the size of a union, the heterogeneity of its member countries, and the incentives for strategic delegation in one unified framework that also allows us to endogenize the sequence of accession.

Acknowledgements We would like to thank Ansgar Belke, Emily Blanchard, Hartmut Egger, Steffen Minter, Stefan Napel, Otto Reich, and seminar participants at the Ifo Political Economy Workshop, the VfS-AWTP Meeting, the IIPF Annual Conference, and Universities of Bayreuth, Deakin, Elon, Massey, Monash, Tübingen, and Virginia. We are also grateful to two anonymous referees for their helpful comments. The usual disclaimer applies. All errors are ours.

Appendix A

This appendix derives the marginal effects of α_i^{rep} on Z_i^e and $\tilde{\beta}^e$ holding all α_j^{rep} ($j \neq i$) constant. As we depart from the symmetric equilibrium, we can summarize all countries $j \neq i$ by a representative country $-i$.

With $s_i = s(\alpha_i^{\text{rep}}, \beta)$ and $s_{-i} = s(\alpha_{-i}^{\text{rep}}, \beta)$, the first-order conditions for Z_i and Z_{-i} can be written as

$$\begin{aligned} &\left(\int_{\tilde{\beta}^e}^1 s_{-i} d\beta + Z_{-i}^e\right)^{n-1} + \lambda \cdot (1 + \gamma Z_i^e) = 0, \\ &\left(\int_{\tilde{\beta}^e}^1 s_i d\beta + Z_i^e\right) \cdot \left(\int_{\tilde{\beta}^e}^1 s_{-i} d\beta + Z_{-i}^e\right)^{n-2} + \lambda \cdot (1 + \gamma Z_{-i}^e) = 0. \end{aligned}$$

From these two equations, we can eliminate λ :

$$(1 + \gamma Z_i^e) \cdot \left(\int_{\tilde{\beta}^e}^1 s_i d\beta + Z_i^e\right) = (1 + \gamma Z_{-i}^e) \cdot \left(\int_{\tilde{\beta}^e}^1 s_{-i} d\beta + Z_{-i}^e\right). \tag{14}$$

Defining $\tilde{s}_i^e = s(\alpha_i^{\text{rep}}, \tilde{\beta}^e)$ and $\tilde{s}_{-i}^e = s(\alpha_{-i}^{\text{rep}}, \tilde{\beta}^e)$, we can write the first-order condition for $\tilde{\beta}^e$ as

$$\begin{aligned} &-\tilde{s}_i^e \cdot \left(\int_{\tilde{\beta}^e}^1 s_{-i} d\beta + Z_{-i}^e\right)^{n-1} \\ &- (n - 1)\tilde{s}_{-i}^e \cdot \left(\int_{\tilde{\beta}^e}^1 s_i d\beta + Z_i^e\right) \cdot \left(\int_{\tilde{\beta}^e}^1 s_{-i} d\beta + Z_{-i}^e\right)^{n-2} = 0. \end{aligned}$$

This yields:

$$-\tilde{s}_i^e \cdot \left(\int_{\tilde{\beta}^e}^1 s_{-i} d\beta + Z_{-i}^e \right) = (n - 1)\tilde{s}_{-i}^e \cdot \left(\int_{\tilde{\beta}^e}^1 s_i d\beta + Z_i^e \right). \tag{15}$$

Combining (14) with (15) leads to:

$$(1 + \gamma Z_i^e) \cdot \tilde{s}_i^e + (n - 1) \cdot (1 + \gamma Z_{-i}^e) \cdot \tilde{s}_{-i}^e = 0. \tag{16}$$

In addition, the budget constraint has to be satisfied:

$$Z_i^e + (n - 1)Z_{-i}^e = -\frac{\gamma}{2}(Z_i^e)^2 - \frac{\gamma(n - 1)}{2}(Z_{-i}^e)^2. \tag{17}$$

Equations (14), (16), and (17) determine the three unknowns, Z_i^e , Z_{-i}^e , and $\tilde{\beta}^e$. Totally differentiating these three equations, setting $d\alpha_i^{\text{rep}} = 0$, and employing the symmetry properties $Z_i^e = Z_{-i}^e = 0$, $\alpha_i^{\text{rep}} = \alpha_{-i}^{\text{rep}}$, and $\tilde{s}_i^e = \tilde{s}_{-i}^e$ yields

$$(dZ_i^e - dZ_{-i}^e) \cdot \left(1 + \gamma \cdot \int_{\tilde{\beta}^e}^1 \tilde{s}_i^e d\beta \right) + \left(\int_{\tilde{\beta}^e}^1 \frac{\partial \tilde{s}_i^e}{\partial \alpha_i^{\text{rep}}} d\beta \right) d\alpha_i^{\text{rep}} = 0, \tag{18}$$

$$n \cdot \frac{\partial \tilde{s}_i^e}{\partial \tilde{\beta}^e} d\tilde{\beta}^e + \frac{\partial \tilde{s}_i^e}{\partial \alpha_i^{\text{rep}}} d\alpha_i^{\text{rep}} = 0, \tag{19}$$

$$dZ_i^e + (n - 1)dZ_{-i}^e = 0. \tag{20}$$

From (19)–(20), we can derive

$$\frac{d\tilde{\beta}^e}{d\alpha_i^{\text{rep}}} = -\frac{\frac{\partial \tilde{s}_i^e(\alpha_i^{\text{rep}}, \tilde{\beta}^e)}{\partial \alpha_i^{\text{rep}}}}{n \cdot \frac{\partial \tilde{s}_i^e(\alpha_i^{\text{rep}}, \tilde{\beta}^e)}{\partial \tilde{\beta}^e}} < 0, \quad \text{and} \tag{21}$$

$$\frac{dZ_i^e}{d\alpha_i^{\text{rep}}} = -\frac{n - 1}{n} \cdot \frac{\int_{\tilde{\beta}^e}^1 \frac{\partial s_i(\alpha_i^{\text{rep}}, \beta)}{\partial \alpha_i^{\text{rep}}} d\beta}{1 + \gamma \int_{\tilde{\beta}^e}^1 s(\alpha_i^{\text{rep}}, \beta) d\beta} < 0. \tag{22}$$

Appendix B

This appendix determines the centralization surplus for a setting in which elected policymakers also decide on the public good levels. In this case, the supplied public good levels in the third stage of the model depend on the identity of the representatives according to $g_i^d = \alpha_i^{\text{rep}}$ and $g_i^c = \alpha_i^{\text{rep}} + \sum_{j \neq i} \alpha_j^{\text{rep}} \beta$. The centralization surplus of a citizen in country i with preference α is given by

$$s_i(\alpha, \alpha^{\text{rep}}, \beta) = \alpha \left[\ln \left(\alpha_i^{\text{rep}} + \sum_{j \neq i} \alpha_j^{\text{rep}} \beta \right) + \sum_{j \neq i} \beta \ln \left(\alpha_j^{\text{rep}} + \sum_{k \neq j} \alpha_k^{\text{rep}} \beta \right) \right] - \alpha \left[\ln(\alpha_i^{\text{rep}}) + \sum_{j \neq i} \beta \ln(\alpha_j^{\text{rep}}) \right] - \beta \sum_{j \neq i} \alpha_j^{\text{rep}} - f. \tag{23}$$

Taking the derivative of (23) at $\bar{\alpha} = \alpha^{\text{rep}}$ implies

$$\left. \frac{\partial s_i(\alpha, \alpha^{\text{rep}}, \beta)}{\partial \alpha_i^{\text{rep}}} \right|_{\bar{\alpha} = \alpha^{\text{rep}}} = \frac{(n-1)\beta(\beta-1)}{1+(n-1)\beta} < 0. \tag{24}$$

An increase in the preference of the domestic representative for public spending therefore lowers the surplus from the view of the voters.

In the first stage of the model, the median voter in country i maximizes

$$V_i(\bar{\alpha}, \cdot) = y + Z_i^e + \bar{\alpha} \int_0^1 \left(\ln \alpha_i^{\text{rep}} + \sum_{j \neq i} \beta \ln \alpha_j^{\text{rep}} \right) d\beta - \alpha_i^{\text{rep}} + \int_{\bar{\beta}^e}^1 s_i(\bar{\alpha}, \alpha^{\text{rep}}, \beta) d\beta.$$

The first-order condition is given by

$$\frac{\partial Z_i^e}{\partial \alpha_i^{\text{rep}}} - s_i(\cdot) \frac{\partial \bar{\beta}^e}{\partial \alpha_i^{\text{rep}}} + \frac{\bar{\alpha}}{\alpha_i^{\text{rep}}} - 1 + \int_{\bar{\beta}^e}^1 \frac{\partial s_i}{\partial \alpha_i^{\text{rep}}} d\beta = 0. \tag{25}$$

As in the baseline model (Eq. (11)), the sum of the first two terms of (25) is negative (as $\partial Z_i^e / \partial \alpha_i^{\text{rep}} < 0$ and $s_i(\cdot) = 0$) for $\alpha^{\text{rep}} = \bar{\alpha}$. According to (24), the last term of (25) is also negative. Therefore, we can conclude that the first order condition implies $\alpha_i^{\text{rep}} < \bar{\alpha}$ similar to our baseline model.

References

- Alesina, A., & Spolaore, E. (1997). On the number and size of nations. *Quarterly Journal of Economics*, 112, 1027–1056.
- Alesina, A., & Spolaore, E. (2003). *The size of nations*. Cambridge: MIT Press.
- Alesina, A., Angeloni, I., & Etro, F. (2005). International unions. *American Economic Review*, 95, 602–615.
- Berglöf, E., Burkhart, M., Friebe, G., & Paltseva, E. (2008). Widening and deepening: reforming the European Union. *American Economic Review: Papers and Proceedings*, 98, 133–137.
- Besley, T., & Coate, S. (2003). Centralized versus decentralized provision of local public goods: a political economy approach. *Journal of Public Economics*, 87, 2611–2637.
- Buchholz, W., Haupt, A., & Peters, W. (2005). International environmental agreements and strategic voting. *The Scandinavian Journal of Economics*, 107, 175–195.
- Chari, V., Jones, L. E., & Marimon, R. (1997). The economics of split-ticket voting in representative democracies. *American Economic Review*, 87, 957–976.
- Cheikbossian, G. (2000). Federalism, distributive politics and representative democracy. *Economics of Governance*, 1, 105–122.
- Cheikbossian, G. (2008). Rent-seeking, spillovers and the benefits of decentralization. *Journal of Urban Economics*, 63, 217–228.
- Crémer, J., & Palfrey, T. R. (1996). In or out?: Centralization by majority vote. *European Economic Review*, 40, 43–60.
- Crémer, J., & Palfrey, T. R. (2000). Federal mandates by popular demand. *Journal of Political Economy*, 108, 905–927.
- Desmet, K., Breton, M. L., Ortuo, I., & Weber, S. (2011). The stability and breakup of nations: a quantitative analysis. *Journal of Economic Growth*, 16, 183–213.

- Dur, R. A., & Roelfsema, H. J. (2005). Why does centralisation fail to internalise policy externalities? *Public Choice*, 122, 395–416.
- Ferretti, G. M. M., & Perotti, R. (2002). Electoral systems and public spending. *Quarterly Journal of Economics*, 117(2), 609–657.
- Gans, J. S., & Smart, M. (1996). Majority voting with single-crossing preferences. *Journal of Public Economics*, 59, 219–237.
- Harstad, B. (2007). Harmonization and side-payments in political cooperation. *The American Economic Review*, 97(3), 871–889.
- Harstad, B. (2008). Electoral systems and public spending. *Journal of the European Economic Association*, 6(2/3), 468–477.
- Harstad, B. (2010). Strategic delegation and voting rules. *Journal of Public Economics*, 94(1–2), 102–113.
- Hoyt, W. H. (1991). Property taxation, Nash equilibrium, and market power. *Journal of Urban Economics*, 34, 123–131.
- Janeba, E., & Wilson, J. D. (2005). Decentralization and international tax competition. *Journal of Public Economics*, 89, 1211–1229.
- Janeba, E., & Wilson, J. D. (2011). Optimal fiscal federalism in the presence of tax competition. *Journal of Public Economics*, 95, 1302–1311.
- Lockwood, B. (2002). Distributive policies and the costs of centralization. *Review of Economic Studies*, 69, 313–337.
- Lockwood, B. (2006). Fiscal decentralization: a political economy perspective. In E. Ahmad & G. Brosio (Eds.), *Handbook of fiscal federalism*.
- Lorz, O., & Willmann, G. (2005). On the endogenous allocation of decision powers in federal structures. *Journal of Urban Economics*, 57, 242–257.
- Olofsgård, A. (2005). Secessions and political extremism: why regional referenda do not solve the problem. *Journal of the European Economic Association*, 2, 805–832.
- Persson, T., & Tabellini, G. (1992). The politics of 1992: fiscal policy and European integration. *Review of Economic Studies*, 59, 689–701.
- Redoano, M., & Scharf, K. A. (2004). The political economy of policy centralization: direct versus representative democracy. *Journal of Public Economics*, 88, 799–817.
- Rota Graziosi, G. (2009). On the strategic use of strategic delegation in international agreements. *Journal of Public Economic Theory*, 11, 281–296.
- Ruta, M. (2005). Economic theories of political (dis)integration. *Journal of Economic Surveys*, 19, 1–21.
- Schneider, C. J. (2007). Enlargement processes and distributional conflicts: the politics of discriminatory membership in the European Union. *Public Choice*, 132, 85–102.
- Segendorff, B. (1998). Delegation and threat in bargaining. *Games and Economic Behavior*, 23, 266–283.