Enlargement versus Deepening: The Trade-off Facing Economic Unions

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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 about 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 size of the union and centralization may be non-monotonic: Up to a certain size of the union enlargement leads to deeper integration, whereas beyond that size further enlargement implies less centralization. We also show that freezing the level of centralization or allowing an associated membership can mitigate the trade-off.

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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 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 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 grows. 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 causing more 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 about which policies to centralize and about side-payments between member states. 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 produce side-payments from other member states. In this framework we derive the effects of changing 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 given identities of the representatives, the surplus from policy centralization increases with the number of countries, since more countries benefit from internalized policy spill-overs. Abstracting from strategic delegation, we should therefore observe more policy centralization as the economic union becomes larger. On the other hand, the size of the union also affects the incentives for strategic delegation: as a union incorporates more member states, voters tend to elect politicians who are less prone to centralization. If the second effect dominates, we have a trade-off between the size of an economic union and the extent of policy centralization within the union. Using numerical methods, we show that the relationship between size and depth of a union may be non-monotonic: 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 becomes more deeply integrated in terms of policy centralization. Beyond a certain number of countries, however, the opposite happens and political centralization becomes weaker 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 concerning 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 and in our normative benchmark, the utilitarian optimum. We show that the welfare gap between these two allocations widens if the union becomes larger. The benefits of enlarging an economic union are lower and, consequently, the optimal size of the union is smaller than in the absence of the strategic delegation effect.

On the positive side, existing member states of an economic union may try to find some institutional arrangements to fend off potentially detrimental effects of enlargement on the degree of centralization. For example, they may invest sunk institutional costs into the extent of integration *before* they accept new members, or they 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:[1] For example, new members may not be integrated into the union as full members but only as associated countries that do not participate in policy centralization.

Our paper builds on earlier work on strategic delegation in economic unions.[2] 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.[3] 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 the public public good, which is 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.[4]

[1] See Schneider (2007) on a "discriminatory membership" and also Alesina et al. (2005).

[2] For recent surveys on the political economy of economic unions see Ruta (2005) and Lockwood (2006).

[3] Janeba and Wilson (2005) endogenize the degree of centralization in a tax-competition model without strategic delegation.

[4] On strategic delegation with respect to local public good provision see also Chari et al.

Redoano and Scharf (2004) and Lorz and Willmann (2005) analyze the influence of strategic delegation on the centralization decision itself. In Redoano and Scharf (2004) 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.[5] Both Redoano and Scharf (2004) and Lorz and Willmann (2005) deal with the case of only two regions. This paper extends the analysis to a multi-region framework, thereby allowing us to analyze the relationship between the number of member states and the degree of centralization in an economic union.

The remainder of the paper is organized as follows: Section 2 presents the model of policy centralization. In Section 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, section 5 examines possible institutional implications of our model for alternative modes of enlargement, and section 6 finally concludes.

2 The Model

In this section we develop a political economy model that builds on Lorz and Willmann (2005). In contrast to our earlier work with 2-country unions, this paper considers economic unions that can consist of an arbitrary number n of symmetric countries. This generalization allows us to address the interaction between the number of member countries and the degree of policy centralization. As in our earlier paper, we assume 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

(1997), Cheikbossian (2000), Ferretti and Perotti (2002), and Dur and Roelfsema (2005). Lockwood (2002) shows in a legislative bargaining model without strategic delegation that centralized policies may be insensitive to heterogeneous local policy preferences and thereby finds another potentially welfare-reducing effect of centralized policy-making.

[5]Related papers dealing with strategic delegation in a bargaining context are Segendorff (1998), Buchholz et al. (2005), Facchini et al. (2006), Rota Graziosi (2006), and Harstad (2007, 2008a, and 2008b). Another related strand of literature is that of strategic information transmission (see e.g. Olofsgard 2005). None of these papers, however, deals with the issue of policy centralization.

unit interval.

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:

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

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. 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 one, and governments can raise non-distortionary 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, the utilitarian optimum and the first-best solution from the perspective of the median voter coincide.

Each public good can be decided on either by a central government or decentrally. Under decentralized decision-making national governments set the quantity of public goods non-cooperatively. 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:

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

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 (potentially different) provision levels in each country are decided centrally. These public good levels are then given by:

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

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.

Because of 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 also entails costs: The disadvantages of policy centralization discussed in the literature include information assymmetries with regard to local conditions, lack of jurisdictional 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. We model these costs of centralization in a reduced-form, straightforward way, by assuming additional fixed costs $f > 0$ for each public good that has its provision decision taken by the central decision-maker, and an over-head cost $h(n)$ 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.[6]

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

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

According to equation (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 high preference for public goods benefits more from centralization than a citizen with a lower 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 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 $\tilde{\beta}^*$:

$$\frac{d\tilde{\beta}^*}{dn} = -\frac{\tilde{\beta}^*}{n-1} < 0\ . \qquad (5)$$

[6]We assume these over-head cost to take the form $h(n) = \delta n^{\epsilon}$.

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 countries can benefit from the public good spill-overs and therefore, the more attractive policy centralization becomes.[7]

To conclude this section, let us point out that we regard the normative solution only as a reference point. We now proceed to develop a political economy model that will offer a positive explanation of the equilibrium degree of centralization.

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 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 policymakers 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 equations (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 on the spill-over threshold $\tilde{\beta}$; furthermore, they determine redistributive side-payments between member states Z_i $(i = 1 \dots n)$. Including side-payments allows for the possibility that the cost of centralized policies is 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

[7]Note 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.

of the Nash-Product:

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

where $s(\beta;\alpha_i^{rep})$ 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:

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

The quadratic term in the budget constraint is meant to capture efficiency costs of inter-regional transfer payments. 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.[8] 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 condition for the equilibrium side-payments Z_i^e is given by:

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

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

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

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 $\{Z_1^e, Z_2^e, \ldots, Z_n^e\}$, $\tilde{\beta}^e$, 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

[8] Facchini et al. (2006) and Harstad (2007 and 2008a) compare the limit cases of free transfers versus prohibitive transfer costs.

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. The cut-off level in the symmetric equilibrium $\tilde{\beta}^e$ is given by $s(\tilde{\beta}^e; \alpha^{rep}) = 0$; that is:

$$\alpha^{rep}\left[1+(n-1)\,\tilde{\beta}^e\right]\ln\left(1+(n-1)\,\tilde{\beta}^e\right)-\bar{\alpha}\,(n-1)\,\tilde{\beta}^e-f=0\;. \qquad (10)$$

The identity of the elected representatives thus determines the degree of centralization. The stronger the preference for public spending among the symmetric representatives, the more public goods are centralized. This follows from:[9]

$$\frac{d\tilde{\beta}^e}{d\alpha^{rep}}=-\frac{\left[1+(n-1)\,\tilde{\beta}^e\right]\ln\left(1+(n-1)\,\tilde{\beta}^e\right)}{\alpha^{rep}\,(n-1)\left[1+\ln\left(1+(n-1)\,\tilde{\beta}^e\right)\right]-\bar{\alpha}\,(n-1)}<0\;. \qquad (11)$$

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

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

where $\tilde{\beta}^e$ and Z^e are determined by equations (8) and (9). The first order condition of this optimization problem is given by $dV_i/d\alpha_i^{rep}=0$, that is:

$$\frac{dZ_i^e}{d\alpha_i^{rep}}-s_i(\bar{\alpha},\tilde{\beta}^e)\frac{d\tilde{\beta}^e}{d\alpha_i^{rep}}=0\;. \qquad (12)$$

From (8) and (9) the marginal effects of choosing a higher α_i^{rep} on the equilibrium degree of centralization and on the equilibrium side-payments can be

[9] The second order condition implies that the denominator of (11) is positive.

written as follows (see appendix):

$$\frac{d\tilde{\beta}^e}{d\alpha_i^{rep}} = -\frac{\dfrac{\partial s_i(\alpha_i^{rep}, \tilde{\beta}^e)}{\partial \alpha_i^{rep}}}{n \cdot \dfrac{\partial s_i(\alpha_i^{rep}, \tilde{\beta}^e))}{\partial \tilde{\beta}^e}} < 0 \ , \tag{13}$$

$$\frac{dZ_i^e}{d\alpha_i^{rep}} = -\frac{n-1}{n} \cdot \frac{\int_{\tilde{\beta}^e}^1 \dfrac{\partial s_i(\alpha_i^{rep}, \beta)}{\partial \alpha_i^{rep}} d\beta}{1 + \gamma \int_{\tilde{\beta}^e}^1 s(\alpha_i^{rep}, \beta) d\beta} < 0 \ . \tag{14}$$

Noting the signs in (13) and (14), equation (12) can only be satisfied if $s(\bar{\alpha}, \tilde{\beta}^e) > 0$. The fact that the centralization surplus of the average citizen is positive at $\tilde{\beta}^e$ implies that $\tilde{\beta}^e > \tilde{\beta}^*$. Hence the degree of centralization is inefficiently low in the political economy equilibrium. This generalizes our earlier findings in Lorz and Willmann (2005) to the case of more than two countries. The reason for this inefficiency result is a strategic delegation effect: 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 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 how it was obtained, one might call this the "Thatcher" effect.

4 Enlargement vs. Deepening

This section analyzes how strategic delegation and the degree of centralization change with the number of member states in the union. The point of departure is the equilibrium condition (12). From (10) we can determine α^{rep} as a function of $\tilde{\beta}^e$. Differentiating (10) yields $\partial s_i(\cdot)/\partial \alpha_i^{rep}$ and $\partial s_i(\cdot)/\partial \tilde{\beta}^e$. Inserting into (12), solving for the integral and employing the symmetry property of the equilibrium, we can determine the equilibrium degree of centralization $\tilde{\beta}^e$ as a function of n. As this expression is not suited for a straightforward comparative-static exercise, we resort to numerical simulations in the following.

In our benchmark simulations we set $\bar{\alpha} = 3$, $f = 0.5$ and $\gamma = 0.5$. Figure 1 shows how the size of the union affects strategic delegation. It plots α^{rep}

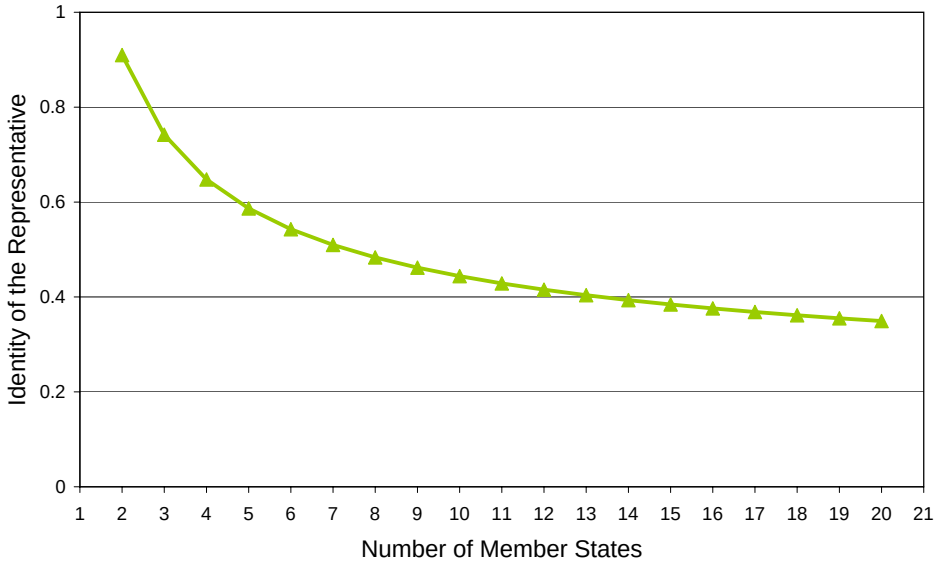

Figure 1: Strategic Delegation and the Number of Member States

relative to $\bar{\alpha}$ in the range $n \in [2, 20]$. As figure 1 shows, strategic delegation increases in the number of countries, and the representative's identity α^{rep} deviates further and further away from the median's identity $\bar{\alpha}$ as the size of the union increases. The more countries bargain over centralization, the lower is the influence of a single representative on the equilibrium $\tilde{\beta}^e$. The marginal costs of strategic delegation—in terms of sub-optimal centralization—decline from the view of a single country, and this effect gives voters a stronger incentive to deviate from their own public good preferences when choosing a representative.

With respect to the equilibrium degree of centralization $1 - \tilde{\beta}^e$, we therefore have two effects working in opposite directions: On the one hand, the centralization surplus increases for a 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 2 depicts 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 deeply integrated as the number of member states rises and then—in our example for $n \geq 5$—the equilibrium centralization level declines in n. Eventually, strategic motives cause a trade-off between an enlargement and a deepening of the union.

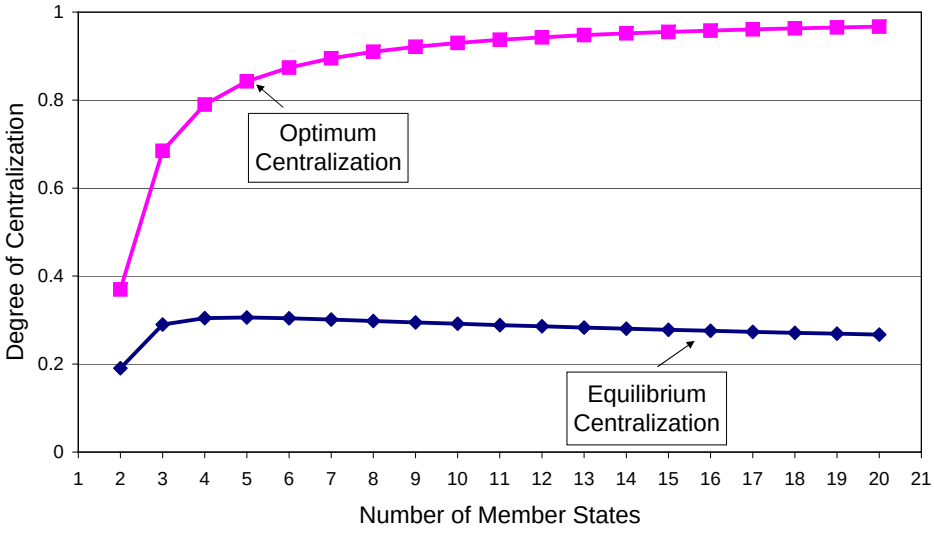

Figure 2: Centralization and the Number of Member States

To see how the the additional costs of interregional transfers influence our results, figure 3 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 figure 3 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.

Figure 4 shows the influence of the centralization costs on the model's predictions. In this figure, we assume a lower f than in the benchmark ($f = 0.1$). Not surprisingly, the optimal degree of centralization is already very high for a low number of member countries. As a result, 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 $n = 2$. For a higher f than in the benchmark case, the maximum level of centralization shifts to the right.

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.

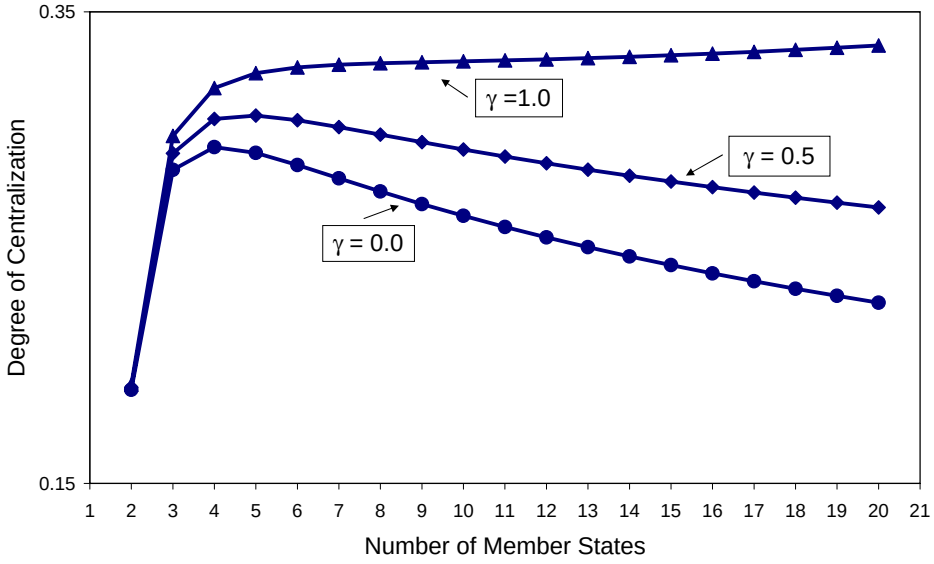

Figure 3: Different Redistribution Costs

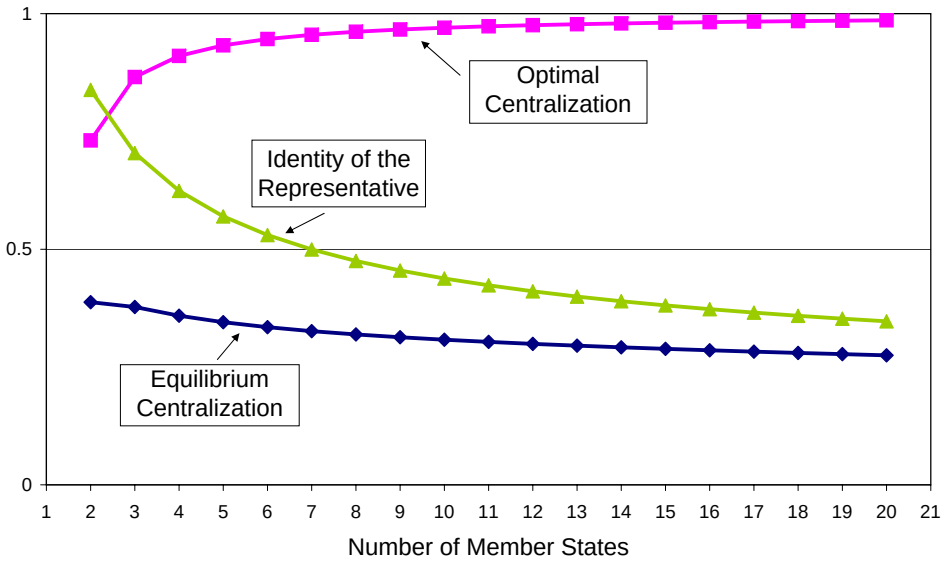

Figure 4: Low Fixed Centralization Costs

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

Table 1: Number of Member States for Maximum Centralization

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 5 depicts the welfare effects of strategic delegation.[10] 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 aggregate welfare of each member state. Strategic delegation influences this optimal union size. Whereas 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 due to strategic delegation thus reduce the optimal size of an economic union.

5 Alternative Modes of Enlargement

The negative welfare effect of enlarging the union beyond a certain size is brought about by ever more conservative representatives coming to power because of strategic delegation. This raises the question whether there exist safeguards or alternative forms of enlargement that avoid this drawback in the political arena. Clearly, this question of constitutional design takes one step further than the positive theory developed so far.

Consider an economic union of a certain size which decides about the 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,

[10] We again use the numerical values assumed so far, as well as $\delta = 0.002$ and $\epsilon = 3$ for the overhead cost.

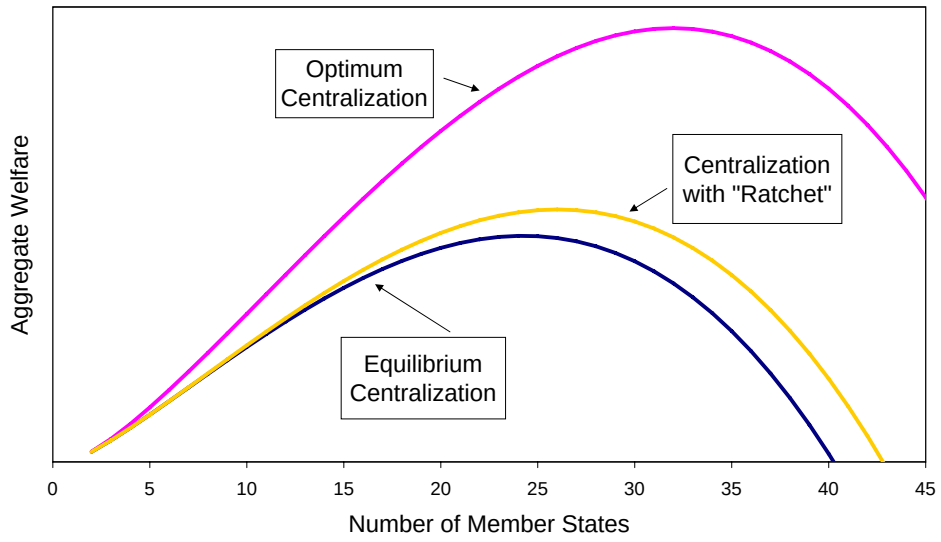

Figure 5: Enlargement with "ratchet" effect

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 Figure 5. In constructing this figure we assume that the centralization level first grows gradually with the size of the union, but once it reaches the maximum it stays at that level as the union grows further. As Figure 5 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 (which occurs at $n = 5$ in the numerical example at hand) the institutional "ratchet" effect prevents the welfare loss associated with the decline in centralization that would otherwise take effect.

Another possible 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. Compared to granting full membership, an associated membership keeps the degree of centralization of the newly enlarged union unchanged. Another 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 6 depicts the welfare gain from admitting a new member state as an

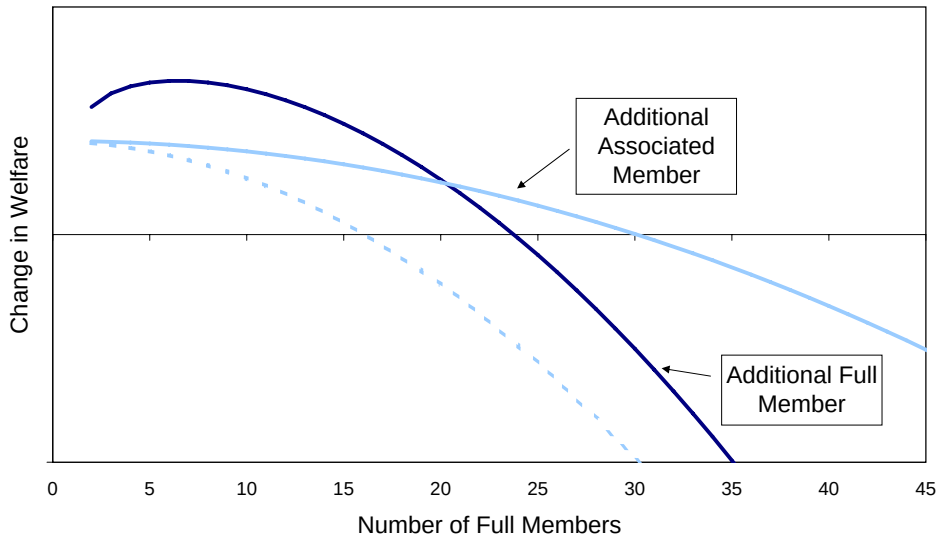

Figure 6: Enlargement and Associated Membership

associated member, given that the union has n full members.[11] With regard to the membership cost, we consider the specification $g(n+s) = 0.002(n+s)^3$, 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 Figure 6 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 Figure 6 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 it is recovered in form of the dues paid by the associated member. In practise, countries associated to the EU pay

[11]Note that we could provide similar graphs for admitting more than one associated member.

membership fees and this renders associated membership more attractive as an alternative form of enlargement.

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 this relationship. 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 union enlargement 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 enlargement and deeper integration.

Our results complement nicely 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 them 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 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 enlargement and deepening of an economic union, however, in the case of an associated membership at the cost of not internalizing spill-overs by these countries.

With respect to future work, we can extend our model to include asym-

metric 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. For example, spill-overs could decline with distance so that countries located at the core send and receive more spill-overs than countries at the periphery. A growing union then becomes increasingly heterogeneous with respect to the preferred level of centralization. A second, promising avenue is 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. Furthermore, old member countries and new entrants then differ with respect to their fall back option when it comes to enlargement. Both extensions of our model appear far from trivial, and we leave them for future research.

Appendix

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

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

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

From these two equations we can eliminate λ:

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

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

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

This yields:

$$-\tilde{s}_i^e \cdot \left(\int_{\tilde{\beta}^e}^1 s_{-i} d\beta + Z_{-i}^e \right) = (n-1)\, \tilde{s}_{-i}^e \cdot \left(\int_{\tilde{\beta}^e}^1 s_i d\beta + Z_i^e \right) . \tag{A.2}$$

Combining (A.1) with (A.2) leads to:

$$(1 + \gamma Z_i^e) \cdot \tilde{s}_i^e + (n-1) \cdot \left(1 + \gamma Z_{-i}^e\right) \cdot \tilde{s}_{-i}^e = 0 . \tag{A.3}$$

In addition, the budget constraint has to be satisfied:

$$Z_i^e + (n-1)\, Z_{-i}^e = -\frac{\gamma}{2} \left(Z_i^e\right)^2 - \frac{\gamma\,(n-1)}{2} \left(Z_{-i}^e\right)^2 . \tag{A.4}$$

Equations (A.1), (A.3) and (A.4) determine the three unknowns, Z_i^e, Z_{-i}^e and $\tilde{\beta}^e$. Totally differentiating these three equations, setting $d\alpha_{-i}^{rep} = 0$, and employing the symmetry properties $Z_i^e = Z_{-i}^e = 0$, $\alpha_i^{rep} = \alpha_{-i}^{rep}$, and $\tilde{s}_i^e = \tilde{s}_{-i}^e$ yields:

$$\left(dZ_i^e - dZ_{-i}^e\right) \cdot \left(1 + \gamma \cdot \int_{\tilde{\beta}^e}^1 s_i d\beta\right) + \left(\int_{\tilde{\beta}^e}^1 \frac{\partial s_i}{\partial \alpha_i^{rep}} d\beta \right) d\alpha_i^{rep} = 0 , \tag{A.5}$$

$$n \cdot \frac{\partial \tilde{s}_i^e}{\partial \tilde{\beta}^e} d\tilde{\beta}^e + \frac{\partial \tilde{s}_i^e}{\partial \alpha_i^{rep}} d\alpha_i^{rep} = 0 , \tag{A.6}$$

$$dZ_i^e + (n-1)\, dZ_{-i}^e = 0 . \tag{A.7}$$

From (A.6)–(A.7) we can derive equations (13) and (14) of the text.

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