The Size and Scope of International Unions: A Coalition-Theoretic Approach

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Draft: July, 2008

Abstract

This paper examines the endogenous strategic considerations in simultaneously creating, enlarging, and deepening an international union of countries within a framework of variable geometry. We introduce a coalition-theoretic model to examine the equilibrium relationship between union size and scope. What is the equilibrium (stable) size and scope of an international union and how do these variables interact? When should we expect countries to take advantage of more flexible modes of integration and how does that possibility affect the pace and depth of integration? In tackling these questions, we characterize the various policy areas of cooperation with respect to their cross-country and cross-policy spillovers, their efficiency scales, the heterogeneity of preferences, and the general cost structure. We then go on to show that the enlargement of a union and the widening of its policy scope are too symbiotic and mutually reinforcing dynamic processes under certain conditions. This is an exciting research puzzle given that current game-theoretic predictions have been at odds with the empirical reality of European integration.

1 Introduction

The recent expansion of the European Union to the East and the impending assimilation of South-East Europe into the European family of nations poses some significant questions with respect to the 'political geometry' of regional integration. The acute disparities in national preferences, economic development, and size among current and prospective member-states renders the existing *modus operandi* of the Union inadequate and further complicates normative questions with regard to the optimal constitutional rules of integration. On one hand, the proliferation of diverse member-states and areas of cooperation intensifies the need for increased *flexibility* in the supranational decision-making processes and the structure of further integration, while, on the other hand, the expansion of the Union necessitates stronger constitutional *commitment* to the *acquis communautaire* in order to lock in the achieved gains of existing integration. Formal and informal manifestations of policy differentiation and flexibility in the mode of integration[1] suggest a reality of a Europe of multiple gears and constellations, where countries self-select themselves (either voluntarily or by failure to meet certain criteria) into a 'core' subunion of deeper integration and a 'periphery' of selective cooperation. This coupled with recent squabbles over the EU budget and the failure to ratify the Treaty establishing a Constitution for Europe (TECE) and (seemingly) the Lisbon Treaty (aka the Reform Treaty) have ushered in a period of apprehension and uncertainty about the future of the European project. The heightened heterogeneity in national preferences and levels of economic development brought about by the recent expansion to the East is another cause for concern vis-à-vis the prospect of legislative stagnation within the policy-making

[1] The possibility for the formation of enhanced cooperation agreements (ECAs) among sub-unions of countries subject to veto was introduced by the Treaty of Amsterdam (1997) (see de Witte, 2000). The veto power of non-participating countries was removed by the Treaty of Nice (2001), which essentially relaxed the stringent conditions for the formation of ECAs. Finally, the Lisbon Treaty changed the minimum acceptable number of ECA participating members to nine, as opposed to one third of all members, which was the case before (see de Búrca, 2008).

supranational bodies and the difficulty of reaping the full gains of international cooperation because of augmented transaction costs. It, hence, becomes of utmost importance both from a theoretical and a practical point of view to achieve a better understanding of the source of these seething tensions in the midst of the Union and how best to alleviate them.

This paper introduces a formal coalition-theoretic framework of the *variable geometry* of regionalism and the dynamics of international union formation with a particular emphasis on the case of the EU. It analyzes the endogenous strategic considerations in simultaneously creating, enlarging, and deepening a regional *bloc* of countries by characterizing the equilibrium relationship between union size and scope. Why do some countries opt for a looser form of international cooperation while others strive for an 'ever closer union'? When and in which policy areas should we expect countries to take advantage of more flexible modes of integration? Finally, examining the effects of union enlargement is an indispensable part of the analysis. Expanding the set of eligible countries for union formation would certainly impact the equilibrium of the model. How would the emergence of new potential candidate-members perturb the equilibrium balance between union size and scope under various coalition expansion protocols? I show that the enlargement of a union and the widening of its policy scope are two symbiotic and mutually reinforcing dynamic processes under certain assumptions.

A coalition-theoretic approach to international union formation is predicated on the conception of international unions as coalitions of several sovereign nation-states (*breadth*) agreeing on the centralization and/or coordination of a diverse set of policies (*width*) through the delegation of authority to supranational institutions (*depth*). Examples include customs unions, monetary unions, regional *blocs*, even common defense unions. The policy variables in the model may be construed as types of supranational public goods universally affecting the welfare of coalition members (and even non-members in the case of policy *externalities*). In keeping with the idea of *variable geometry*, a regional *bloc*, or any international *regime*

for that matter, may be uniquely characterized by three political dimensions: its *breadth* (or size) × its *width* (or scope) × its *depth* (or decision-making institutions).[2] This theoretical schema constitutes a parsimonious framework for the comparative analysis of regional integration across different parts of the world, by generating well-defined research questions on the observed variation in these dependent variables. Tables 1 and 2 present a snapshot comparison of the current state of integration across some of the most developed regional *blocs* in terms of their location in this three-dimensional political space. The emphasis of this paper is mostly on the dynamic relationship between the first two and the set of possible equilibrium unions spanned by their strategic interplay. How does the size of a union affect its scope in equilibrium (and *vice versa*) and how is their relationship perturbed if at all by exogenous changes in the overall set of eligible coalition partners?

The process of European integration has been marked by a succession of periods of stagnation and malaise followed by periods of intense legislative fermentation through the negotiation of far-reaching intergovernmental treaties in the run-up to impending rounds of enlargement. Although the historical record of European integration particularly in the 1990s has shown that union widening may be concomitant with deepening (de Búrca, 2008), recent game-theoretic predictions have been at odds with the empirical reality of European integration. Alesina, Angeloni and Etro (2001, 2005) use a public goods approach to find that there is a trade-off between enlargement and deepening of coordination: a union involved in too many collateral activities will be favored by few countries, while a union which focuses on a core of activities will be favored by many countries. Their political equilibrium implies a certain bias toward excessive centralization and small size. Gilligan (2004) shows that there is

[2] While the dimensions of *breadth* and *width* are more straightforward to measure, the *depth* of an international union is a more elusive concept. The balance, however, between intergovernmental and supranational elements in the institutional structure of a union may be captured by such proxies as the incidence of unanimity vs. majoritarian voting rules across different policy areas, the institutional weight of regional parliaments in the policy-making process, as well as the size of the common budget. See Dewatripont et al. (1995) for an elaboration of these concepts.

The 'Political Geometry' of Regional *Blocs*

	Breadth	**Width**	**Depth**
African Union	53 members/ Total population: 850 million (2005 estimate)/ Economic size: 1.515 trillion (US$ PPP 2003 est.)	Economic affairs/ Human resources/ Infrastructure and energy/ Peace and security/ Political affairs/ Rural economy and agriculture/ Science and technology/ Social affairs/ Trade and industry	AU Assembly/ AU Executive Council/ AU Commission/ The Permanent Representatives' Committee/ Peace and Security Council (PSC)/ Pan-African Parliament/ Economic, Social and Cultural Council **(**ECOSOCC**)/** Court of Justice/ Specialized Technical Committees/ African Central Bank/ African Monetary Fund/ African Investment Bank
ASEAN	10 members/ Total population: 575,525,000/ Economic size: 1,281,853.9 million ($US at current 2007 prices)	Agriculture and forestry/ Culture and the arts/ Employment/ Energy/ Environment/ Finance/ Food security/ Health/ Human resource development/ Information and communications technology/ Investment/ Poverty alleviation/ Science and technology/ Social welfare and rural development/ Telecommunications/ Tourism/ Trade/ Transportation/ Youth	Meeting of the ASEAN Heads of State and Government/ ASEAN Ministerial Meeting (Foreign ministers, Finance ministers and other sectoral ones)/ ASEAN Chair/ Secretary-General of ASEAN/ ASEAN Secretariat/ ASEAN Agencies and Forums
CARICOM	15 full members plus 5 associate members/ Total population: 6,468,870/ Economic size: 64,219 million ($US PPP)	Education/ Employment/ Energy/ Fiscal and monetary coordination/ Foreign economic policy/ Foreign trade/ Free trade and travel/ Health/ Information and technology/ Single market/ Social, cultural and technological development/ Telecommunications/ Transportation	The Conference of Heads of Government (and its Bureau)/ The Community Council of Ministers/ CARICOM Secretariat/ The Council for Finance and Planning (COFAP)/ The Council for Trade and Economic Development (COTED)/ The Council for Foreign and Community Relations (COFCOR)/ The Council for Human and Social Development (COHSOD)/ The Legal Affairs Committee/ The Budget Committee/ The

Figure 1: This table serves as a description of the comparative 'political geometry' of select regional *blocs*. (Sources: *http://www.africa-union.org/*, *http://www.aseansec.org/*, *http://www.caricom.org/*)

EU	27 members/ Total population: 497,481,657/ Economic size: 12,864,394.8 million (PPS, Eurostat forecast)	Agriculture/ Competition/ Consumer protection/ Culture/ Customs union/ Development/ Economic and monetary affairs/ Education, training and youth/ Employment and social affairs/ Energy/ Enterprise/ Environment/ External relations/ External trade/ Anti-fraud policy/ Fisheries and maritime affairs/ Food safety/ Foreign and security policy/ Human rights and humanitarian aid/ Information society/ Internal market/ Justice, freedom and security/ Public health/ Regional policy/ Research and innovation/ Taxation/ Transport	European Parliament/ Council of the European Union/ Presidency/ European/ Commission/ Court of Justice of the European Communities/ European Court of Auditors/ European Ombudsman/ European Central Bank/ European Investment Bank/ European Economic and Social Committee/ Committee of the Regions
MERCOSUR	5 full members plus 5 associate members (Venezuelan membership yet to be ratified)/ Total population: 266.616.849 (2006 est)/ Economic size: 2.895 trillion (US$ PPP)	Agriculture/ Culture/ Economy (macroeconomic coordination)/ Education/ Employment/ Energy/ Environment/ Health/ Home affairs and immigration/ Human rights/ Industry/ Justice/ Science, technology and innovation/ Social development/ Tourism	Council of the Common Market (CMC)/ Group of the Common Market (GMC)/ MERCOSUR Commission of Commerce (CCM)/ MERCOSUR Parliament (PM)/ Economic-Social Consultative Forum (FCES)/ MERCOSUR Secretariat (SM)/ MERCOSUR Permanent Tribunal (TPR)/ Administrative-Labor Tribunal of MERCOSUR (TAL)
NAFTA	3 members/ Total population: 445,335,091 (2008 estimate)/ Economic size: $15,857 billion (PPP, 2007 IMF estimate)	Agriculture/ Competition/ Environment/ Industry/ Intellectual property rights/ Labor/ Migration/ Trade	NAFTA Secretariat (National Sectors)/ National "Investigating authorities" (dispute settlement mechanisms)

Figure 2: (Continued from table 1) This table serves as a description of the comparative 'political geometry' of select regional *blocs*. (Sources: *http://europa.eu/*, *http://www.mercosur.int/*, *http://nafta-sec-alena.org/*)

no such broader-deeper trade-off, once it is no longer assumed that members of a multilateral *regime* must set their policies at an identical level (policy uniformity assumption).

This paper arrives at a similar conclusion with respect to the trade-off between size and scope, albeit within a static environment. Once the model is extended to a dynamic framework allowing for the possibility of *exogenous* enlargement, the relationship between those two variables can be reversed. The intuition is that existing members may find it in their joint interest to extend their scope of cooperation to additional policy jurisdictions in anticipation of future enlargement. Since aspiring candidate-members will be required to fully embrace the *acquis communautaire* at the time of accession without any significant input to its content, the enhancement of cross-country *spillovers* and economies of *scale* and *scope* generated by an increase in union size will expand the efficiency frontier of multidimensional policy centralization. Hence, coordination in policy areas with higher levels of preference heterogeneity, lower bureaucratic fixed costs, and lower degrees of complementarity to the existing *acquis* will become beneficial enough for all incumbent members as a result of union enlargement. This comes to show that the broader-deeper trade-off does not generally survive within a dynamic framework.[3]

A typical assumption utilized in the relevant political economics literature on the constitutional allocation of competences across local, national, and supranational polities is that larger political jurisdictions (in this case supranational ones) are deemed to be more efficient providers of public goods (Bolton and Roland, 1997; Ellingsen, 1998; Alesina, Angeloni and Etro, 2005; Hafer and Landa, 2007). Within the framework of a game of coalition formation, it seems worthwhile to take a non-generic approach to the specification of union benefits by modeling an international union as an efficient central provider of public goods, characterized by *economies of scale* and *scope* and *spillovers* across union members and policy jurisdictions.

[3] See Hausken, Mattli and Plümper (2006) for a similar attempt at extending the relationship between widening and deepening of a union to a dynamic setting.

Given the broad, non-issue specific nature of political unions, it seems more than plausible to assume more than one policy dimensions in the negotiation process, thus giving rise to opportunities for issue-trading, log-rolling, as well as 'enhanced cooperation' in the form of policy-specific subunions. In tackling the above questions, I characterize the various policy areas of cooperation only with respect to their efficiency scales, cross-country and cross-policy spillovers, the heterogeneity of preferences, and their cost structure. A public policy is effectively construed as a form of non-rivalrous and non-excludable public good, given that all citizens of a democratic polity are required to defer to the authority of the state or any supranational organization of which it is a member. Henceforth, the terms 'policy' and 'public good' are used interchangeably.

In a coalition-formation model with multiple policy jurisdictions or public goods, I examine how the coalition formation protocol affects the equilibrium relationship between size and scope. I compare the model's behavior under the 'Rigid Union' protocol, whereby all members are required to conform to the union's full range of policy competences, with more flexible rules of integration, such as 'à la carte integration', 'open partnerships' (Dewatripont et al., 1995), and 'enhanced cooperation' (Widgrén, 2001; Bordignon and Brusco, 2006), and accordingly derive the relevant stability conditions. By allowing for a fully flexible and unencumbered coalition-formation protocol, free from any *ex ante* 'constitutional' restrictions on the space of *admissible* coalition structures and *feasible* unions, one can also determine in theory what kind of policy domains are most amenable to 'enhanced cooperation' arrangements amongst a subset of union members. I find that policy areas with a more 'political' hue, - in the sense that they are generally subject to larger preference heterogeneity, lower 'technocratic' fixed costs, lower cross-country spillovers, and lower degrees of complementarity with the extant 'common policy base' -, will tend to give rise to subunion policy coordination arrangements in the form of 'enhanced cooperation' or 'open partnerships'. This would help

explain why such areas as foreign policy coordination and social policy pertain to the core elements of national sovereignty and remain on the whole bound by the confines of national political jurisdictions. On the other hand, policy jurisdictions of a more 'economic' nature, meaning those that are more expertise- and infrastructure- intensive, with lower preference heterogeneity, and more transparent and palpable benefits of coordination, such as trade policy, competition policy, and environmental regulation, will generally form the crux or 'common base' of union policies within the context of regional integration arrangements.

The following section introduces the coalition-theoretic set of analytical tools[4] and the economic environment of the model. I then characterize the *static* and *dynamic* (i.e., post-enlargement) equilibrium of the symmetric model with unidimensional heterogeneity of preferences. Subsequent sections tease out the implications of asymmetry in country size and flexible integration coalition-formation rules, while the appendix describes the generic version of the model with multidimensional heterogeneity. The penultimate section presents a brief discussion of how the results of the model apply to the study of the dynamic evolution of the EU's political shape and form and help rationalize the current state of affairs. The final section summarizes the results and presents some concluding remarks.

2 The Model

2.1 Multidimensional Coalition Formation and Equilibrium Stability

Let N denote the set of countries that belong to a certain geographically-delimited region of the world and $E = \{i \in N : e_i = 1\}$ the set of countries eligible to participate in regional integration agreements. Such eligibility criteria, which for the purposes of this paper are treated as exogenously given and commonly known, may include the type of political regime

[4] Bandyopadhyay and Chatterjee (2006) provide an excellent survey of the existing results of non-cooperative and cooperative coalition theory as well as some of its applications in political economy.

of a country (democratic vs. authoritarian), its level of economic development, as well as its set of geopolitical constraints (i.e., whether it belongs to the same geopolitical *bloc* as its regional prospective coalition partners).[5] Each country $i \in N$ has population size $s_i \in \mathbb{N}^+$. The exhaustive set of all public policies j that may directly affect the well-being of each country's citizens is given by $\mathcal{P}$, with $|\mathcal{P}| = P$ as its cardinality.[6] Assume that the vector of local policies $\overrightarrow{p_i} = \left(p_i^j\right)_{j \in \mathcal{P}}$ is set by a benevolent national government seeking to maximize the welfare of its representative citizen of mass s_i. This implies that within-country preference heterogeneity does not factor into the model.

Each country has the choice of setting policy *independently* (namely within a state of *autarchy*) or *interdependently* (within the cooperative framework of a regional integration agreement). Let elementary strategy $\sigma_i^j \in \Sigma_i^j = \{0, 1\}$ denote country i's decision to cooperate in policy area j ($\sigma_i^j = 1$) or not ($\sigma_i^j = 0$). A national government's strategy is then given by $\sigma_i \in \Sigma_i$, where $\Sigma_i = \underset{j \in \mathcal{P}}{\times} \Sigma_i^j \equiv \{0, 1\}^P$ is a P-dimensional vector space. Strategic choices across policy dimensions are assumed to be orthogonal. Define $\Sigma \equiv \underset{i \in E}{\times} \Sigma_i$ and denote strategy profiles by $\sigma \in \Sigma$. Country payoffs can then be represented by real-value utility representations $u_i : \Sigma \to \mathbb{R}$,[7] which are going to be functionalized below within the context of a public goods provision game.

Autarchic policy-making ($\sigma_i^j = 0$) by a benevolent government comes down to maximization of the representative citizen's utility weighted by the country's population size, i.e., $p_{\{i\}}^{j*} = \underset{p_{\{i\}}^j}{\text{argmax}} \;\; u_i \left(p_{\{i\}}^j | s_i, \alpha_i^j\right)$. On the other hand, whenever country i chooses to cooperate with others in policy area j, it agrees to enforcing a common union-wide policy set at a Samuelsonian optimum (at a level that maximizes the aggregate utility of member-states),

[5] In the European context, these eligibility membership criteria were explicitly defined by the declaration of the June 1993 European Council in Copenhagen.

[6] Henceforth, in terms of notation, superscripts j will denote policies and subscripts i will denote countries.

[7] Note that $u(\cdot)$ will be symmetric with respect to both country size and preference intensity parameters $\left(s_i, \alpha_i^1, \ldots, \alpha_i^P\right)$.

i.e., $p_U^{j*} = \underset{p_U^j}{\text{argmax}} \sum_{k \in U^j} u_k \left(p_U^j | s_k, s_{-k}, \alpha_k^j \right)$. As is standard in cooperative game theory, this commonly enforced policy constitutes a binding agreement. It is certainly the case that a uniform policy set at a Samuelsonian optimal level as opposed to a differentiated policy regime is not a first-best solution, since policy harmonization may not accurately accommodate local tastes and conditions. Albeit somewhat controversial, the assumption of policy uniformity in international multilateral agreements is quite plausible given the high implementation and coordination costs involved in multiple policy differentiation but also quite standard in the literature.[8]

The next step is to translate the above strategic form game into a cooperative coalition-formation game with non-transferable utility (NTU) and subsequently to define the model's equilibrium concept of coalitional stability. To that end, let us denote ordered pairs $(i, j), i \in E, j \in \mathcal{P}$ as *elementary players*, or else government ministers in charge of a specific policy portfolio. Let $S^j = \{(i, j) | i \in E\}$ be the set of all eligible *elementary players* along any policy dimension $j \in \mathcal{P}$ and $U^j = \{i \in E : \sigma_i^j = 1, j \in \mathcal{P}\}$ [9] the ensuing set of countries acceding to an international union agreement in policy area j. Then $C^j \in \mathcal{C}^j$ is an *admissible* coalition structure along policy dimension j *if and only if* it consists of a partition of S^j with at most one non-singleton element, namely the multi-country union denoted by U^j. Note that the binary action space $\{0, 1\}$ allows for at most one multilateral union agreement in each policy area. Finally, define $U_i^j \equiv \{k \in U^j | i \in U^j, k \in E\}$ as the set of country i's coalition partner along policy j given that $\sigma_i^j = 1$, otherwise as the singleton element $\{i\}$ whenever country i chooses not to cooperate in j.

[8] See for example Gilligan (2004) for a theoretical analysis of the relationship between policy uniformity and the broader-deeper trade-off in international multilateral agreements. Harstad (2007) also provides a theoretical argument in favor of the uniformity assumption traditionally used in the *fiscal federalism* literature. See, on the other hand, De Burca and Scott (2000) for various notions of policy differentiation from an international law perspective.

[9] Note that it only makes sense for $\left|U^j\right| \geq 2$, since the decision by only one country minister to cooperate is tantamount to no cooperation at all.

By way of extending the above notation to a multi-dimensional setting, let $C = \underset{j\in\mathcal{P}}{\cup} C^j$ be a multi-dimensional coalition structure and $\mathcal{C} \equiv \underset{j\in\mathcal{P}}{\times} \mathcal{C}^j$ the set of all coalition structures or partitions of $S \equiv \underset{j\in P}{\times} S^j$. We also need to define $\widetilde{C} \subseteq \mathcal{C}$ as the refined set of *feasible* coalition structures as determined by exogenously postulated institutional constraints. This will turn out to be useful for the characterization of the equilibrium under both *rigid* and *flexible* rules of integration. Moreover, let $U_i = \underset{j\in\mathcal{P}}{\cup} U_i^j$ denote the superset of all union configurations in which country i participates.[10] It should be noted that by way of the formulation of the strategic form game in the original union-formation stage, I employ the 'Open Regionalism' coalition-formation protocol introduced by Yi and Shin (1995) and Yi (1996, 1997), according to which any country is free to enter or exit a union as long as it abides by its decisions.[11] However, the coalition-formation rule will shift to 'Unanimous Regionalism' once I examine the dynamic process of enlargement of an existing union, whereby future accession by candidate-members has to be unanimously approved by all existing members.[12]

I now turn to the definition of the concept of coalitional stability, which is equivalent to the *Stable Agreement Structure* concept by Conconi and Perroni (2002). Coalition structures C are deemed to be *stable* as long as they are immune to *stable* (aka *self-enforcing*) objections and counterobjections[13] by any proper subset of *elementary players*. The intuition here is that national governments may always coordinate during high-level intergovernmental summits on possible deviations of (non)-cooperation with each other along any subset of policies.

[10] Note that all of the above coalition structure notation is implicitly conditional on some strategy profile $\sigma \in \Sigma$ of the strategic form game.

[11] In the case of Europe for example, the Messina conference (1955), an early meeting between the Six founding member-states (France, Germany, Italy, and the Benelux countries) that laid the foundations of the European Economic Community and eventually led to the Treaty of Rome agreement (1957), was not necessarily confined to those six countries. It was open to all interested parties within the democratic Western European *bloc*.

[12] One may perceive of international unions as 'clubs' in the economic sense (Casella and Feinstein, 2002; Padoan, 1997); to that effect, Roberts (1999) presents a related dynamic model of 'clubs' with endogenous membership and enlargement.

[13] This is equivalent to the non-cooperative game-theoretic concept of self-enforcing deviations.

As long as there are no such objections immune to any counterobjections by any subset of *elementary players*, then a given coalition structure is deemed to be stable. In light of the above discussion, we may now provide the formal definitions:

Definition 1 *A restricted*[14] *coalition structure* $\overline{C}(S'), S' \subseteq S$, *can be blocked within a coalition structure* $C' \equiv \overline{C}(S') \cup \overline{C}(S \backslash S')$ *by a coalition* $S'' \subseteq S'$ *of elementary players if there exists* $\overline{C}(S'')$ *such that for all* $\overline{C}(S' \backslash S'')$ *that cannot be blocked within* $C'' \equiv \overline{C}(S'') \cup \overline{C}(S' \backslash S'') \cup \overline{C}(S \backslash S') \in \mathcal{C}$ *we have that (i)* $u_i(C'') \geq u_i(C')$, $\forall i$ *such that* $(i,j) \in S''$ *for some* $j \in \mathcal{P}$ *and* $u_i(C'') > u_i(C')$ *for at least one such* i *and (ii)* $\overline{C}(S'')$ *cannot be blocked within* C''. *Then* $\overline{C}(S'')$ *is a* ***stable objection*** *to* $\overline{C}(S')$ *by* $S'' \subseteq S'$.

Definition 2 *A* ***Stable Coalition Structure*** $C^* \in \mathcal{C}$ *is an unrestricted structure that cannot be blocked.*

Note that this notion of coalitional stability is tantamount to a refinement of the Coalition-Proof Nash Equilibrium concept (Bernheim, Peleg and Whinston, 1987) and as such allows for strong predictions with regards to the expected size and scope of an international union given the parameters of the underlying coalition-formation game. Within a context of unlimited and non-binding pre-play communication, the above definition of coalitional stability is also based on a recursive notion of self-enforceability of deviations by any proper subset of players in addition to the concept of Pareto efficiency. However, unlike Coalition-Proof Nash Equilibria, *Stable Coalition Structures* are appropriately refined to allow for the possibility of *counterobjections* by players belonging to the relevant complement of the deviating coalition $(S' \backslash S'')$. Although this notion of coalitional stability may appear to rely on excessively strong informational requirements, it is quite appropriate within an international environment of unencumbered communication, open regionalism, protracted intergovernmental bargaining, and

[14] By 'restricted' in this sense, we refer to the part of the coalition structure partition that is relevant to any subset of elementary players. $\overline{C}$ is not to be confused with $\widetilde{C}$, which refers to the refined set of *feasible* coalition structures.

long-term processes of coalition formation among states. Moreover, equilibrium existence is not problematic in the model subject to certain assumptions/ restrictions.

Remark 1 *A **Stable Coalition Structure** $C^* \in \mathcal{C}$ as defined above is the outcome of an appropriately refined Coalition-Proof Nash Equilibrium strategy profile $\widetilde{\sigma}^{*CPNE}$, i.e., $C^* = C\left(\widetilde{\sigma}^{*CPNE}\right)$.*

2.2 Economic Environment

I next turn to the specification of the payoff functions of the coalition-formation game. As in Etro (2002), any policy has certain costs and benefits. As is typical in public goods models, I employ a quasilinear utility specification. Let policy-specific benefits for a country with population s_i be denoted by

$$G_i^j\left(p_i^j, p_{-i}^j, \alpha_i^j, B\right) = \alpha_i^j s_i H\left[p_i^j + \beta^{jj}\left(\sum_{k\neq i}^{k\in U_i^j}\frac{s_k}{s_i}p_k^j + \sum_{j'\neq j}^{j'\in\mathcal{P}}\left(\beta^{jj'}\sum_{k\neq i}^{k\in U_i^j\cap U_i^{j'}}\frac{s_k}{s_i}p_k^j\right)\right)\right],$$

where $\alpha_i^j \in (0,1)$ represents citizen i's preference intensity for public policy j and A is the $N \times P$ matrix of preference intensity parameters. $H(\cdot)$ is a strictly concave function with decreasing marginal returns (i.e., $H'(\cdot) > 0$, $H''(\cdot) < 0$, and $\lim_{p\to 0} H'(p) = \infty$), $p_i^j \in \{p_{\{i\}}^j, p_U^j\}$ is the level of public good provision in country i, and finally parameters $\beta^{jj} \in (0,1)$ capture the positive *spillover* effects generated by public spending across countries cooperating within the confines of a policy coordination agreement. The *spillover* benefits from policies abroad are essentially weighted by the relative size of each of i's coalition partners. Note that the above specification assumes that cross-country spillovers only apply to countries adhering to the same policy coordination agreement, which implies that I do not allow for coalitional *externalities* between members and non-members as in Etro (2002) and Maskin (2004).

It is further assumed that in addition to positive first-order cross-country *spillovers* generated by policy coordination in one area (β^{jj}), citizens also reap the second-order benefits of cooperation across different policy domains, as long as any two countries agree to coordinate policy in both policy dimensions. The beneficial effects of these cross-policy strategic complementarities captured by the parameters $\beta^{jj'}, j \neq j'$ are again weighted by the relative size of one's coalition partner in both policy areas. B then is a *symmetric* $P \times P$ matrix, whose diagonal elements β^{jj} capture the first-order spillover effects and whose off-diagonal elements $\beta^{jj'}(= \beta^{j'j}), j \neq j'$ capture the degree of *strategic complementarity in coordination* between policies j and j'. It is quite reasonable to assume that joint coordination in closely related policy jurisdictions, such as for example fiscal and monetary policy or defense and foreign policy, yields superadditive gains from cooperation. The fact that the process of European integration has often centered around *grand projects* bundling together a number of closely related complementary policies (see for example the Single Market project culminating into the creation of the European Monetary Union) constitutes a telling illustration of this concept.

Turning now to the cost structure of public goods provision, it is assumed as in Alesina and Spolaore (2003) that public expenses are linear both with respect to the size of the appropriate political jurisdiction and the level of public good provision. So for any policy level p^j set within a political jurisdiction of size s, aggregate cost will be $c\left(p^j, s\right) = k^j + l^j s + \gamma^j p^j$ $(k^j, l^j, \gamma^j > 0)$, where k^j is a *fixed-cost* parameter, l^j is a *size-proportionality* parameter, and γ^j is a *variable-cost* parameter.[15] When policy is independently set at the domestic level (i.e., $\sigma_i^j = 0$), total cost c is fully borne by the national government responsible for its inception and implementation. On the other hand, whenever policy is harmonized within the framework of an international union U (i.e., $\sigma_i^j = 1$), then total union-wide policy costs

[15] Note that the fact that all the above cost parameters are indexed by j implies that they may vary across policy areas.

are shared amongst its member-states in proportion to their size, i.e., $c_i\left(p_U^j, s_i, s_{-i}\right) = \frac{s_i}{\sum\limits_{k \in U_i^j} s_k}\left(k^j + l^j \sum\limits_{k \in U} s_k + \gamma^j p_U^j\right)$.

The linear specification of the cost function is aptly characterized by *economies of scale* in public goods provision, a critical assumption in the literature on *fiscal federalism* (Oates, 1972; Lockwood, 2002; Besley and Coate, 2003). Any level of public good provision that may be proportionally replicated at the supranational union-wide level yields lower average costs for the simple reason that the fixed-cost parameter $k^j > 0$ is proportionally divided among union members. Obviously, the higher the value of the parameter, the more important *economies of scale* become in the provision of the public good. Parameter k^j can refer to a variety of fixed inputs that factor into the 'policy production function', namely administrative capacity, bureaucratic infrastructure, and technological know-how. In fact, what distinguishes international unions from 'looser' types of international cooperation agreements or *regimes* is their high degree of institutionalization through the creation of an independent bureaucracy in charge of administering common policies across member-states.

Extending the specification of the policy cost structure to a multi-dimensional environment will not amount to a simple exercise in summation. We rather choose to introduce one last assumption to the structure of the model, namely *economies of* scope in the provision of multiple public goods (Musgrave, 1986; Alesina and Spolaore, 2003). In light of our understanding of the fixed-cost parameter k^j as a measure of required administrative capacity, it seems natural to assume that only one government bureaucracy is needed for the administration and implementation of multiple policies within the same political jurisdiction. In the case of *autarchic* public goods provision, this refers to the national state bureaucracy (leaving subnational governmental entities aside). On the supranational union level, however, the same assumption can be extended under the proviso that union membership across different policy jurisdictions is fully overlapping, i.e., only if the exact same set of member-states

choose to coordinate in multiple policy domains, may they be served by a single supranational bureaucracy.[16] By way of operationalizing this concept for the purposes of the model, it is assumed that for any 'regional' political entity R (where $R = \{i\}$ in the *autarchic* case), uniquely identified by its set of members U, aggregate administrative costs are maxed out across all public goods $j \in \mathcal{P}$ provided by that polity, i.e., $k_R = \max\limits_{\{j \in \mathcal{P}: U^j = R\}} \{k^j\}$. This also implies that fixed bureaucratic costs are additive across non-overlapping policy coalitions and flexible cooperation arrangements.

Having characterized both the costs and benefits of multiple public good provision across overlapping jurisdictions, we may now proceed to the full specification of the payoff function u_i for the benevolent government of each country $i \in N$ (disregarding for the time being non-eligible countries $k \in N \backslash E$) conditional on the overall cooperation strategy profile $\sigma \in \Sigma$. For a given country type consisting of a $(P+1)$-tuple $\left(s_i, \alpha_i^1, \ldots, \alpha_i^P\right)$ and given that either $p_i^j = p_{\{i\}}^j$ (in autarchy) or $p_i^j = p_k^j = p_U^j$ (union policy uniformity assumption) we have that

$$
\begin{aligned}
u_i\left(\sigma | s_i, s_{-i}, A, B\right) &= \sum_{j \in \mathcal{P}} G_i^j\left(p_i^j, s_i, s_{-i}, A, B\right) - c_i\left(\overrightarrow{p_i}, s_i, s_{-i}\right) \\
&= \sum_{j \in \mathcal{P}} \alpha_i^j s_i H\left[p_i^j\left(1 + \beta^{jj}\left(\sum_{k \neq i}^{k \in U_i^j} \frac{s_k}{s_i} + \sum_{j' \neq j}^{j' \in \mathcal{P}}\left(\beta^{jj'} \sum_{k \neq i}^{k \in U_i^j \cap U_i^{j'}} \frac{s_k}{s_i}\right)\right)\right)\right] - \\
&\quad \sum_{R \in U_i} \frac{s_i}{\sum\limits_{k \in R} s_k}\left(\max_{\{j \in \mathcal{P}: U_i^j = R\}} \{k^j\} + \sum_{\{j \in \mathcal{P}: U_i^j = R\}} l^j \sum_{k \in R} s_k + \sum_{\{j \in \mathcal{P}: U_i^j = R\}} \gamma^j p_i^j\right) \qquad (1)
\end{aligned}
$$

By means of functionalization of the model and simplification of the analysis, let $H(\cdot) = \ln(\cdot)$, even though any other strictly concave and increasing function would not in essence alter the results. We may now explicitly derive the level of both *autarchic* and union-wide

[16] See Casella and Frey (1992) for a discussion of the transaction costs associated with a complex system of overlapping jurisdictions as in 'functional federalism'.

policies for a given cooperation strategy profile σ. In light of the definition of *autarchic* policy determination by a benevolent government, $p^{j*}_{\{i\}}$ is the policy level that maximizes u_i from equation 1 above where $U^j_i = \{i\}$ is a singleton in the state of autarchy. Hence, in the absence of any kind of coalitional *externalities*, *spillover* effects will not factor into the determination of *autarchic* policy. Taking the first-order condition with respect to $p^j_{\{i\}}$ yields the following optimal autarchic policy level:

$$p^{j*}_{\{i\}} = \frac{\alpha^j_i s_i}{\gamma^j} \ ^{17} \tag{2}$$

Similarly for p^{j*}_U, the Samuelsonian optimal union policy level amounts to:

$$\sum_{k \in U^j_i} \alpha^j_k s_k \frac{1 + \beta^{jj} \left(\sum\limits_{l \neq k}^{l \in U^j_k} \frac{s_l}{s_k} + \sum\limits_{j' \neq j}^{j' \in \mathcal{P}} \left(\beta^{jj'} \sum\limits_{l \neq k}^{l \in U^j_k \cap U^{j'}_k} \frac{s_l}{s_k} \right) \right)}{p^{j*}_U \left[1 + \beta^{jj} \left(\sum\limits_{l \neq k}^{l \in U^j_k} \frac{s_l}{s_k} + \sum\limits_{j' \neq j}^{j' \in \mathcal{P}} \left(\beta^{jj'} \sum\limits_{l \neq k}^{l \in U^j_k \cap U^{j'}_k} \frac{s_l}{s_k} \right) \right) \right]} = \sum_{k \in U^j_i} \frac{s_k}{\sum\limits_{l \in U^j_i}} \gamma^j \tag{FOC}$$

$$\Leftrightarrow p^{j*}_U = \frac{\sum\limits^{k \in U^j_i} \alpha^j_k s_k}{\gamma^j} \tag{3}$$

It now becomes evident how the use of the logarithmic policy benefit function helps simplify the results, since the uniform union policy commonly agreed upon by a coalition of government ministers turns out to be a simple weighted average of their citizens' respective preference intensity factors (α^j_i's) for that particular policy (see figure 3). By deriving the ideal union policy for each country i, $p^{j*}_{U,i} = \underset{p^j_U}{\text{argmax}} \ u_i \left(p^j_U | \alpha^j_i, (s_k)_{k \in U^j_i} \right) = \frac{\alpha^j_i \sum\limits^{k \in U^j_i} s_k}{\gamma^j}$, it becomes obvious that the Samuelsonian optimal union policy is equal to the ideal common policy of a member with preference intensity equal to the union's weighted *average*, i.e.,

$\overline{\alpha}^j = \frac{\sum\limits_{k \in U^j}^{k \in U^j} \alpha_k^j s_k}{\sum\limits_{k \in U^j} s_k}$. Therein lies one of the differences between this cooperative game-theoretic framework and non-cooperative, majority-driven models of union formation, which would in turn locate equilibrium union policy at the *median* country's ideal level $\frac{\alpha_{med}^j \sum\limits_{i}^{k \in U_i^j} s_k}{\gamma^j}$. Within the context of this model, countries may only exert influence on the overall union policy through their population size, where p_U^{j*} is what Boekhoorn, Van Deemen and Hosli (2006) would call the *expected policy center* of coalition U. Having said that, it is quite plausible to think of population size as the primary determinant of a member-state's degree of influence. The link between country size and voting power in the European Council for example has been widely theorized and documented, even though the relationship is well short of direct proportionality (Laruelle and Widgrén, 1998).

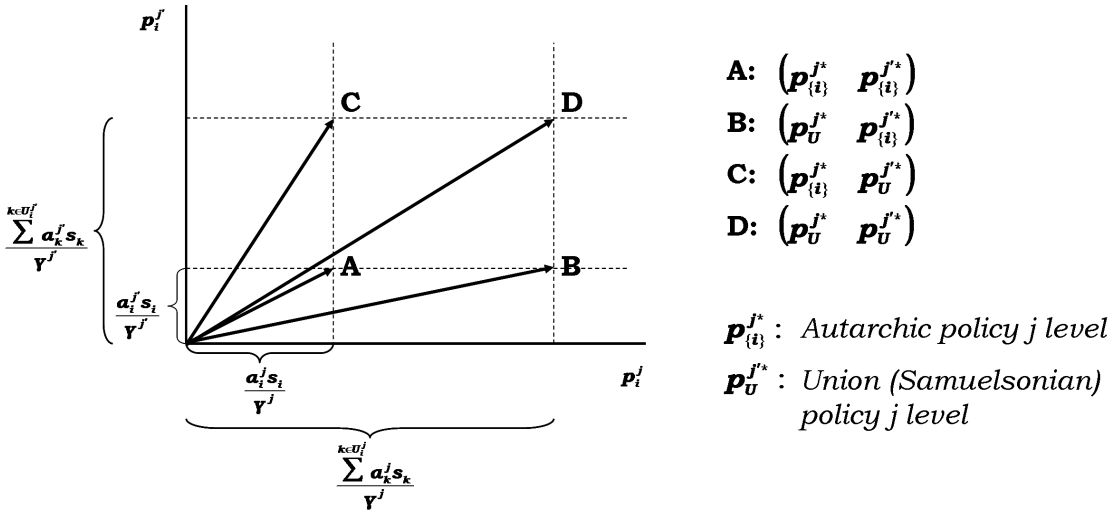

Figure 3: This is a graphical illustration in two-dimensional vector space of the strategic choice between an autarchic (independent) and a supranational (interdependent) policy-making environment.

2.3 Rigid Unions

Symmetric Model with Unidimensional Preference Heterogeneity

To see how the union-formation process plays out in a multidimensional setting in its simplest form, I first impose a restrictive coalition-formation protocol. Let us postulate some exogenous institutional constraints that limit the set of *feasible* coalition structures $\widetilde{C} \in \mathcal{C}^{RU}$ only to such that $U^j = U^{j'} = I$ for all $j, j' \in \mathcal{P}$. Thus, the space of *feasible* coalition structures may only consist of multi-dimensional 'rigid unions' $U(I,J) = \{(i,j) : \sigma_i^j = 1, \forall i \in I, \forall j \in J, I \subseteq E, J \subseteq \mathcal{P}\}$, where I denotes the union's *membership* and J its scope. This further implies that each country that is not a member of the union (a so-called 'outsider') will reside in a fully *autarchic* policy-making state, i.e., $\sigma_k^j = 0, \forall k \notin I$ and $j \in \mathcal{P}$, while there can be no form of international cooperation outside of the rigid union's scope, i.e., $\sigma_i^j = 0, \forall i \in E$ and $j \in \mathcal{P} \backslash J$. In other words, countries may not freely choose to selectively cooperate in particular policy areas, but are instead constraint to embrace an existing union's full scope of cooperation, should they aspire to become a member thereof. In cooperative game-theoretic terms, one may view this restriction on the set of *feasible* coalition structures as a binding pre-negotiation rule.

This assumption is admittedly very useful in helping characterize the shape and form of *Stable Coalition Structures* $\widetilde{C}^*$ by restricting the set of admissible objections by any subset of 'national ministers' (i,j). Furthermore, it encapsulates the Community Method that has been the driving force of the European integration project. What European officials proudly refer to as the *acquis communautaire* essentially consists of the full extant body of European legislation across the union's core areas of cooperation that forms the defining set of obligations of EU membership and the *sine qua non* of future accession by candidate-members. Of course, the introduction of more flexible forms of integration in the past couple of decades as a remedy to the impending *immobilism* of an increasingly diverse union has

undoubtedly eroded the Community's spirit of unity and comity, given that a reality of 'multi-speed' integration has started to emerge (De Burca and Scott, 2000). In light of this, one of the sections to follow will tease out the implications of allowing for unconstrained coalition-formation by means of flexible constitutional arrangements.

Let us then first analyze the 'workhorse' version of the model, whereby countries are symmetric with respect to size, i.e., $s_i = s, \forall i \in E$, and country-specific preference intensity is uniform across policies, i.e., $\alpha_i^j = \alpha_i^{j'} = \alpha_i, \forall j, j' \in \mathcal{P}$. One may thus order ($\succeq$) eligible countries $i \in E$ in weakly decreasing levels of preference intensity such that $\alpha_1 \geq \alpha_2 \geq \ldots \geq \alpha_n$, where $n = |N|$. This formulation introduces a type of *single-crossing property* to be explored below.

Before characterizing the equilibrium of the game, we need to introduce the *utility-differential* function, i.e., the difference in payoffs between becoming a member of a given 'Rigid Union' and staying out. So for a given international union U of membership I, size $|I|$, and scope J, define

$$\Delta u_i(I, J) = u_i\left(\sigma_i^j = 1, \sigma_i^{j'} = 0, \forall j \in J, j' \in \mathcal{P}\backslash J | \sigma_{-i}\right) - u_i\left(\sigma_i^j = 0, \forall j \in \mathcal{P} | \sigma_{-i}\right)$$

as the difference in utilities between being a member ($i \in I$) and remaining an outsider ($i \notin I$). Substituting in from equations 1, 2, and 3 and given that countries are of equal size and preference heterogeneity is unidimensional yields the following expression for any existing member of U:

$$\Delta u_i(I, J) = \alpha_i s\,|J| \ln\left(\frac{\sum^{l\in I}\alpha_l}{\alpha_i}\right) + \alpha_i s \sum_{j\in J} \ln\left[\left(1 + (|I| - 1)\,\beta^{jj}\left(1 + \sum_{j'\neq j}^{j'\in J}\beta^{jj'}\right)\right)\right]$$
$$+ \left(\max_{j\in\mathcal{P}}\{k^j\} - \max_{j'\in\mathcal{P}\backslash J}\{k^{j'}\} - \frac{1}{|I|}\max_{j''\in J}\{k^{j''}\}\right) - |J|\,s\left(\frac{\sum^{l\in I}\alpha_l}{|I|} - \alpha_i\right) \quad [18] \qquad (4)$$

Analyzing equation 4 part by part reveals the costs and benefits of union formation postulated by the model: the first expression on the RHS of the equation consists of the benefits of higher centralized public good provision relative to each country's *autarchic* level, the second part refers to the complementarity gains of cross-country multi-dimensional coordination, the third bracketed expression captures the joint economies of *scale* and *scope* benefits of multiple policy centralization at the supranational level, and finally the last bracketed expression consists of the variable costs of preference heterogeneity uniformly spread across the policy jurisdictions within the union's purview. Note that the effect of preference heterogeneity is negative only for members with preference intensity below the union average, since otherwise the variable costs of *autarchic* public good provision are higher than the union average shared costs of public good provision at the supranational level. Naturally these costs are higher the more dispersed the preference intensity factors are.

We can now show that this *utility-differential* function satisfies the following property:

Lemma 1 *(Single-crossing property) For any given* $U(I,J), I \subseteq E, J \subseteq \mathcal{P}$, $\Delta u_i(I,J) \geq 0$ *for some* $i \in E$ *implies that* $\Delta u_k(I,J) > 0, \forall k \succ i$ *(such that* $\alpha_k > \alpha_i$*).*

Proof. *To prove this result, it would suffice to show that* $\Delta u_k(I,J) > \Delta u_i(I,J), \forall i,k$ *such that* $1 > \alpha_k > \alpha_i > 0$*. Taking the difference in differences from expression 4 above yields the following:*

$$\begin{aligned}\Delta u_k(I,J) - \Delta u_i(I,J) &= s|J|\left[(\alpha_k-\alpha_i)\ln\left(\sum^{l\in I}\alpha_l\right) + (\alpha_i\ln\alpha_i - \alpha_k\ln\alpha_k) + (\alpha_k-\alpha_i)\right] + \\ &\quad (\alpha_k-\alpha_i)\, s\sum_{j\in J}\ln\left[\left(1+(|I|-1)\,\beta^{jj}\left(1+\sum_{j'\neq j}^{j'\in J}\beta^{jj'}\right)\right)\right] > 0\end{aligned}$$

The difference is positive, since the expression in the first bracket is strictly increasing in α_i:

$$\frac{\partial}{\partial \alpha_k}\left(\alpha_k \ln\left(\sum^{l\in I}\alpha_l\right)+\alpha_k-\alpha_k\ln\alpha_k\right)=\ln\left(\frac{\sum^{l\in I}\alpha_l}{\alpha_k}\right)+\frac{\alpha_k}{\sum\limits_{l\in I}a_l}>0.$$

■

This single-crossing property helps to simplify the characterization of the *Stable Coalition Structure* $\widetilde{C}^*$ or equivalently the appropriately refined *coalition-proof Nash* equilibrium strategy profile $\widetilde{\sigma}^*$ in the following manner:

Proposition 1 *In the symmetric model with unidimensional preference heterogeneity, i.e., $s_i = s, \forall i \in E$ and $\alpha_i^j = \alpha_i^{j'} = \alpha_i, \forall j, j' \in \mathcal{P}$, a Stable Coalition Structure $\widetilde{C}^* \in \mathcal{C}^{RU}$ consists of an equilibrium union U^* with membership I^* and scope J^*such that $i \in U^*$ (i.e., $\sigma_i^{j*} = 1, \forall j \in J^*$) if and only if $i \succeq \widetilde{i}$ (i.e., $\alpha_i \geq \alpha_{\widetilde{i}}$) and the following conditions are satisfied:*

(i) $\Delta u_{\widetilde{i}}(I^*, J^*) \geq 0$

(ii) $\Delta u_{\widetilde{i}}(I^*, J^*) > (\geq)\Delta u_{\widetilde{i}}(I^*, J'), \forall J' \subseteq \mathcal{P}$ *such that* $|J'| > (=)|J^*|$ *and* $\widetilde{C}(U(I^*, J'))$ *cannot be blocked*

(iii) $\Delta u_1(I^*, J^*) > (\geq)\Delta u_1(I, J''), \forall I \supseteq I^*, J'' \subseteq \mathcal{P}$ *such that* $|J''| < (=)|J^*|$ *and* $\widetilde{C}(U(I, J''))$ *cannot be blocked and*

(iv) $\Delta u_k(I, J) < 0, \forall k \prec \widetilde{i}, k \in E$, *and* $\forall J \supseteq J^*, J \subseteq \mathcal{P}$, *where* $I = \{l \in E : \alpha_l \geq \alpha_k\}$.

In words, even for a restricted set of potential objections, an equilibrium union U^* of membership $I^* = \{i \succeq \widetilde{i} | i \in E\}$ and scope J^* has to be such that no existing member-states $i \succeq \widetilde{i}$ are strictly better off seceding from the union (condition (i)) and no subset of 'outsiders' $k \prec \widetilde{i}$ wish to jointly enter the union in its current form of cooperation along

policies $j \in J^*$ or in any other wider ($J \supseteq J^*$) shape (condition (iv)).[19] If that were the case, the *single-crossing property* of Lemma 1 would imply that all existing members $i \succeq \widetilde{i}$ would be unconditionally better off, hence that would constitute a stable objection. A stable membership will essentially consist of a *convex* and *connected* set of countries (with respect to their preference intensity parameter) including the highest-demanders all the way down to the 'threshold' member-state $\widetilde{i}$, i.e., $I^* = \left[\alpha_1, \ldots, \alpha_{\widetilde{i}}\right]$.[20] It should be noted that existing members are always better off when a *relatively* 'low-demanding' set of countries decides to join a union of given size and scope, since their accession would have the effect of lowering the implicit cost of heterogeneity for existing relatively 'low-demanding' members by (i) decreasing the union-wide preference intensity average, in addition to (ii) enhancing the overall level of cross-country complementarity spillovers, and (iii) spreading the fixed cost of multilateral cooperation across more members within the union. In formal terms, for any union $U(I,J)$ and any subset $K \subseteq E \backslash I$ of 'outsiders', then $u_i(I \cup K, J) > u_i(I,J), \forall i \in I$ *if* $\frac{\sum\limits^{l \in I} \alpha_l}{|I|} \geq \frac{\sum\limits^{l \in I \cup K} \alpha_l}{|I|+|K|}$.

Finally, as implied by conditions (ii) and (iii) of Proposition 1, the equilibrium constellation of union member-states do not wish to jointly expand (or contract) its scope beyond its stable level. Equilibrium scope J^* has to belong to a *maximal* set of policy clusters:

$$\begin{aligned} J^* \quad &\in \quad M(I^*) = \{J \subseteq \mathcal{P} : \nexists J' \neq J \text{ such that } u_i\left(I^*, J'\right) \geq u_i\left(I^*, J\right), \forall i \in I^* \text{ and} \\ u_k\left(I^*, J'\right) \quad &> \quad u_k\left(I^*, J\right) \text{ for at least one } k \in I^* \text{ and } \widetilde{C}\left(U\left(I^*, J'\right)\right) \text{ cannot be blocked}\}. \end{aligned}$$

This follows from the fact that a *coalition-proof Nash* equilibrium is by definition Pareto efficient, which in this case means that there are no other policy areas of supranational

[19] There is no need to consider the incentives for countries to jointly leave from the equilibrium union, since their individual *autarchic* payoff does not depend on the actions of other countries. This is due to the absence of coalitional *externalities* in the model.

[20] Our finding that equilibrium union membership will be biased towards the highest public good demanders confirms our intuition that founding members of a union tend to be the most pro-integration ones.

cooperation which would make all existing union members jointly better off. To see how conditions (ii) and (iii) demarcate the efficiency frontier of policy configurations for given union membership I, we make use of the monotonicity of the 'workhorse' model by applying the *single-crossing property* to the difference in differences expression $\Delta u_i\left(I,J\right)-\Delta u_i\left(I,J'\right)$ as follows:

$$\begin{aligned}
&\left(\Delta u_k(I,J)-\Delta u_k(I,J')\right)-\left(\Delta u_i(I,J)-\Delta u_i(I,J')\right)= \\
= \;& s\left(|J|-\left|J'\right|\right)\left[\left(\alpha_k-\alpha_i\right)\ln\left(\sum^{l\in I}\alpha_l\right)+\left(\alpha_i\ln\alpha_i-\alpha_k\ln\alpha_k\right)+\left(\alpha_k-\alpha_i\right)\right]+ \\
& \left(\alpha_k-\alpha_i\right)s\sum_{j\in J}\ln\left[\left(1+\left(|I|-1\right)\beta^{jj}\left(1+\sum_{j'\neq j}^{j'\in J}\beta^{jj'}\right)\right)\right]- \\
& \left(\alpha_k-\alpha_i\right)s\sum_{j\in J'}\ln\left[\left(1+\left(|I|-1\right)\beta^{jj}\left(1+\sum_{j'\neq j}^{j'\in J'}\beta^{jj'}\right)\right)\right]>0.
\end{aligned}$$

Assuming that policy cluster J entails a higher overall level of complementarity spillovers $\beta^{jj}\left(1+\sum\limits_{j'\neq j}^{j'\in J}\beta^{jj'}\right)$ than J', then for any $J,J'\subseteq\mathcal{P}$ such that $|J|>(<)\left|J'\right|$, $\Delta u_i\left(I,J\right)-\Delta u_i\left(I,J'\right)\geq 0$ implies that $\Delta u_k\left(I,J\right)-\Delta u_k\left(I,J'\right)>0$ for all $k\succ(\prec)i$. Hence, going back to the stability conditions of Proposition 1, it would be sufficient for either the 'threshold' member-state to object to an expansion of policy scope (condition (ii)) or the highest demander of the union (country 1) to object to a contraction of policies (condition (iii)).

Note that, as in Alesina, Angeloni and Etro (2001), the above *coalition-proof Nash* equilibrium union is the largest possible Nash equilibrium union for a given set of policies J^*, since a Nash equilibrium union would only have to be immune to unilateral single-country deviations. The implied equilibrium condition would then be that the least enthusiastic union member (cutoff $\widetilde{i}$) would just be willing to join and that the country just below it ($k\prec\widetilde{i}$ and $\nexists l\in E$ such that $\widetilde{i}\succ l\succeq k$) would want to stay out. The single-crossing property would then

guarantee that no other 'outsider' would be willing to deviate from the state of autarchy. Any other kind of unilateral deviation would not be admissible in light of the restriction to 'rigid unions'.

Given that within the symmetric framework of this 'workhorse' model the costs of preference heterogeneity are uniform across policies, then the equilibrium set of union members would choose to cooperate in policy areas (i) with a high degree of first-order spillovers (β^{jj}'s), (ii) with strong second-order complementarities with each other ($\beta^{jj'}$'s), and (iii) including the highest possible fixed cost parameters (k^j's). The intuition for the first two criteria is quite straightforward, while with regards to the third, the rationale would be that union members seek to maximize the joint economies-of-*scale* and economies-of-*scope* gains from multiple policy centralization. An inspection of the third part of equation 4 would reveal that for a high enough maximum fixed cost $\max_{j\in\mathcal{P}}\{k^j\}$ relative to symmetric country size s, then $j_{\max} \in J^*, \forall U^*\left(I^*, J^*\right)$, since the economies of *scale* and *scope* would be too large for that policy jurisdiction to be absent from any stable union's core set of policies. They, therefore, have a strong incentive to pool their *autarchic* resources into a highly institutionalized bureaucracy with a penchant for specialization and policy expertise (e.g., European Commission). This would explain why multilateralism at the union level is more prevalent among bureaucracy- and knowledge- intensive policy sectors, such as environmental and product regulation, rule standardization, trade, and agriculture policy (Majone, 1996).

On a further note, the complexity and indeterminacy of the relevant parameter space (A, B, $\left(k^j, \gamma^j\right)_{j\in\mathcal{P}}$) allow for the possibility of multiple equilibria and path dependence in the dynamic evolution of the union's size and scope. Given that I^* and J^* are jointly determined in equilibrium and that the *maximal* policy set $M\left(I^*\right)$ may not be single-valued, the initial choice of a policy cluster (or *grand project*) for a given set of countries to cooperate in may not be unique and as such will condition the future path of integration.

The characterization of the equilibrium in Proposition 1 confirms the previously theorized static trade-off between union size and scope in non-cooperative models of union formation (Alesina, Angeloni and Etro, 2001; Gilligan, 2004). The corollary below shows that within the context of this static coalition-formation model with an 'Open Regionalism' rule there can be no two equilibrium unions 'contained' one within the other. Depending on the configuration of the complementarity ($\beta^{jj'}$'s) and fixed-cost (k^j's) parameters and the distribution of preference intensity parameters (α_i's), one may either observe a smaller but wider (in terms of scope) union or a larger but narrower one. This result is very useful in helping us make sense of the static 'geometry' of regionalism across the world.

Corollary 1 *For any given set of parameters, there exist no two distinct Stable Coalition Structures* $\widetilde{C}^*(U^*(I^*, J^*))$ *and* $\widetilde{C}^{**}(U^{**}(I^{**}, J^{**}))$ *such that* $I^{**} \supset I^*$ *and* $J^{**} \supset J^*$*, i.e., where one strictly dominates the other both in terms of union size and scope.*

This result follows directly from the definition of a *Stable Coalition Structure* in Proposition 1. If we assume by contradiction that two such structures $\widetilde{C}^*(U^*)$ and $\widetilde{C}^{**}(U^*)$ do exist, then it is quite straightforward to show that the smaller and shallower union $\widetilde{C}^*(U^*)$ is subject to a **stable objection** by a subset of originally excluded, 'outsider' countries $k \in I^{**} \backslash I^*$ and 'national ministers' of existing member-states $(i, j), i \in I^*, j \in J^{**} \backslash J^*$ seeking to expand the original union both in terms of size and scope to $U^{**}(I^{**}, J^{**})$, which by definition is stable. We also know from above that the governments of the original member-states will happily authorize their 'objecting' ministers to seek multilateral cooperation, since they will be collectively better-off in an expanded and more comprehensive multilateral cooperation arrangement. Hence, $\widetilde{C}^*(U^*)$ cannot be stable in the first place.

Example 1 *The following numerical example in figure 4 illustrates an interesting parameter configuration that gives rise to three distinct Stable Coalition Structures for the following para-*

meter values: $E = \{1,2,3,4,5,6\}$, $\mathcal{P} = \{a,b,c\}$, $A = (.0878, .0453, .0429, .0263, .0234, .0021)$, $s = 1,000,000$, $K = (79451, 31219, 8400)$, *and* $B = \begin{pmatrix} .66 & 1 & .23 \\ 1 & .01 & .82 \\ .23 & .82 & .23 \end{pmatrix}$. *There are two equilibrium unions with full membership* $I^{**} = I^{***} = E$ *and scope* $J^{**} = \{a,b\}$ *and* $J^{***} = \{a\}$ *respectively. This is a case where the efficiency frontier* $M(I)$ *for given size* $I = E$ *is not single-valued. As it turns out, the relative 'high-demanders" (i.e., the ones with preference intensity above average) prefer the wider union* U^{**}*, since they end up cutting their variable costs compared to their autarchic state, while the 'low-demanders' do not find the total spillover and fixed cost benefits of extending cooperation to policy area b high enough to justify their proportional increase in variable costs. This situation is indicative of the inherent tensions within such coalitions of states between more and less 'integrationist" members. The relative bargaining power and influence between the two camps will determine the final choice of union scope. Finally, note that there is a smaller but even wider stable union* $U^*(I^*, J^*) = (\{1,2,3,4,5\}, \{a,b,c\})$ *that provides an apt illustration of the static broader-deeper trade-off.*

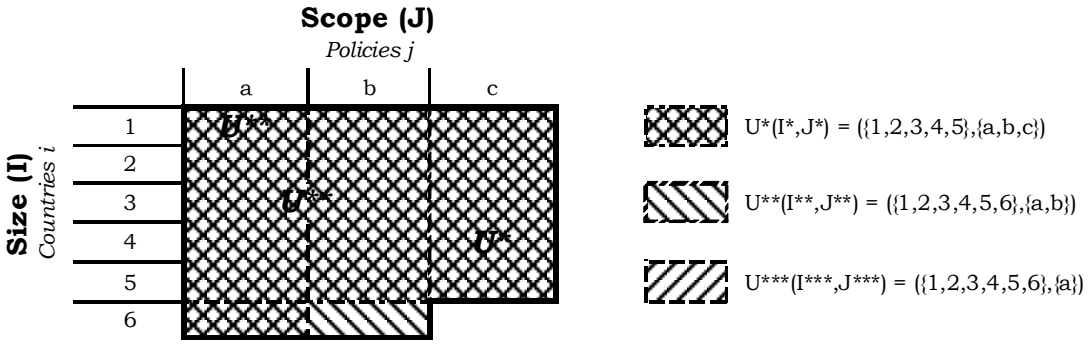

Figure 4: In the above numerical example 1 under the 'Rigid Union' coalition-formation protocol, there exist three distinct Stable Unions. $U^*(I^*, J^*)$ has smaller *size* and wider *scope*, while Stable Unions $U^{**}(I^{**}, J^{**})$ and $U^{***}(I^{***}, J^{***})$ have full membership E, but are narrower in scope. This comes to show the inherent *static* trade-off between union *size* and *scope*.

Small and Large Countries

I now proceed to examine how the model behaves if we dispense with the symmetry assumption $s_i = s$. Introducing the possibility of coalition-formation among countries of unequal size does indeed complicate the characterization of the equilibrium.[21] The main reason is that, in the face of two-pronged heterogeneity both in terms of preferences and country size, the single-crossing property in Lemma 1 fails to apply.[22] This means that there is no meaningful ordering of countries with respect to their types (α_i, s_i).

One way to circumvent this problem is to allow for a discrete number of possible country sizes and then apply the same analysis as before to countries of equal size. Accordingly, let us consider countries of two distinct population sizes: large and small, i.e., let $s_i \in \{\overline{s}, \underline{s}\}, \overline{s} \gg \underline{s} \in \mathbb{N}^+$. Then one may define the following two binary relationships: $i \overline{\succ} i' \Leftrightarrow (\alpha_i > \alpha_{i'}$ and $s_i = s_{i'} = \overline{s})$ and $k \underline{\succeq} k' \Leftrightarrow (\alpha_k > \alpha_{k'}$ and $s_k = s_{k'} = \underline{s})$. It is straightforward to confirm that the single-crossing property with respect to preference intensity α_i applies separately to both large and small countries taking each other's preference profile as given. It then follows that a Rigid Union Stable Coalition Structure will be jointly defined by two distinct 'threshold' preference intensity types $\widetilde{i}$ (for large countries) and $\widetilde{k}$ (for small countries). An equilibrium union U^* would hence consist of membership $I^* = \{i \overline{\succeq} \widetilde{i} | i \in E \cap L\} \cup \{k \underline{\succeq} \widetilde{k} | k \in E \cap S\}$. Moreover, the level of common union policies now becomes:

$$p_U^{j*} = \frac{\sum\limits^{\{i \overline{\succeq} \widetilde{i} | i \in E \cap L\}} \alpha_i \overline{s} + \sum\limits^{\{k \underline{\succeq} \widetilde{k} | k \in E \cap S\}} \alpha_k \underline{s}}{\gamma^j}$$

It is easy to gauge how much more complicated the analysis is compared to the symmetric 'workhorse' model, since one would now have to account for joint deviations across countries

[21] See Casella (1996) for a related model of trade *blocs* with countries of asymmetric size.

[22] The sign of the derivative of the utility-differential function $\Delta u_i (I, J | s_i, s_{-i}, a_1, \ldots, a_N)$ with respect to the product $\alpha_i s_i$ is indeterminate.

of different size. The space of admissible objections is basically spanned by two orthogonal dimensions of preference heterogeneity, even though that complexity will be mitigated by a significant disparity in size $\overline{s} - \underline{s}$, since the effect of small countries on the overall cost-benefit ledger of policy centralization would be too small to affect their larger counterparts' strategic decisions. From equation 1, it turns out that the population size of one's coalition partners affects one's union membership payoff positively through i) higher cross-country and cross-policy spillover benefits and ii) higher economies-of-*scale* and -*scope*, while the sign of the effect on the heterogeneity costs depends on the location of the given country's preference intensity parameter relative to the union weighted average. Given that utility is non-linear with respect to size, the relationship between small and large 'threshold' preference intensity types is conditional on the parametric configuration of the model.

Example 2 *Here I provide another numerical example that demonstrates the existence of multiple stable unions in an asymmetric model of small and large countries. Let policy space* $\mathcal{P} = \{a, b\}$ *and* $E = \{1L, 2L\} \cup \{1S, 2S\}$ *consist of two large and two small countries with population of* $1,000,000$ *and* $10,000$ *respectively. Let* $A_L = (.8296, .0482)$ *and* $A_S = (.1308, .0217)$ *denote their preference intensity parameters* $\alpha_{i,s}$ *for* $s = L$ *and* $s = S$ *respectively. So for* $K = (8277, 2474)$ *and* $B = \begin{pmatrix} .65 & .77 \\ .77 & .19 \end{pmatrix}$*, I find two distinct Stable Unions* $(\{1L, 1S\}, \{a, b\})$ *and* $(\{1L, 1S, 2S\}, \{a\})$*. The geometry of this coalition-formation environment (see figure 5 below) again reflects the size-versus-scope trade-off. What is particularly interesting about this example though is the fact that the second large country is excluded from both union formations despite the fact that its citizens have a stronger public good preference intensity than the citizens of the second small country. Hence, one may conclude that in this instance the threshold intensity parameter for large states is higher than the one for small ones, given the above configuration of country size, fixed cost, and spillover parameters.*

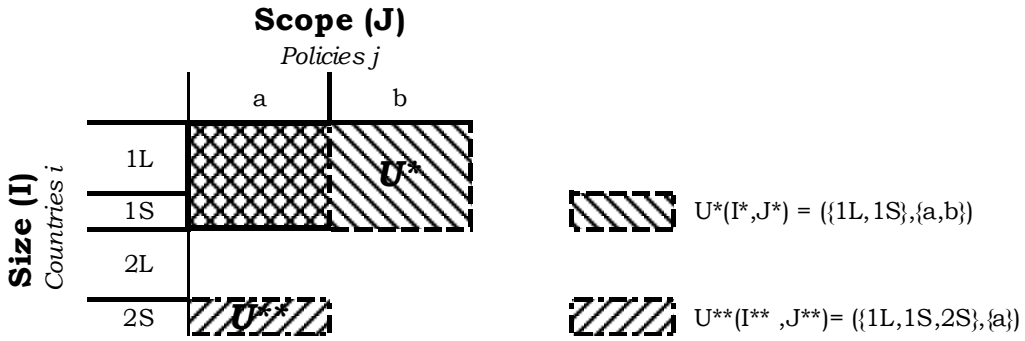

Figure 5: Here is a graphical illustration of the Stable Coalition Structures in an asymmetric model with two small and two large countries. Note that for the above parameter configuration, the second large country $2L$ does not participate in either of the two equilibrium union agreements.

Enlargement

Allowing for the possibility of *exogenous* enlargement[23] of an existing international union generates some interesting insights into the dynamic relationship between union size and scope within the context of this coalition-formation model. I proceed to analyze what happens to the shape and form of a stable union when some previously excluded countries become eligible to join for some exogenous reasons. In the case of the European Union for example, countries such as Greece, Spain, and Portugal and the former communist Central and Eastern European countries were invited to join the existing union soon after they became politically (i.e., democratic) and/or economically (i.e., liberalized market economies) eligible.[24] These expansion members were assumed to be subject to some exogenous (mainly geopolitical) eligibility constraints that ceased to bind at some point in time.

The process of union enlargement essentially introduces a dynamic element to the previous analysis, since the 'enriched' game of coalition-formation is endowed with an entrenched *status*

[23] See Konstantinidis (Forthcoming) for a signaling model of endogenous enlargement in the guise of *gradual* coalition formation.

[24] This list has now been extended to include states of former Yugoslavia and the Western Balkans that achieved a modicum of stability after the turmoil and internecine warfare of the 1990s.

quo outcome consisting of some equilibrium union $U^*(I^*, J^*)$. This implies that all existing union members have formal veto power over any other potential new coalition structure. This effectively amounts to a unanimity voting rule in *enlargement* policy, which is an assumption that accurately reflects reality in the European context. In light of the possibility of multiple equilibria, it follows that the original set of 'enacting' union partners will condition the future path of integration.

Assume that at some later stage the set of eligible countries E within a certain region expands to $E' \supset E, E' \subseteq N$. Hence, $E' \backslash E$ denotes the set of newly eligible candidate-members. Going back to the symmetric 'workhorse' model, let $s_i = s, \forall i \in E'$ and $\alpha_i^j = \alpha_i, \forall j \in \mathcal{P}, i \in E'$. How is then the stable coalition structure $\widetilde{C}^*(E)$ affected by this exogenous expansion of the set of eligible countries? The main result of this analytical exercise and the crux of the paper's argumentation is that in equilibrium an existing union $U^*(I^*, J^*)$ may seek to expand (rather than contract) its scope of cooperation in anticipation of the accession of new members. The *static* trade-off between union size and scope can be essentially reversed in a *dynamic* setting. It then comes with the effect of reconnecting theory with the empirical reality of European integration that the enlargement of a union and the widening of its policy scope are too symbiotic and mutually reinforcing dynamic processes.

In contrast with the 'Open Regionalism' *status quo-free* coalition-formation process analyzed above, we now have to reformulate the concept of stability in light of a new coalition-formation protocol, namely 'Unanimous Regionalism'. This rule posits that a new equilibrium coalition structure $\widetilde{C}^{*\prime}(E')$ with a different multi-country union $U^{*\prime}(I^{*\prime}, J^{*\prime})$ may only arise subject to the approval of existing union members $i \in I^*$. The main difference from the 'workhorse' model is that the founding member-states are now endowed with gate-keeping powers, so that the set of *admissible* objections is circumscribed by their veto prerogatives. The concept of a *stable objection* thus needs to be redefined as follows:

Definition 3 *In the 'workhorse' coalition-formation game with an enlarged set of eligible players* $E' \supset E, E' \subseteq N$*, a* ***stable objection*** $\widetilde{C}(E') = \widetilde{C}^{*\prime}$ *to a status quo coalition structure* $\widetilde{C}^{*}(E')$ *by a subset of elementary players* $S' = \{(i,j) : i \in I^* \cup S, S \subseteq E' \backslash I^*, j \in J \subseteq \mathcal{P}\}$ *has to be such that* $u_i\left(\widetilde{C}^{*\prime}\right) \geq u_i\left(\widetilde{C}^{*}\right), \forall i \in I^*$*,* $\Delta u_e\left(\widetilde{C}^{*\prime}\right) \geq 0, \forall e \in S$*,* ***and*** *there does not exist a* $\widetilde{C}''(E')$ *such that* $u_l\left(\widetilde{C}''\right) \geq u_l\left(\widetilde{C}^{*\prime}\right), \forall l \in I^*$ *and* $u_i\left(\widetilde{C}''\right) > u_i\left(\widetilde{C}^{*\prime}\right)$ *for at least one* $l \in I^*$*.*

No member of the *status quo* equilibrium union $U^*(I^*, J^*)$, which has formal blocking power, may end up worse off under the new proposed coalition structure $\widetilde{C}(E')$. Any such objection that is subject to veto is rendered vacuous and as such does not affect the final payoffs. This would imply a couple of things: (i) no member-state of the original union may be excluded from the enlarged union if it is not to be vetoed, since by Proposition 1 we know that $\Delta u_i(I^*, J^*) \geq 0, \forall i \in I^*$ and (ii) the new proposed coalition structure has to be Pareto efficient with respect to the 'enacting' member-states' payoffs.

In order to rule out the trivial case where the expansion of the set of eligible countries leaves the equilibrium union $U^*(I^*, J^*)$ unaffected, we need to assume that there exists at least one stable objection by a subset of players including at least one of the newly eligible countries $e \in E' \backslash E$. In other words, the citizens of at least one of the expansion countries will have a strong enough public good preference intensity as to wish to join the extant international union. The direct implication is that the *status quo* would no longer be a Stable Coalition Structure (in the sense of Proposition 1) within the enlarged game. We may now proceed to state and explain the main result of this section regarding the effect of the expansion of the set of eligible countries on the shape and form of the stable multilateral union:

Conjecture 1 *Assume that* $\Delta u_e(I, J^*) \geq 0$ *for at least one country* $e \in E' \backslash E$ *and some* $I = \{l \in E' : \alpha_l \geq \alpha_k, k \preceq e, k \in E'\}$ *(non-triviality assumption). Then, the ensuing* $\widetilde{C}^{*\prime}(E')$ *of the enlarged game with* $E' \supset E, E' \subseteq N$ *and* $U^{*\prime}(I^{*\prime}, J^{*\prime})$ *may consist of a* ***stable***

objection *(as defined above) to* $\widetilde{C}^*(E)$ *by all existing member-states* $i \in I^*$ *and a subset of excluded countries* $k \in E' \backslash I^*$ *such that* $I^{*\prime} \supset I^*$ *and* $J^{*\prime} \supseteq J^*$*, which means that an anticipated increase in union size may have the effect of widening the scope of the equilibrium union.*

The assumption in the above conjecture states that there exists one subset of states including at least one of the expansion countries that would be better off acceding to the union in its existing form. Note that it would not be *without loss of generality* to assume that some $e \in E' \backslash E$ wants to accede to $U^*(I^*, J^*)$ unilaterally, since that would imply that $e \succ k, \forall k \in E' \backslash I^*$. This speaks to the fact that enlargement rounds tend to bundle up more than one candidate-member together,[25] which comes as a result of 'package deals' in multilateral union negotiations over the determination of which country receives official candidate status.[26]

Besides the anticipated expansion of union size to $I^{*\prime} \supset I^*$ to include aspiring candidate-members, the proposition also asserts the ensuing widening of its scope to some $J^{*\prime} \supseteq J^*$ in the transition to the new equilibrium coalition structure. The statement may be made even stronger if we assume that the fixed institutional and variable costs of an existing union are sunk and/or that the 'audience costs' of contracting the scope of integration are large enough that the 'highest-demanding' country of the original union, i.e., country $i^*_{\max} \in I^*$ such that $i \succeq l, \forall l \in E$, would be worse off under any *self-enforcing* union proposal with $|J^{*\prime}| < |J^*|$ in the anticipation of accession by even more candidate-members. The intuition here is that the costs of dissolving the institutional (bureaucratic) infrastructure of an existing supranational jurisdiction created for specific policy areas are effectively prohibitive. This in turn would

[25] In the European context, the sole exception to this regularity would be the singular accession of Greece in 1981, even though scholars tend to lump it together with the accession of Spain and Portugal in 1986 as part of the Southern enlargement of the European Community.

[26] Most recently in the EU Brussels Summit of December 2004, it was rumored that Austria's (and others') reservations over starting accession negotiations with Turkey were overcome with a common decision to include Croatia in the same enlargement round and to expedite its accession to the Union.

imply that for any such policy cluster J^* belonging to the maximal set $M(I^*)$ an expansion in union membership to $I^{*\prime} \supset I^*$ (resulting in the enhancement of the overall benefits of union participation *per member*) may only be associated with the extension of the enlarged union's scope $J^{*\prime}$ to additional policy jurisdictions such that $J^{*\prime} \in \{J \subseteq \mathcal{P} : \nexists J'' \neq J$ such that $u_i(I^{*\prime}, J'') \geq u_i(I^{*\prime}, J), \forall i \in I^{*\prime}$ and $u_k(I^{*\prime}, J'') > u_k(I^{*\prime}, J)$ for at least one $k \in I^{*\prime}\}$ and $J^{*\prime} \supseteq J^*$. Given that policy $j_{\max} = \underset{j \in J^*}{\operatorname{argmax}}\{k^j\}$ is assumed to be locked-in, then members $i \in I^{*\prime}$ will choose to cooperate in areas with the highest levels of *spillovers* and complementarities[27] up to the point where the marginal variable cost of centralization in an additional policy area renders the union unstable by making the least enthusiastic member n (such that $k \succeq n, \forall k \in I^{*\prime}$) unwilling to stay in, i.e., $\Delta u_n(I^{*\prime}, J^{*\prime} \cup \{j'\}) < 0$.

The 'Unanimity Regionalism' coalition-formation rule states that all current members need to approve enlargement. Because of the single-crossing property of the 'workhorse' model, this implies that it would be a sufficient condition for 'threshold' U^* member $\widetilde{i}$ to be at least as well off in an enlarged union as before. So, in light of the non-triviality assumption, any objection $\widetilde{C}(E')$ to $\widetilde{C}^*(E)$, amounting to the accession of some subset of 'outsiders' $S \subseteq E' \backslash I^*$ without a change in scope, has to be such that $u_{\widetilde{i}}\left(\widetilde{C}(E')\right) \geq u_{\widetilde{i}}\left(\widetilde{C}^*(E)\right)$, where

[27] They will adopt the following inductive algorithm. For $j_{\max}$ as defined above, let $j_{\max} \succ_c j, \forall j \in \mathcal{P}$. Then binary relation $\succ_c$ may be inductively defined as follows:

$$j \succ_c j' \Leftrightarrow \beta^j \left(1 + \sum_{j'' \succ_c j}^{j'' \neq j} \beta^{jj''}\right) > \beta^{j'} \left(1 + \sum_{j'' \succ_c j}^{j'' \neq j'} \beta^{j'j''}\right), j, j' \in \mathcal{P}.$$

Hence, $J^{*\prime} = \{j \in \mathcal{P} : j \succ_c j^{*\prime}\}$, where $j^{*\prime}$ would denote the 'inframarginal' policy area.

through manipulation of expression 4 above, I find that

$$\begin{aligned}
&\Delta u_{\widetilde{i}}\left(I^{*}\cup S,J^{*}\right)-\Delta u_{\widetilde{i}}\left(I^{*},J^{*}\right)= \\
&= \alpha_{\widetilde{i}}s\left|J^{*}\right|\ln\left(1+\frac{\sum\limits^{e\in S}\alpha_{e}}{\sum\limits_{i\in I^{*}}a_{i}}\right)+\alpha_{\widetilde{i}}s\sum_{j\in J^{*}}\ln\left(1+\frac{\left|S\right|\beta^{jj}\left(1+\sum\limits_{j'\neq j}^{j'\in J^{*}}\beta^{jj'}\right)}{1+\left(\left|I^{*}\right|-1\right)\beta^{jj}\left(1+\sum\limits_{j'\neq j}^{j'\in J^{*}}\beta^{jj'}\right)}\right) \\
&\quad+\left(\frac{1}{\left|I^{*}\right|}-\frac{1}{\left|I^{*}\right|+\left|S\right|}\right)\max_{j\in J^{*}}\{k^{j}\}-s\left|J^{*}\right|\left(\frac{\sum\limits^{i\in I^{*}}\alpha_{i}+\sum\limits^{e\in S}\alpha_{e}}{\left|I^{*}\right|+\left|S\right|}-\frac{\sum\limits^{i\in I^{*}}\alpha_{i}}{\left|I^{*}\right|}\right).
\end{aligned}$$

This comes to show how the number and the average preference intensity type $\frac{\sum^{e\in S}\alpha_{e}}{|S|}$ of candidate-members $e\in S$ (which by assumption will always include at least one of the newly eligible countries $e\in E'\backslash E$ and possibly some of the previously excluded countries $k\in E\backslash I^{*}$) may affect the shape and form of the enlarged union. The effect of an increase in size on the utility of 'threshold' member $\widetilde{i}$ is positive with respect to higher centralized public good provision, enhanced first-order *spillover* gains of cross-country multi-dimensional coordination, larger joint economies of *scale* and *scope* benefits, while the change in aggregate variable costs of preference heterogeneity is ambiguous. For a low enough average expansion-country type $\frac{\sum^{e\in S}\alpha_{e}}{|S|}\leq\overline{V}\left(s,K,A,B,|S|\right)$, where the upper bound value $\overline{V}$ occurs at the point where the marginal benefits of admitting new members equal the marginal variable costs and is strictly greater than $\frac{\sum^{i\in I^{*}}\alpha_{i}}{|I^{*}|}$, then $\widetilde{i}$ is unambiguously better off in the enlarged union. Therefore, there must exist at least one stable union $U^{*\prime}\left(I^{*\prime},J^{*\prime}\right)$, where $I^{*\prime}\supset I^{*}$ and $J^{*\prime}\supseteq J^{*}$, on the expanded (I,J) efficiency frontier to the North-East of the current *status quo* union, such that no current member-state would end up being worse off. The lower the preference intensity of the newly eligible countries $e\in E'\backslash E$ (such that the *non-triviality* assumption continues to hold), the higher the number of former 'outsider' countries $(E\backslash I^{*})$

willing to join, which in turn leads to a wider equilibrium scope of integration $J^{*\prime}$.

All current members have a joint interest to adjust the union's set of policies in such a way as to extract the maximum possible concessions from aspiring candidate-members, given that the onus of adaptation to the modified *acquis communautaire* will fall entirely on the latter. However, the enlarged (I, J) Pareto set may have more than one elements, which would give rise to intergovernmental bargaining among existing member-states over the choice of scope for the enlarged union. Since the new set of union policies $J^{*\prime}$ will effectively act as a self-selection device for the admission of new members, in the sense that it will determine which of the aspiring candidates is better off joining the union and embracing its modified scope, then there may well exist a conflict of interest between 'high-demanding' pro-integration members and those at the lower end of the induced preference ordering over the choice of the enlarged union's $U^{*\prime}\left(I^{*\prime}\left(J^{*\prime}\right), J^{*\prime}\right)$ shape and form. The application of the the unanimity principle to enlargement policy would then allow for the possibility of a stalemate and significant delays in the enlargement process.

The current ambivalence over the future accession of Turkey to the EU is a case at hand. Moreover, the first enlargement round of the European Community is another telling example of intra-coalition tensions over the choice of scope and how they are linked to the prospect of union enlargement. After almost a decade of delay and French vetoes, it was not until the Hague Summit of December 1969 that the deadlock over the admission of the UK (primarily), Ireland, Denmark, and Norway was overcome through concessions by the Five founding members to French demands with respect to the completion of the Community's initial agenda and the expansion of cooperation into new policy areas (Konstantinidis, Forthcoming).

With respect to enlargement in the model with countries of heterogeneous size, we can conjecture that larger expansion countries $(s_e = \overline{s}, e \in E^{\prime} \backslash E)$ will have a more pronounced effect on the size $I^{*\prime}$ and scope $J^{*\prime}$ of the new equilibrium union $U^{*\prime}$ than smaller ones

($s_e = \underline{s}$).[28] Moreover, now there are two 'threshold' union members with equal gatekeeping power: large country $\widetilde{i}$ and small country $\widetilde{k}$. The proliferation of effective veto players limits the range of viable objections and the number of candidates universally acceptable to all founding members.

2.4 Flexible Integration

The institutional complexity and heightened preference heterogeneity caused by successive waves of EU enlargement have cast doubt among both policy-making and scholarly circles over the applicability of the Community Method (Dewatripont et al., 1995; Berglöf et al., 2003) and raised the prospect of tampering with more flexible modes of integration, such as 'Europe à la carte', 'multi-speed integration', 'generalized subsidiarity', and 'open partnerships' (Alesina and Grilli, 1993; Dewatripont et al., 1995; Fratianni, 1998; Pisani-Ferry, 1995). To that end, it would be useful, both from a normative and positive standpoint, to examine how the 'workhorse' model behaves without the restrictive 'Rigid Union' coalition-formation protocol. This section seeks to characterize the shape and form of an equilibrium union within an unrestricted space of *feasible* coalition structures $\widetilde{C} \in \mathcal{C}^{FI} = \mathcal{C}$, in the form of *à la carte* integration, whereby each union member may freely pick and choose in which policy centralization agreements it would like to participate.

By dint of the unidimensional cross-country heterogeneity of preference intensities, it may be safely reasoned that a *single-crossing property* of Lemma 1 will also apply to each policy domain separately under the 'Flexible Integration' rule. Let $I^j = \{i \in E : \sigma_i^j = 1\}, j \in \mathcal{P}$ denote the union set of members in each policy dimension. Define

$$\Delta u_i^J(U^{FI}(\sigma)) = u_i\left(\sigma_i^j = 1, \forall j \in J | \sigma_i^{-J}, \sigma_{-i}\right) - u_i\left(\sigma_i^j = 0, \forall j \in J | \sigma_i^{-J}, \sigma_{-i}\right)$$

[28] Taking the latest round of EU enlargement as an example, the disparity in the attitudes of current members towards the candidacies of Turkey (large) and Croatia (small) is quite telling.

as the difference in utilities between joining 'enhanced cooperation' subunions in policy jurisdictions $j \in J$ and choosing to stay out *ceteris paribus*. Then, in an application of the 'unrestricted' version of the *single-crossing property*, we may posit that there exists a stable *flexible union* $U^{*FI}\left(I^{j*}\right)_{j\in\mathcal{P}}, I^{j*} \subseteq E$ such that $\Delta u_i^J\left(U^{*FI}\left(\sigma^*\right)\right) \geq 0$ for some $i \in E$ implies that $\Delta u_k^J\left(U^{*FI}\left(\sigma^*\right)\right) > 0, \forall k \succ i, \forall J \subseteq \left\{j \in \mathcal{P} : i \in I^{j*}\right\}$. From this, it follows that $i \in I^{j*}$ implies that $k \in I^{j*}, \forall k \succeq i, \forall j \in \mathcal{P}$. Hence, a stable coalition structure C^{*FI} under the 'Flexible Integration' coalition-formation protocol will be defined by a set of 'threshold' preference intensity types for each policy $\left(\widetilde{\alpha}^j\right)_{j\in\mathcal{P}}$ such that $\sigma_i^{j*} = 1$ *if and only if* $\alpha_i \geq \widetilde{\alpha}^j$. Stable policy-specific subunions will essentially consist of a *convex* and *connected* set of countries (with respect to their preference intensity parameter) including the highest-demanders all the way down to the 'threshold' member-state $\widetilde{i}^j$, i.e., $I^{*j} = \left\{1, \ldots, \widetilde{i}^j\right\}$. Then $C^{*FI} = \bigcup\limits_{j\in\mathcal{P}}\left(U\left(I^{j*}\right) \mid \bigcup\limits_{i\in E\setminus I^j}\{(i,j)\}\right)$. Before stating the proposition, it would be useful to rank-order policies with respect to equilibrium membership (in increasing order of their preference intensity threshold), i.e., let $j \succ^{FI} j' \Leftrightarrow \widetilde{\alpha}^j < \widetilde{\alpha}^{j'}$.

Proposition 2 *In the symmetric model with unidimensional preference heterogeneity, i.e.,* $s_i = s, \forall i \in E$ *and* $\alpha_i^j = \alpha_i^{j'} = \alpha_i, \forall j, j' \in \mathcal{P}$*, there exists a Stable Coalition Structure* $C^{*FI} \in \mathcal{C}^{FI}$ *under the 'Flexible Integration' rule that consists of an equilibrium flexible union* U^{*FI} *with membership* I^{j*} *per policy area* $j \in \mathcal{P}$ *such that* $i \in I^{j*}$ *(i.e.,* $\sigma_i^{j*} = 1$*) if and only if* $i \succeq \widetilde{i}^j$ *(i.e.,* $\alpha_i \geq \widetilde{\alpha}^j$*) and the following conditions are satisfied:*

(i) $\Delta u_{\widetilde{i}^j}^J\left(U^{*FI}\right) \geq 0, \forall J \subseteq \{j' \in \mathcal{P} : \widetilde{i}^j \succeq \widetilde{i}^{j'} \in I^{j*}\}, \forall j \in \mathcal{P}$

(ii) $\Delta u_k^j\left(I^j\right)_{j\in\mathcal{P}} < 0, \forall k \in E$ *such that* $k \prec \widetilde{i}^j, \forall j \in \mathcal{P}$*, where* $I^j = \{l \in E : l \succeq k\}$*, and* $\left(I^{j'}\right)_{j'\neq j, j\in\mathcal{P}} = \left(I^{j'*}\right)_{j'\neq j, j\in\mathcal{P}}$*, and*

(iii) $\Delta u_k^J\left(\left(I^j\right)_{j\in J}, \left(I^{j'}\right)_{j'\in\mathcal{P}\setminus J}\right) < 0, \forall J \subseteq \{j' \in \mathcal{P} : k \prec \widetilde{i}^{j'}\}, \forall k \in E$ *such that* $k \prec \widetilde{i}^j, \forall j \in \mathcal{P}$*, where* $I^j = \{l \in E : l \succeq k\}, j \in J$.

The characterization of the *Flexible* integration Stable Coalition Structure is as before refined by a *single-crossing property*, only this time we need to allow for a considerably larger space of potential objections by *elementary players* (national ministers) in each policy dimension considered both separately and in combination with others (subsets $J \subseteq \mathcal{P}$). This admittedly makes for much more stringent equilibrium conditions that mitigate the problem of equilibrium multiplicity. If there are multiple Rigid Union Stable Coalition Structures C^{*RU}, then the inherent conflict of interest among members over the desired shape and form of the international union will be reflected by an asymmetric Flexible Integration Stable Coalition Structure C^{*FI} with 'enhanced cooperation' policy subunions, i.e., there will exist at least one $j' \in J_U^*$ such that $I^{j'*} \subset I^{j*}, I^{j'*} \neq \emptyset$ for some $j \neq j', j \in J_U^*$.

However, it will also be the case that any C^{*FI} will weakly dominate C^{*RU} in terms of efficiency, since the former is immune to an unrestricted set of potential deviations. A Flexible Integration Stable Coalition Structure may in fact for certain parameter configurations resemble a 'Rigid Union' one, whenever the equilibrium 'threshold' country is the same $\widetilde{i}^j = \widetilde{i}$ across all policy jurisdictions within the overall union's purview J_U^*, i.e., $\widetilde{\alpha}^{j*} \in \{\widetilde{a}, 1\}, \forall j \in \mathcal{P}$ for some $\widetilde{\alpha} \in (0,1)$ and $I^{*j} = I^*, \forall j \in J^*$. However, that may only come about for non-generic parameter configurations, e.g., whenever policies are similar with respect to fixed costs and spillovers.

This begs the question of which policy areas are expected to give rise to 'enhanced cooperation' subunions (Bordignon and Brusco, 2006). One may surmise an answer through an examination of the policy-specific *utility-differential* function. Suppose there is an equilibrium *flexible* union U^{*FI} such that $\widetilde{\alpha}^j = \widetilde{\alpha}, \forall j \in J_U^* - \{j'\}$ and $\widetilde{\alpha}^{j'} > \widetilde{\alpha}$ for some $j' \in \mathcal{P}$, i.e., a union with overall membership $I_U^* = \{i \in E : \alpha_i \geq \widetilde{\alpha}\}$ along a 'common base'[29] of policies

[29] This is an interesting term introduced by Dewatripont et al. (1995) to refer to a defining set of policies commonly adopted by all union members for which the gains from cooperation are universally perceived to be large. In the EU case, the defining 'common base' essentially started off with the Single Market initiative ensuring free trade in goods, services, capital, and labor across all member-states.

$J_U^* - \{j'\}$ and a policy area j' of 'enhanced cooperation' among a subset of 'high-demanders' within the union $I^{j*} = \{k \in E : \alpha_k \geq \widetilde{\alpha}^{j'} > \widetilde{a}\}$. This would imply that the *utility-differential* function of participating in the 'enhanced cooperation' agreement for the 'threshold' member $\widetilde{i}$ ($\alpha_{\widetilde{i}} = \widetilde{a}$) of the 'common base' union is negative, i.e.,

$$
\begin{aligned}
\Delta u_{\widetilde{i}}^{j'}(U^{*FI}) &= u_{\widetilde{i}}\left(\sigma_i^j = 1, \sigma_i^{j''} = 0, \forall j \in J_U^*, j'' \in \mathcal{P}\backslash J_U^* | \sigma_{-i}^*\right) \\
&\quad - u_{\widetilde{i}}\left(\sigma_i^j = 1, \sigma_i^{j''} = 0, \forall j \in J_U^* - \{j'\}, j'' \in (\mathcal{P}\backslash J_U^*) \cup \{j'\} | \sigma_{-i}^*\right) \\
&= \alpha_{\widetilde{i}} s \ln \left[\frac{\sum^{k \succeq \widetilde{i}} \alpha_k}{\alpha_{\widetilde{i}}} \left(1 + (|I^*| - 1)\,\beta^{j'j'} \left(1 + \sum_{j'' \neq j'}^{j'' \in J_U^*} \beta^{j'j''}\right)\right)\right] \\
&\quad + \sum_{j'' \neq j'}^{j'' \in J_U^*} \alpha_{\widetilde{i}} s \ln \left(1 + \frac{\beta^{j''j''}\beta^{j''j'}\left(|I_U^*| - 1\right)}{1 + \beta^{j''j''}\left(|I_U^*| - 1\right)\left(1 + \sum_{j''' \neq j', j''}^{j''' \in J_U^*} \beta^{j''j'''}\right)}\right) \\
&\quad + \left(\max_{j \in (\mathcal{P}\backslash J_U^*) \cup \{j'\}} \{k^j\} - \max_{j' \in \mathcal{P}\backslash J_U^*} \{k^{j'}\}\right) - \frac{1}{|I_U^*|}\left(\max_{j'' \in J_U^*} \{k^{j''}\} - \max_{j''' \in J_U^* - \{j'\}} \{k^{j'''}\}\right) \\
&\quad - s\left(\frac{\sum^{k \succeq \widetilde{i}} \alpha_k}{|I_U^*|} - \alpha_{\widetilde{i}}\right) < 0.
\end{aligned}
$$

After careful examination of the above expression, it turns out that it reaches its lowest value when $\max_{j''' \in J_U^* - \{j'\}} \{k^{j'''}\} < k^{j'} < \max_{j' \in \mathcal{P}\backslash J_U^*} \{k^{j'}\}$ and there is a low degree of complementarities $\beta^{j'j'}\left(1 + \sum_{j'' \neq j'}^{j'' \in J_U^*} \beta^{j'j''}\right)$ between j' and the set of 'common base' policies $J_U^* - \{j'\}$, which leads us to the following conjecture:

Conjecture 2 *In a Flexible Integration Stable Coalition Structure, we should expect 'enhanced cooperation' subunion agreements to emerge in policy areas with low fixed costs and low degrees of complementarities with the overall union's 'common base' policies. The higher*

the fixed costs (k^j) of union policies ($j \in J_U^*$), the higher the diseconomies of scope, which in turn implies a lower degree of differentiation in terms of the number of non-overlapping supranational jurisdictions or policy regimes.

An extension of Corollary 1 to an environment with *flexible* integration would essentially imply that there may not exist two distinct stable coalition structures $C^{*FI}\left(U^{*FI}\right)$ and $C^{**FI}\left(U^{**FI}\right)$ such that one is *contained in* the other in the sense that $\widetilde{\alpha}^{j*} \leq \widetilde{a}^{j**}, \forall j \in \mathcal{P}$ and $\widetilde{\alpha}^{j'*} < \widetilde{a}^{j'**}$ for at least one $j' \in \mathcal{P}$. Another way to formalize this is the following: let us think of a *flexible union* U^{FI} as a *fuzzy set* U in E characterized by a *membership* function $f_U : E \to [0,1]$ which assigns a 'degree of membership' in the overall *flexible union* U^{FI} to each country $i \in E$. Define the *membership* function for each country as the ratio of the number of policies in which it chooses to cooperate over the cardinality of the full range of union policies, i.e., $f_U(i) \equiv \frac{\#\{j \in \mathcal{P}: i \in I^j\}}{|J_U|}$. Then we say that flexible *union* U^{FI} is *contained* in (or is a subset of) *flexible union* U'^{FI} *if and only if* $f_U(i) \leq f_{U'}(i), \forall i \in E$ and $f_U(k) < f_{U'}(k)$ for at least one $k \in E$. In symbols, $U^{FI} \subset U'^{FI} \Leftrightarrow f_U \leqq f_{U'}$ (Zadeh, 1965). Then, we may say that there do not exist two distinct stable coalition structures $C^{*FI}\left(U^{*FI}\right)$ and $C^{**FI}\left(U^{**FI}\right)$ such that $U^{*FI} \subset U^{**FI}$, which in turn implies that 'Flexible Integration' Stable Coalition Structures are Pareto efficient.

Example 3 *Finally, let us demonstrate what a stable Flexible Union would look like in tandem with the corresponding Rigid Unions in the following numerical example: let* $E = \{1,2,3,4,5\}$ *and* $\mathcal{P} = \{a,b\}$. *Then for* $A = (.5621, .0782, .0693, .0238, .0183)$, $K = (96798, 11775)$, $s = 1000000$, *and* $B = \begin{pmatrix} .30 & .30 \\ .30 & .41 \end{pmatrix}$, *there exist two distinct stable Rigid Unions* $U^{*RU} = (\{1a, 2a, 3a, 4a, 5a\})$ *and* $U^{**RU} = (\{1a, 2a, 3a\}, \{1b, 2b, 3b\})$ *satisfying the size-and-scope trade-off and one stable Flexible Union* $U^{*FI} = (\{1a, 2a, 3a, 4a, 5a\}, \{1b, 2b, 3b\})$ *that contains both, i.e.,* $U^{*RU} \subset U^{*FI}$ *and* $U^{**RU} \subset U^{*FI}$ *(see figure 6 below). The possibility of à la*

carte integration basically allows the 'high-demanding' countries to move ahead with selective cooperation in policy area b, without the fear of excluding the less integration-prone members from the overall union structure. Note that all three of the more pro-integration members 1, 2, and 3 are strictly better off under the 'Flexible Integration' coalition-formation protocol, while the 'lower-demanding countries' 4 and 5 are indifferent between the 'Flexible Integration' Stable Coalition Structure $C^{*FI}\left(U^{*FI}\right)$ *and the 'Rigid Union' Stable Coalition Structure* $C^{*RU}\left(U^{*RU}\right)$*, in which they are members of the international union. This comes to show that à la carte integration is Pareto efficient.*

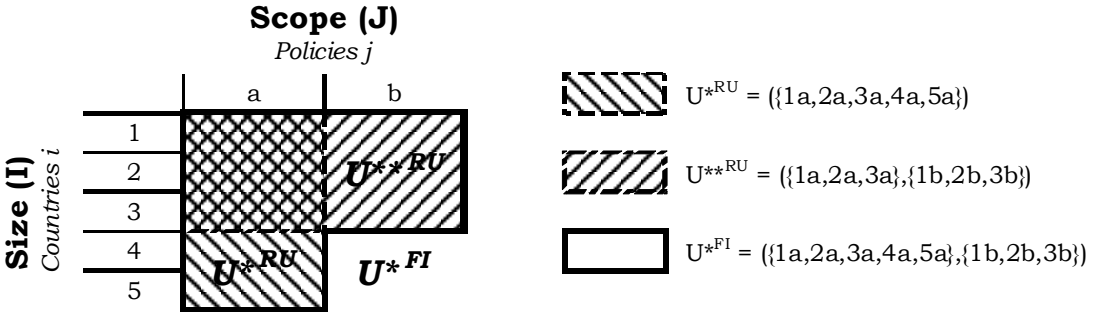

Figure 6: In this numerical example with five countries and two policy areas, there exist two distinct equilibrium Rigid Unions U^{*RU} and U^{**RU} both contained in the equilibrium Flexible Union U^{*FI}.

3 Application to the European Experience

It would now be befitting to examine how the above theoretical framework applies to the case of regional integration in Europe. To that end, one may take a holistic view of the process of European integration as a dynamic game of 'political geometry' among nation-states belonging to the geographically-delimited European space. The goal is to show how the 'political dimensions' of regionalism in Europe have been inextricably interlinked and essentially non-orthogonal and non-separable, and - more specifically - how the *breadth* and

width of European integration are two strategically interrelated variables in this context. Figure 7 below provides a historical time-line of the major intergovernmental treaties and rounds of enlargement that mark the major developments in the evolution of the European project. In keeping with the analogies of this paper, it is essentially a time-line of the EU's *variable geometry*.

The Treaty of Paris (1951), which led to the establishment of the European Coal and Steel Community (ECSC), and the Messina Conference (1955), which paved the way for the Treaty of Rome (1957) and the creation of the European Economic Community (EEC) and the European Atomic Energy Community (Euratom), were among the first instances of *status-quo*-free and unencumbered coalition formation in the aftermath of the Second World War. The deep geopolitical divisions and wide economic disparities at the time restricted the set of eligible participants to the countries of Western and Northern Europe. This fomenting process of international negotiations culminated in the establishment of regional supranational entities, namely the High Authority and later the European Commission, overseeing cross-country cooperation and coordination in so-called areas of 'low-politics' (e.g., industrial trade and atomic energy). The regulatory bias of European integration (Majone, 1996), therefore, originated in the founding member-states' strong incentive to pool their common resources into policy areas with high bureaucratic fixed costs and high degrees of *spillover* benefits (e.g., internal market and agriculture) and, therefore, minimize the conflict of interest lest it mire the negotiations down to a stalemate.

The model demonstrates how the existence of multiple equilibria (or stable unions) is a sign of misaligned preferences and clashing interests among negotiating partners over the shape and form of cooperation. This makes for a strong argument of *path dependency* in the evolution of European cooperation (Pierson, 1996) in light of the leading role played by the Original Six member-states (France, Germany, Italy, the Netherlands, Belgium, and

Luxembourg) as 'levers' regulating the flow and pace of integration towards the creation of a multi-tiered European polity (Marks, Hooghe and Blank, 1996; Hooghe and Marks, 2001). One may accordingly surmise by way of a counterfactual that had the UK been more positively inclined towards the European Community from the outset, then the initial and subsequent size and scope of the union would have been different, not to mention that the rival European Free Trade Association (EFTA) consisting of the Outer Seven (Austria, Denmark, Norway, Portugal, Sweden, Switzerland, and the UK) might never have come into existence.

Following the success of the EEC's 'honeymoon years' (Ludlow, 1997), the 'empty chair' crisis of 1965-66 and the resulting Luxembourg Compromise led to the consolidation of the Community Method, which in terms of the model would translate into the 'Rigid Union' coalition-formation protocol, via the reaffirmation of the right to veto in areas of 'vital national interest' (Parsons, 2003). Hence, the concepts of policy uniformity and Rigid Union Stable Coalition Structures appear more germane to the early formative years of European integration, while the emergence of various forms of *de facto* and *de jure* differentiation (De Burca and Scott, 2000) in the decades to follow highlights the pertinence of the 'Flexible Integration' model.

As for enlargement, one may take the example of the first round (which after a decade of delays and French vetoes[30] culminated into the accession of Denmark, Ireland, and the UK to the EEC in 1973) as an instance of a bargaining stalemate among the founding-members over the corresponding size and scope of an enlarged *bloc*. The sharp divisions between France and the Five others may be construed as a disagreement over the desired size-scope combination on the expanded (I, J) Pareto frontier. It was finally resolved in the Hague Summit of 1969 with the consent of Pompidou and the French to British accession in return for some policy concession in terms of deepening cooperation in the internal market and

[30] See Konstantinidis (Forthcoming) for a theoretical explanation of the strategic underpinnings of this historical episode.

extending the community's competences. The current candidacy of Turkey and the stark opposition to its membership expressed by some EU members also make for a protracted period of deadlock and accession negotiations, especially given the candidate-member's size and geopolitical stature.

However, one of the main intuitions of this paper, honed by its formal theoretical approach, is that the prospect of union enlargement has on the whole breathed life into the European project and uplifted it from periods of legislative stagnation and immobilism, by rekindling the widening process of cooperation and expanding the size-scope efficiency frontier. A model that examines the joint strategic effects of size and scope on the process of coalition formation within the context of an international union can capture the strategic interdependence between enlargement rounds of the European Community and major reforming treaties as shown in figure 7. Depending on their size and policy preferences (which explains the varied effects of the Southern, Nordic, and Eastern[31] enlargement rounds on the Union's shape and form), the accession of additional members to the *bloc* enhanced the cross-country and cross-policy spillover benefits, augmented the economies of *scale* and *scope*, and modified the general configuration of interests within the Union.

Even though the historiography of European integration and the testimonies of relevant actors do not always make this link explicit in specific instances of widening and broadening (e.g., in the run-up to the Single European Act and the Maastricht Treaty), the theoretical analysis of this paper highlights the underlying macropolitical processes that led to simultaneous occurrences of broadening and widening and accounts for the entire constellation of interests of all actors involved. In this 'big picture' approach, it is important to tease out the logical relationships between the variables of interest, in order to explain how years of

[31] See Grabbe (2004) for an analysis of the new constellation of policy coalitions in the EU after the Eastern enlargement.

inactivity and deadlock were overcome in the absence of major extraneous shocks other than enlargement. The 'Rigid Union' version of the model points to the fact that there may be multiple stable coalition structures for any given set of parameters; hence, within a rational choice framework, some form of exogenous shock to the incentive structure of the system is needed to explain the transition from a *status quo* union policy constellation to one that is wider. I show that an expansion in the pool of eligible candidate-members is enough to explain how the EU managed to collectively overcome, i.e., not simply through the leadership of a *vanguard* of countries, long periods of Eurosclerosis. Note, however, that this coalition-theoretic approach does not rely on a specific extensive structure and, thus, may not impute any sort of intertemporal causality on the relationship between the widening of a union's scope of competences and the broadening of its membership.

Another implication that was derived from the theoretical analysis was the strategic use of the *acquis communautaire* as a self-selection device for the accession of candidate-members. One may thus posit that major intergovernmental treaties (e.g., the SEA, the TEU, and the Treaty of Nice) that were signed in anticipation of enlargement reflected the strategic leverage of existing members *vis-à-vis* aspiring members, inasmuch as the latter were implicitly asked to decide whether they would be willing to join and fully embrace an entrenched body of rules and legislation in which they had zero or minimal input. This kind of strategic interplay forms the crux of accession negotiations, in light of the fact that full membership entails complete harmonization of national policy with a malleable European *acquis* (at least within the scope of the Union's 'common base' policies) that is always subject to change depending on the parameter configurations of the overall coalition-formation game.

With respect to the relevance of the 'Flexible Integration' model to European integration, the Schengen Agreement and the European Monetary Union (EMU) are two examples of *flexible* integration policy subunions (even though not all participants in the Schengen

Agreement are EU members) that stand out. These constitute exemplary cases of policy differentiation across Union members not only in the prior sense of failing to meet some eligibility criteria but also in the sense that some EU members opted out of them through special protocols and derogations (Tuytschaever, 2000). This has given rise to a muddled governance structure, especially in the domain of monetary policy with the proliferation of formal (e.g., European Central Bank, Ecofin) and informal (e.g., Eurogroup) institutions of non-overlapping membership (Pisani-Ferry, 1995). A differentiated constitutional model raises questions of effectiveness, democratic legitimacy and transparency, disunity of purpose, and finally credibility of the Union as an international political actor.

The current integration malaise, evidenced by the recent wrangling over the EU budget, the failure of the Treaty establishing a Constitution for Europe (TECE), and the ongoing difficulties in ratifying its watered-down version, the Lisbon Treaty, is indicative of the EU-27's fractured morale and its inherent tensions between the federalist and the Eurosceptic camps. It may also come to vindicate those who make an argument for the untenability of the Community Method in a highly heterogeneous enlarged Union.[32] As the multiple equilibria property of the model would predict, the stability of a broad 27-member union is more precarious than ever, given that there numerous partially overlapping constellations of members with contradicting visions over the desired *width* and *depth* of integration. This rift between the proponents of a federalist model of integration (see for example Verhofstadt, 2006) and those who favor a functionalist approach, i.e., a more pragmatist response to *ad hoc* needs for transnational cooperation, is sapping the Union's unity of purpose and coalitional stability. The fact that its so-called 'absorption capacity' is being strained to its limits and that there are no impactful and uncontroversial rounds of enlargement in prospect implies

[32] The 'flying geese' analogy in Wallace, Wallace and Pollack (2005) is quite befitting in capturing the complex intra-bloc dynamics in a larger than ever regional polity composed of a highly diverse and asymmetric group of sovereign nation-states.

that there is urgent need for a new constitutional mode of integration that can help the EU overcome its internal squabbles and imminent deadlock. It remains to be seen to what extent the formalization of constitutional rules of flexibility in integration enshrined by the Treaties of Amsterdam (1997), Nice (2001), and most recently Lisbon (2007) will unleash these bottling tensions into a complex maze of (partially)-overlapping supranational jurisdictions in the guise of 'enhanced cooperation' agreements, derogations, exit clauses, and 'open partnerships'. So far however, in light of the implicit costs of weakened effectiveness, legitimacy, and credibility, it seems that the trend towards increased flexibility and differentiation has been more informal in nature by means of *ad hoc* policy constellations and subunion advisory groups and directorates. In effect, integrationist and federalist tendencies in the midst of the EU have not been stymied by the rigidity of the coalition-formation process,but instead have managed to take shape without giving the appearance of undermining the Union's overall unity of purpose.

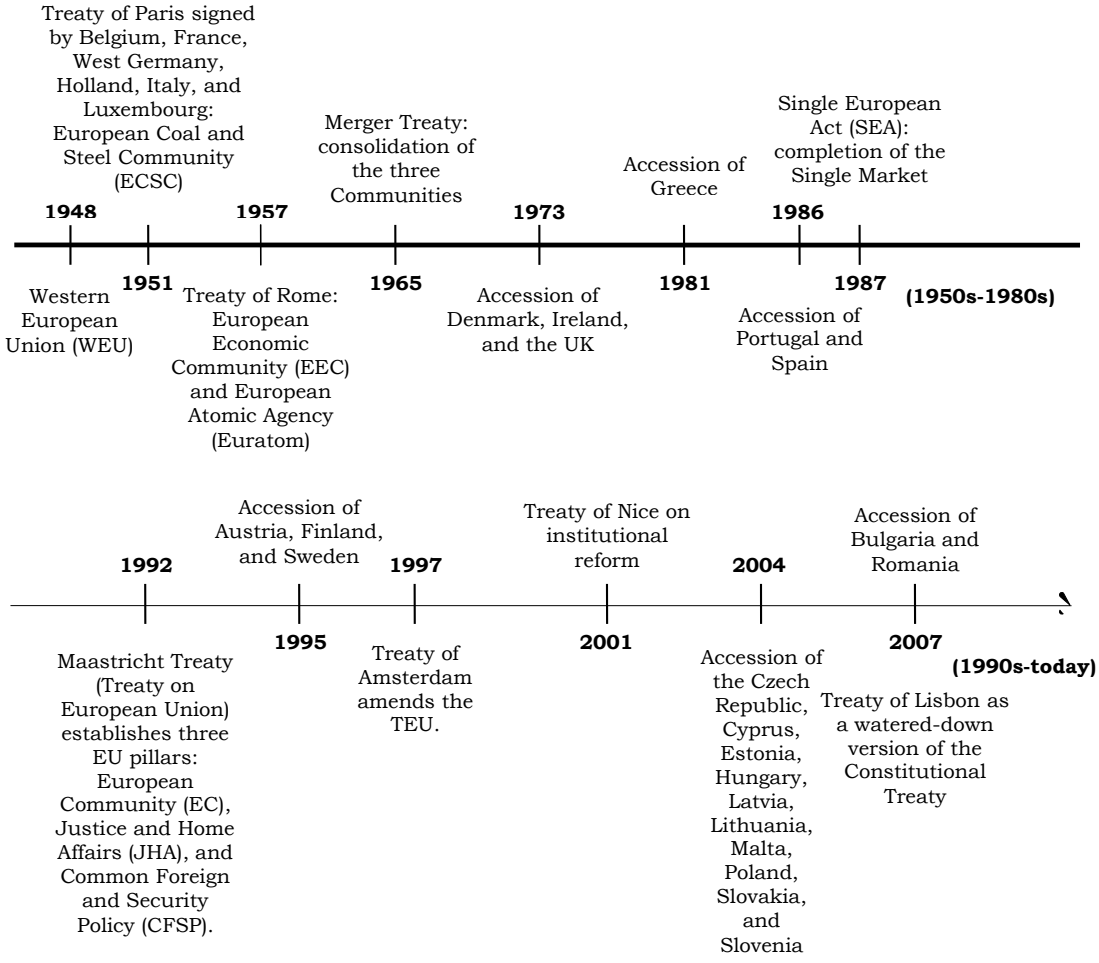

Figure 7: This is a time-line of the history of European integration. Treaties are mentioned in the year they were signed into existence, while enlargement rounds are identified by the year of accession. (Source: *http://europa.eu/*)

4 Concluding Remarks

The goal of this paper has been to introduce a versatile and parsimonious analytical framework to examine the various aspects of the 'political geometry' of regional integration and to help rationalize the current state of affairs in the European and other regional contexts. The use of a coalition-theoretic approach, premised on the conception of regional *blocs* as exclusive political *clubs* (Padoan, 1997), provides us with a rich set of analytical tools for the study of the long-term dynamic processes and strategic interactions in the evolution of regional integration. The emphasis of this paper has been on the interplay between union size and scope within the context of coalition-formation among sovereign nation-states in pursuit of regional cooperation. I find that even though the previously theorized trade-off between *breadth* and *width* is confirmed by the equilibrium multiplicity of the static, *status-quo*-free coalition-formation model subject to some regularity assumptions, it does not generally survive in the dynamic extension of the model with the inclusion of an entrenched *status-quo* coalition structure.

The intuitive explanation is that the emergence of additional countries as prospective partners because of an exogenous change in their eligibility status pushes the size-scope efficiency frontier of regional integration outward, so that previously neglected areas of cooperation with lower fixed costs and lower degrees of complementarity with the union's 'common base' policy competences may actually become part of the enlarged union's equilibrium scope. Incumbent union members seek to take advantage of their gate-keeping prerogatives, in order to extract the highest possible concessions from candidate-members in the latter's bid to join the union and fully embrace its policy *acquis*. However, the possibility of a conflict of interest among member-states over the shape and form of integration may result in a Pareto suboptimal stalemate. Otherwise, the availability of new aspiring members acts as a fulcrum for the widening process of regional cooperation.

I also show how Flexible Integration Stable Coalition Structures relate to those within the restricted feasibility space of 'Rigid Unions'. Flexible unions will generally locate their defining 'common base' of competences in technocratic areas of 'low-politics'. Subunion agreements will tend to emerge in more politicized policy domains, such as foreign and defense policy. These results appear germane to the study of the recent phenomenon of policy differentiation in the heart of the EU.

An extrapolation of the model using proxies, such as national expenditure data per policy domain or Eurobarometer measures of the popularity of national membership in the EU as indicators of preference intensity and issue salience, would be an interesting application of the model to the European context. It would help us predict which countries belong to the pro-integration 'core' and which are the laggards of the integration project, as well as achieve a better understanding of the configuration of interests with respect to the desired degree of differentiation in the EU.

In terms of extensions to the analysis of this paper, it would be very useful to study enlargement under the 'Flexible Integration' coalition-formation protocol and how the type of candidate-members affects the shape of the enlarged union. The emergence of a 'multi-speed' integration reality also stems from the fact that prospective members are not expected to join all union policy initiatives at once, but may be *de facto* confined to the 'periphery' of the union.[33] Together with a general characterization of the relationship between Rigid Union and Flexible Integration Stable Coalition Structures, it would allow us to derive countries' induced preferences over *ex ante* constitutional schemes of integration. One would expect that the effect of country size and public good preference intensity on the attractiveness of flexibility is conditional on the entire space of possible country types.

Introducing a non-state actor such as a supranational institution (like the European Com-

[33] In fact, Frey and Eichenberger (2001) propose the possibility of *partial* entry to the EU - in reference to the recent Eastern enlargement round -, based on economic efficiency and democratic rules.

mission) with its own agenda of promoting cooperation and enhancing functional *spillovers* would also provide us with additional insight over the 'political geometry' of highly institutionalized regional *blocs*. Depending on its role in the determination of policy levels and the voting rule applied in each policy area, one may thus introduce *depth* of integration as a variable of interest and correspondingly tease out its equilibrium relationships with *breadth* and *width*.

Finally, allowing for more than one (non-) or (partially-) overlapping international cooperation agreements in each policy area would add significant complexity to the model by expanding the set of *admissible* objections and counterobjections. Such an approach could help explain the strategic interaction of non-overlapping *blocs* within the same region (such as MERCOSUR and the Andean Pact in Latin America or the EEC and EFTA in Europe).and provide a coalition-theoretic rationale for a 'domino theory' of regionalism (Baldwin, 1999) or a 'building *bloc*' effect of regional trade agreements in the pursuit of global free trade (Aghion, Antràs and Helpman, 2007). The empirical reality suggests that one tends to dominate the other in terms of size and influence, since international unions may be thought of as natural monopolies within their scope of policy competences as a result of high economies of *scale*.

Appendix: Coalition Formation in a Generic Framework

Unidimensional preference heterogeneity was a very useful analytical tool in simplifying the characterization of the stability conditions by giving rise to the single-crossing property in Lemma 1. Allowing country-specific preference intensity to vary across policies and population size to be different across countries introduces a substantial degree of complexity and non-monotonicity to the model by multiplying its degrees of freedom and eliminating its former monotonic properties. One may still though derive some interesting results with respect to the characterization of the equilibrium, even though a computational simulation would

certainly yield a lot more clear-cut insights into the model's behavior within the context of such a large parameter space. This part of the paper consists of the analytical characterization of the equilibrium stability conditions under both a 'Rigid Union' and a 'Flexible Integration' coalition-formation protocol.

Let $\left(\alpha_i^j\right)_{j\in\mathcal{P}} \in (0,1)^P$, such that $\alpha_i^j \neq \alpha_i^{j'}$ for at least a pair of policy areas $j, j' \in \mathcal{P}$, denote the vector of preference intensity parameters of the citizens of country i. One may also think of α_i^j as a country-specific measure of *issue salience* relative to overall welfare. Stability conditions remain the same as before, so the Rigid Union Stable Coalition Structure $\widetilde{C}^*$ or equivalently the refined *coalition-proof Nash* equilibrium strategy profile $\widetilde{\sigma}^*$ may be characterized as follows:

Proposition 3 *In a symmetric model with multidimensional preference heterogeneity, a Rigid Union Stable Coalition Structure $\widetilde{C}^* \in \mathcal{C}^{RU}$ consists of an equilibrium union U^* with membership I^* and scope J^*such that $i \in U^*$ (i.e., $\sigma_i^{j*} = 1, \forall j \in J^*$) if and only if the following conditions are satisfied:*

(i) $\Delta u_i\left(I^*, J^*\right) \geq 0, \forall i \in I^*$

(ii) $\Delta u_k\left(\widetilde{I} \cup S, J^*\right) < 0$ *for at least one* $k \in S, \forall S \subseteq E \backslash I^*$, *where* $\widetilde{I} = \sup\{i \in E \backslash S : \Delta u_i\left(\widetilde{I} \cup S, J^*\right) \geq 0\}$, *and*

(iii) $\nexists\left(I, J\right), I \supseteq I^*$, *such that*

  (a) $\Delta u_i\left(I, J\right) \geq \Delta u_i\left(I^*, J^*\right), \forall i \in I^*$

  (b) $\Delta u_k\left(I, J\right) \geq 0, \forall k \in I \backslash I^*$ *and*

  (c) $\Delta u_e\left(I \cup S, J\right) < 0$ *for at least one* $e \in S, \forall S \subseteq E \backslash I$.

Using the same logic as before, the above conditions make sure that $\widetilde{C}^*$ is immune to any **stable objections** by both union 'insiders' and 'outsiders'. Let us now examine the

utility-differential function of joining an existing *rigid* union $U^*(I^*, J^*)$ for a non-member $k \notin I^*$ together with a subset of 'outsiders' within subcoalition $S \subseteq E \backslash I^*$:

$$\begin{aligned}\Delta u_k(I^* \cup S, J^*) &= \sum_{j \in J^*} \alpha_k^j s_k \ln \left[\frac{\sum^{i \in I^*} \alpha_i^j s_i + \sum^{e \in S} \alpha_e^j s_e}{\alpha_k^j s_k} \left(1 + \left(\sum_{l \neq k}^{l \in I^* \cup S} \frac{s_l}{s_k} \right) \beta^{jj} \left(1 + \sum_{j' \neq j}^{j' \in J^*} \beta^{jj'} \right) \right) \right] \\ &+ \left(\max_{j \in \mathcal{P}} \{k^j\} - \max_{j' \in \mathcal{P} \backslash J^*} \{k^{j'}\} - \frac{s_k}{\sum_{l \in I^* \cup S} s_l} \max_{j'' \in J^*} \{k^{j''}\} \right) \\ &- s_k \sum_{j \in J^*} \left(\frac{\sum^{i \in I^*} \alpha_i^j s_i + \sum^{e \in S} \alpha_e^j s_e}{\sum_{i \in I^*} s_i + \sum_{e \in S} s_e} - \alpha_k^j \right) \end{aligned} \tag{6}$$

This expression shows that in the general version of the model there is no universally applicable concept of 'connectedness' for multidimensional coalitions. Any *binary* ordering relation $\succ_J$ will be uniquely defined by the set of union policies J under consideration. For a given set J, Δu_k will be higher for countries k with higher preference intensities α_k^j given size s_k and for policies with stronger overall demand and higher levels of cross-country and cross-policy coordination *spillovers*. However, one may assert that in equilibrium there does not exist an 'outsider' country $k \notin I^*$ such that $\sum_{j \in J^*} \alpha_k^j > \frac{\sum^{i \in I^* \cup \{k\}} \sum^{j \in J^*} \alpha_i^j s_i}{\sum_{i \in I^* \cup \{k\}} s_i}$, i.e., whose sum of preference intensity parameters across all policy areas within the union's scope exceeds the weighted average sum of all members combined, since that would imply that unilateral accession to U^* would constitute a profitable deviation for k.

With respect to enlargement in the model with multidimensional heterogeneity, I proceed to show as before how the mutually reinforcing, dynamic relationship between size expansion and union widening may arise as a result of a **stable objection** to the *status quo* of the enlarged game. Again consider how the equilibrium is perturbed by an exogenous expansion of the set of eligible countries from E to $E' \supset E$. Assume as before that (a) $\Delta u_k(I^*, J^*) > 0$

for at least one $k \in E' \backslash E$ (*non-triviality assumption*) and that (b) the fixed bureaucratic cost $\max_{j \in J^*}\{k^j\}$ associated with the institutional structure of union $U^*(I^*, J^*)$ is sunk. Then there exists a **stable objection** $\widetilde{C}(E') = \widetilde{C}^{*\prime}$ to the *status quo* coalition structure $\widetilde{C}^*(E')$ in the enlarged coalition-formation game consisting of a proposed *rigid* union $U^{*\prime}$ with size $I^{*\prime} \supset I^*$ and scope $J^{*\prime} \supseteq J^*$ such that

(i) $u_i(I^{*\prime}, J^{*\prime}) \geq u_i(I^*, J^*), \forall i \in I^*$

(ii) $\Delta u_k(I^{*\prime}, J^{*\prime}) \geq 0, \forall k \in I^{*\prime} \backslash I^*$ and $\Delta u_e(I^{*\prime}, J^{*\prime}) > 0$ for at least one $e \in I^{*\prime} \backslash I^*$

(iii) $\nexists (I, J), I \supseteq I^*$, such that

(a) $\Delta u_i(I, J) \geq \Delta u_i(I^{*\prime}, J^{*\prime}), \forall i \in I^*$ and $\Delta u_l(I, J) \geq \Delta u_l(I^{*\prime}, J^{*\prime})$ for at least one $l \in I^*$

(b) $\Delta u_k(I, J) \geq 0, \forall k \in I \backslash I^*$.[34]

Under the 'Flexible Integration' coalition-formation rule, connectedness with respect to the policy-specific preference intensity parameter α_i^j will again generally fail to apply, since a national minister's decision to seek supranational cooperation in his/her own policy jurisdiction will depend on who else does so and which other 'enhanced cooperation' agreements his/her government has acceded to, i.e., it will be conditional on the entire coalition structure of cooperation. Hence, it is not possible to refine the relevant space of *self-enforcing* deviations and hence to simplify the characterization of the stability conditions in a very satisfactory manner, other than by ascertaining that neither unilateral nor multilateral objections and counterobjections are stable.

[34] Note that here there is no need to require that $\Delta u_e(I \cup S, J) < 0$ for at least one $e \in S, \forall S \subseteq E' \backslash I$, since all current members have gate-keeping power, hence the ability to control who can accede to the union. After all, since the new (I, J) combination has to be Pareto efficient, then its policy scope J will effectively render potential objections by 'outsiders' redundant, given that they would not want to join Pareto efficient union $(I(J), J)$. In this set-up, the choice of scope $J^{*\prime}$ as a stable objection to the *status quo* $\widetilde{C}^*(E')$ by existing members will implicitly take into consideration what subset of non-members would be willing to embrace it.

Proposition 4 *In the generic model with multidimensional preference heterogeneity, a Stable Coalition Structure* $C^{*FI} \in \mathcal{C}^{FI}$ *under the 'Flexible Integration' rule consists of an equilibrium flexible union* U^{*FI} *with membership* I^{j*} *per policy area* $j \in \mathcal{P}$ *such that* $i \in I^{j*}$ *(i.e.,* $\sigma_i^{j*} = 1$*) if and only if the following conditions are satisfied:*

(i) $\Delta u_i^J \left(U^{*FI}\right) \geq 0, \forall J \subseteq \{j \in \mathcal{P} : i \in I^{j*}\}, \forall i \in E$

(ii) $\Delta u_k^J \left(U^{FI}\right) < 0, \forall J \subseteq \{j \in \mathcal{P} : k \notin I^{j*}\}, \forall k \in E$, *where* $U^{FI} = \{(k,j)_{j \in J} \cup (i,j')_{i \in E-\{k\}}^{j' \in \mathcal{P}} : \Delta u_i^{J'} \left(U^{FI}\right) \geq 0, \forall J' \subseteq \{j' \in \mathcal{P} : i \in I^{j'}\}\}$, $i \neq k$

(iii) $\Delta u_k^{J,S} \left(U^{FI}\right) < 0$ *for at least one* $k \in E$ *such that* $(k,j) \in S$, $\forall J \subseteq \{j \in \mathcal{P} : k \notin I^{j*}\}, \forall S \subseteq \{(e,j) : e \notin I^{j*}, j \in J\}$, *where* $U^{FI} = \{S \cup (i,j')_{i \in E:(i,j') \notin S}^{j' \in \mathcal{P}} : \Delta u_i^{J'} \left(U^{FI}\right) \geq 0, \forall J' \subseteq \{j' \in \mathcal{P} : i \in I^{j'}\}\}$.

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