Strategic Aspects of the 1995 and 2004 EU Enlargements*

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Abstract

We discuss the two latest enlargements of the EU. While the 1995 entrants are by now fully integrated, the 2004 entrants will "enjoy" a secondary status for a number of years. We attribute this difference to the fact that unlike the former EFTA members joining in 1995, the 2004 entrants formed a group with heterogenous interests, one that lacked the same strong internal economic ties. Not being able to act as a unified block they had a considerably weaker bargaining position. We support our arguments by qualitative results from a simple model, a dynamic partition function game based on Yi (1997) and Morelli and Penelle (1997).

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1 Introduction

World War II divided Europe into three zones: the Soviet area of influence, the NATO countries and the countries that were at least formally neutral. In a few years, more or less the same structure could be observed for the trading blocks. Communist countries have formed the Council for Mutual Economic Assistance (or Comecon), the Marshall Plan gradually grew into the predecessor

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of the European Union and the countries rejecting the political union formed the looser European Free Trade Association.

This structure has not remained unchanged for long. First, we saw a migration of members from the EFTA to the European Economic Community. Then, after the fall of the Iron Curtain and as Comecon was disbanded, the former Comecon members sought entry into the European Community (later: Union) and the first –large– wave of applicants has already joined the EU.

The two latest extensions of the EU have been remarkably different. The accession of Austria, Finland and Sweden is without doubt a success[1] and now it is hard to tell them apart from the former members. On the other hand, the 2004 expansion was only possible after a number of concessions mostly from the side of the applicants and it will be several years before they can enjoy the same status as former members; one feels that the original ideas of Schuman on equality suffered an injury. While Baldwin (1995) claims that this transition is advantageous to the incumbents, we cannot say the same about the entrants. There can be many reasons: the unprecedented differences between entrants and old members, the cost of the expansion, or the entrants' poor economic performance. Disregarding these arguments we look at the differences in bargaining position and strategy, discussing both possibilities and the actual actions taken, using a game theoretic approach.

With its rapidly developing literature coalitional game theory contributes a lot to the better understanding of integration. The latest developments allow us to account for externalities, such as the side effects of forming coalitions. Of the numerous possibilities the partition function form, introduced by Thrall (1962) and Thrall and Lucas (1963), a generalisation of the characteristic function form is the most suitable for our discussion. We also rely on the work of Yi (1997) in using a set of conditions to express the negative externalities of mergers.

After the introduction of the notation, terminology and a historical overview we will discuss the *accession game*, where a number of applicants try to get membership in a coalition represented by a special player (cf. the apex game Bennett and van Damme (1991)), called the Union, as Morelli and Penelle (1997) following the optimal *path*: a sequence of coalition structures that maximises

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[1] Although the expectations were not that high: Flam (1995).

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the present value of future payoffs not independent of the behaviour of other players.

2 Game Theoretic Foundations

In this section we introduce the key elements of our model.

2.1 Preliminaries

Let $N = \{1, \ldots, n\}$ denote the set of players. A subset C of the players is called a *coalition*. A *coalition structure* $\mathcal{P} = \{C_1, \ldots, C_k\}$ is a partition of the player set into disjoint coalitions. $\Pi(C)$ is the set of partitions of C. The set $\Pi(N)$ will be denoted Π.

In the game it is the entire coalition structure that determines the payoffs. A partition function, introduced by Thrall and Lucas (1963), assigns a payoff for each *coalition* in each coalition structure. The *discrete partition function* (Lucas and Macelli, 1978) is a variant that assigns a payoff to each *player* in each coalition structure. In this paper we consider the symmetric case:

Definition 1 *The* per-member partition function *is the function*

$$v \ : \ \Pi \longrightarrow \mathbb{R}^N,$$
$$v = (v_1, \ldots, v_n).$$

The pair (N, v) *is a* per-member partition game.

The per-member partition function assigns an n-vector $v(\mathcal{P})$ to each partition $\mathcal{P}$. Then if coalition structure $\mathcal{P}$ forms and player i belongs to coalition $C \in \mathcal{P}$ such that $|C| = m$, the payoff player i gets is $v_m(\mathcal{P})$. Without loss of generality it is assumed that $v_m(\mathcal{P}) \geq 0$ if there exists $C \in \mathcal{P}$ such that $|C| = m$ and $v_m(\mathcal{P}) = 0$ otherwise.

Now we can explain the game in more detail. By the above property all players belonging to coalitions of the same size are identical, but we allow identical players to make a decision in which they have different fates. The players are assigned to these different roles by fair draws, and hence they choose this strategy if –not disregarding others' strategies– the expected worth of this lottery dominates other strategies. At each move players who enforce the move are

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called *perpetrators*, while the rest are the *residuals* (in the terminology of Ray and Vohra (1997)). As, in Ray and Vohra (1997), the definition of the residual coalition is often arbitrary, we use the term less formally. We assume that the perpetrators' set is always minimal for inclusion. As a corollary if the set of coalitions of size k is not smaller in partition $\mathcal{P}$ than in $\mathcal{P}'$ then the two are separated by a move, all players in a coalition k in $\mathcal{P}'$ are in k in $\mathcal{P}$, too. The significance of this rule will be understood later.

2.2 Customs unions and externalities

The formation of a customs union or a free trade area affects the welfare of the member countries, but also that of the outsiders. These outside effects are called *externalities*.

There is an extensive literature on these welfare effects; here we only mention Bond and Syropoulos (1996), Yi (1996), Syropoulos (1999) and Bond et al. (2004). While some of this recent literature has clearly been prompted by the expansion of the European Union, its focus is more on the overall effect rather than on the effect on the expanding Union, the entrants and potential entrants in the process. Yi (1996), on the other hand, focuses on the acting players and established the following results on the nature of externalities in such games.

Condition 1 $v(n_i, \mathcal{P}) > v(n_i, \mathcal{P}')$, *where* $n_i \in \mathcal{P} \cap \mathcal{P}'$ *and* $\mathcal{P}$ *is a refinement of* $\mathcal{P}'$. *This expresses that mergers hurt those outside the merger.*

Condition 2 $v(n_j, \mathcal{P}) < v(k, \mathcal{P}')$, *where* $k = \sum_{i=1}^{j} n_i$

1. $\mathcal{P} = \mathcal{P}' \cup \{n_1, n_2, \ldots, n_j\} \setminus \{k\}$ *for some partition* $\mathcal{P}_0$ *of* $n - k$,

2. $n_i \geq n_j \quad \forall i$,

that is, a merger with coalitions that are not smaller is beneficial to the members of the coalition.

Condition 3 $v(n_j, \mathcal{P}) < v(n_i + 1, \mathcal{P}')$, *where* $\mathcal{P}' = \mathcal{P} \setminus \{n_i, n_j\} \cup \{n_i + 1, n_j - 1\}$, $n_i \geq n_j$, *that is, a member of a coalition is strictly better off by leaving the coalition and joining another that is not smaller.*

Condition 1 formalises the finding of (Richardson, 1999) that "non-member concerns about CU [Customs Union] formation are well-founded" confirming the observation that as the (predecessors of the) EU expanded the remaining European countries felt increasingly excluded. Condition 2 goes further: merging with a group that is larger in size is beneficial: As a special case we have that joining *any* of the groups is beneficial.[2]

2.3 Path dependence

The basis for our game is like the game also used by Yi (1997): The initial partition is given exogenously. Players form cooperative and therefore binding agreements and the new coalition structure is formed. However, unlike Yi (1997), we consider a infinite-horizon repeated version of this model, where the coalition structure formed in the kth game becomes the initial partition for the $k + 1$st game.

Most of the literature deals with myopic players, that is, with players that only focus on maximising the immediate result of an action. Recently Chwe (1994), Xue (1997), Xue (1998) and Ray and Vohra (1997) have worked with farsighted players. Here players only focus on the final outcome, and not the intermediate stages. This approach is unsuitable for our model as the pace at which customs unions develop is slow: we prefer to have the benefits now, and not centuries later. Our players are *fore*sighted: At each period they collect a flow payoff and a player's aim is to maximise the present value of its income over the *entire* process. This approach is more general than myopia and farsightedness and it reproduces them as extreme cases.

We are therefore not only interested in the final outcome, but also the *path* by which it is attained. The concept of examining paths is due to Morelli and Penelle (1997). We give the basic definitions, introduce a more general notation and proceed to the set-up of our own model.

Definition 2 (Move) *A* move *is a single "action" per player, that is: an agreement is settled, the necessary draws are made, the proposed coalitions are formed*

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[2]Bond et al. (2004, Proposition 5.) show that the formation of a free trade that is too small with respect to the rest of the world can be welfare-reducing for its members. Their analysis, however, focuses on the formation of a single group.

and payoffs are paid out.[3] *Let also* $\Pi^f(\mathcal{P})$ *be the set of feasible partitions after a move starting from* $\mathcal{P}$. *(We will allow* $\Pi^f(\mathcal{P}) \neq \Pi$ *for some* $\mathcal{P} \in \Pi$.)

Definition 3 *A* path π *is a sequence* $\{\mathcal{P}_i\}_{i>0}$ *of partitions such that* $\mathcal{P}_{i+1} \in \Pi^f(\mathcal{P}_i)$. *Let* $\mathcal{P}_t(\pi)$ *denote the partition after playing the game t times along* π.

Definition 4 *The present value for the player* $(m, \mathcal{P})$ *along path* π *from* $\mathcal{P}$ *is the discounted average of the payoffs along path* π *that players of type* $(m, \mathcal{P})$ *obtain, and is denoted by* $w^m(\pi)$. *Let* Φ^m *be the set of paths that can be enforced by the same player, assuming rational behaviour from the others. The* expected present value *or shortly* value *is defined by*

$$w^m(\mathcal{P}) = \max_{\pi \in \Phi} w^m(\pi), \tag{1}$$

and the optimal path

$$\pi^m \in \arg\max_{\pi \in \Phi} w^m(\pi), \tag{2}$$

A path is a *solution* if the outcome cannot be improved and the corresponding game is coalition-proof, stationary and subgame perfect (Bernheim et al., 1987; Morelli and Penelle, 1997). Formally: Let π_t denote the subpath after time t, that is, $\pi_t = \{\mathcal{P}_t, \mathcal{P}_{t+1}, \dots\}$. Then the path π^* is a solution to the game if for all time $t \geq 0$, coalition $C \subseteq N$ and path $\pi_t \in \bigcup_{m \in C} \Phi^m$ there exists $m \in C$ such that

$$w^m(\pi_t) \leq w^m(\pi_t^*)$$

and $\mathcal{P}_t = \mathcal{P}_T$ implies $\pi_t^* = \pi_T^*$. Such a path is finite or has a ubpath infinitely repeated we write it as:

$$\pi = \left\{\mathcal{P}_1, \mathcal{P}_2, \dots, \overline{\mathcal{P}_{\lambda-\kappa+1}, \dots, \mathcal{P}_\lambda}\right\} \tag{3}$$

where $\lambda \in \mathbb{N}$ is the *length* of the path is. The length is then maximal, such that for all $i \leq \lambda$ and $j \leq \lambda, \mathcal{P}_i = \mathcal{P}_j$ implies $i = j$. The last κ partitions form the equilibrium outcome that is repeated forever, forming a *loop* that is non-trivial unless $\kappa = 1$.

We assume that there exists a common *discount factor* $0 \leq \delta < 1$.

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[3]Other approaches would allow interaction between two players at a time or allow only self-enforcing strategies (too slow/too fast communication).

Such solutions do not always exist, and so we will discuss special cases in the next sections. In general, however, finding the solution is mathematically not too difficult. By stationarity, the solution can be written in the special form in Equation 3, and as the same partition can only appear once, the number of such paths is finite. Kóczy (2002) and Konishi and Ray (2003) provide additional results on the properties of such paths.

3 The history of European integration

The history of the European Union is a history of expansions and one that is unlikely to stop in the near future. In the following we briefly review the milestones of European integration.

3.1 A war heritage

World War II redrew the political map of Europe. The treaty of the Yalta Conference created an unprecedented division of Europe where East and West entered different paths of development. The Cold War started. With Europe battered in the war, neither France nor the United Kingdom could match the emerging Soviet superpower in Europe and a long-term strategic alliance with the United States and with each other was necessary. An accelerated reconstruction programme was started under the Marshall Plan in 1947. It has helped the reintegration of the European economies, and to correct the distortions caused by the war and the long military preparation before that. An important aspect was that it required cooperation among the European countries. Notably it included (West) Germany, on the other hand, countries under the Soviet influence could not benefit from the plan, but formed the Council for Mutual Economic Assistance (Comecon) instead.

3.2 Integration on the West

3.2.1 The European Union

The cooperation under the Marshall Plan has become the cradle of the Schuman Plan, announced by French Foreign Minister Robert Schuman, originally refer-

ring to a cooperation between France and Germany, but leading to the formation of the European Coal and Steel Community (ECSC) in 1952 with Belgium, France, Italy, Luxembourg, the Netherlands and West Germany participating. The aim of the agreement was to pool the steel and coal resources of the participating countries. While the word "peace" often reoccurs in the proposal and related speeches, it is clear that the goal was to create a European economy that could defend itself against a Soviet aggression. While the Cold War has not always been that "cold", the military conflicts in Korea and Vietnam have left Europe largely unaffected allowing the members of the ECSC to consider long-term plans and a steady and balanced development. On 1 January 1958, Belgium, France, Western Germany, Italy, Luxembourg and the Netherlands formed the *European Economic Community* (EEC) with the ultimate aim of a total economic and political union. In 1967 the three communities: ECSC, EEC and Euratom fuse to form the European Communities (EC). With the Maastricht Treaty (in 1992) the EC becomes the European Union (EU) in 1993. It shall not lead to confusion if we refer to the predecessors of the EU by the same terms.

3.2.2 The European Free Trade Association

While the EEC had no military aspects the fact that all of the founding members were members of the NATO deterred countries insisting on military neutrality, from joining. On the other hand, by Condition 1 the formation of the EEC produced negative externalities: these countries felt excluded from the EEC markets. To compensate for this, the United Kingdom, Denmark, Norway, Sweden, Austria, Switzerland and Portugal, formed a looser alliance, the European Free Trade Association (EFTA), in 1960 (Iceland joined later, in 1970, Finland in 1986 and Liechtenstein in 1991). Already then the EU was considerably larger than the EFTA: Its members had a very good access to EFTA markets, but poor access to the much larger markets of the "inner six." So by Condition 3 it is not surprising that as soon as the economic impact of the EEC started to be felt the United Kingdom and Denmark decided to leave the EFTA and join the EEC.

3.2.3 Western Europe realigned

Condition 3 could have explained if the entire EFTA would have been swallowed by the EU, so why did this not happen? The EU is more than a simple customs union and not all countries are willing to give up even part of their independence in favour of joint political goals. Remarkably, the EFTAns that stepped over in 1973 are both NATO members, therefore the remaining EFTAns could have *political* reasons. Norway is a special case: it is a NATO member, it has expressed interest in joining the EU already twice, but entry was voted down by national referenda on both occasions.

Ireland was the first country joining the EU without being a NATO member. Here the economic points, namely that its main trading partner, the UK, joins, have outweighed possible political concerns. Ireland may have been the first, but not the last. Previously unaffiliated countries wanted to join these trading blocks (Condition 2) and they have chosen the EU almost unanimously: In the subsequent years the EU has gained Greece in 1981, Spain in 1986, while the EFTA could only get Finland, already allied with EFTA from 1961 and Liechtenstein, who has already been a member via its ties with Switzerland, the EU has gradually won over many more of the former EFTA members: Portugal in 1986 and Austria, Finland and Sweden in 1995 (as a consequence of Condition 3). It was, in fact, likely that by 1995 all EFTA members would join. We have already discussed Norway's case above, the remaining EFTA countries are not likely to join the EU due to their special interests: Iceland had some disagreements with the EU on fishing regulations. Since this would affect an important part of the economy, it is understandable that Iceland prefers to keep the status quo in the sense of staying out. Iceland's physical distance is surely a factor here. Switzerland has a good reputation of independence. While Switzerland's EU membership is an issue raised again and again, the benefits may or may not outweigh the loss due to the loss of the aforementioned reputation - a factor, our symmetric model cannot account for. Liechtenstein would object to EU tax rules. Although not members, these countries are tied to the EU via a series of agreements.

3.3 Integration on the East

3.3.1 Comecon

While the annexation of the Central and Eastern European countries (CEEC's) under the Soviet influence would not have received a world-wide approval, for the purposes of the Communist dictatorship this was just a slight technical detail. A highly centralised economic and military block was formed. Here we are interested in the first: Comecon has established in 1949. The central planning covered all aspects of the economy often allocating entire industries to certain countries. Currencies were non-convertible outside the community, and exchanged at fixed rates within. Lack of market mechanisms or expertise, the admission of developing countries, corruption, the resistance of the population all contributed to the gradual decline and the eventual disbandment in 1991.

While the former member were now free to choose their own ways, they inherited distorted economies from the old regime on the one hand, and lost the trading partners they had for the last 40 years. While foreign investment could help the first problem quickly establishing trade relations with Western European countries and each other (Condition 2) was necessary to overcome the second.

3.3.2 The Visegrád Countries (V3 then V4)

Hungary, Poland and Czechoslovakia have been the three exemplary transition economies. These countries have, since the start, been at the forefront of political and economic development among the former Communist countries. Their common past, similar level of development and common aims made them natural allies. Referring to their historical Visegrád summit in 1335 [4] these countries formed the *Visegrád Group* in 1991. Since the split of Czechoslovakia into Czech Republic and Slovakia the group has four members and aims at a similar cooperation as the Benelux: while each member is too small to make an impact individually, with 60 million inhabitants in total it can hardly be ig-

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[4]The economic, trade and political agreements forged between King Charles I of Hungary, King John of Bohemia, King Casimir III (the Great) of Poland, Margrave Charles of Moravia and other rulers of lesser importance at the (then) Hungarian capital Visegrád in 1335 included, for instance, the creation of a trade route that bypasses Vienna.

nored.[5] This group focuses on deep rather than wide cooperation and therefore has not admitted additional members.

3.3.3 The Central European Free Trade Agreement

The same countries have signed the Central European Free Trade Agreement (CEFTA) at the end of 1992 (in force since March 1993). While the Visegrád Group was focusing more on (external) politics, the CEFTA saw itself as a vestibule to the EU: member states prepared for the economic environment within the EU by eliminating tariffs among them. Unlike the Visegrád Group, the CEFTA admitted new members, Slovenia joined in 1996, Romania in 1997, Bulgaria in 1999, and Croatia in 2002. Initially some of the Baltic states have also expressed interest in joining, but by the time they would have joined they have also been offered membership in the EU, making participation in the CEFTA obsolete. Since the founding countries have joined the EU its significance has declined significantly.

3.3.4 Cooperation with Western Europe

By the time the Comecon has collapsed the EFTA was a dwarf compared to the EU. It is no surprise therefore that the latter was more attractive.[6] Yet, due to its more open nature, EFTA was more welcoming, which led to a number of bilateral agreements. The process of the Eastern extension of the EU has also started, but after an initial burst of enthousiasm, when it was believed that the first wave could join in a matter of a few years, it has slowed down dramatically and it was only in 2004 that the first former Communist countries could become members of the EU.

This extension has been rather different from the previous ones. It is often referred to as one that stands out by its size. Well, looking at the number of new flags in Brussels this may be true, but actually the extension of 1973 was larger

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[5]A notable difference is that the Benelux Group consists of two large countries of comparable size plus a smaller one, while in the Visegrád group Poland is almost twice as large as the rest put together. Its different interests as a large country in the EU and less clear benefits from cooperation might question its long term interests in the Visegrád group.

[6]Suppose that they join the EFTA, then by Condition 3 they would prefer to go over to the European Union.

in terms of population not to mention the relative increase. The real difference is, however, between the wealth of the old and new members. While in previous extensions substantial efforts have been made to reduce these differences now –in EU terms– poor entrants could become net contributors. The outcome is clearly a compromise. By 2004 the EU has become very large and by far the dominant trading partner for most applicants. While these countries did not have the possibility to join before at least 1989, if we try to project a different history where they would have had they would have experienced the effect of Condition 1 manifold: Staying outside the EU is very undesirable. The entrants of 2004 were much more ready to make concessions in exchange of the entry than applicants ever before.

4 The Accession Game

4.1 Introduction

In this section we define the accession game: a game of the extension of a special coalition S_t, with $|S_t| = s_t$ at time t that we refer to as the union. We make the following simplifying assumption:

Assumption 1 (Monotonicity) *We will restrict our attention to paths where the union does not secede, that is, if $S \in \mathcal{P}_t(\pi)$ then there exists $S' \in \mathcal{P}_{t+1}(\pi)$, such that $S \subseteq S'$, that is the size of the Union is monotone increasing.*

As a result for all nontrivial games there exists $\mathcal{P} \in \Pi$ such that $\Pi^f(\mathcal{P}) \neq \Pi$.

Note that, although the above assumption is strong from a theoretical point of view the history of the European Union justifies it: apart from some overseas territories no members have left the EU and this monotonicity is unlikely to change in the near future.

We can have two definitions of the applicants' sets, A: the set $A_0 = N \setminus S_0$ for all t is the natural definition in the sense that it does not change in the course of the game. The alternative we use, $A = N \setminus S_t$, on the other hand does not preserve history; as soon as some of the applicants join S, a new game is considered with fewer applicants, so that the game can be solved inductively.

We define value for A and S, as the mean of the members' values. As

$$w^{S_0}\left(\mathcal{P}\right) = \frac{1}{s_0}\sum_{i \in S_0} w^i\left(\mathcal{P}\right) = \frac{1}{s_t}\sum_{i \in S_t} w^i\left(\mathcal{P}\right) = w^{S_t}\left(\mathcal{P}\right),$$

and $S_0 \subseteq S_t$ the interests of the original and current members of the union coincide.

The focus of the solution is on the conflict between the sets A and S. Although the game is not aimed to model the formation of the cooperative agreement, each step of the game can be pictured as a bargaining procedure: If no offers are made by the union or the offers are not accepted the applicants play the *disagreement strategy*, repartition themselves to obtain the highest value without acceptance. The union makes its most preferred offer. This is accepted if a subset of applicants is willing to take it, and is able to enforce it. If it is not, then the union makes further offers as long as these give improvement over the disagreement strategy.

The first of the two approaches we consider is the pure non-transferable utility game. In the other approach we allow transfers among applicants so the applicants' aggregated preferences are expressed by their total value in the proposed partition. The latter approach is preferred by the applicants as it maximises their value along the optimal path. The difference in the approaches is small if the payoffs for the members of the Union S are considerably larger than for A: the benefit of one applicant being accepted outweighs the others' losses.

Before we go to the general results, consider the following example.

4.2 An example

Table 1 shows the payoffs of game G. (The payoff $v\left(s+1, \{s+1,1,1\}\right)$ must be read from the column with $\geq s$ at the top, and along line $\{s+1,1,1\}$.)

As the union cannot secede, expanding Π by looking further "back" into the past of union does not increase the set of feasible outcomes Π^f. Thus we can have an inductive argument: first solve for the case when we have 0 applicants (partition $\mathcal{P}_6$), and then given the solution for i-applicants, we can solve for $i+1$ applicants. The number of applicants is finite, so in a finite steps we arrive to the case we aim to solve.

v_G	1	2,3	$\geq s$
$\mathcal{P}_6=\quad\{s+3\}$			4
$\mathcal{P}_5=\{s+2,1\}$	0		5
$\mathcal{P}_4=\{s+1,2\}$		2	6
$\mathcal{P}_3=\{s+1,1,1\}$	1		7
$\mathcal{P}_2=\quad\{s,3\}$		3	3
$\mathcal{P}_1=\{s,2,1\}$	1	4	4
$\mathcal{P}_0=\{s,1,1,1\}$	2		5

Table 1: Payoffs of game G

For 0 applicants the solution is trivial.

For 1 applicant we argue as follows: By monotonicity, set of possible strategies is $\{\mathcal{P}_5,\mathcal{P}_6\}$. If no acceptance offer is made by the union or the offers are not accepted (we call this the *disagreement strategy*), the applicants' maximal payoff is 0 by moving to $\mathcal{P}_5$. In this case the union S gets $\frac{5}{1-\delta}$, while at partition $\mathcal{P}_6$ it would get $\frac{4}{1-\delta}$ as calculated in the previous step. Hence it makes no offers for the applicant.

When no offer is made in the 2-applicant case A plays $\mathcal{P}_4$ giving $\frac{6}{1-\delta}$ to the union S. The union makes only offers with a higher payoff: $\mathcal{P}_3$. The applicants have homogeneous interests and hence a self-evident preference-ordering according to the expected payoffs along the various possible paths: $\mathcal{P}_6,\mathcal{P}_5,\mathcal{P}_4,\mathcal{P}_3$. As the state $\mathcal{P}_4$ can be achieved anyway, the applicants will only accept offers that are better than that; in this case we have no such moves, so $\mathcal{P}_4$ is played.

When we have 3-applicants, we deal with $\mathcal{P}_0$ and $\mathcal{P}_2$ first. Although for the applicants $\mathcal{P}_2$ is no better than playing $\mathcal{P}_1$, it gives the union S a lower payoff and is still credible. The disagreement payoffs are therefore $w^A = 3\frac{1}{1-\delta}$ and $w^S = 3\frac{1}{1-\delta}$ which is the lowest of all strategies for S. The applicants prefer $\mathcal{P}_6$ most and hence this is played.

In partition $\mathcal{P}_1$ the applicants have inhomogeneous preferences. Since the pair does not want to merge with the singleton, the non-cooperative outcome is $\mathcal{P}_1$, giving $w^1 = \frac{1}{1-\delta}, w^2 = \frac{4}{1-\delta}, w^s = \frac{4}{1-\delta}$. The table above summarises the steps as the different preference orderings are evaluated with the relation

$\mathcal{P}_1$	Stage I	Stage II	Stage III	Stage IV
1	$\mathcal{P}_4 > \mathcal{P}_6 > \mathcal{P}_3 > \mathcal{P}_1 > \mathcal{P}_5$	$\mathcal{P}_4 > \mathcal{P}_3 > \mathcal{P}_1 > \mathcal{P}_5$	$\mathcal{P}_4 > \mathcal{P}_3 > \mathcal{P}_5$	$\mathcal{P}_4 > \mathcal{P}_3$
2	$\mathcal{P}_5 > \mathcal{P}_6 = \mathcal{P}_3 = \mathcal{P}_1 > \mathcal{P}_4$	$\mathcal{P}_5 > \mathcal{P}_3 > \mathcal{P}_1 = \mathcal{P}_4$	$\mathcal{P}_5 > \mathcal{P}_3 > \mathcal{P}_4$	$\mathcal{P}_3 > \mathcal{P}_4$
s	$\mathcal{P}_3 > \mathcal{P}_4 > \mathcal{P}_5 > \mathcal{P}_1 = \mathcal{P}_6$	$\mathcal{P}_3 > \mathcal{P}_4 > \mathcal{P}_5 > \mathcal{P}_1$	$\mathcal{P}_3 > \mathcal{P}_4 > \mathcal{P}_5$	$\mathcal{P}_3 > \mathcal{P}_4$

Table 2: The evaluation of preference orderings for $\mathcal{P}_1$ in game G without utility transfers.

signs expressing preferences. In stage I we can remove the strategies that are dominated by the disagreement strategy for the union ($\mathcal{P}_6$). From here the strategies are eliminated from backwards. The last chance to improve payoffs before disagreement is $\mathcal{P}_5$. In stage II the pair is willing to accept this and can enforce it after acceptance, so the "offer" $\mathcal{P}_1$ is never made. Foreseeing these actions, the singleton will accept the previous offer in stage III, $\mathcal{P}_4$, as it improves its payoff, and it can enforce it. This is the worst possible outcome for the doubleton, it is willing to accept the previous offer $\mathcal{P}_3$, and can enforce it, and hence this is the outcome for the game. The union exploited the tension among applicants very well: its first offer is accepted, for the applicants $\mathcal{P}_6$ Pareto-dominates this outcome. Table 3 summarises the calculations.

If we do allow transfers among applicants the singleton can compensate the 2-coalition when moving to $\mathcal{P}_2$, and thus the strategy offering the lowest value to the union S becomes a credible threat, and $\mathcal{P}_6$ is played. Remarkably, transfers never take place, as the threat is never executed; as soon as the union believes that transfers *could* take place, a better outcome is achieved.

4.3 An interpretation

While the payoffs in the above example have been chosen arbitrarily, it perfectly illustrates the issues that can arise in an extension like the ones in 1995 or in 2004. If we disregard the -certainly not unimportant- special feature of the EU that it has a large central budget and new contributors are more welcome than beneficiaries a single (poorer) country has a limited chance for being accepted[7]. On the other hand the integration of the applicants outside the union does not

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[7]Single country extensions in the past have been more on political than economic grounds.

Game G	$\mathcal{P}$	m	π^*	w
0-applicants	$\mathcal{P}_6$	$s+3$	$\{\overline{\mathcal{P}_6}\}$	$4\frac{1}{1-\delta}$
1-applicant	$\mathcal{P}_5$	1	$\{\overline{\mathcal{P}_5}\}$	0
		$s+2$		$5\frac{1}{1-\delta}$
2-applicants	$\mathcal{P}_4$	2	$\{\overline{\mathcal{P}_4}\}$	$2\frac{1}{1-\delta}$
		$s+1$		$6\frac{1}{1-\delta}$
	$\mathcal{P}_3$	1	$\{\mathcal{P}_3,\overline{\mathcal{P}_4}\}$	$1+2\frac{\delta}{1-\delta}$
		$s+1$		$7+6\frac{\delta}{1-\delta}$
3-applicants	$\mathcal{P}_2$	3	$\{\mathcal{P}_2,\overline{\mathcal{P}_6}\}$	$3+4\frac{\delta}{1-\delta}$
		s		$3+4\frac{\delta}{1-\delta}$
	$\mathcal{P}_1$	1	$\{\mathcal{P}_1,\mathcal{P}_3,\overline{\mathcal{P}_4}\}$	$1+\delta+2\frac{\delta^2}{1-\delta}$
		2		$4\frac{1}{1-\delta}$
		s		$4+7\delta+6\frac{\delta^2}{1-\delta}$
	$\mathcal{P}_0$	1	$\{\mathcal{P}_0,\overline{\mathcal{P}_6}\}$	$2+4\frac{\delta}{1-\delta}$
		s		$5+4\frac{\delta}{1-\delta}$

Table 3: Values and optimal paths for game G.

only bring potential benefits to them, but also results in negative externalities to the the union. These externalities are unlikely to compete with those produced by the union, but, as in this example, may be sufficient to outweigh the cost of admitting new members.

This example also demonstrates the significance of cooperation, or even: solidarity among applicants. In the case of the expansion in 1995 the applicants were long trading partners and formed a well-organised groups. In case of a rejection they could have continued working in the framework of the EFTA. While at the time of the negotiations such considerations were not probably central, we see now a number of, often large countries being either refused membership in the EU (like Ukraine recently), or experiencing a very slow progress in the negotiations (like Turkey, Croatia or Bulgaria) and for these countries, as well as some of the 2004 entrants, the pre-1995 EFTA could have been an alternative. The more countries chose this alternative, the more attractive would it be. While this is no more than speculation, it is a fact that EFTA has existed for decades before the 1995 EU-extension. On the other hand an often bitter

competition emerged among the Visegrád countries. Countries ranked top in various EU, IMF, etc. reports have tried to exploit their advantage, hoping early membership. As we know this strategy has failed, and it has, over the years, destroyed the solidarity among these applicants. On the other hand even the admission rules make it clear that their free trade area, CEFTA has no long term ambitions providing a very weak outside option. The fates of the EFTA and the CEFTA after these departures confirm our points: the EFTA, though smaller, is still a functioning free trade agreement that maintains special relations with the EU, but looks also beyond Europe to look for new preferential trading partners. The CEFTA became largely dysfunctional: as an indication, its (unofficial) website has not been updated since 1999. It has not been very successful in recruiting new members, and with its members conducting most of their trade with the EU, and little with each other it is hardly useful as a free trade area, its members share common political rather than economic goals.

Our example is also a game that satisfies the conditions of Yi (1996), but where the grand coalition does not necessarily form. This can be explained by the fact that we do not have an open membership game, that is, entry requires EU-permission. It is also true that in our model we overlook countries that are neither members nor applicants.

4.4 The general form

In the general accession game we allow transfers among the applicants. Such a game even with an arbitrary number of applicants simplifies to a two-player game between the union S and the applicants A. At each partition $\mathcal{P}$, given the corresponding $\Pi^f(\mathcal{P})$ the next move is determined as follows.

Given $\mathcal{P}$, both S and A can assign a value to any outcome in $\Pi^f(\mathcal{P})$. Given these, the union proposes its favoured partition. The applicants can either accept this, or reject it, in which case the Union makes further proposals as long as these are better than the disagreement strategy:

$$\mathcal{P}_D \in \arg \max_{\substack{\mathcal{P}' \in \Pi^f \\ |S| \in \mathcal{P}'}} \left\{ w^A(\mathcal{P}') \right\}$$

By perfect knowledge, applicants may choose their most preferred offer. This is

an equilibrium by construction and formally we have the solution:

$$\mathcal{P}^* = \arg \max_{\mathcal{P} \in \Pi^f(\mathcal{P}_0)} \left\{ w^A(\mathcal{P}) \left| w^S(\mathcal{P}) > w^S(\mathcal{P}_D) \right. \right\} \tag{4}$$

Alternatively, if offers are made by the applicants, then

$$\mathcal{P}^* = \arg \max_{\mathcal{P} \in \Pi^f(\mathcal{P}_0)} \left\{ w^S(\mathcal{P}) \left| w^S(\mathcal{P}) \geq w^A(\mathcal{P}_D) \right. \right\}$$

If the decision is made in a symmetrical way, the solution is more complex, we have something similar to the classical problem of the Battle-of-Sexes except that we do not allow randomised strategies. In many real life situations one of the strategies becomes a *focal point*, but in a theoretical problem gives little help.

4.5 Solving the general accession game

Our solution will be inductive. Let $\Pi^a = \{\mathcal{P} \in \Pi | n - s = a\}$ the set of partitions with exactly a applicants. For $a = 0$, $\Pi = \{\{n\}\}$ and the solution is trivial. When solving for $a + 1$ we assume that for all $\mathcal{P} \in \Pi^k$ with $0 \leq k < a$ the solution is known. Now let

$\Pi_D^a = \arg \max_{\mathcal{P} \in \Pi^a} v^A(\mathcal{P})$ the disagreement set,

$\Pi_+ = \left\{ \mathcal{P} \in \bigcup_{a=0}^{n-s_0} \Pi^a \left| w^S(\mathcal{P}) > \min_{\mathcal{P}_D \in \Pi_D^a} w^S(\mathcal{P}_D) \right. \right\}$ the set of offers,

$\mathcal{P}^a \in \arg \max_{\mathcal{P} \in \Pi_+} w^A(\mathcal{P})$ the accepted offer in the case of a applicants.

Let $b \in \mathbb{N}$ such that $\mathcal{P}^a \in \Pi^b$. Then starting from the initial partition $\mathcal{P} \in \Pi^a$ we have the following results:

$$\pi^*(\mathcal{P}) = \begin{cases} \{\mathcal{P}, \mathcal{P}^a\} & \text{if } b = a \\ \{\mathcal{P}\} \cup \pi^*(\mathcal{P}^a) & \text{otherwise,} \end{cases} \tag{5a}$$

$$w^A(\mathcal{P}) = \begin{cases} v^A(\mathcal{P}) + \delta \frac{v^A(\mathcal{P}^a)}{1 - \delta} & \text{if } b = a \\ v^A(\mathcal{P}) + \delta w^A(\mathcal{P}^a) & \text{otherwise,} \end{cases} \tag{5b}$$

$$w^S(\mathcal{P}) = \begin{cases} v^S(\mathcal{P}) + \delta \frac{v^S(\mathcal{P}^a)}{1 - \delta} & \text{if } b = a \\ v^S(\mathcal{P}) + \delta w^S(\mathcal{P}^a) & \text{otherwise,} \end{cases} \tag{5c}$$

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5 Conclusions

Baldwin (1994, pp130-139) describes the "hub-and-spoke bilateralism" model, where the European Union has arrangements with each applicant separately. In our model this corresponds to the union and a set of singletons. This setup is favourable for the Union, but not for the applicants. Candidates may improve their average position by forming a coalition, such as the aforementioned EFTA, Visegrád or the Baltic countries have. Since the EU – not necessarily malevolently– favoured some countries over others, and these made every effort to exploit their advantage these alliances were not always and equally successful. Such divisions reduce the average chance for acceptance. Allowing transfers between the applicants could help to overcome this difficulty and give a more efficient outcome.

There are some questions that we leave open. In larger games or if we do not make our monotonicity assumption loops can arise. While a solution is still feasible it is more difficult to characterise it. The present model is still very simple and extensions can prove to be more descriptive. Morelli and Penelle (1997) discuss how different utility transfers affect the accession path; our example shows that even the uncertainty about the transfers can influence the outcome. Also, our model does not directly build on models of international trade. While our aim was to preserve simplicity, a more detailed model can deliver additional insights.

While the present model is a very limited one, it can already illustrate a number of aspects in the enlargement process. What do these say about possible future extensions? Future applicants will be increasingly eager to join the EU, and they will have to act strategically to achieve this: Intensive cooperation will be necessary. While the 2004 extension has paved the way for future enlargements, it will still keep eurocrats busy for a while so major extensions are not very likely in the near future. Those countries with membership aspirations should prepare for a long fight, ideally joining their forces. The EU should on the other hand consider drawing an outermost border: Yi (1997) and others have shown that unless we play an open membership game, the grand coalition, that is an EU covering the entire world is not optimal. If so, then there is a limit somewhere. If the EU is also planning to deepen integration the cultural and

political homogeneity will also play a role. Limiting cooperation with others to trade in the fashion of the European Economic Area, membership will be restricted to countries who share the same culture, religion, respect for human rights and even history.

References

Baldwin, R. E., 1994, Towards an Integrated Europe. CEPR, London.

Baldwin, R. E., 1995, The Eastern enlargement of the European Union. European Economic Review 39, 474–481.

Bennett, E., van Damme, E., 1991, Demand commitment bargaining: The case of apex games. In: Game Equilibrium Models III: Strategic Bargaining, Selten, R., ed., Springer Verlag, Berlin – Heidelberg, 118–140.

Bernheim, D. B., Peleg, B., Whinston, M. D., 1987, Coalition-proof Nash equilibria: I. Concepts. Journal of Economic Theory 42, 1–12.

Bond, E. W., Riezman, R., Syropoulos, C., 2004, A strategic and welfare theoretic analysis of free trade areas. Journal of International Economics 64, 1–27.

Bond, E. W., Syropoulos, C., 1996, The size of trading blocs. Market power and world welfare effects. Journal of International Economics 40, 411–437.

Chwe, M. S.-Y., 1994, Farsighted coalitional stability. Journal of Economic Theory 63, 299–325.

Flam, H., 1995, From EEA to EU: Economic consequences for the EFTA countries. European Economic Review 39, 457–466.

Kóczy, L. Á., 1999, Cooperative Models for Extending the European Union. Master's thesis, Center for Economic Studies, Katholieke Universiteit Leuven, Leuven.

Kóczy, L. Á., 2002, Finding the best way to join in: A dynamic accession game. In: Game Theory and Decision Theory in Agent-Based Systems, Parsons, S., Gmytrasiewicz, P., Wooldridge, M., eds., Kluwer Academic Publishers,

Multiagent Systems, Artificial Societies, and Simulated Organizations, 159–176.

Konishi, H., Ray, D., 2003, Coalition formation as a dynamic process. Journal of Economic Theory 110, 1–41.

Lucas, W. F., Macelli, J. C., 1978, Discrete partition function games. In: Game Theory and Political Science, Ordeshook, P. C., ed., New York University Press, New York, 191–213.

Morelli, M., Penelle, P., 1997, Economic integration as a partition function game. Discussion Paper 9785, CORE, Louvain-la-Neuve.

Ray, D., Vohra, R., 1997, Equilibrium binding agreements. Journal of Economic Theory 73, 30–78.

Richardson, M., 1999, Trade and competition policies: *concordia discors*? Oxford Economic Papers 51, 649–664.

Syropoulos, C., 1999, Customs unions and comparative advantage. Oxford Economic Papers 51, 239–266.

Thrall, R. M., 1962, Generalised characteristic functions for n-person games. In: Proceedings of the Princeton University Conference of October 1961, 157–160. Privately printed for members of the conference.

Thrall, R. M., Lucas, W. F., 1963, n-person games in partition function form. Naval Research Logistics Quarterly 10, 281–298.

Xue, L., 1997, Nonemptiness of the largest consistent set. Journal of Economic Theory 73, 453–459.

Xue, L., 1998, Coalitional stability under prefect foresight. Economic Theory 11, 603–627.

Yi, S.-S., 1996, Endogenous formation of customs unions under imperfect competition: open regionalism is good. Journal of International Economics 41, 153–177.

Yi, S.-S., 1997, Stable coalition structures with externalties. Games and Economic Behavior 20, 201–237.