Economics of enhanced cooperation in European defense issues

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Abstract

This paper purposes an economics analysis of enhanced cooperation in providing European defense public goods. Since 1999, ESDP (European Security and Defense Policy) is implemented with the voluntary agreement of EU members. This kind of (international) public good provision involves theoretically a free-riding problem. To reduce the negative effects related to collective action, we develop a game-theoretic framework within which three groups of countries adopt either cooperative or non-cooperative strategies. We find eight Nash equilibrium that we compare in terms of utility associated to each game to reveal that cooperative strategies are best responses to any strategy of the two other groups.

Keywords: Public goods provision, enhanced cooperation, European defense policy.

[JEL Codes]: C72, H41, H56, D7.

1 Introduction

The theory of international public goods recently reviewed by Sandler (2004), Barrett (2003) and Kaul & al. (2003) considers that collective action is partly associated with the provision of non-excludable and non-rival public goods. In defense matters, the properties of pure public goods are not necessarily respected. In this perspective, the implementation of European Security and Defense Policy (ESDP) in 1999 rests on a voluntary agreement of provision. But significant differences remain in the level of defense expenditures at the European scale and favor small states. Without a unique European political decision-maker, the level of defense spending can not be provided to satisfy to

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collective preferences of voters. Then various allocative mechanisms should be explored to design the best means of provision. Among these mechanisms, the enhanced cooperation one forms an interesting arrangement because it takes into account a heterogeneous distribution of defense preferences. The paper is divided into three sections. The first one exhibits the position of European countries with respect to their defense expenditure levels and economic structures. The second one deals with the theoretical framework developed by Ihori (2000) in a peculiar case (arms race). We modify it by assuming that European countries are involved in a Nash-Cournot process. The third one displays results with a comparative static methodology.

Since the end of cold war, European countries have decided to gather their defense resources both in order to lower the risk of inner conflicts and to protect their borders against any external threat. In this perspective, European Union has implemented an ESDP while each country is responsible for its own national defense spending. From an economic point of view, this situation is paradoxical since a national allocative process is faced with a European output (collective security). After an empirical analysis of defense budgets from 1981 to 2002, we denote two major trends. First, France, Germany, Italy and UK account in average for 75 per cent of overall security effort. Second, after collapsing of Soviet empire, the big Four have more heavily decreased their defense expenditures than other European countries. The average share of military spending in GDP in EU 15 has grown from 1.46% in 1981 to 2.00% in 1991 and 1.68% in 2002. These figures can be explained by a more sustained effort of "small" countries since 1991, which enables to strengthen ESPD. Thanks to this budgetary convergence, the spillins level is considerably reduced and free-riding issues are partly avoided. Nevertheless, in absence of institutional incentives, one can not prevent countries - individually or collectively - from following a free-rider behavior.

In an uncoordinated Europe, countries choose their defense budgets with respect to their own needs and levels fixed by others, which is best described theoretically by a Nash-Cournot process. As suggested by Ihori (2000), cooperative and non-cooperative defense spending of allied countries reflect possibilities of allocation between conflicting groups of countries. As EU is not a conflicting area, we have to assume that allied countries are not imbedded in an arms race but are competing over spillins levels. That means the slope of reaction function is always negative.

By analogy with EMU building, we have extended the enhanced cooperation framework to European defense. Enhanced cooperation means here that countries can be gathered following their defense preferences and then provide European security at a more efficient level.

2 Questions

Several questions should be answered to:

1. Does voluntary membership of a country to a group depend on its utility

gain or on a refusal to suffer from an imposed decision?

2. Does enhanced cooperation favour European military integration or competition between coalitions of countries?

3. How is preferred enhanced cooperation compared with the current process of provision? How stable are these coalitions?

To simplify the demonstration, we have first assumed that three coalitions (blocks) of countries are formed: the coalition of Big Four (France, Germany, Italy, United-Kingdom), the coalition of 11 remaining European states and the coalition of new comers (10 countries after the enlargement in 2004). Each coalition is then formed by countries whose strategies are either cooperative or non-cooperative. To determine the Nash equilibria, we develop a Cobb-Douglass function of defense production for each country. This utility function depends on a private good (x) and a defense good (G). This latter takes into account the quantity of defense providing by a country i and the quantity of spillins ensured by –i other countries. In fact, the technology of provision is weight-sum technology whose the intensity varies following the nature of the coalition. We have :

$U^i = U^i(x_i, G_i) = x_i(A_i + G_i)$ with $A_i + G_i > 0$

$G_i = g_i + \sum_{j \neq i} \omega_{i,j} g_j$ with $\omega_{i,j}$ the intensity of spillins received by country i from country j.

As we have 3 coalitions (composed of n, m and p countries) and 2 strategies, eight Nash equilibria are derived from the three reaction functions.

We sum up here our results in terms of utility for each (non)cooperative scenario. Once known three coalitions' payoffs, one is led to order them completely for each coalition and to analyze them further two by two. Taking into account combinatory aspects (there are 28 potential comparisons), we choose to restrict ourselves mainly to the following four relevant situations regarding European defense building: "Olson-Zeckhauser" effect, "stand alone" effect, "bandwagon" effect, "enlargement" effect.

In alliance theory, cooperative scenario C describes an ideal world while non-cooperative scenario N describes a situation where each country free-rides anticipating that defense providing relies at least on one group. Comparison of utilities gives the following result : "Olson-Zeckhauser (1966)" effect (C is preferred to N) dominates for all members of three coalitions. This result testifies that Pareto optimal equilibrium is reachable as long as one may improve at least one coalition's utility without depreciating others' utility.

A situation close to reality is one where a group of leader countries would accept to provide defense alone (F scenario) rather than within a generalized cooperation setting (C). Comparison of utilities gives the following result : "Bandwagon" effect (C is preferred to F) dominates for all members of three coalitions. "Bandwagon" effect (meaning that demand for one good – here defense - is an increasing function of the number of consumers, or here countries) dominates any stand alone scenario (F) for all members. This result tends to show that

states unwilling to cooperate when leaders' group provides defense alone would see their utility levels reduced to ideal generalized cooperation. Looking at EU position in enhanced cooperation matters, such a preference order seems to give right to vertical integration modelling with institutional incentives to generalized cooperation.

Taking into account « bandwagon » effect (where C is preferred to non-cooperative strategies), one is led to consider that leaders' coalition α could take advantage either of a stand-alone cooperative behavior (situation J) of coalition of γ (10 new EU entering non-leaders countries) or rather of a simultaneous cooperation (situation H) of γ and β (11 EU non-leaders countries) to adopt free-rider behavior. To answer that question, we check border line effect by comparing utility levels between scenarios H and J. Our result admit that H is preferred to J for any coalition. It is remarkable to notice that if four countries members of block α do not cooperate, and meanwhile coalition γ cooperates, then cooperative behaviour of β determines a higher level than with a non-cooperative strategy. With this result, we confirm that Europe of defense can not rely efficiently on partial cooperative behaviours of States belonging to a poorly endowed coalition with respect to defense goods.

The enlargement effect confronts two scenarios D and E. Situation D (α and β cooperate, γ does not) where ten new entering countries (γ) would reverse non-cooperative strategy of block β countries calls into question the quality of 2004 integration in short and medium-term. Situation E (α and γ cooperate, β does not) describes a conceivable situation where European integration cost of EU 15 could only be borne by the four leader countries and ten 2004 entrants. Comparison of utilities gives the following result: new entering countries (block γ) prefer to free-ride (situation D of block β prefer to cooperate when faced with a cooperation of the richest four.

Summing up all possible situations with associated Nash equilibrium payoffs, the following preference relation: C > H > D > E > K > J > F > N is verified uniformly for any coalition α, β and γ.

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