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## Enlargement of the European Union and the approximation of law: Lessons from an economic theory of optimal legal areas

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***Enlargement of the European Union and the approximation of law:  
Lessons from an economic theory of optimal legal areas\****

by

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Center for the Study of Law and Economics  
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**Abstract**

Before joining the European Union countries from Central and Eastern Europe have to adopt the *acquis communautaire*, i.e. the system of legal rules developed in the Union. The paper outlines an economic theory of optimum legal areas, that is used to determine the optimal size of the Union as well as winners and losers of enlargement. The model also allows to identify an applicants dilemma: by adopting the *acquis* potential entrants reduce the probability of admittance to the club.

JEL-classification: F02, K33

Key words: Constitutional economics, social contract theory, optimum legal area, enlargement of the EU

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## I. Introduction

In its „Agenda 2000. For a stronger and wider Union“ the European Commission lays down the principles for accession negotiation: „New members will take on the rights and obligations of membership on the basis of the *a c q u i s* as it exists at the time of accession; they will be expected to apply, implement and enforce the *a c q u i s* upon accession; in particular the measures necessary for the extension of the single market should be applied immediately“ (Bulletin of the European Union, Supplement 5/97: 52). As a guide to assist the associated countries in meeting the challenges from accession the Commission issued a White Paper entitled „Preparation of the Associated Countries of Central and Eastern Europe for Integration into the Internal Market of the Union“ (from 3.5.1995). In this important document the Commission presents the legislation which is essential for the functioning of the internal market in an enlarged Europe. Key measures in each sector of the internal market are identified in order to facilitate the approximation of laws. Equal importance is attached to the

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establishment of administrative and organizational structures which will be necessary to make the legislation effective. As the Commission puts it: „The main challenge for the associated countries in taking over internal market legislation lies not in the approximation of their legal texts, but in adapting their administrative machinery and their societies to the conditions necessary to make the legislation work. This is a complex process requiring the creation or adaption of the necessary institutions and structures, involving fundamental changes in the responsibilities of both the national administrative and judicial systems and the emerging private sector.“ (White Paper 1995: 23.)

Expanding the Union only makes sense economically, if this process enhances the wealth of both the citizens of the EU and the citizens of the associated countries of Central and Eastern Europe. The Commission as well as most of the observers seem to take that for granted. However, there is no free lunch. Increasing membership of a club may come along with congestion and decisionmaking costs. And one cannot have approximation of law without incurring set up costs, including the costs of restructuring the economy. For example, adopting standards as part of the *acquis* might lead to a phenomenon that has been labelled “raising rivals’ costs”. In addition, enlargement could generate third party effects (externalities), that should be taken in account of when evaluating enlargement from the point of view of overall welfare.

This paper analyzes the enlargement issue with the help of an analytical framework provided by an economic theory of optimum legal areas, that is able to determine the optimal size of the European Union, the optimal degree of the specification of the law and the optimal degree of enforcement of the law. For the purpose of this paper an „optimal legal area“ will be defined as the group of economic agents who submit to the same protective agency *and* for whom the same legal order maximizes net benefits (benefits net of costs).<sup>1</sup> Applying insights from social contract theory as developed by the Virginia School (see Buchanan 1975, 1990) and the theory of clubs (see Buchanan 1965; Allen/Amacher/Tollison 1974, and Sandler/Tschirhart 1980), states and state like entities such as the European Union are viewed as law enforcement agencies i.e., protective clubs, with finite membership.

Legal scientists and philosophers have been dreaming of a common European law and even a universal world law for centuries. Economists, however, have devoted relatively little attention to this issue, in particular relatively few economists have provided formal models concerning state formation and the number and size of states.

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research conferences for helpful comments.

International economics deals with economic integration, but it does not explain the existence and size of nations – it simply takes both for granted. Furthermore, if the EU were only an economic union then the determination of the optimal size would be an easy task: It should be as large as possible (see also Gros/Steinherr 1995: 503). But for the EU as a legal area things might look different: Presumably, its optimum size is neither one member state, nor all states in the world with their diverse preferences, cultural and legal histories. But where exactly should the Union border be drawn? Friedman (1977) argues that state size is determined by the rulers' attempts to maximize tax revenue net of the costs of taxation. But we have doubts whether this approach is appropriate for our endeavour. The same holds for contributions dealing with the secession issue (see Bolton/Roland 1997; Buchanan/Faith 1987). Traditional theory of clubs and constitutional economics have been concerned with the question of the optimality of law, but the focus is on law as a phenomenon of a "closed economy". The same holds for the New Institutional Economics (with the exceptions of Yarbrough/Yarbrough (1992, 1994), dealing with the law of territory, and Schmidtchen/Schmidt-Trenz (1990), Schmidt-Trenz/Schmidtchen (1991) who are concerned with the territoriality of the law).

The much celebrated article by Alesina/Spolaore (1997) "On the Number and Size of Nations" models country formation as a result of a tradeoff between the benefits of large political jurisdictions and the costs of heterogeneity of preferences of citizens (see also Josselin/Marciano (1998), and Whitman (1998)). This article has much in common with our paper. What distinguishes our paper from their contribution and the others mentioned above is our constitutional economics and club-theoretic perspective, our focus on internal and external transaction costs and the endogenous determination of the optimal amount of the law as well as the income of the members of the club.

The paper is organized as follows: In section II, we develop the theory of optimum legal areas. Section III applies this theory to the enlargement issue. The paper closes with an outlook in section IV.

## **II. An Economic Theory of Optimal Legal Areas**

### ***I. Social contract theory***

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<sup>1</sup> As such the basic framework is very similar to the one used in the theory of optimum currency areas, of the theory of clubs, of the modern theory of the firm, viewed as transaction cost saving organization, and of the theory of geographic size of markets.

The social contract theory as developed by Buchanan (1975) and others uses the traditional rational choice model in order to explain how the „Hobbesian problem of social order“ can be solved by a voluntary, i.e., unanimous agreement upon a system of „property rights“ and the simultaneous installation of an enforcement institution, the „protective state“. That agreement (or contract) is elaborated on the basis of an equilibrium situation without contract, the so-called natural equilibrium, prevailing in the „state of nature“. The possibilities of voluntary cooperation thus opened (on the grounds of anticipated increases of utility due to compliance with the contract at a post-constitutional level), determine the contents of the contract, as Buchanan (1975) has shown.

The governance of social interactions on the basis of a rule of law principle allows people to economize on transaction costs, that can broadly be defined as the costs of running a politico-economic system. In particular, a system of private law - consisting of property and contract law – allows people to engage in welfare-improving exchange relations. At the same time, transaction costs may also explain why a unified global order of law and its enforcement does not come into being.

In his contract theoretic explanation of the protective state, Buchanan deals with this subject only briefly (see Buchanan 1975: 31) in contrast to the rather evolutionary theories of the state (see, e.g. Nozick 1976 and Elias 1978, 1980). He argues that due to the large number of economic agents, negotiations and the formation of „states“ will initially take place between members of subgroups „within the larger and more inclusive community membership“ (Buchanan 1975: 31). Thus, Buchanan presumes that a multitude of protective states formed on the basis of corresponding social contracts may coexist - at least temporarily. In this situation, anarchic conflicts continue to exist between subgroups, leading to a natural equilibrium among the different states each one working on behalf of one of those subgroups. In Buchanan’s view, a continuing „process of contractual internalization“ (Buchanan 1975: 32) will lead to larger protective units until all individuals are joined within a single constitutional structure: the „inclusive community“ (Buchanan 1975: 34).<sup>2</sup>

In all his further analyses, Buchanan presupposes a situation, where an extensive process of contractual internalization has reached its end. For that reason, he only speaks of *the* state and *the* constitutional contract<sup>3</sup> that fixes

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<sup>2</sup> Whyne/Bowles (1981: 5) reach the same result: „[W]e might think of the contract theory of the state in the following terms. A group of individuals will sit around a conference table and trash out an agreement or contract under the terms of which all potentially gain a superior outcome to that of any other action. Such a contract will specify the rules of social action necessary for the attainment of the optimal outcome and will, by virtue of the individual’s signature on the contract, be acceptable to all (...) If such conferences can be costlessly convened, we might expect these sorts of arguments to militate in the final analysis in favour of a world-wide solution.“

<sup>3</sup> See Buchanan (1975: 71 f.). Buchanan uses the term „constitutional mix“.

- 1) the mutual behavioral limits (cease-fire treaty)<sup>4</sup>
- 2) the property rights on goods
- 3) the process of legal enforcement
- 4) the procedural rules governing the productive state  
(providing other public goods than that of private law),  
especially the kind of majority rule.

However, Buchanan does not provide a model of this „process of contractual internalization“. In this paper, we will deal with the obstacles to a complete internalization, using the concept of transaction costs.

Transaction costs do not play an explicit role in the Virginia School contract theory. Emphasis is placed upon how the costs of anarchy can be overcome by a constitutional order.<sup>5</sup> But this school of thought abstracts from transaction costs that result from agreeing on this order and organizing its enforcement. This neglect of the „transaction costs of creating and maintaining cooperation“ explains why this order is presented as being perfectly specified, fully enforced by a single inclusive protective agency, and perfectly obeyed.

However, we must realistically assume that both the negotiation of a system of property rights and its enforcement do entail transaction costs. Note, that they are not independent of each other. For example the functioning of a system of detailed property rights may be threatened by excessive enforcement costs. Therefore, a comprehensive cost-benefit calculus becomes necessary, as has been realized already by Buchanan: „A more general model must allow for the simultaneous determination of the preferred or optimal quantities of law and the quantities of enforcement.“ (Buchanan 1975: 132.)

In the subsequent sections we ask the following question: What are the number and size of states in a contract theoretic equilibrium? We are aware of the fact, that historically state formation depends upon a whole bunch of geographical, cultural, ethnic, ideological, military, political and economics forces, that can never exhaustively be treated by a single model. Nevertheless the contract theoretic perspective may provide some insights in the process of state formation, that can usefully be applied to Union enlargement.<sup>6</sup>

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<sup>4</sup> As Buchanan (1975: 59) puts it: „The contract is one of bilateral behavioral exchange“. The contract contains restrictions on behavior, which are agreed upon voluntarily. Rights and duties are defined for the first time. Activities can now be identified as lawful or unlawful.

<sup>5</sup> These costs can be labeled „avoidable transaction costs“. „Avoidable transaction costs“ are the cooperation benefits foregone. See the classification of transaction costs based on game theory provided by Schmidt-Trenz (1990: 64).

<sup>6</sup> If we could manage to give a rationale for the optimal size of states (that are smaller than the world), then we would deliver a „fundamental potential explanation“ for the division of the world into a plurality of states with territorially limited legal systems. For the notion of a „potential explanation“, see Nozick (1976: 32). „We can learn a lot if we realize how the state might have come into being, even if it didn't really do so this way“.

In the following model we show that the specification and enforcement of property rights will most probably be incomplete. Moreover, membership in a state will be exclusive. That means that limits to group size are efficient.<sup>7</sup> Since the citizens of the European Union can be considered as forming such a group, the European Union is confronted with the problem of determining its optimum size.

## 2. *The model: Assumptions and Interpretation*

Our starting point is a Hobbesian state of nature (anarchy) viewed as a  $N$ -person prisoners' dilemma game. Let us call this game the natural game, because of the absence of legal rules and governments. Each individual  $i \in \{N\}$  can choose from a set of strategies  $\{c, nc\}$ , where „c“ means the cooperative, peaceful strategy, as opposed to „nc“, the non-cooperative, aggressive strategy. In the equilibrium of anarchy, the non-cooperative strategy proves to be the individually optimal strategy for all  $i$ , as is well known. In that situation, every individual gets a payoff of  $u_i = u_i(Y^A)$ ,  $Y^A$  representing the individual equilibrium income (social product per capita) that may be gained under anarchy.

This situation is pareto-inferior to a world where  $u_i = u_i(Y^c)$ , with  $Y^c > Y^A$  for all  $i \in \{N\}$ , which results when all  $i$  decide to use the cooperative strategy. As the players are stuck in a prisoners' dilemma, they cannot reach such a pareto-superior situation unless some additional constraints are introduced to the game. We call these constraints a „legal order“, that can be depicted as a matrix of sanctions for illegal, i.e. non-cooperative, behavior.<sup>8</sup> Adding this matrix to a matrix describing the „natural“ game leads to a fundamental transformation: The original equilibrium strategy  $a_i^* = nc$  for all  $i \in \{N\}$  will be replaced by a new equilibrium strategy  $a_i^* = c$  for all  $i \in \{N\}$ .

Deciding upon a specific legal order means to set up a social contract.<sup>9</sup> All parties to the contract agree to abide by the set of legal rules. As has been already mentioned by Buchanan

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(Nozick 1976: 23.) In Hayek's (1981; III: 212) terms, this is a description of „conjectural history“. We shall not refer in detail to Carneiro's (1970) discussion of how states have really come into being, even if - contrary to his propositions - one could find proofs for voluntary alliances. Auster and Silver (1979: 21) criticize him for these very reasons.

<sup>7</sup> On „exclusive“ and „inclusive“ groups, see Olson (1965: 36 ff.).

<sup>8</sup> The view is taken and elaborated in more detail in Schmidtchen/Schmidt-Trenz (1989: 17).

<sup>9</sup> Binmore (1997: 4 ff.) takes a different view. He interprets a society's social contract as a coordination device, which can be reached by direct negotiation or as a consequence of social evolution. The game of life is modelled as an infinitely repeated prisoners' dilemma game. The social contract specifies which equilibrium path out of



this social contract is not self-enforcing, which means, that the fundamental transformation does not work out and the non-cooperative strategy remains the dominant strategy for all  $i \in \{N\}$ . Therefore, the social contract must also provide for the installation of an agency being in charge of enforcing the legal order. Call this agency the “government”.

This term stands for a bundle of administrative, judicial and economic services, that can have either characteristics of a non rival public good or those of an impure public good (club good), with partial rivalness, or a private good.

Decisions regarding the social contract (“choice of the rules”) are taken at the constitutional stage of society. Choices within in the rules are a characteristic of its postconstitutional stage.<sup>10</sup> In the following model, we will consider five variables:<sup>11</sup>

- $n$ : the number of contract parties;  $n \leq N$ .
- $s$ : the degree of specification of the property rights system.
- $e$ : the degree of enforcement of this system by the public authorities.
- $j$ : the degree of openness of the economy.
- $o$ : the enforcement technology.<sup>12</sup>

Assuming risk neutral agents, which means that utility can be represented by the (expected) income, and taking  $Y$  as the numeraire, an individual will join a club, i.e. subscribe to the social contract, if (1) holds:

$$(1) \quad Y^A + \frac{Y^A}{r} < Y^A - NC + \frac{1}{r} \left[ Y^P(s, e, n, j) - C^P(s, e, n, j; o) \right]$$

where  $NC$  represents the individual negotiation costs due to the specification of the contract, that are assumed to be constant.  $C^P$  represents the enforcement costs that has to be borne by the citizen. These costs can be considered as the individual (lump sum) tax charge necessary for the production of government services, i.e., the legal protection by the state;  $r$  is the discount rate and  $Y^P$  the income in the postconstitutional stage, with  $Y^A < Y^P \leq Y^C$ .

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the infinitely large number of paths (folk theorem) is to be played in a society. Thus the social contract solves an equilibrium selection problem. Rights and duties are considered as means for sustaining the chosen equilibrium path.

<sup>10</sup> The distinction between the constitutional and the postconstitutional stage of decisionmaking goes back to Buchanan (cf. Buchanan 1977: 287 ff.).

<sup>11</sup> Auster/Silver chose similar variables. They examine „the number of people“, „geographical size“, „the level of order“ and „the level of resources used by the state“ (Auster/Silver 1979: 27).

<sup>12</sup> “ $o$ ” is a discrete variable representing either the so called territoriality principle ( $o'$ ) or the personality principle ( $o''$ ) (see Schmidtchen/Schmidt-Trenz 1990).

Inequality (1) presents a comparison between the present value of two income streams that the representative and (for the sake of simplicity) immortal individual  $i$  can expect from his resource endowment: On the left hand side we have the present value of the income if anarchy persists and on the right hand side is the present value of the income that results if all  $i \in \{n\}$  agree to install a legal order as described above. The latter income amounts to the difference between  $Y^A$  and  $NC$  (that is the income during the period of negotiation or the constitutional stage), plus the present value of the net income flows at the post-constitutional stage. The net income flows at the postconstitutional stage are calculated as the difference between  $Y^P$  and  $C^P$ . The difference  $1/r(Y^P - C^P)$  can be interpreted as the present value of individual utility from the services provided by the state. Inequality (1) is the overall condition required for a social contract to be concluded.<sup>13</sup> It can be rearranged as follows:

$$(2) \quad NC < \frac{1}{r} [Y^P(\cdot) - C^P(\cdot)] - \frac{Y^A}{r}$$

which means that the benefit from the negotiation must be higher than its costs, if a contract is to be concluded and a legal order is to be established. For the variables which we have introduced, we assume the functional properties, that are shown in the Appendix.<sup>14</sup>

### 3. The marginal conditions

Let us assume that there is a domain where the overall condition (1) is fulfilled. Efficiency requires to maximize utility, which means - given risk neutral individuals -

$$(3) \quad \max [Y^T(s, e, n, j; o)]$$

with  $Y^T$  defined as

$$(4) \quad Y^T = Y^A - NC + \frac{1}{r} [Y^P(s, e, n, j) - C^P(s, e, n, j; o)]$$

For simplicity, we exclude cross effects between  $n$ ,  $s$ ,  $j$  and  $e$ .

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<sup>13</sup> In the principal agent literature this condition is called the rationality or participation constraint.

<sup>14</sup> These properties are illustrated in figure 1 and will be discussed below.

This maximization program results in the following marginal conditions:<sup>15</sup>

$$(5) \quad \frac{1}{r} \cdot \partial Y^P / \partial n = \frac{1}{r} \cdot \partial C^P / \partial n$$

$$(6) \quad \frac{1}{r} \partial Y^P / \partial s = \frac{1}{r} \cdot \partial C^P / \partial s$$

$$(7) \quad \frac{1}{r} \partial Y^P / \partial e = \frac{1}{r} \cdot \partial C^P / \partial e$$

$$(8) \quad \frac{1}{r} \cdot \partial Y^P / \partial j = \frac{1}{r} \cdot \partial C^P / \partial j$$

These marginal conditions indicate the optimum size of a state, denoted  $n^*$ ; the optimal degree of the specification of property rights, denoted  $s^*$ ; the optimal degree of contract enforcement, denoted  $e^*$ , and the optimal degree of openness, denoted  $j^*$ .

The optimum size is reached, if the present value of the marginal benefit due to the adoption of one additional contract party (higher membership) is just equal to the present value of the additional individual enforcement costs (5). These costs are determined by two effects: since an additional member adds to congestion internal enforcement costs go up; in the case of an open economy external transaction costs might also be influenced. The term  $\partial C^P / \partial n$  captures both effects.

The optimum of contract specification ( $s^*$ ) requires, that the present value of the marginal benefit of a better contract specification must be equal to the present value of the marginal enforcement costs of better specified property rights (6).

Regarding the optimal degree of contract enforcement ( $e^*$ ), the present value of the marginal benefit resulting from increased levels of contract enforcement must be equal to the present value of the marginal costs of better enforcement (7).

The degree of openness of the economy is optimal, if the present value of the marginal benefit of lowering the trade barriers is equal to the present value of the increase of the enforcement costs caused by this move. Note, that  $j$  is defined in the following way:  $j = 0$  stands for a free trade economy without barriers to trade and  $j = 1$  means an entirely closed economy.

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<sup>15</sup> These are necessary or first order conditions for a maximum. Given the shape of the functions the second order conditions for a maximum are fulfilled. It does not make sense to derive a marginal condition with regard to the enforcement technology " $o$ " since  $o$  is a discrete variable.

The decisions on  $s$ ,  $e$ ,  $n$ ,  $j$  and  $o$  are simultaneous. Thus, a comprehensive optimum  $(s^*, e^*, n^*; j^*, o^*)$  is reached.<sup>16</sup>

Equation (5) is extremely important for our purposes. It determines the optimal membership size  $n^*$  of the state. With identical individuals (homogenous population  $N$ ) and identical functions for all  $i \in \{N\}$ , all states have optimal membership  $n^*$ . This implies an optimal number of states of equal size  $k^* = N/n^*$ . Thus, population  $N$  is optimally divided in  $k^*$  countries of equal size, provided  $N/n^*$  is an integer. Otherwise, the solution is given by the integer that close to  $N/n^*$  has the higher average net utility. If  $k^*$  is an integer, the number and size of states are chosen in such a way as a benevolent social planner trying to maximize the sum of individual utilities would do. This sum reaches a maximum when average utility is maximized. That is the case with  $n = n^*$ .<sup>17</sup>

We will now discuss the optimum size of the state in more detail (cf. Fig. 1), relying on the assumption that  $s^*$ ,  $j^*$ ,  $e^*$  and  $o^*$  are given.<sup>18</sup>

#### **4. A graphical representation**

##### *a. The post constitutional income production curve*

In Figure 1 the units of social product per capita ( $Y$ ) appear on the vertical axis, the number of clients of the state on the horizontal axis.

The curve  $Y = Y^P(s^*, e^*, j^*, n)/r$  represents the present value of the individual gross benefit in the post constitutional stage. It can be derived from a relationship between aggregate human capital and factor productivity as is emphasized by the endogenous growth literature (see Romer 1986). Let  $h$  denote total human capital in the world. Divide the world in two countries, country  $x$  (where individual  $i$  belongs to) and the rest of the world. Assume that world population has mass 1 and each individual is endowed with the same amount of human capital. Define  $H_x$  as aggregate human capital in country  $x$  and  $H_{-x}$  as aggregate human capital in the rest of the world (see for what follows Alesina/Spolaore 1997: 1040). Finally,

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<sup>16</sup> The optimal enforcement technology is not derived in this paper. Elsewhere it is shown that the territoriality principle pareto-dominates the personality principle (see Schmidtchen/Schmidt-Trenz 1990).

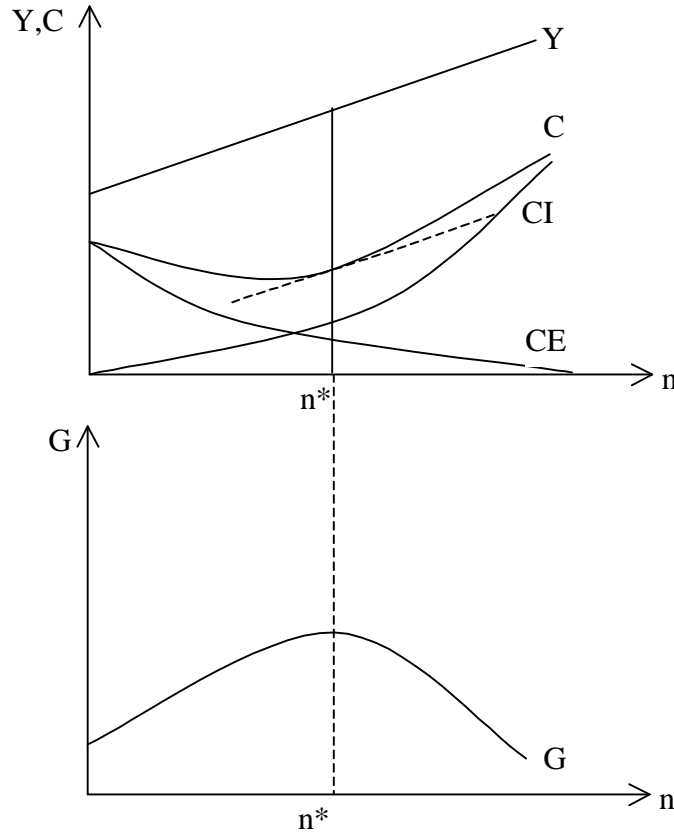
<sup>17</sup> With  $k^*$  as an integer and given our assumptions:  $Max(N \cdot \hat{u}) = N \cdot Max \hat{u}$ , with  $\hat{u}$  denoting average utility. If  $k^*$  is not an integer the maximization program leads to different results regarding optimal membership size.

<sup>18</sup> Schmidt-Trenz (1990: 212 ff.) provides a very detailed discussion and analysis of the optimality calculus determining  $s^*$  and  $e^*$ . The marginal conditions (6) and (7) suggest that the specification and enforcement of „property rights“ will be incomplete. Due to (7), for example, preventing legal violation completely is inefficient.

assume that individual income, denoted,  $Y_x$ , depends on aggregate human capital as described in (9)

$$(9) \quad Y_x = b_o + b_1 \cdot H_x + b_2 \cdot H_{\sim x}; \quad b_o, b_1, b_2 > 0$$

Equation (9) implies that individual income is given by a constant  $b_o$  plus a linear term in aggregate human capital, both at home and abroad. Parameters  $b_1$  and  $b_2$  stand for the aggregate human capital externality.



**Figure 1: Optimal Size of the State**

If each individual is endowed with the same amount of human capital we have:

$H_x = n_x \cdot h$  and  $H_{\sim x} = (1 - n_x) \cdot h$  with  $n_x$  size of country  $X$ . Setting  $b_2 = (1 - j) \cdot b_1$  leads to

$$(10) \quad Y_x = b_o + b_1 \cdot n_x \cdot h + b_1(1 - j)(1 - n_x) \cdot h$$

The magnitude of parameter  $j$  can be interpreted as an indicator of the openness of country  $X$ . If  $j = 1$ , we have a completely closed domestic economy. Members of country  $X$  only interact with each other. The size of the market is identical to the size of the country. Thus, individual

income is only determined by the domestic aggregate human capital. Since a larger country implies a larger size of the market and higher domestic income country size matters.

If  $j = 0$ , we have the opposite case of a completely open economy. Individual income depends on world aggregate human capital. With  $j = 0$ , there is no difference between the aggregate human capital externalities of domestic and foreign human capital (see Alesina/Spolaore 1997: 1041). The size of the country is irrelevant for gross domestic income because it does not determine the size of the market (see Alesina/Spolaore 1997: 1040).

Note, that parameter  $j$  is a shift parameter of the  $Y$ -curve as is indicated by the partial derivative  $\partial Y / \partial n = b_1 \cdot j \cdot h$ .

The curve, labeled  $Y$  in figure 1 is a graphical representation of (10).<sup>19</sup>

#### *b. The enforcement cost curve*

The curve  $C = C^P(s^*, e^*, j^*, n; o^*)/r$  represents the present value of the individual cost contributions to the total costs of enforcing the legal order (for ease of exposition we drop the index  $x$ ). The enforcement costs  $C$  consist of two parts.

One part reflects costs incurred in enforcing the legal order *internally* among the contract parties themselves. This part might include costs of safeguarding domestic contracts and costs of dispute management under the procedural rules of the protective club to which the legal order compatriots belong. The other part of enforcement costs takes account of the fact that the legal order needs to be defended *externally*, i.e., against strangers to the legal order (non-compatriots). This could come about for two reasons:

First, a state could attack members of another state in order to opportunistically appropriate their wealth and enslave the members. Second, if there are transactions between individuals belonging to different states, either tort, contract or criminal conflicts may arise. Thus, private international transactions may result in conflict and ultimately in war unless there is a „superclub“ dealing with such problems on an international scale. Both factors are the source of costs, that can be considered as transaction costs of running a multitude of states.

Overall enforcement costs  $C$  may be viewed as an aggregate cost function representing the sum of the present values of the „internal enforcement costs“  $CI(s^*, e^*, j^*, n; o^*)$ , external enforcement costs  $CE(s^*, e^*, j^*, n; o^*)$  and defense costs  $CD(s^*, e^*, j^*, n; o^*)$ .

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<sup>19</sup> Index  $x$  is dropped.

Neglecting the defense costs the curve of the present value of the enforcement costs per capita  $C$  can be derived by vertical aggregation of the  $CI$ - and  $CE$ -curves. Let

$$(11) \quad C = c_1 \cdot n^2 + c_2[(1-j)(1-n)]^2 \text{ represent such a function.}$$

The first term on the right hand side describes internal enforcement costs  $CI$ .

$$CI(0) = 0; CI(1) = c_1. \text{ From } \partial CI/\partial n = 2c_1n > 0 \text{ and } \partial^2 CI/\partial n^2 = 2c_1 > 0$$

it follows that this function is exponentially increasing in  $n$ . This might be due to the congestion effects of additional members mentioned above. (See Fig 1 for a graphical representation of this function.)

The second term on the right hand side of (11) stands for the costs of a club member's external transactions  $CE$ .

$$CE(0) = c_2(1-j)^2; CE(1) = 0. \text{ From } \partial CE/\partial n = -2c_2(1-j)^2(1-n) < 0 \text{ and}$$

$\partial^2 CE/\partial n^2 = 2c_2(1-j)^2 > 0$  it follows, that the function is downward sloping in the way presented in fig. 1.

Note, that the  $CI$ -curve is independent of  $j$ , whereas the position of the  $CE$ -curve depends on  $j$ .<sup>20</sup> With given  $c_2$ , this curve moves downwards with an increase of  $j$ . With  $j = 0$ , i.e. free trade, the vertical intercept of the  $CE$ -curve is  $c_2$ ; with  $j = 1$ , i.e. closed economy, the  $CE$ -curve is identical with the horizontal axis.

Given the properties of  $CI$  and  $CE$  the  $C$ -function is  $u$ -shaped, if  $c_2(1-j) > c_1$  (see fig. 1). If  $c_2(1-j) < c_1$ , the  $C$ -curve would be strictly increasing in  $n$ .

### *c. The solution*

State size is optimal when the slope of the costs curve is equal to slope of the curve representing per capita income. That is the case with  $n = n^*$  (see fig. 1). The optimal size  $n^*$  can be algebraically derived by calculating the maximum of  $G = Y - C - NC$ , with  $G$  denoting the net gain of being a member of the state. The graph of  $G$  is depicted in the lower part of fig.1, which neglects  $NC$ , since as a constant  $NC$  has no influence on  $n^*$ . Taking the partial derivative of  $G$  with respect to  $n$  and setting it equal to zero results in the first order condition

of a maximum. Solving for  $n$  leads to  $n^* = \frac{c_2(1-j)^2 + b_1jh/2}{c_1 + c_2(1-j)^2}$ , from which it follows that  $n =$

0 can never be an optimum and that with  $2c_1 < b_1 \cdot j \cdot h$  optimal state size is  $n^* = 1$ . In the latter case it would be optimal to have just one state in the world.

As can be easily seen, it is the  $u$ -shape<sup>21</sup> of the enforcement cost function that is responsible for a finite optimal state size.<sup>22</sup> The optimal degree of openness is determined by

$$j^* = 1 - \frac{b_1 \cdot h}{2c_2(1-n)}$$

whether free trade, i.e.  $j = 0$ , is optimal from the point of view of a particular state. A closed economy, i.e.  $j^* = 1$ , can never be optimal.

The ratio  $k^* = N/n^*$  gives the solution regarding the efficient number of states if it is an integer.

The model does not solve the problem of how to assign the world population to certain states in the case of homogeneity of the states.<sup>23</sup> For the sake of simplicity the assumption could be made, that individuals are assigned randomly. After being assigned to a particular state an individual concludes a contract with this state and pays his membership fee.

### III. The Enlargement Issue<sup>24</sup>

#### 1. The modified model

We now turn to an application of the theory of optimal legal areas. If there were no transaction costs and with homogeneous world population the number and size of the nations could be restructured in an efficient manner. But that is not the world as we know it. Transaction costs are positive, world population is not homogeneous and history matters. As

<sup>20</sup>  $\partial CE/\partial j = -2c_2(1-j)(1-n)^2$ .

<sup>21</sup> For a more thorough discussion of this point see Bean (1973: 204), Auster/Silver (1979: 29), and Moss (1980: 25). As an analogy to the theory of the firm, Bean (1973: 204) assumes such a shape. Moss (ibid p. 25) argues that: “[u]nless something is said about tastes or technology of providing public services, it would seem that the optimal size of the ‘protective state’ is the world population”. Nozick (1974: 30), however, only seems to focus on increasing returns to scale.

<sup>22</sup> In this context, compare Williamson 1967. He confirms that “the management factor is responsible for a limitation to firm size” (Ibid, p. 123). Auster/Silver (1979: 28 f.) point out that opportunism becomes more important with growing membership. If the number of potential legal conflicts rises proportionally to the number of possible interactions, then – according to the formula  $n(n-1)$  – an additional member means an exponential rise in conflicts.

<sup>23</sup> The procedure by which the segregation may be achieved must be negotiated by all the members.

<sup>24</sup> This part of the paper substantially benefited from collaboration with Alexander Neunzig.



for the latter, think of the cold war and the iron curtain, two factors that has been operating as constraints to a purely economic determination of the number and size of nations. The political challenge of the day is not how to implement the grand design, but the enlargement of the Union. That does not make the model of the preceding section useless. It must be modified in an adequate way. Our modification looks as follows:

World population is assigned to three groups of states: European Union, applicant countries and the rest of the world. The European Union ( $E$ -countries), the rest of the world ( $R$ -countries) and the applicant countries ( $B$ -countries) have size  $n_E$ ,  $n_R$  and  $n_B$ , respectively. Let  $n_Q$  denote the members of the  $B$ -countries qualified for entering the Union and  $n_D$  the non-qualified candidates that have to stay outside the Union.

We apply a two-step optimization procedure. In the first step we determine current Union size, denoted  $n_E^*$ . That is done by using a calculus as developed in the former section under the constraint  $n_E \leq 1 - n_B$ . This restriction means that the size of the  $B$ -countries is assumed to be constant, i.e.  $n_Q = 0$ .<sup>25</sup> In the second step we start with Union size  $n_E^*$  as determined in the first step and use a similar procedure to calculate the optimal number of new members  $n_Q^*$ . Adding  $n_Q^*$  to  $n_E^*$  leads to the optimal size of the larger Union, denoted  $n_E^{**} = n_E^* + n_Q^*$ .

Since we have now four groups in the world, namely old members, new members, outsiders from  $B$ -countries and  $R$ -countries, some modifications of the enforcement cost as well as the income production functions are necessary.

We assume the following functions, that represent present values:

$$(12) \quad Y_E = b_o + b_1 \cdot h \cdot n_E + \mathbf{a}_Q \cdot b_1 \cdot h \cdot n_Q + b_1 \cdot h(1 - j_R) \cdot (1 - n_E - n_B) + \mathbf{a}_D \cdot b_1 \cdot h(1 - j_D) \cdot (n_B - n_Q)$$

is the income production function for the old members of the Union. This function is different from that used in section 3 in several respects: There is an additional term  $a_Q b_1 h n_Q$ , capturing the positive external effect on the income of old members caused by the aggregate human capital of the new members. Since it is reasonable to assume that this externality may depend on the degree of adoption of the *acquis*, we introduce parameter  $\alpha_Q$ , with  $\alpha_Q = 1$  standing for a perfect adoption and  $\alpha_Q < 1$  for an imperfect one.

The term capturing the impact of foreign human capital on Union income must be split up in two parts: the first part  $b_1 h(1 - j_R)(1 - n_E - n_B)$  relates Union income created by aggregate human capital in the  $R$ -countries, whereas the second part  $a_D b_1 h(1 - j_D)(n_B - n_Q)$  shows the

impact of aggregate human capital of the non-qualified candidates. The parameters  $j_R, j_D$  are indicators of the respective degrees of openness;  $\alpha_D$  is a parameter allowing to represent the idea that the impact of the human capital in nonqualified countries on Union income depends on the productivity of the human capital, that is influenced by the “quality” of the legal order in those countries (the lower the quality the lower  $\alpha_D$ ). The structure of the income production function of the new members, denoted  $Y_Q$ , is similar to that of the old members:

$$(13) \quad Y_Q = b_o + \mathbf{a}_Q \cdot b_1 \cdot h \cdot n_Q + \mathbf{a}_Q \cdot b_1 \cdot h \cdot n_E + \mathbf{a}_Q \cdot b_1 \cdot h(1 - j_R) \cdot n_R + \mathbf{a}_D \cdot b_1 \cdot h(1 - j_D)(n_B - n_Q)$$

Note, that the impact of the internal human capital as well as the human capital of the  $R$ -countries is discounted by factor  $\alpha_Q$ , indicating the degree of adaptation to the acquis.

The following function represents the enforcement cost function of the Union, denoted  $C_E$ :

$$(14) \quad C_E = c_1 \cdot n_E^2 + c_1 \cdot n_Q^2 + c_2(1 - j_R)^2(1 - n_E - n_B)^2 + c_2(1 - j_D)^2 \cdot (n_B - n_Q)^2$$

The first and the second term on the right hand side indicate the internal enforcement costs caused by the interactions of the old and new members, respectively. While the third term on the right hand side of (14) reflects the external enforcement costs of transactions with  $R$ -countries, the fourth term represents enforcement costs of transactions with non-qualified  $B$ -countries. We assume that the cost functions of the old and new members are identical. The reason is that the income functions already take account of the effect of a less than perfect adoption of the acquis. The income production and cost functions, denoted  $Y_D$  and  $C_D$ , respectively, of the outsiders are defined in (15) and (16):

$$(15) \quad Y_D = a_o + \mathbf{a}_D \cdot b_1 \cdot h(n_B - n_Q) + \mathbf{a}_D \cdot b_1 \cdot h(1 - j_R)(1 - n_E - n_B) + \mathbf{a}_D \cdot b_1 \cdot h(1 - j_D) \cdot (n_E + n_Q)$$

$$(16) \quad C_D = c_1(n_B - n_Q)^2 + c_2(1 - j_R)^2(1 - n_E - n_B)^2 + c_2(1 - j_D)^2 \cdot (n_E + n_Q)^2$$

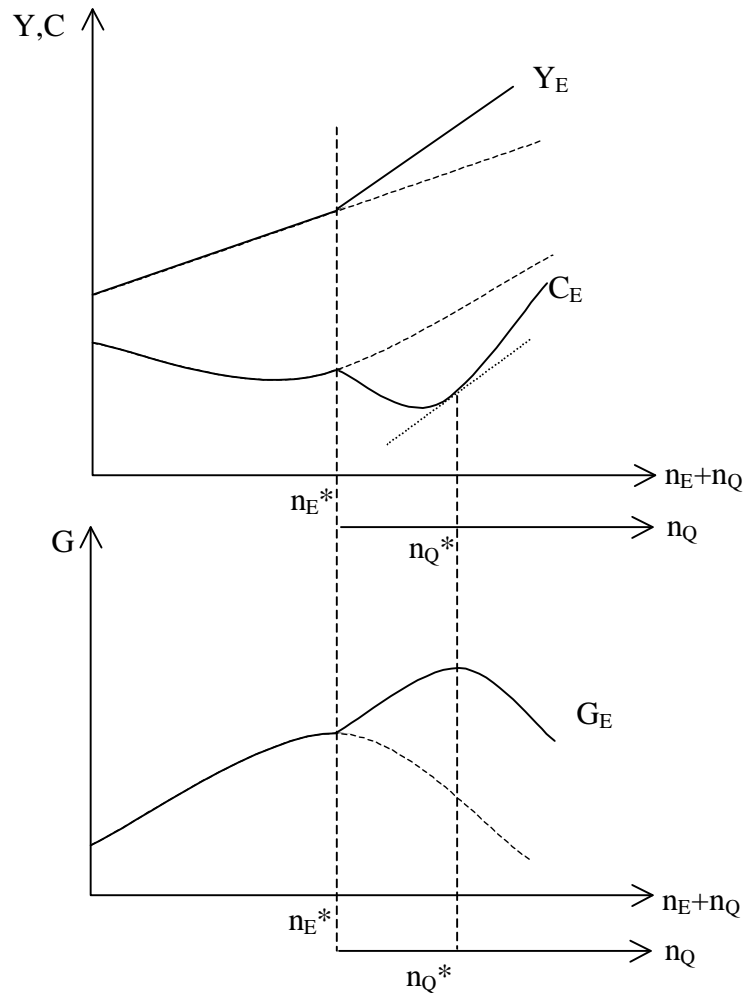
The net gains of the old members, the new members, the non-qualified members and the whole group can easily be calculated using the functions (12) – (16).

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<sup>25</sup> Since the Union now can interact with two foreign countries, it must also decide on two optimal degrees of openness. We neglect this issue.

## 2. The optimization procedures

Before approaching the enlargement issue in more detail some remarks on the optimization procedures seem in order. Consider fig. 2.



**Figure 2: Optimal Enlargement**

In the upper part of figure 2 the linear curve with an initially dark and then dotted part is the graph of the income production function under the assumption  $n_Q = 0$ . The cost function under the same assumption is the  $u$ -shaped curve. In the lower part of fig. 2 the net gain is represented by the initially solid and then dotted curve.

In the first step  $n_E^*$  is determined by the maximization of the difference between income and costs under the assumption that the size of the  $B$ -countries is constant, that means  $n_Q = 0$ . If there is an internal optimum,<sup>26</sup> this is determined by the slope of the income production curve

<sup>26</sup> We neglect corner solutions for the sake of simplicity.

being equal to the slope of the cost curve, given  $n_Q = 0$ . Alternatively, the optimal size can be determined with the help of the curve representing the net gain (see lower part of fig. 2).

For the optimization procedure regarding the enlargement issue  $n_E^*$  has to be taken as given. Geometrically, this means to take the point  $n_E^*$  as origin and draw income and cost curves defined as a function of  $n_Q$  (see the curves with labels  $Y_E$ ,  $C_E$ ,  $G_E$  in fig. 2). Applying a similar procedure as in step 1,  $n_Q^*$  is determined by the maximization of the difference between income and costs on the domain  $]0, n_B]$ . If there is an internal optimum, this is given by the slope of the income production curve being equal to that of the cost curve or, alternatively, by the maximum of  $G_E = Y_E - C_E$ .

Note, that the income production function on the domain  $(n_E + n_Q) = [0, n_E + n_B]$  consists of two parts. On the domain  $(n_E + n_Q) = [0, n_E^*]$  the income-function holds for  $n_Q = 0$ . Since on the domain  $(n_E + n_Q) = [n_E^*, n_E^* + n_B]$  the function is steeper than up to  $n_E^*$  a kink occurs at  $n_E^*$ . The function is steeper if  $\alpha_Q > \alpha_D$  (see function (12)).

For a similar reason the cost-function has a kink at  $n_E^*$ . The first part is defined on the domain  $(n_E + n_Q) = [0, n_E^*]$  with the first and second derivatives  $f_1 := 2c_1 \cdot n_E - 2c_2(1 - j_D)^2 \cdot (1 - n_E - n_B)$  and  $f_3 := 0$ , respectively. The second part is defined on the domain  $(n_E + n_Q) = [n_E^*, n_E^* + n_B]$  with the first and second derivatives  $f_2 := 2c_1 \cdot n_Q - 2c_2(1 - j_D)(n_B - n_Q)$  and  $f_4 := 0$ , respectively.

It is obvious, that the gain-function has also a kink at  $n_E^*$ .

In the subsequent sections we first derive the optimal size of the Union (section 3.). Section 4. identifies the winners and the losers of an enlargement that is optimal from the point of view of the old members of the Union. Section 5. derives the social planner solution which is compared with that of the Union in section 6. Section 7. deals with the “applicants dilemma”.

### 3. The optimal size of the Union

Enlargement means a change of the Union size from  $n_E^*$  to  $n_E^* + n_Q$ . The optimal  $n_Q$  from the point of view of the Union can be calculated by maximizing the net gain  $G_E$  with respect to  $n_Q$ . Based on (12) and (14) we have as the partial derivative of this function

$$(17) \quad \partial G_E / \partial n_Q = \mathbf{a}_Q \cdot b_1 \cdot h - \mathbf{a}_D \cdot b_1 \cdot h(1 - j_D) - 2c_1 \cdot n_Q + 2c_2(1 - j_D)^2(n_B - n_Q)$$

Setting (17) equal to zero leads to the first order condition, that implies

$$(18) \quad n_Q^* = \frac{1}{2} \frac{\mathbf{a}_Q \cdot b_1 \cdot h - \mathbf{a}_D \cdot b_1 \cdot h(1 - j_D) + 2c_2(1 - j_D)^2 \cdot n_B}{c_1 + c_2(1 - j_D)^2}$$

The following properties of (18) are important:

- The higher  $c_1$ , the lower  $n_Q^*$ .
- The higher  $c_2$ , the higher  $n_Q^*$ .
- The higher  $n_B$ , the higher  $n_Q^*$ .
- The higher  $\alpha_Q$ , the higher  $n_Q^*$ .<sup>27</sup>
- The higher  $\alpha_D$ , the lower  $n_Q^*$ .<sup>28</sup>

Does enlargement improve the welfare of the old members of the Union?

The answer can easily be found by looking at the derivative of their gain function  $G_E$ , see (17), at the position  $n_Q = 0$ . With  $n_Q = 0$ , Union size amounts to  $n_E^* + n_Q = n_E^*$ , and the value of the derivative at this size is what matters.

Since at  $n_Q = 0$  the derivative is positive we can conclude that starting from a Union size  $(n_E^* + n_Q) = n_E^*$  the marginal benefit of the old members is always positive.

This result can be illustrated with the help of Fig. 2. The gain-curve at  $(n_E^* + n_Q) = n_E^*$  is upwards sloping, meaning that marginal enlargement is for the benefit of the old members. That is also true for each additional new member as long as the slope of the gain-curve remains positive. Since increasing  $n_Q$  moves the terms in (17) including  $c_1$  and  $c_2$  in opposite directions it might happen that enlargement optimally (from the point of view of the Union) stops before  $n_Q = n_B$ . Fig. 2 represents such an inner optimum. In this case the number of outsiders is positive, i.e.  $n_D > 0$ .

The analysis also reveals that the marginal benefit of enlargement increases with  $\alpha_Q$  (siehe (17)). However, this does not give support to the current policy position of the Union, requiring the adoption of the *acquis* by the applicant countries before they are admitted to enter

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<sup>27</sup>  $\partial n_Q^* / \partial \mathbf{a}_Q = \frac{1}{2[c_1 + c_2(1 - j_D)^2]} \cdot b_1 \cdot h > 0$

<sup>28</sup>  $\partial n_Q^* / \partial \mathbf{a}_D = -\frac{1}{2[c_1 + c_2(1 - j_D)^2]} \cdot b_1 \cdot h(1 - j_D) < 0$ .

the Union. As (17) shows, the marginal benefit of enlargement is at the position  $n_Q = 0$  positive even if  $\alpha_Q = \alpha_D$ , which means that the applicant countries were entering the Union without having adopted the *acquis*.

#### 4. The winners and the losers

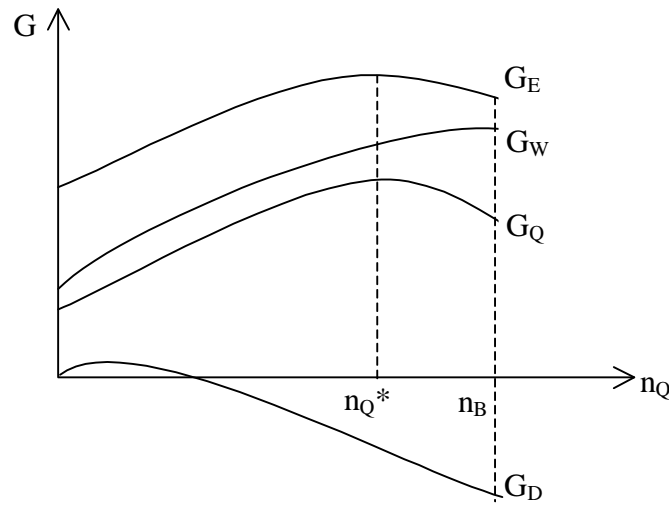
In this section we discuss the impact of enlargement on the welfare of the new members, the outsiders and the whole group (excluding the  $R$ -countries).

##### a. The new members

From (13) and (14) the net gain of the new members, denoted  $G_Q$ , can be determined. The partial derivative with respect to  $n_Q$  is given in

$$(19) \quad \partial G_Q / \partial n_Q = \mathbf{a}_Q \cdot b_1 \cdot h - \mathbf{a}_D \cdot b_1 \cdot h(1 - j_D) - 2c_1 \cdot n_Q + 2c_2(1 - j_D)^2 \cdot (n_B - n_Q)$$

Since (19) is identical to (17) the marginal benefit of enlargement on the domain  $]n_E^*, n_E + n_B]$  for the new members equals that of the old members. In other words, the slopes of the gain curves are identical for each  $n_Q$ . However, new members receive a lower level of the net gain as long as  $\alpha_Q < 1$ . That means  $G_Q$  is parallel to  $G_E$ , and becomes identical with  $G_E$  if  $\alpha_Q = 1$ . See fig. 3 for a graph of the net gain functions of the old and new members, given  $\alpha_Q < 1$ .



**Figure 3: Net Gains of Enlargement**

*b. The outsiders*

In a similar way the impact of enlargement on the welfare of the outsiders can be analysed. Based on (15) and (16) the partial derivative of  $G_D$  with respect to  $n_Q$  looks as follows:

$$(20) \quad \partial G_D / \partial n_Q = -\mathbf{a}_D \cdot b_1 \cdot h + \mathbf{a}_D \cdot b_1 \cdot h(1 - j_D) + 2c_1(n_B - n_Q) - 2c_2(1 - j_D)^2(n_E + n_Q)$$

At  $n_Q = 0$ , the marginal benefit is unclear. The sum of the first and second term is always negative. Thus, it depends on  $[2c_1 \cdot n_B - 2c_2(1 - j_D)^2 \cdot n_E]$ , whether the marginal benefit is positive, negative or zero. Without a specification of the parameters the net effect of enlargement cannot be determined.

Note, that with increasing  $n_Q$  the terms in (20) including  $c_1$  and  $c_2$  move in a direction that implies a negative effect on  $G_D$ . (See fig. 3 for a graph of  $G_D$ , that implies on a “small” domain positive welfare effects.)

Although the sign of the net gain  $G_D$  depends on the specification of the parameters, one thing can be stated with certainty: while the old and new members always reap gains from enlargement the outsiders may loose.

*c. The overall balance*

Adding up the gain functions of the old members using the respective group size as a weight, the new members and the outsiders delivers the net gain function of the whole group. (See the curve labeled  $G_W$  in fig. 3).

As it turns out, there is a positive net gain for the whole group, since at  $n_Q^*$ , the gains of the old and new members outweigh the losses of the outsiders, i.e.  $G_W = n_E \cdot G_E + n_Q \cdot G_Q + n_D \cdot G_D > 0$ . Of course, a more precise analysis should be based on the partial derivative of  $G_W$  with respect to  $n_Q$ . Since this derivative includes a great many terms we do without.

**5. What would the social planner do?**



The social planner is a fictitious figure that always maximizes overall welfare. Overall welfare is at a maximum if the partial derivative of the gain function of the whole group with respect to  $n_Q$  is equal to zero:

$$(21) \quad \partial G_w / \partial n_Q := n_Q \cdot \frac{\partial G_Q}{\partial n_Q} + G_Q + n_E \cdot \frac{\partial G_E}{\partial n_Q} + n_D \cdot \frac{\partial G_D}{\partial n_Q} - G_D = 0$$

The first term,  $n_Q \cdot \frac{\partial G_Q}{\partial n_Q}$ , represents the change of the net gain of all infra-marginal new members of the Union, whereas  $G_Q$  stands for the net gain of the marginal member. A similar interpretation holds for the  $D$ -group. The term  $n_E \cdot \frac{\partial G_E}{\partial n_Q}$  reflects the change of the net gain of the old members of the Union.

The social planner always acts by taking account of all positive and negative effects of enlargement. That is, what (21) means.

## 6. Comparing the Union and the social planner decision

If the Union were interested in maximizing its own welfare, it would act according to the following condition:

$$(22) \quad n_E \cdot \frac{\partial G_E}{\partial n_Q} = 0.$$

That means, that the Union is only interested in how the enlargement affects the welfare of the old members.

From (21) it follows, that the Union decision would be identical with that of the social planner if and only if

$$(23) \quad n_Q \cdot \frac{\partial G_Q}{\partial n_Q} + G_Q + n_D \cdot \frac{\partial G_D}{\partial n_Q} - G_D = n_E \cdot \frac{\partial G_E}{\partial n_Q} = 0$$

Since  $\frac{\partial G_Q}{\partial n_Q} = \frac{\partial G_E}{\partial n_Q}$  (both curves are parallels), it follows:

$$(24) \quad G_Q + n_D \cdot \frac{\partial G_D}{\partial n_Q} - G_D = 0$$

$$(25) \quad G_Q - G_D = -n_D \cdot \frac{\partial G_D}{\partial n_D}$$

The interpretation of (25) is easy:

$G_Q - G_D$  is the net benefit of the marginal new member. This benefit is positive if  $\mathbf{a}_Q \geq \mathbf{a}_D$ .

The right hand side represents the infra-marginal losses of the outsiders.

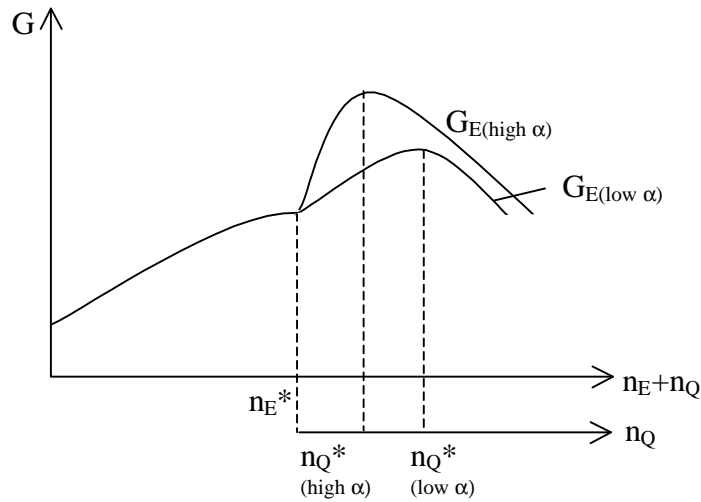
(25) allows some further interpretation:

If, with  $n_Q^*$ , the left hand side is greater than the right hand side, the marginal benefits at  $n_Q^*$  exceed marginal costs. Union size  $n_Q^*$  is too small from the point of view of group welfare. The opposite result holds if the right hand side of (25) is greater than the left hand side. Fig. 3 represents a case where Union size  $n_Q^*$  is too small from the point of view of group welfare. At  $n_Q^*$  the slope of the net gain function of the group, i.e.  $G_W$ , is still positive, which implies that increasing the size of Union beyond  $n_Q^*$  improves group welfare. But, as fig. 3 also reveals, such a move would lower the welfare of both the old members and the new members  $n_Q^*$ . However, in the situation depicted in fig. 3 with enlargement up to  $n_B$  all groups were better off compared to  $n_Q = 0$ .

The message to be derived from this exercise sounds as follows: There is no guarantee, that what is good for the Union, i.e. maximizes Union welfare, is also good for the group as a whole.

### **7. The applicants dilemma**

Our model fits reality in that we have actually two groups of applicant countries. One group, consisting of five countries, can reasonably expect to enter the Union at the beginning of the next century, although there is no guarantee of admittance after the adoption of the *acquis*. But there is another group – in our model  $n_D$  – that has got the hope to enter the Union in a second accession round. This situation is depicted in Fig.4.



**Figure 4: The Applicants Dilemma**

It is the declared policy position of the Union, that without the adoption of the acquis membership would be illusory. Thus, the Union creates strong incentives for the  $n_D$ -group to adopt the acquis. However, on the side of the then enlarged Union there might be some second thoughts.

Our model shows, that independent of whether there is another round of enlargement or not, the Union will always gain from the adoption of the acquis by the  $n_D$ -group. The reason is, that with the adoption of the acquis  $\alpha_D$  moves upwards. With rising  $\alpha_D$  the Union benefits unambiguously from an externality. The last term of the income production function (12) increases, whereas there is no effect on the enforcement costs. This positive effect on the net gain is shown in fig. 4 by the shift of the curve labelled  $G_{E(low \alpha)}$  to the curve with label  $G_{E(high \alpha)}$ .

As their income production function (15) indicates, outsiders would also reap gains from the adoption. Independent of whether there is an additional gain from becoming member of the Union, their income would go up without affecting the enforcement costs. At least as long as the acquis represents the “better” law.

However, adopting the acquis creates a dilemma for the outsiders. As the partial derivative of  $n_Q^*$  with respect to  $\alpha_D$  reveals (see footnote 28), an increase of  $\alpha_D$  is accompanied by a decrease of  $n_Q^*$ .  $n_Q^*$  has been the optimal degree of enlargement given the inherited legal order of the applicant countries, captured by the parameter  $\alpha_D$ . But now, with a better legal order, the Union would be better off by restructuring the modes of economic integration. In other words, it improves Union welfare, if internal transactions are substituted by external ones. That means, that the then enlarged Union of size  $(n_E^* + n_Q^*)$  is already too big. A smaller Union would make members better off. That is what is depicted in fig. 4.

Union size  $n_Q^*$  (low  $\alpha$ ) represents the enlargement in the first accession round. This bigger Union would benefit by the adoption of the *acquis* (high  $\alpha$ ) indicated by the upwards shift of the  $G_E$ -curve. However, the maximum of the shifted curve is now at  $n_Q^*$  (high  $\alpha$ ), which is smaller than  $n_Q^*$  (low  $\alpha$ ).

The model suggests, that the applicant countries which do not participate in the first round of enlargement, undermine the probability of being let in the more they are successful in adopting the *acquis*. They should ask themselves whether it is reasonable to expect a further enlargement being accepted by the members of the Union if this would necessarily come along with a reduction of their welfare. Note, that accession is a constitutional issue, which needs unanimous consent of the then 20 members.

#### **IV. Outlook**

This paper is a first step towards the development of a theory of optimum legal areas and its application to the study of enlargement of the European Union. Rather than summarizing our results we would like to point to avenues for further research. These avenues are connected with modifying some assumptions of our model.

A model with more explanatory power should include

- heterogeneous preferences of the population
- heterogeneity of the human capital, which would lead to differences in individual incomes
- a more sophisticated treatment of the government, including the possibility of decentralization of government.

Finally, the issue of set up costs of a new legal order in the applicant countries and the costs of institutional reform within the Union needs further elaboration. If it should turn out that these costs are all but negligible institutional alternatives to enlargement and the approximation of law must be found. What comes to mind is trade liberalization. The theory of optimal legal areas can be applied to tackle the question whether the road to free trade is superior to the road to enlargement. But free trade is also associated with problems. Even if we have free trade as is understood in international economics, there are barriers to international transactions, that are largely neglected in the literature.

Whereas for domestic, internal, transactions one monopolist, the protective state, fulfils the task of law enforcement, international, external, transactions make contact with a multitude of

legal systems and with the monopoly of power claimed by each state within its boundaries. Furthermore, whereas the legal rules of each protective state can be judged - at least in principle - as unequivocal, in the international arena we do find a serious „incompossibility of rights“. Collisions of norms and gaps between different norm systems appear, an accord in court decisions is often coincidental, and the assistance of the judicial and penal institutions in foreign countries is not at all, a matter of course. Thus, the territoriality of law and law enforcement results in a specific kind of attenuation of property rights and the emergence of a special kind of risk, that has been called constitutional uncertainty in international transactions. This kind of uncertainty gives rise to coordination problems of a special kind reflected in corresponding transaction costs. Harmonization of the law and enlargement can be considered as means for the reduction of these transaction costs. But, one should not forget that there are also privately created means such as the law merchant and reputation. In some cases these means might be cheaper and more effective than consciously cooperating governments or mergers of government.

## Appendix

1. Properties of the functions of  $Y^P$ , and the enforcement cost function ( $C^P$ ):

$$\begin{aligned} \partial Y^P / \partial s > 0; \partial^2 Y^P / \partial s^2 < 0; \partial Y^P / \partial e > 0; \partial^2 Y^P / \partial e^2 < 0; \partial Y^P / \partial n > 0; \partial^2 Y^P / \partial n^2 = 0; \\ \partial Y^P / \partial j < 0; \partial^2 Y^P / \partial j^2 < 0. \\ \partial C^P / \partial s > 0; \partial^2 C^P / \partial s^2 > 0; \partial C^P / \partial e > 0; \partial^2 C^P / \partial e^2 > 0; \partial^2 C^P / \partial n^2 > 0; \\ \partial C^P / \partial j < 0; \partial^2 C^P / \partial j^2 > 0. \end{aligned}$$

We suppose that  $n$  is a natural number  $C^P > 0$  for  $n = 0$ , which means that part of the enforcement costs borne by the individual is independent of the size of the club;  $Y^P = Y^A$  and  $C^P = 0$  if  $s \vee e = 0$ .

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