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Economic Integration

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PROPAEDEUTICS OF STRATEGIC THEORIES OF ECONOMIC INTEGRATION

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Abstract. *We briefly discuss strategic considerations regarding economic integration of two countries. We primarily explore strategic aspects of economic integration when three countries are involved. The concluding section contains a short comment on the case of more than three countries.*

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1 Introduction

International economic integration removes barriers to trade. Some barriers like tariffs or quotas can be abolished easily, if this is in the interest of the countries involved. The removal of other barriers can cause considerable costs. Examples are the harmonization of differing industrial standards; anti-trust, banking, utility, environmental, health, and safety laws and regulations; conflicting fiscal and monetary policies; incompatible transportation infrastructures. The costs that must be incurred before integrated markets can function are substantial and there are serious conflicts over the sharing of these costs. This is underscored by the hard bargaining that goes on in interregional as well as international negotiations aimed at economic integration.

In the present paper we seek an improved understanding of the inherent conflict among countries as they set out to share in the costs and benefits of economic integration. We direct attention to the case of more than two countries. The departure from strategic game settings with two countries is noteworthy. With two countries, the value from not integrating, i.e. autarky, is exogenously given. With more than two countries, consecutive steps of integration are possible and the value of further integration may be endogenous. The final outcome may be path-dependent. The formation of non-trivial coalitions may play a rôle. This complicates the strategic situation considerably.

2 Economic Integration of Two Countries

There are two countries ($i = 1, 2$), two goods for simplicity, and a representative consumer for each country. There is diversity of consumer characteristics across countries which offers the prospect of mutually beneficial trade. The status quo is autarky. Economic integration amounts to opening up frictionless trade between the two countries and is costly. It requires an ex ante total resource cost D to be split between the countries. In the first stage of a strategic game, each country i chooses an investment d_i not exceeding its

initial endowment with resources, e_i . If $d_1 + d_2 \geq D$, then the two countries are economically integrated and trade from their reduced endowments, $e_i - d_i$ in the second stage. If $d_1 + d_2 < D$, then trade is not possible and each country consumes its reduced endowment. In many instances, indeed, this setting gives rise to a well defined strategic game where a player's (country's) strategic variable is d_i . This sort of game is very much in the style of Cournot-Walras market games [Gabszewicz and Vial (1972)]. Suppose that economic integration obtains, that is, $d_1 + d_2 \geq D$. Then there is also economic integration if one country increases its cost share and the other country reduces its share by the same amount. This resembles the strategic situation in a Nash demand game. Hence, if there is economic integration at all, then as a rule, there exists a continuum of equilibria with economic integration. There is also potential for mutual obstruction: There are examples where an equal split of D constitutes an equilibrium and the resulting commodity allocation Pareto-dominates the status quo, but autarky is also an equilibrium outcome. In such cases, if one of the countries does not bear any costs, then it is best for the other country not to incur any costs either, because its gains from trade would not exceed its loss from bearing all the costs. In Haller and Ioannides (1996), where more details can be found, we further parametrize diversity in consumer (country) characteristics and obtain that the more diverse the two countries are, the more they are willing to invest in economic integration.

3 Examples of Economic Integration Involving Three Countries

With more than two potential participants, economic integration poses a number of challenging questions: which countries integrate first, when to enlarge or reduce group size, and how to invoke outside options as a threat in internal bargaining. Once some, but not full economic integration has taken place, then a country's reservation or "fall-back" value when negotiating full integration is endogenously determined and admits a whole set of challenging new possibilities.

Our research to date [Haller and Ioannides (1996)] leads us to conjecture that

the most critical step in modeling many-player settings is the move from two to three players. Next we present a number of examples which highlight the fundamentals of the three-country case. We proceed by exploring further the condition that trade among any two nations, that is bilateral trade, must be mutually beneficial to both partners. Sometimes, the condition can lead to autarky as the sole outcome in a sequential integration process, although full integration would result in a simultaneous integration process. We arrive at this conclusion by drawing on an adaptation of the classic Wicksell demonstration of the importance of double coincidence of wants.¹

Example 1 (Absence of Double Coincidence of Wants): Consider an international economy consisting of three countries $i = 1, 2, 3$; commodity space \mathbb{R}^3 ; consumption spaces \mathbb{R}_+^3 ; initial endowments $e_i = i^{\text{th}}$ unit vector, that is the vector consisting of 1, in the i^{th} place, and zeroes elsewhere. Let preferences be represented by

$$u_1(x_1, x_2, x_3) = x_2; \quad u_2(x_1, x_2, x_3) = x_3; \quad u_3(x_1, x_2, x_3) = x_1.$$

There exists no mutually beneficial bilateral trading arrangement in this model. The Pareto-optimum could be reached, of course, if one trader acted as an intermediary. The Pareto-optimum is achieved, too, in a Walrasian spot market. So if establishing a “market” linking the three countries is costless, it is in the countries’ interest to establish the market. Since each country derives no utility from consuming its endowment, even a relatively large vector of integration costs, defined in terms of fixed quantities of all goods in the model, $D = (d, d, d)$ where $0 < d < 1$, could still be assumed in order to achieve world economic integration. $\square\square$

Next consider more general three-country economies, each comprised of countries $i \in I = \{1, 2, 3\}$, commodity space \mathbb{R}^3 , consumption spaces \mathbb{R}_+^3 , initial endowments $e_i \in \mathbb{R}_+^3$, and preferences represented by $u_i : \mathbb{R}_+^3 \rightarrow \mathbb{R}$. A major consequence of moving from a two- to a three-country setting is that inter-

¹This is a popular source of models in monetary theory. See Wicksell (1934) and Kiyotaki and Wright (1989).

national trade may be achieved only within a group of countries composed of a proper subset of all countries, $J \subset I$. We say that such a group forms a *regional union*, if all members of J are directly or indirectly linked with each other.²

At the beginning, no trade links exist. Individual countries can establish links, but forming a link is costly. For each direct link between a pair of potential trading partners, the cost of forming the link is given by a cost vector $D = (d, d, d) \in \mathbb{R}_{++}^3$.

Decisions to establish links are assumed to be made sequentially. Trade, if any, takes place at the very end. First a pair of countries, say 1 and 2, decide whether to establish international trade links between them. Secondly, if applicable, a further link may be established. Naturally, in the present context, a third link is redundant and will never be considered. Finally, trade takes place within each of the regional markets formed. With three countries, three types of unions are conceivable: singletons (autarky or local markets), two-country unions or regional markets, and the grand coalition I , the three-country union or global market.³ Whenever a link is created, all the members of the international trading group emerging this way can contribute some of their endowment to cover the cost of the link. So, in particular, internal subsidies are allowed, while external subsidies are not. A decision by a country to contribute to the cost necessary for an additional link is motivated by its desire to improve its own utility. A country compares its trade opportunities in the international trading group to which it currently belongs to its opportunities in an enlarged group, where it would be trading from a reduced endowment. The question of whether a link can

²After the fact it does not matter whether links are direct or indirect. If country 1 can trade with country 2 and country 2 can trade with country 3, then trade among all three is possible. Thus full economic integration is transitive. This contrasts with less invasive arrangements, like bilateral free trade agreements. A free trade agreement between countries 1 and 2 plus a free trade agreement between countries 2 and 3 does not automatically create a free trade zone including all three countries. A similar intransitivity can hold, for example, for joint R&D ventures: The fact that firm 1 is collaborating with firm 2 and firm 2 is collaborating with firm 3 does not necessarily imply that firm 1 is collaborating with firm 3.

³The possibility of international trade distortions that such an arrangement may give rise to has attracted considerable attention recently by the so-called strategic trade theory. For example, see Kohler (1997).

be formed without the consent of both countries constituting the link is irrelevant in the examples that follow, but has to be addressed in general. We assume that trade within a group of integrated economies is determined by a Walrasian market mechanism. An individual country's optimal choice in general depends on the others' choices. For the time being, *myopic* behavior is assumed, that is, when a link is formed, individual countries ignore the implications for the formation of further links.

Example 2. We reconsider Example 1 with $d = \frac{1}{3}$. A first link is never established, since it would not, by itself, open a trade opportunity.⁴ $\square\square$

The following example provides a stark contrast to the first two. It shows that countries with identical preferences and suitably chosen endowments may choose not to form a global market after a regional market is formed by two of the countries.

Example 3. Let consumer characteristic and integration costs be given as $e_1 = (11, 11, 0)$, $e_2 = (0, 11, 11)$, $e_3 = (11, 0, 11)$;
 $u_i(x_1, x_2, x_3) = x_1 x_2 x_3$ for $x = (x_1, x_2, x_3) \in \mathbb{R}_+^3$ and $i \in I$;
 $D = (d, d, d) = (9, 9, 9)$.

It is in the interest of 1 and 2 to form a first link. In the symmetric case, their endowment net of integration costs are then $(2, 6.5, 0)$ and $(0, 6.5, 2)$. Should they trade (between themselves) from these endowments, each obtains the consumption bundle $(1, 6.5, 1)$ with utility 6.5 — which dominates autarky.

Now consider that 3 joins 1 and 2, where the costs of establishing a second link have to be contributed in advance and 3 contributes as much as possible. Then, with symmetric treatment of 1 and 2, their revised endowments net of integration costs become $(2, 2, 0)$, $(0, 2, 2)$, and $(2, 0, 2)$, respectively. If trade

⁴A similar incentive problem can arise in sequential innovation with division of labor. A basic innovation may not have any direct use value *per se*, but serve as an important stepping stone towards subsequent innovations that are commercially profitable. Suppose the entire process of innovation would be profitable, but too little profit accrues to a basic innovator. Then basic innovators may have insufficient reason to invent in the first place and, consequently, the entire process will not take place despite its desirability.

occurs from these endowments, each ends up with the consumption bundle $(\frac{4}{3}, \frac{4}{3}, \frac{4}{3})$ and associated utility $\frac{64}{27} \approx 2.37$.

This shows that 1 and 2 benefit from establishing the first link between them. They have no interest in establishing the second link. Notice that this is an efficient outcome, albeit at the detriment of country 3. Notice further that this outcome constitutes an instance where *ex ante* symmetry does not beget *ex post* symmetry. $\square\square$

In the next example country 3's willingness to contribute to a second link is high enough to establish the second link (to the benefit of all three countries) after the first link between countries 1 and 2 has been formed.

Example 4. Here $e_1 = (2, 1, 1)$, $e_2 = (1, 2, 1)$, $e_3 = (1, 1, 2)$. Preferences are as in the previous example. We treat $D = (d, d, d) \geq 0$ as variable.

Suppose a link between 1 and 2 already exists. It is primarily (though not exclusively) country 3 who is interested in establishing a second link. And 3 is certainly willing to shoulder most of the burden of establishing this link. The alternatives for 3 are autarky, with utility 2, and a global market. In the latter, 3 attains the consumption bundle $(\frac{4-c}{3}, \frac{4-c}{3}, \frac{4-c}{3})$ and utility $(\frac{4-c}{3})^3$ where $c = c_1 + c_2 + c_3$ and (c_1, c_2, c_3) is 3's contribution to the second link. Let d^* denote 3's "willingness to contribute", i.e. the c which makes 3 indifferent between the two alternatives. Then d^* is given by $(\frac{4-d^*}{3})^3 = 2$ or $d^* = 4 - 3\sqrt[3]{2} = 0.2202369$.

Now let d be such that a first link between 1 and 2 is feasible and benefits both. Consider the symmetric outcome of this market: Each gets the consumption bundle $(\frac{3-d}{2}, \frac{3-d}{2}, \frac{2-d}{2})$ and utility $(\frac{3-d}{2})^2 \cdot \frac{2-d}{2}$. Feasibility requires $0 \leq d < 2$. Desirability requires $d < 0.1$. Suppose 3 makes a total contribution $\min\{3d, d^*\}$ to a second link, while 1 and 2 share the residual cost equally. Because of the homotheticity of preferences, trade in the global market leads to the consumption bundle $(\frac{x}{3}, \frac{x}{3}, \frac{x}{3})$ and utility $(\frac{x}{3})^3$ for both 1 and 2, where $x = 4 - [3d + \max\{0, 3d - d^*\}]/2$.

- (i) $3d \leq d^*$. Then $\frac{x}{3} = \frac{1}{2}(\frac{8}{3} - d)$ and $(\frac{8}{3} - d)^3 - (3-d)^2 \cdot (2-d) = 0.962 - \frac{1}{3}d > 0$. Hence 1 and 2 wish to have the second link.

- (ii) $3d > d^*$. Then $3d - d^* < 0.3 - 0.22 < 0.09$, $\frac{x}{3} = \frac{1}{2} \left(\frac{8}{3} - d - \frac{3d - d^*}{3} \right)$ and $\left(\frac{8}{3} - d - \frac{3d - d^*}{3} \right)^3 > \left(\frac{8}{3} - d - 0.03 \right)^3 = \left(\frac{8}{3} - d \right)^3 - 3 \cdot \left(\frac{8}{3} - d \right)^2 \cdot 0.03 + 3 \cdot \left(\frac{8}{3} - d \right) \cdot 0.03^2 - 0.03^3 > \left(\frac{8}{3} - d \right)^3 - 3 \cdot \frac{64}{9} \cdot 0.03 = \left(\frac{8}{3} - d \right)^3 - 0.64$ and, therefore, $\left(\frac{8}{3} - d - \frac{3d - d^*}{3} \right)^3 - (3 - d)^2 \cdot (2 - d) > 0.322 - \frac{1}{3}d > 0$. Hence again, 1 and 2 wish to have the second link.

Unlike in our previous example, 1 and 2 always want the second link to be established. \square

Remarks. While diversity is the prevalent driving force, but not the only force⁵ for economic integration, there are still apparent *ex ante* symmetries depicted in all four examples of this section, a feature that has allowed us to illustrate that *ex ante* symmetries need not force symmetric or efficient outcomes. However, it is equally important to observe that our analysis need not rely on *ex ante* symmetries — except for computational convenience. A slight perturbation of the primitive data of our model economies (initial endowments, preferences, integration costs) would render the analysis more complicated, but not affect it in any substantive way. The situation can look quite differently, if there are, for instance, major differences regarding country size (measured by the number of consumers, an additional variable) or the magnitude of per capita resources. Then only a particular pair of countries may be interested in a first link. Or formation of the global market may require that the right pair of countries integrates first.

A more formal treatment of the three-country case could incorporate endogenous determination of reservation utilities along the lines of Bennett (1988). Namely, when countries contemplate forming a union, each takes into account what it might achieve in alternative cooperative arrangements. In this respect, the three-country case differs fundamentally from the two-country case: each party points at its alternatives which are now endogenous. As an example, the creation of the European Free Trade Association (EFTA) may be interpreted in this manner. As soon as the European Economic Community (EEC) was formed the UK promoted EFTA, which played the rôle of a fallback position for the UK during the subsequent negotiations leading to her accession to the EEC.

⁵See Krugman (1981) for the intraindustry specialization argument.

4 Conclusions and Ramifications

International economic integration or, alternatively, disintegration constitutes one of the most dramatic efforts of redesigning economic institutions. We assume from the outset that fixed costs must be incurred as an important prerequisite for international trade and proceed to explore several three-country examples. Our examples show that countries with identical preferences but (suitably chosen) different endowments may choose not to form an integrated world economy. This reveals the importance of the sequence with which regional trading blocks integrate.

Although we have merely described the feasible outcomes of the process of integration and refrain from promoting here a particular extensive form of a strategic game of economic integration, the complexity of this setting is quite evident. Clearly, the outcomes are sensitive to the choice of extensive form. But more importantly, the above examples pose fascinating questions regarding multiplicity of equilibria, given a specific extensive form. A more in depth analysis would require crucial choices concerning the extensive form and the adoption of a particular solution concept.

The obvious variety of outcomes in examples with three countries is suggestive for the case of more than three countries: As the number of countries increases, the availability of more regional unions increases the number of options in the initial stages of economic integration, but may subsequently restrict the possibilities of achieving a global market. ¿From the point of view of a particular country's welfare, a larger number of countries seems to provide more opportunities for beneficial alliances. But this also holds true for the country's potential partners. The latter circumstance could increase the likelihood that the country ends up as the "odd man out."

Also, as the number of potential trading partners increases, the dependence of the welfare gains from trade on group size promises to become complex and intriguing. Future research should study the pattern of international trade in large trading groups and its consequences for the international distribution of welfare gains from trade. Elsewhere we examine additional aspects of the process of economic integration, such as those associated with monetary union [Haller and Ioannides (1993)].

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