THE INTERNATIONAL ECONOMIC COOPERATION

THEORETICAL FOUNDATIONS

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Warszawa 1992

PREFACE

The main difference between the work here presented and the other studies related to the same, generally speaking, domain, consists in the fact that considerations contained in this book indicate the possibility of resolving questions concerning the choice of the subject and establishment of profitability of international trade and cooperation in conditions when:

* prices on the internal market do not correspond to social costs,

* there is lack of conviction as to correctness of exchange rates,

* prices in international trade are subject to manipulations, resulting from definite interests of some countries, or they simply cannot follow the development of world production system.

As can easily be noticed these are just the conditions in which currently the international trade and cooperation system is being shaped. These particular conditions result, for instance, from governmental subsidies oriented at individual commodities or groups of commodities (e.g. food products), from existing custom tax barriers and from an extremely quick pace of technological progress in the techniques of production.

INTRODUCTION

The problem of international exchange was presented for the first time in precise mathematical terms by Wassily Leontief in his paper entitled "Factor Proportions and the Structure of American Trade", published in *Review of Economics and Statistics* (1956, vol. 38, no. 4).

The first mathematical approach to the problem presented in Poland, was of international industrial cooperation formulated in the Doctoral dissertation of Andrzej Ameljańczyk (Military Technical Academy, 1975), supervised by this author.

Earlier, a similar formulation of the problem of international trade exchange had been forwarded in the Doctoral dissertation of J.Kotyński (Main School of Planning and Statistics, Warsaw, 1968).

If we distinquish the specific problem of international economic cooperation within the broader domain of international trade exchange then the first monograph devoted entirely to economic cooperation is the book in Polish by S.Piasecki, J.Hołuniec and A.Ameljańczyk, entitled "International economic cooperation - Modelling and Optimization" (PWN, Warsaw-Łódź, 1982).

The assumption of complementarity of goods, characteristic for the problem of cooperation, was first introduced by D.Graham in 1923 in his paper "The Theory of International Values Examined" (Quarterly Journal of Economics, vol. 38, no.1).

The present publication contains the original results of studies conducted during the years 1982-1985, being a continuation of work started a dozen years before.

Models of international cooperation considered there (see Chapters 1 to 3) were much simpler than in the ones 'presented here. Still, they are, alas, only theoretical models, which cannot be practically applied in economic activity.

Notwithstanding this situation, the models give certain possibilities with respect to applications. I am convinced that

further in-depth studies in and broadening of the theory presented here will make out of it in the future a perfect instrument for economic practice. I think that conclusions resulting from it may contribute to quicker reequilibration of the international economic system, which has been put so much off the equilibrium by the existing debts.

Against the background of existing numerous publications dealing with international trade and cooperation, as well as international specialization, the theory here presented does not require acceptance of the commonly up to date adopted assumption concerning economic equilibria within the cooperating countries, and, furthermore, this theory has much greater practical potential than the previous theories, in which it has been necessary to assume existence of economic equilibrium prices for comparing profitability of trade.

Since the theory presented in this book is independent of existence of prices, it can also be used in determination of the price structure of goods included in the trade, profitable for the partners in such an international trade deal. Thus, the structure determined ("terms of trade") guarantees stimulation of international cooperation and improvement of international specialization.

On the other hand, the theory can also be used in deciding whether the structure of prices actually existing in the international market is enhancing or, to the contrary, hindering, the development of trade, whether it does not lead to an unsound development of some of the partners at the expense of the other ones. It is not difficult to realize that the theory presented, and especially its results, concern one of the essential economic problems of present time.

The theory has, indeed, its weak points as well. A number of technical simplifying assumptions put aside (their number shall be decreasing as the theory develops), there is one fundamental assumption. It says that every participant of cooperation relation (of international trade) tries to produce the maximum of necessary goods of a given structure, entering the group

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considered.

When these ones are consumption goods, we are dealing with the situation, when every partner (every national economy) participating in international exchange, is geared towards maximization of the living standard of own population, given a consumption structure characteristic for this population.

When, however, these are not consumption goods, but, e.g. semi-products, then this corresponds to the situation in which every participant-producer tries to maximize own production, this production determining the structure of demand for semi-products encompassed by cooperation. From this point of view the theory presented may get applied beyond the domain of international cooperation.

Technical simplifications adopted in the book result from the wish of possibly clear and understandable presentation of the theory. Thus, wanting to show graphically the mechanism of cooperation and to illustrate the results of the theory, the present author emphasizes in the book bilateral cooperation encompassing only two kinds or groups of commodities. Analysis of the thus simplified problem is contained in first seven chapters of the book.

The eighth chapter is in a way a generalization of considerations presented in the previous chapters so as to account for the case of multilateral cooperation, involving multiple goods. This chapter may constitute a separate whole - a summary of the contents of the book.

commodities exchanged. This leads directly to the conclusion that international exchange must be conducted under surveillance, usually in the form of granting export-import licenses.

Thus, the ideal model of international exchange (and the international specialization), based upon the uniform currency exchange rates might be valid in conditions of global price equilibrium (concerning both internal and international markets) and abolition of all governmental subsidies and tax barriers.

Until that time we must be prepared for existence and spread of clearing-type bilateral agreements with negotiated prices, as well as for tolerating the import and export licences.

In conclusion of our considerations we shall present an exemplary way of applying the theory presented for selective construction and development of advantageous cooperative connections.

The manner of applying the theory for this purpose is shown in the form of an ALGORITHM of proceeding, which can be carried out by appropriate units of administration.

The ALGORITHM:

1. Select a pair of commodities (call them no.1 and no.2), whose exchange has not been analysed until now, and which are of interest for you in terms of exchange, for you might expect that such an exchange could be advatageous for you. In case when analysis was performed for all pairs already, terminate the procedure of searching for the advantageous cooperation solutions.

2. Check whether for the selected pair of commodities there exist the conditions of free trade in the international market.

If "yes" - propose their production and exchange applying Theorem 1 and then return to point 1. of the Algorithm.

If "no" - then look for the partner of cooperation by carrying out point 3. of the Algorithm.

3. Choose for the pair of commodities considered such a partner of cooperation (side II) that the value Δ appearing in Theorem 3 be possibly high.

4. Check whether the value of "terms of trade", $\gamma_2 = c_2/c_1$, for the pair of commodities considered and the partner chosen in point 3. is contained within the bounds defined in Theorem 4.

5. Determine the couple of optimum strategies $\overset{*}{\alpha}_1^{I}$, $\overset{*}{\alpha}_1^{II}$, and $\overset{*}{\alpha}_2^{I}$, $\overset{*}{\alpha}_2^{II}$, on the basis of Theorem 2. Then, cause the start of the trade talks and negotiations with the side II, leading to conclusion of a cooperation agreement of clearing or compensational nature, based upon the prices c_1, c_2 and the determined optimum strategy of international production specialization. Then, return to point 1. of the Algorithm.

6. Cause the start of talks (with the side II) concerning potential specialization of production, indicating mutual advantages that the optimum cooperation, defined by Theorem 2., would bring, provided the ratio of mutual compensation prices is established in such a way as to make the value of γ_2, "terms of trade", be contained within the interval defined by Theorem 4.

In order to carry out the above Algorithm in the domain of international economic cooperation the following organizational units are necessary:

* a department tracking the production capacities of industry (of the own one, and of countries - potential partners), in particular with respect to shortages or surpluses of capacity;

* a bureau tracking demand/supply and prices for commodities of interest for us within the international market, in particular the ones which are being sought and for which there is a shortage.

* the specialized organizations conducting talks and trade negotiations until the trade and cooperation agreements are concluded.

As can easily be imagined the tasks of the first kind of unit shall encompass deciding in the domain of specialization (determination of the optimum strategy in accordance with Theorems 1 and 2) and gathering of appropriate information meant for this purpose.

The task of the second unit would be tracking of price movements and deciding of directions of cooperation (exports-imports), according to Theorem 3, and controlling of profitability of the negotiated transaction prices, conform to Theorem 4.

Certainly, the exemplary application of the theory here presented, outlined above, in practical activity of organization of economic cooperation with foreign countries is in complete abstraction from the organization existing presently. One could imagine a number of other manners of applying the theory for various purposes. These purposes could be: controlling the degree of profitability of the agreements reached, licencing the activity of an enterprise in the domain of foreign trade, and the like.

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