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Industrial Development

International Symposium on
Industrial Project Evaluation

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GENERAL DOCUMENTATION FOR THE
INTERNATIONAL SYMPOSIUM ON
INDUSTRIAL PROJECT EVALUATION

- A Preliminary step in setting up Industrial Projects
- B Considerations in Evaluation of Industrial Projects
- C Follow-up and supervision of Industrial Projects
- D Survey of Country Experience (including Case Studies)
- E Miscellaneous Documents

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21	ID/IPA/P.3	The Role of an Industrial Project Evaluation Agency in the Selection of Capital Investments	Theodore W. Schultz
22	CID/IEE/P.4	The Role of Government in Manufacturing Investment	Theodore W. Schultz
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CRITERIA OF ECONOMIC INTEGRATION IN INDUSTRIAL
PROJECT EVALUATION IN DEVELOPING COUNTRIES

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A. IMPORTANCE OF ECONOMIC INTEGRATION OF DEVELOPING COUNTRIES
IN RELATION TO THEIR INDUSTRIALIZATION

Economic integration means in fact a gradual unification of economies by which, as it is generally known, several important effects for the participating countries are achieved, namely:

1. Combination of resources of several countries and their joint coordinated exploitation facilitate better results than would be achieved by separate efforts if individual countries;

2. Integration means an evolution of regional division of labour. Individual countries specialize in certain industries which manufacture products for large market of the entire integrated sub-region or/and region and thus:

a/ prevent the introduction of parallel production and unsound competition;

b/ reduce investment costs per product;

c/ increase productivity of labour;

d/ reduce production costs per product.

3. Integrated area may acquire the quality of a strong partner in world markets, thus strengthening the negotiating position of developing countries and creating prerequisites for improvement of their terms of trade.

The economy of any developing country should be built up as a complex which is composed of mutually interdependent sectors. In other words, it is necessary to develop agriculture so that it may supply increasing quantities of raw materials for industry, more food-stuffs for the population which finds working opportunities in industry so that those employed in agriculture could buy ever increasing quantities of industrial products. On the other hand a simultaneous development of industries producing capital and consumer goods and services as well as the creation of appropriate infrastructure is indispensable.

The comprehensiveness of economic development does not mean, however, that individual sectors and activities are not differen-

tiated from the point of their function and order of priority in development. With regard to long-term perspective of industrialization emphasis should be placed on strategic importance of the means of production which primarily creates conditions for the development of the whole economy.

However, individual countries cannot develop the production of every type of goods and services. They do not have all the requisite means and even if they had them, self-sufficiency would be conducive to waste since limited domestic markets would not ensure conditions for viable large scale production. Therefore the comprehensiveness of economic development must be understood regionally, i.e. the entire sub-region and/or region should be developed as a single economic entity. Even in this connexion the importance of integration for industrial development and the general growth of developing countries is brought to prominence. It should be noted that the policy of constructing large-scale capacities for the whole region is not contradictory to the efforts aimed at developing simultaneously small-scale production earmarked mainly for domestic market.

It is becoming increasingly evident that without integration developing countries cannot achieve the required accelerated rate of economic growth due to the fact that the construction of strategic key industries (metallurgy of iron and non-ferrous metals, chemistry, engineering) cannot be effected on a narrow national basis of individual countries.^{1/}

Even though in some branches technical progress provides for economically viable production on a relatively small scale for domestic market, a large market seems to be a sine qua non condition for the utilization of modern technology. Modern technology necessitates large-scale plants, division of labour and specialization which often

1/ "Never before had there been such unanimous recognition of the need for integration and of the urgency of expediting it, ideas were given particular stress by Mr. Gustavo Diaz Ordaz, President of Mexico, at the inauguration of the eleventh session, when he stated that ECLA's principal function and raison d'etre at the present time were to help achieve the economic and social integration of Latin America." See Noticias de la CEPAL, Year 1965 No.2, p.7.

are not possible within the narrow limits of national markets.

It is a very complicated problem, however, to decide in which production the country in question should specialize in order to obtain other goods it needs through exchange for products it manufactures at low costs. This problem may be solved only on the basis of a detailed complex research of conditions prevailing in individual countries which is an integral part of the method of industrial project evaluation from the point of view of integration. The decision concerning the location of individual projects within an integrated area must necessarily be based on a profound knowledge of integration problems of developing countries as a specific economic process which will then logically reveal the principles to be applied in project location.

B. THE BASIC PROBLEMS OF INTEGRATION AND SOME SUGGESTIONS
FOR THEIR SOLUTION

The recent integration attempts of developing countries have brought a number of valuable experiences. They particularly pointed to certain specific obstacles which stand in the way of further integration efforts.

The most difficult problem which is encountered in all forms and all phases of integration is the question of how to counteract tendencies toward industrial concentration in countries where an industrial base with at least partial facilities already exists.

It has been proved that this problem can only be solved by consistent coordination of development plans and general economic (trade, financial, transport, etc.) policies and by close cooperation provided for in interstate agreements.^{1/}

The unfavourable position of less developed countries should be compensated by certain unilateral advantages and preferential treatment; in granting them assistance and priority in decisions on joint construction of infrastructural facilities, etc.

In the liberalization of mutual trade within the integrating area less developed countries should be granted longer periods for the reduction and elimination of customs tariffs or possibilities to use restrictive measures in case of need.

Priority treatment for the less developed, mostly landlocked countries in the redistribution of customs and tax incomes derived from mutual trade represents another possible way to be taken in the solution of this problem.

1/ There is no doubt today that integration must be effected through cooperation of all participating countries in a complex manner and simultaneously in both spheres of production and distribution.

Of help might be common investment fund from which less developed countries would draw preferentially. Regional development banks which must become integration institutions should grant credits preferentially to less developed countries in cases of projects collectively allocated to them within the framework of regional division of labour.

All these preferences may effectively help eliminate unequal economic position of less developed countries. A long-term solution of the problem, however, will be found only in an accelerated rate of industrialization of less developed countries enabling them to catch up with their more advanced partners. The core of the solution to this problem therefore lies in allocating to less developed countries such industry which in their conditions will facilitate their economic growth to the maximum.

It is therefore particularly essential to identify projects in the course of the collective evaluation of their location, which could be assigned preferentially to less developed countries, leaving aside, if necessary, the strict application of certain efficiency criteria.

Another similar possibility is to allocate to less developed countries such industrial establishments where the availability of raw materials or other natural resources does not play the decisive role in the choice of location. In landlocked countries attention should be paid to construction of such industries whose products are, if possible, of low weight and high value in order to effect savings in transportation costs.

If, in another case, two countries in close vicinity dispose of approximately the same natural resources, preference should be given to the construction of processing industry in the less developed country of the two with the understanding that this industry will supply the adjacent areas of the more developed country.

Another important problem closely connected with the preceding one is the question of finding solution to the relation between the protection of infant industry and a certain necessary level of competition. The liberalization of trade gives rise to competition which has a different impact upon individual countries, depending on the level of their industrial production. Competition affects most sensitively the least developed countries. Therefore liberalization should proceed with caution, with due regard to the difficulties of individual countries. Fixed

terms for liberalization should be specified together with a plan of measures which will be helpful in surmounting existing difficulties. Full liberalization should be undertaken, i. e. competition should be allowed to operate in full only after approximately the same conditions have been created in all the countries concerned. The common customs tariff should be so adjusted that after a certain period of time, when there will emerge danger that industry would lag behind sound external competition would start to operate.

A great obstacle to integration effort are differences in legislation, administration, price and financial policies etc. of individual countries. One of the first tasks before the countries, striving for integration, is mutual harmonization of laws, regulations, administration, nomenclature of goods, etc. Another necessary measure is standardization of products, quality norms, etc.

If political disputes exist between developing countries, it is necessary to choose such forms of economic cooperation that may be developed even in conditions of political tension and which help eliminate the tension.

In this connexion it is useful to mention the interdependence of political and economic relations between countries. It is common knowledge that politics and economics cannot be separated; only emphasis may be placed on either the political or the economic aspects of relations between countries. Good political relations between countries are generally recognized to have a positive impact on the development of their economic relations. It is often forgotten, however, that the latter can also exercise positive influence on the former. Convincing, mutually advantageous economic contacts considerably help in diminishing political divergencies. This aspect can be of great importance in facilitating negotiation on integration particularly in the important initial stage. If some countries take a skeptical attitude to creating an integrated area for political reasons, then they must be persuaded by objective economic analyses of the colossal advantages accruing from integration. In some cases efforts should be made to effect a progressive development of economic cooperation only in several specific questions which create conditions for general economic rapprochement. In other cases it may even be considered as a success to conclude an agreement among participating countries stipulating that they will abstain from construc-

tion of parallel capacities and that they will mutually fix import quotas for goods the manufacture of which they will not introduce.

A considerable obstacle to the development of the already existing integration are vested interests of groups of producers who feel threatened by trade liberalization and by systematic construction of new capacities. The more independent course of development individual countries follow (paying no regard to what the other countries of the region are doing), the greater are the obstacles looming on the way of future coordination of plans and integration effort. At the present time it is of primary importance, especially for Africa, to start the coordination of development plans as soon as possible, as long as these plans are still sufficiently flexible and before the African countries develop modern industry. Once development plans are frozen at the national level and their implementation gives rise to interests on the part of producers, both domestic and foreign, it will be much more difficult to attain coordinated planning and integration. "The sooner, the better" is the principle applicable to the integration of all developing regions.

C. INDUSTRIAL PROJECT EVALUATION WITHIN INTEGRATED ECONOMIC
SYSTEM OF DEVELOPING COUNTRIES

I. Specific features of industrial project evaluation from the
point of view of integration

In industrial project evaluation from the point of view of economic integration and/or economic cooperation of developing countries certain specific features are brought to prominence which do not come into the picture in the industrial project evaluation within a country. At least two of these features, the most relevant ones, merit to be mentioned here, namely:

- (i) in discussing any question pertaining to the sphere of international relations, i. e. also in negotiating the distribution of industries within an integrating area individual countries deal with each other as economic units; it follows that in such cases it is necessary to proceed from macro-economic aspects, i. e. from the assumption that social views are decisive;
- (ii) international coordination of investment and production programmes, i. e. the building up of industrial enterprise from the point of view of group of developing countries, is a matter of agreement between the countries concerned based on the reciprocal advantage and quid pro quo principle. This is why the generally valid criteria applied in the project evaluation from the standpoint of domestic economy of individual countries are supplemented by other specific views concerning the relations between countries where the reciprocity principle constitutes the decisive aspect.^{1/}

1/ In the evaluation made from the point of view of a group of countries the generally valid criteria used in the project evaluation within individual countries are to be applied to economic conditions and possibilities of the group and/or region. In other words, it is assumed that the contemplated enterprise will depend on resources of not one country but of a group of countries which will also provide markets for its products.

II. Principles applied in the choice of location of industrial projects within a group of countries.

A decisive prerequisite of success in integration efforts of any kind, and in efforts in distributing industries among the countries involved in particular, is the strict observance of the principle of equitable distribution of positive and negative impacts, economic results and sacrifices resulting from the division of labour and integration.

The principle of equitable distribution of benefits among participating countries should, however, be understood and interpreted in such a way that the less developed countries could obtain equitable share in benefits only if they are given special preferential treatment.^{1/}

The above mentioned prerequisite is so important and decisive that it practically determines all activities connected with project evaluation. Any attempts for integration of developing countries that would disregard the equitable distribution of positive and negative, direct and indirect impacts between the countries involved are doomed to failure. The observance of this principle also constitutes a condition for preserving the existing customs unions and other economic groupings.

This basic principle is applied in practice by means of several partial principles derived from it, of which the most prominent is the principle that each of the countries involved must have efficient industry which will become one of the factors of rapid economic growth. The problem of what industry should be built in this or that country must be solved on the basis of comprehensive pre-investment studies facilitating the choice of the most effective industries for the country in question. The scope of such an industrial project should be decided so that its output should cover not only the growing domestic demand but also exports to the other countries involved which will enable to effect

^{1/} See preceding section (ii)

payment for imports from these countries. This principle helps the countries participating in the division of labour to mutually secure the markets for the production in which they specialize.

An equally important condition for success is the principle that economic cooperation within integration effort must in each of the participating countries provide for gradual construction of even such industrial branches that might profitably export to markets of advanced countries and thus create foreign exchange funds for imports of machinery equipment.

Another principle is that each candidate project must be compared with others under a uniform system of criteria in order to, (1), determine their most effective location within the whole region and (2), enable individual countries to compare the advantages and the disadvantages emanating from the construction of projects allocated to them with the advantages and disadvantages of projects located in the other countries. Some projects will for various reasons appear to be more advantageous from the point of view of all countries involved. Therefore attention should be paid in the course of negotiations on the allocation to the equitable distribution of both the attractive and the less attractive industries.

The following criteria may come within the uniform system of criteria facilitating comparison of candidate projects:

- a/ social value added by manufacture per unit of money invested, including both direct and indirect benefits;
- b/ fixed and circulating capital-output ratio;
- c/ pay-back of capital invested;
- d/ cost-benefit ratio;
- e/ social profitability;
- f/ ratio between foreign and domestic investment resources;
- g/ capital and labour intensity;
- h/ absolute and relative foreign exchange savings;
- i/ losses resulting from shifting imports from low-cost to high-cost sources due to introduction of common external tariffs and trade liberalization within the region;
- j/ tariffs receipts reduction due to liberalization of trade between member countries;
- k/ possibility of selling the products concerned in industrially advanced countries;

- l) share of individual countries in the common build-up of infrastructure necessary for ensuring cooperation of participating countries (railways, roads, communications, port facilities, power bases, research institutes, technical schools etc.)
- m) others.

III. Procedure in industrial project evaluation from the standpoint of their distribution within a group of cooperating countries.

In evaluating industrial projects from the point of view of their distribution within a group of countries (sub-region or region) certain principles and procedures should be observed since project evaluation comes within the sphere of international relations. From this point of view the activities connected with evaluation and distribution may be divided into the three following stages:

1. working out of a list of projects suitable for distribution within a given sub-region or region;
2. evaluation of candidate projects at national level;
3. contractual and institutional implementation of coordinated construction of agreed projects.

Stage I - working out of lists of projects suitable for distribution within a given sub-region or region

The list of candidate projects may be worked out by any country or institution. The list should include projects feasible in view of the possibilities and requirements of the whole region and/or group of cooperating countries. These will be projects meeting specific demands, for example:

1. industrial plants necessitating a larger market than the market provided by individual countries where economically sound operation is possible only on the basis of large scale production;
2. industry that might be supplied by raw materials and power resources existing in the region;
3. industry that will constitute a basis for further economic

- development of all participating countries and to which construction of other industries will be linked (e.g. iron and steel, basic chemical raw materials, non-ferrous metals, etc) and which will create new and numerous working opportunities;
4. industry that would, in the largest extent possible, replace imports and achieve maximum savings of foreign exchange from the point of view of both, the entire region and individual countries;
 5. industry the output of which may be exported to markets of advanced countries.^{1/}

Stage II - evaluation of candidate projects
at national level

On the basis of the first preliminary list individual countries will undertake pre-investment studies of those candidate projects for the construction of which they have suitable conditions. At this stage attention will be paid, besides normal technical and economic criteria^{2/} and direct and indirect impacts and effects, especially to the following aspects:

- i/ whether they have available sufficient quantities of raw materials and power at an accessible place;
- ii/ whether their countries meet the condition of orientation towards inputs or orientation towards markets, depending on what the project in question requires.
- iii/ what supplementary investments in the infrastructure would be necessary for the project and how the country may contribute to investments in such infrastructural projects.

1/ For example, a secondary copper industrial plant located in Zambia could cover all the criteria mentioned above. Such a plant with an approximate output 8.000 tons per annum (the minimum economic scale of output for a viable copper fabrication plant) could cover the total demand of East Africa including Malawi and Southern Rhodesia. Additionally export markets outside Africa would have to be found. (See "Report of the ECA industrial coordination mission to East and Central Africa" E/CN.14/247, p.23.)

2/ For example, the level and pattern of the future demand, which is one of the normal economic criteria applied by individual countries should be carefully assessed for the whole sub-region or region. Detailed country-wise demand projections can be aggregated to regional level.

iv/whether the output volume of candidate projects will be sufficiently great to cover domestic consumption, exports to the other countries involved for obtaining the foreign exchange needed for payments of imports from these countries and, if possible, exports to advanced countries for obtaining foreign exchange for payment of imports of capital goods.

v/ what advantages accrue for the country in question from individual projects.^{1/}

Stage III - c o n t r a c t u a l a n d i n s t i t u t i o n a l
i m p l e m e n t a t i o n o f c o o r d i n a t e d
c o n s t r u c t i o n o f a g r e e d p r o j e c t s

An ideal solution would be conclusion of a multilateral agreement on gradual economic integration which would be conducive to an economic union, and establishment for this purpose of the necessary institutions which would secure in this process uniform investment, trade, tariff and financial policies. Attention is called here, as at another place of the study, to the fact that it is insufficient to build up a customs union and a common market. The liberalization of trade without a conscious systematic distribution of industries on the basis of coordination of investment plans and without close economic cooperation would lead to unequal development within the integrated region, to an unequitable distribution of benefits derived from integration and eventually to a decomposition of the integrating unit.

However, the way towards an economic union through common market and systematic coordination of economic policies faces numerous obstacles, particularly differences in the political sphere. It would not be correct, however, to postpone efforts for coordination of investment policies until the disputable questions existing between developing countries will have been solved. It is necessary to introduce without delay such forms of economic cooperation that are feasible even in a situation when relations between countries are not at their best. Experience has shown that economic relations contribute to improving political atmosphere. Therefore, if an agreement on the formation of a common

1/ See preceding paragraph "II. Principles applied...."

market is not in view, more modest aims will prove more practicable. The possibility of attaining partial results is offered, e.g., by interstate agreements, viz.

a/ on economic cooperation and complex, partial or sectoral industrial specialization. These are agreements specifying that certain industrial activities (sectors) are assigned to certain countries and that the other participating countries, will abstain from construction of parallel capacities and purchase the relevant products from the former contracting countries. Such agreements could cover coordination of investments into import replacing industries, and usually contain mutual obligations of the contracting countries to create conditions facilitating the division of labour and the resulting trade.

b/ on mutual exchange of goods which would be conducive to gradual specialization through setting of fixed quotas of goods and principles of clearing payments.

c/ on coordination of trade, financial and general economic policies, in particular on progressive liberalization of mutual exchange of goods.

d/ on joint construction of infrastructure projects, necessary for the development of the whole region and/or group of participating countries.

A practical step towards the conclusion of the agreements mentioned above might be collective scrutiny of all candidate projects by specialists from all the interested countries according to the list worked out in the preceding stage. The principles referred to in section C should be applied in these deliberations. Different direct and indirect methods may be used for purposes of international comparison. Since market prices existing in individual countries are distorted to a great extent by different interventions of economic policy and as these aspects are macro-economic in nature, methods of international comparison should make use of accounting or shadow prices and exchange rates reflecting as best as possible the social costs.^{1/}

^{1/} One of the applicable methods of international comparison of social costs is explained in the last section.

D. SOME METHODS OF INTERNATIONAL COMPARISON OF PRICES AND PRODUCTION COSTS FOR THE PURPOSES OF ASCERTAINING COMPARATIVE ADVANTAGE OF INDUSTRIAL PROJECTS LOCATION

Various methods of international comparison have been employed to find out which of the participating countries has the most suitable conditions for individual branches of industrial production. The main indicators serving this purpose are, in particular, the availability and cost of raw materials, power, skilled labour, transportation, etc. In addition to these partial indices it is necessary to compare also synthetic data, which are prices and production costs reflecting the productivity of labour. International comparison of prices and production costs is required particularly in countries which had already established certain type of industrial production, e.g. Latin American countries. In countries where modern industrial plants have not been built yet, e.g. in some African countries, comparison will have to be made of calculated prospective prices and costs.

There are not many feasible methods of comparison of prices between developing countries and it may well be stated that none of those when applied in practice gives satisfactory results. This is of course understandable in view of the insufficient statistical data which are available for such comparison. The little satisfactory results in the field of international comparison of prices and costs unfortunately affect integration efforts of developing countries at a particularly sensitive place. One of the basic prerequisites for the development of cooperation, coordination, division of labour and a common market between developing countries is precisely the confidence in the justification of such comparisons, since on their basis individual countries have to decide on very important measures and investments. This is the principal reason why effort should be made to seek such methods of comparison that would win the largest measure of confidence of developing countries.

The two methods of comparison explained below represent an attempt to render a contribution in this very effort to gain more confi-

discrepancy in the results of international comparison of prices and costs.

The first method is in substance only a minor adaptation and/or development of the well-known method of basket of goods and services recently elaborated by the ECLA Secretariat.^{1/}

The other method represents a modification of the indirect method of international comparison of production costs proposed by the author of this study in 1961.^{2/}

I. Method of direct international comparison

The method of international price comparison elaborated in detail and practically feasible is contained in the already quoted document prepared for the 10th session of ECLA . The method is mathematically simple, but demanding considerable quantity of spade work. In order to calculate the parity exchange rates, it is necessary to collect the prices of a large number of products and services of all categories constituting the common basket of goods and services which necessarily gives rise to difficulties inherent in any attempt for international comparison of prices, productivity of labour, etc. The difficulties arise from the qualitative difference of products compared, time difference of data acquired, impossibility of expressing exactly the relations between national currencies, etc. The method used in the document attempts to surmount these difficulties by a choice of averages, representative products, approximation, etc. However, the document does not deal with one important deficiency, even though it is mentioned in the text, namely the distortion of domestic prices resulting from the very much different levels of taxation in individual countries (customs, indirect taxes, consular and other fees, subsidies, etc.) which make the prices considerably divergent from the "real" let alone the so-called social

1/ "A Measurement of Price Levels and the Purchasing Power of Currencies in Latin America 1960-1962" E/Cn.12/553.

2/ V. Černianský "Ekonomika socialistického zahraničního obchodu" (Economics of Socialist Foreign Trade), Prague 1961, pp. 62-63.

equilibrium prices of final products and opportunity cost of inputs.

This deficiency might be surmounted in part by applying so-called social accounting or shadow prices in the formulae used in the study. The practically feasible formula which would pay regard to adequately adjusted prices would, in the method in question, look as follows:^{1/}

$$E_{ok} = \bar{P}_{ok} = \bar{R}_{ok} = \frac{\sum_i q_{i\bar{o}} / P_{ik} - T_{ik} + S_{ik}}{\sum_i q_{i\bar{o}} / P_{io} - T_{io} + S_{io}} \quad (1)$$

where E_{ok} is the parity exchange rate which expresses the currency of country o in units of country k's currency;

\bar{P}_{ko} is the price ratio of country k relative to country o / o being any other country within the group of countries/;

\bar{R}_{ok} is purchasing power equivalents of the currency in country o expressed in currency units of country k;

$\sum_i q_{i\bar{o}}$ is the cost of an average regional quantity basket per capita / covering consumer goods, means of production and services/;

\bar{o} is the average of all countries involved;

o is any country within the group / o = a, b, c, ... m countries/;

i is the final consumption or investment product for the country concerned / i = 1, 2, 3 n items/;

P_{ik} is market price of item i in national currency of the country k;

P_{io} is market price of item i in national currency of the country o;

T_{io} , T_{ik} are indirect taxes, custom duties, consular and other fees etc. include^d in the calculation of the prices P_{ik} and P_{io} ;

S_{ik} , S_{io} are subsidies reducing the market prices P_{ik} and P_{io} ;

It is understandable that the above formula may be used not only for the calculation of parity rates, but also for international comparison of prices of individual products or groups of products both by

1/ For detailed information on the concept and use of the accounting method see "A Measurement of Price Levels and the Purchasing Power of Currencies in Latin America 1950-1952." op.cit.

means of indices and coefficients.

If the prices to be compared which are expressed in different national currencies need to be expressed in a common denominator, we use the following formula:

$$\bar{P}'_{ko} = \frac{1}{\bar{R}'_{ko}} = \bar{R}'_{ok} = \frac{\sum_i q_{io} \left[\frac{P_{ik} - T_{ik} + S_{ik}}{E'_k} \right]}{\sum_i q_{io} \left[\frac{P_{io} - T_{io} + S_{io}}{E'_o} \right]} \quad (2)$$

where E'_k , E'_o are prevailing exchange rates of countries k and o with respect to common currency ;

\bar{R}'_{ko} is the purchasing power equivalent of country k to country o when the exchange rates E'_k and E'_o are applied ;

\bar{R}'_{ok} is the purchasing power equivalent of o and k using the same exchange rates ;

P'_{ko} is the price ratio for countries o and k, again when the exchange rates E'_k and E'_o are applied ;

Other symbols maintain the significance that they have previously had with respect to the formula No.1.

The above variations to the basic formula (2) does not make it possible to express directly the parity rate, since prevailing rates E'_o and E'_k were employed. Since, however, the symbol \bar{P}'_{ko} expresses the price ratio between two countries when exchange rates E'_k and E'_o are employed, it serves simultaneously as a corrective factor which must be used so that prevailing exchange rates should equal the parity rates, i. e.

$$E_{ok} = E'_{ok} \times \bar{P}'_{ko} = \frac{E'_{ok}}{\bar{P}'_{ok}} \quad (3)$$

and

$$E_{ko} = E'_{ko} \times \bar{P}'_{ko} = \frac{E'_{ko}}{\bar{P}'_{ko}} \quad (4)$$

The given basic formula and the other formulae derived from it may be applied for the calculation of:

1. parity exchange rates expressed in
 - a/ domestic currency equivalent to one unit of other currency,
 - b/ units of other currencies to one unit of the domestic currency;
2. relation between price levels of countries and the purchasing power of national currencies /as reciprocal value of price relation/ ;
3. price relatives by individual products or sectors and by country, when as a base or reference point for prices and quantity basket is used
 - a/ any chosen country,
 - b/ average of the whole region or group of countries;
4. purchasing power equivalents for individual products or groups of products or sectors expressed in currency units of individual countries as equivalent to currency unit of the chosen country.

According to some economists^{1/} the accounting prices may be used only in the "universe of candidate projects" in one given country by progressive application of accounting prices at different levels till all the available resources are exhausted. However, this condition cannot be met in developing countries due to the lack of necessary data. Moreover, the amount of effort expended in the calculation of an immense number of variants would not be commensurate to the results achieved. It is believed that in most cases of project evaluation in developing countries it will be sufficient for preserving comparability within a macro-economic complex to apply equal methods of calculation concerning all items and projects. For example, the comparability within a complex is preserved if, under a uniform method, the prices of all products compared are decreased by distorting calculation components as, e.g., taxes, customs and other firmly fixed fees and increased by subsidies, as it is indicated in the basic formula (1) of this study.

1/ J. Timbergen " The Design of Development", John Hopkins Press, Baltimore, Maryland, 1956.

II. Method of indirect international price comparison by means of average world prices.

In international comparison of industrial projects it is necessary to apply primarily such methods that are not too complicated, do not require information not available in developing countries and which, as much as possible, evade unreliable approximations resulting from the fact that numerous products and services are not directly comparable.

Finally it should be pointed out that, regardless of the difficulties in methodology and collection of data, the methods themselves as well as the resulting indices must attract as much credit of the governments concerned as possible. This requirement is particularly essential because of the highly sensitive nature of international relations.

A summary of indirect international comparison of adjusted prices follows which strives to comply, at least partly, with these requirements.

1. The substance of the method

Indices expressing the relationship of unit prices cleared from certain distorting calculation components and average world prices for sufficiently long period (3 - 5 years) are calculated first for items which are representative of the country's production pattern. Next comes the calculation of a linear average of all these indices and percentage deviation of individual indices from the average index, which is internationally comparable. The greater the positive deviation of the individual index from the national average, the more favourable is the evaluation of the product in question in the country concerned in relation to the world price and vice-versa.

2. Formula and its structure

The calculation of indices reflecting the evaluation of unit production costs in relation to average world prices is made according to the formula which follows:

$$CV_{ki} = \frac{WP_i \cdot E_k \cdot 100}{P_{ki} - T_{ki} + S_{ki} - DP_{ki}} \quad /5/$$

$$\frac{100}{CV_{ki}} = \frac{P_{ki} - T_{ki} + S_{ki} - DP_{ki}}{WP_i \cdot E_k} \quad /6/$$

where CV_{ki} is the index which expresses the ratio between adjusted production cost of item i in country k to average world market (international) price of the same item ;

$\frac{100}{CV_{ki}}$ is the coefficient which expresses the reciprocal value of the index CV_{ki} indicating how many times is the production of item i in country k

more expensive $\left[1 < \frac{100}{CV_{ki}} \right]$ or

cheaper $\left[1 > \frac{100}{CV_{ki}} \right]$ than the world average represented by the average world market price ;

WP_{ki} is the average world market price of item i of contemplated site of the plant, not including customs duty and taxes ;

E_k is exchange rate applied in order to convert the world market price into currency of country k ;

P_{ki} is market wholesale price of product i in country k ;

T_{ki} are indirect taxes, customs duties and other fees and charges of similar kind included in the calculation of the wholesale price P_{ki} in the last two production phases ;

S_{ki} are subsidies reducing the price P_{ki} granted in the last two production phases ;

DP_{ki} are wholesale distributor's profits calculated in the last two production phases.

Thus index CV_{ki} expresses the ratio of adjusted production costs expended in country k in manufacturing product i to the average world market price of the same product while production costs equal 100. For example, index $CV_i = 80$ means that 100 Mex. \$ of adjusted production costs expended in Mexico in the manufacture of a certain quantity of a textile article correspond to 80 Mex. \$ of world price of the same quantity

of the same article, c.i.f. location of the plant in Mexico.

The corresponding coefficient which is the reciprocal value of index $(\frac{100}{CV})$ would, in the given case, be 1.25 and would mean that the manufacture of the article in question is 1.25 times more expensive in Mexico than in the rest of the world which is represented by average world market price.

Some symbols used in the formulae require further explanation.

First comes the calculation of the anticipated average world market price WP_{ki} . The base for the calculation of this price are prices prevailing in the principal world markets of the product in the period of the last 3 - 5 years which, by extrapolation, give an average assumed to indicate the trend for the coming period. To this average price will be added all costs (c.i.f.) which would arise if the product in question was sold and transported to the contemplated location of the future establishment except duty, taxes and other administrative fees.

As far as the symbols T_{ki} , DP_{ki} and S_{ki} are concerned all relevant fiscal price distorting components have to be deducted from (symbols T_{ki} and DP_{ki}) or added to (symbol S_{ki}) the prices of raw materials, semi-fabricates, finished products, services and other inputs which entered the last two production phases. Symbol DP_{ki} denotes in substance the profits of agents and intermediaries which often undeservedly inflate prices of goods.

3. Tabulation of indices for the purpose of international comparison.

It might be possible to make direct international comparison of the above indices and coefficients only if foreign exchange rates used in the formulae corresponded exactly to the real parity exchange rates of countries to be compared and if their currencies were fully mutually convertible. This, however, is not the case and the exchange rates differ considerably from real rates; besides, they concern only imported or exported goods. Accordingly, the indices must be compared indirectly.^{1/}

^{1/} A direct comparison of indices would presuppose that both world (WP_i) and domestic (P_{ki}) prices would have to be expressed in a single currency. As to the possibility of using, for purposes of direct comparison

For purposes of international comparison it is necessary to calculate from all indices a linear average - a national index. Percentage differences by which individual indices deviate from the average national index are comparable with similar differences calculated in other countries. A hypothetical example follows to illustrate the point:

Table 1
 HYPOTHETICAL INDIRECT INTERNATIONAL COMPARISON OF ADJUSTED PRODUCTION COSTS OF PAPER BOARD
 (Adjusted production costs = 100)

Country	CV_{kb}	CV_{ki}	$\frac{CV_{kb} - CV_{ki}}{CV_{ki}} \times 100$	a/
A	62	95	- 34,7	
B	16	18	- 11,1	
C	35	31	+ 12,9	
D	45	50	- 10,0	

a/ Rounded figures.

CV_{kb} is the index expressing the ratio between adjusted production costs of 1 kg paper board (b) and the average world market price of paper board of the same quantity and quality ;

CV_{ki} is the average index in any of the A,B,C,D countries (linear average of indices of all the items \bar{i} which are adequately representative of the whole production pattern of the individual countries) ;

$\frac{CV_{kb} - CV_{ki}}{CV_{ki}} \times 100$ is the percentage deviation of the average index from the individual index.

The percentages shown in the last column of the table reflect roughly the comparative advantage for production of paper board in the four hypothetical countries. For example, the national economic profitability of paper board production is by 34,7 per cent lower in country A and by 12,9 per cent higher in country C than the average profitability of production in general in the respective countries, as compared with the interna-

of indices, the method of parity exchange rates mentioned elsewhere in this paper (basic formula 1), it should be noted that these are only approximate rates calculated on the basis of distorted prices which are subject to rapid changes. They might be used in practice only if the participating countries had full confidence in their real value but this is doubtful.

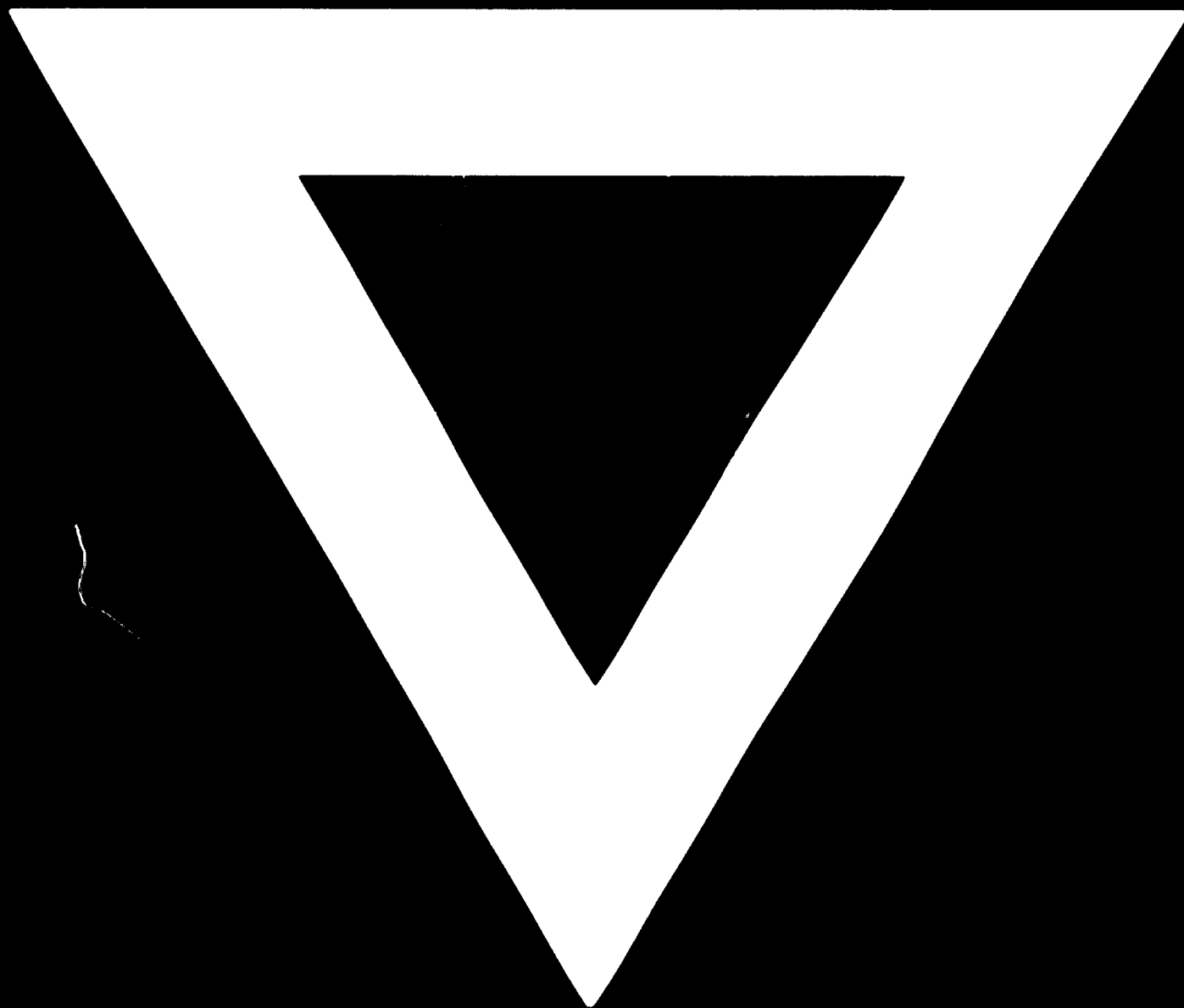
tional price level. It follows, that the ranking of the respective countries from the viewpoint of comparative advantage should be as follows: C, D, B, A.

However, it must be pointed out that this ranking cannot have absolute meaning since the national average indices which served as basis for comparison of individual indices may considerably vary owing to substantially different levels of economic development in the individual countries.

The formula (5) could also be employed for ascertaining those specific product fields in which the individual countries have the highest as well as the lowest comparative advantage.

In conclusion it may be stated that the above discussed method of indirect international price comparison provides only a rough guide to the ranking of comparative advantage by product and country. In practice, the differences between countries in factor endowments, structure of production and consumption, price, wage and income levels etc. must be simultaneously ascertained and compared in detail.

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