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INSTITUTO DE PESQUISA - INPES

PREFERENCE FOR INDUSTRY AND COMMERCIAL POLICY THEORY IN INDUSTRIALIZING COUNTRIES

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RIO DE JANEIRO
JANEIRO DE 1971

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Edmar L. Bacha (*)

Introduction

Throughout the underdeveloped world and in particular in Latin America, economists and policy makers are trying to devise new strategies of commercial policy which will permit the acceleration of the growth process of the less developed countries.

At the same time, a revived conscience of the importance of rationality in resource allocation is acquired, when it is observed that the process of indiscriminateimport substitution is leading one country after the other into economic stagnation.

This paper proposes an analytical scheme to compare the different options of commercial policy which are discussed currently, in terms of their impacts on the levels of real output and income of an industrializing country.

(*) I am indebted for comments to Jere Behrman, Carlos Díaz-Alejandro, Ernesto Fontaine, Arnold Harberger, Milton da Mata and Lance Taylor. Mrs. Auguste de Rooy-Gischler was kind enough to correct my English. Remaining errors and imperfections are my sole responsability. A Portuguese version of this paper will appear in a volume of essays dedicated to Prof. Octávio C. Bulhões, edited by Prof. Roberto Campos and published by APEC Editora, Rio de Janeiro.

In the hypotheses of the model, the new element which is introduced is a preference for industry on the part of the government of the country, which can be justified by arguments found in the literature on infant industries. Here, however, this preference is simply taken as an additional restriction to be met by the economic system when allocating resources.

After a summary description of the basic model, the following alternatives of commercial policy are analyzed one by one: free trade, partial import substitution, "autarky", tariff preferences in the markets of developed countries, subsidies to industrial exports, and economic integration. In appendix, certain aspects of the controversy "trade vs. aid" are discussed.

When the preference for industry is ignored, we arrive at the usual conclusion that free trade is the solutin which reaches the highest level of real income, for it is assumed that the economy has a "static" comparative advantage in agriculture. However, when the preference for industry restriction is imposed, free trade is not feasible, and tariff preferences in developed countries, subsidies to industrial exports, and economic integration under specified conditions become the more desirable alternatives, in that order.

The Economy Described

Consider an economy with three sectors: agriculture (A), industry-one (I_1) and industry-two (I_2). With a fixed endowment of production factors, the outputs of A, I_1 and I_2 can be related to one another by a production possibilities curve with the general form:

$$A = A(I_1, I_2)$$

This function gives the maximum output of the agricultural good which can be obtained with the available resources, for given values of I_1 and I_2. Without loss of generality, in this essay we will work with a rather specific form of this function, that is, the one for which alternative costs or transformation rates are constant:

$$(1) \qquad A = A^{\circ} - p'_1 I_1 - p'_2 I_2,$$

where A° indicates the maximum agricultural output which can be attained that is, the output obtained when all available resources are allocated to agriculture; and where p'_1 and p'_2 are the rates of domestic transformation between the agricultural good and the goods of industries one and two, respectively. Under perfect competition and other well-known conditions, p'_1 and p'_2 define the domestic prices of industrial goods in terms of the agricultural good.

In order to define the structure of comparative advantages of the economy with respect to the rest of the world, the international prices of I_1 and I_2 in terms of the agricultural good, indicated by p_1 and p_2, respectively, are assumed to be related to domestic prices by the following inequalities:

$$(2) \qquad \begin{cases} p_1 < p'_1 \\ p_2 < p'_2 \\ p_1/p_2 < p'_1/p'_2 \end{cases}$$

That is, the economy produces both industrial goods at higher costs than international market prices. Within the industrial sector, the economy produces I_1 at higher relative costs, that is, the "comparative disavantage" of the economy is higher in the production of I_1.

It is assumed that the government of this country has a preference for industry (1). That is, despite the comparative disavantage of the economy in industrial production, the government wishes to reach a certain degree of industrialization. It is irrevelevant for the following analysis to inquire on the "rationality" or "irrationality" of this preference for industry. In the short-run, there is a trade-off between the level of real income and the degree of industrialization. Given the comparative advantage of the country in agriculture, the higher the industrial output, the lower the level of real income will be. On the other hand, the preference for industry can be justified if, up to a certain point, a higher present participation of industry in output will lead to a higher real income in the future. In this rational interpretation of industrial preference, there would be a positive degree of industrialization in the present which would maximize the present value of the future steam of real incomes appropriately discounted. This can occur, in spite of the present inneficiency of industry, because of market imperfections, external effects, learning effects and other arguments

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(1) I was inspired by the paper by C. Cooper and B. Massell, "Towards a general theory of customs unions for developing countries", Journal of Political Economy, 73 (October 1965), 461-76, when trying to find a formulation for the preference for industry as well as for a few other ideas of this paper.

of a social-cultural nature which are related to the effect of modernization of society as a result of the industrialization of the country (2).

Without going into the merit of this discussion, in this paper the preference of industry is taken as an observed data characterizing government behavior not only in Chile but in nearly all developing countries. What we are trying to do is to study the influence of this industrial preference on the government's evaluation of the alternatives of commercial policy which are open to the country.

Formally, the preference for industry can be represented by a preference function of the government of the form:

$$U = U(N, I),$$

where U is an utility index; N is the total output of the country, measured in terms of the agricultural good at international prices:

$$(3) \qquad N = A + p_1 I_1 + p_2 I_2$$

and I is the value of industrial output at international prices:

$$(4) \qquad I = p_1 I_1 + p_2 I_2$$

It is assumed that both $\delta U/\delta N > 0$ and $\delta U/\delta I > 0$ hold true. That is, the utility level can be raised by an increase in industrial output even if the level of total output remains constant. This means that the level of utility enjoyed by society increases even if a decrease in agricultural output exactly compensates the increase in industrial production, leaving the total output unchanged. Only for mathematical convenience, it is assumed that the function U is defined over the values of N and I, expressed in

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(2) Cf. among others, H. B. Chenery, "Comparative advantage and development policy", in American Economic Associaton/Royal Economic Society, Surveys of Economic Theory, Volume II: Growth and Development (New York: St. Martin's Press, 1966), 125-155.

international prices. The general nature of the results derived in this paper can be shown to hold under the more realistic assumption that U is defined over N and I in domestic prices.

One possible form of the index U is illustrated by the family of "indifference curves" between N and I presented in Diagram I. The different functions U_1, U_2, U_3, ..., represent successively higher utility levels. Along a given function - U_2 for example - the utility level is constant. This means that the government is indifferent between the position indicated by point D and the position given by point B, where the first point offers more total output but less industry than the second one. Now, comparing points D and C, the government will have a clear preference for the second positon, which offers the same level of output and more industry than the first one.

One other type of relationship necessary for this paper is the transformation curve between total output and industry, which is obtained substituing (1) in (3):

$$(5) \quad N = A^o - (p'_1 - p_1)I_1 - (p'_2 - p_2)I_2$$

From this expression one can define two relationships between N and I, the first one holding I constant, and the second, holding I_2 constant. It is sufficient to consider the first relationship: $N = N(I/I_1)$. From the definiton of I, we have in terms of changes:

$$\Delta I = p_2 \Delta I_2,$$

and from the definition of N:

$$\Delta N = -(p'_2 - p_2)\Delta I_2 = -(p'_2/p_2) - 1)\Delta I$$

Since $p'_2 > p_2$, the higher I, the smaller N will be.

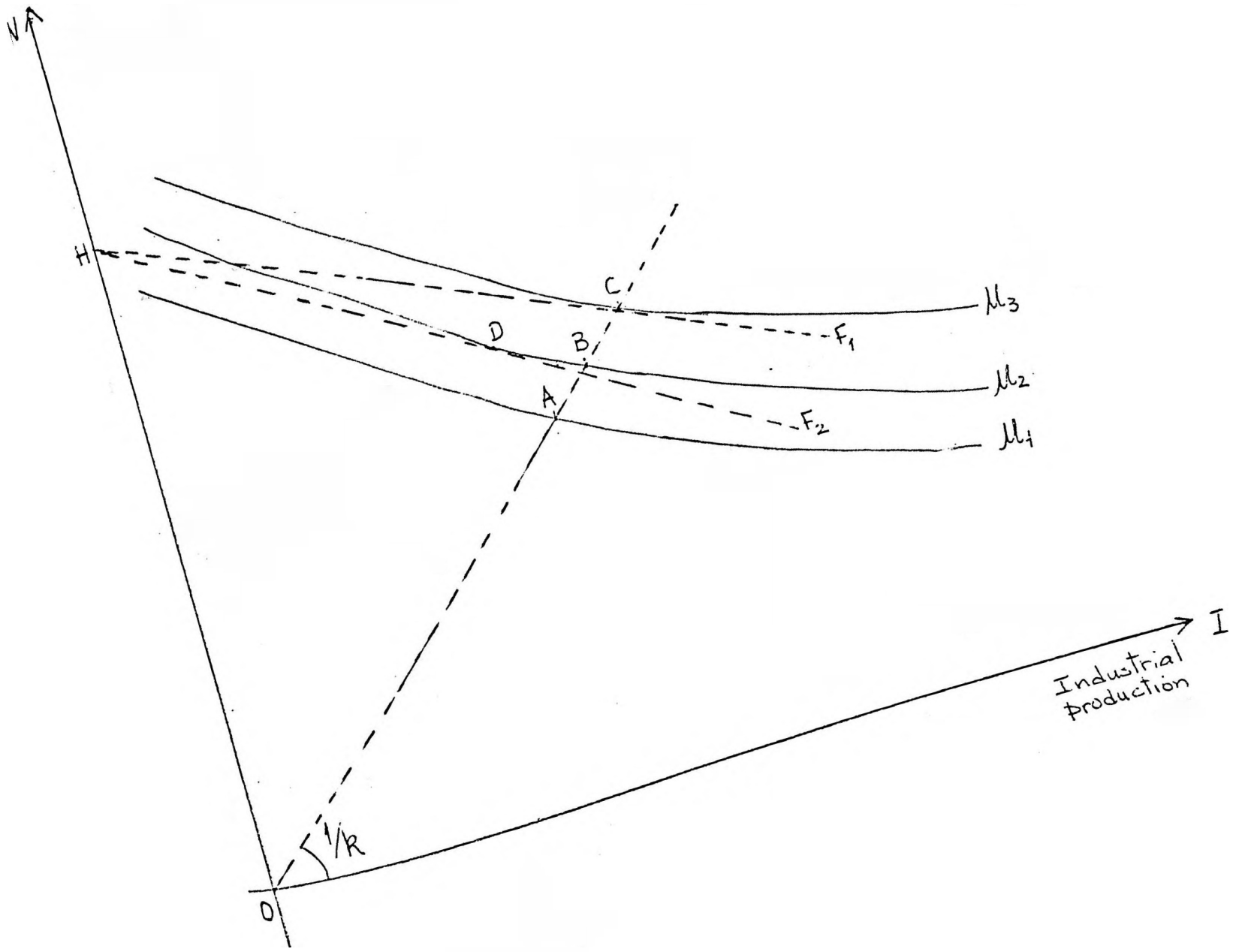
Two transformation curves between N and I are shown in Diagram I, both starting from an arbitrary point, H, which depends on the preassigned output level of I_1. The curve HF_2 indicates a cost of industrialization, that is, a value of the ratio p'_2/p_2, which is higher than that indicated by HF_1.

The analytical task of the following sections is simplified because one needs to work with only one particular point of the preference function which the government might have. This point is determined by the tangency of U with the transformation curve between N and I. Normally, this will be a point such as A, B, or C, located on a ray from the origin. Thus, one can keep U in the background and identify the preference for industry with the inverse of the slope of the ray from the origin which has the following functional form:

$$(6) \quad I = kN$$

where k expresses the degree of industrialization desired by the government. Actually, this degree is a variable which depends on the shapes of U and the transformation function. The higher industrial costs in the country, the more one will have to sacrifice N in order to obtain additional units of I. This means that the higher industrial costs, more to the left the tangency point between the transformation curve and the preference function will be. Thus, if the transformation rate between N and I is expressed by HF_1, the relevant point will be C along the ray OABC. Should industrial costs be higher, and the transformation curve be expressed by HF_2, then the relevant point will be D along the ray OD (not drawn). Anyway, once U and the particular transformation

DIAGRAM I



curve which characterize the country are known, the relevant tangency point and the reference ray can be found. Hereafter, it is assumed that both the preference curve and the transformation function are given. Thus, we can reason as if the reference ray also were given and, as a consequence, we can treat $\underline{k}$ as a parameter which is identified as the fixed degree of industrialization desired by the government.

The last basic hypothesis refers to the distribution of domestic consumption between A, I_1 and I_2. Restricting the analysis to the limits of traditional models of international trade, it is assumed that the three goods are final consumption goods and problems of capital formation and input-output relationships are ignored. More drastically, it is assumed that the different goods are consumed in fixed proportions:

$$(7) \quad \begin{cases} I''_1 = bI''_2, & \text{and:} \\ A'' = cI''_2, \end{cases}$$

where the superscript (") indicates consumption levels.

Within certain limits, one could allow for substitution in the consumers' preference function for A, I_1 and I_2 without affecting the results below. The assumption that consumers' preferences are fixed is used to generate an inconsistency between the balance of payments constraint and the degree of industrialization desired by the government. The same inconsistency could have been generated without fixed preferences, as long as the field of substitution among products in the consumers' preference function were limited, as shown in Diagram II. Production and consumption of the agriculture good are indicated in the vertical axis, and production and consumption of industry-two good are indicated in

the horizontal axis. Assuming again that the output level of I_1 be given, the production opportunities curve $A = A(I_2/I_1)$ represented by the strainght line BC can be drawn. A series of indifference contours C_1, C_2, C_3 ..., are also drawn indicating the degree of substitutability in consumption between the agricultural good and the good of industry-two for successively higher consumers' utility levels. The rays OE_1 and OE_2 mark the substitution field between A" and $I"_2$. The competitive equilibrium position in a closed economy with no "imperfections" (such as discriminatory indirect taxes) is given by point L, in the contour C_2. The straight line $G_I G_{II}$, however, indicates the values that the outputs of A and I_2 should have in order to satisfy government preference for industry, for given values of I_1. This line is derived from equations (3), (4) and (6), and it has the following analytical expression:

$$A = p_1 I_1 (1-k)/k + p_2 I_2 (1-k)/k.$$

In order to satisfy government industrial preference, the output of industry-two must be equal to OJ. However, the maximum quantity of this good, which will be consumed domestically under full employment of resources, is OM, and this will happen only when consumers' price of I_2 in terms of A fall to zero [3].

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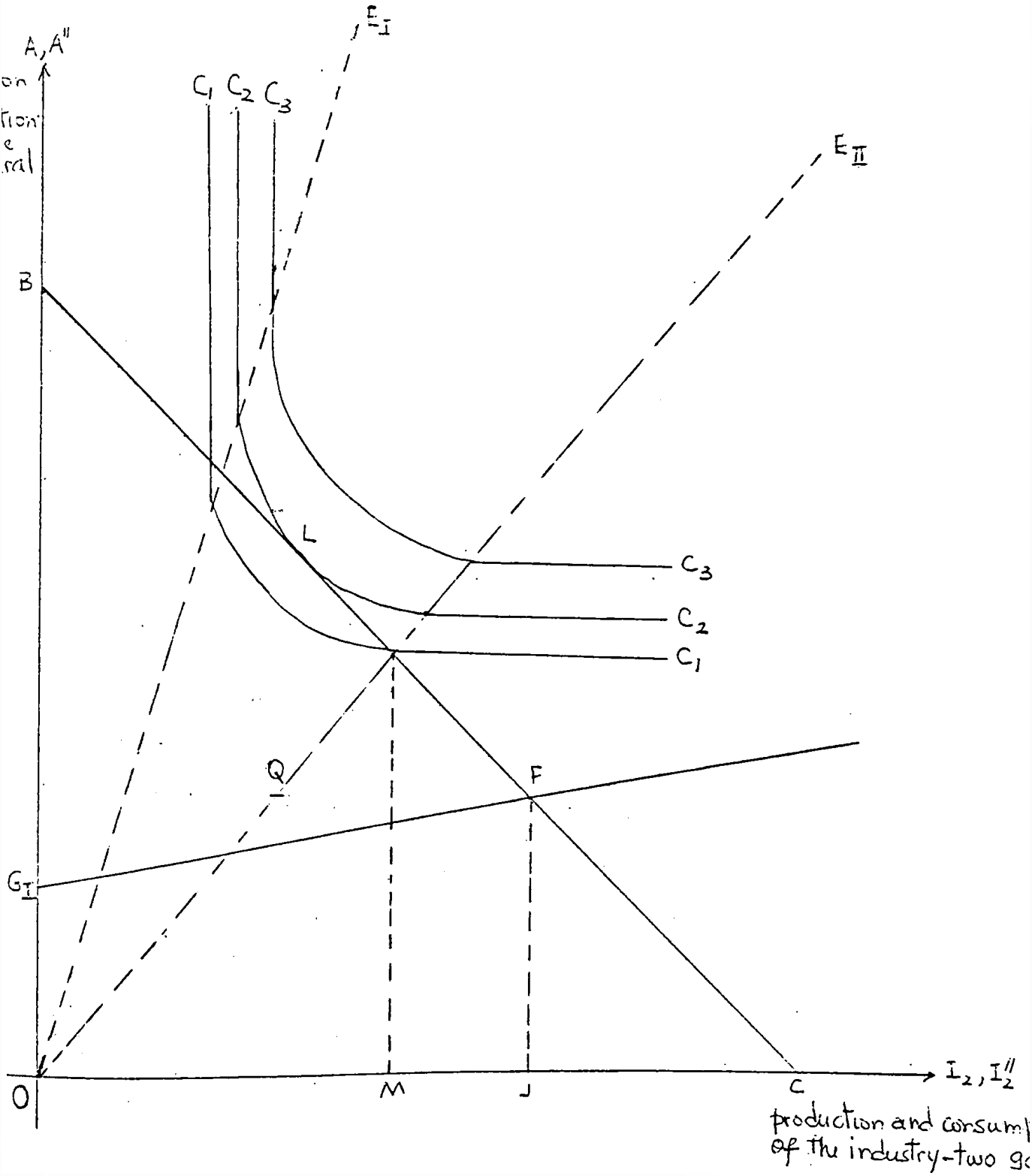
(3) The qualification "maximum quantity of this good which will be consumed domestically under full employment of resources" is important. Consumers may be induced to absorb the quantity OJ of the industry-two good combined with a consumption of FJ of the agricultural good. However, this consumption mix, given by point F, offers the consumers the same satisfaction level as the mix given by point Q, located in the same paralel to the horizontal axis as point F. This point Q is located inside the production possibilities frontier, BC, that it, it is a point where full employment of resources is lacking. The analysis here is analogue to the classical case of market failure in underdeveloped countries as presented in R. S. Eckaus, "The factor-proportions problem in underdeveloped areas" in A. N. Agarwala and S. P. Singh (ed.), The Economics of Underdevelopment (London: Oxford University Press, 1958), 348-378.

DIAGRAM II



production and consum
of the industry-two g

Thus, the only way of "closing" the system is by the exportation of I_2, and this cannot be done because the country produces this good at prices above those in the international market.

The dilemma outlined in the last paragraph is fully explored in the following section, where the problem of resources allocation is analyzed in the context of the alternatives of commercial policy which are open to an economy with the characteristics described in this section.

Commercial Policy Alternatives

Case 1: Free Trade

Obviously, free trade is the first option of commercial policy which must be examined for the economy described above.

The free trade solution is that which produces the highest level of total output, because it forces the country to specialize in agriculture, where it has a comparative advantage.

The equation of total output evaluated at alternative costs, that is, in international prices, is written:

$$N = A + p_1 I_1 + p_2 I_2.$$

Substituting the value of A, given by the transformation function (1), one obtains equation (5), or:

$$N = A^o - (p'_1 - p_1) I_1 - (p'_2 - p_2) I_2.$$

Clearly, given assumption (2), maximum $N = A^o$. Nonetheless, in point A^o, the government's preference for industry is not satisfied. Thus, this production point cannot be reached and the free trade solution cannot be applied.

Case 2: Partial Import Substitution

In order to overcome the difficulty found in Case 1, the natural medicine is to start production of I_2 in the country, but not of I_1 because, in this last product, the country has a bigger comparative disavantage. The question is as to whether this solution can be applied.

Consider the case of equilibrium in the balance of payments:

$$A - A'' = p_1 I''_1 + p_2 (I''_2 - I_2).$$

This means that the exports of A pay for the imports of I_1, which are equal to the domestic consumption of this good, and for the imports of I_2, which are equal to the difference between consumption and domestic production of I_2. If national income (N") is defined as the sum of consumption levels at world prices, then:

$$(8) \quad N'' = A'' + p_1 I''_1 + p_2 I''_2$$

It easily can be seen that equilibrium in the balance of payments implies that income = output, or:

$$(9) \quad N'' = N = A + p_2 I_2$$

The question is: Is this solution, domestic production of I_2 combined with partial imports of this good and total imports of I_1, possible? For an answer, consider Diagram III.

In the vertical axis, total income and output are marked. In the horizontal, consumption and output levels of I_2 are indicated.

The curve preference for industry when $I_1 = 0$ (ON) is derived form (4) and (6), letting $I_1 = 0$:

$$(10) \qquad N = (p_2/k)I_2$$

The curve consumption distribution (OM) derives from (7) and (8), and it is given by:

$$(11) \qquad N'' = (c + p_1 b + p_2)I''_2$$

The transformation curve when $I_1 = 0$ (A^oF) is obtained from (5), letting $I_1 = 0$:

$$(12) \qquad N = A^o - (p'_2 - p_2)I_2$$

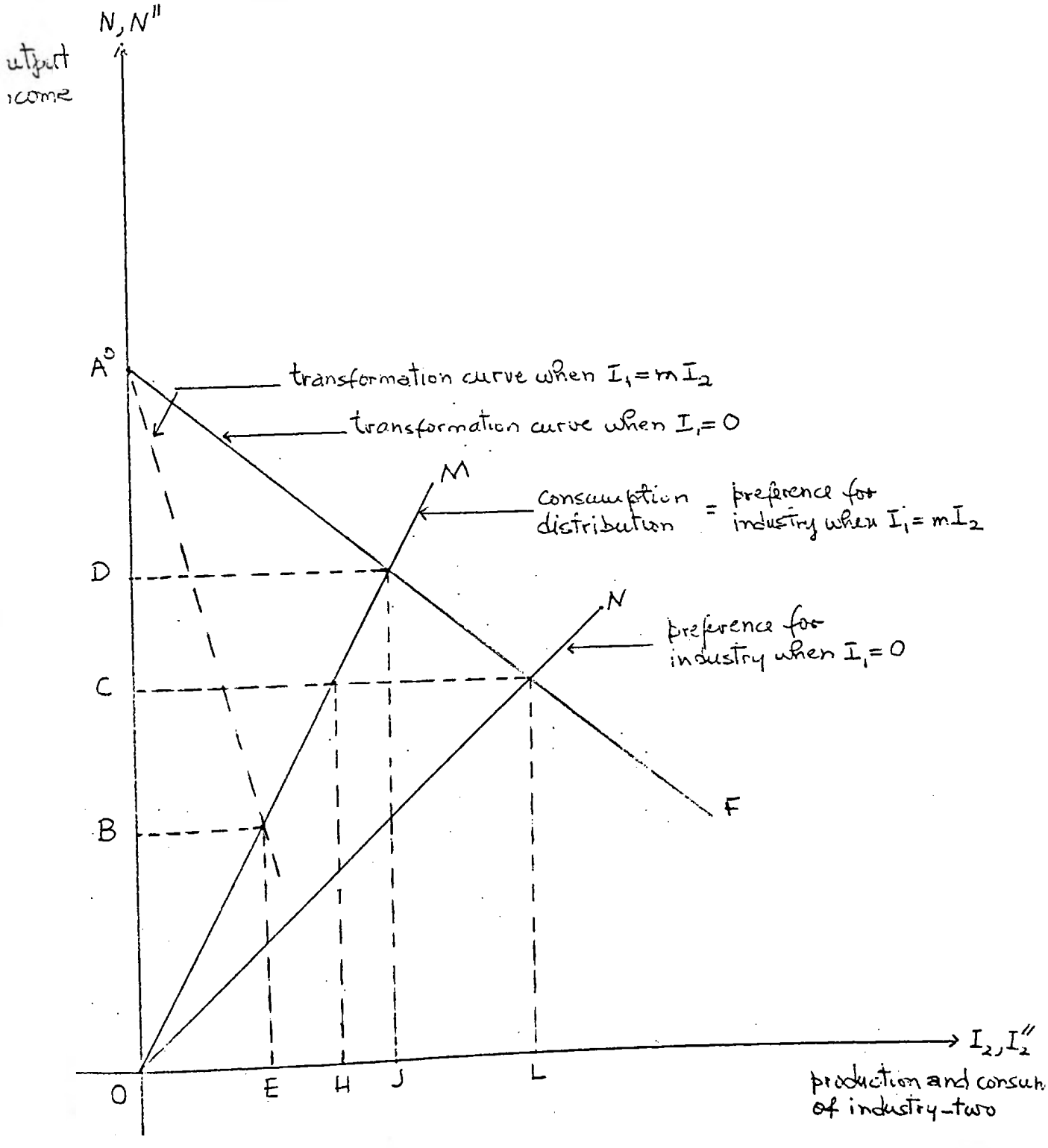
Further on, the meaning of the other curves in the diagram is explained.

In the intersection of (10) and (12) the equilibrium points for N and I_2 are determined. In the diagram, these are represented by OC and OL, respectively. Balance of payments equilibrium requires that N" = N. Thus, the value of I''_2 can be obtained from equation (11). This value is measured by OH in the diagram.

Thus, we obtain the result that $I_2 > I''_2$ (or: OL> OH). The presumed imports of I_2 actually got to be exports in order to satisfy the system. However, $p'_2 > p_2$, that is, demestic prices of I_2 are higher than international market prices and I_2 cannot be exported in a free market.

The conclusion is that the preference for industry condition can be inconsisistent with equilibrium in balance of payments, when the domestic demand structure is rigid. In other words, when equilibrium in the balance of payments is required, the desired industrialization level may not be attainable with domestic production of I_2 only. The higher the desired industrialization level and the smaller the domestic market for industry-two, more likely this to occur.

DIAGRAM III


N, N''
utput
come
A°
transformation curve when $I_1 = mI_2$
transformation curve when $I_1 = 0$
M
consumption = preference for industry when $I_1 = mI_2$
distribution
D
N
preference for industry when $I_1 = 0$
C
F
B
I_2, I_2''
O
E
H
J
L
production and consum
of industry-two

The argument above is simply hypothetical and only established the possibility of a contradiction. In the empirical level, however, is it believed that the possibility indicated became quite real for a good number of Latin-American countries in the decade of the fifties.

Case 3: The "Autarkic" Solution

A way out for the dilemma of the last case is that imports be also substituted in industry-one. In such a case, one should produce I_1 until exports of I_2 are not any longer required for balance of payments equilibrium, that is, until $I"_2 = I_2$. For lack of a better term, this solution will be denominated "autarkic".

In terms of the diagram, the requirements of I_2 per unit of N to satisfy the desired degree of industrialization will be smaller than before, when domestic production of I_1 starts. That is, the preference for industry curve in the plane (I_2, N) will rotate towards the left around the origin. When this curve coincides with the consumption distribution curve, which does not move, I_2 will be equal to $I"_2$ and consistency between equilibrium in the balance of payments and the preference for industry will be attained.

However, the transformation curve in the diagram will also rotate, when I_1 is produced demestically. It will rotate towards the left around A^o. This can be seen assuming that, in the new equilibrium point, domestic production of I_1 is equal to mI_2, where m is a real number. Then, from (5) we immediately obtain:

$$(13) \quad N = A^{o} - [(p'_1 - p_1)m + (p'_2 - p_2)]I_2$$

Clearly, the slope of (13) is higher than in (12). The resulting level of output can then be found by intersecting the preference for industry curve with the production possibilities curve when $I_1 = mI_2$. It is seen that the new level of output (OB) is smaller than before (OC). Such a result is intuitively obvious, since scarce resources now are also dedicated to the production of I_1, whereas before they were employed only in the two more efficient sectors, A and I_2.

In order to prove that OB is smaller that OC consider the following. Substitute the value of I, given by (4), in equation (6), and change this and equation (5) into differences:

$$p_1\Delta I_1 + p_2\Delta I_2 = k\Delta N$$

$$\Delta N = -(p'_1 - p_1)\Delta I - (p'_2 - p_2)\Delta I_2$$

Solving for ΔN as a function of ΔI_1:

$$(14) \quad \Delta N = -\frac{p_1[(p'_1/p_1) - (p'_2/p_2)]}{1 + k[(p'_2/p_2) - 1]}\ \Delta I_1$$

It can be seen, given assumptions (2), that $\Delta N<0$. Note that $\Delta I_1 = I_1$ and that ΔN = OB - OC in the diagram. Equation (14) measures the costs of an "autarkic" solution compared to partial import substitution. The solutions analyzed here below allow the country to reach output level OC. Thus, it is of interest to calculate the losses measured by (14).

For such a purpose, consider an economy which has opted for the "autarkic" solution and let us measure the gains obtained, by changing to the partial import subsitution solution, under alternative price assumptions:

TABLE I

GAINS IN OUTPUT BY SHIFTING FROM "AUTARKY" TO PARTIAL IMPORT SUBSTITUTION

	Agriculture	Industry-Two	Industry-One	Percentual gain in total output as measured by (14)
Initial share in total output (k = 0,5)	0,50	0,25	0,25	
World prices	1,0	1,0	1,0	
Domestic prices (alternative hypothesis):				
i)	1,0	1,2	1,5	0,07
ii)	1,0	1,2	2,0	0,18
iii)	1,0	1,5	2,0	0,10
vi)	1,0	1,5	2,5	0,20

It is our feeling that Chilean conditions are reflected either by price hypothesis (ii) or (iv) [4]. This implies that a customs union with other Latin American countries could bring a short-run gain to the radable part of Chile's national product of nearly twenty per cent. Assuming that fifty per cent of the GNP of a country like Chile can enter international trade, these figures imply a gain of the order of ten percent of GNP. This figure should be compared with those estimates of possible gains through "trade creation" in common markets among developed countries.

(4) For comparisons of Chilean and international prices, see L. Taylor and E. Bacha, "Growth and trade distortions in Chile and their implications in calculating the shadow price of foreign exchange", mimeo, 1970.

which are always put at levels under one per cent of GNP (5).

Case 4: Tariff Preference in the Markets of Developed Countries

The conclusion of last section was that the "autarkic" solution to the problem of resource allocation would lead to substantial losses in output levels. One alternative to that solution would be that our country obtain tariff preferences for exports of manufactured products. Normally, these preferences would be granted by industrial countries as illustrated by the UNCTAD scheme (6).

Should this tariff preference be important enough to cover the difference $p'_2 - p_2$, our country could especialize in I_2 without creating an inconsistency between the industrialization objectives and the constraints in the balance of payments.

Thus, the output level measured by OC could be reached, and, since industrial exports would be made not at world prices but at domestic prices, total income would be above OC, or equal to OD.

In order to picture this result, consider the new balance of payments equilibrium condition:

$$A - A'' + p'_2(I_2 - I''_2) = p_1 I''_1$$

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(5) Cf. R. G. Lipsey, "The theory of customs unions: a general survey", Economic Journal, LXX (September 1960), 496-513.

(6) Cf. R. Prebish, Hacia uma nueva política comercial em pro del desarrollo (New York: United Nations, 1964).

The other equations in the system are as before, or:

$$(15)\quad \begin{cases} \text{total output:} & N = A + p_2 I_2 \\ \text{production of } I_2\text{:} & I_2 = (k/p_2)N \\ \text{production of A:} & A = A^o - p'_2 I_2 \\ \text{total income:} & N'' = A'' + p_1 I''_1 + p_2 I''_2 \\ \text{consumption of } I_1\text{:} & I''_1 = bI''_2 \\ \text{consumption of A:} & A'' = cI''_2 \end{cases}$$

The following relation is then immediately derived:

$$N'' = N + (p'_2 - p_2)(I_2 - I''_2)$$

Geometrically, given $N = OC$ and $I_2 = OL$, it can be seen in Diagram III that the only combination of N'' and I''_2 which satisfies this equation is $N'' = OD$ and $I''_2 = OJ$.

As it will be made clear when the following two alternatives are analyzed, this solution is the one which produces the highest level of income among all solutions except free trade, which is not feasible.

The difficulty with this solution is a practical one: how to obtain high enough tariff concessions to permit exports of I_2. On one hand, industrial countries are reluctant to open their markets to labor intensive manufactures from developing countries because such imports could cause them serious social troubles. On the other hand, even a complete tariff cut might not be enough to cover the difference between p'_2 and p_2, because it might be that the countries which make the tariff concessions are same ones which determine the international price, p_2, in the world market.

Case 5: Subsidies to Industrial Exports

Another alternative to the "autarkic" solution, which would permit the country to specialize in I_2, is to subsidize the exports of this industry. In this case, the exports of I_2 are made at the international price, p_2, but the producers receive the domestic price, p'_2, with the difference $p'_2 - p_2$ being covered by the government. In case the subsidies are to be financed by taxes, this should be done in such a way as not to disturb the relationships between the domestic prices of the different goods (now dependent on the tax system) and the domestic transformation rates of these goods. Otherwise, the determination of the supply structure of the model, which is given by the intersection of the production possibilities curve, with the preference-for-industry curve, would not coincide with the equilibrium point reached by private entrepreneurs acting in a competitive market. Without taxes, the points N = OC and I_2 = OL can be reached because private producers are indifferent among all points along the transformation curve A^oF as long as the domestic price of I_2 is p'_2. However, if the export subsidies of I_2 were to be financed by, say, a tax on agricultural production, then the relevant price for producers' decisions would be $p'_2/(1-t)$, where t is the tax rate paid by farmers. In this case, a competitive system would tend to eliminate agricultural production, because the costs at which one can produce I_2 in terms of the agricultural good, measured by the slope of the transformation curve and equal to p'_2, are always less than the income in terms of the agricultural good derived from the production of I_2, which are equal to $p'_2/(1-t)$.

In the simplified model structure, in which there are only consumer goods and in which the factor endownment is fixed, any proportional and uniform indirect tax will leave domestic price ratios invariable and thus will meet the proposed criteria.

With a subsidy to exports, the country will specialize in I_2 and thus will reach output level OC. The subsidy will imply some internal income redistribution, but will not interfere with the equality between income and output as exports are made at international prices.

A difficulty with this strategy is that it may imply a substantial income redistribution if the difference to be covered by subsidies, $p'_2 - p_2$, is large or if the exportable surplus $I_2 - I''_2$ is too big. In this case, serious political problems may have to be overcome to implement this solution.

Case 6: Economic Integration

The last possibility to be analyzed is the formation of a customs union with a country that has a similar economic structure to ours, i.e., it has a preference for industry as well as a comparative advantage in agriculture. It is assumed, however, that within the industrial sector, the partner country has smaller costs in industry-one than in industry-two.

If this union is formed, our country can export I_2 to the partner country at domestic prices, but it will have to import I_1 from the partner country at its own domestic prices which are higher than international prices.

When our country specializes in I_2, it reaches output level OC. It is a more complex task than in previous cases to obtain the income level attained, however, and no diagramatic representation can be made. Mathematically, the only required change in the equation system, presented in Case 4, is in the balance of payments equilibrium condition, which now will be:

$$(16)\quad A - A'' + p'_2(I_2 - I''_2) = p_1 I^w_1 + p''_1(I''_1 - I^w_1)$$

That is, our exports of A and I_2 are now compensated by imports of I_1 from the rest of the world (I^w) at the world price of this good, and by imports of I_1 from the partner country, which are equal to the difference between our consumption and our imports from the rest of the world. Intra-unions imports, however, are acquired at our partner's price, p''_1.

If the system (15)-(16) is put together with the corresponding system of the partner country we will end up with fourteen equations in sixteen variables. The whole system is closed by two indentities specifying:

	exports of I_2 from our country to the partner country	≡	imports of I_2 of the partner country from our country
and:	imports of I_1 of our country from the partner country	≡	exports of I_1 from the partner country to our country

Assuming the existence of a viable economic solution to this set of equations, the resulting income levels can be determined. Manipulation of (15)-(16) yields the following expressions:

$$(17)\quad N'' = N + [(p_1/p''_1)\, p'_2 - p_2](I_2 - I''_2) + [(p_1/p''_1) - 1]S$$

where:

$$S = (A - A'') - p_1 I^w_1$$

is the superavit of our contry transactions with the rest of the world.

Consider the second term in the right-hand side of equation (17). Clearly:

$[(p_1/p"_1)p'_2 - p_2](I_2 - I"_2) \gtrless 0$, according to $p'_2/p_2 \gtrless p"_1/p_1$.

That is, if our country is less efficient in I_2 than the partner country in I_1 (i.e.: if $p'_2/p_2 > p"_1/p_1$), then our income level, N", will tend to be higher than the output level, N. If our country is more efficient, the opposite will happen.

Consider now the last term of (17). Clearly:

$[(p_1/p"_1) - 1]S \gtrless 0$, according to $S \lessgtr 0$, since $p"_1 > p_1$.

Thus, if our country has a deficit with the rest of the world (S<0), corresponding to a superavit with the union, the income level will tend to be higher than output.

These results can be expressed more synthetically by the manipulation of (17), from which, using (16), one can obtain:

$$(17a)\quad N" - N = (p'_2 - p_2)(I_2 - I"_2) - (p"_1 - p_1)(I"_1 - I^W_1).$$

That is, our country will benefit from intra-union trade as long as the excess over international prices of the value of our exports to the union is larger than the excess over international prices of the value of our imports from the union [7].

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(7) A formula similar to (17a) is proposed by French-Davis and Griffin to obtain the value of compensation payments, which would assure that the "reciprocity principle" is respected in the context of commercial flows induced by the Latin American Free Trade Association. Cf. R. French-Davis and K. B. Griffin, Comercio Internacional y Políticas de Desarrollo Económico (Mexico: Fondo de Cultura Económica, 1967), pp. 196-198. See also: D.C. Mead, "The distribution of gains in a customs union between developing countries", Kyklos, vol. XXI, 1968, Fasc. 4; and also: Carlos F. Díaz-Alejandro, "The Andean Common Market: Gestation and Outlook", mimeo, 1970, pp. 34, ff.

Observe that for the union as a whole these are zero sum gains or losses. If one country has income higher than product, the partner will have product higher than income. Moreover, our country income + partner's income = our country output + partner's output (simply because the balance of payments of the union with the rest of the world is balanced in world prices). Thus, from the point of view of the union, the only gains compared with an "autarkic" solution are these measured by the displacement of the output from OB to OC, due to the elimination of the less efficient industrial production.

Thus, it can be concluded that a customs union can solve the problem of resource allocation satisfactorily. However, inequalities in the benefits enjoyed by the partner countries will inevitably arrise if they are of distinct degrees of industrial efficiency. Same will also arrise if intra-union trade is unbalanced at those points where the partner countries are specialized in their more efficient activities.

The political difficulties to create a compensation mechanism to cancel possible discrepancies between output and income as measured by (17) are well known. Thus, it can be concluded that the only solution to the problem of equity in a customs union is the association of countries which have similar degree of industrial efficiency and for which intra-union trade equilibrium can be expected at the specialization points.

If intra-union trade equilibrium is imposed, then, in general, only one of the two countries will completely specialize in its more efficient industry, and the other one will continue to produce both industrial goods. Formally, what happens can be visualized by the substituion of (16) by two equilibrium conditions:

$$(18) \quad p'_2(I_2 - I''_2) = p''_1(I''_1 - I^W_1)$$

and:

$$A - A = p_1 I^W_1$$

The first equation imposes equilibrium in intra-union trade and the second one can be derived from the first, in view of (16).

Equation counting will reveal that in this case there are seventeen equations in the whole system (recalling that equation (18) serves both countries) with the same sixteen variables as before. There is one equation too much which is generally not satisfied. The system can become consistent only if the less efficient industry starts operation in one of the countries. In this case, we would have one additional variable to be determined - the domestic production of I_1 for example - and the system at least would present as many equations as variables.

Two additional points deserve consideration.

In the first place one initial assumption was that our country would export I_1 to the partner, and import from him I_1 only. However, it might occur within our price assumptions that:

$$p'_1 < p''_1,$$

and:

$$p'_2 < p''_2,$$

even when:

$$p'_1/p'_2 > p''_1/p''_2.$$

That is: in terms of the agricultural good, our country could have both industrial prices lower than the partner's, even when, in terms of industry-two, the home country produces I_1 at higher costs than the partner.

If this occurs our country will tend to export both I_1 and I_2 to the partner, importing from him the agricultural good, A.

Now, such a situation would be uninteresting to our country in terms of real output, and would hurt the partner country twice, by not satisfying its industrial preference and also by forcing it to buy industrial goods from a relatively expensive source. Incidentally, the position of the partner country is similar to that of Venezuela, which has high industrial costs, in comparison to Chile and Colombia. This disavantage would explain the reluctance of Venezuela to enter the recently proposed Andean Pact (8).

The best alternative for the partner country under these conditions would be to subsidize the intra-union exports of I_1, to cover the difference $p"_1 - p'_1$ and give its industry competitive conditions in our market. The creation of a payments union between the two countries, with flexible exchange rates and valid only for industrial goods, or the institution of a dual exchange rate system by the partner country, favoring industrial exports in general, would have similar effects to the subsidies. Such measures of commercial policy could "artificially" reduce the price of I_1, produced by the partner country, to levels below our domestic price and thus induce "correct" commercial flows within the union.

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(8) Cf. E. L. Bacha, "Venezuela y el Grupo Andino: El problema y las alternativas", El Trimestre Económico, January-March 1970.

One could ask if it would be easy to find a country "like ours" with a comparative advantage exactly in our less efficient industry. If one remembers that in the real world there are numerous industries instead of only two,it is clear that the difficult thing would be to find a country with exactly the same structure of compartive advantage as ours. Obviously, the more distinct the comparative advantage structures are, the better it is for the union because the number of inneficient industries in our country could be reduced substantially when our partner's market is opened to a large number of our more efficient industries.

Finally, it is of interest to compare the results obtained with the methods developed in this paper with those derived in appreaches of the Viner and Meade variety, which worry about "trade creation" and "trade diversion" in the context of partial equilibrim models.

This paper, taking the customs union as an alternative to the "autarkic" solution, makes a distinction between a production effect and a consumption effect. The first one, measured by (14), is always positive if we ignore the perverse cases of specialization in the higher cost industries. The second one, measured by (17) or (17a), can be positive or negative, depending on the relative industrial efficiency of our country as compared to the partner's, and on the trade balance situation within the union. For all partners taken together, the sum of the consumption effects is null. Thus, from the point of view of the union, economic integration is always a good thing.

This result is in contrast with that derived from a comparison of the benefits of "trade creation" with the costs of

"trade diversion", from which it is frequently concluded that the costs will be higher than the benefits in the context of customs unions among developing countries (9). The fundamental distinction between the two approaches is that, in the case of Viner and Meade, the alternative to integration is free trade, whereas in the approach of this paper, the alternative to integration is the "autarkic" solution (10).

Ordering the Alternatives

In conclusion, the different cases studied can be ordered according to the level of income attained without constraints and according to the level of income reached along the preference for industry curve. The table below summarizes the conclusions, considering only customs unions for which the income level is equal to the output level.

TABLE II

ORDERING OF THE COMMERCIAL POLICY ALTERNATIVES

Alternative	Ordering according to unconstrained income level		Ordering according to income level along the preference for industry curve	
Free Trade	1	(OA^{o})	4	(0)
Partial Import Substitution	2	(OD)	4	(0)
"Autarky"	4	(OB)	3	(OB)
Tariff preferences in industrial countries	2	(OD)	1	(OD)
Industrial exports subsidies	3	(OC)	2	(OC)
Economic Integration	3	(OC)	2	(OC)

(9) Cf. R.L.Allen, "Integration in less developed areas", Kyklos, 1961, Fasc. 3.

(10) The type of approach of this paper is also employed by S. Dell, A Latin American Common Market ? (London: Oxford University Press, 1967)

The following comments about the results shown in Table II can be made:

i) The classification of "free trade" and "partial import substitution" as the less desirable alternatives, when there is a preference for industry, is explained by the fact that zero is the only income level compatible with the preference-for-industry constraint. Rather than classifying these solutions, one could also say that they are not applicable when a preference for industry exists;

ii)The "partial import substitution" solution is placed second, according to the unconstrained income level attained, on the assumption that the preference for industry is not respected, that the country becomes sel-sufficient in I_2 and that it does not produce I_1 at all. In this case, N = N" =OD and I_2 = $I"_2$ = OJ in Diagram III;

iii) "Economic integration" has the same rank order as "industrial export subsidies" whether or not a preference for industry exists. However, taking into account the difficulties of creating and intra-union compensation mechanism and the fact that, in principle, there is a total uncertainly as to whether or not the country will be hurt by intra-union trade, it can be anticipated that a government with risk aversion will give "export subsidies" a higher rank than "economic integration".

APPENDIX

A Note on the Controversy "Trade vs. Aid"

Recent macroeconomic analysis of the development process and of the potential contribution of external aid make a distinction between two alternative limits to the growth rate of output. One would be given by the domestic savings potential, and the other by the capacity to import (1). Empirically, it has been observed that a large number of underdeveloped countries has its growth rate limited not by the savings potential but by the capacity to import intermediate and capital goods (2).

Under these conditions, an additional dollar of foreign aid would have the same effect on the growth rate as an additional dollar of exports, because both would reduce the external bottleneck on the same proportion. Trade and aid thus would be perfectly substitutes from the point of view of a developing country.

Such a conclusion, argues Harry Johnson (3), is fallacious because foreign aid can eliminate a prospective trade gap without any additional savings effort, whereas the elimination of the same gap through exports would require not only that the country supply the goods, but also that it increases its domestic savings to the

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1) This is the well known Chenery's two gap model which is discussed by R. McKinnon, "Foreign exchange constraints in economic development and efficient aid allocation", Economic Journal, June 1964.

2) Cf. H. B. Chenery and A. Strout, "Foreign assistance and economic development", American Economic Review, 56 (September 1966), 679-733.

3) Cf. H. C. Johnson, Economic Policies Towards Less Developed Countries (New York: Frederick A. Praeger, 1967), pp. 52, ff.

same extent of its new exports receipts (4).

More specifically, Prof. Johnson maintains that:

"As a first approximation, foreign aid serves two functions in the development process. First, it provides real resources additional to what can be extracted from the domestic economy, increasing the total available for investment; second,since the resources are foreign, it averts the real income losses to the country involved in transforming domestic into foreign resources.The opening of additional opportunities to trade differs from the provision of additional aid in that, again as a first approximation, it does not provide additional real resources for investment. Instead, it provides the opportunity to convert additional domestic resources into foreign resources without the losses that would ensue on the country's own efforts to effect this transformation. The contribution of resources is obviously to be measured, not by the value of the additional trade, but by the losses the opportunity permits the country to avoid" (5).

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4) The simplest way to compare trade and aid is to conceive aid as a continuous flow of free resources for the developing country. Empirically, one should observe that the conversion of the ammount described as "foreign aid" in the statistics of the developed countries to this pure concept of aid involves a substantial reduction in those nominal values, not only due to payments of interest and loans amortization, but also due to practices such as parceled liberation of resources and aid tying. For an interesting empirical analysis, see V. E. Tokman, "An evaluation of foreign aid: the Chilean case", Bulletin of the Oxford University Institute of Economics and Statistics, may 1969.

5) H. G. Johnson, op. cit., 55-56.

Thus, from the point of view of a developing country, dollar per dollar foreign aid would me more valuable than the export opportunity, although the latter is more attractive, the higher are the domestic costs of import substitution.

The analysis of Prof. Johnson is unassailable in its own terms, and it simply reafirms the common sense observation that an additional domestic saving unit has a positive alternative cost even when the country propensity to save is not an effective constraint on its growth rate.

However, for an economy describedy by the model of this paper it can be shown that Prof. Johnson's conclusion does not work out as long as the additonal trade opportunities are given by tariff preferences for manufacturing exports (6). Actually, not even the conclusion of the two gap model is verified and preferential trade appears as inequivocally better than foreign aid, dollar per dollar.

This conclusion is obtained in the model of this paper because the opportunity to export manufactures allows the country to specialize in its more efficient industry. In the case of foreign aid, although the country is allowed to live with a deficit in its foreign accounts, it becomes necessary to operate the industry in which the country is less efficient in order to meet its government industrial preference.

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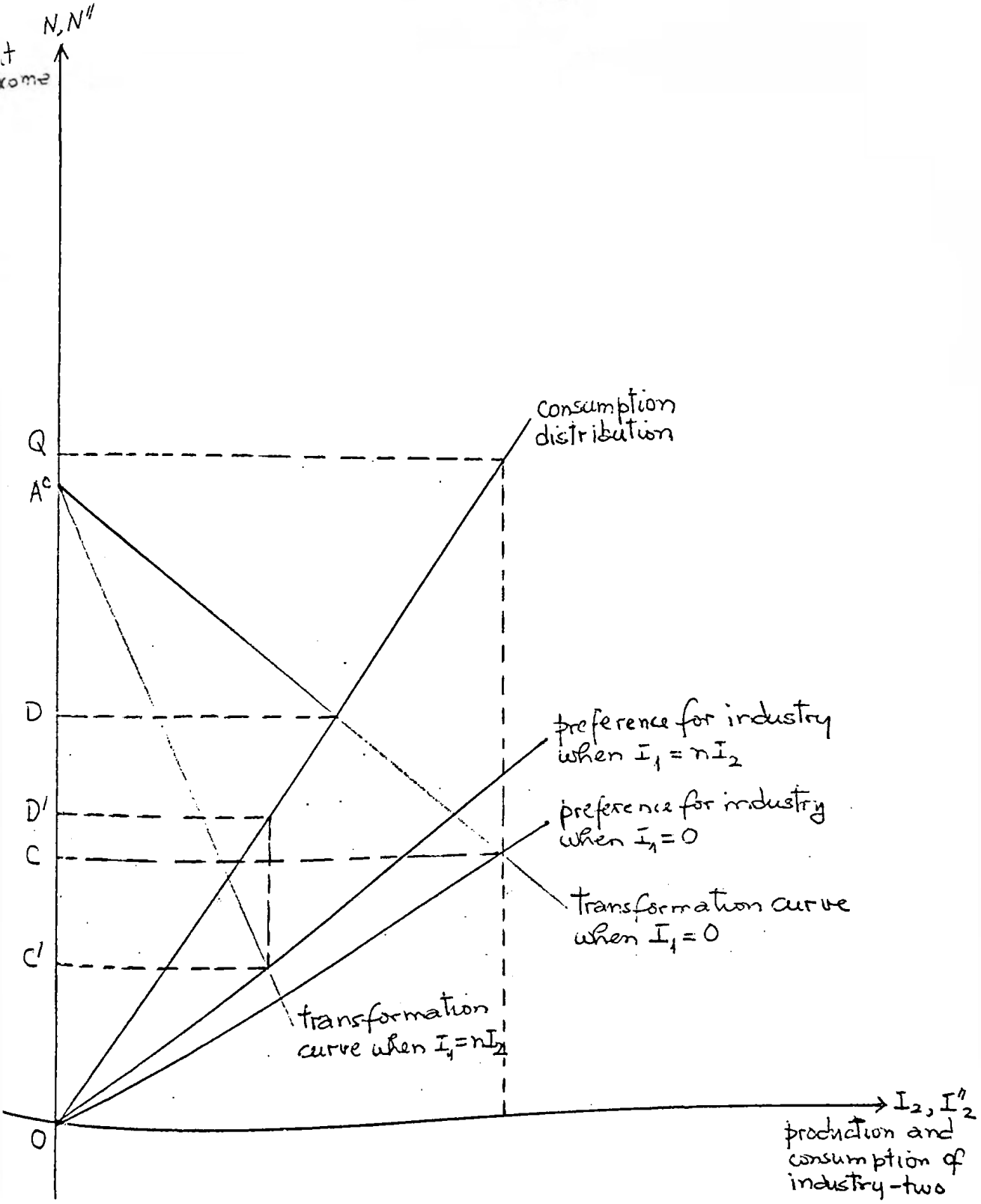
(6) This is the context in which the controversy trade vs. aid is discussed in UNCTAD. See: R. Prebish, Hacia una Nueva Política Comercial en pro del Desarrollo (New York; United Nations, 1964).

Let us consider Diagram IV for a geometric proof of the superiority of preferencial trade over aid. From the text, we know that, under preferential trade, the output level will be OC and the income level will be OD. CD measures not only the difference between income and product, but also the potential deficit in the trade balance of the country if its exports of I_2 were made not at the domestic prices, as they are, but at world prices, as they would have to be in the absence of tariff preferences. Thus, CD is identifiable as "foreign aid". Suppose that this same value, CD, were given as a continuous flow of donations rather than through tariff preferences. Then, the question is: what levels of output and income can be reached when CD is given as a donation?

In the first place, it can be seen in Diagram IV that an amount of aid equal to CD is inconsistent with specialization of the country in I_2. For, in the case of specialization, the output level would be OC generating a supply of I_2 equal to OL, which would be tottaly consumed only if the income level were equal to OQ, implying a flow of aid equal to CQ, much higher than CD.

Thus, it is necessary to manufacture I_1 in the country. In this case (according to equation (14) in the text), the output level will be less than OC. Graphically, the new levels of output and income can be found by simultaneously rotating the transformation locus (clockwise around A^o) and the preference for industry locus (counterclockwise around the origin), until the vertical distance between the crossing point of these two loci and the consumption distribution line is equal to the aid ammount CD = C'D'. At this point it is assumed in the diagram that domestic production of I_1 is given by $I_1 = nI_2$, where $\underline{n}$ is

DIAGRAM IV


N, N''
t
rome
consumption distribution
Q
A^c
D
D'
C
C'
preference for industry when $I_1 = nI_2$
preference for industry when $I_1 = 0$
transformation curve when $I_1 = 0$
transformation curve when $I_1 = nI_2$
O
I_2, I''_2
production and consumption of industry-two

an auxiliary variable found by the solution of the equation system in the text (7).

It can be seen that the income level reached with preferencial trade, OD, is above that level, OD', attained with a foreign aid equivalent dollar-per-dollar to the tariff preference. Actually, it is conceivable that the distance OD' is even less than OC, if the country is not very inefficient in the production of I_2 and/or very inefficient in the production of I_1. In this case, an external aid equal to CD would be even less desirable than a domestic policy of export subsidies, which would permit the country to specialize in I_2 (in this case income and output levels would be equal to OC as shown in the text).

Finally, it is trivial that any positive level of aid will permit the country to reach an income level superior to that under an "autarkic" policy, as described in the text. This is a fact, because as long as it is positive, foreign aid will lead to an output of I_1 smaller than that obtained under the "autarkic" solution.

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(7) The equations are the same as in the "autarkic" solution, with the difference that a deficit is allowed in the trade balance:

total output: $N = A + p_1 I_1 + p_2 I_2$

production of I_1: $p_1 I_1 + p_2 I_2 = kN$

production of I_2: $I_2 = I''_2$

production of A: $A = A^o - p'_1 I_1 - p'_2 I_2$

total income: $N'' = A'' + p_1 I''_1 + p_2 I''_2$

consumption of I_1: $I''_1 = bI''_2$

consumption of A: $A'' = cI''_2$

balance of payments: $A - A'' + AJUDA = p_1 (I''_1 - I_1)$

where AJUDA = CD in the diagram.