

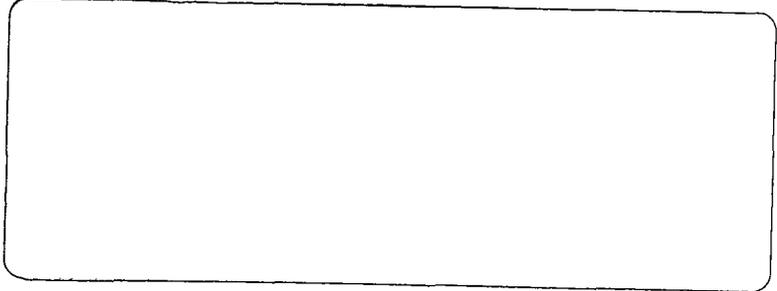
FILE COPY

# Intra-Industry Trade and the Integration of Developing Countries in the World Economy

SWP312

World Bank Staff Working Paper No. 312

January 1979



Prepared by: Bela Balassa, The Johns Hopkins University and the Development Research Center

Copyright © 1979  
The World Bank  
1818 H Street, N.W.  
Washington, D.C. 20433, U.S.A.

FILE COPY

Views and interpretations in this document are those of the authors and should not be attributed to the World Bank, to its affiliated organizations or to any individual acting in their behalf.



The views and interpretations in this document are those of the author and should not be attributed to the World Bank, to its affiliated organizations, or to any individual acting in their behalf.

WORLD BANK

Staff Working Paper No. 312

January 1979

INTRA-INDUSTRY TRADE AND THE INTEGRATION  
OF DEVELOPING COUNTRIES IN THE WORLD ECONOMY

INTERNATIONAL MONETARY FUND  
JOINT LIBRARY  
FEB 28 1985  
INTERNATIONAL BANK FOR  
RECONSTRUCTION AND DEVELOPMENT  
WASHINGTON, D.C. 20431

This paper reviews the experience of the Latin American Free Trade Association and the Central American Common Market with intra-industry trade in manufacturing, entailing the exchange of differentiated products, and considers the welfare effects of this trade. The paper further examines intra-industry specialization between developed and developing countries that involves the importation of labor intensive product varieties and parts, components, and accessories into the former group of countries from the latter. Finally, recommendations are made for policy measures that may be taken to encourage intra-industry specialization, including regional integration and multi-lateral trade liberalization.

This is a revised version of a paper presented at the Conference on Intra-Industry Trade, held in Kiel at the Institut für Weltwirtschaft on December 7-8, 1978. The author gratefully acknowledges helpful comments and discussions on various points raised in the paper.

Prepared by:  
Bela Balassa, The Johns Hopkins University  
and the Development Research Center

Copyright © 1979  
The World Bank  
1818 H Street N.W.  
Washington, D.C. 20433 U.S.A.



INTRA-INDUSTRY TRADE AND THE INTEGRATION  
OF DEVELOPING COUNTRIES IN THE WORLD ECONOMY

Bela Balassa

This paper reviews the experience of developing countries with intra-industry trade in manufactured goods and examines the prospects for such trade among developing, as well as between developed and developing, countries. The concepts and the measurement of intra-industry trade are described in Section I of the paper. Section II analyzes the pattern of intra-industry trade in the Latin American Free Trade Association and in the Central American Common Market. The welfare effects of intra-industry specialization among developing countries in the framework of regional arrangements are discussed in Section III while Section IV considers the past experience and the future prospects of intra-industry trade between developed and developing countries. Finally, in Section V the principal conclusions and the policy implications of the findings are presented.

I. Intra-Industry Trade: Concepts and Measurement

Having earlier noted that in the European Common Market "much of the increased trade in manufactures occurred within rather than between commodity groups" (Balassa, 1963, p. 178),<sup>1/</sup> the author suggested an explanation of this phenomenon in terms of product differentiation in consumer goods, machinery, transport equipment, and intermediate products<sup>2/</sup> and introduced statistical indicators to measure the extent of intra-industry specialization (Balassa, 1966). Subsequently, additional evidence was provided on the ex-

---

<sup>1/</sup> A similar result was reached in regard to the Benelux by Verdoorn (1960).

<sup>2/</sup> The existence of product differentiation in trade among the developed countries was earlier noted by Linder (1961).

tent of intra-industry specialization in manufactured goods among the EEC countries (Balassa, 1975, pp. 108-12).<sup>1/</sup>

For purposes of empirical measurement, an industry has been defined to include commodities that have high substitution elasticities in production. In practice, limitations of data availability have led to the use of a 91 industry classification scheme consisting of 3-digit and 4-digit items in the U.N. Standard International Trade Classification (SITC), and combinations thereof.

The use of a technological definition of an industry is not open to the strictures Lipsey (1976) addressed to subsequent work by Grubel and Lloyd (1975), who employed 3-digit SITC categories in the calculations regardless of the technological characteristics of the product within each category. And although a further disaggregation of the data would be desirable in particular instances, Hesse (1974) and Willmore (1974), respectively, have shown that a high degree of intra-industry specialization is apparent in the European Common Market and the Central American Common Market, even if a very disaggregated commodity classification scheme is employed.<sup>2/</sup> At any rate, recognizing the limitations of the use of the statistical indicators to measure the extent of intra-industry specialization in a single country at a particular point of time, the author has used these indicators to make comparisons over time and among countries.

---

<sup>1/</sup> The expressions "intra-industry trade" and "intra-industry specialization" will be used interchangeably, although it is recognized that the exchange of differentiated consumer goods without a change in the production structure does not affect specialization and that, in certain circumstances, intra-industry trade may also entail the exchange of identical products (Adler, 1970, p. 177). We will return to the latter point in Section III below.

<sup>2/</sup> In fact, in the latter case, the use of 7 and 9 digit items in the Central American trade classification scheme, based on the SITC, carried disaggregation too far by separating commodities which are good substitutes in production. In turn, apart from the excessive disaggregation used (e.g. iron or steel pipes with and without seams are considered separate industries), the relatively low degree of intra-industry specialization shown for Israel (Ponfret, 1978) may be explained by Israel's geographical isolation, its lack of participation in regional integration schemes, and relatively high tariffs on goods produced domestically (Balassa, 1978, ch. 9). Similar comments apply to Australia (Grubel-Lloyd, 1975, p. 67).

The measures employed by the present and that for indicating changes in the extent of intra-industry specialization were the following: rank correlation coefficients between the export structure of pairs of Common Market countries in intra-EEC trade and "representative ratios" of intra-EEC trade balances for the individual countries, defined as the ratio of the absolute difference between exports and imports in each industry to the sum of the exports and imports for the industry in question (Balassa, 1966). The latter measure is shown in (1).

$$(1) \quad \frac{|X_i - M_i|}{(X_i + M_i)}$$

Spearman rank correlation coefficients, calculated for the years 1958, 1963, and 1970, show an increasing similarity of the export structure of the Common Market countries in intra-EEC trade, thus providing evidence of growing intra-industry specialization. With the sole exception of the Italy-Netherlands comparison between 1963 and 1970, the rank correlation coefficients increased between 1958 and 1963, and again between 1963 and 1970, for every pair of countries. Unweighted averages of the coefficients rose from .53 in 1958 to .67 in 1963 and to .76 in 1970 (Balassa, 1975, p. 109).

The decline in representative ratios, calculated for the same benchmark years as the rank correlation coefficients, also indicate the trend towards increased intra-industry specialization in the European Common Market.<sup>1/</sup> The unweighted averages of these ratios for the individual EEC countries were in the .39 - .58 range in 1958; they ranged between .32 and .52 in 1967;

---

<sup>1/</sup> In this connection, it should be noted that, during the same period, "representation ratios" declined considerably less in the United States (*ibid.*, p. 152) that participated in negotiations on multilateral trade liberalization, which have led the reductions in tariffs but not to their elimination.

and were between .27 and .41 in 1970. Between 1958 and 1970, the decline was the largest in Germany (.38 percent) and the smallest in Belgium (.26 percent), the average decline for the EEC countries being 30 percent (*ibid.*, p. 109).

An alternative measure of intra-industry specialization, suggested by Grubel and Lloyd (1975, p. 21) is shown in (2). It is apparent that, apart

$$(2) \quad \left( \frac{(X_1 + M_1) - |X_1 - M_1|}{(X_1 + M_1)} \right) \cdot 100 = \left( 1 - \frac{|X_1 - M_1|}{(X_1 + M_1)} \right) \cdot 100$$

from it taking 100 rather than 1 as the base, this measure equals one minus the measure introduced by the present author. Thus, while the measure used by the author assumes a value of zero in the case of complete intra-industry, and a value of one for complete inter-industry specialization, the Grubel-Lloyd measure shows the opposite pattern.

Grubel and Lloyd also calculated weighted rather than unweighted averages and made an attempt to adjust for trade imbalance. Aquino has subsequently shown that the Grubel-Lloyd adjustment for trade imbalance does not ensure consistent results and proposed an alternative for consistent measurement (1978, pp. 278-82). Aquino's measure is equivalent to that earlier used by Michaely (1962), which was cited but dismissed by Grubel and Lloyd (1975, p. 28).

Several measures have been employed in the present paper. For comparability with the author's estimates for the EEC countries and with Willmore's earlier results for the Central American Common Market (1972), use has been made of an unweighted average of representative ratios shown

by (3). Furthermore, an (unadjusted) weighted average of these ratios has been calculated, the weights being the sum of exports and imports for individual industries (4). Finally, adjusted weighted averages have been derived by utilizing the adjustment procedure suggested by Aquino (5).<sup>1/</sup>

$$(3) \quad \frac{1}{n} \sum \frac{|X_i - M_i|}{(X_i + M_i)}$$

$$(4) \quad \frac{\sum |X_i - M_i|}{\sum (X_i + M_i)}$$

$$(5) \quad \frac{\sum |X_i^e - M_i^e|}{\sum (X_i^e + M_i^e)}, \text{ where } X_i^e = X_i \frac{\frac{1}{2} \sum (X_i + M_i)}{\sum X_i} \text{ and } M_i^e = M_i \frac{\frac{1}{2} \sum (X_i + M_i)}{\sum M_i}$$

Use has further been made of rank correlation coefficients calculated in the manner described above. Although, following Linneman (1966, pp. 140-43), Grubel and Lloyd (1975, p. 28) have criticized the use of rank correlation coefficients on the grounds that their possible values ranged from -1 to +1, this should not discourage their use. Thus, apart from assuring comparability with results obtained for the European Common Market and the Central American Common Market, they provide a more familiar tool of analysis than the cosine measure suggested by Grubel and Lloyd (*ibid.*).

## II. Intra-Industry Trade in LAFTA and CACM

Aside from Willmore's paper on Central America, efforts to measure the extent of intra-industry specialization have thus far been limited to

---

<sup>1/</sup> However, utilizing expression (5), we have made adjustments for the imbalance in total trade rather than in trade in manufactured goods as Aquino has done; in the latter case, one overestimates the extent of intra-industry trade by abstracting from inter-industry specialization between primary and manufactured products.

developed countries. This paper presents the results of calculations on trade in manufactured goods for countries of the Latin American Free Trade Association (LAFTA) and the Central American Common Market (CACM). The results for the latter group of countries will further be compared to Willmore's estimates.

In the absence of detailed data for a sufficiently long time period, calculations have been made for the latest year for which data are available. However, use has been made of a geographical breakdown separating trade with the world as a whole, with developed countries, with member countries in LAFTA or CACM as the case may be, and with other developing countries as well as an industry breakdown separating fifteen manufacturing industry groups. The comparison of these results offers interest, although it should be recognized that industry-group estimates made for the individual countries are influenced by the composition of their industries.

Data availabilities have permitted making calculations for six LAFTA and three CACM countries, utilizing the 91 industry breakdown employed earlier in estimates for the European Common Market. They are Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela in LAFTA, and Costa Rica, Honduras, and Nicaragua in CACM. With the exception of Chile and Mexico, for which only 1974 data were available, data for the year 1975 have been used in the calculations.

Table 1 shows the results obtained for the total manufactured trade of the countries concerned, using the measures described in (3), (4), and (5) while results for fifteen industry groups are reported in Table 2, utilizing (5) alone. The latter measure has been selected because of the desirability of adjusting for trade imbalances that are of importance in some of the developing countries in question.

Table 1

## Measures of Intra-Industry Trade for Trade in Manufactured Goods

	<u>Argentina</u>				<u>Brazil</u>				<u>Chile</u>			
	<u>World</u>	<u>DC</u>	<u>LAFTA</u>	<u>LDC- LAFTA</u>	<u>World</u>	<u>DC</u>	<u>LAFTA</u>	<u>LDC- LAFTA</u>	<u>World</u>	<u>DC</u>	<u>LAFTA</u>	<u>LDC- LAFTA</u>
Unweighted Average	.652	.871	.706	.889	.693	.793	.711	.741	.913	.975	.847	.973
Weighted Average, Unadjusted	.653	.871	.599	.916	.745	.864	.655	.796	.861	.935	.809	.976
Weighted Average, Adjusted	.675	.874	.573	.908	.689	.828	.597	.796	.865	.935	.813	.973
	<u>Colombia</u>				<u>Mexico</u>				<u>Venezuela</u>			
	<u>World</u>	<u>DC</u>	<u>LAFTA</u>	<u>LDC- LAFTA</u>	<u>World</u>	<u>DC</u>	<u>LAFTA</u>	<u>LDC- LAFTA</u>	<u>World</u>	<u>DC</u>	<u>LAFTA</u>	<u>LDC- LAFTA</u>
Unweighted Average	.730	.885	.655	.799	.599	.688	.734	.774	.939	.973	.921	.844
Weighted Average, Unadjusted	.783	.934	.492	.799	.657	.754	.537	.638	.970	.989	.893	.828
Weighted Average, Adjusted	.781	.932	.472	.782	.610	.689	.550	.646	.975	.989	.834	.832
	<u>Costa Rica</u>				<u>Honduras</u>				<u>Nicaragua</u>			
	<u>World</u>	<u>DC</u>	<u>CACM</u>	<u>LDC- CACM</u>	<u>World</u>	<u>DC</u>	<u>CACM</u>	<u>LDC- CACM</u>	<u>World</u>	<u>DC</u>	<u>CACM</u>	<u>LDC- CACM</u>
Unweighted Average	.764	.969	.587	.705	.888	.972	.762	.932	.802	.980	.737	.943
Weighted Average, Unadjusted	.664	.989	.390	.420	.861	.987	.647	.927	.752	.987	.595	.916
Weighted Average, Adjusted	.622	.988	.400	.406	.840	.987	.653	.900	.728	.987	.560	.910

Note: Unweighted averages, and unadjusted and adjusted weighted averages have been derived by the use of equations (3), (4), and (5), respectively. Calculations have been made for trade with the world as a whole, with developed countries, with member countries of LAFTA or CACM, and with other developing countries.

Source: United Nations, Commodity Trade Statistics

Table 2

Measures of Intra-Industry Trade for Industry-Groups

	<u>Argentina</u>				<u>Brazil</u>				<u>Chile</u>			
	<u>World</u>	<u>DC</u>	<u>LAFTA</u>	LDC- <u>LAFTA</u>	<u>World</u>	<u>DC</u>	<u>LAFTA</u>	LDC- <u>LAFTA</u>	<u>World</u>	<u>DC</u>	<u>LAFTA</u>	LDC- <u>LAFTA</u>
1. Textile Mill Products	.734	.929	.781	1	.516	.588	.773	.654	.978	(a)	.935	(a)
2. Apparel and other Textile Products	.918	.984	.612	.979	.923	.907	.984	.835	(a)	(a)	(a)	(a)
3. Lumber and Wood Products	(a)	(a)	(a)	(a)	.878	.900	.561	.962	.619	(a)	(b)	(a)+(b)
4. Paper and Paper Products	.857	.939	.772	(a)+(b)	.585	.695	.506	.744	.810	(a)	.973	(a)
5. Chemicals and Allied Products	.730	.844	.513	.741	.784	.854	.488	.657	.671	.809	.635	.967
6. Rubber and Rubber Products	.572	.913	.700	.969	.394	.625	.549	.531	.855	(a)	.331	(a)
7. Leather and Leather Products	.997	(b)	.956	(b)	.950	.972	1.000	.436	(a)	(a)	(a)	(a)
8. Stone, Clay and Glass Products	.656	.907	.375	.965	.411	.812	.755	.831	.986	(a)	.877	(a)
9. Primary Metal and Allied Products	.726	.821	.653	1	.742	.877	.774	.976	.939	.939	.910	(b)
10. Fabricated Metal Products	.258	.780	.191	.997	.457	.824	.638	.640	.593	.990	.216	.971
11. Nonelectrical Machinery	.557	.879	.558	.934	.654	.837	.443	.701	.971	.994	.871	.978
12. Electrical Machinery and Equipment	.640	.947	.331	.657	.640	.779	.319	.422	.974	.993	.727	(a)
13. Transport Equipment	.693	.949	.788	.896	.715	.779	.871	.952	.943	(a)	.899	(a)
14. Instruments and Related Products	.497	.948	.463	.420	.818	.908	.431	.876	(a)	(a)	(a)	(a)
15. Miscellaneous Manufactured Products	.523	.910	.412	.481	.333	.557	.279	.546	.899	.888	(a)	(a)
All Manufacturing	.675	.874	.573	.908	.689	.828	.597	.796	.865	.935	.813	.973

Note: Estimates have been made by using equation (5).

Explanation of symbols: (a) no exports, (b) no imports.

Source: United Nations: Commodity Trade Statistics.

Table 2 (Cont'd)

Measures of Intra-Industry Trade for Industry-Groups

	Colombia				Mexico				Venezuela			
	World	DC	LAFTA	LDC- LAFTA	World	DC	LAFTA	LDC- LAFTA	World	DC	LAFTA	LDC- LAFTA
1. Textile Mill Products	.754	.778	.808	.925	.694	.686	.693	.853	.948	.951	(a)	.605
2. Apparel and other Textile Products	.590	.518	.810	.987	.461	.552	.669	.457	.967	(a)	(a)	.905
3. Lumber and Wood Products	.669	.606	(b)	(b)	.576	.619	(a)+(b)	1	.980	(a)	(a)	.515
4. Paper and Paper Products	.887	.984	.253	.872	.882	.959	.394	.998	.903	.985	(a)	.971
5. Chemicals and Allied Products	.698	.934	.497	.714	.563	.615	.640	.457	.899	.948	.680	.711
6. Rubber and Rubber Products	.366	.955	.757	.615	.434	.546	(b)	(b)	.973	.983	.963	.880
7. Leather and Leather Products	.978	(b)	(a)	.986	.625	.657	(a)+(b)	.719	.933	(a)	(a)	.759
8. Stone, Clay and Glass Products	.721	.907	.687	(b)	.375	.379	.301	.978	.924	.978	.861	.937
9. Primary Metal and Allied Products	.948	.995	.769	.686	.692	.702	.926	.973	.996	(a)	.339	.834
10. Fabricated Metal Products	.332	.814	.173	.795	.149	.040	.782	.922	.947	.984	.820	.164
11. Nonelectrical Machinery	.867	.992	.224	.548	.732	.826	.411	.745	1	(a)	.994	.985
12. Electrical Machinery and Equipment	.875	.995	.330	.194	.639	.817	.250	.591	(a)	(a)	(a)	(a)
13. Transport Equipment	.937	.970	.693	.668	.590	.646	.798	.876	.986	.989	.894	.915
14. Instruments and Related Products	.855	.987	.529	.634	.723	.947	.586	.570	.998	(a)	(a)	(a)
15. Miscellaneous Manufactured Products	.277	.209	.732	.852	.340	.402	.718	.205	.975	.982	(a)	.822
All Manufacturing	.781	.932	.472	.782	.610	.689	.550	.646	.975	.989	.894	.832

Source: United Nations: *Commodity Trade Statistics*.

Table 2 (Cont'd)

Measures of Intra-Industry Trade for Industry-Groups

	Costa Rica				Honduras				Nicaragua			
	World	DC	CACM	LDC- CACM	World	DC	CACM	LDC- CACM	World	DC	CACM	LDC- CACM
1. Textile Mill Products	.494	(a)	.420	.390	.613	(a)	.622	.836	.657	.876	.564	.855
2. Apparel and other Textile Products	.216	(a)	.186	.467	.323	.506	.436	.484	.431	.239	.587	.911
3. Lumber and Wood Products	.683	.848	.636	.159	.760	.820	.801	(b)	.421	1	.291	.507
4. Paper and Paper Products	.770	(a)	.243	.601	.899	(a)	.602	.851	.946	(a)	.870	(a)
5. Chemicals and Allied Products	.418	.997	.446	.166	.725	(a)	.581	.879	.549	.979	.659	.899
6. Rubber and Rubber Products	.392	(a)	.430	.404	.913	(a)	1.000	1	.846	(a)	.658	.990
7. Leather and Leather Products	.521	.515	.669	.744	.833	.851	1.000	.068	.189	(a)	.205	.944
8. Stone, Clay and Glass Products	.937	(a)	.944	.938	.913	.929	.920	.997	.878	(a)	1	(a)
9. Primary Metal and Allied Products	.914	(a)	.367	.843	.923	1	.432	.938	.736	1	.891	.988
10. Fabricated Metal Products	.485	(a)	.223	.487	.592	(a)	.591	.783	.570	(a)	.073	.755
11. Nonelectrical Machinery	.961	(a)	.452	.941	(a)	(a)	(a)	(a)	.986	(a)	.586	.999
12. Electrical Machinery and Equipment	.370	.887	.371	.278	(a)	(a)	(a)	(a)	.901	(a)	.636	(a)
13. Transport Equipment	.988	.995	.641	.989	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
14. Instruments and Related Products	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
15. Miscellaneous Manufactured Products	.063	(a)	.293	.352	.692	(a)	.233	.405	.772	(a)	.692	.673
All Manufacturing	.622	.988	.400	.406	.840	.987	.653	.900	.728	.987	.560	.910

Source: United Nations: *Commodity Trade Statistics*.

The results of Table 1 also show that, with a few partial exceptions, the extent of intra-industry specialization in the six LAFTA countries is greater in trade with their LAFTA partners than with other LDCs or with the developed countries. The exceptions are Mexican trade with developed countries, using the unweighted measure, and Venezuela's trade with non-LAFTA developing countries, using the unweighted and the adjusted weighted measures.

The evidence is mixed as far as comparisons of trade relations with developed and with non-LAFTA developing countries are concerned. All three measures show a greater degree of intra-industry specialization in the trade of Argentina with developed as compared to non-LAFTA developing countries while the opposite result has been obtained for Brazil, Colombia and Venezuela, and the results vary depending on the measure chosen for Chile and Mexico.

Given the small share of non-LAFTA developing countries in the manufactured trade of the individual LAFTA countries, not much can be read into the latter comparisons. At the same time, it is noteworthy that, irrespective of the measure used, the extent of intra-industry trade with developed countries is the greatest in Mexico, Brazil, and Argentina, which are at a higher level of industrial sophistication, and the smallest in Colombia, Chile and Venezuela, which are less industrialized.

The extent of intra-industry specialization in intra-LAFTA trade, too, is considerably greater in Argentina, Brazil, and Mexico than in Chile and Venezuela, although Colombia now belongs to the first rather than the second group. In this connection, the implications of the so-called complementarity agreements for intra-LAFTA trade should be noted.

Under the Montevideo Treaty, complementarity agreements were to provide a framework for specialization in particular product varieties among

LAFTA countries. Due to the difficulties of negotiating agreements that constrain the freedom of action of private firms and the requirement that tariff concessions be automatically extended to all LAFTA members, only one such agreement was signed until 1963. At the same time, negotiations on tariff reductions in intra-LAFTA trade practically came to a standstill. In attempting to respond to this situation, in 1964 the rules governing the application of complementarity agreements were modified. Under the new rules, these agreements have become a vehicle for preferential tariff reductions among the signatories and may or may not involve product specialization.

Twenty complementarity agreements have been signed since 1964. As shown in Table 3, these agreements are dominated by the industrially more developed member countries of LAFTA. Among the countries under study, by 1976 the number of such agreements entered into was 18 in Brazil, 15 in Argentina and Mexico, 6 in Chile, 4 in Venezuela, and 2 in Colombia. Additional evidence on this point is available for the early seventies, when the more industrially developed member countries (Argentina, Brazil, and Mexico) were both the originators and the recipients of concessions in regard to particular products in 47.1 percent of the cases; they supplied 78.6 percent of the concessions and received 57.0 percent. By contrast, only 17.5 percent of the concessions were both given and received by the remaining eight LAFTA countries (Bolivia, Colombia, Chile, Ecuador, Paraguay, Peru, Uruguay, and Venezuela) that are at lower levels of industrial development.

It appears, then, that -- Colombia apart -- intra-industry specialization has assumed the greatest importance in countries that have intensively participated in complementarity agreements. At the same time, among the manufacturing industries of these countries, the extent of intra-industry specialization is generally

Table 3  
Complementarity Agreements in the Latin American Free Trade Association, 1976

<u>Complementarity Agreement</u>	<u>Year</u>	<u>Industrial Classification</u>	<u>Participating Countries</u>
1 Statistical Calculators and Software	1962	11 Nonelectrical Machinery	Ar., Br., Ch., Ur.
2 Electronic Valves	1964	12 Electrical Machinery and Equipment	Ar., Br., Ch., (a), Me., Ur.
3 Domestic Electrical, Mechanical and Heating Apparatus	1966	12 Idem	Br., Ur.
4 Electronic and Electrical Communication Products	1966	12 Idem	Br., Ur.
5 Chemical Industry	1968	5 Chemical and Allied Products	Ar., Br., Co., Ch., Me., Pe., Ur., Ve.
6 Petrochemical Industry	1968	5 Idem	Bo., Co., Ch., Pe.
7 Building Materials	1963	8 Stone, Clay and Glass Products	Ar., Ur.
8 Glass Industry	1969	8 Idem	Ar., Me.
9 Electrical Generation, Transmission and Distribution Equipment	1969	12 Electrical Machinery and Equipment	Br., Me.
10 Office Machinery	1970	11 Nonelectrical Machinery	Ar., Br., Me.
11 Office Machinery	1970	11 Idem	Ar., Br., Me.
12 Electronic and Electrical Communications Products	1970	12 Electrical Machinery and Equipment	Br., Me.
13 Sound Speakers and Reproducers	1970	15 Miscellaneous Manufactured Products	Ar., Br., Me., Ur., Ve.
14 Domestic Refrigerators, Air Conditioning, Electrical, Mechanical and Heating Apparatus	1970	12 Electrical Machinery and Equipment	Br., Me.
15 Pharmaceutical Products	1970	5 Chemical and Allied Products	Ar., Br., Me.
16 Petroleum Derivatives	1970	5 Idem	Ar., Br., Ch., (b), Me., Ve.
17 Domestic Refrigerators, Air Conditioning, Electrical, Mechanical and Technical Apparatus	1971	12 Electrical Machinery and Equipment	Ar., Br.,
18 Photographical Products	1972	14 Instruments and Related Products	Ar., Br., Me., Ur.
19 Electronic and Electrical Communication Industry	1972	12 Electrical Machinery and Equipment	Ar., Br., Me., Ur.
20 Dyes and Pigment Industries	1972	5 Chemicals and Allied Products	Ar., Br., Ch., Me., Ur.
21 Chemical Products	1975	5 Chemicals and Allied Products	Ar., Br., Ch., Me., Ur., Ve.

Notes: (a) Chile left the agreement on August 26, 1971

(b) Chile signed the agreement on June 12, 1972

Abbreviations: Ar: Argentina; Br: Brazil; Ch: Chile; Co: Colombia; Me: Mexico; Pe: Peru; Ur: Uruguay; Ve: Venezuela

Source: Interamerican Development Bank, Annual Report.

greater than the average in electrical machinery and equipment, nonelectrical machinery, and chemicals, where the number of complementarity agreements is by far the largest (Tables 2 and 3). By contrast, inter-industry specialization predominates in textiles, leather and leather products, and primary metals, where there are no complementarity agreements.

There are also several consumer goods industries such as paper and paper products, stone, clay, and glass products, and fabricated metal products that show some degree of intra-industry specialization, although they are not subject to complementarity agreements. In these cases, national product differentiation may explain the results as the countries in question exchange consumer goods that have different "attributes."<sup>1/</sup> Trade in these commodities had been liberalized prior to 1974, and it appears to have contributed to the relatively high degree of intra-industry specialization observed in Colombia.

In the three Central American countries, inter-industry specialization predominates in trade with the developed countries. Thus, averages of representative ratios are between .95 and 1.0 in all three countries, irrespective of the measure chosen (Table 1). These results conform to our earlier conclusions regarding the correspondence between the degree of industrial sophistication and the extent of intra-industry specialization with developed economies, since the CACM countries are at lower levels of industrial development than any of the LAFTA countries studied.

---

<sup>1/</sup> For an examination of trade in consumer goods utilizing Lancaster's technique that treats products as a bundle of attributes, see Gregory-Tearle, 1977.

At the same time, again irrespective of the measure chosen, the three Central American countries exhibit a relatively high degree of intra-industry specialization in trade with their CACM partners. The extent of intra-industry specialization is the greatest in textiles and clothing, fabricated metal products, and miscellaneous manufactured goods, followed by paper and paper products (Table 2).

The unweighted averages, calculated for intra-area trade in all manufactured goods, are slightly higher than those derived by Willmore for 1967 (Costa Rica, .578; Honduras, .725; and Nicaragua, .684) while they are considerably lower than Willmore's results for 1961 (Costa Rica, .805; Honduras, .842; and Nicaragua, .874). Although differences in the commodity classification schemes utilized may have affected the comparisons,<sup>1/</sup> the results by-and-large reflect the integration experience of Central America.

Thus, it appears that while the establishment of the Central American Common Market in the early sixties led to a considerable degree of intra-industry specialization, subsequent developments have given rise to changes in the opposite direction. These developments included Honduras leaving CACM and other member countries applying fiscal incentives that affect trade flows. If CACM nevertheless shows a greater degree of intra-industry specialization than LAFTA, this may be explained by the removal of tariffs on practically all intra-area trade in manufactured goods that is far from being the case in the Latin American Free Trade Association.

---

<sup>1/</sup> Willmore used a 59 industry breakdown as against the 91 industry classification employed in the present paper.

Finally, the extent of intra-industry specialization is far greater in the European Common Market than in either CACM or LAFTA. The differences appear to reflect disparities in the level of industrial development and the more far-reaching economic integration of the EEC. Thus, the extent of intra-industry specialization among the Common Market countries was greater than among the LAFTA and among the CACM countries already in 1958, i.e. before the EEC was established, and it increased to a very considerable degree in the subsequent period.<sup>1/</sup>

These conclusions are strengthened if we consider rank correlation coefficients between the intra-area exports of pairs of the individual countries. Except for the Argentina-Brazil relationship, where the large number of complementarity agreements mutually entered into by the two countries may explain this result, the coefficients are lower in the trade of the LAFTA countries (Table 4) than they were in the trade of the EEC countries in 1958. The differences are even greater if comparisons are made with correlation coefficients calculated for intra-EEC trade in subsequent years, and the latter now exceed the Argentina-Brazil result as well.

Finally, the rank correlation coefficients for intra-CACM exports are .647 in the Costa Rica-Nicaragua, .508 in the Costa Rica-Honduras, and .506 in the Honduras-Nicaragua comparisons. These results confirm our earlier conclusion as regards the extent of intra-industry specialization in the Central American Common Market. At the same time, they represent a

---

<sup>1/</sup> Cf. p. 3 above -- Recent results for the period 1970-73 show a continued trend towards intra-industry specialization in the European Common Market, albeit at a somewhat slower rate (Glejzer, Goosens, and Vanden Eude 1978).

Table 4

Rank Correlation Coefficients for the Intra-area  
Exports of LAFTA Countries

	<u>Argentina</u>	<u>Brazil</u>	<u>Chile</u>	<u>Colombia</u>	<u>Mexico</u>	<u>Venezuela</u>
Argentina	1.000	.693	.199	.331	.361	.409
Brazil	.693	1.000	.397	.458	.234	.241
Chile	.199	.397	1.000	.411	.332	.279
Colombia	.331	.458	.411	1.000	.453	.400
Mexico	.361	.234	.332	.453	1.000	.408
Venezuela	.409	.241	.279	.400	.408	1.000

Note: See text

Source: United Nations, *Commodity Trade Statistics*

slight reversal of the general tendency towards the greater similarity of export patterns shown by Willmore (1972, p. 665).

### III. The Welfare Effects of Intra-Industry Specialization Among Developing Countries

In the preceding section, we have provided evidence on intra-industry specialization in the developing countries of Latin America. It appears that the elimination of tariffs on intra-area trade has led to increased intra-industry trade in the Central American Common Market while in LAFTA the same result has been achieved in the framework of complementarity agreements signed after 1974 and as a result of tariff reductions undertaken before that date.

As regards the commodity composition of intra-area trade, Willmore (1978) provides evidence on the cross-hauling of cement, a homogeneous commodity, in CACM that has since ceased. There may also have been some border trade and seasonal exchange in homogeneous commodities (Grubel and Lloyd, 1975, Ch. 5). However, it appears that by-and-large intra-area trade in LAFTA and CACM has been characterized by product differentiation in consumer goods, nonelectrical machinery, electrical machinery and equipment, and intermediate products. In this connection, one needs to consider the welfare effects of such trade.

Gray suggests that "the gains from international trade in differentiated goods are to be found in the wider choice offered to consumers in the different nations, in the possibilities of an exchange of scale economies among nations, and perhaps the most important, in the exposure to foreign competition of domestic industries" (Gray, 1973, p. 27). According to Gray, however, "it is not immediately apparent that involvement in a two-way trade with other countries

is a worthwhile goal for a developing country" (p. 39). In particular, he suggests that "X-efficiency gains are likely to be small when competition is opened up between manufacturing concerns in developing nations." (*ibid.*).

This statement does not stand up to scrutiny. To begin with, in the small domestic markets of developing countries, monopoly and oligopoly positions predominate and there is little competition. This fact is well-recognized and estimates of the cost of protection have assigned a considerable weight to X-inefficiencies (Balassa, 1971, Ch. 4; Bergsman, 1974). The opening of markets to other developing countries, in turn, permits greater competition that provides pressure for improving production methods.

The increased exchange of consumer goods by reason of the existence of national product differentiation will also give rise to welfare gains through improvement in the efficiency of exchange. Furthermore, there will be gains in productive efficiency as product variety in individual firms manufacturing consumer goods, intermediate products, machinery, and equipment is reduced (horizontal specialization).

The gains from reductions in product variety, or horizontal specialization, are obtained through the lengthening of production runs that contributes to productivity improvements along the "learning curve," permits the use of special-purpose machinery, and lowers the cost involved in moving from one operation to another (Balassa, 1967, pp. 101-3). Such gains are likely to be particularly important in developing countries where short production runs predominate whereas in developed countries the advantages of longer production runs may partly be obtained in the framework of national markets.

Intra-industry specialization through the exchange of national consumer goods and changes in product composition may be accomplished relatively easily, thereby facilitating the process of adjustment in response to the

lowering of trade barriers. At the same time as the examples of the European Common Market, LAFTA, and CACM indicate, intra-industry specialization assumes particular importance among countries at similar levels of development, where differences in relative factor prices are small.

The experience of the European Common Market, as well as that of the Central American Common Market, also point to the fact that the full benefits of intra-industry specialization can be obtained through the elimination of tariffs and other barriers to intra-area trade. However, in developing countries that have established manufacturing industries behind high protection, across-the-board trade liberalization has encountered difficulties, in large part because differing levels of efficiency among firms have created fears that competition will lead to the demise of some of them.

These considerations point to a conclusion opposite of that reached by Gray; i.e. it is countries at the lowest levels of development that have the most to gain from intra-industry trade in the framework of a regional union. This is because in such an event industrialization will occur in the framework of a larger market, permitting increased specialization and greater competition, so that one may avoid the establishment of high-cost industries serving exclusively national markets.

The above conclusion should be tempered, however, by consideration given to tariff levels in an integrated area. Thus, the experience of the Central American Common Market indicates that high tariffs may permit the establishment of inefficient industries. This has happened, for example, in the tire industry where two relatively small-scale plants have been established to serve the regional market (Willmore, 1978). The policy implications of these

results will be considered in the concluding section of the paper.

As noted above, regional integration encounters difficulties in developing countries at higher levels of industrialization that have established national industries behind high protection. In LAFTA, the situation has been aggravated by differences in levels of development among the member countries. As a result, since 1964, tariff reductions have been effected only on a preferential and a selective basis in the framework of complementarity agreements.

It has been suggested that preferential tariff reductions are conducive to trade diversion rather than to trade creation. Trade diversion, in turn, is said to reduce welfare as higher-cost products imported from the member countries will replace lower-cost products that had previously been imported from third countries.

In fact, research carried out under the direction of Anne Krueger has led to the conclusion that intra-LAFTA trade in manufactured goods does not conform to the comparative advantage of the countries concerned. In the case of Chile, for example, it has been pointed out that the direct capital-labor ratio was more than three times as high in exports to other LAFTA countries than in exports to developed economies and nearly three times as high as in the production of import-competing goods (Corbo-Meller, 1978).

In interpreting these results, note should be taken, however, of the possibilities for cost reductions at higher output levels and for learning-by-doing, both of which are of importance in the electrical machinery and equipment, nonelectrical machinery, and chemical industries, i.e. for the products that dominate intra-LAFTA trade carried out in the framework of complementarity agreements. Evidence on learning-by-doing is provided in the

case of Chile, where these industries attained substantial improvements in efficiency during the sixties (Behrman, 1976, pp. 138-9). And while the domestic resource cost calculations made for Chile -- according to which all three industries have become internationally competitive (*ibid.*) -- are open to question, information on capital-labor ratios does not suffice to establish their efficiency levels.

In turn, Willmore concludes that horizontal specialization has led to welfare gains in the Central American Common Market. In his view, "most of the industries in the area have achieved economies of scale through a reduction in the variety of goods produced by individual plants ... This 'horizontal specialization' in production may well result in a substantial increase in efficiency due to longer production runs" (1972, p. 670).

Nugent, too, has emphasized the welfare gains Central American countries have obtained through horizontal specialization (1974, p. 68). While separate estimates for these gains are not provided, Nugent finds that, on the average, integration in Central America has added 0.6 percent to the rate of economic growth in the area (*ibid.*, p. 75).

The apparent differences in the results obtained for LAFTA and CACM may be explained by the character of trade liberalization in the two cases. In the Latin American Free Trade Association, tariff reductions were undertaken on a preferential basis which, as noted above, tend to be trade-diverting. By contrast, tariffs were eliminated on practically all intra-area trade in manufactured goods in Central America, leading on balance to trade creation (*ibid.*, pp. 44-45).

Apart from horizontal specialization, economic integration may contribute to vertical specialization that involves the production of parts, components, and accessories for assembly in different countries. Vertical specialization brings gains through the exploitation of economies of scale in the manufacture of individual inputs at various levels of fabrication (Balassa, 1967, pp. 103-4).

Vertical specialization in automobile parts, components, and accessories has assumed considerable importance among the countries of Western Europe as well as between the United States and Canada, and the possibilities for vertical specialization in this industry among developing countries have been indicated by Jack Baranson (1969). Gains through vertical specialization may also be derived in the production of other kinds of transport equipment, nonelectrical machinery, and electrical machinery and equipment.

For various reasons, few of the possibilities for vertical specialization have been utilized in developing countries. For one thing, tariffs have been maintained at relatively high levels on the products of industries subject to vertical specialization in the more advanced developing countries, where the industries in question have already been established. For another thing, the uncertainties existing in regard to national economic policies in general, and exchange rates in particular, militate against vertical specialization among these countries.

These considerations apply especially to LAFTA, where there has been little interchange of parts, components, and accessories among protected national industries. Thus, again, the conclusions point to the desirability of economic integration in developing countries at low levels of industrial-

zation, so that potential benefits from vertical specialization will not be foregone as industries are established in protected national markets.

In turn, countries at higher levels of development that have industrialized in the framework of national markets behind high protection face considerable problems of adjustment in the event of their integration. Yet, these countries, too, would derive gains through horizontal and vertical specialization. This question will be taken up in the concluding section of the paper.

#### IV. Intra-Industry Trade Between Developed and Developing Countries

In the preceding section, we have examined issues relating to horizontal and vertical specialization among developing countries. Possibilities for horizontal and vertical specialization exist also between developed and developing countries. They will be considered in the following.

Linder (1961) gives emphasis to product differentiation in consumer goods among countries at the same level of development on the grounds that such countries will have similar tastes. This proposition neglects differences in consumption patterns within countries, which may find their origin in inter-personal differences in incomes as well as in tastes.

Recognizing these differences, it may be suggested that horizontal specialization will also occur among countries at different levels of development, when the product varieties traded will incorporate attributes that correspond to the factor endowments of the countries in question. Focusing on "quality" among product attributes, it may be hypothesized that developing countries will export lower-quality varieties requiring chiefly unskilled-labor to developed countries and import higher-quality product varieties from them.

The existence of horizontal specialization between developed and developing countries in a variety of consumer goods, including clothes, shoes, bicycles and transistor radios, provides evidence in support of this hypothesis. In fact, it appears that some lower-priced lines, such as plastic shoes and simple transistor radios, have been abandoned by domestic producers in the United States and they originate exclusively from abroad.

An indication of differences in product quality is provided by the unit value figures reported in trade statistics. The data reveal considerable disparities in unit values for clothing and shoes imported into the United States from developed and from developing countries. Similar differences have been reported in regard to tires and tubes, television receivers, and still cameras by Grossman (1978), who has further shown that the U.S. demand for imports from developing countries is sensitive to changes in the prices of these imports relative to products imported from other developed countries or produced in the United States.

Horizontal specialization between developed and developing countries has not generally involved multinational firms. In a number of instances, it has taken the form of contractual relationships between large foreign buyers, such as department houses, and national producers in the developing countries. With the more industrialized developing countries improving product quality and establishing trading houses, however, the relative importance of these relationships is on the decline.

In turn, Baranson (1969) and, subsequently, Helleiner (1973) have given emphasis to vertical specialization in the framework of multinational

firms. According to Helleiner, "in the second half of the 1960s there rapidly emerged a [new] path along which poor countries seeking to initiate or accelerate their industrial export growth can travel: the development of specialized labor-intensive activities or processes within vertically integrated international manufacturing industries" (1973, p. 28).

As evidence to this proposition, Helleiner cites the rapid expansion of United States imports under items 806.30 and 807.00 of the U.S. Tariff Schedule under which import duties are levied only on value added abroad, provided that the product incorporates inputs originating in the United States (1973, p. 30). The dutiable value of these imports rose from \$31 million to \$417 million between 1966 and 1970 or from 2 percent to 14 percent of United States imports of manufactured goods from developing countries.<sup>1/</sup>

However, imports under tariff items 806.30 and 807.00 in part represent horizontal specialization -- the importation of final goods processed abroad -- and only part of the remainder is the result of vertical specialization in the framework of multinational firms as the transactions often take place among independent firms. Thus, data reported by the United States Department of Commerce show that imports of manufactured goods by multinational firms from their majority-owned foreign affiliates in developing countries increased by only 40 percent between 1966 and 1970, from \$221 million to \$310 million (*Survey of Current Business*, August 1974, pp. 28-29). As a result, the share of intra-firm trade in United States imports of manufactured goods from developing countries declined from 16 percent in 1966 to 11 percent in 1970.

---

<sup>1/</sup> U.S. Tariff Commission, Special communication.

And, rather than increasing as Helleiner predicted, the role of multinational firms in U.S. trade with developing countries declined slightly in subsequent years. Thus, in 1976, the manufactured imports of these firms from their majority-owned foreign affiliates located in developing countries were \$1151 million (*ibid.*, March 1978, p. 39) as compared to U.S. manufactured imports from developing countries of \$11.3 billion, i.e. their share in the total amounted to 10 percent.<sup>1/</sup>

These results conflict with predictions made by Helleiner, who expressed the view that "the multi-national manufacturing firm is likely to play a major role in the future development of manufactured exports from the less developed countries..." (1973, p. 46). Furthermore, according to Helleiner, "in the next decade or two processing, assembly, and components manufactures for export within vertically integrated international industries is bound to become an increasingly important element in this development (*ibid.*).

In support of his position, Helleiner (1978) now claims that the purchases of multinational firms from their majority-owned foreign affiliates do not fully indicate their role of multinationals in international trade, since these firms may have less than 50 percent ownership abroad and may also buy from foreign firms on a subcontracting basis. But, there is no presumption that the share of U.S. multinationals with less than 50 percent ownership would have risen over time. Also, the share of imports under tariff items 806.30 and 807.30 in U.S. imports of manufactured goods from developing countries remained

---

<sup>1/</sup> In fact, this figure represents an overestimate as the data on the trade of multinationals, but not those on the imports of manufactured goods, include food products. Excluding the latter, the imports of multinational firms from their majority-owned foreign affiliates will be \$989 million, i.e. 8 percent of U.S. manufactured imports. (Comparable figures for 1966 and 1970 are not available.)

at the 14 percent level in 1976<sup>1/</sup> and an increasing proportion of these imports comes from independent foreign firms who take advantage of the tariff regulations in using American components in their production for exports to the United States.

Part of the explanation lies in the fact that the exports of the two largest developing country exporters of manufactured goods, Korea and Taiwan, largely originate from national firms. In the case of Korea, the export share of multinational firms hardly surpassed one-tenth in the early seventies (Cohen, 1973, pp. 180-1), and, in 1976, imports by such firms into the United States from their majority-owned affiliates in Korea amounted to only \$8 million (*Survey of Current Business*, March, 1978, p. 39).

The declining importance of multinational firms in vertical specialization between the United States and developing countries indicate that national firms in these countries are increasingly able to provide products that conform to the specifications of U.S. firms. The situation is similar as far as imports into Japan are concerned that originate largely from national firms in Korea and Taiwan. In Western Europe, however, this process is hindered by the fact that duty exemptions apply only if the following conditions are fulfilled: the product was imported by a domestic enterprise, it was processed abroad on account of this enterprise, and it incorporates inputs that had been exported by the enterprise (Finger, 1975, p. 365). We will return to this issue in the concluding section below.

---

<sup>1/</sup> The absolute value of these imports was \$1.543 million (U.S. International Trade Commission, *U.S. Imports for Consumption -- Tariff Items 807.00 and 806.30*, Washington, D.C., June 1978, Tables 3 and 7.

## V. Conclusions and Policy Implications

In this paper, it has been shown that integration efforts in the postwar period have contributed to intra-industry trade among developing countries. In the Central American Common Market, intra-industry specialization has occurred following the elimination of tariffs on practically all trade in manufactured goods; in LAFTA, this has taken place in the framework of complementarity agreements in machinery and chemicals and in response to tariff reductions in consumer goods.

Apart from the increased exchange of consumer goods by reason of national product differentiation, intra-industry trade may entail horizontal or vertical specialization. In the first case, product variety is reduced in national firms, leading to cost-reductions through the lengthening of production runs and the exploitation of economies of scale; in the second case, an exchange of parts, components, and accessories permits exploiting economies of scale in the manufacture of these inputs at various levels of fabrication.

Intra-industry specialization through the exchange of consumer goods and through reductions in product variety assumes particular importance in countries at similar levels of development. The ease of adjustment in the event of intra-industry specialization, as against adjustment costs under inter-industry specialization, then, provides an argument for the economic integration of these countries.

In turn, differences in relative prices will contribute to inter-industry specialization, with concomitant adjustment costs, in a regional union consisting of countries at different levels of development. But, the liberalization of trade among developing countries that have industrialized behind high

protection encounters difficulties even if these countries are at similar income levels.

These considerations point to the desirability of regional integration among countries at lower levels of development for the sake of efficient industrialization through increased specialization and greater competition. At the same time, in order to avoid the establishment of inefficient industries, it would be desirable to set external tariffs at low levels in the regional union or to provide for tariff reductions over time.

This is not to say that integration among the more industrialized developing countries may not be desirable. These countries would benefit from lengthening production runs and exploiting economies of scale while adjustment costs could be reduced if tariff reductions take place over a sufficiently long period. At the same time, the adverse effects of integration in the form of replacing lower-cost products imported from third countries by the higher-cost products of the partner countries could be minimized through multilateral trade liberalization. Finally, in cases where governments enter into product specialization agreement, these should be subject to rigorous project evaluation.

The possibilities for intra-industry trade between developed and developing countries have also been noted in the paper. Horizontal specialization occurs through the exchange of consumer goods, with developing countries specializing in product varieties utilizing unskilled labor. Possibilities for horizontal specialization exist also in regard to intermediate products, whenever the labor intensities of particular product varieties differ.

Vertical specialization has taken the form of the developing countries specializing in unskilled-labor intensive operations, involving the production of particular parts, components, and accessories or assembly. While it had been

assumed that vertical specialization takes place chiefly in the framework of multinational firms, with the increased sophistication of developing country producers, contractual relationships between independent firms have become of increasing importance over time.

Whatever its organizational form, vertical specialization represents a response to rising labor costs on the part of firms in developed countries. As a result, it strengthens the "lobby" for freer trade while easing the problem of adjustment in developed economies. For one thing, firms producing parts, components, and accessories can change their product composition; for another thing, the importation of low-cost inputs may be a condition for successfully competing with imports.

It would appear, then, that developing countries are well-advised to participate in the international process of vertical specialization. This may involve establishing free trade zones or avoiding discrimination against exports, when the latter procedure has the advantage of intensifying the links of exports with the rest of the economy and improving the efficiency of resource allocation.

Efficiency objectives would also be served if developing countries engaged in vertical specialization in regard to products oriented towards their own markets. This may take the form of the importation of capital-intensive and technology-intensive parts, components, and accessories for combining them with labor-intensive inputs produced domestically. Apart from overall trade liberalization, it would require reducing domestic content requirements that have often increased costs to a considerable extent.

In turn, developed countries may encourage vertical specialization with developing countries by liberalizing existing rules on the duty-free treatment of domestic inputs that are re-imported in processed form. In Western Europe, it would be desirable to liberalize the restrictive provisions applied as far as the nationality of the supplier is concerned. In the United States, existing provisions requiring that the domestic components do not lose their physical identity in imported products would need to be changed (Finger, 1975).

International vertical specialization brings gains to developed and to developing countries alike by permitting specialization to take place according to the relative labor-intensity of the production process. The liberalization of trade in developed and in developing countries would permit the exploitation of these differences and would also lead to inter-industry specialization. At the same time, adjustment policies would permit to minimize the cost of dislocation involved.

## REFERENCES

- Adler, Michael, "Specialization in the European Coal and Steel Community," *Journal of Common Market Studies*, March 1970, pp. 175-91.
- Balassa, Bela, "European Integration: Problems and Issues," *American Economic Review, Papers and Proceedings*, May 1963, pp. 175-84.
- \_\_\_\_\_, "Tariff Reduction and Trade in Manufactures among the Industrial Countries," *American Economic Review*, June 1966, pp. 466-73.
- \_\_\_\_\_, *Trade Liberalization among Industrial Countries: Objectives and Alternatives*, New York, McGraw Hill, 1967.
- \_\_\_\_\_, *The Structure of Protection in Developing Countries*, Baltimore, Johns Hopkins Press, 1971.
- \_\_\_\_\_, *European Economic Integration*, Amsterdam, North-Holland, 1975.
- \_\_\_\_\_, *Development Strategies in Semi-Industrialized Countries*, 1979, forthcoming.
- Baranson, Jack, *Automotive Industries in Developing Countries*, World Bank Occasional Papers No. 8, Washington, 1969.
- Behrman, Jere R., *Chile*, New York, National Bureau of Economic Research, 1976.
- Bergsman, Joel, "Commercial Policy, Allocative and 'X-Efficiency'," *Quarterly Journal of Economics*, August 1974, pp. 409-33.
- Cohen, Benjamin I., "Comparative Behavior of Foreign and Domestic Export Firms in a Developing Economy," *Review of Economics and Statistics*, May 1973, pp. 190-7.
- Corbo, Vittorio and Patricio Meller, "Chile: Alternative Trade Strategies and Employment Implications," 1978 (mimeo).
- Finger, J.M., "Tariff Provisions for Offshore Assembly and the Exports of Developing Countries," *Economic Journal*, June 1975, pp. 365-71.
- Glejzer, H. , Goosens, K., and Vanden Eude, M., "Interindustry versus Intra-industry Specialization in World Trade," *CEMS*, nr. 90, Brussels, Centrum Voor Econometrie en Management Science, September 1978, (mimeo).
- Gray, H. Peter, "Two-Way International Trade in Manufactures: A Theoretical Underpinning," *Weltwirtschaftliches Archiv*, 1973, pp. 19-39.
- Gregory, R.G. and D. Tearle, "Product Differentiation and International Trade Flows: An Application of the 'Hedonic' Regression Techniques," *Australia Economic Papers*, June 1973, pp. 78-90.

- Grossman, Gene, "Import Competition from Developed and Developing Countries," July 1978, mimeo.
- Grubel, H.G. and P.J. Lloyd, *Intra-Industry Trade*, London, Macmillan; 1975.
- Hesse, H., "Hypotheses for the Explanation of Trade between Industrial Countries," in H. Giersch (ed.), *The International Division of Labor: Problems and Perspectives*, Tübingen, 1974, pp. 39-58.
- Helleiner, G.K., "Manufactured Exports from Less-Developed Countries and Multi-national Firms," *Economic Journal*, March 1973.
- \_\_\_\_\_, "Transnational Corporations and Trade Structure: The Role of Intra-Firm Trade," paper prepared for the Conference on Intra-Industry Trade, held in Kiel at the Institut für Weltwirtschaft on December 7-8, 1978.
- Linder, S.B., *An Essay on Trade and Transformation*, Uppsala, Almqvist & Wikells, 1961.
- Linneman, H., *An Econometric Study of International Trade Flows*, Amsterdam, North Holland, 1966.
- Lipsey, R.E., Review of "Intra-Industry Trade" by Grubel and Lloyd, *Journal of International Economics*, August, 1976, pp. 312-4.
- Michaely, M. *Concentration in International Trade*, Amsterdam, North Holland, 1962.
- Nugent, Jeffrey, *Economic Integration in Central America*, Baltimore, Md., Johns Hopkins University Press, 1974.
- Pomfret, Richard, "Intra-Industry Trade in Intraregional and International Trade," paper prepared for the Conference on Intra-Industry Trade, held in Kiel at the Institut für Weltwirtschaft on December 7-8, 1978.
- Verdoorn, P.J., "The Intra-Bloc Trade of Benelux," in E.A.G. Robinson, ed., *Economic Consequences of the Size of Nations*, Proceedings of a Conference held by the International Economic Association, London, 1960, pp. 291-398.
- Willmore, L.N., "Free Trade in Manufactures among Developing Countries: The Central American Experience," *Economic Development and Cultural Change*, July 1972, pp. 659-70.
- \_\_\_\_\_, "The Pattern of Trade and Specialization in the Central American Common Market," *Journal of Economic Studies*, November 1974, pp. 113-34.
- \_\_\_\_\_, "The Industrial Economics of Intra-Industry Trade and Specialization," paper prepared for the Conference on Intra-Industry Trade, held in Kiel at the Institute für Weltwirtschaft on December 7-8, 1978.

RECENT PAPERS IN THIS SERIES

<u>No.</u>	<u>TITLE OF PAPER</u>	<u>AUTHOR</u>
279	India - Occasional Papers	M. Ahluwalia, J. Wall S. Reutlinger, M. Wolf R. Cassen (consultant)
280	Educational Effects of Class Size	W.D. Haddad
281	Relieving Traffic Congestion: The Singapore Area License Scheme	P.L. Watson E.P. Holland
282	World Trade and the International Economy: Trends, Prospects and Policies	B. Balassa
283	Urban Land Policy Issues and Opportunities	H. Dunkerley, A. Walters, J. Courtney. W. Doebele, D. Shoup, M.D. Rivkin (consultants)
284	Pakistan: Forestry Sector Survey	S.A. Draper, A.J. Ewing. J. Burley, G. Grayum (consultants)
285	The Leisure Cost of Electric Power Failures	M. Munasinghe
286	Shadow Pricing and Power Tariff Policy	M. Munasinghe, J. Warford
287	Wages Capital Rental Values and Relative Factor Prices in Pakistan	S. Guisinger (consultant)
288	Educational Reform in the Soviet Union: Implications for Developing Countries	I. Blumenthal, C. Benson (consultants)
289	Petroleum and Gas in Non-OPEC Developing Countries: 1976-1985	R. Vedavalli
290	Major Reforms of the Swedish Education System	A. Heidenheimer (consultant)
291	Industrialization, Technology and Employment - China	T.G. Rawski (consultant)
292	Development and Income Distribution - Zambia	C. Blitzer
293	World Potash Survey	W. Sheldrick, H. Stier
294	The Economic Dimensions of Malnutrition in Young Children	M. Selowsky
295	The Technology of Rural Development	J.P. McInerney (consultant)

RECENT PAPERS IN THIS SERIES

<u>No.</u>	<u>TITLE OF PAPER</u>	<u>AUTHOR</u>
279	India - Occasional Papers	M. Ahluwalia, J. Wall S. Reutlinger, M. Wolf R. Cassen (consultant)
280	Educational Effects of Class Size	W.D. Haddad
281	Relieving Traffic Congestion: The Singapore Area License Scheme	P.L. Watson E.P. Holland
282	World Trade and the International Economy: Trends, Prospects and Policies	B. Balassa
283	Urban Land Policy Issues and Opportunities	H. Dunkerley, A. Walters, J. Courtney. W. Doebele, D. Shoup, M.D. Rivkin (consultants)
284	Pakistan: Forestry Sector Survey	S.A. Draper, A.J. Ewing. J. Burley, G. Grayum (consultants)
285	The Leisure Cost of Electric Power Failures	M. Munasinghe
286	Shadow Pricing and Power Tariff Policy	M. Munasinghe, J. Warford
287	Wages Capital Rental Values and Relative Factor Prices in Pakistan	S. Guisinger (consultant)
288	Educational Reform in the Soviet Union: Implications for Developing Countries	I. Blumenthal, C. Benson (consultants)
289	Petroleum and Gas in Non-OPEC Developing Countries: 1976-1985	R. Vedavalli
290	Major Reforms of the Swedish Education System	A. Heidenheimer (consultant)
291	Industrialization, Technology and Employment - China	T.G. Rawski (consultant)
292	Development and Income Distribution - Zambia	C. Blitzer
293	World Potash Survey	W. Sheldrick, H. Stier
294	The Economic Dimensions of Malnutrition in Young Children	M. Selowsky
295	The Technology of Rural Development	J.P. McInerney (consultant)

<u>No.</u>	<u>TITLE OF PAPER</u>	<u>AUTHOR</u>
296	The Financial Cost of Agricultural Credit: A Case Study of Indian Experience	C.D. Datey (consultant)
297	Agricultural Sector Planning Models: A Selected Summary and Critique	A.C. Egbert
298	Textbooks and Achievement: What We Know	S.P. Heyneman, J.P. Farrell, A. Sepulveda-Stuardo (consultants)
299	An Economic and Social Analysis of the Chao Phya Chao Phya Irrigation Improvement Project II	C. Bruce Y. Kimaro
300	Two Studies of Development in Sub-Saharan Africa	S. Acharya B. Johnston (consultant)
301	The Intermediate Sector, Unemployment, and The Employment-Output Conflict: A Multi-Sector Model	W.F. Steel Y. Takagi (consultant)
302	The Economic Theory of the Household and Impact Measurement of Nutrition and Related Health Programs	D. Chernichovsky
303	Trade Restrictions and International Price Instability	M. Bale E. Lutz
304	Intergovernmental Fiscal Relations in Developing Countries	R. Bird (consultant)
305	A Programming Approach to Fertilizer Sector Planning	A. Choksi A. Meeraus
306	The Foreign Exchange Gap, Growth and Industrial Strategy in Turkey: 1973-1983	K. Dervis S. Robinson
307	The Importance of Risk in Agricultural Planning Models	P. Hazell, R. Norton M. Parthasarathy C. Pomareda (consultant)
308	Guidelines for School Location Planning	W. Gould (consultant)
309	Growth and Poverty in Developing Countries	M. Ahluwalia, N. Carter H. Chenery
310	Teacher Training and Student Achievement in Less Developed Countries	T. Husen, L. Saha R. Noonan (consultants)
311	Optimum Economic Power Supply Reliability	M. Munasinghe M. Gellerson (consultant)



HG3881.5 .W57 W67 no.312 c.2

Balassa, Bela A.

Intra-industry trade and the  
integration of developing  
countries in the world