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The Changing International Division of Labor in Manufactured Goods

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Introduction

This paper will examine the changing pattern of the international division of labor in manufactured goods between developed and developing countries. It will consider recent and prospective changes in trade flows between the two groups of countries and analyse the employment implications of these flows for the developed countries.

Section I of the paper will describe changes in trade in manufactures between developed and developing countries following the oil crisis of 1973. The employment effects of this trade for the developed countries will be analysed in Section II, with further consideration given to the skill-composition of employment. Information will also be provided on the physical and the human capital intensity of the manufactured exports and imports of the developed countries in trade with the developing countries.

Section III will consider possible future changes in manufactured trade between the developed and the developing countries and indicate the employment implications of the projected trade flows. In so doing, distinction will again be made among skill classes. Finally, the policy implications of the findings will be discussed.

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I. Recent Trends in Trade in Manufactured Goods between the Developed Industrial and the Developing Countries¹

The Time Pattern of Trade

In popular discussions, as well as in international fora, much attention has been given in recent years to the growth of the manufactured imports of the developed countries from the developing countries. In particular, questions have been raised concerning the effects of increased imports on output and employment in the former group of countries.

Changes in the imports of the developed countries from the developing countries cannot, however, be considered independently from changes in their exports to them. Correspondingly, in the following, we will examine the time pattern of manufactured exports and imports in trade between developed and developing countries. This will be done for the period 1973-77, further disaggregating the results according to major country and industry groups. Unless otherwise noted, all data have been expressed in current U.S. dollars.

Use has been made of data reported by the developed industrial countries (for short, the industrial countries), including the United States, Canada, the European Common Market, the European Free Trade Association, and Japan. In turn, among the developing countries, distinction has been made between oil-exporting and oil-importing countries. Australia, New Zealand, and South Africa, the countries of Southern Europe, and the Communist countries have not been included in either grouping.

Tables 1 and 2 provide annual data for the period 1973-77 on trade between industrial and developing countries in manufactured goods (defined as commodity classes 5 to 8 in the U.N. Standard International Trade Classification less 68 nonferrous metals) in a geographical and in an industry breakdown, respectively. Within the manufacturing category, distinction has been made among the following commodity groups: nonelectrical and electrical machinery and transport equipment; chemicals, iron and steel; textiles; clothing; and consumer goods other than clothing and their intermediate inputs. The latter category includes leather and leather

¹ Statistical work for this section of the paper was done by Michel Noël.

products, rubber products, wood and cork products, paper and paper products, non-metallic mineral manufactures, sanitary plumbing, heating, and lighting equipment, furniture, shoes, and miscellaneous manufactures.

Little needs to be said of the industrial countries' trade in manufactured goods with the oil-exporting developing countries. The latter group of countries export few manufactured goods while their imports have been rising rapidly since the quadrupling of oil prices in late 1973. As a result, the industrial countries increased their exports of manufactured goods to the oil-exporting developing countries from \$12.9 billion in 1973 to \$55.5 billion in 1977.

Several phases may be distinguished in regard to trade in manufactures between the industrial countries and the oil-importing developing countries. In the years of the world recession, 1974 and 1975, the industrial countries' imports of manufactured goods from the developing countries increased by 27 percent. Adjusting for price increases of 31 percent,² the volume of these imports declined by 3 percent between 1973 and 1975. In the same period, the manufactured exports of the industrial countries to the oil-importing developing countries rose by 59 percent, representing price increases of 37 percent and a volume increase of 16 percent.

These changes in trade flows led to an increase in the export surplus of the industrial countries in their manufactured trade with the oil-importing developing countries from \$23.9 billion in 1973 to \$42.9 billion in 1975. The United States accounted for two-thirds of the rise in the surplus, with an export increase of 71.5 percent as against average increases of 54.2 percent for the other industrial countries, reflecting largely an improvement of the U.S. competitive position following the devaluation of the dollar.

The described developments were associated with the continued growth of the national economies of oil-importing developing countries in the midst of the world recession. The combined GDP of these countries increased by 9.7 percent between 1973 and 1975 while the 1975 GDP of the industrial countries barely reached the 1973 level.

² The unit value indices used in deflating the current dollar value of the manufactured exports of the developing countries have been derived from data published in GATT, *Networks of World Trade by Areas and Commodity Classes, 1955-1976*, Geneva, 1978. The corresponding data for the developed countries are published in United Nations, *Monthly Bulletin of Statistics*, December 1978.

TRADE BETWEEN THE INDUSTRIAL COUNTRIES AND THE DEVELOPING

(Billion dol)

	United States			Canada			EEC		
	Export	Import	Balance	Export	Import	Balance	Export	Import	Balance
<i>Oil-Exporting Developing Countries</i>									
1973	2.43	0.06	2.37	0.17	0	0.17	7.00	0.42	6.58
1974	4.28	0.10	4.18	0.31	0	0.31	11.63	0.42	11.21
1975	8.00	0.09	7.91	0.57	0	0.57	20.00	0.46	19.54
1976	9.90	0.09	9.81	0.76	0.01	0.75	23.10	0.53	22.57
1977	10.50	0.10	10.40	0.84	0	0.84	29.43	0.67	28.76
<i>Oil-Importing Developing Countries</i>									
1973	10.35	7.33	3.02	0.57	0.53	0.04	16.01	4.68	11.33
1974	16.10	9.73	6.37	0.87	0.76	0.11	23.03	5.83	17.20
1975	17.75	8.89	8.86	1.06	0.76	0.30	25.82	6.85	18.97
1976	18.25	12.95	5.30	1.06	1.21	-0.15	25.35	8.92	16.43
1977	18.84	15.61	3.23	1.08	0.16	-0.08	29.98	10.87	19.11
<i>Developing Countries together</i>									
1973	12.78	7.39	5.39	0.74	0.53	0.21	23.01	5.10	17.91
1974	20.38	9.83	10.55	1.18	0.76	0.42	34.66	6.25	28.41
1975	25.75	8.98	16.77	1.63	0.76	0.87	45.82	7.31	38.51
1976	28.15	13.04	15.11	1.82	1.22	0.60	41.45	9.45	39.00
1977	29.34	15.71	13.63	1.92	1.16	0.76	59.41	11.54	47.87

Source: GATT, *International Trade 1977/78*

The oil-importing developing countries financed the expansion of their manufactured imports by drawing down foreign exchange reserves and borrowing in international financial markets. In a recessionary situation, the increased imports of these countries benefited the industrial countries through a multiplicative effect on their domestic incomes.

The situation changed in 1976 when renewed economic expansion on the industrial countries gave impetus to their imports of manufactured goods from the oil-importing developing countries. At the same time, the 19 percent increase in the volume of these

TABLE 1

COUNTRIES IN MANUFACTURED GOODS (EXCLUDING NON-FERROUS METALS)

lars, f.o.b.)

EFTA			Japan			Industrial Countries		
Export	Import	Balance	Export	Import	Balance	Export	Import	Balance
0.69	0.05	0.64	2.57	0.02	2.55	12.86	0.55	12.31
1.19	0.07	1.12	5.16	0.03	5.13	22.59	0.62	21.95
1.97	0.05	1.92	8.12	0.01	8.11	38.66	0.61	38.05
2.80	0.06	2.74	8.93	0.02	8.91	45.49	0.71	44.78
3.21	0.08	3.13	11.51	0.04	11.47	55.49	0.89	54.60
2.56	0.75	1.81	9.96	2.22	7.74	39.45	15.51	23.94
3.54	1.01	2.53	14.90	2.52	12.38	58.44	19.85	38.59
3.74	1.18	2.56	14.25	2.00	12.25	62.62	19.65	42.97
3.82	1.38	2.44	16.05	2.89	13.16	64.53	27.35	37.18
4.57	1.81	2.76	20.14	2.97	17.17	74.61	32.42	42.19
3.25	0.80	2.45	12.53	2.24	10.29	52.31	16.06	36.25
4.73	1.08	3.65	20.06	2.55	17.51	81.03	20.47	60.56
5.71	1.23	4.48	22.37	2.01	20.36	101.28	20.29	80.99
6.62	1.44	5.18	24.98	2.91	22.07	110.02	28.06	81.96
7.78	1.89	5.89	31.65	3.01	28.64	130.10	33.31	96.79

imports, derived by adjusting the 39 percent increase in import value for an average price increase of 8 percent, exceeded the 5.3 percent rise in the combined GDP of the industrial countries by a considerable margin. This result reflects in part the high marginal propensity to import in the developed countries and in part the export promotion efforts of several developing countries, in particular, Korea and Taiwan.

In turn, the value of the manufactured exports of the industrial countries to the oil-importing developing countries rose by only 3 percent, with export prices remaining at the 1975 level.

THE INDUSTRY COMPOSITION OF TRADE BETWEEN THE INDUSTRIAL COUNTRIES AND THE DEVELOPING COUNTRIES
(Billion dollars)

	Non-electrical and Electrical Machinery and Transport Equipment			Iron and Steel, Chemicals			Textiles		
	Export	Import	Balance	Export	Import	Balance	Export	Import	Balance
<i>Oil-Exporting Developing Countries</i>									
1973	8.04	0.07	7.97	2.89	0.06	2.83	0.78	0.31	0.47
1974	13.25	0.08	13.17	6.15	0.13	6.02	1.11	0.28	0.83
1975	25.90	0.14	25.76	8.30	0.10	8.20	1.35	0.28	1.07
1976	32.88	0.15	32.73	6.93	0.10	6.83	1.56	0.32	1.24
1977	40.09	0.22	39.87	7.83	0.11	7.72	1.84	0.34	1.50
<i>Oil Importing Developing Countries</i>									
1973	22.71	3.70	19.01	10.02	1.47	8.55	2.38	2.02	0.36
1974	31.85	5.30	26.55	17.75	2.35	15.40	2.88	2.40	0.48
1975	37.55	5.31	32.24	16.24	2.07	14.17	2.55	1.96	0.59
1976	40.04	7.45	32.59	14.91	2.40	12.51	2.75	2.72	0.03
1977	46.01	9.23	36.78	16.88	2.81	14.07	3.25	2.93	0.32
<i>Developing Countries together</i>									
1973	30.75	3.77	26.98	12.91	1.53	11.38	3.16	2.33	0.83
1974	45.10	5.38	39.72	23.90	2.48	21.42	3.99	2.68	1.31
1975	63.45	5.45	58.00	24.54	2.17	22.37	3.90	2.24	1.66
1976	72.92	7.60	65.32	21.84	2.50	19.34	4.31	3.04	1.27
1977	86.10	9.45	76.65	24.71	2.92	21.79	5.09	3.27	1.82

Source: GATT, *International Trade 1977/78*.

Within this total, the exports of iron and steel and chemicals declined by 8 percent while other commodity groups showed increases of 7 to 8 percent. These developments may be explained by a slowdown in the economic growth in some of the oil-importing developing countries and in the efforts made to improve their balance-of-payments position, in particular through import substitution in steel.

The described changes in trade flows led to a decline in the net export balance of the industrial countries in their manufactured trade with the oil-importing developing countries from \$42.9 bill-

TABLE 2

OPENING COUNTRIES IN MANUFACTURED PRODUCTS (EXCLUDING NON-FERROUS METALS), 1973/77
(in billions of dollars, f.o.b.)

Clothing			Consumer Goods other than Clothing and Intermediate Inputs			Manufactured Products excluding Non-ferrous Metals		
Export	Import	Balance	Export	Import	Balance	Export	Import	Balance
0.08	0	0.08	1.06	0.08	0.98	12.86	0.55	12.31
0.13	0	0.13	1.90	0.09	1.81	22.59	0.62	21.95
0.23	0	0.23	2.86	0.08	2.78	38.66	0.61	38.05
0.31	0	0.31	3.81	0.17	3.69	45.49	0.71	44.78
0.45	0	0.45	5.26	0.18	5.08	55.49	0.89	54.60
0.39	3.42	-3.03	3.97	4.91	-0.94	39.45	15.51	23.94
0.52	4.30	-3.78	5.45	5.51	-0.06	58.44	19.85	38.59
0.51	4.97	-4.46	5.75	5.37	0.38	62.62	19.68	42.94
0.55	7.08	-6.53	6.22	7.69	-1.47	64.53	27.35	37.18
0.72	7.78	-7.06	7.76	9.70	-1.94	74.61	32.42	42.19
0.47	3.42	-2.95	5.03	4.99	0.04	52.31	16.06	36.25
0.65	4.30	-3.65	7.35	5.60	1.75	81.03	20.47	60.56
0.74	4.97	-4.23	8.61	5.45	3.16	101.28	20.29	80.99
0.86	7.08	-6.22	10.03	7.81	2.22	110.02	28.06	81.96
1.17	7.78	-6.61	13.02	9.88	3.14	130.10	33.31	96.79

ion in 1975 to \$37.2 billion in 1976. The brunt of the decline was borne by the United States, whose competitive position deteriorated at the time. The export surpluses of European countries decreased to a lesser extent while Japan experienced a small increase in its surplus.

Predictions made as to the continuation of this trend proved erroneous, however, and the industrial countries' export surplus in manufactures traded with the oil-importing developing countries increased again the following year. As a result, the trade balance in manufactured goods between the two groups of countries returned

to approximately the 1975 level, exceeding the level reached in 1973 by more than three-fourths.

The improvement in the industrial countries' trade balance in manufactured goods with the oil-importing developing countries between 1976 and 1977 reflects a deceleration in the growth of their imports and an acceleration in the rise of their exports. The rates of increase were 19 percent and 16 percent, respectively, when the average prices of manufactured goods in world trade increased by 9 percent.

The slowdown in the imports of the industrial countries was concentrated in Japan, whose manufactured imports from the oil-importing developing countries rose by only 3 percent in 1977, as well as in Canada, whose imports fell in absolute terms. In both cases, a decline in the rate of economic growth and continued protection against developing country products contributed to the outcome. Despite increased protection of textiles and clothing and a deceleration of economic growth, U.S. and European imports of manufactured goods from the non-oil producing developing countries rose by more than one-fifth between 1976 and 1977.

With a continued deterioration in its competitive position, however, U.S. exports of manufactured goods to the oil-importing developing countries increased by only 3 percent. As a result, the manufactured trade surplus of the United States with these countries declined further, from \$5.3 billion in 1976 to \$3.2 billion in 1977. In turn, slow increases in imports, accompanied by a one-fourth rise in exports, led to an increase in Japan's trade surplus in manufactured goods with the oil-importing developing countries from \$13.2 billion in 1976 to \$17.2 billion in 1977. In the same period, the trade surpluses of the European countries with the oil-importing developing countries increased by about one-sixth.

Among individual product groups, the slowdown in the industrial countries' imports was the most pronounced in textiles and clothing, with increases of 8 and 10 percent, respectively, reflecting in part a consolidation after the unsustainable increase of about 40 percent in 1976 and in part the effects of protectionist measures taken. By contrast, the imports of nonelectrical and electrical machinery and transport equipment, and of consumer goods other than textiles and their intermediate inputs, increased by about one-fourth and imports of iron and steel and chemicals by one-sixth.

In the exports of the industrial countries to the non-oil importing developing countries an increase by one-fourth occurred in consumer goods other than textiles and their intermediate inputs. The exports of clothing rose at a somewhat faster (31 percent), and textile exports at a somewhat slower (18 percent), rate. Finally, the exports of nonelectrical and electrical machinery and transport equipment and of iron and steel and chemicals increased by 15 and 13 percent respectively.

The Changing Position of Individual Countries and Country Groups

For the 1973-77 period as a whole, the manufactured trade surplus of the industrial countries with the oil-exporting developing countries increased nearly four-and-a-half times, from \$12.3 billion in 1973 to \$54.6 billion in 1977. There were relatively small variations in percentage increases of the export surplus among the industrial countries, with Canada (394 percent) at the upper, and the EEC countries (337 percent) at the lower end of the range.

In turn, the manufactured trade surplus of the industrial countries with the oil-importing developing countries rose from \$23.9 billion in 1973 to \$42.2 billion in 1977, with substantial variations shown among the major industrial countries and country groups. The U.S. surplus increased from \$3.0 billion in 1973 to \$3.2 billion in 1975, with practically no change in Canada, increases in the surpluses of the EEC and the EFTA countries from \$11.3 billion to \$19.1 billion and from \$1.8 billion to \$2.8 billion, respectively, and a rise from \$7.7 billion to \$17.2 billion in Japan.

The observed changes in net balance of the Common Market countries and the United States in their manufactured trade with the oil-importing developing countries are largely explained by reference to the initial situation in 1973. The EEC countries increased their imports of manufactured goods from the oil-importing developing countries (132 percent) more rapidly than the United States (113 percent) and experienced only a slightly larger rise in their exports to these countries (87 percent as compared to 82 percent in the U.S.). However, they benefited from the fact that their export-import ratio in manufactured trade with the oil-importing developing countries was 3.4 in 1973 as compared to 1.4 in the United States.

Similar considerations apply in United States-EFTA relationships. Thus, the imports of manufactured goods by the EFTA countries from the oil-importing developing countries rose more (141 percent) than imports into the United States, while their exports increased less (79 percent) than U.S. exports. But, the EFTA countries had an export-import ratio of 3.4 in manufactured trade with the oil-importing developing countries in 1973, just as the Common Market.

Differences in the initial situation, in turn, are largely explained by the more liberal import policy followed vis-à-vis the developing countries by the United States, as compared to European countries, in the early seventies. The contrast is even greater with Japan, whose export-import ratio in manufactured trade with the oil-importing developing countries was 4.5 in 1973. At the same time, Japan's imports from these countries rose by only 34 percent between 1973 and 1977, representing an absolute decline in volume terms.

The protectionist policies followed by Japan, together with the greater similarity of its economic structure to that of the more advanced developing countries, may account for these results. At the same time, the 102 percent rise in Japan's exports was aided by its increased competitiveness. As a result, Japan's manufactured trade surplus with oil-importing developing countries more than doubled between 1973 and 1977.

The Commodity Composition of Trade

The manufactured exports of the industrial countries to the oil-exporting developing countries are increasingly dominated by nonelectrical and electrical machinery and transport equipment, which accounted for 62.5 percent of the total in 1973 and for 72.3 percent in 1977. Other commodity groups of importance, with their 1977 share in parenthesis, are iron and steel and chemicals (14.1 percent) and consumer goods other than clothing and their intermediate inputs (9.5 percent).

Nonelectrical and electrical machinery and transport equipment also assumed increasing importance in the manufactured exports of the industrial countries to oil-importing developing countries, with their share in the total rising from 57.6 percent in 1973 to 61.7

percent in 1977. But, the industrial countries' imports of these commodities increased even faster, leading to a decline in their export-import ratio from 6.1 in 1973 to 5.0 in 1977.

The United States accounts for the lion's share of the imports (62 percent in 1977) of nonelectrical and electrical machinery and transport equipment from the oil-importing developing countries. Office and telecommunication equipment and household equipment each account for nearly one-third of this total and the miscellaneous machinery and transport equipment category (mainly ships) for slightly less.

As a result of the rapid rise of imports, the U.S. trade surplus in nonelectrical and electrical machinery and transport equipment with the oil-importing developing countries declined to \$7.0 billion in 1977, after having risen from \$4.2 billion in 1973 to \$8.8 billion in 1975. This contrasts with an increase from \$14.8 billion in 1973 to \$29.8 in 1977 in the trade surplus of the other industrial countries, taken together. The latter group of countries experienced similar growth rates of exports and imports of nonelectrical and electrical machinery and transport equipment as the United States, but started out with a much higher export-import ratio in 1973.

In iron and steel and in chemicals, the export surplus of the industrial countries with the oil-importing developing countries reached the highest point, \$15.4 billion, in 1974; after declining to \$14.2 billion in 1975 and to \$12.5 billion in 1976, it rose again to \$14.1 billion in 1977. These results conceal different trends in iron and steel and in chemicals. While the industrial countries experienced more-or-less continuous increases in their export surplus in chemicals, the export surplus of these countries in steel declined sharply after 1974, reflecting largely import substitution in steel in the major oil-importing developing countries.

No clear trend is discernible in the industrial countries' trade in textiles with the oil-importing developing countries, with small surpluses shown in every year of the period under review. This contrasts with the popular perception, according to which industrial country markets would have been invaded by developing country products.

The situation is different for clothing, where all industrial countries experienced a rising deficit in their trade with oil-importing developing countries. The deficit rose from \$3.0 billion in 1973 to \$7.1 billion in 1977, with the United States and the EEC

each accounting for about two-fifths of the total. Even Japan experienced a trade deficit in clothing with the oil-importing developing countries.

Finally, from a deficit of \$0.9 billion in 1973, the trade balance of the industrial countries in consumer goods other than clothing and their intermediate inputs temporarily turned into a small surplus in 1975 and again showed a deficit (\$1.9 billion) in 1977. This deficit is composed of a growing deficit in consumer goods other than clothing and a small surplus in their intermediate inputs.

Among the individual countries and country groups, Japan and EFTA have experienced a rising surplus, the Common Market a more-or-less continuous decline in its surplus, and the United States a growing deficit, in trade with the oil-importing developing countries in consumer goods other than clothing and their intermediate inputs. At the same time, changes in the two commodity sub-groups that make up this category were about the same in each country and country group.

II. The Employment Effects of Trade in Manufactures between Developed and Developing Countries³

The Available Evidence

We have considered so far changes in trade in manufactured goods between the developed industrial and the developing countries. The next question relates to the employment effects of this trade. While much of the recent discussion has concentrated on the employment implications of increased imports by the developed countries from the developing countries, our concern is with the employment effects of changes in exports *and* imports in trade between the two groups of countries. In this connection, reference will first be made to the findings of studies on the employment effects of multilateral trade liberalization.

These studies have concluded that net changes in trade and employment in the developed countries resulting from multilateral

³ The voluminous statistical work underlying the estimates of this section was undertaken by Kishore Nadkarni.

trade liberalization would be negligible. Baldwin finds, for example, that — for his preferred set of elasticities — a 50 percent multilateral across-the-board tariff cut in all commodities, excluding textiles in U.S. exports and imports, petroleum in U.S. imports, and agricultural products in U.S. exports to the EEC, would have practically no effect on the U.S. trade balance and would represent a net employment loss of only 15 thousand in the United States (1976, p. 146). Thus, “the main conclusion emerging from the study is that the United States can participate in a substantial tariff-cutting negotiation without causing significant adverse trade and employment effects in the country” (p. 148).

Baldwin’s calculation refers to direct plus indirect changes in employment, the latter being derived by utilizing the 367 sector U.S. input-output table for 1967. Cline *et al.* provide estimates of direct and indirect employment effects for twelve alternative tariff-cutting formulas, all of which exclude petroleum products and textiles. Labor-input coefficients have been available in a 92 sector breakdown in the United States, a 160 sector breakdown for Japan, and a 10 to 30 sector breakdown for the Common Market countries. For Canada, U.S. coefficients have been used (1978, p. 63).

Under formula (1), representing a 60 percent multilateral across-the-board tariff cut that approximately corresponds to the median of the twelve alternative estimates, a net direct employment gain of 18.8 thousand and a direct plus indirect employment gain of 28.9 thousand is shown for the United States while the corresponding figures are -25.7 and -50.6 thousand for Canada, 2.7 and 23.9 thousand in Japan, and -112.2 thousand (direct effects only) for the EEC; in the latter case, it is estimated that total exports would decline as the decrease in intra-EEC trade would outweigh the increase in extra-EEC exports (pp. 125-6). Correspondingly, Cline concludes that “those who fear serious employment dislocation from liberalizing imports are without empirical support” (p. 232).

The results of these studies do not permit one, however, to derive conclusions as regards the employment effects of increased trade between developed and developing countries, in part because the estimates include trade among the developed countries that far outweighs trade between developed and developing countries, and in part because textiles, an important export product of the de-

veloping countries, has been excluded.⁴ In the following, we will concentrate on the employment effects of trade in manufactured goods between developed and developing countries.

In a paper entitled "Impact of LDC Exports on Employment in American Industry", Anne Krueger has estimated the direct employment effects of changes in the share of imports in domestic consumption and in the net trade balance of the United States for the 1970-76 period in the two-digit breakdown of the U.S. Standard Industrial Classification, encompassing 20 manufacturing sectors. While additional estimates are provided on the employment effects of imports in some four-digit categories where import competition has been especially strong, the employment effects of imports from, and exports to, the developing countries are not separately examined. Krueger thus relies on data on total imports in rejecting "the belief that the underlying cause of the difficulties of industries seeking protection is competition from abroad, especially from the LDCs" (1978, p. 2).

In turn, Grinols and Thorbecke have estimated the direct plus indirect employment effects of changes in the U.S. trade balance with developing countries between 1963 and 1975 for a sample of 22 industries among the 157 sectors of the 1972 input-output table, where changes in the net trade balance exceeded \$175 million. The authors find that there has been a net gain of 219 thousand jobs in the United States, which is reduced to 147 thousand jobs if the four food processing industries are excluded (1978, p. 11). Having further examined "the effects on U.S. employment of a hypothetical 10% change in the prevailing US-LDC trade pattern for every year of the sample period" (p. 36), they conclude that "protectionistic measures as they relate to US-LDC trade are more likely to reduce domestic employment than increase it" (*Ibid*).

The results obtained by Grinols and Thorbecke are explained by the growing export surplus of the United States in manufactured trade with the developing countries. Thus, between 1963 and 1975, the sum of positive increments in the U.S. trade balance in manufactured goods with the developing countries in the 18 manufacturing industries (excluding food processing) exceeded the sum of negative increments about three-and-a-half times. If we adjust

⁴ Cline *et al.*, however, also estimated the direct employment effects of multilateral trade liberalization in textiles. These are -37 thousand jobs in the United States, -6 in Canada, -17 in E.E.C., and -41 in Japan (pp. 132-35).

for differences in the absolute increment in trade flows, and calculate the average number of jobs per \$1 million of exports and imports, the conclusions reached by Grinols and Thorbecke are reversed: an increase in exports of \$1 million would entail a gain of 34.7 jobs in industries of the first group as compared to a loss of 56.3 jobs resulting from a \$1 million increase in imports in the second group, i.e., a ratio of .62 (p. 11).⁵ At the same time, to the extent that the application of protectionist measures would lead to decreases in imports and exports by equal amounts, it is the latter results that indicate the employment implications of such measures.

Estimates of the employment effects of increased trade with the developing countries have also been made for Belgium and for Germany. In the first case, the ratio of direct plus indirect employment for BF 1 billion worth of exports to that for imports has been estimated at .84 for 1970 by utilizing a 27 sector input-output table, of which 20 sectors produce manufactured goods (de Grauwe, *et al.*, 1978, p. 9). In the second case, two sets of estimates are available.

Utilizing a 47 sector input-output table, with 28 sectors producing manufactured commodities, Schumacher has estimated the ratio of the direct plus indirect employment effects of a balanced increase of German trade in manufactured goods with the developing countries at .96 while a net employment gain is shown if only the direct effects in the manufacturing sector are considered (1977, p. 39). The latter estimate contrasts with more recent calculations by Hiemenz and Schatz who projected a gain of 400 thousand jobs through increased exports and a loss of 846 thousand jobs through increased imports in trade in manufactured goods with the developing countries for 1985, assuming that recent trends continue and utilizing the same industrial breakdown as Schumacher (1979, pp. 48-49).

In turn, Lydall has utilized a 20 sector input-output table, of which 10 sectors produce manufactured goods, to estimate the direct plus indirect employment effects of trade liberalization in selected industries of the developed countries, matched by the re-spending of increased export proceeds by the developing countries in the country of importation. Results obtained for the United States, France, Germany, and the United Kingdom show net losses

⁵ The cited estimates exclude processed food that is not part of manufactured goods under the definition used in this paper.

in employment if trade in textiles and clothing is liberalized; there is a net gain if trade liberalization occurs in wood products, paper and printing, and ferrous and nonferrous metals; and net employment effects are approximately nil for machinery and other manufactured goods (1975, pp. 110-11).

Lydall has compared employment changes in selected import-competing industries with across-the-board changes in export industries that would result from the re-spending of increased export proceeds by the developing countries. The re-spending assumption has also been made by Birnberg, who has compared the direct employment effects of a 60 percent across-the-board tariff cut for U.S. imports of manufactured goods other than textiles from the developing countries with the employment effects of the increase in U.S. exports that would result from the spending of the increment in the foreign exchange earnings of the developing countries in the United States. Birnberg's results show a gain of 31.5 jobs for a \$1 million increase in the exports and a loss of 37.1 jobs for a \$1 million increase in the imports of the United States, i.e. a ratio of .85 (1978, p. 66). The results for imports from the developing countries originate from Cline's study while exports have been estimated in the framework of a 21 sector input-output table, with 16 sectors producing manufactured commodities.

These estimates of the employment effects of trade in manufactured goods between developed and developing countries are subject to various limitations. Lydall and Birnberg make different assumptions as regards exports and imports; they as well as de Grauwe, *et al.*, Schumacher, and Hiemenz and Schatz use highly-aggregated commodity classification schemes that include products of varying labor intensity in the individual categories; while Grinols and Thorbecke, who employ a more detailed classification scheme, cover only selected commodity categories.

The Estimates of This Study

In the present study, a detailed commodity framework has been used to estimate the employment effects for the developed countries of the simultaneous expansion of manufactured exports and imports in their trade with the developing countries. For this purpose, use has been made of a 184 commodity category break-

down of the manufacturing sector that was earlier employed in a study of the changing pattern of comparative advantage (Balassa, 1979).⁶ Each commodity category includes products that have similar economic characteristics, including labor intensity.

The labor-input coefficients used in the calculations originate from the U.S. Census of Manufacturing for the year 1975. The Census provides data for the four-digit categories of the Standard Industrial Classification, which have been combined whenever considered necessary in arriving at the 184 commodity category classification scheme. This classification scheme has further been matched against the UN Standard International Trade Classification that is used in reporting trade statistics.

The U.S. labor-input coefficients have been utilized for the other developed countries as well. While Lydall shows that labor-input coefficients are negatively correlated with per capita incomes, the differences in the coefficients are considerably smaller at the higher income levels of the developed countries (1975, p. 87). At any rate, by 1975 most developed countries have approached — and some have even exceeded — U.S. incomes per head.

At the same time, the choice of U.S. coefficients has been made necessary by reason of the lack of labor-input coefficients in a comparable commodity breakdown for the other developed countries. In the only other country, Japan, that has a detailed industrial classification scheme, rapid increases of labor productivity have rendered the 1970 coefficients used by Cline out of date, and comparability with the 184 commodity category classification scheme could not be assured. Note further that unpublished calculations by Robert E. Baldwin show that the use of Japanese input-output coefficients give results very close to those obtained by Grinols and Thorbecke for the sectors covered by the latter.

The coefficients pertain to labor inputs used directly in the production process. In the absence of an input-output table in the appropriate breakdown, estimating the indirect employment effects of trade in manufactured goods would have involved a very substantial effort. At the same time, for reasons noted below, such an effort did not appear warranted.

⁶ We have excluded from our purview primary products where the availability of natural resources affects the outcome. At any rate, in public discussions attention has been concentrated on the employment effects of trade in manufactured goods.

To begin with, calculating indirect effects on the basis of historical coefficients assumes unchanged proportions of domestically produced and imported inputs that would not be appropriate for estimating the employment effects of an *expansion* of trade. This is because product market equilibrium requires that the marginal cost of domestically produced inputs equals the world market price plus the tariff, so that the increased demand for inputs at higher export levels would be satisfied from abroad.

Nontraded inputs by definition originate from domestic sources and should ideally be included in the calculations. Such inputs are, however, of limited importance, averaging 8-12 percent of the product price, and their omission is not likely to bias the results. This is because, other things being equal, nontraded inputs used in import-substituting industries can be expected to be more labor intensive than nontraded inputs used in export industries.

Still, the question may be raised what difference the use of direct, as against direct plus indirect, labor-input coefficients may make for the results. Cline's estimates of the employment effects of multilateral trade liberalization, reported above, show small differences between the two alternatives in relation to the total trade of developed countries. The same conclusion applies to Schumacher's estimates of the employment effects of increased trade in manufactured goods between Germany and the developing countries.

Employment Effects in the Developed Countries Resulting from the Expansion of Their Trade in Manufactured Goods with the Developing Countries

The employment effects in the developed countries that would result from a *balanced* expansion of their trade in manufactured goods with the developing countries (i.e. with exports and imports rising by equal amounts) have been estimated in the present study on the assumption of the unchanged composition of exports and of imports. Under this assumption, comparisons of average labor-input coefficients for exports and for goods competing with imports will indicate the employment effects of balanced trade expansion.

Average labor-input coefficients for the exports and the imports of manufactured goods in trade between developed and de-

veloping countries are reported in Table 3. The estimates shown for eighteen industry groups are weighted averages of the labor-input data obtained for the 184 industries, derived by using the value of exports and imports in trade between developed and developing countries in the year 1976 as weights. The table provides estimates for the OECD as a whole, the United States, the EEC and Japan.⁷

The estimates show the existence of considerable differences in average labor-input coefficients for the exports and for the imports of manufactured goods of the developed countries in trade with the developing countries. For the OECD, taken as a whole, the average number of jobs for \$1 million of output is 18.4 for exports to, and 28.5 for imports from, the developing countries, the ratio of the two being .65. The corresponding ratios are .61 for the United States, .65 for the EEC, and .73 for Japan. Thus, among the developed countries, the average ratio of labor-input coefficients for exports and imports is negatively correlated with per capita incomes as the Heckscher-Ohlin theory would lead us to expect.

These estimates conflict with the by-now popular view, according to which trade in manufactured goods between the developed and the developing countries has negligible net employment effects. At the same time, they confirm the results reached in the author's study on the stages approach to comparative advantage, according to which developing countries tend to specialize in labor-intensive commodities.

Comparisons with the results obtained by other authors in regard to the employment effects of trade with the developing countries offer further interest. As shown above, the average ratio of direct plus indirect employment coefficients for U.S. exports and imports of manufactured goods in trade with the developing countries was .62 for selected industries in the Grinols-Thorbecke study. Thus, the differences between the direct employment effects estimated in this study and the direct plus indirect employment effects estimated by Grinols and Thorbecke is small, although the

⁷ The OECD includes the industrial countries (the United States, Canada, the EEC, EFTA, and Japan) as well as the countries of Southern Europe, (Greece, Spain, and Turkey), Australia and New Zealand. Differences in country composition as well as differences in commodity composition (e.g. synthetic fibers have been included with manufactured goods in the 184 industry breakdown although they are not part of commodity classes 5 to 8) account for differences in the value of manufactured trade shown in Tables 1 and 2 and that reported in the subsequent tables.

TABLE 3

AVERAGE LABOR INPUT COEFFICIENTS IN MANUFACTURED
TRADE BETWEEN DEVELOPED AND DEVELOPING COUNTRIES

(Jobs per \$ million of output)

	OECD		USA		EEC		JAPAN	
	Export	Import	Export	Import	Export	Import	Export	Import
1. Textile Mill Products.....	28.66	32.73	29.28	34.34	28.30	32.05	28.46	31.55
2. Apparel & Other Textile Products..	40.13	43.12	40.69	40.78	41.38	43.14	39.08	40.53
3. Lumber & Wood Products.....	25.12	25.62	25.45	25.80	23.92	25.30	27.63	26.09
4. Furniture & Fixtures.....	32.68	32.68	32.68	32.68	32.68	32.68	32.68	32.68
5. Paper & Allied Products.....	11.80	12.48	11.00	14.36	12.83	12.40	11.92	10.81
6. Printing & Publishing.....	26.66	24.58	26.64	24.59	27.27	25.02	28.20	27.73
7. Chemicals & Allied Products.....	10.67	11.37	10.29	13.07	10.96	10.37	11.37	10.53
8. Petroleum Products.....	10.30	10.30	10.30	10.30	10.30	10.30	10.30	10.30
9. Rubber & Plastic Products.....	22.87	43.27	22.46	43.96	25.13	42.30	18.13	40.41
10. Leather & Leather Products.....	28.21	30.93	30.06	35.93	33.26	26.69	22.25	28.13
11. Stone, Clay & Glass Products...	24.44	30.82	25.51	34.91	25.89	29.81	24.69	31.64
12. Primary Metal & Allied Products..	13.59	13.35	15.56	13.63	14.29	13.11	12.59	13.07
13. Fabricated Metal Products.....	21.27	22.93	21.37	23.20	21.35	23.29	21.30	22.31
14. Nonelectrical Machinery.....	19.73	20.42	18.75	20.39	20.00	20.88	20.20	20.43
15. Electrical Equipment & Supplies..	24.59	24.68	25.05	24.75	24.46	24.69	24.50	25.30
16. Transportation Equipment.....	15.86	18.90	13.85	12.29	13.42	19.14	20.25	26.88
17. Instruments & Related Products...	22.15	23.23	21.27	24.81	21.39	20.32	21.04	23.18
18. Misc. Manufactured Products.....	23.44	23.65	23.44	25.63	22.28	21.77	29.05	21.39
Total.....	18.44	28.53	17.77	29.12	18.50	28.40	19.30	26.32

Source: See text.

comparability of the results is reduced by differences in industry coverage.

In turn, de Grauwe's results for Belgium and Schumacher's estimates for Germany refer to earlier years, and shifts have since occurred in favour of the importation of labor-intensive goods, such as clothing and electronics, from the developing countries at the expense of capital-intensive iron and steel and chemicals. In fact, Schumacher's results show increases in the relative labor-intensity of imports after 1972, although the ratio of estimated average direct plus indirect labor-input coefficients for German exports and imports of manufactured goods was only .94 for changes in the composition of this trade between 1972 and 1976 (1978, p. 10). Furthermore, as we have seen, projections made by Hiemenz and Schatz indicate a considerable employment loss for German trade in manufactured goods with the developing countries.*

Also, the Belgian and the German estimates are based on the assumption that labor-input coefficients are the same for exports and for imports in each industry group. The estimates of the present study, however, show the existence of considerable differences in the coefficients as between the developed countries' exports and imports in trade with the developing countries *within* most industry groups. This is indicated by a comparison of average labor-input coefficients for exports and for imports in the 18 industry group breakdown (Table 3).

To begin with, there are large differences in average labor-input coefficients for exports and imports in the case of rubber and plastic products; stone, clay and glass products; and transportation equipment. In these industry groups, the ratios of the average labor-input coefficients for exports as compared to imports are .53, .79, and .84, respectively, for the OECD taken as a whole.

The results for these industry groups are explained by the dominant role played by highly labor-intensive rubber footwear in the developed countries' imports, and by the relative importance of highly capital-intensive tires and tubes in their exports, of rubber and plastic products; by the high share of relatively labor-intensive

* Schumacher's more recent estimates do not report direct labor-input coefficients alone. Also, there seems to be a conflict between estimates of direct plus indirect employment effects in Schumacher's estimates reported in his 1977 (p. 39) and 1978 (p. 8) articles as well as between the results shown in two of the tables in his 1978 paper (pp. 9 and 10).

glass containers in the imports, and the high share of relatively capital intensive exports of cement in the exports, of stone, clay and glass products by the developed countries; and by the high share of relatively labor-intensive ships and boats in the imports, and the high share of relatively capital-intensive motor vehicles in the exports, of transportation equipment by these countries.

Labor-input coefficients are higher for imports than for exports in the trade of the OECD countries with the developing countries in most other industry groups, too. The opposite result is shown only for printing and publishing and for primary metals. But, in these cases, the differences are small; the ratio of labor-input coefficients in export-import relationships is 1.08 in the first case and 1.02 in the second. At the same time, printing and publishing is a relatively unimportant item in trade between developed and developing countries.⁹

There are a few additional exceptions for individual developed countries and country groups but the differences exceed 10 percent only for transportation equipment in the United States (a ratio of 1.13), leather and leather products in the EEC (a ratio of 1.25), and miscellaneous manufactured products in Japan (a ratio of 1.36). In the United States, the result has been due to the relatively high share of the imports of automobile parts and accessories that are combined with capital-intensive motor vehicles; in the EEC, the high export share of capital-intensive leather has contributed to the outcome; while in Japan the exportation of relatively labor-intensive toys and sports goods is largely responsible for the result obtained in regard to miscellaneous manufactured products.

The numerical magnitudes of average *between* and *within* industry group differences on labor-input coefficients are of further interest. These can be shown by comparing the ratios of average labor-input coefficients for exports and imports reported above with the ratios derived on the assumption that labor-input coefficients are invariant within each of the eighteen industry groups. The relevant results are .65 and .71 for the OECD, taken as a whole, .61 and .66 for the United States, .65 and .70 for the EEC, and .73 and .81 for Japan. It appears, then, that within-industry group differences in labor-input coefficients account for about one-sixth of

⁹ Labor-input coefficients are the same for exports and for imports in the case of furniture and petroleum products where, due to data limitations, further disaggregation was not feasible.

the difference in average labor-input coefficients for exports and imports, estimated in a 184 commodity category breakdown. It may be suggested that additional disaggregation would further increase differences in the coefficients.

Thus far, we have compared average labor-input coefficients for manufactured goods traded between developed and developing countries. These coefficients will be relevant in the event of a *balanced* expansion of manufactured trade between the two groups of countries. In such an eventuality, the number of jobs lost through increased imports would be about one-half higher than the number of jobs gained through exporting, for the OECD taken as a whole.

An alternative hypothesis postulates equiproportionate increases in the exports and imports of manufactured goods in trade between developed and developing countries (i.e. identical rates of change for exports and imports); for short, a *proportional* expansion of trade. Assuming further unchanged export and import structures as beforehand, the employment effects of a proportional expansion of trade are indicated in Table 4 that provides information on the labor content of manufactured exports, and of products competing with manufactured imports, in the trade of the developed countries with the developing countries. The estimates have been derived by multiplying export and import values for 1976 by the labor-input coefficients estimated in the 184 industry breakdown.

The results show substantial positive employment effects for the OECD countries in their trade in manufactured goods with the developing countries. Similar conclusions apply to the United States, the EEC, and Japan. Thus, in the event of a proportional expansion of trade, the ratio of jobs gained through exports to jobs lost through imports would be 2.8 in the OECD taken as whole, 1.4 in the United States, 3.4 in the EEC, and 7.9 in Japan. It is apparent that differences in the results shown in Tables 3 and 4 are explained by intercountry variations in export-import ratios in manufactured trade with the developing countries.

The proportional expansion of manufactured trade between developed and developing countries would create new jobs in most industry groups in the developed countries. Exceptions are textiles, clothing, lumber and wood products, rubber and plastic products, leather and leather products, and miscellaneous manufactures. For the OECD countries, taken together, a 10 percent proportional

TABLE 4

TOTAL EMPLOYMENT EFFECTS OF MANUFACTURED TRADE BETWEEN
DEVELOPED AND DEVELOPING COUNTRIES, 1976

(Thousand jobs)

	OECD		Balance
	Export	Import	
1. Textile Mill Products	138.9	192.2	- 53.3
2. Apparel & Other Textile Products	40.8	218.2	-177.4
3. Lumber & Wood Products	10.4	26.3	- 15.9
4. Furniture & Fixtures	19.7	10.6	9.1
5. Paper & Allied Products	33.3	2.8	30.5
6. Printing & Publishing	25.0	2.7	22.3
7. Chemical & Allied Products	163.4	23.4	140.0
8. Petroleum Products	1.1	0.0	1.1
9. Rubber & Plastic Products	32.2	63.1	- 30.9
10. Leather & Leather Products	10.1	36.2	- 26.2
11. Stone, Clay & Glass Products	51.6	10.9	40.7
12. Primary Metal & Allied	194.2	27.7	166.5
13. Fabricated Metal Products	91.9	7.3	84.5
14. Nonelectrical Machinery	527.4	18.7	508.7
15. Electrical Equipment & Supplies	417.3	122.7	294.6
16. Transportation Equipment	486.2	13.7	472.5
17. Instruments & Related Products	72.7	17.8	54.9
18. Misc. Manufactured Products	47.7	58.0	- 10.3
Total	2363.8	852.5	1511.3
of which sum of positive balances			1825.4
negative balances			314.1
		USA	
1. Textile Mill Products	15.4	62.5	-47.1
2. Apparel & Other Textile Products	13.0	81.5	-68.5
3. Lumber & Wood Products	2.0	11.5	- 9.5
4. Furniture & Fixtures	3.4	4.1	- 0.7
5. Paper & Allied Products	8.6	1.0	7.6
6. Printing & Publishing	4.5	0.8	3.7
7. Chemical & Allied Products	37.5	10.4	27.1
8. Petroleum Products	0.0	0.0	0.0
9. Rubber & Plastic Products	4.4	41.8	-37.4
10. Leather & Leather Products	2.5	15.1	-12.6
11. Stone, Clay & Glass Products	6.6	4.5	2.1
12. Primary Metal & Allied	25.7	11.9	13.8
13. Fabricated Metal Products	15.9	2.8	13.1
14. Nonelectrical Machinery	142.7	6.4	136.3
15. Electrical Equipment & Supplies	106.3	77.9	28.4
16. Transportation Equipment	108.0	2.6	105.4
17. Instruments & Related Products	16.3	9.5	6.8
18. Misc. Manufactured Products	9.1	27.2	-18.1
Total	521.9	371.5	150.4
of which sum of positive balances			344.3
negative balances			193.9

TABLE 4
(cont.d)TOTAL EMPLOYMENT EFFECTS OF MANUFACTURED TRADE BETWEEN
DEVELOPED AND DEVELOPING COUNTRIES, 1976

(Thousand jobs)

	Export	EEC Import	Balance
	1. Textile Mill Products	48.7	74.3
2. Apparel & Other Textile Products	19.8	90.1	-70.3
3. Lumber & Wood Products	5.2	8.9	- 3.7
4. Furniture & Fixtures	12.8	3.4	9.4
5. Paper & Allied Products	6.5	1.2	5.3
6. Printing & Publishing	15.3	0.8	14.5
7. Chemical & Allied Products	73.8	6.6	67.2
8. Petroleum Products	0.7	0.0	0.7
9. Rubber & Plastic Products	16.0	11.5	4.5
10. Leather & Leather Products	3.7	13.7	-10.0
11. Stone, Clay & Glass Products	25.7	3.2	22.5
12. Primary Metal & Allied	77.4	9.8	67.6
13. Fabricated Metal Products	49.5	2.2	47.3
14. Nonelectrical Machinery	261.7	6.6	255.1
15. Electrical Equipment & Supplies	187.1	29.9	157.2
16. Transportation Equipment	145.1	5.0	140.1
17. Instruments & Related Products	22.3	4.5	17.8
18. Misc. Manufactured Products	25.3	18.3	7.0
Total	996.7	289.9	706.8
of which sum of positive balances			816.3
negative balances			109.5
		JAPAN	
1. Textile Mill Products	61.7	18.8	42.9
2. Apparel & Other Textile Products	3.4	13.7	-10.3
3. Lumber & Wood Products	0.3	2.2	- 1.9
4. Furniture & Fixtures	1.7	1.6	0.1
5. Paper & Allied Products	3.6	0.1	3.5
6. Printing & Publishing	1.4	0.2	1.2
7. Chemical & Allied Products	28.8	2.8	26.0
8. Petroleum Products	0.0	0.0	0.0
9. Rubber & Plastic Products	8.1	3.2	4.9
10. Leather & Leather Products	3.1	2.0	1.1
11. Stone, Clay & Glass Products	11.0	1.3	9.7
12. Primary Metal & Allied	73.1	2.8	70.3
13. Fabricated Metal Products	13.5	0.3	13.2
14. Nonelectrical Machinery	71.5	1.6	69.9
15. Electrical Equipment & Supplies	88.6	10.8	77.8
16. Transportation Equipment	177.4	3.0	174.4
17. Instruments & Related Products	17.2	1.5	15.7
18. Misc. Manufactured Products	9.4	6.3	3.1
Total	573.8	72.3	501.6
of which sum of positive balances			513.8
negative balances			12.2

Source: See text

increase in trade flows would entail the loss of altogether 31 thousand jobs in these industries as compared to a total gain of 183 thousand jobs in the other industry groups. Comparable figures are 19 thousand and 34 thousand for the United States and 11 thousand and 82 thousand for the EEC. Finally, Japan would experience a gain of 51 thousand jobs in its export industries, with practically no loss of jobs elsewhere.¹⁰

The Skill-Intensity of Trade

We have seen that average labor input-coefficients are about one-half greater for the manufactured imports of the developed countries from the developing countries than for their exports to these countries. The opposite conclusion obtains if we consider professional and technical labor alone. In this occupational group, the ratio of labor-input coefficients for exports as compared to imports is 1.20 in the OECD taken as a whole, 1.20 in the United States, 1.29 in the EEC, and 1.12 in Japan (Table 5A). Thus, there would be a gain in the employment of professional and technical labor in the developed countries, even if one assumed a balanced expansion of their trade in manufactured goods with the developing countries. On the OECD level, as well as for the EEC and Japan, there would also be gains in the employment of foremen and skilled workers, while a small loss in this category is shown for the United States. In turn, the largest losses would be incurred in regard to semi-skilled and unskilled production workers, where the ratio of labor-input coefficients for exports as compared to imports is .44 for the OECD taken as a whole, .42 for the United States, .45 for the EEC, and .50 for Japan.¹¹

The results cited in Table 5A point to the existence of considerable differences in the occupational structure of production for exports and for import substitution in the trade of the developed countries with the developing countries. These differences are put into focus in Table 5B that provides information on the average

¹⁰ In all cases, we have taken one-tenth of the sum of positive and negative employment balances shown in Table 4. It is apparent from the table that the net employment effects for particular industries were generally of the same sign in the individual developed countries and country groups as for the OECD as a whole.

¹¹ Results for the individual occupational groups have been obtained by utilizing U.S. statistics on Occupation by Industry for the year 1970.

TABLE 5

**EMPLOYMENT EFFECTS OF TRADE IN MANUFACTURED PRODUCTS BETWEEN
DEVELOPED AND DEVELOPING COUNTRIES ACCORDING
TO OCCUPATIONAL CATEGORIES**

	OECD		USA		EEC		JAPAN	
	Export	Import	Export	Import	Export	Import	Export	Import
A. Labor-Input Coefficients (No. of Jobs per \$ Million of Output)								
1. Professional and Technical Workers	2.07	1.72	2.36	1.97	2.03	1.57	1.93	1.72
2. Managers and Administrators ..	1.03	1.40	1.06	1.47	1.08	1.36	0.91	1.32
3. Sales Workers	0.28	0.50	0.28	0.51	0.37	0.51	0.22	0.47
4. Clerical Workers	2.29	2.93	2.35	3.08	2.32	2.85	2.23	2.72
5. Foremen and Skilled Workers (Craftsmen)	4.28	3.84	3.69	3.89	4.08	3.69	5.26	3.94
6. Production Workers, Unskilled and Semi-skilled (Operators)	7.32	16.57	7.08	16.68	7.53	16.81	7.36	14.63
7. Workers in Construction, Transportation, Material Handling, etc.	0.39	0.50	0.36	0.50	0.38	0.50	0.42	0.48
8. Laborers	0.78	1.06	0.60	1.02	0.76	1.11	0.99	1.04
Total	18.44	28.53	17.77	29.12	18.50	28.40	19.30	26.32
B. Employment Shares (percent)								
1. Professional and Technical Workers	11.22	6.04	13.26	6.77	10.98	5.52	9.99	6.53
2. Managers and Administrators ..	5.57	4.91	5.96	5.04	5.83	4.80	4.73	5.01
3. Sales Workers	1.54	1.76	1.56	1.75	1.72	1.78	1.14	1.78
4. Clerical Workers	12.43	10.27	13.20	10.59	12.55	10.03	11.53	10.32
5. Foremen and Skilled Workers (Craftsmen)	23.23	13.45	20.76	13.37	22.07	12.99	27.25	14.96
6. Production Workers, Unskilled and Semi-skilled (Operators)	39.71	58.08	39.84	57.27	40.58	59.19	38.11	55.60
7. Workers in Construction, Transportation, Material Handling, etc.	2.09	1.76	2.04	1.73	2.07	1.77	2.15	1.84
8. Laborers	4.23	3.73	3.39	3.49	4.11	3.92	5.14	3.95
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
C. Employment Effects of Trade in 1976 (Thousands of Jobs)								
1. Professional and Technical Workers	265.2	51.5	69.2	25.2	109.4	16.0	57.3	4.7
2. Managers and Administrators ..	131.8	41.9	31.1	18.7	58.2	13.9	27.1	3.6
3. Sales Workers	36.4	15.0	8.1	6.5	17.2	5.2	6.5	1.3
4. Clerical Workers	294.0	87.6	68.9	39.3	125.1	29.1	66.2	7.5
5. Foremen and Skilled Workers (Craftsmen)	549.0	114.7	108.4	49.7	220.0	37.7	156.3	10.8
6. Production Workers, Unskilled and Semi-skilled (Operators)	938.6	495.1	207.9	212.7	405.5	171.6	218.7	40.2
7. Workers in Construction, Transportation, Material Handling, etc.	49.4	15.0	10.6	6.4	20.6	5.1	12.4	1.3
8. Laborers	99.8	31.8	17.6	13.0	40.9	11.4	29.5	2.9
Total	2363.8	852.5	521.9	371.5	996.7	289.9	573.8	72.2

employment shares of the various occupational categories in the manufactured exports and imports of the OECD countries, taken together, the United States, the EEC, and Japan.

Among occupational categories, the share of professional and technical workers in total employment is nearly double for the exports than for the imports of manufactured goods in the OECD countries' trade with the developing countries. The relevant ratios are 1.96 for the United States, 1.99 for the EEC, and 1.53 for Japan, reflecting a less sophisticated export structure in the latter case.

Also, the share of foremen and skilled workers in total employment is about three-fourths higher for the exports than for the imports of the OECD countries in their manufactured trade with the developing countries, with Japan at the top (1.82) and the United States (1.55) at the bottom of the range. The differences go in the same direction,¹² but they are numerically smaller, for managers and administrators, clerical workers, service workers, and for workers in construction, transportation and material handling.

Differences in the opposite direction are observed in regard to sales workers and, in particular, for the largest category, unskilled and semi-skilled production workers. In the latter case, the average employment share of developed country manufactured imports from the developing countries is about two-fifths lower than that of their exports, with the United States (36 percent) and Japan (45 percent) being at the opposite ends of the range. Again, these results conform to the Heckscher-Ohlin theory of international specialization.

By comparison, Keesing found that in 1957 the exports of the United States, Germany, Sweden, and the United Kingdom were relatively skill-intensive whereas skill intensity was higher for imports than that for exports in the Netherlands, Belgium, Italy, France, and Japan (1965, p. 291). In interpreting Keesing's estimates, it should be recalled, however, that they pertain to a relatively early postwar year and concern the total manufactured trade of the countries in question that was dominated by trade among the developed countries themselves.

In turn, Baldwin and Lewis estimate that a 50 percent multilateral tariff cut in manufacturing (textiles excluded) would provide

¹² Exceptions are clerical workers in Japan and workers in construction, transportation, and material handling in the United States.

a net employment gain in the professional and technical labor as well as in the management and administration categories, as against losses in all other labor categories, in the United States (1978, p. 253). A comparison of the Baldwin-Lewis estimates with those reported in Table 5C shows that, as expected, increased trade with the developing countries would lead to a larger shift from low-skill to high-skill occupations than that resulting from an increase in U.S. overall trade.

While the estimates reported in Table 5A indicate the employment effects of a *balanced* expansion of manufactured trade between developed and developing countries in the various occupational categories, the estimates of Table 5C show the effects of *proportional* change in this trade. It is apparent that an equi-proportionate increase in OECD exports and imports in trade in manufactured goods with the developing countries would have a net employment-creating effect in all eight occupational categories. The same results have been obtained for the EEC and Japan and, with the exception of unskilled and semi-skilled production workers, for the United States. For the latter category, the U.S. shows a slight deficit.

The Human and the Physical Capital Intensity of Trade

We have considered the effects of trade in manufactured goods between developed and developing countries on employment in the former group of countries for various skill classes. In order to express the skill intensity of trade in a single number, Keesing (1965, 1968, 1971)¹³ has calculated ratios of jobs in high-skilled to low-skill occupations. Given the arbitrariness involved in making such a distinction, we have instead followed Kenen (1965) in estimating the human-capital intensity of trade. This procedure also permits making comparisons between the physical and the human capital intensity of the exports and imports of the developed countries.

¹³ In his earlier work (1965 and 1968), Keesing also used U.S. labor input coefficients for examining the occupational effects of the exports of various industrial countries. In a later paper (1971), Keesing has made use of data obtained for the individual industrial countries. This has not been done in the present paper for lack of comparable data on the appropriate breakdown.

Physical capital and human capital coefficients have been taken from "A 'Stages Approach' to Comparative Advantage," (Balassa, 1979) where the derivation of these coefficients is described in detail. Two sets of coefficients have been calculated: "stock" and "flow" coefficients. The former have been defined as the value of fixed capital per worker (physical capital) and the discounted value of the difference between average wage and the unskilled wage (human capital), and the latter as nonwage value added per worker (physical capital) and the average wage (human capital).

Table 6 provides information on average physical and human capital coefficients for exports and imports of manufactured goods in the trade of developed countries with the developing countries. As is apparent from the table, for the OECD taken as a whole, capital coefficients for exports are substantially higher than for imports. The average ratios of the coefficients for exports and for imports are 1.58 for physical capital and 1.44 for human capital utilizing the stock measure, and 1.48 and 1.28, respectively, utilizing the flow measure.

Similar results have been obtained for the United States and the EEC, except that in the latter case the stock measure shows the same ratios for physical and for human capital. Note further that in the EEC the ratio for human capital under the flow measure (1.28) is roughly the same as that obtained for Belgium, where this was estimated at 1.26 for 1970 (de Grauwe, *et al.*, 1977, p. 8).

The ratios of physical and human capital coefficient for exports and for imports are, however, substantially lower for Japan than for the other developed countries. This result may be taken to reflect the fact that capital accumulation in Japan has not been commensurate with incomes per head that have risen very rapidly in recent years.

The cited estimates indicate the relatively high physical capital and skill-intensity of the manufactured exports of the developed countries to the developing countries as compared to their imports from these countries. It is thus apparent that, in their manufactured trade with the developing countries, the developed countries exchange physical and human capital for unskilled labor.

TABLE 6
 PHYSICAL AND HUMAN CAPITAL COEFFICIENTS FOR MANUFACTURED EXPORTS
 AND IMPORTS OF DEVELOPED COUNTRIES
 (Thousand dollars per worker)

	Export	OECD Import	Ratio
<i>Stock Measures</i>			
Physical Capital	16.6	10.5	1.58
Human Capital	29.7	20.6	1.44
Together	46.3	31.1	1.49
<i>Flow Measures</i>			
Physical Capital	8.6	5.8	1.48
Human Capital	9.6	7.5	1.28
Together	18.2	13.4	1.36
USA			
<i>Stock Measures</i>			
Physical Capital	15.6	9.2	1.68
Human Capital	30.6	19.9	1.54
Together	46.2	29.2	1.58
<i>Flow Measures</i>			
Physical Capital	8.8	5.5	1.60
Human Capital	9.8	7.6	1.29
Together	18.7	13.1	1.42
EEC			
<i>Stock Measures</i>			
Physical Capital	15.3	11.0	1.39
Human Capital	29.1	21.0	1.39
Together	44.4	32.0	1.39
<i>Flow Measures</i>			
Physical Capital	9.0	5.9	1.53
Human Capital	9.5	7.4	1.28
Together	18.5	13.3	1.39
JAPAN			
<i>Stock Measures</i>			
Physical Capital	14.1	11.9	1.18
Human Capital	24.8	22.0	1.13
Together	38.9	33.9	1.15
<i>Flow Measures</i>			
Physical Capital	8.1	6.7	1.21
Human Capital	8.4	7.6	1.10
Together	16.5	14.3	1.15

Source: See text.

III. Employment Implications of Prospective Trends in Trade in Manufactured Goods between Developed and Developing Countries¹⁴

Projections for Growth and Trade

In the preceding section, we have examined the employment implications for the developed countries of a *balanced* and a *proportional* expansion of their trade in manufactured goods with the developing countries. Consideration has further been given to the occupational structure and to the physical and human capital-intensity of this trade.

Neither a balanced nor a proportional expansion of trade in manufactured goods between developed and developing countries is a likely occurrence. Rather, these alternatives represent extreme cases, assuming a zero trade balance in manufactured goods *on the margin* in the first case, and an equiproportionate expansion of *all* manufactured trade flows in the second.

Correspondingly, in order to evaluate the employment implications of future trade in manufactured goods between the developed and the developing countries, projections of trade flows would have to be made. In projecting trade flows, we have taken the estimates of the *World Development Report* as a point of departure.

The Report forecasts the following growth rates of the total exports of manufactured goods from the developing countries between 1975 and 1985: textiles, 6.2 percent; clothing, 8.3 percent; chemicals, 13.0 percent; iron and steel, 14.5 percent; machinery and transport equipment, 17.3 percent; and other manufactures 10.0 percent; averaging 12.2 percent (1978, p. 29). The same estimates are employed in regard to the developing countries' exports to the developed countries, which account for about three-fourths of the total.

We have applied the export growth rates assumed in the *World Development Report* for 1975-85 to project the future exports of the developing countries to the developed countries in in-

¹⁴ The calculations reported in this section were performed by Joung-Yong Lee.

dividual industry groups for the 1976-86 period. The resulting estimates, reported in Table 7, entail an average growth rate for manufactured exports of 12.6 percent, slightly higher than the 12.2 percent shown in the Report (p. 29). The difference is largely due to the fact that nonelectrical and electrical machinery and transport equipment, which have the highest projected growth rate, had a larger share in the developing countries exports of manufactured goods in 1976 than in 1975.

Our estimates for textiles and clothing represent a departure from the projections of the *World Development Report* that call for developing country exports to increase at an annual average rate of 4.5 percent in the first case, and 5.5 percent in the second, between 1976 and 1986 (p. 28). The latter figures appear overly low. For one thing, they assume no change in the market share of the developing countries in the domestic consumption of textiles and clothing in the developed countries, although the developing countries may further increase their share at the expense of developed country exporters such as Japan. For another thing, the estimates do not take account of the continuous upgrading of the exports of textiles and clothing from the developing countries that has raised the unit value of these exports at a rate much exceeding average prices in world trade (Keesing, 1978).

More generally, the question needs to be answered if the 1975-85 export growth rates projected in the *World Development Report* could be applied to the 1976-86 period, given that the manufactured exports of the developing countries to the developed countries rose by 29 percent in volume terms in 1976 (cf. p. 4 above). The results for 1977, an increase of 9 percent in volume terms, would point to the need for a downward adjustment. However, this decline has proved to be temporary and GATT reports that "in volume terms... exports from the oil-importing developing countries, which had only a small increase in 1977, appear to have increased at a much faster pace, mainly on account of manufactures" in 1978 (GATT/1231, February 9, 1978, p. 4). In fact, among the major developing country exporters of manufactured goods, the volume of total exports rose by 14 percent in Korea and by 24 percent in Taiwan in 1978 while manufactured exports, including processed food, increased by 28 percent in Brazil.¹⁵ The

¹⁵ *International Financial Statistics*, May 1979 and *Conjuntura Econômica*, April 1979.

TABLE 7

PROJECTED EXPANSION OF EXPORTS AND IMPORTS IN MANUFACTURED GOODS
BETWEEN THE OECD AND DEVELOPING COUNTRIES

(\$ million; percent)

	Exports 1976	Annual Growth Rate	Projected Exports, 1986	Increment in Exports, 1976-86	Imports 1976	Annual Growth Rate	Projected Imports, 1986	Increment in Imports, 1976
1. Textile Mill Products	4846	3.0	6512	1666	5874	6.2	10719	4845
2. Apparel & Other Textile Products ..	1016	3.0	1365	349	5060	8.3	11231	6171
3. Lumber & Wood Products	414	3.0	556	142	1025	10.0	2659	1634
4. Furniture & Fixtures	601	3.0	808	207	324	10.0	839	515
5. Paper & Allied Products	2819	5.7	4907	2088	228	10.0	592	364
6. Printing & Publishing	937	5.7	1631	694	110	10.0	285	175
7. Chemical & Allied Products	15316	5.7	26662	11346	2058	13.0	6986	4928
8. Petroleum Products	107	3.0	143	36	4	10.0	9	5
9. Rubber & Plastic Products	1407	3.0	1890	483	1458	10.0	3782	2324
10. Leather & Leather Products	357	3.0	479	122	1171	10.0	3036	1865
11. Stone, Clay & Glass Products ..	2112	3.0	2839	727	344	10.0	892	548
12. Primary Metal & Allied Products ..	14289	3.0	19203	4914	2076	10.7	5736	3660
13. Fabricated Metal Products	4318	3.0	5804	1486	320	10.7	884	564
14. Nonelectrical Machinery	26731	7.0	52583	25852	916	20.3	5812	4896
15. Electrical Equipment & Supplies	16971	7.0	33384	16413	4970	20.3	31550	26580
16. Transportation Equipment	30652	5.7	53360	22708	725	20.3	4601	3876
17. Instruments & Related Products ..	3281	7.0	6454	3173	768	10.0	1991	1223
18. Misc. Manufactured Products	2036	5.7	3545	1509	2454	10.0	6365	3911
Total	128210	5.7	222125	93915	29881	12.6	97968	68087

increases would be larger if we considered manufactured goods alone.¹⁶

Furthermore, the Korean 15-year plan calls for manufactured exports to rise at an average annual rate of 14.9 percent between 1977 and 1991 (1978, p. 53); the corresponding projections of Taiwan's 6-year plan are 15.8 percent for the period 1978-81 (1978, p. 12); and unofficial projections for Brazil call for increases of slightly over 10 percent for total exports, with substantially higher growth rates for manufactured exports. Note finally that the estimates of this study exclude, and those of the *World Development Report* include, the countries of Southern Europe that have experienced considerably lower growth rates of manufactured exports than all other developing countries, taken as a group.

In estimating the future exports of manufactured goods from the developed countries to the developing countries, we have applied the GDP growth rate of 5.7 percent projected in the *World Development Report* for the developing countries in the 1975-85 period (1978, p. 32) to the 1976-86 period.¹⁷ Next, we have assumed varying income elasticities of demand in demand in the developing countries for different groups of manufactures, constrained to an average of 1.0 for all manufactured goods combined.

The latter figure has been derived from the overall average elasticity of .88 assumed in the Report (pp. 30, 32), with adjustment made for past relationships between the relevant elasticities. Thus, in the 1965-76 period, the ratio of the elasticity of import demand for manufactured imports to that for all imports by the developing countries was 1.15. In conformity with the experience of this period, it has further been assumed that share of the developed countries in the manufactured imports of the developing countries would remain unchanged during the period of projection.

An income elasticity of import demand of approximately 1.2

¹⁶ Manufactured goods account for 85 percent of total exports in Korea and 88 percent in Taiwan while processed food represents 38 percent of Brazilian exports of manufactured goods, inclusive of processed food. At the same time, historically, manufactured exports have been rising more rapidly than the exports of unprocessed and processed primary commodities.

¹⁷ Again, the definition of developing countries used in this study differs from that employed in the Report, as we exclude the countries of Southern Europe; in turn, we include Kuwait, Libya, and Saudi Arabia in the group. These adjustments are unlikely to modify the results by more than one or two tenths of a percentage point, however.

has been assumed for nonelectrical and electrical machinery and for instruments and related products that are required by the investment effort developing countries would have to make in order to reach high rates of economic growth. In turn, an income elasticity of import demand of 1.0 has been assumed for paper and paper products, printing and publishing, chemicals, and transport equipment, where a high income elasticity of domestic demand is counter-balanced by import substitution. Finally, an elasticity of import demand of approximately 0.5 has been assumed for all other industry groups, where income elasticities of domestic demand are relatively low and the import substitution effort tends to be considerable.

These estimates would give rise to an average rate of growth of 5.7 percent for the exports of manufactured goods from the developed countries to the developing countries between 1976 and 1978 as compared to the projected growth rate of 12.6 percent for their imports. Expressed in 1976 prices, there would be an absolute increment of \$94 billion in the exports, and \$68 billion in the imports, of manufactured goods by the OECD countries in their trade with the developing countries during the 1976-86 period (Table 7). The ratio of exports to imports would correspondingly decline from 4.3 in 1976 to 2.3 in 1986, with the incremental ratio being 1.4.

The Employment Effects of Projected Trade Flows

The employment implications of projected trade in manufactured goods between developed and developing countries will be considered in the following for the OECD taken as a whole. The estimates have been made on the assumption that labor-input coefficients would remain unchanged during the 1976-86 period. Correspondingly, changes in employment resulting from trade flows have been overestimated by neglecting future increases in labor productivity and the substitution of capital for labor in response to increases in real wages.

As shown in Table 8A, the projected expansion of trade in manufactured goods between the developed and the developing countries would have practically no net effect on employment in the former group of countries. The increase of employment in

exports is estimated at 1747 thousand and the decline of employment in imports at 1736 thousand.

The average labor-input coefficients for increases in exports and in imports are estimated at 18.6 and 25.5, respectively, with their ratio being .73. It is thus apparent that the projections would entail a slight reduction in the labor-intensity of imports from the developing countries that would result from changes in the commodity composition of this trade. Similar considerations apply to the capital coefficients shown in Table 8C.

Nevertheless, substantial differences in labor-input coefficients and in capital intensity remain as between projected exports and imports in manufactured trade between developed and developing countries. Also, there are considerable differences in projected changes in employment among occupational categories, involving a shift from low-skill to high-skill employment. The major loser is the unskilled and semi-skilled production workers category, with a net decline of 197 thousand jobs. These results are not surprising, given the occupational distribution of labor in production for exports and for imports in the developed countries.

Prima facie, it is surprising, however, that the largest projected gain among the skilled and technical labor categories is shown for foremen and skilled workers, with an incremental export-import ratio of 1.54, rather than for professional and technical workers, where the incremental ratio is 1.18. This result is explained by the fact that in electrical machinery and equipment, the industry group with the highest professional and technical labor coefficients, imports from developing countries are projected to rise at a rapid rate, with the absolute increment in imports exceeding the increment in the exports of these commodities between 1976 and 1986.

At the same time, projected increases of imports of electrical machinery and equipment from the developing countries are likely to involve the increased importation of parts, components, and accessories, coupled with the eventual dominance of these countries in the world export of radios, television sets, automotive electrical equipment, and simple electronics. The products in question have lower professional and technical labor requirements than electrical machinery and equipment in general. This is not shown by the results, however, because the occupational statistics were not available in sufficient detail, so that a distinction between the two groups of electrical machinery and equipment could not be made.

TABLE 8

EMPLOYMENT IMPLICATIONS AND CAPITAL COEFFICIENTS
FOR INCREASES IN MANUFACTURED TRADE BETWEEN
DEVELOPED AND DEVELOPING COUNTRIES, 1976-86

	Exports	Imports	Balance	Ratios
A. Employment Effects by Occupational Category (thousands of jobs)				
1. Professional and Technical Workers	215.1	182.2	33.0	1.18
2. Managers and Administrators	101.5	94.0	7.5	1.08
3. Sales Workers	27.5	28.3	-0.8	0.97
4. Clerical Workers	226.1	206.5	19.6	1.09
5. Foremen and Skilled Workers (Craftsmen)	402.3	261.9	140.4	1.54
6. Production Workers, Unskilled and Semi-Skilled (Operators)	677.5	874.4	-196.9	0.77
7. Workers in Construction, Transportation, Material Handling, etc.	35.8	31.4	4.4	1.14
8. Laborers	61.6	58.0	3.6	1.06
Total	1,746.8	1,736.0	10.8	1.01
of which sum of positive balance			208.5	
negative balance			197.7	
B. Employment Effects by Industrial Groups (thousands of jobs)				
1. Textile Mill Products	47.8	158.6	-110.8	0.30
2. Apparel and Other Textile Products	14.0	266.1	-252.1	0.05
3. Lumber and Wood Products	3.6	41.9	-38.3	0.09
4. Furniture and Fixtures	6.8	16.8	-10.0	0.40
5. Paper and Allied Products	24.6	4.5	20.1	5.47
6. Printing and Publishing	18.5	4.3	14.2	4.30
7. Chemicals and Allied Products	121.1	56.0	65.1	2.16
8. Petroleum Products	0.4	0.1	0.3	4.00
9. Rubber and Plastic Products	11.0	100.6	-89.6	0.11
10. Leather and Leather Products	3.4	57.7	-54.3	0.06
11. Stone, Clay and Glass Products	17.8	17.4	0.4	1.02
12. Primary Metal and Allied Products	66.8	48.9	17.9	1.37
13. Fabricated Metal Products	31.6	12.9	18.7	2.45
14. Nonelectrical Machinery	510.1	100.0	410.1	5.10
15. Electrical Equipment and Supplies	403.6	656.1	-252.5	0.62
16. Transportation Equipment	360.1	73.2	286.9	4.92
17. Instruments and Related Products	70.3	28.4	41.9	2.48
18. Miscellaneous Manufactured Products	35.4	92.5	-57.1	0.38
Total	1,746.8	1,736.0	10.8	1.01
of which positive balance			875.6	
negative balance			864.7	
C. Capital Coefficients (thousand dollars per job)				
<i>Stock Measures</i>				
Physical Capital	15.2	10.6	—	1.43
Human Capital	30.2	25.3	—	1.19
Together	45.3	35.9	—	1.26
<i>Flow Measures</i>				
Physical Capital	8.7	6.3	—	1.38
Human Capital	9.6	8.4	—	1.14
Together	18.4	14.7	—	1.25

It follows that the results shown in Table 8A understate the gain in professional and technical employment in the developed countries that would result from increased trade in manufactured goods with the developing countries. The same conclusion is likely to apply to other skilled categories, all of which show a net employment gain. Thus, the shift from low-skill to high-skill occupations in the developed countries, resulting from their increased trade in manufactured goods with the developing countries, would be greater than estimated here.

Among the 18 industry groups, total employment in the developed countries would rise in paper and allied products, printing and publishing, chemicals and allied products, primary metals and fabricated metal products, with the largest gains experienced in nonelectrical machinery, transport equipment, and instruments and related products (Table 8B). In turn, there would be employment losses in textiles, clothing, lumber and wood products, furniture, rubber and plastic products, leather and leather products, electrical machinery and equipment, and miscellaneous manufactures, whereas practically no change is shown for petroleum and coal products and stone, clay, and glass products. The implications of these results will be examined in the concluding section of the paper.

Conclusion and Policy Implications

We have seen that the export surplus of the developed industrial countries in manufactured trade with the developing countries increased from \$36.3 billion in 1973 to \$96.8 billion in 1977. And while the bulk of this increase occurred in trade with the oil-exporting developing countries, the export surplus in manufactured trade with the oil-importing developing countries also rose from \$23.9 billion in 1973 to \$42.2 billion in 1977.

All major industrial countries and country groups experienced an increase in their trade surplus in manufactured goods with the oil-importing developing countries, with the largest increases shown for Japan and the smallest for the United States. These differences have been explained by reference to differences in the initial situation in 1973 and in the trade policies followed.

We have further considered the employment implications for the developed countries of their manufactured trade with the de-

veloping countries. The employment effects of a *balanced* expansion of trade have been indicated by the use of labor-input coefficients that are, on the average, one-half larger for the imports than for the exports of manufactured goods in the developed countries. In turn, due to differences in trade volume, the ratio of jobs gained through exports to jobs lost through imports in the OECD countries would be 2.8 in the event of *proportional* increase in their manufactured exports and imports in trade with the developing countries, taking 1976 trade flows as a basis.

Neither a balanced increase nor a proportionate increase in manufactured trade between developed and developing countries is a likely occurrence, however. We have, therefore, estimated the employment implications of the expected expansion of this trade in the period 1976-86, by taking the projections of the *World Development Report* as a starting point. The results show no net employment effects for the OECD countries as well as a continuing shift of labor from low-skill to high-skill occupations in these countries. Particular interest attaches to the effects of trade in manufactured goods on the skill-composition of labor, since one should look to general economic policies rather than trade policies to ensure a satisfactory level of overall employment.

The upgrading of the labor force, as well as the exchange of physical and human capital for unskilled labor, would have favorable effects on resource allocation and on economic growth in the developed countries.¹⁸ At the same time, welfare gains are not limited to the exchange of productive factors through trade. Thus, additional gains would be forthcoming as a result of increased competition that provides inducements to technological change.

The shift from low-skill to high-skill occupations would be associated with a shift of labor from unskilled-labor intensive to skill-and physical capital-intensive industries. The sum of job losses in the former group of industries would not, however, reach one million, accounting for a small proportion of employment in these industries. In the case of textiles, clothing, leather and leather products, the estimated job loss of 416 thousand compares to a total employment of 9213 thousand in this sector in the OECD countries, taken together, in 1976. For the miscellaneous manu-

¹⁸ Nevertheless, in this study the rate of GNP growth has been taken as exogenous and estimates of the effects of trade on economic growth have not been made.

facturing product group, the comparable figures are 57 thousand and 1421 thousand (Table 8B and OECD, *Labor Force Statistics*, 1978).

Note further that the ten-year time period considered in this study may permit adjustments to take place among industries and allow sufficient time for the upgrading of labor. In fact, one may envisage larger increases in the imports of manufactured goods by the developed countries from the developing countries than projected in the *World Development Report* without appreciable adverse effects on employment in import-competing industries. For one thing, the Report foresees a decline in the incremental share of manufactured goods imported from the developing countries in developed country markets from 7.1 percent in 1970-75 to 5.4 percent in 1975-85 (1978, p. 28), despite the large increase in this share that occurred between 1975 and 1976. For another thing, there are possibilities for additional increases in the share of exports to the developing countries in the manufactured output of the developed countries, which is projected to rise only slightly from the 1975 level in the Report.¹⁹

The above considerations indicate the advantages of liberal trade policies for the developed countries. This conclusion is strengthened if we consider that the import-competing industries of the developed countries may not experience job losses in absolute terms inasmuch as increased demand associated with economic growth leads to higher domestic consumption and production. Furthermore, increased imports of labor-intensive products may be a substitute for the immigration of unskilled and semi-skilled labor, whether legal or illegal.²⁰ By disregarding labor migration, the above calculations overestimate job losses to the nationals of the developed countries in import-competing industries.

Reference should further be made to the increasing importance of developing country markets for the developed industrial countries. Excluding U.S.-Canada trade that is in large part intra-firm trade and one-third of which does not involve the payment of duties in the framework of the automotive agreement, as well as trade in manufactured goods within the European industrial free-

¹⁹ Results based on trade data and on information provided in the *World Development Report* (p. 28).

²⁰ In the case of Germany, one-fifth of the projected job loss would be compensated by a decline in immigration (HIEMENZ and SCHATZ, 1979, p. 50).

trade area, the developing countries offer larger markets to the exports of the developed industrial countries than does trade among groups of these countries. In fact, the ratio of the sales of manufactured goods by the developed industrial countries in developing country markets to their exports to other developed industrial countries increased from 1.03 in 1973 to 1.55 in 1977. And while increases were much larger than the average in manufactured exports to the oil-exporting developing countries, with the ratio of these exports to trade among groups of developed industrial countries rising from .25 to .66, increases in this ratio are shown with respect to exports to the oil-importing developing countries as well (from .78 in 1973 to .89 in 1979).

Concentrating our attention to the oil-importing developing countries, it may be suggested that increases in the manufactured exports of these countries have multiplicative effects on their national incomes and, by increasing their creditworthiness for borrowing in international markets, on their imports. It follows that, apart from adverse effects on the economic growth of the developing countries, protectionist actions taken in the developed countries would adversely affect economic growth in the developed countries themselves by foregoing employment gains in high-skill occupations and in technologically advanced industries that can be obtained through increased trade in manufactured goods.

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