

DEVELOPING COUNTRIES' EXPORTS OF MANUFACTURES: PAST AND FUTURE IMPLICATIONS OF SHIFTING PATTERNS OF COMPARATIVE ADVANTAGE

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I. INTRODUCTION

CONSIDERATIONS relating to the determinants of comparative advantage for countries or groups of countries have played a major role in the formulation of both national and international economic and trade policies. For example, international organizations like the World Bank and International Monetary Fund have given considerable attention to the need for formulating positive structural adjustment policies under which countries adopt trade, financial, fiscal, and other measures to facilitate the transfer of resources from industries where they have lost a comparative advantage in production to those where it has been gained or maintained.¹ Problems relating to contemporary protectionism are also linked to changing comparative advantage as OECD countries have often utilized nontariff barriers (NTBs) against more competitive imports.² On the positive side, industrial country governments have provided substantial incentives for the development of high technology industries (like aerospace) where a comparative advantage can be maintained or increased.

As might be expected from the importance of such issues, the policy debate has stimulated considerable empirical research on the concept of comparative advantage. A major innovation was Balassa's [1] development of the "revealed" comparative advantage (RCA) model and subsequent extension of the approach [2] to account

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¹ See [12] [13] [14] or [8] for examples of the types of issues normally addressed in these discussions. A key element often stressed is the need for developed countries to implement measures to facilitate the flow of resources from industries experiencing longer term structural adjustment problems (i.e., agriculture, textiles, clothing, etc.) into sectors like chemicals and machinery where comparative advantage has not shifted to developing countries.

² Documentary evidence on the increased use of nontariff barriers in sectors with long-term structural adjustment problems can be found in [18] [6]. The latter study examined trends in nontariff barrier use in major OECD countries over the 1966-86 period and concluded that the value of trade affected by NTBs such as quantitative restrictions, variable import levies and other import charges (excluding tariffs), import licensing, and different product standards or regulations more than doubled over this interval (from 25 per cent in 1966 to about 58 per cent in 1986). The increase was even more dramatic in sectors like textiles, clothing, and steel.

for a “stages” approach to industrialization.³ The “revealed” comparative advantage model was employed by UNIDO [10] that attempted to identify industries experiencing major shifts in established patterns of production and trade. An alternative empirical approach for measurement of comparative advantage was tested by the United States National Bureau of Economic Research (NBER) that employed relative shares of labor and capital used in the production of specific goods. This model was based on the assumption that developing countries should have a comparative advantage in goods that employ relatively large labor inputs.⁴

Given the obvious importance of issues concerning changing comparative advantage, this paper attempts to extend the related empirical analyses in several directions. First, an attempt is made to evaluate the predictive power of comparative advantage indices for future changes in trade by drawing on the NBER study. This will be done by analyzing the 1965–86 trade changes in products identified as labor intensive in the earlier year. Aside from the ability to identify industries where major changes are likely to occur in trade or production, an attempt will also be made to determine the time frame for which predictions based on comparative advantage indices are valid.⁵ Other issues that will be addressed include: the importance of textiles and clothing in the initial stages of a labor-intensive trade expansion; how the product composition of “maturing” developing country exports has changed over time; the extent that differences exist in imports of labor-intensive products by OECD countries; and the extent that individual developing countries have been able to capitalize on labor-intensive manufactures in their export base. While the initial analysis is largely *ex post* in that it relates to the 1965–86 period, the comparative advantage indices are updated to the mid-1980s and their implications for trade patterns in the 1990s and beyond assessed.

³ Country i 's “revealed” comparative advantage in product j is defined as the ratio of the share of product j in i 's exports to the share of j in world trade. If this index takes a value greater than unity the country is considered to have a “revealed” comparative advantage in the product while a value below unity indicates a comparative disadvantage. See [1] or [10] for a discussion of the basic properties of the RCA model.

⁴ See [7] for details. According to the United Nations product classification scheme, manufactured products are those items which fall in: SITC 5 (Chemicals); SITC 6 (Manufactured goods classified by material), less SITC 68 (Nonferrous metals); SITC 7 (Machinery and transport equipment); and SITC 8 (Miscellaneous manufactured articles). The National Bureau of Economic Research study adopted a somewhat broader definition of manufactures in that it includes some processed foods falling in SITC 0, cigars (in SITC 1), shaped wood (in SITC 2), and fish oil (in SITC 4). See Appendix Table I for a listing of the labor-intensive manufactured products identified in the NBER study.

⁵ There have been several attempts to develop “early warning” systems for disruptive imports with studies by Watkins and Karlick [11] and Tuong and Yeats [9] being representative of the earlier work. Indices of comparative advantage could play a major role in the development of such systems if it were established that these measures are accurate predictors of future trade patterns. This study shows that the NBER labor-intensive indices are generally accurate predictors of changes in South-North trade flows and that they may provide a lead time of as much as one or two decades.

II. THE MEASURES OF COMPARATIVE ADVANTAGE

In this study, the measures of comparative advantage are based on labor intensity indices derived by Lary [7] for the NBER. Lary's analysis employed the criteria of value added per employee, both in the United States and other countries, for identification of products which were capital or labor intensive. The general rule followed was to classify labor-intensive products as those which met two conditions: (1) value added per employee did not exceed the national average for all United States manufacturing by more than 10 per cent, and (2) imports by developed from developing countries totaled at least U.S.\$100,000 at the three-digit level of the Standard International Trade Classification (SITC) system in 1965.⁶ According to the NBER reasoning, this approach excluded clearly capital-intensive products while applying the test of the market (as reflected in imports) to items at or near the overall national average.⁷ The import value criteria was therefore added in recognition that value added per employee was not an infallible guide to South-North comparative advantage.

While there is a theoretical basis for postulating a positive relationship between labor intensity and developing countries' exports, there are certain types of products where other factors may be more important determinants of whether manufacturing activity is located in developed or developing countries. Some production processes, for example, are often located near areas of raw material production, particularly if transportation costs for manufacturing inputs greatly exceeds those for higher stage (semi-finished or fabricated) goods. This locational influence might be especially important for manufactured processes that require relatively large inputs of bulky commodities like wood and metal ores. In other cases, transport costs might dictate that manufacturing activity be located closer to centers of consump-

⁶ The factor intensity index for industry j (L_j) is defined as,

$$L_j = (V_j \div N_j) / (V_t \div N_t) \times 100, \quad (1)$$

where V_j and V_t represent value added in industry j and all United States manufacturing respectively, while N_j and N_t represent the number of workers in the industry and in all manufacturing activity. With regard to the NBER's condition that imports totalled U.S.\$100,000 it should be noted that the absolute value of trade is not an appropriate indicator of labor intensity.

⁷ The reader should note that there is an inverse relation between the numeric value of the index defined in equation (1) and the labor intensity of a given product. That is, the *lower* the numeric value of the index the *higher* the labor intensity of the product. It also follows that products with very high index values are capital intensive in production. The selection of items based on value added per employee in the United States was supplemented by detailed examination of manufactures imported by developed from less developed countries to see if additional products needed to be taken into account. On this basis, several items such as batteries, lamps, and miscellaneous manufactures were added to the NBER list since relative value added in other countries appeared below the United States average. However, a major conclusion of this portion of the analysis was that products manufactured by labor-intensive processes in the United States were also manufactured by relatively labor-intensive processes in other countries. Lary used these findings to justify extensive use of U.S. production statistics as a guide to factor-proportions.

tion. This would be the case where nominal transport costs are relatively low on production inputs, but are more important for the final manufactured good (See [16] for documentary evidence on this point). Finally, some manufacturing processes require location near abundant sources of relatively cheap production inputs like energy. The production of some metals from ores (bauxite) are examples of these types of manufacturing processes.⁸

Aside from these locational factors, there are other reasons why factor proportions may not be reflected in actual trade flows. Protectionism is of obvious importance as trade barriers in major markets can be an important constraint to trade. Many empirical studies have documented the restrictive effects of trade barriers developing countries often face in textiles, clothing, foodstuffs, footwear, and other products. Production incentives like subsidies, procurement practices, and tax concessions for domestic industries may also distort trade flows. Finally, a lack of access to technology, capital markets, marketing and distribution systems, or oligopolistic practices of established firms, may be additional reasons why trade patterns do not follow lines of comparative advantage.

While the above factors all relate to external barriers, policies pursued by the developing countries themselves also cause trade to be diverted from lines of comparative advantage. Many developing countries in Latin America and Asia have, for example, followed costly import-substitution policies that have severely constrained exports of manufactures. It has also been documented (see [3]) that the *structure* of protection in developing countries may impose importance constraints on some manufacturing sectors. Similarly, other domestic tax, labor, political and social policies pursued by developing countries also augment or offset natural lines of comparative advantage.

III. TRENDS IN IMPORTS OF LABOR-INTENSIVE PRODUCTS

Table I examines trends in the trade of the NBER-defined (1965) labor-intensive products over 1965–86. The table shows all developed countries' imports of these goods as well as imports of all other (capital-intensive) manufactures and all other non-fuel products. While the top half of Table I shows imports measured in value terms, the lower half shows developing countries' trade shares. To assist in evaluating these statistics, similar information is given for seven selected developed country markets; namely, Canada, EC(10), Japan, Norway, Sweden, Switzerland, and the United States. Appendix Table I provides a listing of the three-, four-, and five-digit SITC products that are included in the labor-

⁸ If the objective is to forecast the future composition of developing country exports, a factor proportions analysis, by itself, could be inappropriate for dealing with products where transport or related factors have a strong locational influence. For "flagging" these items, the revealed comparative advantage approach may be more appropriate since the results incorporate the "net" effect of different factors influencing the production process. Yeats [17] provides an RCA framework that is useful for analyzing competitive inroads made by developing countries in specific industries. Lead times, may however, be an important drawback. Since revealed comparative advantage indices are constructed from actual (current) trade flows they may not signal trade changes until after they have in fact occurred.

TABLE I
COMPARATIVE ANALYSIS OF SELECTED DEVELOPED COUNTRIES IMPORTS OF LABOR-INTENSIVE
AND OTHER NON-FUEL PRODUCTS, 1965-86

Year	All Developed				Canada				EEC (10)				Japan			
	Manufactures		Total Non-fuel	Labor- intensive	Manufactures		Total Non-fuel	Labor- intensive	Manufactures		Total Non-fuel	Labor- intensive	Manufactures		Total Non-fuel	Labor- intensive
	Capital- intensive	Labor- intensive			Capital- intensive	Labor- intensive			Capital- intensive	Labor- intensive			Capital- intensive	Labor- intensive		
	Import values expressed in terms of U.S.\$ million															
1965	80,315	31,407	38,076	3,964	2,370	3,442	43,101	14,682	19,342	5,744	944	799				
1970	133,487	63,858	72,367	6,487	4,539	6,113	69,252	30,861	36,318	12,285	2,338	2,692				
1975	288,176	148,577	172,919	15,628	11,244	14,235	153,438	75,983	90,245	25,568	4,338	6,645				
1980	620,339	336,690	406,005	26,698	18,353	23,867	342,356	185,099	223,043	53,934	12,320	15,966				
1984	581,995	340,516	444,094	33,117	24,321	35,114	280,310	156,399	191,939	55,912	16,352	18,009				
1985	612,180	371,274	476,362	35,282	27,001	35,554	293,974	168,370	207,740	53,284	15,970	18,438				
1986	733,593	458,669	603,917	37,827	28,774	38,040	368,422	220,115	277,979	59,152	19,601	23,368				
	Share of developing countries in total imports of the product group															
1965	21.7	1.7	8.7	8.2	0.2	2.8	21.1	1.2	8.2	34.4	9.4	10.4				
1970	17.8	2.1	9.4	5.7	0.2	3.9	16.4	1.6	7.0	31.3	5.9	16.2				
1975	14.9	2.4	12.7	4.4	0.8	5.6	12.9	2.1	9.1	29.5	7.1	32.9				
1980	15.2	4.0	16.8	5.0	1.3	7.6	12.4	3.2	11.7	33.9	13.9	37.0				
1984	15.8	6.0	22.4	6.5	3.7	9.8	12.4	3.6	12.8	33.1	17.3	41.1				
1985	15.1	5.9	21.7	5.5	2.9	9.7	12.2	3.8	12.2	33.3	16.0	41.7				
1986	14.1	4.7	21.2	6.2	3.4	11.2	10.7	3.4	12.3	34.2	17.3	43.7				

TABLE I (Continued)

Year	Norway			Sweden			Switzerland			U.S.A.		
	Total Non-fuel	Manufactures Capital-intensive	Manufactures Labor-intensive	Total Non-fuel	Manufactures Capital-intensive	Manufactures Labor-intensive	Total Non-fuel	Manufactures Capital-intensive	Manufactures Labor-intensive	Total Non-fuel	Manufactures Capital-intensive	Manufactures Labor-intensive
1965	1,404	945	639	2,293	1,365	1,605	2,102	1,170	1,338	12,942	4,426	6,203
1970	2,248	1,508	1,169	3,477	2,151	2,782	3,617	2,292	2,504	23,014	11,351	13,862
1975	5,704	4,260	3,045	8,224	5,742	6,733	6,764	4,203	5,140	43,371	23,890	27,129
1980	7,825	5,455	6,169	12,954	8,737	12,399	16,506	10,591	15,588	98,545	59,251	69,531
1984	6,854	5,149	5,609	10,934	7,593	10,274	13,050	9,101	13,535	139,134	94,882	135,802
1985	7,067	5,400	6,187	11,726	8,235	11,418	13,598	9,598	13,984	152,754	107,726	150,269
1986	9,822	7,654	9,284	14,615	10,514	14,382	18,800	13,846	19,984	168,544	120,062	173,051
Import values expressed in terms of U.S.\$ million												
1965	9.1	3.0	2.7	13.1	0.6	4.1	10.1	0.8	4.7	33.0	3.1	17.9
1970	9.1	5.8	2.9	10.9	1.2	4.6	8.4	0.7	4.7	24.6	3.2	20.9
1975	7.3	4.1	3.6	7.2	1.0	6.3	8.0	1.3	7.0	23.7	4.8	30.9
1980	9.1	5.2	4.6	7.9	1.4	8.2	7.3	0.9	7.9	22.8	6.9	39.6
1984	10.0	7.1	5.2	8.4	2.9	8.8	5.7	1.0	10.2	20.4	10.1	42.1
1985	9.4	6.6	5.1	7.1	1.7	8.3	6.0	1.3	8.8	19.0	9.8	40.2
1986	8.1	4.9	5.4	7.1	1.5	8.6	5.3	1.2	7.8	19.3	10.2	40.5
Share of developing countries in total imports of the product group												

Source: All statistics were compiled from United Nations Series D Commodity Trade Tapes. Appendix Table I provides a tabulation of products in the labor-intensive group in terms of the SITC classification system. The "total non-fuel" group shown in this table includes all other SITC products with the exception of items falling in SITC 3.

intensive group. Capital-intensive manufactures consist of all other items classified in SITC 5 through 8 less nonferrous metals (SITC 68).

Table I shows developed country imports of labor-intensive manufactures rose almost sixteen-fold over the twenty-one-year period (a slightly smaller expansion occurred for capital-intensive manufactures) and that this increase is considerably higher than the nine-fold growth in other nonfuel products. There is considerable variation in the performance of individual markets, however, as United States and Japanese imports of labor-intensive products registered the largest expansion over 1965–86 (they rose more than twenty-eight times) while imports by Sweden and Canada rose by nine and eleven times respectively. While these growth rates are affected by factors such as relative price changes or the growth of GDP in the importing country there is considerable evidence that commercial and protectionist practices have also been a major factor.

Aside from the differences between the growth in the *value* of imports of labor-intensive products Table I shows that there are sizeable differences in the *shares* of developing countries in developed country markets. For example, the share of developing countries in United States labor-intensive imports rose by 22 points over 1965–86, while these countries also increased their shares four-fold (to 44 per cent) in the Japanese market. In contrast, developing countries supplied only 12 per cent of the European Community's labor-intensive imports in 1986, while their share in Norway and Sweden was between 7 and 8 per cent.⁹ Table I also shows developing countries' shares of labor-intensive products are higher and have grown faster than those for other non-fuel products, even though there is considerable variation across markets. In total, as well as in each of the selected developed countries, developing countries significantly increased their import shares of labor-intensive manufactures. In contrast, developing countries experienced declining shares in the aggregate for non-labor-intensive products, while their shares for capital-intensive manufactures increased but remained low.

Table II examines variations in developed countries imports of labor-intensive products in more detail. The top third of the table shows the 1986 value of these imports from developing countries, in total and for major product groups.¹⁰ The middle third shows the share of developing countries, while the lower third reports imports from developing countries on a per capita basis. Similar information is shown for total developed countries' imports.

Table II further confirms the superiority of the United States as a market for

⁹ A EEC-EFTA trade protocol may be one major reason why the trade performance of developing countries in Europe is poor relative to the United States and Japan (where shares are high). Under the terms of the protocol manufactured goods can be exchanged between member states free of all import duties and some nontariff barriers. With intra-EEC, intra-EFTA, and EEC-EFTA inter-trade being duty free, European tariffs only apply to outside suppliers like the United States, Canada, and Japan, socialist countries of Europe, and developing countries. Laird and Yeats [5] show that post-Tokyo Round European tariffs on many labor-intensive products are still very high and stimulate intra-European trade in these items at the expense of developing countries.

¹⁰ Appendix Table I provides the SITC numbers and a description of the products comprising each of these aggregate groups. It also gives detailed statistics on trade changes and trends in labor intensity ratios for these items over the period 1965–82.

TABLE II
ANALYSIS OF VARIATIONS IN DEVELOPED COUNTRIES IMPORTS OF LABOR-INTENSIVE PRODUCTS
FROM DEVELOPING COUNTRIES IN 1986

Major Product Group*	All Developed	Canada	EEC (10)	Japan	Norway	Sweden	Switzerland	U.S.A.
	1986 value of import from developing countries in U.S.\$ million							
Clothing and accessories	27,908.9	1,007.3	8,617.7	2,039.7	129.9	394.6	354.2	14,743.7
Textile small wares	2,167.5	102.2	626.9	201.4	14.0	30.6	19.0	998.6
Other woven fabrics	1,744.5	132.6	669.6	304.3	0.8	9.5	13.4	450.3
Leather and manufactures	15,107.9	485.6	3,530.9	904.5	91.0	175.5	154.5	9,230.0
Toys and sporting goods	8,905.8	323.0	1,804.2	461.6	40.4	68.5	51.1	5,750.0
Jewelry and silverware	5,941.5	64.2	1,744.3	815.4	2.6	3.7	389.9	2,856.6
Tools and hardware	4,036.7	164.8	809.7	151.3	17.2	36.5	18.0	2,626.3
Electrical apparatus	22,434.8	588.9	4,426.5	1,127.3	63.4	168.0	97.2	15,200.2
Nonelectrical machinery	11,003.2	489.7	2,332.7	433.2	33.4	70.7	55.4	7,075.2
Lumber, plywood, and veneers	4,106.6	76.9	1,747.4	646.3	15.8	28.7	20.7	1,321.7
Building materials	818.7	13.3	168.4	241.4	1.5	3.5	3.7	353.7
All labor-intensive manufactures	127,732.9	4,257.4	34,433.5	10,219.4	502.1	1,230.4	1,564.2	70,165.3
	1986 share of total imports from developing countries in percent							
Clothing and accessories	54.6	70.9	36.8	83.3	12.7	27.9	18.6	85.8
Textile small wares	23.5	18.1	13.0	51.9	7.9	10.5	7.4	56.3
Other woven fabrics	15.5	22.0	10.0	49.6	1.6	5.9	4.3	29.1
Leather and manufactures	39.6	35.6	20.9	60.1	14.4	19.3	11.3	69.3
Toys and sporting goods	23.7	23.7	12.8	44.3	10.2	11.4	5.1	35.2
Jewelry and silverware	30.9	26.9	20.9	54.7	4.7	5.8	15.5	45.8
Tools and hardware	15.9	9.9	6.9	25.5	3.0	4.4	2.0	39.9
Electrical apparatus	20.7	10.4	10.0	31.3	4.2	6.3	3.5	39.1

TABLE II (Continued)

Major Product Group ^a	All Developed	Canada	EEC (10)	Japan	Norway	Sweden	Switzerland	U.S.A.
Nonelectrical machinery	6.9	2.6	3.2	11.5	1.4	1.6	1.4	17.8
Lumber, plywood, and veneers	21.1	13.4	19.0	30.2	3.6	11.0	3.9	25.2
Building materials	6.5	2.3	2.4	47.9	0.6	1.0	0.8	15.8
All labor-intensive manufactures	21.2	11.2	12.3	43.7	5.4	8.6	7.8	40.5
Imports per capita expressed in terms of U.S. dollars								
Clothing and accessories	35.65	40.46	24.52	17.12	31.53	47.34	55.73	63.03
Textile small wares	2.76	4.10	1.79	1.69	3.40	3.67	2.99	4.26
Other woven fabrics	2.22	5.32	1.91	2.55	0.19	1.14	2.11	1.93
Leather and manufactures	19.30	1.95	10.04	7.59	22.08	21.06	2.43	39.46
Toys and sporting goods	11.38	1.23	5.13	3.87	9.80	8.22	8.04	24.58
Jewelry and silverware	7.58	2.58	4.96	6.84	0.63	0.44	6.14	12.21
Tools and hardware	5.16	6.62	2.30	1.27	4.17	4.38	2.83	11.23
Electrical apparatus	28.66	23.66	12.60	9.45	15.39	20.16	1.53	64.98
Nonelectrical machinery	14.06	19.67	6.64	3.63	8.11	8.48	8.72	30.25
Lumber, plywood, and veneers	5.24	3.09	4.97	5.42	3.84	3.44	3.25	5.65
Building materials	1.05	0.53	0.48	2.02	0.36	0.42	0.58	1.51
All labor-intensive manufactures	163.16	171.04	98.00	85.76	121.86	147.62	246.14	299.98

^a For the SITC numbers and description of components of each major product group see Appendix Table I.

developing countries' labor-intensive products. With U.S.\$70.2 billion in 1986 imports, the U.S. absorbed approximately 55 per cent of total developing country shipments of these items to developed countries. In 1986, United States per capita imports were more than three times those of the European Communities and about three and one-half times that of Japan. Aside from the overall level of imports, Table II shows that the share of U.S. imports of these products from developing countries is almost double that for developed countries as a group.

The statistics in Table II can be used to determine whether the overall differences between the United States imports of labor-intensive products and those of other developed countries are due to one or two abnormal sectors or result from a general disparity. Relatively higher levels of U.S. imports are evident for all products, as both developing countries' market shares and imports per capita exceed those of other developed countries. For example, at U.S.\$63 per capita U.S. clothing imports are more than 70 per cent above the developed country average, while imports of nonelectrical machinery and electrical apparatus are more than twice as high.¹¹ Two additional observations should be made with regard to Table II. First, informal ("negotiated") trade restraints may be a factor causing Japanese imports per capita to be the lowest in the table. In contrast, relatively open trade policies by Switzerland (which does not participate in the MFA) appear to be a major reason why this country's imports per capita are relatively high.

In contrast to the United States, the developing country import shares in Norway, Sweden, Switzerland, and Canada are markedly lower. Norway imports only about 5 per cent of its labor-intensive products from developing countries, with the corresponding shares for Sweden and Switzerland ranging between 8 and 9 per cent.¹² The Scandinavian countries shares are well below those of the

¹¹ Protectionism is a likely explanatory factor for some of the national variations, and trade barriers could be especially important in the textile and clothing sector where nontariff barriers discriminate against developing countries. Under the terms of the Multifibre Arrangement (MFA) imports of textiles and clothing from developing countries are subject to strict quota limits while similar goods originating in developed countries are traded freely. The previously cited EFTA-EEC protocol is undoubtedly a factor accounting for the relatively low import per capita figures for Europe since Laird and Yeats report that post-Tokyo EEC and EFTA tariffs average approximately 10 to 20 per cent for textile and clothing products [5, p. 95]. These figures represent the margins of tariff preferences intra-European trade enjoys over outside suppliers.

¹² The import per capita figures for these countries are closer to (or exceed) the developed country average, but there is a problem with such comparisons in that they do not involve any adjustment for country size. That is, smaller countries are often more open to imports since they do not have the resources and other physical endowments required to produce the range and variety of goods manufactured in larger countries. Given this size-import relation, one would expect the imports per capita of (say) Norway and Sweden to be greater than those of the United States. Spatial factors within Europe may also be a factor accounting for some countries relatively poor performance as import markets for developing countries. That is, location close to low-cost labor countries like Greece, Italy, Spain, and Portugal may provide the Mediterranean countries with a transport cost advantage in Europe that offsets developing countries' natural comparative advantage. Table III compares the export profiles of the latter with those of selected developed countries.

United States for clothing, with Norway only receiving 13 per cent of its imports from developing countries (as opposed to 86 per cent for the United States).

An important question concerning variations in imports of individual products is the extent to which the differences can be explained by variations in labor intensity among products. To investigate this question correlations were run between both the *level* and *change* in developing countries import shares against the index of value added per employee [equation (1)]. The Pearson correlation between levels of the index and developing countries shares in the United States ($r=-0.539$) was significant at the 95 per cent level, as was the correlation between the index and developing countries' shares in other industrial countries ($r=-0.435$). The negative sign was anticipated since the more labor-intensive items (i.e., those with a lower value added per employee index) should have higher developing country import shares. Labor intensity also has considerable explanatory power in accounting for *changes* in the developing countries' United States market shares, as this correlation is also significant ($r=-0.400$).¹³ Appendix Table I provides details on changes in developing country shares for labor-intensive products over 1965 or 1985.

IV. DEVELOPING COUNTRIES' EXPORTS OF LABOR-INTENSIVE PRODUCTS

While there is considerable variation in developed countries' imports of the NBER (1965) labor-intensive manufactures, Table III examines the importance of individual developing countries as sources of supply for these goods. The table identifies the twenty most important developing country exporters of NBER labor-intensive manufactures in terms of 1986 exports and also provides statistics on the value of this exchange for selected years back to 1965. To indicate the evolving importance of these products in total trade, the table shows their share in all non-fuel exports of each country over 1965–86. In addition, the share of textiles and clothing products within the labor-intensive group is given to illustrate how the importance of these products changed during the period.

Table III shows that labor-intensive products have been growing rapidly in importance for practically all of the twenty developing countries listed, yet the 1986 trade in these products (measured in value terms) remains concentrated in a relatively small number of exporters. Taiwan alone accounted for over 22 per cent of the value of shipments to developed countries in 1986 while five exporters (the Republic of Korea; Singapore; China; Hong Kong; and Taiwan, China) originated about 62 per cent of this trade. For each of these five countries, labor-intensive manufactures rose in importance over 1965–86 and now account for between 62 (China) to 94 per cent (Hong Kong) of total non-fuel exports. In total, the twenty

¹³ The correlation between the value added index and changes in developing countries' shares in other industrial countries ($r=-0.369$) is weaker, but takes the appropriate negative sign and is statistically significant.

TABLE III
TRENDS IN THE TRADE OF MAJOR EXPORTERS OF LABOR-INTENSIVE MANUFACTURES TO DEVELOPED COUNTRIES

Exporter	Share of Labor-intensive Manufactured Exports in Total Non-fuel Exports (%)					Share of Textiles and Clothing in Labor-intensive Manufactured Exports (%)					Value of Labor-intensive Manufactured Exports (U.S. \$ Million)		
	1965	1975	1985	1986	1965	1975	1985	1986	1965	1975	1985	1986	
Taiwan, China	45.5	78.9	85.6	85.0	13.4	28.0	15.9	15.6	143.2	3,194.1	22,607.8	28,525.3	
Korea, Rep. of	51.1	79.2	78.7	78.2	19.3	35.8	27.5	26.3	60.1	3,031.1	14,599.2	19,598.9	
Hong Kong	89.9	94.2	94.1	93.6	44.4	48.7	39.6	38.9	758.1	4,141.7	14,813.9	17,246.6	
China	19.2	41.4	57.7	62.0	25.1	31.0	43.9	47.4	113.5	847.4	6,007.0	8,429.0	
Singapore	31.5	74.8	74.5	75.3	2.4	11.5	8.8	6.6	12.9	885.2	5,056.2	6,049.4	
Brazil	6.2	16.7	26.7	29.4	1.9	10.2	7.1	6.8	81.7	1,037.0	5,019.9	5,152.0	
India	44.3	65.2	62.3	63.1	10.1	25.5	27.3	28.1	526.0	996.9	3,369.2	3,931.5	
Malaysia	12.5	32.2	47.1	50.2	7.4	7.7	10.0	11.3	81.2	620.2	3,333.7	3,602.0	
Israel	48.5	48.3	58.6	59.4	6.4	12.6	8.9	9.7	157.3	665.2	2,897.9	3,461.4	
Yugoslavia	35.7	53.0	54.1	53.8	17.9	38.3	32.3	34.6	171.0	943.8	2,424.5	3,168.9	
Thailand	8.7	19.8	49.1	52.7	1.3	25.1	25.4	22.1	27.2	284.6	2,238.1	3,070.7	
Philippines	10.9	15.8	54.4	54.2	28.5	26.0	23.8	27.3	87.8	385.3	2,584.1	2,527.8	
Turkey	8.7	26.8	51.5	57.6	1.5	4.1	38.9	43.7	35.3	280.1	1,519.2	2,323.5	
Indonesia	1.9	4.5	30.0	35.2	4.0	4.2	26.0	26.1	8.5	72.3	1,280.0	1,684.9	
Pakistan	30.4	63.5	71.3	69.1	16.7	13.3	23.1	29.5	86.9	299.4	1,070.0	1,354.8	

TABLE III (Continued)

Exporter	Share of Labor-intensive Manufactured Exports in Total Non-fuel Exports (%)				Share of Textiles and Clothing in Labor-intensive Manufactured Exports (%)				Value of Labor-intensive Manufactured Exports (U.S. \$ Million)			
	1965	1975	1985	1986	1965	1975	1985	1986	1965	1975	1985	1986
Morocco	10.6	16.3	31.8	37.8	1.4	23.7	43.5	49.4	49.2	206.4	583.9	829.6
Tunisia	6.6	30.8	60.1	71.1	7.2	63.0	68.1	70.6	5.9	94.1	530.0	774.4
Argentina	1.6	9.4	13.2	14.7	1.2	1.0	1.2	1.8	19.7	168.7	529.5	565.4
Dominican Republic	1.7	3.8	38.9	44.1	2.0	32.2	54.5	55.6	2.4	34.4	411.7	522.1
Chile	2.6	3.4	11.0	13.0	0.1	0.7	0.7	1.7	19.2	39.8	310.9	404.4
All developing countries	16.0	33.7	52.8	55.2	17.8	28.2	24.1	24.9	3,319.7	21,881.5	103,302.7	127,723.9
Memo item												
Greece	29.0	47.2	52.9	55.6	5.6	26.7	35.4	39.1	76.3	773.8	1,735.6	2,484.4
Italy	48.7	55.4	63.9	64.3	27.0	21.4	21.2	21.7	2,516.6	12,874.3	34,781.2	47,179.5
Portugal	66.1	63.1	66.7	69.0	16.5	35.6	43.9	44.6	145.4	650.5	1,826.1	2,205.7
Spain	23.4	41.9	38.7	39.2	8.5	7.9	6.2	6.5	229.4	2,360.9	6,438.8	8,318.3

Source: All statistics were compiled from United Nations Series D Commodity Trade Tapes. Appendix Table I provides a tabulation of products in the labor-intensive group in terms of the SITC system. A list which analyzes changes in Taiwan, the Republic of Korea, Hong Kong and Singapore's exports of labor-intensive products over 1965-86 is available from the author on request.

countries listed in Table III accounted for U.S.\$113 billion or approximately 89 per cent of all labor-intensive exports from developing countries.¹⁴

For many of the largest exporters of labor-intensive manufactures textiles and clothing were dominant early in the expansion and then declined in importance as countries shifted to other items. For example, from 1965 to 1975 labor-intensive manufactures rose from 46 to 79 per cent of Taiwan's total non-fuel exports and the share of textiles and clothing within these items rose from 13 to 28 per cent. From 1975 to 1986 the share of all labor-intensive products in Taiwan's exports continued to rise (to 85 per cent), yet the share of textiles and clothing in the labor-intensive group fell by about 12 percentage points. This same general pattern is evident in many of the developing countries' export profiles.¹⁵ In the initial stages, textiles and clothing appear to have been a major element or catalyst for the initial export expansion and then were replaced by other labor-intensive products.

The question of which labor-intensive products replace textiles and clothing as "dynamic" elements in developing country exports is addressed in Table IV. The table lists the major three and four-digit SITC labor-intensive products exported by developing countries (ranked in terms of their 1986 export values) to developed countries and also shows the share of each item in total trade of the group. This information is given for selected years from 1965 to 1986 to identify items of increasing and declining importance.¹⁶

Table IV suggests that the dynamic elements in developing country labor-intensive manufactures are not confined to a few items, but have a fairly broad base. Footwear and transistors each increased their share by more than 4 percentage points, while the share of toys and sporting goods more than doubled. Several electronic equipment products (i.e., statistical machines, telecommunications equipment, electronic power machinery, office machines, and radio broadcast

¹⁴ The subject is not explored in this paper, but there is considerable evidence that the export performance statistics reported in Table III are linked to domestic policy measures in developing countries. For example, the rapid 40 point increase in labor-intensive products share in total Dominican Republic exports over 1975-86 can be tied directly to internal measures, such as the establishment of export processing zones, aimed at trade expansion. See [15] for an evaluation of how domestic policies influenced the export performance of the Caribbean Group for Cooperation in Economic Development (CGCED) countries.

¹⁵ Among the five largest exporters of manufactures China is an exception as the share of textiles and clothing in the labor-intensive group rose throughout 1965-86 and reached 47 per cent in 1986. This may be explained by a difference in timing as China began its major export expansion to developed countries later than Taiwan, the Republic of Korea, Hong Kong, and Singapore. That is, the current Chinese export profile appears to be similar to that of the "newly industrialized" countries in the mid-1970s. Related information on this point is available from the author on request.

¹⁶ Pearls and precious stones (SITC 667) experience the steepest decline in Table IV as the share of these items in labor-intensive exports went from 10.2 per cent in 1965 to 3.6 per cent in 1986. Protectionism in developed countries has not played a role in this decline as tariffs are generally low on these items and there are few reported nontariff barriers. Other items whose share declined by 2 percentage points or more include: preserved fruit (SITC 053); woven cotton fabrics (SITC 652); shaped wood (SITC 243); textile products n.e.s. (SITC 656); floor covers (SITC 657); leather (SITC 611); plywood (SITC 631.2); and preserved vegetables (SITC 055).

TABLE IV
ANALYSIS OF THE CHANGING COMPOSITION OF LABOR-INTENSIVE EXPORTS FROM DEVELOPING
TO DEVELOPED COUNTRIES, 1965-86

SITC	Description	Value of Exports (U.S. \$ Million)				Share in Labor-intensive Exports (%)			
		1965	1975	1985	1986	1965	1975	1985	1986
841.1	Textile clothing, not knit	220.3	2,769.9	12,952.5	15,795.5	6.6	12.7	12.6	12.4
841.4	Clothing accessories, knit	169.3	2,235.1	7,946.7	11,136.8	5.1	10.2	7.7	8.7
851	Footwear	45.8	905.0	5,891.3	7,103.2	1.4	4.1	5.7	5.6
729.3	Transistors, valves, etc.	10.1	937.3	5,627.1	5,990.0	0.3	4.3	5.4	4.7
894	Toys and sporting goods	71.1	612.2	4,658.7	5,807.6	2.1	2.8	4.5	4.5
667*	Pearls and precious stones	337.2	920.8	3,542.8	4,533.6	10.2	4.2	3.4	3.6
724.9	Telecommunications equipment	11.5	488.6	3,540.5	4,173.6	0.3	2.2	3.4	3.3
714.3	Statistical machines	4.4	89.8	2,143.0	3,337.2	0.1	0.4	2.1	2.6
714.9	Office machines, n.e.s.	1.5	161.0	2,531.4	3,233.6	—	0.7	2.5	2.5
724.2	Radio broadcast receivers	26.3	574.1	2,815.7	3,067.0	0.8	2.6	2.7	2.4
722	Electrical power machinery	10.1	302.0	2,622.6	3,065.1	0.3	1.4	2.5	2.4
821	Furniture	31.9	221.1	2,071.7	2,663.6	1.0	1.0	2.0	2.1
891	Sound recorders	5.3	233.7	1,507.8	2,525.2	0.2	1.1	1.5	2.0
831	Travel goods and handbags	25.4	328.9	2,000.5	2,456.2	0.8	1.5	1.9	1.9
053*	Preserved fruit	142.9	492.4	2,186.2	2,205.3	4.3	2.3	2.1	1.7
651	Textile yarn and thread	64.2	518.0	1,933.3	2,166.3	1.9	2.4	1.9	1.7
652*	Cotton fabrics, woven	232.4	763.0	1,938.2	2,131.0	7.0	3.5	1.9	1.7
841.3	Leather clothing	13.2	466.8	1,476.6	1,887.6	0.4	2.1	1.4	1.5
893	Articles of plastic	20.0	313.4	1,352.1	1,781.9	0.6	1.4	1.3	1.4
243*	Shaped wood	232.2	648.9	1,517.8	1,697.0	7.0	3.0	1.5	1.3
656*	Textile products, n.e.s.	105.3	318.4	1,349.9	1,696.0	3.2	1.5	1.3	1.3

TABLE IV (Continued)

SITC	Description	Value of Exports (U.S. \$ Million)				Share in Labor-intensive Exports (%)			
		1965	1975	1985	1985	1965	1975	1985	1986
732.8	Motor-vehicle parts	3.9	182.3	1,281.7	1,598.1	0.1	0.8	1.2	1.3
657*	Floor covers and tapestry	144.9	569.8	1,153.9	1,569.7	4.4	2.6	1.1	1.2
729.9	Other electrical machinery	4.5	211.7	1,229.6	1,482.3	0.1	1.0	1.2	1.2
032*	Prepared fish	61.1	255.3	1,045.2	1,395.3	1.8	1.2	1.0	1.1
897.1	Real gold and jewelry	6.0	94.7	976.4	1,387.8	0.2	0.4	0.9	1.1
864.1	Watches and watch movements	1.8	190.3	1,001.5	1,248.3	0.1	0.9	1.0	1.0
611*	Leather	99.4	378.1	1,074.3	1,172.8	3.0	1.7	1.0	0.9
725.05	Electric space heaters	0.3	75.3	965.8	1,136.3	—	0.3	0.9	0.9
631.2*	Plywood	86.2	423.7	832.4	1,118.6	2.6	1.9	0.8	0.9
653.5	Woven synthetic fabrics	2.9	184.7	781.2	1,019.2	0.1	0.8	0.8	0.8
055*	Preserved vegetables	80.9	397.0	832.0	924.8	2.4	1.8	0.8	0.7
719.2	Pumps and centrifuges	2.6	50.6	859.8	911.1	0.1	0.2	0.8	0.7
632	Wood manufactures, n.e.s.	19.6	208.6	760.0	876.2	0.6	1.0	0.7	0.7
697	Base metal household equipment	9.7	131.1	719.8	830.6	0.3	0.6	0.7	0.7
Other labor-intensive products*		1,015.5	4,227.9	18,182.7	22,588.5	30.6	19.4	17.8	17.5

* The item registered a declining share in total exports of products identified by NBER as produced by labor-intensive processes in 1965.

receivers) had their share of labor-intensive products increase by 1 to 2 percentage points, while leather clothing, motor vehicle parts, other electrical machinery also recorded a similar increase.

V. TRENDS IN LABOR-INTENSIVE PRODUCTION

The key point that emerged from the preceding analysis is that labor intensity was a useful predictor of developing country exports, although there was variation in national supply of, and demand for, these goods. Items identified as labor intensive in 1965 registered a superior developing country export performance in terms of market shares over the next two decades (1965–86) and also accounted for a steadily increasing share of non-fuel exports. As such, updating the NBER indices of labor intensity into the 1980s could provide insights concerning likely changes in developing countries exports in the 1990s and beyond.

Drawing on U.S. Census Bureau data, Table V provides details on trends in labor intensity ratios for broad two-digit U.S. Standard Industrial Classification (SIC) industry groups over 1963–82 for years in which census data were available, and also gives similar information for selected three and four-digit textile and apparel products. To assist in evaluating the relative importance of each industry in total U.S. manufacturing, statistics on the 1982 value of shipments are shown along with industry employment information for 1963, 1972, and 1982.

For most industries listed in Table V the 1963–82 labor intensity ratios fluctuated in a narrow range, but there are important exceptions. Petroleum and coal products (SIC 29) experienced more than a 50 per cent rise in factor intensity ratios (from 215 to 337) while the ratios for tobacco products (SIC 21) rose from 192 to 359 points. These developments indicate both sectors were becoming relatively highly capital intensive. A similar increase in capital intensity is evident in the ratios for both food products and paper although the magnitude of change is smaller. Since these industries' ratios exceeded the United States average throughout the 1963–82 period the rising trend implies they were becoming even less suitable for export by developing countries. However, the ratios for primary metals (SIC 33) fell from about 15 points above the United States average to 10 points below average during 1963–82, a development which suggests an increase in developing countries' comparative advantage.

Table V suggests that most of the 1963 labor-intensive product sectors were also relatively labor intensive in 1982. This implies that most items which were identified as suitable for developing country exports in the 1960s would also be selected in the 1980s. However, there are some lower level four-digit SIC products that shifted from relatively labor intensive to capital intensive production techniques and would now be deleted from the original 1965 NBER product list (see Appendix Table I).

Given the key role that textiles and clothing played in the initial export expansion of some developing countries, Table V examines changes in employment and factor intensity ratios for these products in more detail. The data show that considerable labor shedding occurred in these sectors since approximately 230,000 jobs were lost over 1963–82 (146,000 in textiles), and that the labor intensity

TABLE V
FACTOR INTENSITY RATIOS AND EMPLOYMENT STATISTICS FOR SELECTED INDUSTRIES, 1963-82

SIC	Description	Total Employees (1,000)		1982 Value of Shipments (U.S. \$ Million)	Labor Intensity Ratios (All Manufacturing=100)				
		1963	1972		1963	1967	1972	1977	1982
—	All manufacturing	16,910.1	19,026.8	1,960,205.8	100.0	100.0	100.0	100.0	100.0
20	Food products	1,643.1	1,569.3	280,529.3	117.3	119.0	122.0	123.5	137.7
21	Tobacco products	77.3	66.3	16,061.4	191.7	199.6	213.8	239.4	358.7
22	Textiles mill products	863.2	952.6	47,515.4	62.6	64.7	66.1	61.6	59.9
2211	Cotton mills	208.9	121.3	3,972.0	53.1	59.1	55.7	55.5	49.3
2221	Artificial fiber mills	88.2	149.7	8,191.2	66.2	62.6	65.8	61.9	57.4
225	Knitting mills	220.5	276.5	10,986.1	55.9	58.7	61.8	54.8	56.3
226	Nonwool textile finishing	70.8	79.5	4,971.9	72.6	71.1	75.3	65.8	63.4
228	Yarn and thread mills	102.6	147.5	7,036.4	56.1	58.5	57.6	53.7	49.5
23	Apparel and textiles	1,279.5	1,368.3	53,387.9	54.2	54.7	53.0	49.4	50.8
2311	Mens suits	122.7	124.8	3,061.5	59.8	56.8	57.8	53.4	51.9
232	Mens clothing	305.6	363.7	12,727.1	46.7	46.7	37.9	45.3	51.3
233	Women's outerwear	405.4	377.7	18,224.5	53.6	57.4	51.0	48.1	47.4
234	Women's undergarments	113.9	105.4	3,322.7	57.5	56.5	53.5	45.6	48.9
236	Childrens outerwear	81.9	74.8	2,711.4	50.4	50.7	51.0	41.3	47.0
24	Wood products	563.1	691.0	42,934.9	63.0	66.2	80.2	78.4	61.8
25	Furniture and fixtures	376.5	462.0	24,128.6	72.0	72.3	70.9	64.4	68.2
26	Paper and products	588.0	633.4	79,895.1	111.1	112.6	110.9	118.1	127.7
27	Printing and publishing	913.2	1,056.5	85,796.9	101.3	102.7	102.8	98.0	97.6
28	Chemicals	737.4	836.5	170,736.9	210.6	206.4	208.3	215.7	205.3
29	Petroleum and coal products	153.4	139.5	208,918.6	215.0	282.6	223.2	373.5	337.3

TABLE V (Continued)

SIC	Description	Total Employees (1,000)			1982 Value of Shipments (U.S. \$ Million)	Labor Intensity Ratios (All Manufacturing = 100)				
		1963	1972	1982		1963	1967	1972	1977	1982
30	Rubber and plastic products	415.0	617.7	681.7	55,415.8	99.0	97.1	101.4	91.6	92.5
31	Leather and products	327.5	273.4	199.8	9,719.2	56.1	58.9	57.4	51.4	55.3
32	Stone, clay, and glass	573.9	623.2	531.5	45,180.6	108.4	104.2	208.6	104.4	100.2
33	Primary metal industries	1,126.5	1,142.8	854.1	104,666.8	118.1	115.0	109.4	112.9	90.3
34	Fabricated metal products	1,082.1	1,493.3	1,459.7	119,440.0	99.1	99.2	96.9	97.9	93.5
35	Nonelectrical machinery	1,459.4	1,827.7	2,188.7	187,895.7	105.8	110.1	110.5	108.0	108.3
36	Electrical equipment	1,511.8	1,661.3	1,914.5	147,943.6	99.4	96.3	99.0	97.9	102.4
37	Transport equipment	1,601.2	1,719.0	1,595.9	201,346.1	124.4	113.3	124.4	121.7	123.3
38	Instruments	305.5	452.3	623.6	51,797.6	115.4	120.1	125.5	112.3	125.1
39	Misc. manufactures	390.8	445.6	386.2	26,891.4	80.5	80.2	81.7	78.2	85.1

Source: All data compiled from the United States Department of Commerce, *Census of Manufactures, Vol. I, Summary and Subject Statistics* (Washington, D.C.: United States Department of Commerce, various years).

* Value added per worker in the industry expressed as a ratio to value added per worker for all United States manufacturing.

of both sectors has changed relatively little. On average, the labor intensity of apparel and clothing (SIC 23) is approximately 50 per cent higher than for all United States industry, while textile mill products (SIC 22) appear to be only slightly less labor intensive. The implication is that the very strong comparative advantage developing countries have in the production of textiles and clothing has changed little and that these countries will continue to exert strong pressures on developed country suppliers in the 1990s.

Table VI addresses the question of where labor-intensive products are concentrated (i.e., in which industry sectors do they generally originate) in the 1980s. The table tabulates the number of four-digit SIC labor-intensive products in each industry sector and also indicates the extent that these products' labor intensity ratio differ from the United States average. The table shows the number and per cent of labor-intensive products falling in each broad industry group and also classifies these items in a range of "very high" to "moderately" labor intensive.¹⁷

Among the nineteen industry groups listed, the highest concentration of labor-intensive products is now in textile mill products (twenty-five products or 13 per cent of all four-digit SIC items) and apparel and textiles (thirty-one products or 17 per cent of all labor-intensive items). Furthermore, the table shows that these products are entirely concentrated in the "very high" labor intensity group (cotton mills, artificial fiber mills, men's suits, and children's outerwear), or are distributed between the "very high" and "high" groups. Appendix Table I shows that these products (identified in terms of their corresponding SITC group) were also among the most highly labor-intensive goods in the mid-1960s.

Aside from textiles and clothing, wood products (SIC 24) have the third highest concentration of labor-intensive goods (seventeen items or 9 per cent of the total) while 7 per cent of the labor-intensive products fall in SIC 34 (fabricated metals) and SIC 39 (miscellaneous manufactures). Analysis of the underlying product data¹⁸ show various furniture products account for about half of the labor-intensive items in the wood group while products like hand saws, metal barrels, structural metal products, wire springs, or sheet metal work in the fabricated metal sector are produced by labor-intensive methods. However, Table VI suggests that the labor-intensive products, in which developing countries have a comparative advantage, are distributed throughout the industry sectors with a few exceptions like petroleum refining and chemicals.

Given the previous (1965–86) developing country export expansion of products

¹⁷ In Table VI, a four-digit SIC product is classified labor-intensive if its factor proportions index is 10 points or more below the United States average. This "cut-off" point is lower than that used by the NBER due to the mixed export results developing countries had for products closer to the United States average. Furthermore, products are considered to be "very highly" labor intensive if their ratios are 40 points or more below the U.S. average, while items with a "high" labor intensity are those with ratios between 0.60 and 0.74. "Moderate" labor-intensive products are those with factor proportions ratios between 0.75 and 0.90. On request, the author will supply a list of the four-digit SIC labor-intensive products selected using these criteria. The list also provides related shipment and employment statistics.

¹⁸ A list of these products is available from the author on request.

identified as labor intensive in 1965, Table VII examines the implications of the updated 1980s product list using U.S. employment and shipment information. Specifically, the table shows the 1982 value and share of industry employment and shipments that originates in labor-intensive products. The latter is further disaggregated into three component product groups (very high, high, or moderate labor intensity).

As was the case with previous analyses, Table VII demonstrates the "vulnerability" of the textile and clothing sectors to exports from developing countries. Over 80 per cent of textile mill (SIC 22) shipments and employment originate in labor-intensive products while the corresponding shares for apparel (SIC 23) exceed 95 per cent. The table also shows that employment and shipments in both sectors are highly concentrated in the "very high" labor-intensive group which would appear to be most suitable for developing countries. High "exposure" ratios (i.e., industries where labor-intensive products account for at least 50 per cent of total employment or shipments) occur for wood products (100 per cent of shipments and employment), furniture and fixtures, rubber and plastic products, leather products (100 per cent coverage), and miscellaneous manufactures. Overall, 43 per cent of 1982 United States manufacturing employment originates in labor-intensive products and 24 per cent of industry shipments are composed of these goods.¹⁹ Such statistics imply broad based competitive pressures from developing country exporters in the 1990s.

Just as Table VII showed certain industries appear vulnerable to increased exports from developing countries (based on the implications of factor proportions data), several of these industries also appear relatively "safe" as far as labor intensity is concerned.²⁰ No labor-intensive products occur in petroleum refining and coal (SIC 29), while chemicals (SIC 28) generates less than 2 per cent of total shipments and employment in labor-intensive products. Aside from these sectors capital-intensive production techniques seemingly prevail in processed food products, paper, printing, electrical equipment, transport equipment and instruments. In a recent extension of the NBER approach, Erzan and Yeats [4] also determined that most service industries in the United States employ relatively high capital-intensive methods as compared to all manufacturing activity.

¹⁹ Employing the 1965 NBER labor intensity indices in connection with the *1963 Census of Manufactures* allows one to compute related "exposure" indices for the earlier period. The results suggest that in 1963 approximately 46 per cent of United States manufacturing employment originated in labor intensive products and 23 per cent of all industry shipments were composed of these goods. In computing both the 1963 and 1982 employment and shipment ratios, labor intensive products were defined as items whose factor proportions indices were at least 10 per cent below the U.S. average.

²⁰ Petroleum refining was identified as one of the most capital intensive of U.S. manufacturing industries (see Table V), yet this industry should not be considered "safe" due to the special situation that exists in some energy exporting developing countries. Saudi Arabia, for example, has been developing an increased export capacity in refined petroleum and petrochemical products and has both the financial reserves and access to international capital markets needed for these ventures.

TABLE VI
ANALYSIS OF THE CONCENTRATION OF LABOR-INTENSIVE PRODUCTS WITHIN BROAD INDUSTRY GROUPS

SIC	Description	Distribution of Labor-intensive Products within Industry Groups*						Number	% of Total
		A. Number of Four-Digit SIC Products		B. Percentage Distribution of A					
		Very High	High	Moderate	Very High	High	Moderate		
—	All manufacturing	71	64	55	37.4	33.7	28.9	190	100.0
20	Food products	2	2	0	50.0	50.0	0.0	4	2.1
21	Tobacco products	0	1	1	0.0	50.0	50.0	2	1.1
22	Textile mill products	15	10	0	60.0	40.0	0.0	25	13.2
2211	Cotton mills	(1)	(0)	(0)	100.0	0.0	0.0	(1)	(0.5)
2221	Artificial fiber mills	(1)	(0)	(0)	100.0	0.0	0.0	(1)	(0.5)
225	Knitting mills	(5)	(2)	(0)	71.4	28.6	0.0	(7)	(3.7)
226	Nonwool textile finishing	(1)	(2)	(0)	33.3	66.7	0.0	(3)	(1.6)
228	Yarn and thread mills	(4)	(0)	(0)	100.0	0.0	0.0	(4)	(2.1)
23	Apparel and textiles	23	7	1	74.2	22.6	3.2	31	16.5
2311	Men's suits	(1)	(0)	(0)	100.0	0.0	0.0	(1)	(0.5)
232	Men's clothing	(4)	(2)	(0)	66.7	33.3	0.0	(6)	(3.2)
233	Women's outerwear	(3)	(1)	(0)	75.0	25.0	0.0	(4)	(2.1)
234	Women's undergarments	(1)	(1)	(0)	50.0	50.0	0.0	(2)	(1.1)
236	Children outerwear	(2)	(0)	(0)	100.0	0.0	0.0	(2)	(1.1)
24	Wood products	8	6	3	47.1	35.3	17.6	17	8.9
25	Furniture and fixtures	4	4	4	33.4	33.3	33.3	12	6.3
26	Paper and products	1	1	2	25.0	25.0	50.0	4	2.1
27	Printing and publishing	1	3	3	14.2	42.9	42.9	7	3.7
28	Chemicals	0	1	0	0.0	100.0	0.0	1	0.5

TABLE VI (Continued)

SIC	Description	Distribution of Labor-intensive Products within Industry Groups*										Number and Percent of Labor-intensive Products in Each Industry Group	
		A. Number of Four-Digit SIC Products					B. Percentage Distribution of A					Number	% of Total
		Very High	High	Moderate	Very High	High	Moderate						
29	Petroleum and coal products	0	0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	
30	Rubber and plastic products	1	0	2	33.3	0.0	66.7	0.0	3	1.6	3	1.6	
31	Leather and products	9	2	0	81.8	18.2	0.0	0.0	11	5.8	11	5.8	
32	Stone, clay, and glass	2	2	6	20.0	20.0	60.0	0.0	10	5.3	10	5.3	
33	Primary metal industries	1	3	7	9.1	27.3	63.6	0.0	11	5.8	11	5.8	
34	Fabricated metal products	0	4	9	0.0	30.8	69.2	0.0	13	6.8	13	6.8	
35	Nonelectrical machinery	0	2	6	0.0	25.0	75.0	0.0	8	4.2	8	4.2	
36	Electrical equipment	2	4	3	22.2	44.4	33.3	0.0	9	4.7	9	4.7	
37	Transport equipment	0	4	1	0.0	80.0	20.0	0.0	5	2.6	5	2.6	
38	Instruments	0	1	3	0.0	25.0	75.0	0.0	4	2.1	4	2.1	
39	Misc. manufactures	2	7	4	15.4	53.8	30.8	0.0	13	6.8	13	6.8	

* Products with "very high" labor intensities are those where the factor proportions ratio is at least 40 points below the average for all United States manufacturing. Products with "high" labor intensities are those whose factor proportions ratios fall between 0.60 and 0.74, while the "moderately" labor-intensive products have factor proportions ratios between 0.75 and 0.90. On request, the author will supply a list of the four-digit SIC products that fall in these categories.

TABLE VII
ANALYSIS OF THE DISTRIBUTION OF LABOR-INTENSIVE PRODUCTS WITHIN MAJOR INDUSTRY GROUPS

SIC	Description	Share of Industry Employment on Shipments in Four-Digit SIC Labor-intensive Products*										1982 Industry	
		Employment					Shipments					Employment (1,000)	Shipments (U.S. \$ Million)
		Very High	High	Moderate	Total	Very High	High	Moderate	Total				
—	All manufacturing	18.7	9.8	14.4	42.9	9.1	6.2	8.6	23.9	19,094.1	1,960,205.8		
20	Food products	9.5	1.2	0.0	10.7	5.8	0.6	0.0	6.4	1,487.7	280,529.3		
21	Tobacco products	0.0	8.8	14.3	23.1	0.0	1.6	18.8	20.4	57.9	16,061.4		
22	Textile mill products	70.2	17.5	0.0	87.6	57.8	23.1	0.0	80.9	717.4	47,515.4		
2211	Cotton mills	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0	76.9	3,972.0		
2221	Artificial fiber mills	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0	140.8	8,191.2		
225	Knitting mills	75.5	24.5	0.0	100.0	63.5	36.5	0.0	100.0	204.8	10,986.1		
226	Nonwool textile												
	fishing	20.0	79.9	0.0	99.9	15.2	84.8	0.0	100.0	58.1	4,971.9		
228	Yarn and thread												
	mills	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0	108.6	7,036.4		
23	Apparel and textiles	78.7	18.9	0.3	97.9	72.5	22.3	0.8	95.6	1,189.0	53,387.9		
2311	Men's suits	100.0	0.0	0.0	100.0	100.0	0.0	0.0	100.0	75.2	3,061.5		
232	Men's clothing	67.3	32.7	0.0	100.0	60.7	39.3	0.0	100.0	298.9	12,727.1		
233	Women's outerwear	80.1	19.9	0.0	100.0	42.4	57.6	0.0	100.0	418.9	18,224.5		
234	Women's												
	undergarments	83.1	16.9	0.0	100.0	78.3	21.7	0.0	100.0	81.6	3,322.7		
236	Children's outerwear	91.6	0.0	0.0	91.6	92.9	0.0	0.0	92.9	71.3	2,711.4		
24	Wood products	42.7	51.5	5.8	100.0	40.3	52.1	7.6	100.0	576.4	42,934.9		
25	Furniture and fixtures	48.3	22.6	20.9	91.8	38.3	23.0	26.0	87.3	436.0	24,128.6		
26	Paper and products	1.8	7.2	6.1	15.1	0.5	4.9	1.3	6.7	605.6	79,895.1		

TABLE VII (Continued)
Share of Industry Employment on Shipments in Four-Digit SIC
Labor-intensive Products*

SIC	Description	Employment					Shipments					1982 Industry	
		Very High	High	Moderate	Total	Very High	High	Moderate	Total	Employment (1,000)	Shipments (U.S. \$ Million)		
												Total	Total
27	Printing and publishing	2.0	14.1	25.4	41.4	0.9	10.7	2.3	13.9	1,291.8	85,796.9		
28	Chemicals	0.0	1.6	0.0	1.6	0.0	0.7	0.0	0.7	872.6	170,736.9		
29	Petroleum and coal products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	151.6	208,918.6		
30	Rubber and plastic products	2.6	0.0	83.4	86.0	1.3	0.0	78.3	79.6	681.7	55,415.8		
31	Leather and products	82.2	17.8	0.0	100.0	73.8	26.2	0.0	100.0	199.8	9,719.2		
32	Stone, clay, and glass	2.5	3.5	18.4	24.4	1.1	2.0	13.6	16.7	531.5	45,180.6		
33	Primary metal industries	0.3	2.7	28.4	31.4	0.6	1.5	15.7	17.8	854.1	104,666.6		
34	Fabricated metal products	0.0	11.2	29.3	40.5	0.0	7.3	28.1	35.2	1,459.7	119,440.0		
35	Nonelectrical machinery	0.0	1.4	19.6	21.0	0.0	1.3	11.9	13.2	2,188.7	187,895.7		
36	Electrical equipment	2.7	3.5	6.2	12.4	1.4	2.5	5.2	9.1	1,914.5	147,943.6		
37	Transport equipment	0.0	5.3	10.4	15.7	0.0	3.4	5.5	8.9	1,595.9	201,346.1		
38	Instruments	0.0	2.7	14.8	17.5	0.0	2.3	9.7	12.0	623.6	51,797.6		
39	Misc. manufactures	1.9	34.7	25.4	62.0	1.4	25.6	28.9	55.9	386.2	26,891.4		

* Products with "very high" labor intensities are those where the factor proportions ratio is at least 40 points below the average for all United States manufacturing. Products with "high" labor intensities are those whose factor proportions ratios fall between 0.60 and 0.74, while the "moderately" labor-intensive products have factor proportions ratios between 0.75 and 0.90. On request, the author will supply a list of the four-digit SIC products that fall in these categories.

VI. SUMMARY AND CONCLUSIONS

For various purposes such as the implementation of structural adjustment programs (or giving related World Bank assistance), efforts to liberalize international trade barriers, or the development of an "early warning" system for disruptive imports, information on changing comparative advantage and the future composition of international trade is often a key input. In recognition of this point, this study tested the use of factor proportions indices as a predictor of developing countries' exports. Four main conclusions followed from this exercise. First, tests conducted for the 1965–86 period showed that factor proportions data was a useful predictor of developing countries future exports. Developing countries significantly increased their total exports and share of labor-intensive products, while their shares for other non-fuel products registered persistent declines. Second, the evidence developed in this study suggests that factor proportions information is useful for longer-term trade projects. The 1965 indices of labor intensities identified specific products that developing countries would do well in one and two decades later. In part, this may be due to the fact that most products manufactured by labor-intensive methods in the 1960s continued to be produced by such methods in the 1980s (see Table V and Appendix Table I). Third, this study noted that a relation existed between the level of labor intensity of a product and the export performance of developing countries. That is, developing countries generally exhibited a superior export performance in the most labor-intensive products.

In view of the past success of factor proportions information for predicting developing countries trade, this study assessed the implications of recent data on labor intensities for the 1990s and beyond. Specifically, a "core group" of labor-intensive products was identified using 1980s production data²¹ from which four main points can be drawn. First, the position of most textile and clothing products remained virtually unchanged over the last two decades. These products were produced by highly labor-intensive production processes in the 1970s and 1980s, a point that indicates future competitive pressures from developing countries will not be reduced. Second, several other sectors like wood, rubber, and leather products had a high concentration of very labor-intensive production processes in both the 1960s and 1980s, while some items like processed food shifted from relatively labor-intensive production techniques to those that were capital intensive. Third, the recent data show that labor-intensive products are generally found in the same general sectors in the 1980s and 1960s. Finally, the magnitude of the coverage of labor-intensive products suggest they will continue to place broad based competitive pressure on developed countries in the future as over one-quarter of United States industrial employment now originates in relatively labor-intensive product sectors.

While the primary objective of this study was to test the predictive power of factor proportions information for future South-North trade, and the utility of this

²¹ A list of these products is available from the author on request.

data was established, several points were raised in the investigation that should be subject to further research. Five such issues are as follows:

1. Why do such major differences exist in imports of labor-intensive products by individual developed countries (see Tables I and II)? In particular, why has the United States import demand for these products been so much greater than that of the European countries or Canada in terms of levels and shares and from Japan in terms of levels?
2. To what extent do domestic policies of developing countries explain the marked differences in their ability to supply these items? As shown (Table III) labor-intensive exports were concentrated in relatively few countries.
3. The data presented in this study on textiles and clothing production (see Tables VI and VII) indicate more analyses is needed on this sector. Specifically, given that the Long Term Textile Arrangement (LTA) and the Multifibre Arrangement were intended to give these industries an opportunity to restructure, why do they remain among the most labor intensive sectors of U.S. industry in the 1980s?
4. This investigation identified specific industries (Table VII) that appeared especially "vulnerable" to increased competitive pressures from developing country exporters. As such, it provides a focus for further analyses aimed at establishing how resources may be best transferred from these sectors to industries where a competitive edge has been maintained. These results also provide a focus for monitoring future developments concerning market penetration and pressures for protection.
5. This study employed a measure of comparative advantage based on factor proportions data, but noted that Balassa's "revealed" comparative advantage (RCA) indices [1] could also be used for the analysis. It would be useful to determine how RCA indices relate to those developed in this study (and by the National Bureau of Economic Research). The objective might be to expand the utility of such statistics for anticipating disruptive imports or structural adjustment problems.

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APPENDIX

STATISTICS ON TRENDS IN TRADE AND FACTOR PROPORTIONS INDICES FOR PRODUCTS IDENTIFIED IN 1965 AS BEING MANUFACTURED BY LABOR-INTENSIVE PRODUCTION PROCESSES, 1965–85

Appendix Table I updates trade statistics and factor proportions indices for the original list of manufactured products identified by the National Bureau of Economic Research (NBER) as being produced by relatively labor-intensive production processes. The table shows the SITC code of each item, gives a brief product description, and also gives the value and share of developed country imports from developing countries in 1965, 1975, and 1985.^a All trade data were drawn from United Nations, Series D, Commodity Trade Tapes.

^a These items were originally identified in terms of the United States SIC classification system. See [7, pp. 189–213] for the concordance used to identify corresponding SITC products. In Appendix Table I, and elsewhere in this report, standard World Bank definitions of developed and developing countries are employed with one exception. That is, Greece, Spain, and Portugal are classified in the developed rather than developing country group.

The NBER factor intensity indices are updated in the appendix table from 1965 to 1982 using United States Department of Commerce information for the latest years now available. Apart from the usual data defects which may distort inter-temporal comparisons of relative factor intensities, the indices of value added per employee presented in Appendix Table I may suffer for the 1972 revisions of the United States SIC system. These revisions affected, in some manner, 121 industries out of a total of 422. In the data compilations, an attempt was made to account for these revisions. Lack of detailed statistics, however, sometimes precluded a perfect matching of industries before and after 1972. Thus, the industrial coverage of some groups may vary over time. This defect would, of course, make the use of the data as indicators of *absolute* levels of activity and employment suspect. However, to the extent that the data correspond to general trends in value added and employment for closely related activities, the calculated *ratio* of value added per employee should be representative of that industry.

APPENDIX TABLE I
THE EXPORT PERFORMANCE OF DEVELOPING COUNTRIES IN LABOR-INTENSIVE MANUFACTURED GOODS, 1965-85

SITC	Description	Value Added/Employee (Mfg. = 100) ^a		Total Developed Country Imports			Developing Country Import Share		
		1965	1982	1965	1975	1985	1965	1975	1985
	Yarn and thread								
65100	Textile yarn	60	49	1,304.0	4,228.1	8,892.1	4.9	12.3	21.8
	Cotton fabrics								
65200	Cotton fabrics	60-67	49-51	854.3	2,526.0	5,166.1	27.2	30.2	37.5
	Other woven fabrics								
65320	Woolen fabrics	71	62	550.6	743.6	1,390.7	1.3	2.4	5.8
65310	Silk fabrics	67-75	57-67	77.3	269.4	639.1	11.5	64.4	47.0
65350	Synthetic fabrics	67-75	57-67	277.4	2,294.0	4,252.6	1.0	8.1	18.4
65360	Other fabrics	67-75	57-67	377.2	703.0	961.7	1.5	6.0	12.1
65330	Linens	81-87	57-67	18.8	61.3	145.4	1.1	1.6	5.0
65370	Knitted fabrics	81-87	57-67	187.1	968.7	1,081.1	1.8	1.9	3.6
65390	Woven fabrics, n.e.s.	81-87	57-67	54.2	50.5	131.9	4.1	8.3	13.6
	Total			1,542.6	5,090.5	8,602.5	1.9	8.7	15.6
	Textile small wares								
65400	Tulle or lace	57-85	51-68	193.6	333.4	719.0	3.0	7.9	14.4
65500	Special textile fabrics	57-85	51-68	422.9	1,735.7	3,628.6	7.2	8.7	8.6
65600	Made-up textile fabrics	57-85	51-68	327.0	1,129.6	2,849.8	32.2	28.2	47.4
	Total			943.5	3,198.7	7,197.4	15.0	15.5	24.5
	Carpets and floor covers								
65700	Floor coverings	78-60	37-62	487.7	1,901.9	3,222.6	29.7	30.0	35.8
	Clothing and accessories								
84110	Clothing, not knitted	42-55	36-64	835.6	6,622.8	21,758.0	26.4	41.8	59.5

APPENDIX TABLE I (Continued)

SITC	Description	Value Added/Employee (Mfg. = 100) ^a			Total Developed Country Imports			Developing Country Import Share		
		1965	1982	1985	1965	1975	1985	1965	1975	1985
84120	Clothing accessories	42-55	36-64	1,338.2	180.6	662.9	1,338.2	16.4	28.6	44.4
84140	Knitted accessories	42-55	36-64	14,856.8	872.1	5,494.6	14,856.8	19.4	40.7	53.5
84150	Headgear	42-55	36-64	524.1	61.4	197.5	524.1	3.8	20.5	48.2
	Total			38,477.1	1,949.1	12,977.8	38,477.1	21.6	40.3	56.5
Leather and other mfg.										
61200	Leather manufactures	50-55	53	1,000.9	59.7	265.2	1,000.9	7.9	19.5	54.7
83100	Travel goods	46-57	48-63	3,147.5	147.0	829.4	3,147.5	20.6	39.7	63.6
84130	Leather clothing	39-67	43-61	2,135.4	80.2	875.6	2,135.4	16.4	53.3	69.1
85100	Footwear	46-63	46-54	12,702.8	538.2	3,946.6	12,702.8	8.5	22.9	46.4
84200	Fur clothing	97	90	1,117.3	32.1	398.4	1,117.3	2.2	25.5	47.3
62990	Rubber articles, n.e.s.	76-96	83	1,253.4	87.2	416.4	1,253.4	1.6	3.7	15.2
84160	Rubber clothing	76-96	82	450.6	10.7	60.7	450.6	0.1	2.0	69.0
89300	Plastic articles, n.e.s.	76-96	81-87	7,824.4	346.8	2,512.5	7,824.4	5.8	12.5	17.2
	Total			29,632.3	1,301.9	9,304.8	29,632.3	8.6	23.4	41.5
Glassware										
66500	Glassware	84-94	107	2,520.8	248.2	1,109.7	2,520.8	2.8	5.5	9.3
66600	Pottery	69	48-72	2,190.7	218.0	830.2	2,190.7	1.8	6.6	25.1
	Total			4,711.5	466.2	1,939.9	4,711.5	2.3	6.0	16.7
Furniture										
82100	Furniture	63-74	48-70	10,612.9	410.7	3,411.2	10,612.9	7.8	6.5	19.5
Printed matter										
89200	Printed matter	74-81	71-82	7,093.8	735.8	3,092.5	7,093.8	1.7	3.1	5.3

APPENDIX TABLE I (Continued)

SITC	Description	Value Added/Employee (Mfg. = 100) ^a		Total Developed Country Imports			Developing Country Import Share		
		1965	1982	1965	1975	1985	1965	1975	1985
Sporting goods and instruments									
73290	Motorcycles and parts	73-78	72	230.2	1,416.1	1,706.0	0.4	0.6	0.7
73310	Bicycles and parts	73-78	72	78.6	454.9	1,620.7	1.3	9.4	25.6
89100	Musical instruments	74-106	64-160	562.4	3,313.5	16,926.6	0.9	7.1	8.9
89400	Sporting goods	55-74	86	586.7	2,663.7	8,786.2	12.2	23.0	53.0
	Total			1,457.9	7,848.2	29,039.5	5.3	11.4	22.7
Jewelry and silverware									
66700	Precious stones	55-87	84	1,402.1	5,020.0	11,327.7	24.0	18.3	31.2
89710	Gold jewelry	55-87	79-84	136.0	713.5	3,707.5	4.4	13.3	26.3
	Total			1,538.1	5,733.5	15,035.2	22.3	17.7	30.0
Misc. manufactures									
55100	Essential oils	n.a.	n.a.	225.4	574.4	1,207.8	25.4	19.1	20.3
64200	Paper articles	73-88	80-125	248.5	1,593.8	4,446.6	0.8	3.5	9.2
69850	Pins and needles	80	120	45.9	153.6	272.1	3.9	6.2	15.0
89520	Pens and pencils	72-81	92-94	78.6	273.0	782.5	1.4	2.8	7.0
89720	Imitation jewelry	62	65	51.5	275.0	946.2	16.9	34.0	57.0
89920	Basketwork and brooms	85	71	81.8	335.7	880.1	22.4	40.2	58.4
89930	Candles and matches	59-71	80	84.4	388.3	545.3	3.6	6.1	22.7
89940	Umbrellas	72	80	26.9	124.9	312.8	9.2	51.1	70.5
89960	Orthopedic goods	99-102	96-116	31.5	265.5	980.3	2.2	1.4	1.1
89910	Carved manufactures	62-67	80	16.2	73.3	158.1	15.4	48.0	50.2
89950	Toilet articles ^b	62-67	272	69.9	242.5	414.4	4.1	4.9	19.3

APPENDIX TABLE I (Continued)

SITC	Description	Value Added/Employee (Mfg. = 100) ^a		Total Developed Country Imports			Developing Country Import Share		
		1965	1982	1965	1975	1985	1965	1975	1985
89990	Other manufactures, n.e.s.	62-67	80	3.5	1.2	2.8	2.9	6.8	1.6
	Total			964.1	4,301.2	10,949.3	18.0	16.2	25.9
Optical goods and instruments									
86120	Spectacles and frames	73	79	62.3	406.2	1,136.9	0.8	5.3	23.3
86130	Optical instruments	96	109	86.4	293.7	1,144.3	3.3	4.2	8.5
86140	Photographic cameras ^c	108	210	146.1	811.6	1,927.4	1.8	11.1	14.4
86160	Photographic apparatus ^c	108	210	131.3	1,259.8	4,867.3	0.5	1.4	1.3
86170	Medical instruments, n.e.s.	95	117	110.4	897.7	3,133.4	1.0	2.4	6.7
86410	Watches	63-89	66	242.1	1,241.2	2,920.9	0.7	15.3	34.3
86420	Clocks	63-89	66	139.1	592.4	875.7	1.2	0.7	20.7
	Total			917.7	5,502.6	16,005.9	1.1	7.5	13.1
Tools and hardware									
67850	Tube fittings of steel	92	101	124.8	830.6	1,228.5	1.2	2.5	10.8
69300	Wire products	82	73	152.8	795.3	1,359.2	0.6	4.2	12.6
69400	Nails and screws	100	88	281.8	1,287.4	2,975.8	2.0	3.2	15.7
69500	Hand tools	98	102	450.8	1,925.4	4,429.9	1.0	3.6	13.9
69600	Cutlery	73	121	169.4	552.0	1,132.5	3.1	11.8	26.0
69700	Household equipment	82-99	79	228.9	918.9	2,244.6	4.2	14.3	32.0
69810	Locksmith wares	90	n.a.	154.5	750.1	2,257.7	1.4	3.8	14.4
69830	Steel chains	91-102	82	71.8	346.3	486.7	0.8	4.5	13.3
69880	Misc. metal articles	91-102	82	83.4	394.9	657.9	1.7	2.5	3.7
69890	Metal articles, n.e.s.	91-102	82	263.9	1,558.4	3,592.3	2.1	2.9	14.5
	Total			1,981.8	9,359.3	20,365.1	1.9	4.9	16.4

APPENDIX TABLE I (Continued)

SITC	Description	Value Added/Employee (Mfg. = 100) ^a		Total Developed Country Imports			Developing Country Import Share		
		1965	1982	1965	1975	1985	1965	1975	1985
Electrical apparatus									
71730	Sewing machines	99	71	221.1	658.3	1,013.9	0.5	5.0	22.2
72200	Electric power machines	72-107	95-100	1,293.8	6,272.7	16,740.3	0.8	4.8	15.7
72940	Automotive equipment	72-107	102	164.6	957.1	2,654.8	0.6	3.3	5.9
72990	Electric machines, n.e.s.	72-107	91	439.9	2,321.3	7,428.1	1.0	9.1	16.6
72320	Insulating equipment	80-104	72-107	55.6	201.9	373.5	0.2	1.9	8.2
72420	Radio receivers	98	96	376.8	2,048.3	6,115.5	7.0	28.0	46.0
72490	Telecommunications, n.e.s.	95-102	105-120	812.8	4,465.3	15,653.3	1.4	10.9	22.6
72503	Domestic appliances	98	92	105.2	623.8	1,474.3	0.3	0.1	20.7
72505	Space heaters	101	90	102.4	1,022.2	3,720.4	0.3	7.3	26.0
72910	Batteries	121	110	90.8	520.0	1,731.9	4.5	4.7	11.9
72920	Electric lamps	130	132	156.2	646.1	1,469.4	1.2	5.6	12.1
72930	Thermionic materials	80	95	460.0	3,695.8	16,706.7	2.2	25.4	33.7
81240	Lighting fixtures	90	96	149.0	609.5	1,566.8	9.9	8.3	2.4
89110	Tape recorders	72	96	321.5	1,915.6	11,100.9	0.4	8.0	8.3
	Total			<u>4,749.7</u>	<u>25,957.9</u>	<u>87,749.8</u>	1.8	11.3	21.9
Nonelectrical machines									
71200	Agricultural machines	100	122-124	1,356.1	4,824.5	6,660.5	0.2	0.3	0.9
71420	Calculating machines	89	122-134	428.7	1,344.9	1,311.0	0.0	20.5	17.6
71430	Statistical machines	89	122-134	285.0	4,039.3	24,231.1	1.5	2.2	8.8
71490	Office machines	89	122-134	400.9	2,445.6	17,217.0	0.3	6.6	14.7
71510	Machine tools	97-105	92	812.1	2,744.9	5,127.6	0.2	0.9	6.0

APPENDIX TABLE I (Continued)

SITC	Description	Value Added/Employee (Mfg. = 100) ^a			Total Developed Country Imports			Developing Country Import Share		
		1965	1982	1985	1965	1975	1985	1965	1975	1985
71520	Metal working machines	97-105	92	1,021.6	800.4	1,021.6	0.1	0.3	1.2	
71710	Textile machinery	76	76	3,352.4	2,249.7	3,352.4	0.0	0.4	1.3	
71810	Paper mill machinery	87	99	1,844.1	897.8	1,844.1	0.0	0.4	2.4	
71830	Food processing machinery	105	96	1,073.1	491.1	1,073.1	0.3	0.7	1.9	
71920	Pumps	108	113	9,318.9	4,097.3	9,318.9	0.3	1.2	9.2	
71950	Power tools, n.e.s.	89-103	80-113	3,838.5	1,607.5	3,838.5	0.2	1.0	4.7	
71960	Machines, n.e.s.	89-103	77-88	4,138.7	1,747.9	4,138.7	0.2	0.9	3.4	
71980	Mechanical goods, n.e.s.	89-103	77-88	7,222.9	2,682.5	7,222.9	0.2	1.0	2.2	
71991	Metal foundry boxes	89-103	77-88	889.2	271.7	889.2	0.9	2.1	4.6	
71992	Tapes and valves	89-103	77-88	4,244.3	1,972.8	4,244.3	0.4	1.4	5.7	
73100	Railway vehicles	101	100	1,046.0	686.6	1,046.0	0.7	3.3	3.6	
73280	Motor vehicle bodies	103	120	34,530.9	12,379.6	34,530.9	0.2	1.5	3.7	
	Total			127,067.8	45,284.1	127,067.8	0.3	2.0	6.5	
	Fish and products									
03200	Canned fish	93	102	2,444.0	1,023.2	2,444.0	15.1	25.0	42.8	
08140	Fish or meat meal	93-102	120	667.7	402.0	667.7	50.3	30.3	44.6	
41110	Oil of fish	102	120	324.9	213.9	324.9	20.6	23.6	18.8	
	Total			3,436.6	1,639.1	3,436.6	29.3	26.0	40.8	
	Fruits and vegetables									
05200	Dried fruit	90-100	134	705.9	351.2	705.9	25.3	33.3	36.8	
05300	Prepared fruit	90-100	116	4,428.9	1,639.4	4,428.9	25.5	30.0	49.4	

APPENDIX TABLE I (Continued)

SITC	Description	Value Added/Employee (Mfg. = 100) ^a		Total Developed Country Imports			Developing Country Import Share		
		1965	1982	1965	1975	1985	1965	1975	1985
05500	Prepared vegetables	90-100	116	290.1	1,354.6	2,507.0	27.9	29.3	33.2
	Total			1,028.4	3,345.2	7,641.8	26.2	30.1	42.9
	Misc. food products								
06200	Sugar confectionary	84	140	76.9	455.9	740.2	1.6	5.2	7.6
09900	Food preparations, n.e.s.	108	182	108.4	713.7	2,154.8	7.2	10.5	11.7
12210	Cigars and cheroots	80	60	43.9	200.2	262.7	4.3	7.1	19.3
	Total			229.2	1,369.8	3,157.7	4.7	8.2	11.3
	Products of jute								
65190	Textiles yarns, n.e.s.	63	49	39.1	54.6	135.9	39.6	40.5	72.0
65340	Woven jute fabrics	63	49	264.2	219.1	214.5	87.4	86.3	86.1
65560	Cordage	63	63	100.3	330.4	447.1	21.8	34.3	36.9
65610	Textile bags	53	50	81.5	109.6	274.8	68.4	58.8	65.1
	Total			485.1	713.7	1,072.3	66.8	54.4	58.4
	Leather and rubber materials								
61100	Leather	80	69	403.3	1,218.1	3,093.0	24.6	31.0	34.7
61300	Tanned fur skins	100	n.a.	126.1	388.8	793.6	5.5	15.9	6.6
62100	Rubber materials ^d	n.a.	n.a.	142.7	569.3	1,315.8	1.8	1.4	3.1
	Total			672.1	2,176.2	5,202.4	16.2	20.6	22.5
	Lumber and plywood								
24300	Shaped wood	44-65	70	1,957.9	4,223.1	9,070.2	11.9	15.4	16.7
63180	Simply worked wood	44-65	55	41.4	548.7	973.0	22.9	6.6	14.4
63110	Veneer sheets	68	55-57	152.1	327.2	626.5	15.5	23.8	30.7

APPENDIX TABLE I (Continued)

SITC	Description	Value Added/Employee (Mfg. = 100) ^a		Total Developed Country Imports			Developing Country Import Share		
		1965	1982	1965	1975	1985	1965	1975	1986
63120	Plywood	68	55-57	324.6	984.7	1,655.0	26.6	43.0	50.3
63140	Improved wood	48-80	44-80	55.7	371.2	858.5	0.7	0.4	2.0
63200	Wood products, n.e.s.	48-80	44-80	233.4	995.1	2,492.9	8.4	21.0	30.5
63300	Cork manufactures	48-80	65	51.3	117.4	234.1	5.3	3.3	3.0
	Total			2,816.4	7,567.4	15,910.2	13.3	18.5	21.8
Building materials									
66130	Building stone	57	65	58.5	282.7	944.4	2.9	7.5	18.8
66180	Cement building material	84-86	83-86	53.6	191.2	329.9	4.3	2.0	1.3
66200	Clay materials	71-75	76	282.1	1,313.0	2,264.7	2.0	2.6	5.0
66300	Mineral products, n.e.s.	82	85	285.8	1,223.0	2,714.3	2.1	2.2	3.6
66400	Glass	139	128	360.4	1,159.5	3,104.4	1.1	1.7	8.0
	Total			1,040.4	4,169.4	9,357.7	1.9	2.5	6.9

^a Due to the fact that the SIC classification of the United States has undergone a number of major revisions, and the fact that an exact concordance to the SITC system does not exist, it has been necessary to express some of the factor proportions indices as a likely range rather than a specific average for the SITC group. See Lary [7, pp. 191-212] for a SITC-SIC concordance relating to the 1960s.

^b Available concordances between the SITC and SIC place this product in SIC group 2844 "toilet preparations." In 1982, this SIC group had 60,400 employees and produced a value added of U.S.\$7,130.6 million which accounts for the very high value added per employee ratio.

^c The corresponding SIC product is 3861 "photographic equipment and supplies" which employed 119,300 workers in 1982 and produced a value added of U.S.\$14,059.1 million. As such, it moved from about average to very high capital intensity in production over 1965-82.

^d Although factor intensity indices could not be computed for this product, it was included in the original NBER list on the basis of the import valued criterion and factor proportions data drawn from non-United States sources.

^e This product was included in the original National Bureau of Economic Research list on the basis of valued added per employee data from non-United States sources.