The Generalized System of Preferences and the Comparative Advantage of Less Developed Countries in Manufactures

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INTRODUCTION

One of the proposals of the first United Nations Conference on Trade and Development in 1964 was the establishment of a system of preferential tariff rates favouring existing imports from less developed countries under which all developed countries would unilaterally reduce their tariff duties charged on imports from less developed countries while maintaining most-favoured-nation rates[1] on imports from other (developed) countries. The idea was later extended to cover all manufactured products and came to be known as the Generalized System of Preferences (GSP). The first GSP scheme was introduced by the European Economic Community on July 1, 1972. It was followed by schemes of Austria, Denmark, Finland, Ireland, Japan, New Zealand, Sweden, Switzerland and the United Kingdom. Some socialist countries have also implemented GSP schemes.[2]

This study seeks to determine whether GSP will promote the establishment and growth of industries in less developed countries in which they have greater comparative advantage, or lesser comparative disadvantage, as compared with developed (preference-giving) countries. This can be done by comparing the structure of effective protection rates in developed countries

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[1]Most favoured-nation rates are the rates applied under the GATT rules of non-discrimination and reciprocity.

[2]For details on the nature of G.S.P. schemes see Murray [30].

with the comparative advantage schedules of less developed countries; a similar comparison for developed countries would indicate potential losses for the preference-granting countries. If a high degree of positive correlation between the comparative advantage schedules of less developed countries and the effective protection rates of developed countries exists, then according to this approach GSP will promote the expansion of industries in less developed countries in which they have greater comparative advantage or least comparative disadvantage. Similarly, a significantly negative correlation between the comparative advantage schedules and effective protection rates in developed countries will mean that GSP will involve minimum losses to developed countries. The existence of appropriate correlations as indicated above will therefore generate a net trade-creation effect. This requires (a) ranking of manufacturing activities by an index of comparative advantage in less developed as well as developed countries and (b) the estimation of effective protection rates in developed countries. The estimation of both comparative advantage and effective protection is subject to serious conceptual and data limitations. Comparative advantage of a country is a function of many factors some of which are unquantifiable, therefore, any partial measure of comparative advantage can, at best, be an approximation. Similarly, effective protection rates that are normally calculated in a partial equilibrium setting and subject to restrictive assumptions provide only a rough measure of true protection. Given these limitations, very significantly high correlations should not be expected.

The following section briefly describes the potential effects of GSP on global resource allocation and world trade, and is followed by another section which surveys various models of comparative advantage that have been used in the past and selects criteria to develop indices for ranking industries according to their comparative advantage. In the immediately next section these indices are estimated and the comparative advantage schedules are constructed for various less developed and developed countries. The section which comes next uses the effective protection rates calculated by Balassa to assess the nature of correlation between the comparative advantage schedules and the structure of effective protection in developed countries. The results that show positive correlation for less developed and negative correlation for developed countries are, as expected, significant in most cases at only 5 per cent level or above.

GENERALIZED SYSTEM OF PREFERENCES

GSP works in two ways, or combinations of these: it can increase the returns to an exporter from less developed countries of commodities already being sold in the preference-giving countries,[8] and it can reduce the importer's price in the developed country sufficiently to permit new manufactured and semimanufactured products to be sold abroad. The competitive advantage that preferences in manufactured products give less developed producers must

[8]The increase in return to an exporter from less developed countries may be measured by the reduction in the burden of nominal tariff in developed countries borne by the exporter.

advantage in the production of commodities subject to higher effective protection. Therefore a positive correlation between the comparative advantage schedule of less developed countries and effective protection rates of developed countries, and a negative correlation between the comparative advantage schedules and structure of effective protection rates in developed countries, would cause a net increase in trade flows and a better global allocation of resources.

CRITERIA OF COMPARATIVE ADVANTAGE

There are several alternative explanations of a country's comparative advanatage, each subject to its own set of limitations. This is essentially due to the fact that production and trade patterns are a function of many factors and it is difficult to incorporate all of them in a single theorem of general validity.[6] It is therefore necessary to draw upon alternative models to estimate comparative advantage and trade that are analytically sound and which do not involve serious data problems. In this respect resource endowment models like the Factor Proportions Model, Human Skills Model, research, development and technology models, and those models stressing scale economies effect are particularly suitable. In addition, "revealed" comparative advantage models that stress the realized trade patterns as indicators of comparative advantage are also appropriate for the construction of comparative advantage schedules.

Resource Endowment Models

Despite the fact that differential rates of factor accumulation, technological change and development of new factors of production limit the ability of Resource Endowment Models (especially Factor Proportions and Human Skills Models) in predicting changes in comparative advantage of less developed countries, a less developed country's present comparative advantage as determined by resource endowments, provides a useful guide to its appropriate choices for resource allocation between alternative uses. This is so because the fact that economic development is proceeding does not necessarily alter conditions sufficiently to change the basic structure of the economy in the short run. It should also be noted that growth is taking place in developed as well as less developed countries and that this simultaneous growth is likely to have a neutralizing effect leaving relative factor endowments substantially unchanged.

Factor Proportions Model

The Factor Proportions Model states that a country specializes in the production and export of a commodity that draws more heavily on the factor with which the country is relatively well-endowed, i.e., a capital abundant country will export capital-intensive products and a labour abundant country, labour-intensive products. Therefore, a ranking of industries by their relative labour intensity will be consistent with the principle of comparative advantage. If all industries are arrayed according to a simple ratio of labour per unit of capital, then leaving aside some industries falling in the middle of the schedule,

[6]See. Bhagwati [4]; Chipman [6]; Ohlin [31]; Jones [13]; Kravis [21]; and Linder [28].

the patttern of trade between any two countries can be explained adequately by the Factor Proportions Model as has been done in a number of studies.[7]

There are alternative methods of ranking industries according to labour/caiptal or capital/labour ratios. Hufbauer[8] ranks the factor intensity of the final industry only, and does not take into consideration the decomposition of intermediate goods into labour and capital. Lary[9] uses the nonwage value added by manufacture per employee (roughly, value of output minus value of materials used and wages divided by employment) as a guide to interindustry differences in capital intensity. The higher the nonwage value added per employee, the more capital intensive the industry. Both Hufbauer and Lary consider only the direct input requirements and not the total, i.e., direct plus indirect requirements in the production process. The Leontief[10] criterion of ranking industries according to the ratio of "total" capital and labour requirements is more comprehensive and analytically better technique.

Human Skills Model

Recent empirical investigations by Keesing, Yahr, Waeher, Kenen, and Bhagwati and Bhardwaj show, however, that phsycial capital and labour are not the most effective generic factors whose relative availability determines trade patterns.[11] Instead these investigations show that differences in supplies of human skills afford a better factor proportions explanation of trade and international location in manufacturing industries than do endowments of physical capital and labour within the framework of the Factor Proportions Model.

The Human Skills Model postulates that the availability of labour skills or human capital determines the pattern of international location and trade for a broad group of manufactured goods, those not closely tied to natural resources and those that are produced by the "footloose" industries. A country with relative abundance of highly trained personnel and skilled labour will have a comparative advantage in the production and export of skill-intensive products while a country with relative scarcity of skilled labour will have a comparative advantage in relatively less skill-intensive manufactures. A ranking of industries by their relative skill intensity will, therefore, represent a ranking according to the principle of comparative advantage.

There is a strong logical basis for regarding differences in labour skills availability as the basic explanation underlying location, specialization and trade in manufactured goods. First, in most industrial activities, labour is the most important factor of production as reflected by factor income shares. Moreover, although human skills can be augmented and are somewhat mobile internationally, in many respects the human resources of a country are subject to slower change and less international mobility than man-made resources such as physical or financial capital. The lower international mobility of human skills

[7]See for example, Bhagwati [4] and Baldwin [3]
[8]See Hufbauer [12].
[9]See Lary [24].
[10]See Leontief [25].
[11]See Waeher [34] Kenen [19] Yahr [36]. Keesing [14] Bhardwaj and Bhagwati [5].

ensures that its initial availability in one place compared to another will have strong and persistent influence on industrial location. Furthermore, it is not possible to carry out rapid transformation of skills of a labour force. Some occupational skills can be acquired only through a long process of professional training. Broad classes of skills in any population can only be altered slowly. This is enough to maintain skill differences sufficient to produce persistent patterns of trade among nations.

The assumptions underlying the Human Skills approach are similar to those used in the Factor Proportions Model. It is assumed that there exist identical, homogeneous production functions for a commodity in all countries. Perfect skills mobility internationally, perfect competition and full utilization of resources; and the absence of "skill-intensity reversals," in order to ensure a unique ranking of commodities according to their skill content, are also assumed.

There are alternative methods of ranking industries according to the skills model. Kravis and Waehrer have used the differences in wage rates as proxy for differences in skill intensity of commodities because higher wages and greater skill intensity are consistently correlated. Similar approximations were employed by Roskamp, Yudin, and Kenen.[12] Baldwin applies Schulze's concept of human capital in the form of average years and cost of education of labour to rank commodities and determine the structural basis of U.S. trade.[13] Keesing has used the U.S. skill input coefficients to rank industries according to the ratio of "direct" requirements of skilled labour to "direct" requirements of unskilled labour in man-years.[14] All these criteria of human skills are closely related to each other.

Research, development and technology

Keesing and certain other writers have developed another explanation of the pattern of trade in manufactures which suggests that a country with greater research and development (R&D) expenditures will have a comparative advantage in the production of newer and more sophisticated products.[15] This is so because on the one hand R&D results in technical progress, lowers costs, attracts resources into industries with greater R&D expenditures and confers comparative advantage on them; on the other hand, it results in the development of new products not available elsewhere which leads to the creation of a comparative advantage for the country in the new commodities. Industries can, therefore, be ranked by the index of R & D that will be consistent with comparative advantage. One index of R & D is the percentage of engineers and scientists employed in R & D activities in the total employment of the industry.

Scale economies effect

The impact of scale economies in production and distribution on the determination of comparative advantage is very important but little quantitative

[12]See Kravis [22] Weahrer [34], Roskamp-McMeekin [32], Kenen-Yudin [20].
[13]See Baldwin [3].
[14]Keesing [15].
[15]Keesing [16].

knowledge is available regarding many relevant dimensions of economies of scale so that no really good indicator has been computed. One commonly used indicator is the size of the home market; this suggests that a large home market is conducive to the export of goods produced under increasing returns to scale, while a small home market is conducive to the export of goods produced under constant or decreasing returns to scale.[16]

"Revealed" Comparative Advantage

Comparative advantage in manufactured products appears to be the outcome of a number of factors such as factor proportions, human skills, level of technology and the extent of scale economies in production and distribution besides a host of other price and nonprice variable.[17] Moreover, some of the assumptions underlying these explanations of trade structure are very limiting and some of the explanations involve factors that are not easily measurable. Therefore, instead of enunciating general principles and trying to apply these to explain actual trade flows, it may be desirable to take the observed pattern of trade flows as a point of departure, and subsequently use them to determine the main influences that have determined the pattern and performance of trade for a country. In other words, the trade performance of a country in regard to manufactured goods can be drawn upon to determine what Professor Balassa calls the "revealed" comparative advantage of that country in manufactures.[18] This is possible because the commodity pattern of trade is expected to reflect relative costs as well as differences in nonprice factors. It is possible, therefore, to rank commodities by their trade performance over a period of time that will be consistent with the "revealed" comparative advantage of the country.

Various indices have been used to estimate the comparative advantage as revealed by trade flows. Liesner has used relative export performance as an indicator of comparative advantage.[19] A similar method was adopted by Balassa in order to indicate the possible consequences of trade liberalization among OECD countries.[20] Kreinin used the Balassa index to analyze the restrictive effect of the tariffs in the OECD countries.[21] One could also use the changes in export/import ratios to reflect the relative advantages. There is a possibility of extending the market-share analysis of export growth to determine the "competitiveness effect" and rank the commodities by using their respective competitiveness effect indices. Balassa's export performance index for individual countries seems more appropriate for ranking manufacturing industries in the developing countries because of the availability of data.

Choice of Models

The theoretical models considered above tend to make the pattern of trade a function of one variable (or one set of variables), while in fact the explanation of trade patterns is more complex. It is, therefore, necessary to follow an eclectic approach to the estimation of comparative advantage. Instead of considering just one model, several alternatve models will be used to

[16]Hufbauer [12].
[17]Balassa [2].
[18]Balassa [2].
[19]Liesner [27].
[20]Balassa [2].
[21]Kreinin [23].

rank manufactured commodities in developing countries consistent with their comparative advantage. This approach will help to incorporate in the analysis most of the factors that explain the structure of production, specialization and trade. The Factor Proportions, Human Skills, and the "Revealed" Comparative Advantage models are analytically sound and sufficient data are available to estimate their indices to rank commodities. While the first two models are applied below, the export performance index estimating Revealed Comparative Advantage is analyzed in Appendix II.

ESTIMATES OF COMPARATIVE ADVANTAGE INDICES

The computation of total requirements of primary inputs, i.e., capital, labour, and human skills, was done by the application of the input/output technique. The "total requirements" input-coefficient matrix was obtained by subtracting the "direct" input-coefficient matrix A from identity matrix I, and inverting the resultant matrix [I-A], i.e., [I-A].[22] Given the vectors of physical capital, labour, and skills coefficients encompassing all the industries in the matrix, the "total" primary input requirements were obtained by pre-multiplying the total requirements matrix $[I-A]^{-1}$ by the respectiye primary input coefficients vectors. The total input requirements so estimated were then used to calculate the input ratios to rank industries.

Labour/capital ratios

Total labour/capital ratios were used to rank manufacturing industries in selected less developed countries, India, Mexico, Pakistan, and Taiwan (see Appendix Tables 1-3), for which sufficient data were available and which are likely to gain the most from the implementation of GSP schemes. The higher the labour/capital ratio, the greater is the labour intensity and, subsequently, the greater is the comparative advantage in the given manufacturing activity.

The capital coefficients were computed in the net form by dividing the net book value of capital stock and the inventories by the current value added of the respective industries. The inventory value included the inventories of finished products, work in process and materials.[23] The labour coefficients were estimated in man years as the ratio of the number of workers employed in an industry and its value added, i.e., the number of man years required to produce one unit of value added. Data on these input coefficients were not available in sufficient detail for the less developed countries. Therefore, capital and labour coefficients of the Japanese industries in 1954 were used in the estimation of total input requirements.[24] While these coefficients are expected to adequatelv reflect the industrial structure of the more developed of the less

[22]This formulation of total requirements matrix is adapted from Abraham [1]. Leontief [26]. Tims [33] Yuan, [37] Manne and Rudra [29]. Mexican Input Output Tables 1960 (Mexico; Banco-de-Mexico. S.A.)

[23]The methodology followed in the estimation of capital coefficients is derived from Kendrick [17,18], Creamer, Scoleovolsky and Borenstein [8].

[24]The Japanese capital and labour coefficents were obtained from the following sources: National Income Accounts 1957, Economic Research Institute, Economic Planning Agency, Japan; National Wealth Survey 1965; Economic Bulletin No. 1 (February 1959); *Capital Structure of the Japanese Economy*, Council for Industrial Planning Tokyo 1958; Japan Labour Year book, Council of Industrial Planning; and Watanabe [35].

developed countries, they may give rise to results not entirely consistent with the input endowment of less developed countries.

Since developed countries are capital abundant and are expected to have comparative advantage in the production of capital-intensive products, ranking of industries was done on the basis of capital/labour ratios—a higher ratio implies higher comparative advantage (see Appendix Tables 4-6). The United States and United Kingdom were selected as representative developed countries as they absorbed over 60 per cent of the manufactured exports of less developed countries in 1968/69.[25] The switch to capital/labour ratios for developed countries was aimed at determining the nature and significance of correlation between effective tariff rates in developed countries and the comparative advantage schedules of developed and less developed countries, approximated by the relative capital (or labour) intensity.

Human Skill Ratios

The occupational structure of industries was divided into the following five groups of skills:

(1) Professional and technical workers,
(2) Administrators and managers,
(3) Clerical workers,
(4) Sales workers, and
(5) Manual workers and unskilled service workers.

If x_{j1}, x_{j2}, x_{j3}, x_{j4}, and x_{j5} represent respectively the quantities of different types of skills required to produce one unit of value added in jth industry, then the coefficients of skilled and unskilled labour for various industries and sectors can be estimated in the following way:

Skilled Labour Coefficient for jth industry =

$$X'_j = \frac{\sum_{i=1}^{4} x_{ji}}{\sum_{i=1}^{5} x_{ji}}$$

[25]The data on capital and labour co-efficents and the input requirements matrices for the U.S. and U.K. were obtained from the following sources: *A Program for Growth, Capital and Employment*, 1948-60, The Development of Applied Economics, University of Cambridge, Chapman and Hall, April 1964. "Total requirements (Inverse) Input Output Matrix, U.S. Economy 1963". *Survery of Current Bussiness* (November 1969) *British Input Output Relationship* 1954-66, *A Program for Growth No.* 3. Department of Applied Economics. University of Cambridge 1963. Mr. Alterman of the U.S. Bureau of Labour Statistics furnished the data on labour input for the U.S. economy (1963) Gort-Boddy estimates (unpublished) of capital co-efficients for the U.S. economy were also used.

and

Unskilled Labour Coefficient for jth industry =

$$X''_j = \frac{x_{j5}}{\sum_{i=1}^{5} x_{ji}}$$

Given these skill coefficients the total requirements of skilled labour and unskilled labour were obtained by premultiplying the total requirements matrices by $(X'j)$ and $(X''j)$ vectors.

The ranking of industries into comparative advantage schedules by their intensity in unskilled labour was obtained for less developed countries (see Appendix Tables 7-9). The higher the ratio, the greater is the comparative advantage. The comparative advantage schedules for the developed countries (see Appendix Tables 5 and 6) were constructed by ranking the industries in terms of their intensity in skilled labour, i.e., by the ratio of skilled labour to unskilled labour.[26] The higher the ratio, the greater is the comparative advantage.

No information on skill coefficients was available for the less developed countries. Therefore, Japanese skill coefficients for 1950 were used to determine total skills requirements ratios for industries in the developing countries.[27] Skill coefficients for the United States and the United Kingdom were obtained from skill matrices prepared by Horowitz, Zymelman, and Herrenstadt.[28]

The Export Performance Index

The export performance of an individual industry in a particular market can be evaluated by (a) comparing the relative shares of a country in the world exports of individual commodities, (b) indicating changes in relative shares over time, and (c) a combination of (a) and (b). Following Balassa, export performance indices were estimated by combining (a) and (b).[29] This was done by dividing a less developed country's share in the exports of manufactured goods of all the less developed countries to the developed countries, and expressing the results in index number form. The higher the index number for an export commodity, the greater is the revealed comparative advantage of the country in that export product.

The export performance index is developed in symbols below:

Definitions:

V_i = Value of less developed country A's exports of manufactured commodity i in period 1 (1960-61) to the developed countries.[30]

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[26]The switching of ratios was once again aimed at emphasizing the significance and nature of correlation between comparative advantage of respective countries and the structure of effective protection in developed countries.

[27]See Horowitz. [11].

[28]Horowitz [11] pp. 16-17, 46-47.

[29]Balassa [2] pp. 99-117.

[30]The developed countries included in this calculation are EEC, Australia, Canada, Japan, New Zealand, Scandanavian countries, and the U.K.

V'_i = Value of A's exports of the ith commodity in period 2 (1967-68) to developed countries.

$V_{.j}$ = Value of A's manufactured exports to jth developed country in period 1.

$V'_{.j}$ = Value of A's manufactured exports to the jth developed country in period 2.

V_{ij} = Value of A's exports of the ith manufactured commodity to the jth developed country, in period 1.

V'_{ij} = Value of A's exports of the ith manufactured commodity to the ith developed country, in period 2.

Then:

$$(1)\ \sum_j V_{ij} = V_{i.}$$

$$(2)\ \sum_j V'_{ij} = V'_{i.}$$

$$(3)\ \sum_i V_{ij} = V_{.j}$$

$$(4)\ \sum_i V'_{ij} = V'_{.j}$$

$$(5)\ \sum_i \sum_j V_{ij} = \sum_i V_{i.} = \sum_j V_{.j} = V_{..}$$

$V_{...}$ = Total manufactured exports of A to developed market economy countries in period 1.

$$(6)\ \sum_i \sum_j V'_{ij} = \sum_i V'_{i.} = \sum_j V'_{.j} = V'_{..}$$

$V'_{...}$ = Total manufactured exports of A to the developed countries in period 2.

$(7)\ \sum_A V_{i.}$ = Total export of ith commodity from all the less developed countries of the world to the developed countries in period 1.

$(8)\ \sum_A V'_{i.}$ = Total exports of ith commodity from all the less developed countries of the world to the developed countries in period 2.

$$(9)\ \sum_A \sum_i V_{i.} = \sum_A V_{..}$$

$\sum_A V_{..}$ = Total manufactured exports of all less developed countries to all the developed countries in period 1.

(10) $\sum_{A}^{M}\sum_{i}^{M} V'_{i.} = \sum_{A}^{M} V'_{.}$

$\sum_{A}^{M} V'_{..}$ = Total manufactured exports of all less developed countries to all the developed countries in period 2.

(11) $\dfrac{V_{i.}}{\sum_{A}^{M} V_{i.}} \div \dfrac{V_{..}}{\sum_{A}^{M} V_{..}}$ = Relative share of A's export of ith commodity to the developed countries in period 1.

(12) $\dfrac{V_{i.}'}{\sum_{A}^{M} V'_{i.}} \div \dfrac{V'_{..}}{\sum_{A}^{M} V'_{..}}$ = Relative share of A's export of ith commodity to the developed countries in period 2.

(13) $\dfrac{V'_{i.}}{\sum_{A}^{M} V'_{i.}} \Big/ \dfrac{V'_{..}}{\sum_{A}^{M} V_{..}} \div \dfrac{V_{i.}}{\sum_{A}^{M} V_{i.}} \Big/ \dfrac{V_{..}}{\sum_{A}^{M} V_{..}}$ = Growth rate of A's export of ith manufactured commodity to the developed countries.

Equations (11) and (12) represent approach (a) to the estimation of the export performance index while equation (13) represents approach (b). A combination of the two approaches, approach (c), assumes "that while past trades in relative shares of exports can be expected to continue, this will take place at a declining pace as compared to the past.[81]" Such a combination can be approximated by the following:

$$(14)\ \frac{1}{2}\left[\frac{V'_{i.}}{\sum_{A}^{M} V'_{i.}} \div \frac{V'_{.}}{\sum_{A}^{M} V'_{..}} + \left[\left(\frac{V'_{i.}}{\sum_{A}^{M} V'_{i.}} \div \frac{V'_{..}}{\sum_{A}^{M} V'_{..}}\right)^2 \div \left(\frac{V_{i.}}{\sum_{A}^{M} V_{i..}} \div \frac{V_{..}}{\sum_{A}^{M} V_{..}}\right)\right]\right] = X,$$

X = Export Performance Index

where,

i = 1..... , n = all manufactured goods as defined by UNCTAD.

j = 1... , m = all the developed market economy countries.

This export performance index was estimated for each commodity and for each of the four less developed countries included in this investigation. The results are presented in Appendix Table 10.[82]

EFFECTS OF GENERALIZE SYSTEM OF PREFERENCES

Linear regression analysis and Spearman rank correlation tests were used to determine the nature of correlation between comparative advantage

[81] Balasssa [2] pp. 106-107.

[82] Since export performance indices for the U.K. and the U.S. as calculated by Balassa were available, they are not estimated by the present study. Balassa [2] pp. 118-20.

schedules of less developed and developed countries as determined by the factor endowment models developed in Sections III and IV and the effective protection rates in developed countries as calculated by Balassa (see Appendix Table 11 and footnote to it). The results as presented below indicate positive correlation for less developed, and negative correlation for developed countries. They are, however, not highly significant; significance level for most of the test being 5 per cent. This is primarily due to the nature of data used in this analysis that, at best, provide rough approximations. The calculated comparative advantage indices, as already stated earlier, are only rough indicators of the real comparative advantage of these countries. Similarly, the effective protection rates used in this study were computed subject to certain limiting assumptions such as fixed input coefficients and the nonexistence of other trade-distorting measures. The effective rates therefore need not reflect the true restrictiveness of tariff systems in developed countries. The results should therefore be judged in the light of these data limitations.

Factor Proportions Model

Taiwan:

$$\hat{Y} = 20.24910 + 0.00041952\,X \qquad R^2 = .25449$$
$$(1.784091)\ (1.431031)^*$$
Number of observations = 16

Pakistan:

$$\hat{Y} = 17.260988 + 0.00054513\,X \qquad R^2 = .270008$$
$$(1.12940)\ (1.470021)^*$$
Number of observations = 15

India:

$$\hat{Y} = 18.210218 + 0.0053498\,X \qquad R^2 = .418721$$
$$(2.01390)\ (1.480009)^*$$
Number of observations = 14

Mexico:

$$\hat{Y} = 18.35550 + 0.00386926X \qquad R^2 = .267557$$
$$(1.98021)\ (1.337501)^{**}$$
Number of observations = 18

United States:

$$\hat{Y} = 43.7832 - 0.001568\,X \qquad R^2 = .268944$$
$$(2.60093)\ (-2.10391)^*$$
Number of observations = 35

United Kingdom:

$$\hat{Y} = 41.69940 - 0.0388467\,X \qquad R^2 = .597245$$
$$(2.970132)\ (-3.182530)^*$$
Number of observations = 13

where:

Y_i = effective protection rate on activity i in the developed countries.

X_i = comparative advantage index for activity i.

The t- statistic values are given in the parentheses.

Single and double asterisks refer, respectively to significant results at the 0.05 level and 0.10 level.

The parameter (elasticity coefficient) is small for both the less developed and the developed countries, especially for the former. This is perhaps due to the high level of aggregation on account of data constraints. Moreover, manufactured products are in general, subject to relatively higher tariffs with relatively small spread between tariff rates, thus accounting for small elasticity coefficients.

Conclusions of the regression tests are reinforced by the Spearman rank correlation tests showing significant and positive (between .4 and .7) correlation for less developed and negative (—.61 and —.87) correlation for the developed countries. The results are summarized in Table I.

Table I

Results of Rank Correlation Test—The Factor Proportions Model

Countries	Rank Correlation Coefficient	t—value	Significance Level
Taiwan	0.4400	1.68520	0.075
Pakistan	0.5070	1.93167	0.05
India	0.7170	2.93826	0.025
Mexico	0.3710	1.54707	0.075
United States	—0.6112	—4.2274	0.005
United Kingdom	—0.8654	—5.4415	0.01

Source: Appendix Tables 1-6 and 11.

Human Skills Model

Taiwan:

$$\hat{Y} = \underset{(1.89322)}{22.49325} + \underset{(2.23597)^*}{0.095398\, X_1} \qquad R^2 = .410051$$

Number of observations = 17

Pakistan:

$$\hat{Y} = \underset{(1.900386)}{18.35486} + \underset{(2.39320)^*}{0.039871\, X_1} \qquad R^2 = .471822$$

Number of observations = 17

India:

$$\hat{Y} = 22.78608 + 0.0981809\ X_1 \qquad R^2 = .402201$$
$$(1.93871)\ (2.07033)^*$$

Number of observations = 16

Mexico:

$$\hat{Y} = 17.05680 + 0.042051\ X_1 \qquad R^2 = .275841$$
$$(1.73741)\ (2.19100)^*$$

Number of observations = 18

United States:

$$\hat{Y} = 38.2583 + 0.0321996\ X_1 \qquad R^2 = .281609$$
$$(4.10080)\ (-2.71901)^*$$

Number of observations = 35

United Kingdom:

$$\hat{Y} = 42.3178 + 0.00729763\ X_1 \qquad R^2 = .391770$$
$$(3.29781)\ (-2.235510)^{**}$$

Number of observations = 13

where:

X_{1i} = comparative advantage index of ith activity measured by skills ratio.

Rank correlation tests reinforce the conclusions of regression tests as shown in Table II.

Table II

Results of Rank Correlation Tests—Human Skills Model

Countries	Rank Correlation Coefficient	t- value	Significance Level
Taiwan	0.6000	2.59806	0.025
Pakistan	0.73830	4.08852	0.01
India	0.7660	3.76106	0.01
Mexico	0.4690	2.05422	0.05
United States	—0.50061	—3.2065	0.01
United Kingdom	—0.69500	—3.0536	0.05

Source: Appendix Tables 5, 6, 7-9, and 11.

Revealed Comparative Advantage

Unlike the Factor Proportions and the Human Skills models, the "revealed" comparative advantage formulation shows rather weak positive correlation for the less developed and insignificant negative correlation for the developed countries between the structure of effective protection in the developed countries and the revealed comparative advantage of the respective countries in manufactures. However, this result should be interpreted with caution because revealed comparative advantage unlike the Factor Proportions and Human Skills models is not an "explanatory" model.

CONCLUSIONS

The analysis in this study shows that the structure of effective tariff protection in developed countries is significantly and positively correlated with the comparative advantage of less developed countries in manufacturing activities.[33] Therefore, a truly "generalized" GSP scheme, that would require all developed countries to grant duty-free access to manufactured exports of less developed countries without limitation on volume would give the greatest incentive to the establishment and growth of industries in less developed countries in which they have comparative advantage. Since the study also shows that effective protection rates in developed countries are negatively correlated with their comparative advantage, introduction of GSP schemes would result in a better allocation of resources in developed countries as well. Such an arrangement would therefore result in a more rational structure of world trade by lessening trade diversion.

The study further brings out that gains from a GSP scheme should be assessed in terms of reduction in effective (as against nominal) protection in developed, and corresponding effective preference accorded to an activity in less developed countries by the introduction of the scheme. With effective protection much higher than the corresponding nominal tariff rates, a reduction in nominal rates on the final products may not bring about a proportionate change in the effective protection rates. Only under the exceptional situation where a one-to -one relationship between nominal and effective rates holds, can a reduction in nominal rates measure the real extent of preferences granted to imports from less developed countries. Where such a relationship does not hold, the reduction in effective protection rate is the true measure of preference.[34] The actual GSP schemes accord preferences in terms of reduction in nominal rates for a broad set of products. Whether these schemes accord any signifcant preference depends upon the extent to which the structure of effective protection has been altered. It would therefore be advisable to evaluate the effects of these

[33]This concluson holds despite rather weak positive correletion between effective protection rates in developed countries and the export performance index in less developed countries (See Appendix II).

[34]No attempt has as yet been made to assess the effects of GSP schemes on the structures of the effective tariff protection of the preference granting countries. A few recent studies of the European Economic Community's scheme based on changes in nominal rather than effective protection indicate that it is of very little benefit to less developed countries. It is most generous for those products in which these countries have the least comparative advantage such as jet aircraft and advanced computers. In contrast, the EEC scheme offers little incentive, or none at all, to expand exports of those products in which less developed countries have comparative advantage. The same holds true for other GSP schemes currently in operation. See for details Cooper. [7] and Murray [30].

schemes on effective protection rates and introduce revisions to modify the structure of effective protection in order to make it more conducive to the development of activities in less developed countries in which they have comparative advantage.

These conclusions are, however, based upon certain restrictive assumptions that underlie the present study. It was assumed that, either, surplus resources were available in less developed countries, or, that international mobility of factors of production and technology was high, that would supply resources for the development of preferred activities in the beneficiary countries. It was also assumed that high supply elasticities prevailed in both developed and less developed countries thus allowing for smooth substitution of a cheaper source for a costly source of imports, therefore, resulting in a better global trade pattern. Moreover, the effective protection rates used were calculated on the basis of certain assumptions like the fixed input-output relationship that may not be realistic. The findings of the study are also qualified by the fact that many nontariff barriers to imports from less developed countries exist and they might nullify the potential gains accorded by a GSP scheme.

Table I

Mexico: Total Capital and Labour Requirements of Manufacturing Industries, 1960

(Per US $1 million of output)

SITC	Description of Commodities	Capital (-K) (In millions of dollars)	Labour (-L) (In man years)	Labour/ Capital in L/K
013	Processed meat products	1,233.239	3,433.855	0.00270
032, 053, 055	Other processed products	1,247.715	3,265.694	0.00261
266	Synthetic fibre	724.365	1,278.996	0.00176
551	Essential oils and perfumes	1,259.106	3,038.813	0.00241
599	Chemical materials and products	1,271.867	3,276.193	0.00257
641,642	Paper and paper products	929.517	2,219.159	0.00238
651-653	Textiles and fabrics	969.979	3,753.222	0.00386
655-657	Textile products, n.e.s.	891.132	3,605.884	0.00404
664-666	Glass, glassware, pottery products	1,155.031	1,999.629	0.00173
671	Pig iron	908.618	1,794.274	0.00197
696	Fabricated metal products and cutlery products	996.166	2,530.026	0.00253
711	Nonelectrical machinery	610.693	1,874.386	0.00306
729	Electrical goods, n.e.s.	890.345	2,082.204	0.00233
841, 851	Clothing footwear	823.621	3,370.294	0.00409
892	Printing and publishing	731.603	1,899.177	0.00259
629, 893	Rubber and plastic products	767.481	1,490.660	0.00194
894, 897	Other manufactures, n.e.s.	698.792	2,631.996	0.00376

Source: Inverse Input-Output Table of Mexico.

Table 2

Pakistan and India: Total Capital Labour Requirement in Manufacturing Industries

(Per US $ 1 million of output)

No.	SITC Equivalents	Description of Commodities	Pakistan			India		
			Total Labour Requirements (L) (In man years)	Total Capital Requirements (K) (In millions of dollars)	L/K	Total Labour Requirements (L) (In man years	Total Capital Requirements (K) (In millions of dollars)	L/K
1.	013, 032, 053, 055	Food products	4,298.64	929,457	0.00462	4,247.29	1,034,516	0.00411
2.	651-657, 841	Textiles, clothing	4,139.09	878,599	0.00471	3,871.98	865,090	0.00448
3.	631, 632 821	Wood products, furniture	5,688.52	1,536,815	0.00370	—	—	—
4.	641, 642, 892	Paper products, printing	2,825.10	861,588	0.00327	—	—	—
5.	611, 612	Leather and leather products	5,229.49	1,238,073	0.00422	2,770.69	540,391	0.00513
6.	629	Rubber manufactures	3,688.76	1,095,556	0.00336	2,468.91	668,961	0.00369
7.	551, 599	Chemical industries	2,877.51	1,080,762	0.00266	970.95	490,399	0.00198
8.	664-666	Glass, glassware, pottery, etc.	2,130.21	882,386	0.00241	1,772.10	669,510	0.00265
9.	671	Basic metals industries	2,075.39	678,669	0.00305	1,059.77	469,321	0.00226
10.	711	Nonelectrical machines	3,324.29	959,125	0.00346	1,716.48	554,052	0.00310
11.	724, 729	Electrical manufactures	2,411.21	755,702	0.00319	1,456.89	527,960	0.00276
12.	894, 897	Miscellaneous manufactures	5,323.59	1,056,787	0.00503	—	—	—
13.	695, 696	Fabricated metal products	4,257.16	1,305,363	0.00326	1,059.77	469,321	0.00226
14.	851	Footwear	4,139.09	878,599	0.00471	2,770.69	540,391	0.00513
15.	653	Noncotton fabrics	—	—	—	4,238.57	945,490	0.00454

Source: Input-Output Matrices (Inverses) of Pakistan and India.

Table 3

Taiwan: Total Labour and Capital Requirements in Manufacturing Industries

(Per US $1 million of output)

No.	SITC Equivalents	Description of Commodities	Total Labour Requirements (L) (In man years)	Total Capital Requirements (K) (In millions of dollars)	Labour/Capital (L/K)
1.	013, 032, 053, 055	Canned food products	3,939.5398	1,483,913	0.002654
2.	651, 657	Textiles	4,431.4421	1,274,022	0.003478
3.	631, 632	Lumber & plywood products	2,850.1838	931,791	0.003058
4.	641, 642	Paper, paper products	2,395.4004	1,586,373	0.001509
5.	611, 612	Leather, Leather products	5,775.9468	1,883,616	0.003066
6.	629	Rubber products	2,635.3586	1,206,354	0.002184
7.	893	Plastic products	2,066.1414	2,358,225	0.000884
8.	551, 599	Miscellaneous chemicals	2,210.5524	1,901,447	0.001162
9.	664-666	Glass, glass products and clay products	1,890.6505	1,397,343	0.001353
10.	671	Iron and steel	2,600.7848	1,121,763	0.002318
11.	695, 696	Simple fabricated metal products	2,742.7580	1,484,218	0.001847
12.	711	Nonelectrical machinery	3,104.3132	1,355,711	0.002289
13.	724, 729	Electrical appliances	2,624.4051	1,648,264	0.001592
14.	851	Footwear	5,775.9468	1,883,616	0.003066
15.	841	Clothing	4,431.4421	1,374,022	0.003478
16	894-897	Miscellaneous manufactures	3,740.0858	1,153,121	0.003244

Source: Input-Output Matrice of Taiwan, 1961.

APPENDIX

Table 4

United States: Total Capital and Labour Requirements of Selected Industries per US$1 Million of output, 1963

SITC No.	Total Capital Requirements (K) (In thousands of Dollars)	Total Labour Requirements (L) (In man years)	Capital Requirement per Unit of Labour (K/L)
013	3,681.821	206.112	17,863
032	3,681.821	206.112	17,863
053	3,681.821	206.112	17,863
055	3,681.821	206.112	17,863
266	2,488.286	148.671	16,737
551	2,526.923	135.354	18,669
599	2,519.419	135.091	18,649
611	1,496.531	173.730	8,614
612	1,496.531	173.730	8,614
629	2,272.782	179.950	12,630
631	2,600.308	298.907	8,699
632	2,848.840	393.147	7,246
641	2,686.389	181.721	14,783
642	2,962.879	206.105	14,375
651	3,193.237	315.321	10,127
652	3,193.237	315.321	10,127
653	3,096.384	351.684	8,804
655	3,096.384	351.684	8,804
656	2,995.055	249.558	12,001
657	2,995.055	249.558	12,001
664	2,132.415	163.480	13,043
665	2,132.415	163.480	13,043
666	2,308.820	174.625	13,221
671	2,919.251	182.364	16,007
696	2,525.916	201.649	12,526
711	2,347.645	188.283	12,468
724	1,853.726	177.800	10,426
729	2,040.115	192.105	10,619
421	1,633.902	259.325	6,301
841	2,119.687	342.340	6,191
851	1,711.711	288.878	5,925
892	1,934.880	177.464	10,903
893	2,272.782	179.950	12,630
894	2,222.712	215.890	10,295
897	2,222.712	215.890	10,295

Sources " 'Total' Input Requirements Table, U.S. Economy (1963)," *Survey of Current Business*, November 1969. *Censuses of Manufacturing* (1962), *Agriculture* (1964), *Mining* (1963) and *Business* (1963), Bureau of Labour Statistics, O.B.E. 1963 (Jack Alterman); John W. Kendrick, *Industrial Composition of Income and Product*, Brookings, (1968); M. Gort and G. Boddy, *Capital and Labour Intensity in U.S.A.*, forthcoming

Table 5

United Kingdom: Total Requirements of Capital, Labour and Human Skills in Selected Industries, 1960

(Per £1 million of output)

SITC	Description of Commodities	Factor Proportions			Human Skills		
		Capital (K) (In thousands of pounds)	Labour (L) (In man years)	Capital/ Labour (K/L)	Skilled Labour (S_1) (In man years)	Unskilled Labour (S_2) (In man years)	S_1/S_2
013, 032, 053, 055	Processed food chemicals	3,605.899	2,929.882	1,230.7284	929.432	2,145.062	0.43320
551, 599	Chemicals	4,756.909	2,289.710	2,077.5159	797.444	1,489.557	0.53535
611, 612, 851	Leather, leather products, footwear	2,814.556	3,860.619	729.0426	677.091	3,181.924	0.21279
629	Rubber products	3,410.278	2,964.759	1,150.2715	766.708	2,195.453	0.34922
631, 632 821	Wood products and furniture	1,987.990	2,980.044	667.1009	594.735	2,394.143	0.24841
641, 642, 892	Paper and paper products, printing	2,877.099	2,307.108	1,247.0586	730.110	1,608.128	0.45401
651-657	Textile products	3,450.008	3,493.463	987.5610	615.512	2,876.143	0.21400
664, 665, 666	Glass, glassware and pottery	3,012.596	2,468.176	1,220.5758	593.635	1,880.270	0.31571
671	Pig iron products	5,406.415	2,555.990	2,115.1941	650.481	1,985.540	0.32760
695, 696	Fabricated metal products, cutlery, etc.	3,298.355	2,949.964	1,118.1000	718.876	2,228.605	0.32256
711, 729	Electrical and non-electrical machinery, products	2,742.798	2,614.896	1,048.9128	813.726	1,803.402	0.45121
841	Clothing	2,814.556	3,860.619	729.0426	677.091	3,181.924	0.21279

Sources: Inverse Input-Output Table of the United Kingdom, "A Program for Growth", *Production, Capital and Labour*, Department of Applied Economics, Cambridge University, MIT Press, 1966; M. Horowitz, M. Zymelman, and I.L. Herrenstadt, *Manpower Requirements for Planning, an International Comparison Approach*, Vol. 2 (Boston: Northeastern University Press, 1967).

APPENDIX

Table 6

United States: Total Skill Requirements per US$1 Million of Output in Selected Industries, 1963

SITC	Total Skilled Labour Requirements (S_1) (In man years)	Total Unskilled Labour Requirements (S_2) (In man years)	Total Skilled Labour Requirements per Unit of Unskilled Labour (S_1/S_2) In man years)
013	66.23389	140.51726	0.47135
032	66.23389	140.51726	0.47135
053	66.23389	140.51726	0.47135
055	66.23389	140.51726	0.47135
266	58.48164	90.17667	0.64852
551	54.98552	79.84508	0.68865
599	51.64904	90.17667	0.61987
611	36.94547	136.07076	0.27151
612	36.94547	136.07076	0.27151
629	59.21207	120.58467	0.49104
631	56.51263	242.47513	0.23306
632	72.92902	320.39453	0.22762
641	51.84514	130.86914	0.39616
642	57.74442	146.73225	0.39353
651	58.73003	256.57239	0.22890
652	58.73003	256.57239	0.22890
653	65.77014	283.84129	0.23171
655	65.77014	283.84129	0.23171
656	53.46978	194.50789	0.27489
657	53.46978	194.50789	0.27489
664	44.81665	118.38448	0.37856
665	44.81665	118.38448	0.37856
666	46.98184	128.41057	0.36587
671	42.55332	142.42001	0.29878
696	60.95037	140.85676	0.43271
711	42.55332	129.13870	0.45101
724	61.45302	115.98638	0.52982
729	63.40664	128.12369	0.49488
821	62.92258	211.67381	0.29726
841	61.54647	280.81126	0.21917
851	57.71474	231.14629	0.24968
892	86.72599	90.38221	0.95954
893	59.21207	120.58467	0.49104
894	66.44263	149.35757	0.44485
897	66.44263	149.35757	0.44485

Sources: "Total Input Requirements Input-Output Table, U.S. Economy (1963)," *Survey of Current Business*, (November 1969). M. Horowitz, M. Zymelman and I.L. Herrnstadt, *Manpower Requirements for Planning: An International Comparison Approach*, Vol. 2 (Boston: Northeastern University, 1967) pp. 46-47.

Table 7

Mexico: Total Requirements of Human Skills of Manufacturing Industries, 1960

(Per US$1 million of output)

SITC	Description of Commodities	Skilled Labour (S_1) (In man years)	Unskilled Labour (S_2) (In man years)	S_2/S_1
013	Processed meat products	944.052	3,029.689	3.20923
032, 053, 055	Other processed products	903.663	2,971.723	3.28853
266	Synthetic fibre	641.981	655.742	1.02143
551	Essential oils and perfumes	1,168.346	1,906.091	1.63144
599	Chemical materials and products	1,050.122	2,256.605	2.14889
641, 642	Paper and paper products	895.516	1,307.756	1.46033
651-653	Textiles and fabrics	831.593	2,825.923	3.39820
655-657	Textile products, n.e.s.	810.212	2,813.799	3.47291
664-666	Glass, glassware, pottery products	787.323	1,172.379	1.48906
671	Pig iron	718.456	1,087.905	1.51422
696	Fabricated products, cutlery products	778.527	1,753.099	2.25181
711	Nonelectrical machinery	625.562	1,253.435	2.00369
729	Electrical goods, n.e.s.	872.163	1,214.385	1.39238
841, 851	Clothing, footwear	1,078.618	2,688.067	2.49213
892	Printing and publishing	1,011.988	889.918	0.87937
629, 892	Rubber and plastic products	769.824	894.387	1.16180
894, 897	Other manufactures, n.e.s.	692.388	1,905.288	2.75176

Source: Inverse Input-Output Table of Mexico.

Table 8

Taiwan: Labour Skills Requirements in Manufacturing, 1961

(Per US $1 million of output)

No.	SITC Equivalents	Description of Commodities	Total Skilled Labour Requirements (S_1) (In man years)	Total Unskilled Labour Requirements (S_2) (In man years)	Unskilled Labour/ Skilled Labour (S_2/S_1)
1.	013, 032,053, 055	Canned food products	644.8483	3,185.9034	4.94054
2.	651-657	Textiles	606.7359	3,839.7609	6.32855
3.	631, 632	Lumber and plywood products	337.7647	2,493.6740	7.38287
4.	641, 642	Paper, paper products	438.9386	1,935.7348	4.41003
5.	611, 612	Leather, leather products	891.8606	4,793.4213	5.37463
6.	629	Rubber products	450.3200	2,202.0003	4.88985
7.	893	Plastic products	549.7966	1,550.1647	2.81952
8.	551, 599	Miscellaneous chemicals	510.8853	1,719.4420	3.36561
9.	664-666	Glass, glass products and clay products	326.0449	1,607.7247	4.93099
10.	671	Iron and steel	493.7568	1,927.6271	3.90400
11.	695, 696	Simple fabricated metal products	466.0252	2,284.0183	4.90106
12.	711	Nonelectrical machinery	675.3178	2,378.8228	3.52252
13.	724, 729	Electrical appliances	669.2467	1,958.8471	2.92694
14.	851	Footwear	891.8606	4,794.4213	5.37463
15.	841	Clothing	606.7359	3,839.7609	6.32855
16.	894-897	Miscellaneous manufactures	557.9043	3,200.6531	5.73692

Source: Input-Output Matrix (Inverse) of Taiwan, 1961.

Table 9

Pakistan and India: Labour Skills Requirements in Manufacturing Industries

(Per US$1 million of output)

No.	SITC Equivalents	Description of Commodities	Pakistan			India		
			Skilled Labour Requirements (S_1) (In man years)	Unskilled Labour Requirements (S_2) (In man years)	Unskilled/ Skilled Labour (S_2/S_1)	Skilled Labour Requirements (S_1) (In man years)	Unskilled Labour Requirements (S_2) (In man years)	Unskilled/ Skilled Labour (S_2/S_1)
1.	013, 032, 053, 055	Food manufactured products	1,679.686	2,590.920	1.542502	636.163	3,670.462	5.769687
2.	651, 657, 841	Textiles and clothing	1,376.681	2,738.467	1.989180	446.328	3,392.049	7.599901
3.	631, 632	Wood products	2,022.913	2,667.347	1.318568	223.832	1,852.856	8.277886
4.	641, 642	Paper products	1,552.327	1,264.771	0.814758	—	—	—
5.	611, 612	Leather and leather products	2,139.221	3,092.594	1.445663	452.629	2,343.256	5.176990
6.	629	Rubber products	1,949.567	1,743.693	0.894400	406.345	2,088.928	4.140774
7.	551, 599	Chemical industries	1,595.900	1,289.188	0.807812	221.424	737.390	3.330217
8.	664-666	Nonmetallic mineral products (glass, pottery)	956.447	1,172.568	1.225962	171.580	1,068.494	6.227380
9.	671	Basic metals industries	1,153.453	925.412	0.802297	191.366	703.458	3.675982
10.	711	Nonelectrical machinery	1,727.908	1,599.056	0.925428	401.300	1,258.512	3.136087
11.	724, 729	Electrical manufactures	1,210.916	1,087.026	0.897689	398.513	1,043.366	2.618140
12.	894, 897	Miscellaneous manufactures	1,370.269	3,954.233	2.885734	—	—	—
13.	695, 696	Fabricated metal products	2,297.488	1,961.673	0.853830	401.300	1,258.512	3.136087
14.	821	Furniture	1,954.100	2,736.275	1.400273	—	—	—
15.	851	Footwear	1,336.003	2,392.441	1.790745	350.118	2,445.767	6.985550
16.	892	Printing and publishing	1,729.024	1,115.720	0.645288	—	—	—
17.	653	Jute textiles	—	—	—	568.295	3,719.380	6.544805

Source: Input-Output Matrices (Inverses) of Pakistan (1963-65) and India (1965).

Table 10

"Revealed" Comparative Advantage Index[1] Estimates for Selected Developing Countries, 1960-61—1967-68 (1960-61-100)

SITC No.	Description of Commodities	Export Performance Index			
		Taiwan	Pakistan	Mexico	India
013	Canned and prepared meat	—	1.287	—	—
032	Canned and prepared fish	6.344[2]	957.709	670.886	2,540.964
053	Preserved food	115.833	—	107.820	0.963
055	Preserved vegetables	1,054.640	38.458	23.708	6.096
266	Synthetic, regenerated fibres	160.809	—	2.887	25.570
551	Essential oils, perfumes, etc.	38.908	—	319.146	114.837
599	Chemical materials, n.e.s.	—	—	29.663	251.190
611	Leather	—	2,890.245	22.638	617.130
612	Manufactures of leather	204.691[2]	499.227[3]	366.668	108.278[2]
629	Articles of rubber	126.877[2]	—	—	43.147
631	Veneers, plywood boards	287.329	—	45.140	—
632	Wood manufacturing, n.e.s.	964.228	—	380.717	—
641	Paper and paperboard	—	—	5.970	—
642	Articles of paper pulp, paper	50.815	—	329.253[2]	238.453
651	Textile yarn and thread	39.474	3,342.817	902.066	269.951
652	Cotton, fabrics, woven	60.923	419.662	94.744	398.221
653	Other textile fabrics, woven	4.981[3]	925.423	0.802	1,102.484
655	Special textile fabrics	47.519	—	304.089	2.900
656	Made-up textile articles	43.034	504.152	1.157	502.859
657	Floor coverings, etc.	8.225	263.816	0.919	185.656
664	Glass	506.217	—	24.105	—
665	Glassware	27.600[2]	—	319.215	—
666	Pottery	66.991	—	115.258[2]	73.968[2]
671	Pig iron, etc.	—	3.415[2]	0.713	493.358
711	Power generating machinery	2,192.392	479.569	172.598	157.913
724	Telecommunications aparatus	1,410.472[3]	2.817	217.902[2]	7.033
729	Electrical machinery, n.e.s.	149.801[2]	1.307[2]	156.159[2]	6.480
821	Furniture	81.707[2]	—	250.267	18.176
831	Travel goods, handbooks, etc.	68.336[3]	—	25.488	5.157
841	Clothing except fur	169.146	17.257	43.612	18.559
851	Footwear	756.581	140.148[3]	40.109	108.022
892	Printed matter	—	—	63.001	250.091
893	Plastic articles	417.528[2]	2.638[2]	5.434[2]	—
894	Preambulators, toys, sporting goods	324.355[3]	128.819	406.384[3]	1.867
897	Jewelry, goldsmith's wares	58.404[3]	—	31.487	512.998

Sources: U.N., *Commodity Trade Statistics, Series D*, OECD, *Foreign Trade Statistics, Series C.*

1. The formula used for the index is:

$$X=\frac{1}{2}\left[\frac{V'_{i.}}{\sum_{A} V'_{i.}} \div \frac{V'_{..}}{\sum_{A} V'_{...}} + \left[\left(\frac{V'_{i.}}{\sum_{A} V'_{i.}} \div \frac{V'_{..}}{\sum_{A} V'_{..}}\right)^2 \div \left(\frac{V_{i.}}{\sum_{A} V_{i..}} \div \frac{V_{..}}{\sum_{A} V_{...}}\right)\right]\right] - X,$$

2. The base year is 1962-63.

3. The base year is 1961-62.

Table 11

Weighted Effective Tariff Rates of Selected Commodities

SITC No.	Description of Commodities	Weighted[1] Effective Rates Pre-K.R.[2]	SITC No.	Description of Commodities	Weighted[1] Effective Rates Pre-K.R.[2]
013	Meat, tinned or prepared	21.233	656	Bags, sacks, linen, n.e.s.	21.091
032	Fish, tinned or prepared	27.979	657	Floor coverings	29.705
053	Fruit, preserved or prepared	15.968	664	Glass	25.988
055	Vegetables, preserved	19.708	665	Glassware	25.988
266	Synthetic fibres	25.562	666	Pottery products	25.149
551	Essential oils and perfumes	20.697	671	Pig iron	5.988
599	Chemical materials and products	15.350	695-696	Fabricated products	29.218
611	Leather	25.433	711	Nonelectrical machinery	16.238
612	Manufactures of leather	25.116	724	Telecommunications apparatus	21.867
629	Rubber products	27.063	829	Electrical goods, n.e.s.	26.017
631	Veneer and plywood	39.529	821	Furniture	27.052
632	Wood manufactures, n.e.s.	27.052	831	Travel goods, handbags	25.116
641	Paper and paperboard	11.398	841	Clothing	34.688
642	Paper products	11.398	851	Footwear	30.319
651	Textile yarn and thread	33.175	893	Printed matter	0.776
652	Cotton fabrics	33.585	893	Plastic products	28.746
653	Woven noncotton fabrics	55.389	894	Toys, sporting goods, etc.	35.924
655	Special textile fabrics	30.703	897	Jewelry	35.924

Sources: B.A. Balassa, "Tariff Protection in Industrial Countries: An Evaluation" *Journal of Political Economy*, (December 1965); "The Structure of Protection in Industrial Countries and Its Effects on Processed Goods Imports from Developing Nations," *Program for the Liberalization and Expansion of Trade in Manufactures and Semi-Manufactures of Interest to Developing Countries*, UNCTAD (New York: U.N., 1967); *The Kennedy Round, Estimated Effects on Tariff Barriers*, Part II, UNCTAD, TD/6/Rev. 1 (New York: U.N., 1968).

1. The weighted effective rates were obtained by calculating weighted averages of rates for the EEC, Japan, the United Kingdom and the United States where the value of each country's (or region's) total trade in the commodity concerned served as weights.
2. Pre-Kennedy Round Effective Rates.

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