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EMPIRICAL EVIDENCE CONCERNING THE MAGNITUDE AND EFFECTS OF DEVELOPING COUNTRY TARIFF ESCALATION

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I. INTRODUCTION

ONE objective of developing countries' trade policy often is to increase the share and value of processed commodities in total exports. Such a shift in trade structure is viewed as a means of offsetting both the deteriorating terms of trade for primary commodities and the instability in their international prices. Other potential benefits include employment creation due to the processing activity, linkage effects to other sectors, and a reduction in product spoilage due to processing. The preservation effects of processing are viewed as being of special importance for many food and oilseed products.

Previous empirical analyses concerning these issues focused exclusively on the effects of trade barriers facing commodities in the developed market economy countries (DMECs). Among the factors these investigations identified as constraining trade in processed commodities are restrictive business practices by transnational corporations, impediments to the international transfer of technology, lack of developing country marketing and distribution systems, or financial constraints that restrict needed investment in plant and equipment.[1] In addition, special importance is attached to the fact that developed country tariffs (and non-tariff barriers) have been found to increase or "escalate" with product processing. Balassa [2] and others maintain that these escalating tariffs in the North constitute a major structural bias against developing country exports of processed commodities.[2]

The views expressed in this paper are those of the authors and need not reflect those of the United Nations or its staff.

1 The UNCTAD secretariat has conducted a number of detailed studies of obstacles developing countries face in efforts to expand exports of processed commodities. For examples see [16] [17] [14].

2 The importance that developing countries attach to issues involving tariff escalation is highlighted by the fact that these nations succeeded in having the issue placed on the agenda for the 1982 Ministerial Meeting of the General Agreement on Tariffs and Trade and also had a related statement incorporated in the 1973 GATT Ministerial Declaration concerning the objectives of the Tokyo Round negotiations. For illustrative examples of previous empirical studies relating to tariff escalation in the developed market economy countries see [1] [2] [15] or [6].

Given the importance attached to the problem, it is surprising that there have been no attempts to extend tariff escalation analyses to countries outside the North.[3] However, growing interest in "collective self-reliance" development strategies, increased protectionism in the North, or the sheer size of some developing countries' markets are legitimate reasons for extending the analysis to the South. It also appears important to determine if developing countries' (purported) natural advantage in primary commodity production establishes cost differentials of a magnitude such that these nations do not need protection from escalating domestic tariffs. As such, this study attempts to determine if developing countries' import duties incorporate a similar structural bias against imports of processed commodities as that found in DMEC tariffs. Aside from testing two new indices of tariff escalation, which have the potential to reduce biases affecting the empirical measures normally employed, an attempt is also made to simulate the value and structure of South-South commodity trade which would occur under preferential tariffs for this exchange. The study closes with an overall assessment of the empirical results and also considers some of their practical policy implications.

II. DATA AND METHODOLOGY

The approach followed in previous tariff escalation studies has been to compute nominal or effective protection rates for products comprising stages of a commodity processing chain. If these rates increase or "escalate" with the level of fabrication, this has been taken as a bias against trade in processed commodities.[4] However, Yeats [20] has shown that a trade bias against processed commodities may still exist when tariffs do not escalate due to the fact that developed country import demand elasticities are consistently higher for processed than for primary goods. As a result, a given tariff rate (say 10 per cent) can have more of a trade restrictive effect on processed commodities, where demand elasticities are higher, than on primary products. In other cases, a lower tariff on the processed goods may have more of a restrictive effect on trade than a higher duty on the primary product if the elasticity of demand rises sufficiently over the stages of the processing chain.

A related methodological problem in previous escalation studies is that tariff averages for different stages of processing chains have been computed employing actual trade weights. Such a procedure will cause tariffs which have the most restrictive trade effects to enter into the overall average with low or, if the duty

[3] In a related study, Yeats [19] compared the structure of imports of primary and processed commodities from developing countries into the developed market-economy countries and the socialist countries of Eastern Europe. The investigation concluded that the state trading activities of the socialist countries resulted in an import structure that was far more biased against processed commodities than escalated tariffs in the DMECs. In addition, this study showed that the level of socialist country imports from developing countries (measured in terms of imports per capita or imports relative to GNP) was far below that of the worst performing OECD country market.

[4] See, for example, [2] [5].

is prohibitive, zero weights. What is needed in such cases is a measure or index that reflects the potential (free) trade in the commodity rather than that which occurs in the presence of tariffs.

Given these limitations of the traditional procedures for tariff escalation analysis, a useful alternative approach can be developed as follows. If p is the duty-free import price of a given commodity, q the quantity imported, and t the nominal tariff then the value of additional (incremental) imports (dM) kept out by the tariff can be approximated from

$$dM = pqe_d \cdot (t/1+t), \tag{1}$$

where e_d is the elasticity of demand for imports of the commodity with respect to the duty paid price.[5] These *potential* import values for different commodities will give a different set of weights than those based on actual imports since there is no reason to expect any systematic relationship between e_d and t. The average height of the import duty weighted by potential imports is then,

$$D_1 = \sum \left\{ \frac{pqe_d \cdot \frac{t}{(1+t)}}{\sum pq\left[1+e_d \cdot \frac{t}{(1+t)}\right]} \right\} \cdot t, \tag{2}$$

summing over all commodities in a common processing stage.

An alternative approach to tariff averaging is to compute an index of the effective height of an import duty by taking the ratio of potential (i.e., incremental) to actual plus potential imports. Employing this index, the average height of a tariff is measured by[6]

$$D_2 = \frac{\sum pqe_d \cdot \frac{t}{(1+t)}}{\sum \left\{ pq\left[1+pqe_d \cdot \frac{t}{(1+t)}\right] \right\}} \cdot 100, \tag{3}$$

with the above expression summed over items in the common processing stage.

[5] A more general formulation of this equation that incorporates supply elasticities is given in equation (7) in this study. The use of equation (1) assumes that supply is perfectly elastic. Maizels [8] first suggested the use of equations (2) and (3) for tariff analysis, but there appear to be no previous empirical applications due to the fact that comprehensive information on import demand elasticities were not available. Compendia of these parameters, such as those prepared by Stern [10], have done much to rectify these data deficiencies.

[6] From equation (1) it is evident that very high tariffs may also produce distortions in the D_1 and D_2 indices through their influence on the actual trade base (M). At the extreme, prohibitive tariffs will cause M to be zero, in which case the potential trade indices could not be computed. This particular problem would not appear to be so important in analysis of developed countries' tariffs since their duties are generally far lower than tariffs in developing countries (see Tables I and II for information relating to this point).

For the present analysis the problem of identifying commodity processing stages and chains was greatly simplified by drawing from a previous UNCTAD [13] document which examined tariff escalation in developed market economy countries. Essentially, this study covered the key commodities exported by developing countries in primary and processed form, namely, meat, fish, fruit, vegetables, cocoa, coffee, sugar, leather, groundnuts, copra, palm kernel, rubber, wood, wool, cotton, iron, copper, aluminium, lead, zinc, petroleum, and phosphates, and also identified the stages of the processing chains for these items in terms of the Standard International Trade Classification (SITC) system. Aside from simple and actual trade-weighted tariffs, averages based on potential trade were computed [equations (2) and (3)] for each stage of these chains using estimates of import demand elasticities drawn from published inventories of these parameters such as Stern [11]. However, in cases where elasticities were not available for specific commodities, several individual chains had to be combined (for example, wood and paper products had to be treated as one chain in spite of the fact that the SITC system provided trade data for the separate processing stages of these commodities). Also, in a few cases where elasticities were not available for developing countries, proxies based on estimates for OECD markets in the 1940s and 1950s were employed.

Trade and tariff statistics for each stage of the commodity processing chains were drawn primarily from two different sources. For the former, the United Nations publication *Commodity Trade Statistics* has compiled import and export statistics for most developed and developing countries on a continuous basis since the early 1970s. However, since the statistics for most developing countries were generally several years out of date, comprehensive trade data could only be compiled for these nations through 1981. Matched tariff statistics for major developing countries were drawn from a special UNCTAD-UNDP data base which tabulated information on actual tariff profiles of countries or country markets that accounted for approximately 70 per cent of developing country intra-trade in 1981) (see Appendix for details).

III. THE STRUCTURE OF TARIFFS IN DEVELOPING COUNTRIES

Table I summarizes the developing country trade and tariff statistics for individual commodity processing chains. Shown here are the value of imports from other developing countries and from all sources and the share of intra-trade, as well as the total (primary and processed) commodity trade in the processing chain. In addition, the unweighted and actual trade weighted tariff averages for each processing stage are given, as are the average import duties computed on the basis of potential trade weights.

The key point that is evident in Table I is that a high degree of escalation is incorporated in developing countries' tariffs and it is reflected in all the averages employed for comparisons. The most consistent pattern of escalation occurs for the index based on total potential trade weights (D_2) where the final stage (processed) product registers a higher average tariff than the primary stage in

TABLE I

THE STRUCTURE OF TARIFFS AND TRADE AMONG DEVELOPING COUNTRIES IN PRIMARY AND PROCESSED COMMODITIES

(Values in U.S. $ million)

Processing Chain (SITC)[a]	1981 Developing Country Imports				Developing Country Share	Developing Country Tariff Average[b]			
	From Developing Countries		From All Sources			Unwtd. Average	Actual Trade Weights	Potential Trade Weights	
	Value	% of Total	Value	% of Total				D_1	D_2
Meat									
1. Fresh and frozen meat (011)	547.7	92.0	2,204.0	91.1	26.1	43.2	6.6	8.1	1.2
2. Preserved meat (013)	49.8	8.0	216.5	8.9	23.0	66.2	21.9	22.6	18.8
Total	624.5	100.0	2,420.5	100.0					
Fish									
1. Fresh or frozen fish (031)	260.4	67.5	792.3	58.8	32.9	48.5	10.9	11.1	2.2
2. Preserved fish (032)	125.6	32.5	555.5	41.2	22.6	68.8	30.1	30.2	23.1
Total	386.0	100.0	1,347.8	100.0					
Fruit									
1. Fresh fruit (051)	857.9	84.5	1,497.5	72.2	57.3	47.1	17.0	25.2	3.9
2. Preserved fruit (053)	157.3	15.5	576.0	27.8	27.3	73.3	11.1	12.9	11.2
Total	1,015.2	100.0	2,073.5	100.0					
Vegetables									
1. Fresh vegetables (054)	555.6	88.3	1,342.8	74.0	41.4	39.3	16.6	23.1	3.9
2. Preserved vegetables (055)	73.7	11.7	472.3	26.0	15.6	48.2	26.9	29.3	5.9
Total	629.3	100.0	1,815.1	100.0					
Vegetable Oils[c]									
1. Vegetable oilseeds (221)	70.0	32.2	132.4	35.9	52.8	23.7	18.1	18.2	5.1

TABLE I (Continued)

Processing Chain (SITC)[a]	1981 Developing Country Imports				Developing Country Share	Developing Country Tariff Average[b]			
	From Developing Countries		From All Sources			Unwtd. Average	Actual Trade Weights	Potential Trade Weights	
	Value	% of Total	Value	% of Total				D_1	D_2
2. Vegetable oils (422)	147.5	67.8	236.8	64.1	61.5	25.9	26.5	26.9	21.4
Total	217.5	100.0	369.2	100.0					
Coffee, Cocoa, and Sugar[d]									
1. Coffee-Cocoa beans/Raw sugar	1,798.9	93.7	2,377.8	84.3	75.6	38.2	23.5	22.1	7.3
2. Refined and processed items	121.5	6.3	442.9	15.7	27.4	73.3	24.3	25.9	20.1
Total	1,920.4	100.0	2,820.7	100.0					
Leather									
1. Hides and skins (211)	54.8	30.6	410.6	40.4	13.3	15.6	4.8	5.9	1.5
2. Leather (611)	108.8	60.9	452.8	44.5	24.0	32.6	17.5	17.5	15.9
3. Leather manufactures (612)	15.2	8.5	153.1	15.1	9.9	45.5	33.9	34.3	46.2
Total	178.8	100.0	1,016.5	100.0					
Rubber									
1. Crude rubber (231)	1,295.3	83.1	1,345.2	37.9	96.2	20.4	7.2	11.8	2.2
2. Rubber manufactures (629)	262.3	16.9	2,200.1	62.1	11.9	33.7	19.4	19.6	44.0
Total	1,557.6	100.0	3,545.3	100.0					
Wood and Wood Products									
1. Rough logs (242)	69.6	3.2	324.9	3.4	21.4	27.9	8.0	9.3	2.5
2. Pulp and shaped wood (243, 251)	873.8	40.1	2,850.1	30.1	30.6	24.8	13.1	16.8	6.4
3. Plywood and paper (631, 641)	926.6	42.6	4,498.3	47.5	20.6	39.7	23.5	26.7	19.1

TABLE I (Continued)

Processing Chain (SITC)[a]	1981 Developing Country Imports				Developing Country Share	Developing Country Tariff Average[b]			
	From Developing Countries		From All Sources			Unwtd. Average	Actual Trade Weights	Potential Trade Weights	
	Value	% of Total	Value	% of Total				D_1	D_2
4. Wood and Paper Mfg. (632, 642)	306.6	14.1	1,803.8	19.0	17.0	47.8	27.6	29.1	42.1
Total	2,176.6	100.0	9,477.1	100.0					
Wool									
1. Wool and animal hair (262)	25.5	48.9	270.0	53.4	9.4	18.3	13.9	14.5	4.0
2. Wool yarn (651.2)	14.0	26.8	102.4	20.2	13.7	32.0	21.9	21.9	17.8
3. Wool fabrics (653.2)	12.7	24.3	133.3	26.4	9.5	68.1	26.4	26.4	27.6
Total	52.2	100.0	505.7	100.0					
Cotton									
1. Raw cotton (263)	486.7	58.3	1,585.4	54.0	30.7	10.4	3.2	3.9	1.0
2. Cotton yarn (651)	117.0	14.0	239.0	8.1	49.0	28.9	29.7	31.0	22.3
3. Cotton fabrics (652)	231.2	27.7	1,113.3	37.9	20.8	56.4	32.1	32.3	30.9
Total	834.9	100.0	2,937.7	100.0					
Iron									
1. Iron ore (281)	314.4	20.3	456.3	3.9	68.9	8.9	2.6	2.6	0.1
2. Pig iron (671)	20.7	1.3	120.6	1.0	17.2	10.4	7.4	7.4	5.9
3. Ingots and shapes (672)	216.1	13.9	2,187.9	18.7	9.9	15.1	12.1	12.9	11.4
4. Bars and plates (673, 674)	998.4	64.5	8,909.1	76.4	11.2	20.2	19.9	26.7	24.2
Total	1,549.6	100.0	11,673.9	100.0					
Copper									
1. Copper ore (283.1)	183.2	20.8	264.5	15.2	69.2	10.8	5.4	5.4	1.8

TABLE I (Continued)

Processing Chain (SITC)[a]	1981 Developing Country Imports				Developing Country Share	Developing Country Tariff Average[b]			
	From Developing Countries		From All Sources			Unwtd. Average	Actual Trade Weights	Potential Trade Weights	
	Value	% of Total	Value	% of Tatal				D_1	D_2
2. Copper alloys (682)	697.7	79.2	1,479.7	84.8	47.2	19.0	26.3	27.9	21.8
Total	880.9	100.0	1,744.2	100.0					
Bauxite									
1. Bauxite (283.3)	35.4	10.4	55.6	3.0	63.6	9.4	4.1	4.1	1.3
2. Aluminium alloys (684)	306.0	89.6	1,803.0	97.0	17.0	18.6	17.1	18.4	16.4
Total	341.4	100.0	1,858.6	100.0					
Lead									
1. Lead ore (283.4)	11.0	17.7	22.7	9.3	48.5	9.1	7.3	7.3	2.3
2. Lead alloys (685)	51.2	82.3	221.7	90.7	23.1	18.9	11.9	12.0	12.5
Total	62.2	100.0	244.4	100.0					
Zinc									
1. Zinc ore (283.5)	26.4	23.6	74.9	19.5	35.2	8.2	1.9	1.9	0.7
2. Zinc alloys (686)	85.7	76.4	309.9	80.5	27.7	18.1	13.8	15.3	15.1
Total	112.1	100.0	384.8	100.0					
Tin									
1. Tin ore (283.6)	56.9	30.7	172.3	47.7	33.0	9.0	0.7	0.7	3.4
2. Tin alloys (687)	128.5	69.3	188.8	52.3	68.1	18.9	17.0	17.6	16.1
Total	185.4	100.0	361.1	100.0					

TABLE I (Continued)

Processing Chain (SITC)[a]	1981 Developing Country Imports				Developing Country Share	Developing Country Tariff Average[b]			
	From Developing Countries		From All Sources			Unwtd. Average	Actual Trade Weights	Potential Trade Weights	
	Value	% of Total	Value	% of Total				D_1	D_2
Phosphates									
1. Natural phosphates (271)	221.3	62.1	410.9	25.3	53.9	9.1	12.8	12.9	3.3
2. Phosphatic fertilizers (561)	135.1	37.9	1,210.7	74.7	11.2	7.6	9.4	9.5	10.4
Total	356.4	100.0	1,621.6	100.0					
Petroleum									
1. Crude petroleum (331)	44,773.8	85.3	49,178.6	79.4	91.0	7.8	5.1	5.1	2.9
2. Gasoline and fuel oils (332)	7,692.2	14.7	12,767.4	60.2	60.2	15.4	12.8	15.6	12.2
Total	52,466.0	100.0	61,946.0	100.0					

[a] In cases, the component of the processing chain is only one or more four-digit SITC item in the indicated three-digit SITC group.

[b] Computed using four-digit SITC averages for tariffs applied by the following twenty-three developing countries or developing country groups; Algeria, Bangladesh, CARICOM (the Caribbean Community), CEUCA (Customs and Economic Unions of Central Africa), Egypt, India, Indonesia, Ivory Coast, Kenya, Republic of Korea, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Philippines, Saudi Arabia, Singapore, Sri Lanka, Tanzania, Thailand, Tunisia, and Yugoslavia. For technical details relating to the preparation of the tariff statistics see Appendix.

[c] Includes trade and tariff data relating to groundnuts, copra and palm kernel oil and oilseeds. Due to the fact that separate import demand elasticities were not available for these items they were combined into one commodity processing chain.

[d] Due to the fact that separate demand elasticities were not available coffee, cocoa, and sugar products were combined in a single processing chain.

all of the commodity chains listed. Furthermore, for processing chains such as fish, leather, rubber, wood, wool, cotton, iron, and copper the spread between primary and processed good tariffs is twenty percentage points or more. A similar pattern is evident in the incremental index (D_1) except that in two chains (fruit and phosphates) the averages fail to register tariff escalation. In both of these product groups the incremental index decline results from the processed commodity stage being heavily influenced by one component four-digit SITC product that has a relatively high value of trade and a relatively low tariff compared to other items in the stage.

In view of their potential biases, it is interesting to note that both the unweighted and actual trade weighted tariff averages normally signal the presence of tariff escalation, but in a few cases they provide contradictory information. As an example, in the processing chain for fruit the unweighted tariff average rises by over twenty-five points from primary to processed products, but the trade weighted average registers a six point decline over these stages. Aside from this directional inconsistency, there are cases where these two standard indices give very different readings concerning the level and change (escalation) in protection as one moves from a lower to a higher processing stage. Note, for example, the fact that the unweighted tariff average of 43.2 per cent for fresh and frozen meat (SITC 011) is approximately seven times the value (6.6 per cent) of the trade weighted average for these products. Analysis of the underlying country tariff statistics shows that this disparity is caused by duties of several hundred per cent which all but prohibit trade in several developing countries. As previously noted, such tariff extremes can produce a major bias in the actual trade weighted tariff average. Also, in the case of the coffee and cocoa chain the weighted tariff average rises by less than one percentage point from the primary to processed stage (from 23.5 to 24.3 per cent) while the unweighted average rises by approximately thirty-five percentage points. Again, the underlying data show that these divergent results are due to the actual trade weighted index being heavily influenced by tariffs that exceed several hundred per cent.[7]

While the previous analysis showed that developing country tariffs generally

[7] The divergence in statistics presented in Table I raises an important question concerning the reliability of the different averages as a gauge of the level and escalation of tariffs. Taking, on theoretical grounds, the D_2 index as the most appropriate measure, Pearson correlation coefficients were run between this and the other indices. The results showed that *changes* in D_2 as one moved from lower to higher stages of a given commodity processing chain were significantly correlated (at the 95 per cent confidence level) with the actual trade weighted average tariff ($r=0.51$), but not with the simple tariff average ($r=0.12$). Similar tests on *levels* showed D_2 to be significantly correlated with the actual trade weighted average ($r=0.66$), but not with the simple tariff average ($r=0.33$). Even with the distortions that have previously been mentioned, these results suggest that simple averages are less reliable than trade weighted tariffs due to the fact that the former cannot distinguish between the potential importance of items traded internationally. As such, the correlations indicate that more reliance should be placed on the trade weighted averages in Table I as being indicative of the importance of tariff barriers than on the simple averages. See Tumlir and Till [12] for further statistical tests relating to quantification of the biases inherent in different systems of tariff averaging.

contain a high degree of escalation, no indication was given as to the variation that exists in the level and structure of protection in individual countries. As such, Table II provides information relevant to these points. Specifically, for each of the processed commodities the table shows the percentage of developing countries where tariff escalation occurs. Also, as a measure of the dispersion in tariff levels between countries, the table shows the proportion of national tariffs falling within fixed limits (i.e., under 5 per cent, 5 to under 10 per cent, etc.). Finally, the table also indicates the range in tariffs for each commodity and identifies the countries applying these extreme duties.

One important feature emerging from Table II concerns the variation in tariff escalation for different groups of commodities. For example, 85 per cent or more of the developing countries' tariffs escalate for wool fabrics, cotton yarn, leather and paper products while, at the other extreme, less than half of the tariffs escalate for vegetable oils, coffee, and unwrought aluminium, lead, zinc, and tin. However, even with these exceptions, the data show that tariff escalation is far higher in developing than in developed countries. For example, the average difference between the former's tariffs as one goes from the primary to processed stages of commodities listed in Table I was approximately 9 percentage points while a related analysis [2] of pre–Tokyo Round duties in the EEC, Japan, and United States showed that tariffs escalated by less than 5 percentage points for these same products. Of the three, the United States recorded the lowest average increase in tariff escalation (2.8 percentage points) while Japan was the highest (6.6 points).

In attempting to account for the failure of some countries' tariffs to escalate several statistical associations were tested. Specifically, over 40 per cent of the countries where tariffs failed to escalate were found not to have any important production capacity in the basic unprocessed commodity in the processing chain. While lack of a domestic production capacity for raw material input need not preclude the establishment of a processing industry, the evidence shows that developing countries often have not established escalating tariffs in these cases. Second, in cases where the domestic raw material base existed and tariffs failed to escalate, information taken from the UNCTAD Data Base on Trade Measures showed that non-tariff barriers (NTBs) are applied to over 50 per cent of the products. These results suggest that developing countries may have substituted non-tariff for tariff protection for some processed commodities.[8] However, it cannot be established with certainty that total protection from tariffs and NTBs escalates since ad valorem equivalents for the latter are not available.

Before turning from Table II, a further point to be noted concerns the large differences in national tariffs for specific commodities. For example, import tariffs for processed meat (SITC 013) range from 15 per cent in Yugoslavia to 225 per cent in Morocco while even wider differences are recorded for processed fish,

[8] For the commodities in Table II important differences were found to exist in the extent of tariff escalation in individual countries. For example, Morocco, Tunisia, Republic of Korea, Yugoslavia, and CARICOM only recorded tariff declines as one moved from an unprocessed to a processed item in under 5 per cent of the stages, while Nigeria, CEUCA countries, Kenya, and Tanzania recorded declines in over 20 per cent of these cases.

TABLE II

THE LEVEL AND ESCALATION OF TARIFFS ON MAJOR PROCESSED COMMODITIES IN DEVELOPING COUNTRIES

Processed Commodity[a]	Weighted Tariff Average	% of Countries with a Tariff under[b]						Range in Tariffs[c] (Country/Tariff Rate)		% of Countries Escalating Tariffs[d]
		5%	10%	25%	50%	100%	150%	Low	High	
I. Foodstuffs										
Preserved meat (013)	21.9	8.7	8.7	26.1	47.8	73.9	87.0	Yugoslavia (15.0)	Morocco (225.0)	73.9
Preserved fish (032)	30.1	8.7	13.0	26.1	39.1	73.9	87.0	Malaysia (7.2)	Morocco (225.0)	73.9
Preserved fruit (053)	11.1	8.7	8.7	21.7	34.8	73.9	91.3	Yugoslavia (11.1)	Morocco (254.1)	69.6
Preserved vegetables (055)	26.9	8.7	13.0	21.7	60.9	95.7	100.0	Malaysia (5.9)	Bangladesh (109.0)	60.9
Coffee extracts (071.3)	13.5	13.0	17.4	21.7	39.1	78.2	87.0	Malaysia(0.0)	Morocco (225.0)	43.4
Sugar confection (062.0)	26.8	4.3	4.3	21.7	34.8	60.9	82.6	CEUCA (15.0)	Morocco (225.0)	91.3
Cocoa butter/powder (072)	27.4	21.7	26.1	30.4	69.6	82.6	91.3	Malaysia (0.0)	Pakistan (150.0)	63.6
Chocolate (073.0)	29.7	4.3	4.3	17.4	35.8	69.6	78.2	Yugoslavia (14.0)	Indonesia (263.0)	82.6
Groundnut oil (421.4)	13.9	30.4	30.4	52.2	82.6	100.0	—	Egypt (0.0)	India (60.0)	40.9
Coconut oil (422.3)	27.9	30.4	30.4	47.8	82.6	95.7	100.0	Algeria (0.0)	Pakistan (120.0)	52.2
Palm kernel oil (422.4)	23.7	26.1	26.1	52.2	82.6	100.0	—	Algeria (0.0)	Pakistan (70.0)	47.8
II. Metals										
Pig iron (671.2)	7.4	30.4	65.2	91.3	100.0	—	—	CARICOM (0.0)	India (40.0)	52.2
Iron ingots (672)	12.1	26.1	56.5	87.0	87.0	100.0	—	Malaysia (0.0)	India (66.5)	56.5
Iron bars and plates (673/4)	19.9	17.4	30.4	78.2	87.0	100.0	—	Malaysia (0.0)	India (74.8)	73.9
Copper unwrought (682.1)	33.7	43.4	52.2	87.0	95.7	95.7	100.0	Algeria (0.0)	India (100.0)	47.8
Copper worked (682.2)	19.3	17.4	26.1	65.4	87.0	100.0	—	Algeria (0.5)	India (92.5)	69.6
Aluminium unwrought (684.1)	11.3	39.1	56.5	87.0	100.0	—	—	Nigeria (0.0)	India (40.0)	30.4
Aluminium worked (684.2)	21.2	8.7	13.0	65.2	87.0	100.0	—	Algeria (4.8)	Pakistan (76.9)	87.0
Lead unwrought (685.1)	13.1	34.8	47.8	78.2	91.3	100.0	—	Malaysia (0.0)	India (55.0)	39.1
Lead worked (685.2)	10.3	17.4	17.4	60.9	87.0	100.0	—	Malaysia (0.0)	Pakistan (80.0)	82.6
Zinc unwrought (686.1)	15.7	30.4	47.8	82.6	91.3	100.0	—	CARICOM (0.0)	India (50.0)	47.8
Zinc worked (686.2)	11.0	17.4	21.8	69.6	87.0	100.0	—	Malaysia (0.0)	Pakistan (76.0)	69.6
Tin unwrought (687.1)	18.7	30.4	39.1	82.6	91.3	100.0	—	Malaysia (0.0)	Nigeria (66.7)	43.4
Tin worked (687.2)	9.1	17.4	26.1	73.9	87.0	100.0	—	Malaysia (0.0)	Pakistan (76.0)	78.3

TABLE II (Continued)

Processed Commodity[a]	Weighted Tariff Average	% of Countries with a Tariff under[b]						Range in Tariffs[c] (Country/Tariff Rate)		% of Countries Escalating Tariffs[d]
		5%	10%	25%	50%	100%	150%	Low	High	
III. Textiles										
Wool yarn (651.2)	21.9	8.7	17.4	43.5	78.2	95.7	100.0	Malaysia (6.0)	Bangladesh (100.0)	69.6
Wool fabrics (653.2)	26.4	4.3	8.7	17.4	43.5	73.9	95.7	Yugoslavia (19.7)	Bangladesh (300.0)	87.0
Cotton yarn (651)	29.7	8.7	17.4	47.8	78.2	100.0	—	Sri Lanka (7.5)	Pakistan (85.0)	87.0
Cotton fabrics (652)	32.1	8.7	8.7	8.7	56.5	82.6	95.7	Yugoslavia (18.0)	Bangladesh (200.0)	82.6
IV. Wood, leather, and rubber										
Leather (611)	17.5	8.7	13.0	52.2	82.6	95.7	95.7	Yugoslavia (7.3)	Bangladesh (150.0)	87.0
Leather Mfg. (612)	33.9	8.7	8.7	16.0	65.2	91.3	100.0	Yugoslavia (15.0)	Bangladesh (131.3)	78.3
Rubber articles (629)	19.4	8.7	8.7	52.2	87.0	95.7	100.0	Malaysia (12.1)	Bangladesh (118.8)	82.6
Plywood-Veneers (631)	8.8	8.7	8.7	26.1	73.9	91.3	91.3	Yugoslavia (10.3)	Pakistan (168.0)	82.6
Wood manufactures (632)	24.5	8.7	8.7	17.4	69.6	91.3	95.7	Yugoslavia (10.6)	Bangladesh (150.0)	52.2
Paper and board (641)	27.9	8.7	13.0	39.1	78.3	95.7	100.0	Malaysia (5.8)	Bangladesh (106.8)	87.0
Articles of paper (642)	33.5	4.3	8.7	21.7	60.9	91.3	100.0	Tanzania (15.0)	Bangladesh (147.1)	82.6
V. Other commodities										
Phosphatic fertilizer (561)	9.4	60.9	73.9	91.3	95.7	100.0	—	Egypt (0.0)	Bangladesh (50.0)	30.4
Gas and fuel oils (332)	12.8	21.7	52.1	82.6	87.0	95.7	95.7	CEUCA (0.0)	Saudi Arabia (157.0)	69.6

Note: For details relating to the preparation of the developing country tariff statistics shown in this table see Appendix.

[a] SITC numbers are shown in parentheses. In cases, the processing stage item may be defined in terms of one or more of the underlying four-digit SITC products in the three-digit SITC group.

[b] The statistics in these columns relate to the following twenty three developing countries or country groups: Algeria, Bangladesh, CARICOM, CEUCA, Egypt, India, Indonesia, Ivory Coast, Kenya Republic of Korea, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Philippines, Saudi Arabia, Singapore, Sri Lanka, Tanzania, Tunisia, and Yugoslavia.

[c] Due to the fact that they had zero tariffs on almost all processed commodities listed in the table Singapore and Saudi Arabia were excluded from calculations of the *lower end* of the range in import duties for each processed commodity.

[d] Measured in terms of the present of developing countries that registered an increase in nominal tariffs from the previous stage to the indicated processed commodity.

fruit, coffee extracts, and chocolate. While the tariff range is somewhat smaller, differences of 100 percentage points for processed metal products also occur. Such disparities for common items could greatly complicate the problem of negotiating a tariff liberalization in multilateral negotiations, particularly if the differences reflect variations in underlying production costs.

IV. THE TRADE EFFECTS OF PREFERENTIAL TARIFFS

An important point reflected in the previous (Table I) analysis is that developing countries' trade shares generally experienced marked reductions as one moved from primary to processed commodities. This observation, coupled with the fact that increasing the value and share of processed commodities in total exports is a policy objective of many of these nations, raises the question as to what effect a trade liberalization in these nations might have on the structure of their commodity trade. While there are a number of liberalization scenarios that could be tested, we focus on the likely effects of a preferential removal of tariffs in favor of other developing countries since this option is attracting increased attention as an element of the "collective self-reliance" development strategy. While empirical information was not previously available, the likely order of magnitude of the effects of a preferential liberalization can be projected through the use of the UNCTAD Trade Policy Simulation Model. This fully computerized projection model is similar to other partial equilibrium models employed by academic institutions and international organizations for related types of trade policy analyses.[9]

Essentially, the UNCTAD model projects the value of trade creation (TC) in a country (j) which is liberalizing tariffs or NTBs through the use of,

$$TC_{ijk}=M_{ijk}\cdot e_d\cdot dt_{ijk}/\left[(1+t_{ijk})\cdot(1-(e_d/e_x)\right], \tag{4}$$

where M_{ijk} represents the initial level of country j's imports of product i from country k, t is the initial tariff rate, while e_d and e_x represent import demand and export supply elasticities respectively. If the tariff was being completely eliminated than dt equals t in the above. In addition to trade creation, trade diversion (i.e., the tendency of importers to substitute goods from preference-receiving (developing) countries at the expense of other nations) is also estimated. For an individual preference-receiving developing country k, the positive value of trade diversion (TD) is projected through the use of

$$TD_{ijk}=\frac{M_{ijk}}{\sum M_{ijk}}\cdot\frac{\sum M_{ijk}\cdot\sum M_{ijK}\cdot Es\cdot\dfrac{d(P_{ijk}/P_{ijK})}{P_{ijk}/P_{ijK}}}{\sum M_{ijk}+\sum M_{ijK}+\sum M_{ijk}\cdot Es\cdot\dfrac{d(P_{ijk}/P_{ijK})}{P_{ijk}/P_{ijK}}}, \tag{5}$$

where Es is the elasticity of substitution between preference-receiving and other goods, M_{ijK} represents imports from non-preference-receiving (developed) country

[9] See [6][3] or [9] for example of these models and their applications.

TABLE III

PROJECTED CHANGES IN THE VALUE AND SHARE OF DEVELOPING COUNTRIES' PRIMARY AND PROCESSED COMMODITY IMPORTS UNDER PREFERENTIAL TARIFFS FOR INTRA-TRADE

Commodity Group	1981 Developing Country Imports (U.S.$ million)[a]		Developing Country Share	Projected Change in Developing Country Intra-Trade under Tariff Preferences					
				Value (U.S.$ million)			Developing Country Share		
	From Developing Countries	All Sources		$e_s=\infty$	$e_s=3.0$	$e_s=1.0$	$e_s=\infty$	$e_s=3.0$	$e_s=1.0$
All commodities	65,547.0	108,166.7	60.6	3,950.8	3,112.4	2,357.5	1.4	1.3	1.2
All commodities (excl. petroleum)	13,081.0	46,220.7	28.3	1,830.8	1,450.4	1,164.3	3.2	2.6	2.1
Food Products of which:	4,792.9	10,846.8	44.2	380.8	345.8	307.6	2.5	2.4	2.2
Meat	624.5	2,420.5	25.8	36.2	33.2	30.1	1.3	1.2	1.1
Fish	386.0	1,347.8	28.6	56.0	48.8	42.1	3.2	3.1	2.9
Fruit	1,015.2	2,073.5	49.0	75.6	68.8	61.5	2.6	2.4	2.3
Vegetables	629.3	1,815.1	34.7	49.2	47.4	44.7	2.3	2.2	2.1
Vegetable oils[b]	217.5	369.2	58.9	13.4	10.6	7.9	1.8	1.5	1.2
Coffee, cocoa, and sugar	1,920.4	2,820.7	68.1	150.4	137.0	121.3	3.0	2.9	2.7
Ores and metals of which:	3,488.0	17,891.6	19.5	649.9	499.8	391.2	3.0	2.4	1.9
Iron	1,549.6	11,673.9	13.3	305.4	238.8	190.7	2.3	1.9	1.5
Copper	880.9	1,747.2	50.4	162.3	113.7	83.9	3.9	3.4	3.0
Bauxite	341.4	1,858.6	18.4	88.0	71.7	57.7	4.1	3.4	2.8
Lead	62.2	244.4	25.5	7.0	5.4	4.1	2.3	1.8	1.4
Zinc	112.1	384.8	29.1	16.0	13.0	10.4	3.4	2.9	2.4
Tin	185.4	361.1	51.3	29.2	21.1	14.0	4.0	3.1	2.2
Phosphates	356.4	1,621.6	22.0	42.0	36.1	30.4	2.4	1.9	1.7

TABLE III (Continued)

Commodity Group	1981 Developing Country Imports (U.S.$ million)[a]		Developing Country Share	Projected Change in Developing Country Intra-Trade under Tariff Preferences					
	From Developing Countries	All Sources		Value (U.S.$ million)			Developing Country Share		
				$e_s=\infty$	$e_s=3.0$	$e_s=1.0$	$e_s=\infty$	$e_s=3.0$	$e_s=1.0$
Petroleum	52,466.0	61,946.0	84.7	2,120.0	1,662.0	1,193.2	0.6	0.6	0.4
Fibres of which:	887.1	3,443.4	25.8	304.4	226.6	166.9	6.7	5.2	4.1
Wool	52.2	505.7	10.3	30.3	25.3	21.1	5.5	4.7	4.0
Cotton	834.9	2,937.7	28.4	274.1	201.3	145.8	6.8	5.2	4.1
Other commodities of which:	3,913.0	14,038.9	27.9	495.7	378.2	298.6	2.8	2.2	1.6
Leather	178.8	1,016.5	17.6	43.1	30.9	22.7	3.5	2.6	2.0
Rubber	1,557.6	3,545.4	43.9	172.0	109.8	80.1	3.2	2.3	1.8
Wood and paper	2,176.6	9,477.1	23.0	280.6	237.5	195.8	2.4	2.1	1.6

Note: The projected trade changes shown in this table are based on the assumption that any non-tariff barriers applied to these products are also liberalized to an extent that the full effects of the tariff preferences can be realized. Trade diversion estimates, which are incorporated in the total figures, are based on an assumed elasticity of substitution of 1.5 between preference receiving and other products. See [3] for a discussion covering this latter point. Table I shows the SITC product groups that are included in the "All Commodities" projections as well as in the individual commodity processing chains.

[a] Total imports of both primary and processed commodities in the indicated processing chain.

[b] Includes groundnuts, copra, palm kernel oil, and oilseeds.

K, while P_{ijk} and P_{ijK} are prices of preference-receiving and other countries' goods.[10]

In cases where the supply elasticity for exports is infinite there is no price effect (i.e., producers continue to charge the same price for exports even at the higher levels of production). However, if this condition does not hold the projected increase in prices can be obtained from:

$$dP_{ikj}/P_{ikj}=[dt_{ijk}/(1+t_{ijk})]\cdot[e_m/(e_m-e_x)], \tag{6}$$

with the result that the revenue increase for an exporting country can be estimated through the use of:

$$dR_{ikj}/R_{ikj}=[dt_{ijk}/(1+t_{ijk})]\cdot e_m\cdot[(1+e_x)/(e_x-e_m)], \tag{7}$$

where R represents the value of trade in the commodity.[11]

Employing the statistics on developing country tariffs (see Appendix for details on how these data were compiled) in connection with the estimates of import demand elasticities in developing countries, Table III shows projections of the likely impact of preferences for commodity intra-trade under three different assumptions concerning supply conditions; a situation where supply in developing countries is perfectly elastic, a second case where supply is unitary elastic, and a third case in which the rise in prices is one-third the corresponding change in output (i.e., $e_s=3.0$). These situations incorporate the full range of assumptions normally made about supply conditions in developing countries and show how sensitive the projections are to changes in this parameter. In each of these cases it is assumed that existing tariffs are reduced to zero for commodity exports originating in other developing countries while the present rates continue to be applied to primary and processed commodities imported from developed market economy and socialist countries.[12]

[10] The elasticity of substitution term between preference and non-preference-receiving goods is a key parameter in equation (5). After a survey of available empirical information Cline [3] suggested that a value of 2.5 be employed for this coefficient in projections for developed market economy countries. Based on our analysis of this data, as well as the recognized fact that developing countries often have fewer options for shifting sources of supply, we have employed a lower coefficient of 1.5 for this parameter in our simulations.

[11] Equations (4) through (7) present a very simplified description of the full UNCTAD Trade Policy Simulation Model and a complete description and derivation will be sent to interested readers upon request. It should also be recognized that there are limitations connected with the partial equilibrium nature of the model in that it cannot account for secondary effects, such as exchange rate changes, that may influence the ultimate value of the trade changes. Even with such limitations, however, economists have found that the partial equilibrium approach provides a useful "order-of-magnitude" guide to the effects of alternative trade policies. See [10] for a discussion and assessment of the use of partial equilibrium models for evaluating the effects of various trade liberalization measures.

[12] The "sensitivity" tests involving supply conditions were necessitated by the fact that there are very few empirical estimates of supply elasticities in developing countries and those that exist are considered to be far less reliable than estimates relating to demand.

Table III shows that under conditions of perfectly elastic supply full tariff preferences for commodity intra-trade would increase the value of this exchange by approximately U.S.$4 billion annually which represents a rise of about 6 per cent above existing levels. Although these overall projections are heavily influenced by petroleum products, which account for U.S.$2.1 billion or 54 per cent of the total increase, Table III shows that the projected increase for non-petroleum commodities is about 14 per cent above these items' 1981 trade base. Examination of the product sector simulations shows that textile fiber trade would expand by over U.S.$300 million, a 34 per cent increase over existing levels, while the increase in the ores and metals group would be approximately 19 per cent.

Overall, Table III indicates that full 100 per cent preferential tariff margins would enable developing countries to increase their shares in imports of these commodities by about 1.4 percentage points in total or by about 3.2 percentage points for the non-petroleum products. On a sectoral basis the largest share changes occur for non-petroleum commodities in the textile group (an overall increase in shares of about 6.7 percentage points) with the lowest increases (2.5 points) being recorded for food products.[13]

As far as the sensitivity of the estimates to variations in supply conditions is concerned, the simulations in Table III show that the increase in commodity intra-trade would be about U.S.$2.4 billion under conditions of unitary elastic supply which represents a decline of U.S.$1.5 billion below the projections based on perfectly elastic supply. However, even under these "worst case" assumptions the projected change in non-petroleum commodity trade under full tariff preferences is still 9 per cent above the actual 1981 commodity trade values. A further important point to be noted is that tests show the trade expansion estimates are linearly related to the depth of the preferential tariff margins established under any given assumption concerning supply elasticities. For example, if supply is assumed to be perfectly elastic 50 per cent preferential tariff margins would increase intra-trade by about U.S.$2 billion, or one-half the total value shown in Table III.

Aside from changes in overall levels, important considerations also involve the impact of preferences on the structure of commodity intra-trade. As such, Table IV shows that tariff preferences would result in a shift in the composition

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Under these limitations we have attempted to determine the maximum variance that would occur in our simulations if supply were to fluctuate between possible extremes. For another example of a policy simulation study that adopted this approach see [6].

[13] In a related study Erzan et al. [4] estimated that full tariff preferences for all products could increase the value of developing country intra-trade by about U.S.$14 billion annually assuming that conditions of perfectly elastic supply prevailed. As such, our present analysis suggests that the commodities listed in Table I would account for approximately one-third of the potential total expansion. A point that should be noted, however, is that the projected totals are quite sensitive to changes in the actual value of intra-trade for petroleum as well as the estimated demand elasticity for these products [see equation (1) regarding this point]. The 1981–86 decline in petroleum prices suggests that the current value of a potential expansion in intra-trade may be less than that indicated by Tables III and IV.

TABLE IV

PROJECTED CHANGES IN THE STRUCTURE OF DEVELOPING COUNTRIES' INTRA-TRADE IN PRIMARY AND PROCESSED COMMODITIES UNDER PREFERENTIAL TARIFFS

Processing Chain	1981 Value of Intra-Trade (U.S.$ million)		Share of Processed Products	Projected Change in Developing Country Intra-Trade in Processed Commodities under Tariff Preferences[a]					
				Value (U.S.$ million)			Processed Products' Share		
	Primary Stage	Processed Products		$e_s=\infty$	$e_s=3.0$	$e_s=1.0$	$e_s=\infty$	$e_s=3.0$	$e_s=1.0$
All commodities	51,644.8	13,874.9	21.2	2,529.5	1,894.4	1,365.0	2.4	1.8	1.3
All commodities (excl. petroleum)	6,871.0	6,182.7	47.4	1,491.4	1,132.1	845.7	3.9	3.0	2.1
of which:									
Meat	547.7	49.8	8.0	12.6	9.8	8.1	1.8	1.5	1.2
Fish	260.4	125.6	32.5	36.0	29.4	23.6	4.1	3.1	2.4
Fruit	857.9	157.3	15.5	23.9	19.2	15.2	1.1	0.8	0.5
Vegetables	555.6	73.7	11.7	9.8	9.6	9.3	0.6	0.6	0.6
Vegetable oils[b]	70.0	147.5	67.8	9.3	6.9	4.8	0.1	−0.1	−0.3
Coffee, cocoa, and sugar	1,798.9	121.5	6.3	38.2	30.9	24.5	1.4	1.1	0.9
Leather	54.8	123.7	69.2	43.8	30.2	22.1	8.1	4.3	3.3
Rubber	1,295.3	262.3	16.9	151.8	91.0	63.4	7.1	4.3	3.0
Wood and paper	69.6	2,107.0	96.8	258.7	217.3	157.9	−0.5	−0.5	−0.5
Wool	25.5	26.7	51.1	25.9	21.1	17.1	12.7	10.6	8.7
Cotton	486.7	348.2	41.7	258.9	186.8	132.4	13.0	9.9	7.3
Iron	314.4	1,235.2	79.7	300.1	233.9	186.2	3.1	2.4	2.0
Copper	183.2	697.7	79.2	157.3	115.2	79.4	2.8	2.0	1.3
Bauxite	35.4	306.0	89.6	87.9	71.6	57.6	2.1	1.8	1.5
Lead	11.0	51.2	82.3	6.8	5.2	3.9	1.5	1.1	0.8
Zinc	26.4	85.7	76.4	15.2	12.2	9.8	2.4	1.9	1.6
Tin	56.9	128.5	69.3	28.7	20.5	13.6	4.0	2.9	1.9
Phosphates	221.3	135.1	37.9	26.5	21.3	16.8	2.7	1.9	1.4
Petroleum	44,773.8	7,692.2	14.7	1,038.1	762.3	519.3	1.3	0.9	0.6

Note: The projected trade changes shown in this table are based on the assumption that any non-tariff barriers applied to these products are also liberalized to an extent that the full effects of the tariff preferences can be realized. Trade diversion estimates, which are incorporated in the total figures, are based on an assumed elas icity of substitution of 1.5 between preference receiving and other products. See [3] for a discussion covering this latter point. Table I shows the SITC product groups that are included in the "all commodities" projections as well as in the individual commodity processing chains.

[a] Processed commodities are defined as all items other than the stage one goods listed in Table I of this study.

[b] Including groundnuts, copra, palm kernel oil, and oilseeds.

of this exchange in the direction of processed products. Overall, the share of processed commodities in total (primary and processed commodity) developing country intra-trade is projected to rise by about 2.4 percentage points (assuming supply elasticities are infinite) with the corresponding increase being close to 4 percentage points for non-petroleum products. Among this latter group the share of processed textile products (i.e., yarns and textile fabrics) registers the largest increase (12.7 percentage points) while processed rubber and leather products raise their share by 7 to 8 points in these items' processing chains. At the other extreme, however, preferences would appear to have a very limited capacity to increase processed products' share in the meat, fruit, vegetables, coffee, cocoa, and lead chains as the projected rise is under 2 percentage points in each case.

V. CONCLUSIONS AND POLICY IMPLICATIONS

While previous studies have examined tariff escalation in the developed countries no related analyses have been undertaken for developing countries. After compiling a comprehensive data base on developing country tariffs this study examined the structure of these duties on key primary and processed commodities. The results show that these nations' tariffs are generally set at higher levels and incorporate a greater degree of escalation than do import duties in developed market economy countries. These findings have important policy implications in that they show tariff escalation in the South also has an important restrictive effect on trade in processed commodities. The implications are that tariff escalation can no longer be viewed as a pure South-North trade problem, which was the case in the Tokyo Round negotiations or the 1982 Ministerial Meeting of the GATT, but must be approached in a broader (universal) context.[14] This study also made a methodological innovation by testing two new indices of tariff escalation which have the potential to reduce biases inherent in the measures traditionally employed. The initial results indicate that these measures do provide useful insights concerning the effects of tariff escalation and should be tested in further investigations of the effects of international trade barriers.

The empirical results presented in this study also call into question traditional explanations as to why tariff escalation is a characteristic of national tariff structures. For example, Balassa [2, p. 195] indicated that tariffs in the North increase with fabrication in order to "discriminate against the processed export products of developing countries" and thereby protect these countries' producers from their more efficient counterparts in the South. However, the fact that

[14] For example, the 1982 GATT Ministerial Declaration stated that "prompt attention should be given to the problem of escalation of tariffs on products with increased processing with a view to effective action towards the elimination or reduction of such escalation where it inhibits international trade, taking into account the concerns relating to exports of developing countries" (p. 16). Background documents prepared by GATT [5] for the Ministerial Meeting focused on the effects of tariff escalation in the North. A similar orientation was incorporated in the 1972 Ministerial Declaration for the Tokyo Round negotiations.

developing countries have *also* found it necessary to incorporate escalation in their tariffs suggests that alternative explanations for this phenomenon must be found. At the least, the South-North orientation suggested by Balassa must be dropped as national tariffs generally escalate to protect against more efficient producers (who may be either developed or developing countries).

While there has been considerable "political" debate about the possible advantages of a "collective self-reliance" development strategy, remarkably little supporting empirical analysis has been undertaken as to the likely effects of this approach. The simulations in this study suggest that tariff preferences, which constitute an important element of collective self-reliance, seemingly have the potential to produce a sizeable expansion in commodity intra-trade. As such, these *initial* findings have potential importance, but it should be recognized that considerably more analysis is needed concerning quantification of the costs and benefits of preferences for intra-trade before a definitive evaluation can be made of the merits of this policy approach. For example, among the questions that need to be addressed are: how the trade effects of preferences would differ among developing countries and what mechanisms exist for compensating those nations experiencing a deterioration in their trade balances; how important would the revenue (loss) effects be for countries extending preferences due to their lower tariff levels; what the effects of a "global" system of preferences would be on established customs unions like ASEAN, CEUCA (Customs and Economic Union of Central Africa), or CARICOM (the Caribbean Community); or what improvements would be needed in existing infrastructure in order to accommodate an expansion of South-South trade? As far as the latter is concerned, special attention might be given to the need for investment in transport services given that the existing (North-South) pattern of liner conference routes may not be able to accommodate a preference induced expansion of developing country intra-trade. In addition, attention should be directed at estimating the likely size and nature of adjustment costs that would occur under meaningful preferential tariff margins (including the possible transfer of some industries from one developing country or region to another), what the administrative costs would be in order to make the system of preferences operational (including the enforcement of rules of origin), or the extent to which gains might accrue to transnational corporations at the expense of indigenous developing country enterprises.[15] Perhaps of key importance is empirical information as to how the costs and benefits associated with a preferential tariff liberalization would compare with those connected with a most-favored-nation (MFN) reduction of duties. Until this is available a reasoned judgement cannot be made concerning the real utility of preferences for intra-trade as an element of any development strategy.

[15] In short, it should be expected that any "global" system of trade preferences among developing countries would encounter exactly the same type of problems that have plagued previous attempts to form smaller customs unions. The record in resolving these problems in regional groupings does not suggest that they could be easily handled in a far larger (global) system of trade preferences among developing countries. In fact, Viatsos [18] has argued convincingly that the failure to resolve these basic problems has produced a "crisis" in regional economic integration efforts among developing countries.

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APPENDIX

STATISTICS RELATING TO THE LEVEL OF PROTECTION IN DEVELOPING COUNTRIES

While the GATT maintains up-to-date computerized records on the pre– and post–Tokyo Round import duties in developed market economy countries at the level of the tariff line, no centralized records previously existed for the developing countries. In recognition of the need for such information for both research efforts and practical trade policy initiatives, the UNCTAD secretariat, with support from the United Nations Development Programme (UNDP), recently initiated a project to systematically collect and tabulate this information. The records have now been developed to a point where they include full tariff information for the individual countries included in our analysis as well as additional (non-computerized) statistics for other major developing countries.[a]

In our projections of the effects of a global system of trade preferences (GSTP) we have made use of this basic data source with some modifications. First, in our analysis tariffs were defined as the sum of customs duties and fiscal charges. Second, since trade data were generally not available at the level of the UNCTAD records [which store information according to the current version of the (*Customs Co-operation Council Nomenclature*) (CCCN)], the tariff statistics were concorded with the SITC Revision 1 at the four-digit SITC level.[b] When several CCCN items corresponded to a single four-digit SITC product, simple arithmetic averages of the former were taken to indicate the level of tariffs for the product group. While there would appear to be advantages in also computing weighted tariff averages at this level, it could not be done since trade data for individual CCCN items are not available. Nevertheless, using simple averages in this manner allowed tariff data to be condensed to 611 SITC product groups for which full trade records (with destinations) were available from United Nations commodity trade statistics.

[a] However, some of the computerized files have not been fully updated. The status (i.e., year of application) of data for the countries in our study is as follows: Algeria, 1982; Bangladesh, 1983; CARICOM, 1979; CEUCA, 1977; Egypt, 1981; India, 1984; Indonesia, 1980; Ivory Coast, 1980; Kenya, 1982; Rep. of Korea, 1985; Malaysia, 1981; Mexico, 1984; Morocco, 1980; Nigeria, 1982; Pakistan, 1982; Philippines, 1985; Saudi Arabia, 1980; Singapore, 1983; Sri Lanka, 1983; Tanzania, 1982; Thailand, 1981; Tunisia, 1982; and Yugoslavia, 1980.

[b] SITC Revision 1 covers all trade in goods except non-monetary gold items which are included in Revision 2. At the four-digit level there are 625 product groups excluding residual items (i.e., 181 UN special codes). Tariffs are not relevant for two product groups: SITC 9110—postal packages; and SITC 9310—special transactions. Of the remaining 623 product groups, 12 had to be merged with other SITC items due to concordance problems from CCCN to SITC Revision 1. These were SITC 2424 included in 2429, 2921 in 2929, 5213 in 5999, 5325 in 5324, 6414 in 6415, 6417 in 6412, 6711 in 6712, 6729 in 6782, 6913 in 6989, 6934 in 6933, 7311 in 7313, and 7326 in 7327.

For most individual countries in our analysis specific tariffs (i.e., tariffs expressed in a fixed monetary rate-per-unit) were applied with the result that nominal equivalents were not directly available, while a second problem was that some countries had gaps or omissions in their tariff records. The general rule applied in these cases was the following: when one SITC four-digit product group covered several CCCN items, the items for which ad valorem rates were available were taken to be representative for those with missing of specific tariffs. Hence the latter were disregarded in taking averages, as were items subject to an outright prohibition. On the other hand, when no ad valorem rates were available for any of the CCCN items concerned, estimates had to be made.

In estimating ad valorem equivalents for specific tariffs, the preferred method was to take the ratio of the charge to the unit value of the SITC group.[c] Where this was not possible, ad valorem rates of related CCCN items falling outside the particular SITC group were adopted as proxies. This method was also applied in cases where tariff information was missing and could not be traced in national customs publications.

A further technical problem arose with regard to regional preferential rates. Regional preferential rates were available in the UNCTAD records for only ASEAN and Bangkok Agreement countries. In addition, it appears that the preferential margins of Indonesia, Malaysia, and Thailand have been eroded for many product groups, i.e., the most-favored-nation (MFN) rate became equal or lower than the recorded preferential duty due to unilateral changes in customs schedules. In other cases this result was partially a statistical artifact arising from tariff averaging in the presence of specific tariffs and missing tariff information. For our analysis, of course, when a preferential rate did appear that was higher than the MFN rate the latter was taken to represent both import duties.

Appendix Table I summarizes the results of these computations and compares the level of existing tariffs in the twenty-three developing countries or groups of countries both for total imports and for the major SITC product groups. In each case two tariff averages are presented: one based on imports from other developing countries and (in parentheses) averages based on developed country trade weights. The key point that emerges from these statistics is that very different levels of nominal tariff protection exist in the individual countries. In the Republic of Korea, Malaysia, Saudi Arabia, and Thailand, the average level of tariff protection against goods from other developing countries is under 7 per cent, while in the case of Singapore duties average less than one-half of 1 per cent. In contrast, other countries listed in the table have average tariffs that exceed 30 per cent, with Bangladesh registering a high of close to 70 per cent. Such wide differences in national tariff averages suggest that the use of some general preference-creating formula aimed at reducing tariff disparity might be considered as an alternative to the linear approach for the GSTP.

[c] Unit values were calculated from import data of the country in question when available. Otherwise, they were taken from another country, preferably in the same region. In taking the ratio of the specific rates to the unit values, average official exchange rates relating to the dates of the trade data were used. Of course, in cases where no unit values were available, the gaps in the tariff statistics were left intact.

APPENDIX TABLE I

AVERAGE TRADE WEIGHTED TARIFF RATES APPLIED BY SELECTED DEVELOPING COUNTRIES IN MAJOR PRODUCT GROUPS
(Tariff rates weighted by imports from developing countries)

(%)

Importing Country or Market	Foodstuffs	Argicultural Raw Materials	Ores and Metals	Fuels	Chemicals	Other Manufactures	All Items
Algeria	7.6 (5.3)	3.6 (10.6)	5.1 (7.0)	1.5 (1.8)	1.7 (8.5)	19.5 (15.0)	11.0 (11.9)
Bangladesh	65.3 (24.4)	23.7 (68.5)	51.1 (57.9)	47.2 (48.6)	53.8 (56.0)	107.7 (96.6)	69.3 (68.3)
CARICOM	22.6 (16.0)	10.1 (8.5)	4.8 (9.8)	6.2 (17.3)	13.4 (11.9)	23.2 (22.2)	7.7 (18.7)
CEUCA	21.1 (19.4)	20.5 (14.9)	11.1 (19.5)	0.3 (1.5)	15.8 (14.3)	23.8 (20.2)	12.5 (18.3)
Egypt	29.2 (13.9)	22.2 (24.4)	10.6 (13.2)	15.2 (5.3)	6.5 (16.5)	50.4 (34.1)	35.5 (22.8)
India	64.7 (49.8)	69.7 (98.0)	58.9 (73.2)	0.1 (40.0)	50.5 (46.3)	66.7 (57.1)	26.9 (60.2)
Indonesia	49.7 (20.4)	3.2 (2.8)	8.0 (16.8)	5.8 (7.5)	7.9 (13.3)	30.8 (31.0)	20.2 (24.7)
Ivory Coast	13.7 (22.0)	9.6 (31.7)	29.1 (28.6)	44.5 (43.9)	36.9 (38.5)	40.6 (36.3)	37.3 (33.6)
Kenya	31.2 (38.0)	25.0 (25.3)	31.7 (25.8)	38.7 (27.2)	13.9 (21.2)	33.8 (35.4)	37.5 (31.8)
Korea, Rep. of	21.0 (10.2)	7.9 (7.9)	6.7 (12.6)	5.0 (4.4)	21.0 (18.8)	16.2 (21.5)	6.9 (16.2)
Malaysia	6.9 (21.3)	3.1 (2.8)	1.0 (2.7)	2.7 (1.4)	10.7 (9.1)	16.4 (16.4)	6.6 (14.3)
Mexico	21.9 (12.3)	4.5 (6.7)	10.4 (10.4)	1.9 (6.9)	16.2 (17.2)	28.6 (25.1)	19.3 (20.2)
Morocco	87.2 (35.4)	22.2 (22.6)	18.3 (26.9)	20.0 (20.0)	25.4 (34.3)	51.7 (44.3)	33.2 (36.7)
Nigeria	26.2 (19.7)	32.8 (16.5)	14.0 (13.3)	32.7 (16.6)	21.3 (20.2)	32.8 (24.2)	29.3 (22.1)
Pakistan	57.9 (21.9)	133.7 (132.2)	14.0 (63.7)	13.7 (44.2)	17.5 (36.7)	69.8 (56.6)	30.3 (54.7)
Philippines	29.0 (20.2)	15.5 (18.5)	11.6 (13.6)	15.7 (17.0)	17.3 (17.7)	31.0 (24.6)	17.5 (21.5)
Saudi Arabia	9.9 (82.7)	1.1 (0.8)	2.1 (4.6)	3.7 (3.1)	3.7 (2.5)	3.3 (2.8)	5.5 (11.9)
Singapore	3.6 (15.2)	0.0 (0.0)	0.0 (0.0)	0.1 (6.8)	0.0 (0.0)	0.4 (1.3)	0.4 (2.1)
Sri Lanka	37.2 (23.8)	17.9 (25.5)	19.1 (13.0)	5.6 (19.1)	12.8 (16.9)	34.4 (26.1)	19.7 (23.8)
Tanzania	22.7 (21.9)	15.4 (19.5)	17.8 (15.1)	1.3 (7.0)	12.7 (12.2)	17.9 (16.5)	12.5 (15.9)
Thailand	10.4 (26.9)	9.1 (5.4)	9.7 (11.2)	2.3 (4.4)	23.7 (21.8)	33.4 (23.2)	6.1 (20.5)
Tunisia	19.7 (17.0)	11.1 (16.3)	7.1 (9.8)	13.6 (4.6)	13.3 (13.9)	20.1 (25.1)	14.5 (18.9)
Yugoslavia	4.0 (9.2)	1.5 (5.0)	3.4 (11.7)	5.0 (5.5)	8.9 (10.9)	10.9 (14.1)	4.5 (12.1)
All countries above	26.5 (28.0)	10.2 (18.7)	15.6 (17.4)	6.2 (7.4)	17.8 (16.8)	18.8 (18.1)	11.9 (18.9)

Notes: 1. In terms of the (revision 1) Standard International Trade Classification (SITC) the product groups are defined as follows; foodstuffs (SITC 0+1+22+4), agricultural raw materials [SITC 2 less (22+27+28)], ores and metals (SITC 27+28+67+68), fuels (SITC 3), chemicals (SITC 5), other manufactured goods [SITC 6 to 8 less (67+68)], all items (including SITC 9).

2. Figures in parentheses are tariff rates weighted by imports from developed countries.