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# **Do Natural Resource-Based Industrialization Strategies Convey Important (Unrecognized) Price Benefits for Commodity-Exporting Developing Countries?**

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Because of a relative shift from primary commodity exports to more processed commodities between the 1960s and the 1980s, most developing countries have experienced less instability in export earnings for agricultural materials, ores, and metals — and more favorable long-term price trends.

This paper — a product of the International Trade Division, International Economics Department — is part of a larger effort in PRE to analyze and predict important structural changes in world trade as well as to identify factors affecting developing countries' export earnings. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Jean Jacobson, room S8-037, extension 33710 (30 pages).

Developing countries have long had two main objectives in terms of commodity exports: to reduce instability in exporters' earnings and importers' prices through international (buffer stock) agreements and to encourage more processing of domestically produced commodities by developing countries.

Little attention seems to have been paid to possible connections between these objectives. If processed commodities are traded in markets that are generally more stable, for example, and if these items experience more favorable longer term price trends, might a natural resource-based industrialization strategy not convey important (unrealized) price benefits for commodity-exporting developing countries?

And if a significant number of developing countries are shifting their composition of exports toward processed commodities — and if the markets for these items are less unstable — could this not alter the priority attached to negotiating commodity price stabilization agreements?

Using the World Bank's commodity-processing classification scheme, Yeats shows that a major structural shift in commodity trade occurred between 1965 and 1987. Almost all regional groups of developing countries shifted from primary commodity exports to more processed commodities — except for foodstuffs — and this change was reflected to varying degrees in all major developed-country import markets.

But the developing countries actually responsible for the further processing (such as the Asian NICs) were often not major producers of the primary (unprocessed) commodity. This suggests that internal constraints on commodity processing may often be more important than such external barriers as escalating tariffs.

The shift has generally reduced instability in export earnings for agricultural materials, ores, and metals — and to a lesser extent for foodstuffs — and has resulted in more favorable long-term price trends.

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by  
Alexander J. Yeats

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(Unrecorded) Price Benefits for Commodity Exporting Developing Countries?

Alexander J. Yeats<sup>1</sup>

I. Introduction

Developing countries have long had two policy objectives relating to commodity price stability and domestic processing. Concerning the former, "buffer stock" agreements or export earnings stabilization schemes like STABEX have been designed to offset unstable primary commodity prices which are purported to have detrimental effects on both producers and consumers. Second, developing countries have attempted to remove constraints--like escalating tariffs in export markets--to further processing of domestically produced commodities. The rationale for such efforts is that domestic commodity processing can have important employment creation effects, it may increase trade contacts and provide benefits associated with "outward-oriented" trade policies, there may be important linkage effects to other sectors of the economy, and it may produce an increase in export revenues and foreign exchange earnings.<sup>2</sup>

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<sup>2</sup>See Chapter 3 in Yeats (1981) for a survey of major issues relating to commodity processing and trade. Helleiner and Welwood (1978) or Roemer (1979) provide useful overviews of problems and prospects for natural resource-based industrialization. Section D of the Punta del Este (Uruguay Round) Ministerial Declaration states that the "negotiations shall aim to achieve the fullest liberalization of trade in natural resource-based products, including in their processed and semiprocessed forms. The negotiations shall aim to reduce or eliminate tariffs and nontariff measures, including tariff escalation."

In spite of the effort devoted to these initiatives there appears to have been no consideration given to whether certain complementarities exist between the two policy approaches. Specifically, if prices for semiprocessed or processed commodities behave differently than those for the primary form then shifting the structure of exports will alter the level and stability of export earnings. One possibility is that markets for some processed commodities (such as leather, chocolate, or iron and steel) may be more stable than those for raw-form goods, particularly if administered pricing is used in the former or if the demand for these items is relatively more stable. A related question of importance is whether major differences exist in longer-term trends in primary and processed commodity prices. If the latter are more stable and also have a greater secular increase (or less of a decrease) this would be a further attraction for natural resource-based industrialization strategies.

This study has a threefold objective relating to these points. First, an attempt is made to quantify the magnitude of change that occurred in developing country commodity exports from the mid-1960s to the late 1980s. Here, an effort will be made to identify important factors--such as differential changes in demand or developing countries' competitive position--which produced the structural trade changes. Second, intercountry and interregional differences in export performance will be examined in an attempt to determine whether there were major differences in developing countries' experience. This section also examines longer-term changes in individual developed country import statistics in order to determine if some markets were relatively more open (or closed) to processed commodities. Third, import price (unit value) statistics for primary and processed commodities are analyzed in order to determine whether the structural trade changes which occurred lead to greater (or less) stability and growth in export earnings.

## II. The Methodological Approach

In this study a World Bank classification scheme was used to identify different levels of fabrication for 48 commodities exported in primary and processed form by developed and developing countries. At a minimum, the scheme distinguishes between a primary and processed stage product (i.e., the primary stage of the coffee chain consists of green and roasted beans (SITC 071.1) while the processed stage consists of coffee extracts (SITC 071.2)). In other instances, a semifabricated stage or stages is identified (i.e., the cocoa chain consists of cocoa beans (primary stage), cocoa powder and butter (intermediate stages), with chocolate being the final stage item). The appendix provides a description of the processing chain components and also gives their corresponding Standard International Trade Classification (SITC) Revision 1 number.<sup>3</sup>

Statistics on developed country imports of each processing chain's components were drawn directly from United Nations Series D trade tapes for 1965,

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<sup>3</sup>It should be noted that "leakages" may occur as one goes up the processing chains in that some products may be employed as inputs for other production processes and be lost from the chain. For example, cotton fiber may be used for the manufacture of rubber tires and not appear in the textile stages of the cotton chain. Such leakages may cause the magnitude of the shift to processed commodity exports to be understated and may also affect the accuracy of the estimated indices of price stability. If prices for the product where leakages occur are relatively more stable than for goods in the main part of the chain the indices in this study will understate the true degree of stability gained by further processing. Balassa (1968) first developed commodity processing chain concept within the SITC system for analysis of trade and tariff data.

1987 and several intermediate years.<sup>4</sup> In addition, imports from developed and developing countries were tabulated separately in order to determine how the latter's competitive position (market shares) was changing. Finally, both import value and quantity statistics were drawn for each processing chain stage so unit values could be computed. In general, these unit values were calculated for the most highly aggregate country group possible (i.e., data for the EC(10) would have preference over (say) statistics for France and Germany combined) with the selection determined by the availability of consistent value and quantity data. Appendix Table 1 lists the specific countries that were used for computation of each processing chain's unit values.<sup>5</sup>

Once unit values were derived for each processing chain stage two measures of price instability were computed. The first instability index was based on the average absolute percentage change in prices from one year to the next while the second was based on the variation that could not be accounted for by a

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<sup>4</sup>The end years 1965 and 1987 were chosen since UN records were incomplete before and after these dates. Also, one would ideally want to analyze trends in commodity exports to all destinations but the UN Series D Tapes--the sole source of consistent records on developing countries' imports and exports in terms of the SITC--have major gaps for South-South and South-East trade. (See Yeats (1990) for an evaluation of Sub-Saharan African trade data). Due to these limitations the present study had to focus on developing countries' exports to developed countries using data compiled from the latter's import statistics. Full trade data were not available for some of the relatively unimportant processing chains (i.e., hair, horn and whalebone, etc.) and these were dropped from the analysis.

<sup>5</sup>In Appendix Table 1 several SITC products may be shown within a primary, intermediate, or final stage item. In these cases, the unit value was an aggregate for all SITC products listed in the specific stage. For example, the intermediate stage in the cocoa processing chain consists of cocoa powder (SITC 072.2) and cocoa butter (072.3). The price for the intermediate stage is a trade weighted unit value for these components.

regression trend line.<sup>6</sup> These indices were supplemented by a measure of longer-term change based on the average price in 1965-68 and 1985-87.<sup>7</sup>

### III. Secular Changes in Commodity Trade

Table 1 presents summary information on changes in the structure of developed countries' commodity imports for selected years from 1965 to 1987. Shown here are total imports of the primary stage and processed commodities as well as similar data for four major subgroups: foodstuffs, agricultural materials, ores and metals, and petroleum. The table also shows the share of the primary stage (unprocessed) commodity in total developing country exports as well as the share of both primary and processed commodity imports supplied by developing countries.

Table 1 documents two important secular trends in developing countries commodity exports: a shift toward processed form commodities, and also a

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<sup>6</sup>Specifically, the first instability index computed from,

$$(1) \quad I_1 = \left[ \frac{\sum (|U_t - U_{t-1}| : U_{t-1})}{N-1} \right] \times 100$$

where  $U_t$  is the unit value in years  $t$  and  $N$  is the number of years for which these data were available. If the commodity's prices were subject to a significant predictable trend equation (1) would overstate the degree of "unexpected" instability. For this reason a linear trend was fitted to the annual price data and the coefficient of determination ( $R^2$ ) used as a measure of unexplained instability. That is, the higher the value of  $R^2$  the lower the level of unexplained instability.

<sup>7</sup>The measure of price level change was defined as,

$$(2) \quad P_1 = \left[ \frac{\bar{P}_{85-87} - \bar{P}_{65-68}}{\bar{P}_{65-68}} \right] \times 100$$

where  $\bar{P}_{85-87}$  and  $\bar{P}_{65-68}$  represent the average unit value for the processing stage over 1965 to 1968 and 1985 to 1987 respectively.



**Table 1: SECULAR CHANGES IN MAJOR CATEGORIES OF PRIMARY AND PROCESSED COMMODITY IMPORTS OF DEVELOPED COUNTRIES, 1965 to 1987**  
(Millions of US Dollars)

Commodity group	Year	Primary stage imports from			Processed stage imports from			Share of primary stage in all developing country exports(%)
		Developing countries	All sources	Developing country share(%)	Developing countries	All sources	Developing country share(%)	
ALL FOODS <sup>a</sup>	1965	5,912	12,039	49.1	1,646	5,568	29.6	78.2
	1975	15,279	35,441	43.1	4,754	19,459	24.4	76.3
	1980	29,453	62,283	47.2	9,066	35,145	25.8	76.4
	1987	35,193	77,783	45.2	11,236	46,994	23.9	75.8
AGRICULTURAL MATERIALS <sup>b</sup>	1965	2,614	5,992	43.6	963	9,955	9.6	73.1
	1975	4,150	11,100	37.4	4,444	33,367	13.3	48.2
	1980	10,287	23,161	44.4	12,848	75,593	17.0	44.5
	1987	8,364	23,095	36.2	24,743	117,594	21.0	25.2
ORES, MINERALS AND METALS <sup>c</sup>	1965	1,901	3,656	52.0	1,641	9,203	17.8	53.7
	1975	5,677	13,024	43.6	4,245	28,323	15.0	57.2
	1980	9,192	19,815	46.4	11,577	68,413	16.9	44.3
	1987	6,738	14,065	47.9	10,938	67,471	16.2	38.1
PETROLEUM	1965	6,414	8,037	79.8	1,435	3,411	42.1	81.7
	1975	78,443	90,307	86.9	7,300	21,452	34.0	91.4
	1980	202,478	252,321	80.2	23,350	60,979	38.3	89.7
	1987	73,905	109,295	67.6	20,020	49,241	40.7	78.7
ALL COMMODITIES EXCEPT PETROLEUM	1965	10,427	21,687	48.1	4,251	24,725	17.2	71.0
	1975	25,106	59,574	42.1	13,444	81,149	16.6	65.1
	1980	48,932	105,359	46.4	33,491	179,151	18.7	59.4
	1987	50,294	114,942	43.8	46,919	232,058	20.2	51.7

<sup>a</sup> Food commodities consist of primary and processed forms of the following: pork, poultry, bovine meat and mutton, fish, shellfish, wheat, rice, fruit, vegetables, coffee, cocoa, tea, sugar, groundnuts, copra, palm nuts and kernels, soya bean, linseed, cotton seed, castor seed and tobacco. See Appendix Table 1 for a list of the primary and processed items in each of these commodity chains.

<sup>b</sup> Agricultural material commodities consist of primary and processed forms of the following: wood, cork, paper-pulpwood, rubber, leather, silk, jute, wool, cotton, flax, hemp and ramie. See Appendix Table 1 for a list of the primary and processed items in each of these commodity chains.

<sup>c</sup> Ores, mineral and metals consist of primary and processed forms of the following: phosphate, sulphur, asbestos, glass (quartz sand), iron, manganese, copper, nickel, bauxite, lead, zinc, tin, tungsten and silver. See Appendix Table 1 for a list of the primary and processed items in each of these commodity chains.

consistent loss of market share for the primary stage commodities. Excluding petroleum, the proportion of primary stage items in total commodity exports fell almost 20-percentage points over 1965-87 with the largest reduction (73 to 25 percent) occurring for agricultural materials. Including petroleum--where the share of the primary stage (crude petroleum) fell from 82 to 79 percent--the decline is less dramatic but the relative importance of the primary stage in total exports still declined by more than 5 points. These data show that developing countries have been achieving a long-standing goal of increasing the relative importance of processed commodity exports.

The second major trend observed in Table 1 relates to a consistent loss in developing countries market share for all the commodity groups' primary stages as well as the processed stages of foods, ores and metals, and petroleum. Excluding petroleum, the 4.3 point reduction (from 48.1 to 43.8 percent) in market share translates into a US\$4.9 billion loss in export earnings.<sup>8</sup> It also follows that the market share loss was a partial factor causing the relative increase in importance of processed commodity exports. Had this market share remained unchanged (at 48.1 percent) primary stage commodities would have

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<sup>8</sup>The gain or loss in export earnings due to changes in developing countries' market share can be approximated from,

$$(3) \quad E_c = (s_t - s_o) D_t$$

when  $s_t$  and  $s_o$  represent their share of total imports in period  $t$  and  $o$  respectively and  $D_t$  is the total value of imports in period  $t$  (1987). A second index is sometimes calculated to measure the influence of demand changes on export earnings apart from any variation in competitive position. This measure is defined by,

$$(4) \quad E_d = s_o(D_t - D_o)$$

where  $D_o$  is the value of imports in period  $o$  (1965).

accounted for 54.1 percent of total exports in 1987 as opposed to the actual value of 51.7 percent.

Questions of key importance concern the factors which caused the developing countries' market share losses for the primary stage commodities. In some cases--particularly involving Sub-Saharan Africa--declining productivity and inappropriate government policies imposed major supply constraints on domestic producers that severely limited their ability to take advantage of existing export opportunities (see Akiyama and Larson 1989).<sup>9</sup> The 1973 OPEC price shock and subsequent attempts to influence energy prices by producers also appears to have had longer-term implications as importers of raw materials attempted to diversify sources of supply. In Japan, and other developed countries, this often involved a shift toward stable and "politically safe" countries like Australia, Canada and the United States. Agricultural policies of some developing countries were also a factor in some market share losses. This may have been due to subsidized exports that displaced developing countries from their traditional markets (see Borrell and Duncan 1990 for an analysis of sugar policies) while the expanding European Community also diverted trade from developing to domestic European producers. In some situations--such as the case involving Brazil's hides and skins exports--quotas were placed on the primary stage commodity in an attempt to stimulate further processing. Finally, the fact that developing countries "upgraded" their exports to a greater extent than developed countries may have caused market share losses for the primary stage items.

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<sup>9</sup>The role of external constraints in the decline of African exports has played an insignificant role. Erzan and Svedberg (1989) show that the EC, Japan and the United States impose few important tariffs and NTBs on Sub-Saharan exports and in fact extend major trade preferences to most of these countries through the Lomé Convention and Generalized System of Preferences.

Table 2 takes a more disaggregate look at structural trade changes by analyzing similar statistics for individual commodity chains. The results are remarkably consistent throughout the agricultural materials group (and to a lesser extent for ores and metals) where major shifts occurred in the relative importance of processed stage commodities. In cases the shift was particularly dramatic--the share of hides and skins in the leather chain fell from 60.5 to 3 percent, the share of raw cork fell from 72 to about 9 percent--although these changes often were accompanied by sizable declines in developing countries market shares for the primary stage products (exceptions occur for pulpwood, silk and hard fibers). The same general pattern--that of a shift toward processed commodities and a loss of primary stages market share--occurred in most of the individual ore, minerals and metals chains except in the case of nickel where developing countries managed both to achieve a sizable increase in both their market share for nickel ore (largely due to Indonesia's 1987 exports of US\$125 million) as well as the share of fabricated nickel products in total exports.

For the food commodities a less-consistent picture emerges although the overall share of primary stage items did fall by almost two and one-half points (to 75.8 percent).<sup>10</sup> However, for almost 40 percent of the 19 food processing chains the share of primary stage commodities increased, and in two of the remaining chains the decline in the relative importance of the primary stage

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<sup>10</sup>Several of the tropical product commodities appear to have improperly recorded trade, or to have undergone some processing, which explains why imports are reported from developed countries. For example, in 1987 developed countries reported imports of US\$355 million in green and roasted coffee beans (071.1) from the Federal Republic of Germany and US\$126 million from Belgium. From the UN data there is no way to determine if this reflects improper recording of entrepot trade or processing (roasting) of beans in these countries. Similarly, developed countries reported US\$102 million of raw or roasted cocoa bean imports from the Netherlands, US\$89 million in tea from the United Kingdom, US\$7 million in palm nuts from the Netherlands, and US\$1.6 million in raw silk from Switzerland.

**Table 2: SECULAR CHANGES IN DEVELOPING COUNTRIES' EXPORTS IN INDIVIDUAL COMMODITY PROCESSING CHAINS, 1965-1987**

Processing chain	Imports from developing countries (millions of US\$)		Share of developing countries in total developed country imports (%)						Share of primary stage in all developing country exports	
	1965	1987	All stages		Primary stage items		Processed stage products		1965	1965-87 chg
			1965	1965-87 chg	1965	1965-87 chg	1965	1965-87 chg		
<b>FOOD AND TOBACCO</b>										
Meat	622	2,927	19	-5	7	2	22	-9	8	5
Fish except shellfish	82	4,057	9	19	7	19	11	20	70	3
Shellfish	182	6,640	46	15	53	11	23	20	90	-4
Coffee	2,065	9,822	92	-5	93	-2	9	27	97	-5
Cocoa	412	3,286	67	-20	98	-4	18	4	70	-35
Tea	412	769	95	-14	96	-14	8	16	99	-2
Sugar	676	1,213	54	-4	47	9	61	-17	63	-7
Wheat	145	43	13	-12	13	-13	3	-1	78	11
Rice	132	214	56	-32	36	-11	64	-41	37	-1
Groundnuts	279	369	85	-28	87	-36	80	-3	66	9
Copra	328	487	93	-1	96	3	86	5	11	-1
Palm nuts and kernels	115	229	87	0	96	-33	47	42	6	2
Soya beans	78	1,067	10	13	11	13	6	1	98	-4
Linseed	35	4	32	-29	4	-3	76	-61	19	67
Cotton seed	41	25	53	-10	97	-32	23	-3	77	-26
Castor seed	42	110	91	1	90	11	92	-2	21	-2
Fruit	1,187	9,300	42	3	45	-1	26	20	70	1
Vegetables	357	4,152	24	5	24	4	28	3	73	2
Tobacco	370	1,770	35	-9	40	5	2	0	96	-41
<b>AGRICULTURAL MATERIALS</b>										
Wood	740	8,612	22	9	51	-1	13	14	55	-21
Cork	10	15	13	-10	30	-25	5	-2	72	-64
Pulpwood	22	1,696	1	3	4	2	0	3	29	-26
Rubber	656	4,220	42	-19	66	-18	1	12	99	-39
Leather	255	11,123	19	22	28	-18	12	33	61	-58
Silk	46	724	30	26	61	38	12	36	76	-47
Jute	389	260	86	-2	86	-2	82	2	40	-33
Wool	258	584	10	-2	13	-8	7	3	67	-50
Cotton	1,140	5,407	50	-8	69	-15	23	15	82	-50
Flax, hemp and ramie	9	175	7	19	10	27	42	-31	97	-14

Table 2: SECULAR CHANGES IN DEVELOPING COUNTRIES' EXPORTS IN INDIVIDUAL COMMODITY PROCESSING CHAINS, 1965-1987 (Cont'd)

Processing Chain	Imports from Developing Countries (millions of US\$)		Share of developing countries in total developed country imports (%)						Share of primary stage in all developing country exports	
	1965	1987	All stages		Primary stage items		Processed stage products		1965	1965-87 chg
			1965	1965-87 chg	1965	1965-87 chg	1965	1965-87 chg		
<b>ORES, MINERALS AND METALS</b>										
Phosphate	210	1,002	51	2	64	-4	4	33	98	-35
Sulphur	35	117	22	-5	26	-3	0	1	100	-1
Asbestos	27	60	8	-1	11	2	3	1	89	-35
Glass	8	574	2	6	3	1	2	6	11	-9
Iron	876	5,065	18	-1	53	0	2	6	93	-33
Manganese	160	155	55	-29	74	-24	12	-6	93	-5
Copper	1,131	4,297	45	-9	65	-7	43	-11	13	15
Nickel	2	255	0	10	1	19	0	6	100	-44
Bauxite	319	3,560	23	-4	86	-11	8	8	72	-53
Lead	127	392	31	-3	41	6	27	-14	41	33
Zinc	127	416	27	-10	45	-20	13	-2	75	-13
Tin	426	752	72	4	94	-24	64	12	34	-26
Tungsten	25	38	47	-23	57	8	8	-1	96	-19
Silver	68	794	23	11	2	28	28	6	3	14

commodity exports is accounted for by the fall in market share for these items.<sup>11</sup> In other words, had developing countries' market shares remained at their 1965 levels the relative importance of primary stage exports would have risen rather than fallen for the rice and tea processing chains.

While the previous analysis demonstrated that there has been a secular shift in developing countries' exports toward processed commodities, two questions of importance concern the contribution of different developed country markets to this shift and, second, the extent to which different developing countries have participated. Table 3 is addressed to the first issue and examines major developed country commodity imports over 1965-87. Specifically, the table shows the value of 13 countries' (or country groups) 1987 imports of major commodity groups as well as the 1987 share of primary stage (unprocessed) commodities in this total. To indicate the shift in relative importance, the lower third of the table shows the 1965-87 change in the share of primary stage items in total commodity imports.

With one or two exceptions Table 3 shows that the sizable shift toward trade in processed commodities extends to all the developed countries and occurs over all major commodity groups. Due largely to ores, minerals and metals the share of unprocessed items in Australia and New Zealand's total commodity import fell by more than 30-percentage points while the corresponding decline for Japan

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<sup>11</sup>Aside from the normal reasons often advanced in support of further commodity processing in developing countries there is an additional potentially important consideration relating to food products in that further processing generally means increased preservation or an extension of the useful life of the commodity (grains may be an exception to this general rule). As such, further processing may be a useful way of combatting the major problem of food spoilage in some developing countries. Data compiled by Olechowski (1987), Yeats (1979) and Laird and Yeats (1990) suggest that escalating tariffs and nontariff barriers in developed country markets are one reason why developing countries have difficulties in processing food commodities for export.

**Table 3: STRUCTURAL CHANGES IN DEVELOPED COUNTRIES' IMPORTS OF PRIMARY AND PROCESSED COMMODITIES FROM DEVELOPING COUNTRIES, 1965-187**

Importing country	Commodity product group				
	Foodstuffs	Agricultural materials	Ores, minerals and metals	All commodities	
				Incl. petroleum	Excl. petroleum
	(1987 value of all imports in US\$ million)				
<u>ALL DEVELOPED COUNTRIES</u>	46,429	33,107	17,676	191,138	97,213
Australia	476	677	82	2,254	1,235
Austria	460	276	51	1,264	787
Canada	1,005	874	369	3,307	2,248
European Community(10)	18,378	12,143	6,706	64,691	37,228
Finland	411	141	48	737	600
Japan	8,957	6,972	5,507	46,994	21,435
New Zealand	125	106	51	559	282
Norway	284	122	207	649	612
Portugal	334	451	73	1,890	857
Spain	1,448	755	531	7,623	2,734
Sweden	629	322	111	1,456	1,062
Switzerland	675	325	33	1,283	1,032
United States	13,232	9,938	3,908	58,409	27,079
	(1987 share of unprocessed commodities in total imports)				
<u>ALL DEVELOPED COUNTRIES</u>	75	25	38	65	52
Australia	62	6	18	40	28
Austria	81	22	48	72	58
Canada	68	12	44	54	42
European Community(10)	79	22	42	66	54
Finland	87	11	53	73	67
Japan	74	52	47	69	60
New Zealand	67	8	10	56	35
Norway	87	9	14	49	47
Portugal	98	68	34	88	77
Spain	88	54	85	89	78
Sweden	82	14	35	68	57
Switzerland	75	27	1	65	58
United States	71	9	15	58	58
	(1965-87 change in share of unprocessed commodities)				
<u>ALL DEVELOPED COUNTRIES</u>	-3	-48	-16	-10	-19
Australia	-32	-15	-45	-22	-34
Austria	4	-65	-11	-4	-18
Canada	-20	-31	-32	-27	-35
European Community(10)	-1	-54	-8	-13	-17
Finland	-12	-63	34	-13	-18
Japan	-1	-46	-41	-17	-28
New Zealand	-29	-12	-73	-1	-31
Norway	-8	-34	-17	-22	-21
Portugal	18	-30	-33	1	-12
Spain	30	-40	23	8	-11
Sweden	-13	-33	13	9	-11
Switzerland	-4	-56	-3	-7	-15
United States	-3	-40	-24	-3	-5



was 28 points. Table 3 also shows that all developed countries participated in the sizable (relative) decline in the importance of unprocessed agricultural material imports with the share of these items falling by 50 points or more for Austria, EC(10), Finland and Switzerland.<sup>12</sup>

In spite of the broad-based reductions that occurred in the importance of unprocessed commodity imports, Table 3 shows that major differences still persist in the trade structure of individual developed countries. Among the largest importers, 60 percent of Japan's total nonpetroleum imports still consist of primary stage commodities--in spite of the 28-percentage point decline that occurred in the relative share of these items over 1965-1987. There is fairly strong evidence that Japan's bias against processed commodity imports is due, at least in part, to the structure of its trade barriers as Yeats (1987, Table 15.2, pages 114-115) shows it has the highest tariff escalation index for the 10-OECD countries for which comparisons are made.

While the previous analysis showed that the structural shift toward processed commodity imports occurred in all major developed country markets, Table 4 examines the extent of this change for various regional groups of developing countries. Specifically, the table shows the total food, agricultural material, ores and metals, and petroleum exports of ten regional groups of developing countries (the Latin American Integration Association--better known

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<sup>12</sup>Spain and Austria both import a considerably higher proportion of unprocessed food products in 1987 than they did in 1965. Spanish imports of coffee beans increased more than eightfold (to US\$350 million) as these raw-form products (from developing countries) were substituted for coffee blends and extracts originally produced in EFTA and the EC. This, plus an increase of about US\$500 million in imports of soya bean and fresh shellfish, accounts almost entirely for the increase in Spain's primary product import ratio. Similarly, the Austrian increase is accounted for by a US\$171 million rise in coffee bean imports (from US\$16 million in 1965) and a rise of US\$100 million in fresh fruit imports from developing countries.

Table 4: STRUCTURAL CHANGES IN SELECTED DEVELOPING COUNTRY GROUPS COMMODITY EXPORTS, 1965-1987

Commodity group/Regional exporter <sup>a</sup>	Total		Exporter's share of all developed country imports (%)				Share of primary stage in total commodity exports (%)	
	Value of exports (US\$mn)		Primary stage		Processed commodities			
	1965	1987	1965	1965-87 chg	1965	1965-87 chg	1965	1965-87 chg
<b>FOODSTUFFS</b>								
ALADI	1,836	11,234	10.4	-0.5	11.1	-3.5	67	1
Andean Group	754	4,221	5.8	-0.7	1.1	-0.6	92	2
CARICOM	196	433	1.3	-0.8	0.5	-0.4	85	5
Other America	492	2,448	2.4	0.3	2.0	-1.3	73	13
Sub-Saharan Africa	1,762	6,813	12.8	-5.0	2.9	-1.3	91	-2
North Africa	322	1,043	2.3	-1.2	0.9	-0.5	85	-4
West Asia	215	1,555	1.7	0.0	0.1	0.4	96	-11
ASEAN	643	6,149	3.2	1.7	4.5	0.5	61	1
Other Asia and China	775	5,642	5.4	0.2	1.6	1.1	88	-10
Developing Oceania	196	456	0.7	-0.2	0.3	-0.1	83	1
<b>AGRICULTURAL MATERIALS</b>								
ALADI	610	4,610	9.1	-6.9	0.6	2.9	90	-79
Andean Group	83	277	1.2	-1.0	--	0.2	89	-71
CARICOM	10	15	0.1	-0.1	--	--	61	-40
Other America	4	66	--	--	--	--	43	-29
Sub-Saharan Africa	525	2,148	7.4	-1.0	0.8	-0.2	84	-16
North Africa	187	776	2.7	-1.3	0.3	0.1	85	-46
West Asia	193	1,199	3.1	-1.9	--	0.8	97	-72
ASEAN	815	8,256	12.0	6.4	1.0	2.4	88	-37
Other Asia and China	880	10,663	5.6	-0.6	5.5	2.6	38	-27
Developing Oceania	4	145	--	0.6	--	--	46	44
<b>ORES, MINERALS AND METALS</b>								
ALADI	840	5,868	8.9	8.3	5.6	-0.5	39	2
Andean Group	437	1,732	7.9	-2.8	1.6	-0.1	66	-25
CARICOM	186	482	4.2	-2.8	0.3	0.1	83	-41
Other America	73	288	1.9	-1.6	--	0.4	97	-80
Sub-Saharan Africa	980	2,762	11.0	-3.1	6.3	-3.9	41	-1
North Africa	255	840	6.6	-3.6	0.1	0.5	95	-45
West Asia	52	596	0.8	-0.3	0.3	0.5	55	-43
ASEAN	362	1,660	4.2	1.1	2.2	-0.8	43	2
Other Asia and China	252	1,875	5.0	-1.0	0.7	1.2	73	-43
Developing Oceania	67	454	1.8	1.3	--	--	100	-1

Table 4: STRUCTURAL CHANGES IN SELECTED DEVELOPING COUNTRY GROUPS COMMODITY EXPORTS, 1965-1987 (Cont'd)

Commodity Group/Regional Exporter <sup>a</sup>	Total		Exporter's share of all developed country imports (%)				Share of primary stage in total commodity exports (%)	
	Value of exports (US\$mn)		Primary stage		Processed commodities			
	1965	1987	1965	1965-87 chg	1965	1965-87 chg	1965	1965-87 chg
<b>PETROLEUM</b>								
ALADI	84	8,403	0.5	6.3	1.3	0.7	48	41
Andean Group	1,702	8,486	13.2	-8.4	18.8	-12.1	62	-1
CARICOM	200	1,063	0.1	0.4	5.6	-4.6	4	47
Other America	469	642	0.1	-0.1	13.5	-12.2	2	0
Sub-Saharan Africa	238	12,100	2.9	7.9	0.2	0.4	97	1
North Africa	1,480	14,676	17.9	-8.2	1.3	6.9	97	-25
West Asia	4,939	45,973	56.7	-21.3	11.1	3.8	92	-8
ASEAN	278	8,559	2.2	3.0	2.9	3.0	65	1
Other Asia and China	8	3,330	--	1.8	0.2	2.6	23	36
Developing Oceania	--	--	--	--	--	--	0	2

<sup>a</sup> The composition of the developing country groups is as follows:

ALADI - Argentina, Brazil, Chile, Mexico, Paraguay, Uruguay.

Andean Group - Bolivia, Colombia, Ecuador, Peru, Venezuela.

CARICOM - Bahamas, Barbados, Belize, Guyana, Jamaica, Trinidad and Tobago.

Other America - Antigua, Dominica, Grenada, Saint Lucia, Saint Vincent, Bermuda, Cuba, Dominica, Falkland Islands, French Guiana, Greenland, Guadeloupe, Haiti, Martinique, Antigua, Panama, Surinam.

Sub-Saharan Africa - All countries in Africa except Rep. of South Africa and those listed in North Africa (below).

North Africa - Algeria, Egypt, Libya, Morocco, Sudan, Tunisia.

ASEAN - Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand.

Other Asia and China - Bangladesh, India, Rep. of Korea, Laos, Sri Lanka, Afghanistan, Burma, Democratic Kampuchea, Hong Kong, Macau, Maldives, Nepal, Pakistan, China.

West Asia - All Asian developing countries not in ASEAN or other Asia and China.

Developing Oceania - American Samoa, Fiji, French Polynesia, Guam, Kiribati, New Caledonia, Papua New Guinea, Samoa, Solomon Islands, Tonga, Vanatu.

by its Spanish acronym ALADI, Andean Group, CARICOM, etc.) in 1965 and 1987 as well as the share of this exchange that was in primary and processed stages. To indicate how the competitive position of the developing countries changed, the table also shows their 1965 trade share as well as the change that occurred over 1965-1987.

In the agricultural materials group, and to a slightly lesser extent in ores and metals, the table shows that a fairly massive shift occurred in almost all the developing country groups toward processed exports even though different "baskets" of goods may be traded. Both ALADI and the Andean Group, for example, exported approximately 90 percent of their agricultural commodities in unprocessed (stage one) form in 1965, but the share of these items in 1987 had declined by more than 70-percentage points.<sup>13</sup> West Asian countries exported 97 percent of all agricultural materials in raw form in 1965, by due to a major trade expansion for cotton yarn and cloth, rubber manufactures and leather goods--accompanied by an absolute decline in primary stage exports of the cotton, rubber and leather processing chains--the share of unprocessed commodities fell to about one quarter of total exports. Developing Oceania is the only group where unprocessed agricultural materials actually increased in relative importance due entirely to development of natural rubber exports (a newly traded good) over the 1965-87 period.

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<sup>13</sup>The dramatic decline in ALADI's primary product ratio is to a large degree due to a shift from primary to processed leather products. Leather footwear was particularly important as exports changed from about US\$1 million in 1965 to over US\$1.3 billion in 1987--primarily due to Brazil. The paper and cotton chains were largely responsible for the Andean Group's declining primary product ratio. In 1987 exports of bulk cotton (US\$76 million) were almost double that of raw cotton, although the latter was only exported by the Andean Group in 1965.

Table 4 shows that the structure of food exports was more stable, although the share of unprocessed foods declined by 10 points or more for the West and Other Asian groups. In both cases this shift was almost entirely due to further processing of products in the fruit, vegetable and fish chains. Conversely, fruits and vegetables were largely responsible for the relative increase in primary foodstuffs exported by the "other America" group as these countries became increasingly important suppliers of fresh winter produce to the North American market.

In spite of the reversals for petroleum, the picture that emerges from Table 4 (and Table 3) is one of a general broad-based shift in the structure of most developing countries' commodity exports toward processed products--particularly in the agricultural materials and the ores, minerals and metals groups.<sup>14</sup> A key question is how this shift may have influenced the stability and trend in developing countries' export prices.

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<sup>14</sup>While an in-depth evaluation of factors responsible for the increase in processed commodities' relative importance is beyond the present study's scope, it is possible to identify several important contributing factors. First, a series of multilateral trade negotiations has greatly reduced the level and degree of escalation in developed countries' tariffs. See Balassa (1968, Tables 1 to 7) for data on the importance of these duties before and after the Kennedy Round. Second, it appears that developing countries' own domestic policies may be at least of equal importance in stimulating processing as external constraints in export markets. Countries that followed "outward-oriented" growth strategies, like Hong Kong, Republic of Korea, Singapore and Taiwan (China), greatly increased their exports of processed commodities even when the primary stage item had to be first imported. Third, the shift was also the result of some developing countries promoting policies that discouraged unprocessed exports. These include quotas on some primary commodity exports (such as limits Brazil placed on hides and skins shipments) or special export taxes. Political and economic stability were a contributing factor in some countries as this attracted new investment. Capital requirements can be a major constraint to the expansion of developing country commodity processing particularly in the ores, minerals and metals group.

#### IV. Price Formation for Primary and Processed Commodities

Table 5 summarizes results when the measures of price change and instability (see equations 1 and 2) were computed for the primary and final stages of each commodity processing chain. In addition, average results for the three major commodity groups--foodstuffs, agricultural materials, ore and metals--have also been derived using actual trade weights for the individual chains. Using plus and minus symbols the table has been coded to quickly indicate where further commodity processing leads to greater (+) price stability and long-term increases while a negative (-) symbol indicates prices have fluctuated less (or risen more) for the primary stage item.

In terms of both stability and long-term price increases, Table 5 shows that the major gains from further processing occurred in the ores, minerals and metals group. On average, the primary stage commodities in this group experienced annual fluctuations of 23 percent as opposed to 13 percent for the processed components. The most extreme primary stage annual price fluctuations--33 and 39 percent respectively--were for copper and tin where changes of 80 (copper) to 10 (tin) percent occurred after the 1973 oil price shock. In addition to greater stability, Table 5 also shows that processed ores and metals experienced a considerably more favorable long-term increase as the average price rise for these items (246 percent) was almost 70 points higher than that for the primary stage components of the chain.<sup>15</sup>

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<sup>15</sup>A crude measure of the export earnings gain due to higher prices for processed commodities can be derived by deflating the overall value increase for these items by the 1965-87 difference in the change in primary and processed commodity prices. These higher prices raised developing countries' gross export earnings for both agricultural raw materials and ores and metals by more than US\$6,200 million.

Table 3 ANALYSIS OF INSTABILITY AND LONG TERM CHANGES IN PRIMARY AND PROCESSED COMMODITY PRICES, 1965-1987

Processing Chain	Measures of Annual Prices Stability <sup>a</sup>										Trend Growth more (+) or Less (-)
	Average annual price changes 1965 to 1987 (%)		Stability more (+) or Less (-)	Coefficient of determination (R <sup>2</sup> )		Stability more (+) or Less (-)	Secular price change <sup>a</sup> 1965:08 to 1985:87 (%)		Growth more (+) or Less (-)		
	Primary stage	Final stage		Primary stage	Final stage		Primary stage	Final stage			
I	FOODSTUFFS <sup>b</sup>										
	Meat	17	15	+	0.63	0.64	+	27.7	168	+	
	Fish except shellfish	12	9	+	0.73	0.86	+	178	151	+	
	Shellfish	12	11	+	0.48	0.53	+	498	447	+	
	Coffee	14	10	+	0.86	0.87	+	646	272	+	
	Cocoa	14	15	+	0.63	0.60	+	284	258	+	
	Tea	21	12	+	0.56	0.83	+	400	318	+	
	Sugar	11	14	+	0.65	0.01	+	43	7	+	
	Wheat	38	31	+	0.15	0.30	+	4	40	+	
	Rice	11	8	+	0.76	0.81	+	172	148	+	
	Groundnuts	14	15	+	0.66	0.84	+	261	317	+	
	Copra	14	13	+	0.79	0.80	+	266	144	+	
	Palm nuts and kernels	15	13	+	0.28	0.32	+	65	81	+	
	Soya bean	12	44	+	0.39	0.46	+	52	16	+	
	Linseed	11	20	+	0.64	0.46	+	103	105	+	
	Cotton seed	17	23	+	0.35	0.59	+	84	125	+	
	Castor seed	16	17	+	0.45	0.48	+	80	82	+	
	Fruit	19	20	+	0.67	0.40	+	152	223	+	
	Vegetables	11	8	+	0.85	0.89	+	224	223	+	
	Tobacco	12	11	+	0.81	0.86	+	191	286	+	
		7	9	+	0.90	0.49	+	190	159	+	
II	AGRICULTURAL MATERIALS <sup>b</sup>										
	Cork	16	10	+	0.62	0.82	+	176	203	+	
	Pulpwood	14	11	+	0.75	0.78	+	354	471	+	
	Silk	17	15	+	0.64	0.82	+	200	234	+	
	Jute	12	10	+	0.75	0.85	+	152	163	+	
	Wool	11	11	no chg	0.61	0.79	+	54	223	+	
	Cotton	16	11	+	0.76	0.84	+	140	194	+	
	Flax, hemp and ramie	24	10	+	0.69	0.85	+	221	278	+	
	Rubber	11	14	+	0.58	0.73	+	245	469	+	
	Leather	12	9	+	0.71	0.87	+	133	144	+	
	Wood	17	10	+	0.84	0.65	+	261	177	+	
		11	8	+	0.80	0.81	+	190	220	+	
III	ORES, MINERALS AND METALS <sup>b</sup>										
	Manganese	23	13	+	0.45	0.72	+	179	246	+	
	Iron	8	17	+	0.77	0.75	+	114	197	+	
	Zinc	11	8	+	0.76	0.84	+	101	294	+	
	Lead	16	10	+	0.68	0.81	+	204	207	+	
	Nickel	27	16	+	0.40	0.16	+	145	31	+	
	Bauxite	18	15	+	0.82	0.46	+	215	235	+	
	Tin	7	15	+	0.73	0.74	+	239	190	+	
		19	22	+	0.32	0.71	+	530	520	+	

**Table 5 ANALYSIS OF INSTABILITY AND LONG TERM CHANGES IN PRIMARY AND PROCESSED COMMODITY PRICES, 1965-1987 (Cont'd)**

Processing Chain	Measures of Annual Prices Stability <sup>a</sup>						Secular price change <sup>b</sup>		Trend growth more (+) or less (-)
	Average annual price changes 1965 to 1987 (%)		Stability more (+) or less (-)	Coefficient of determination (R <sup>2</sup> )		Stability more (+) or less (-)	1965-68 to 1985-87 (%)		
	Primary stage	Final stage		Primary stage	Final stage		Primary stage	Final stage	
Tungsten	24	15	+	0.04	0.44	+	327	64	-
Copper	33	13	+	0.09	0.64	+	92	96	+
Phosphate	18	17	+	0.52	0.91	+	198	619	+
Sulphur	18	15	+	0.78	0.82	+	427	223	-
Asbestos	9	17		0.70	0.76	+	156	228	+
Glass	14	15		0.61	0.35		133	109	
IV <u>PETROLEUM</u>	21	20	+	0.80	0.50		828	668	

<sup>a</sup> The price instability and price change measures relate to the first and last stages of the processing stages of the processing stages outlined in Appendix Table 1. Similar data for intermediate stages (where they exist) are available from the author on request.

<sup>b</sup> The averages shown have been computed using developing country trade weights for the individual commodities in the group.



Similar conclusions about more favorable prices for processed commodities occur for the agricultural materials group. Annual price changes for the primary stage items were 60 percent greater (16 as opposed to 10 percent) than that for the processed stages with the instability in raw cotton prices being almost two and one-half times that for cotton fabrics. In the two instances (pulpwood and flax) where annual price changes for the primary stage item were lower, the coefficient of determination ( $R^2$ ) for the trend line fitted to the processed stage item was distinctly higher. This implies that the latter's prices were in fact more predictable although their annual changes were larger. As was the case with the ores and metals group, the secular change in processed agricultural materials prices was more favorable--the 1965-87 increase for these items was 15 percent above the corresponding change for primary stage agricultural materials.

The observed relation between further processing and more stable international prices also holds for the food group overall, but the statistical results for individual chains show far less consistency. The processed stage food products experienced annual price fluctuations that were 2 points lower (15 versus 17 percent) than that for unprocessed foods with this overall result largely being influenced by coffee which has a relatively high weight in the group average. In a majority of the chains (11 of 19) processed foods had greater price stability with an even higher proportion (14 of 19) occurring when the coefficient of determination is used as the relevant measure. Primarily due to the absolute decline in tea extract prices, as well as the 646 percent increase for fresh shellfish, unprocessed food commodity prices rose more than 22 percent above those for the processed products in these chains. A rapid expansion of seasonal (winter) fresh food exports, which command a price premium,

from developing countries also helps explain why the overall trend in processed food prices was less favorable.<sup>16</sup>

#### V. Summary and Conclusion

Two objectives of international commodity policy have been to reduce instability in exporter's earnings and importer's prices through international (buffer stock) agreements and to encourage further processing of domestically produced commodities by developing countries. However, it appears that little attention has been given to potential interrelations between these objectives. Specifically, if processed commodities are traded in markets that are generally more stable, and if these items experience more favorable longer-term price trends, this would be a further previously unrecognized attraction of natural resource-based industrialization strategies. Also, if a significant number of developing countries are shifting their composition of exports toward processed commodities, and if the markets for these items are in fact less unstable, this could alter the priority attached to negotiating commodity price stabilization agreements.<sup>17</sup>

Using the World Bank's commodity processing classification scheme this study shows that a major structural shift occurred from the mid-1960s to late

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<sup>16</sup>For all nonpetroleum products reported in Table 5 the average annual primary stage price change was 18 percent, or 5 points higher than the processed products. Due to the relatively high weight of foods, the secular price change for primary stage products (198 percent) was 3 points higher than that for processed goods.

<sup>17</sup>Alternatively, if a shift to exports of processed commodities leaves a diminishing and relatively small number of developing countries reliant on exports of primary (unprocessed) commodities it may be more attractive to work for export earnings stabilization measures (like the European Community's STABEX program) rather than standard commodity agreements or Common Financial Fund operations.

1980s in the composition of developing countries' exports toward most processed commodities and this change was reflected to varying degrees in all major developed country import markets. However, the developing countries actually responsible for the further processing (such as the Asian NICs) often were not major producers of the primary (unprocessed) commodity. This finding suggests that internal constraints to commodity processing may often be more important than external barriers like escalating tariffs. This study also established that the shift resulted in developing countries receiving considerably more stable agricultural materials and ores and metals export prices--and to a lesser extent prices for foodstuffs--as well as more favorable long-term price changes. Both factors should further enhance efforts by developing countries to encourage local processing of domestically produced primary commodities.

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Appendix

Elements of Primary Commodity Processing Chains Defined in Terms of  
Revision 1 of the Standard International Trade Classification (SITC) System

Appendix Table 1 provides details on the commodity processing chains which form the basis for this study's empirical analysis. Each commodity is classified as falling in the primary, intermediate or final stage of the processing chain. In addition, its Standard International Trade (SITC) Revision 1 classification number is also given.<sup>18</sup>

A point to note is that chains defined in Appendix Table 1 are based on the existing SITC system and therefore may have certain limitations. One problem is that some of the SITC-based stages define products at too high a level of aggregation with the result that product composition may vary in ways that influence the empirical analyses. For example, the primary and processed stages of the fruit and vegetable chains may contain different proportions of (say) temperate and tropical products so they need not accurately represent a given commodity undergoing increased fabrication. A second problem concerns leakages from the chain. In these cases a given commodity experiences further processing, but is not used as a direct input into the next highest stage item. As a result, analysis of trade changes a SITC defined processing chain may understate the actual level of commodity processing undertaken by developing countries.<sup>19</sup>

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<sup>18</sup>As an example, Appendix Table 1 shows that the cocoa chain has three distinct stages with cocoa beans (SITC 072.1) representing the primary unprocessed product. Cocoa powder (SITC 072.2) and cocoa butter (072.3) are two items classified as the next highest stages of processing while chocolate (SITC 073) represents an even higher level of processing activity. For products like wood manufactures it is possible to identify five different levels of commodity fabrication with some of these chains stages consisting of two or three different SITC products.

<sup>19</sup>For example, Appendix Table 1 classifies various types of cotton fabric as a higher stage of processing than cotton yarn, but some yarn may be used as direct inputs into other products (like tires and other rubberized products) and be lost from the processing chain analysis. Similarly, some copper products may be lost if they are used in the manufacture of (say) electronic goods. Due to the nature of the SITC system it has not been possible to deal with this problem of leakage in a satisfactory way.

Appendix Table 1. ELEMENTS OF THE WORLD BANK'S COMMODITY PROCESSING CLASSIFICATION SCHEME AND SOURCES OF UNIT VALUE INFORMATION

<u>Processing chain</u>	<u>Primary stage product (SITC)</u>	<u>Intermediate product(s) (SITC)</u>	<u>Final stage product(s) (SITC)</u>
<b>I FOODSTUFFS AND TOBACCO</b>			
Pig meat	Live swine (001 3)	Fresh or frozen pork (011 3)	Preserved pork (012 1, 013) <sup>a</sup>
Poultry	Live poultry (001 4)	Fresh or frozen poultry (011 4, 011 81)	Prepared or tinned meat (013) <sup>a</sup>
Meat of Cows, sheep or goats	Live cattle, sheep or goats (001 1, 001 2)	Fresh or frozen beef or mutton (011 1, 00 2)	Meat tinned or smoked (012 less 012 1, 013) <sup>a</sup>
Fish other than shellfish	Fresh or frozen fish (031 1)	none identified	Salted or preserved fish (031 2, 032 01)
Shellfish	Fresh or frozen shellfish (031 3)	none identified	Prepared or preserved shellfish (031 02)
Wheat	Unmilled wheat (041)	Wheat meal or flour (046)	Bread or biscuits (048 41)
Rice	Rice in husk or husked (042 1)	none identified	Rice glazed or polished (042 2)
Fruit	Fresh fruit (051)	none identified	Preserved fruit (053)
Vegetables	Fresh vegetables (054)	none identified	Preserved vegetables (055)
Coffee	Green or roasted beans (071 1)	none identified	Coffee extracts (071 3)
Cocoa	Raw or roasted beans (072 1)	Cocoa powder and butter (072 2, 072 3)	Chocolate (073)
Tea	Tea (074 1)	none identified	Tea extracts (099 02)
Sugar	Raw beet and cane sugar (061 1)	Refined sugar (061 2)	Flavored sugar and sugar candy (062)
Groundnuts	Groundnuts (221 1)	none identified	Groundnut oil (421 4)
Copra	Copra, excl flour and meal (221 2)	none identified	Coconut oil (422 3)
Palm nuts and kernels	Palm nuts and kernels (221 3)	none identified	Palm kernel oil (422 4)
Soya beans	Soya bean excl flour (221 4)	none identified	Soya bean oil (421 2)
Linseed	Linseed excl flour (221 5)	none identified	Linseed oil (422 1)
Cotton seed	Cotton seed excl flour (221 6)	none identified	Cotton seed oil (421 3)
Castor seed	Castor seed excl flour (221 7)	none identified	Castor oil (422 5)
Tobacco	Unmanufactured tobacco (121)	none identified	Cigars, cigarettes, etc (122)
<b>II AGRICULTURAL MATERIALS</b>			
Wood	Rough logs (242 21, 242 31)	Logs roughly square (242 22, 242 32) <sup>b</sup>	Plywood and veneer (631 1, 631 2) <sup>b</sup>
Cork	Cork unworked (244 01)	Lumber sawn and planed (243) <sup>c</sup>	Wood manufactures (632) <sup>c</sup>
Paper pulpwood	Pulpwood (242 1)	Cork simply worked (244 02)	Cork manufactures (633)
Rubber	Natural and synthetic rubber (231 1, 231 2)	Woodpulp (251 2, 251 6, 251 7, 251 8)	Paper (641 1 to 641 4, 641 7, 641 9) <sup>b</sup>
Leather	Hides and skins (211 less 211 8, 211 9)	Unvulcanized rubber (621 01 to 621 03) <sup>b</sup>	Paper articles (641 1 to 642 3, 642 9) <sup>c</sup>
Feathers	Feathers (291 96)	Vulcanized rubber (621 04 to 621 06) <sup>c</sup>	Tires, tubes and belts (629 1, 629 4, 655 45) <sup>d</sup>
Horn and whalebone	Horn and whalebone (291 12)	Bovine and sheep leather (611 3, 611 4, 611 91, 611 92) <sup>b</sup>	Rubber clothing (841 6) <sup>d</sup>
Hair	Human hair (291 91)	Chamois and parchment leather (611 93, 611 94) <sup>c</sup>	Leather belting (612 1, 612 2, 612 9) <sup>d</sup>
Silk	Raw silk (261 3)	none identified	Leather clothing (841 3, 851 02)
Jute	Raw jute (264)	none identified	Feather goods (899 26, 899 92)
Wool	Wool greasy (262 1) <sup>b</sup>	none identified	Carved horn and whalebone (899 15)
	Wool degreased (262 2, 262 6, 262 8) <sup>c</sup>	none identified	Human hair worked (899 94)
		Silk yarn and thread (651 1)	Silk fabrics (653 1)
		Jute yarn (651 9)	Jute fabrics (653 4)
		Combed and carded wool (651 21, 651 22, 651 25)	Wool fabrics (653 21, 653 22) <sup>d</sup>
			Wool blankets (656 61) <sup>d</sup>

Appendix Table 1. ELEMENTS OF THE WORLD BANK'S COMMODITY PROCESSING CLASSIFICATION SCHEME AND SOURCES OF UNIT VALUE INFORMATION (Cont'd)

Processing chain	Primary stage product (SITC)	Intermediate product(s) (SITC)	Final stage product(s) (SITC)
Cotton	Raw cotton (263 1) <sup>b</sup> Cotton combed and carded (263 4) <sup>c</sup>	Cotton yarn (651 3, 651 4)	Cotton fabrics (652.11 to 652.13, 652) <sup>d</sup> Cotton blankets (656 62) <sup>d</sup>
Flax, hemp and ramie	Raw flax, hemp and ramie (265 1 to 265 3)	none identified	Flax, hemp and ramie yarn (651 5)
<b>III ORES, MINERALS AND METALS</b>			
Phosphate	Natural phosphate (271 3)	Phosphoric esters (512 63)	Phosphoric acid (513 35) <sup>d</sup> Phosphate fertilizer (561 2) <sup>d</sup>
Sulphur	Sulphur (274 1)	Esters and purified sulphur (512 61, 512 2)	Sulphuric acid and compounds (513 33, 513 42)
Asbestos	Crude Asbestos (276 4)	none identified	Asbestos fiber and material (661 83, 663 8)
Glass	Sand excl metal bearing (273 3)	Glass in mass (664 11, 664 13, 664 3) <sup>b</sup> Glass surface ground (664) <sup>c</sup>	Safety or construction glass (664 5 to 664 7) <sup>d</sup> Glass manufactures (664 91 to 664 93, 665 1, 665 2) <sup>d</sup>
Iron	Iron ore (281 3)	Pig iron (671 2) <sup>b</sup> Iron wire and rod (673) <sup>c</sup>	Iron and steel plate (674 1 to 674 3) <sup>d</sup> Iron strip, rails, wires (675, 676, 677) <sup>d</sup>
Manganese	Manganese ore (283 7)	none identified	Ferro manganese (674 1)
Copper	Copper ore (283 11, 283 12)	Copper unrefined (682 11) <sup>b</sup> Copper refined (682 12, 682 13) <sup>c</sup>	Copper bars, wire, plate (686)
Nickel	Nickel ore (283 21, 283 22)	Unwrought nickel (683 1)	Nickel bars and sheet (683)
Bauxite	Bauxite ore (283 3)	Aluminum oxide (513 65) <sup>b</sup> Unwrought aluminum (684 1)	Aluminum bars, plate, wire (684 2 less 684 24)
Lead	Lead ores (283 4)	Unwrought lead (685 1)	Lead bars, plate, wire (685 2)
Zinc	Zinc ores (283 5)	Unwrought zinc (686 1)	Zinc bars, plate, wire (686 2)
Tin	Tin ores (283 6)	Unwrought tin (687 1)	Tin bars, plate, wire (687 2)
Tungsten	Tungsten ore (283 92)	none identified	Tungsten (689 41)
Silver <sup>e</sup>	Silver ore (285 01)	Unworked silver (681 11)	Rolled silver (681 12)
<b>IV PETROLEUM</b>			
Petroleum	Crude petroleum (331 01)	none identified	Gasoline, kerosene, fuels (332 1/2, 332 3/4)

- <sup>a</sup> SITC 013 (preserved meat) may contain other meats that do not strictly belong in the processing chain.  
<sup>b</sup> Of the two products shown in this stage of the chain this item is less processed and may be a production for the other.  
<sup>c</sup> This item is considered to be the more highly processed of the two in the same stage of the processing chain.  
<sup>d</sup> The items in this stage of the processing chain are classified as having similar levels of fabrication.  
<sup>e</sup> No unit value data could be computed for this commodity.

Note: Sources of unit value information

1. European Community (16) - Shellfish, wheat, rice, fruit, cocoa, tea, groundnuts, copra, soya bean, linseed, cork, manganese, bauxite and tungsten
2. France, Italy and Germany combined - Pork, poultry, other meats, fish other than shellfish, vegetables, tobacco, castor seed, petroleum, wood, paper, rubber, leather, horn and whalebone, jute, flax, hemp and ramie, zinc.
3. France and Germany - Coffee.
4. Italy and Germany - Feathers, hair, silk, wool, cotton.
5. EFTA - Sugar.
6. France - Phosphate, sulphur, asbestos, glass, iron, copper, nickel, lead
7. Japan - Palm nuts and kernels, cotton seed
8. Germany - Tin.



Finally, the SITC system may be based on some product groups that contain products which are at different levels of fabrication. As an example, the vegetable oil stages of the groundnut, linseed, soya bean, copra and cotton seed chains do not distinguish between crude and refined oils although different levels of processing are involved.

Several of the commodities listed in Appendix Table 1 have end uses at the primary or intermediate stage of processing. For these items a processing chain analysis will naturally show little progress in shifting exports to higher levels of fabrication. Soya beans are an example as the primary stage item is a feed and foodstuff. Vegetables, fruits, fish and shellfish are other processing chains where a strong consumer preference may exist for the fresh (unprocessed) stage of the product--a factor that would work against processing (preservation) in exporting countries.

A final point to note is that there may be major differences in the number of stages that are identified for the processing chains listed in Appendix Table 1 and this is often due to the nature of the SITC system. For example, several commodities like fruit, vegetable, fish and shellfish have only a primary and final stage good identified as SITC products. This contrasts with the wood (manufactures) chain where a primary stage, two intermediate, and two final stages can be identified. As a result of these differences in detail, it is very difficult to make cross-commodity comparisons of trade at similar levels of fabrication.

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