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EXTRAPOLATION OF HISTORICAL TRENDS OF MANUFACTURING OUTPUT,  
EMPLOYMENT AND TRADE FOR DEVELOPING COUNTRIES  
IN THE SECOND DEVELOPMENT DECADE <sup>1/</sup>

prepared by

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This report describes the preliminary results of the initial phase of the UNIDO's efforts to project industrial value added, employment and income for various developing countries and several regional aggregations. In brief, econometric growth functions were estimated using past data for each of these variables and extrapolated to 1980. The objective of this work is to obtain a rough idea of industrialization performance, a tentative picture of industry's prospects in developing countries. Then this picture is juxtaposed to the goals of the Second UN Development Decade. This work began in December, 1970. The tentativeness of results from this simplistic method must be emphasized. A second phase is now beginning, using more advanced methods (see appendix A).

GENERAL SCOPE AND SCOPE OF THE PROJECTIONS

Before turning to the results of this work, we describe the data, the problems encountered in projecting them and the method of projection.

A. DATA COLLECTION AND DATA PROBLEMS

In this initial effort, we have collected and assembled time series data for twelve large developing countries and for eight world regions, including the industrial countries. Value added and employment are treated separately for thirteen industrial sectors (two-digit SITC categories and combinations thereof). Gross domestic product (GDP) also was compiled and projected to permit conclusions about the extent of changes in industry's role in the economy at large. These data comprise 213 time series for production, 133 for employment, and 21 for GNP. Most series run from the early 1950s to 1969, although for certain small sectors they begin only in 1960.

1/ The twelve countries are Argentina, Brazil, Chile, Colombia, Mexico, Venezuela, India, Indonesia, Korea, Pakistan, the Philippines and the United Arab Republic. The regions are (1) Asia (excl. China, Japan and Israel), (2) Latin America, (3) Africa (excl. South Africa), (4) the developing countries, (5) the developed market economies, (6) world excluding centrally planned economies, (7) the centrally planned economies, and (8) the world total. The six Latin American countries treated separately included 83 percent of industrial production in that region in 1969; the five Asian countries included 91 percent in their region. Overall these countries produced about 65 percent of the industrial output of the developing countries.

Information for imports and exports was gathered for SITC sector 5 (chemicals), sector 7 (equipment and vehicles) and an amalgam of sectors 6 and 8, which include most other manufactured goods except processed food, drink and tobacco, timber and petroleum products. Total commodity trade also is treated for comparison. The trade in both directions, 210 data series were required. Most country data run from the late 1950's to 1968; the regional data begin in 1960. Unfortunately, these series are not long enough to prevent cyclical distortions, where they exist, from affecting the trend equations and the projections.

The trade data are not comparable to the output data in several fundamental respects. First, the categorization schemes do not match. Second, the trade data represent the gross values of exports and imports, while output is stated in terms of value added. A third problem is that the export and import values are published only in current prices, while output is tallied at constant 1963 prices.

Only the third problem is addressed seriously in this paper. The interim solution is to deflate trade in manufactures by the export price index for industrial Europe published by the International Monetary Fund. This index is chosen because it represents world market prices and contains the highest proportion of manufactured products of any such index that is readily available. Total commodity trade (including foodstuffs and raw materials) is deflated by UN and IMF indexes tailored as well as possible to the individual countries or regions (see appendix B for details).

Because of the remaining serious problems in comparing the two sets of data, inferences about the interactions of trade with production can be only tentatively drawn. The only direct comparison in this paper is based on a hypothetical formula to reconcile the categorization and valuation schemes (see p. 28 below). In the next phase of the project, considerable effort must be invested in overcoming these inconsistencies. Progress can be made on this front, but the goal can be only imperfectly achieved. An effort has already begun to impute price deflators by sector for each country's trade in manufactures from highly disaggregated data. The initial attempt, however, has revealed many difficulties.

## B. METHOD

To indicate the general magnitude of production, employment and trade for 1975 and 1980 within the limited time allotted to this initial work, we have confined our method at present to the projection of semi-logarithmic time trends for these variables. Thus, equations of the form

$$\log y = \log a + t \log (1 + r) \quad (1)$$

were estimated by regressing variable  $y$  on  $t$  for each sector in each country;  $y$  represents value added, employment, exports, imports or GDP, the growth rate of which is to be measured;  $t$  represents the year of the calendar;  $r$  is the historical growth rate, which is estimated as a regression coefficient; and  $a$  is a constant term, also a product of the regression.

This method makes no explicit assumptions about the causes of growth and permits no estimate of the effect on the results of policy actions (such as trade preferences for developing countries) or unforeseen changes in other variables. The most one may say for this method is that in cases for which the sources of growth continue to unfold as in the past ten to twenty years this method should give reasonable projections. To test for changes over time in the historical rate of development and in the statistical fit of the observations to a trend line, we successively shortened the time series by dropping two or three earliest years and recomputed the growth rates. Where data were available, computations were made for series beginning in 1950, 1953, 1955, 1958, 1960 and 1963. With these several readings, we set upper and lower boundaries on the implications of historical experience. To aid in interpretation of results, a computer-drawn graph of the data and trend equations has been done for each sector, and summary tables of results were made.

Recognizing the limitations of this method, we have formulated a prototype of a multi-equation model, incorporating the interdependence between trade, production and other variables. This model is displayed in Appendix A. It should be feasible to estimate its coefficients (although adaptations to individual countries would be necessary) and on this basis to test the

sensitivity of the projections to certain policy actions and autonomous economic factors. Single-equation estimates already have been made for a few countries (e.g. India, Korea and Mexico).

## II. PROJECTIONS OF MANUFACTURING OUTPUT AND EMPLOYMENT

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A methodological dilemma is presented by the fact that projections for individual countries may yield results inconsistent with those from aggregated data for the corresponding regions, and the regional results may be inconsistent with projections based on still more highly aggregated data. Through aggregation, high growth rates in some sectors and countries are moderated by low ones in others. In a projection of the disaggregated output levels, however, the fast-growing sectors and countries become increasingly dominant, boosting any summation of the projections for all of them. There is no "correct" choice of aggregation level except to the extent that quite large errors would result from the projection of extraordinarily high short-run growth trends. In this paper we report results at the regional level. Results for single countries are shown for comparison among themselves with the proviso that they are considered less reliable. The second-phase model should be helpful in interpreting the country data.

Another basic question is that of the extent to which sectors or countries can be expected to continue expansion at past rates. Clearly some industries may encounter rising input costs or constraints on market growth which slow their expansion. In the same or other sectors, improvements in technology or the development of new markets for certain products may stimulate the pace of growth. In this paper, however, we project the historical growth rates (with certain limitations to be mentioned). Thus the output shares of the fast-growing sectors would increase consistently, and those of certain traditional sectors would shrink.

### A. REGIONAL PROJECTIONS

Most of the regional time series, although influenced by the business cycle, have grown quite regularly over the long run (much more so than the series for individual countries). Thus the calculations yield a high degree of statistical significance and tight confidence intervals for the estimated growth rates,



although some variation remains along the historical periods tested.<sup>1/</sup> Narrow confidence intervals are highly desirable, of course, when a coefficient is to be used for extrapolation into the future. The series showing less regular growth usually refer to smaller industrial sectors (especially sectors 28, 30 and 39, which make up less than 10 percent of manufactured production<sup>2/</sup>). Thus, we can predict the global and regional developments with some accuracy, barring fundamental change in the world economic climate, but we cannot say with confidence in which countries these developments will take place.

1. Output: Taking for each sector the median growth rate from the several periods for which rates were calculated, one arrives at a weighted average of 7.7 % per year for the developing region as a whole. The average of the growth rates from the equations that fit best statistically yields the same figure, which is only slightly below the average of the highest rates among the several periods (see Table 1).

If manufactured value added in these countries is projected from 1968 at the lowest and the highest rates shown in Table 1, a span develops whereby the low projection deviates from the high one by 18 percent in 1975 and 27 percent in 1980. Thus value added in developing countries (stated at constant 1963 prices) would range in 1980 between \$ 87 billion and \$ 119 billion. Inspection of the historical scatter diagrams indicates, however, that the uncertainty is not so large as this, because the higher rates (median and above) clearly are more appropriate for projection, particularly for Asia and Africa. This is the case because the higher rates are based on longer-run

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<sup>1/</sup> As can be seen in Table C/1 of Appendix C, the average value of the Student's t-statistic for the growth rates reported there is 23.5, and its inter-quartile range (for 33 cases) is from 8.7 to 36.9.

<sup>2/</sup> These sectors are printing, leather, rubber, and miscellaneous manufactured products respectively.

TABLE 1

PROJECTIONS OF MANUFACTURED VALUE ADDED IN MAJOR DEVELOPING REGIONS

(Values at constant 1963 prices)

Regions	1968 Value Added		Projected Growth Rate			Estimated 1980 Value Added			1980 Shares	
	Bl. \$	Share (%)	High	Mediar	Low	High	Mediar	Low	High	Mediar
Asia <sup>a/</sup>	18.6	41.1	9.4	8.3	5.6	55.9	51.1	39.2	47.0	40.2
Latin America	22.9	50.3	6.7	6.4	5.1	51.8	48.6	40.5	43.5	44.0
Africa <sup>b/</sup>	3.6	8.0	9.5	9.3	5.5	11.1	10.8	6.3	9.4	9.8
Weighted averages <sup>c/</sup>	-	-	8.1	7.7	5.8	-	-	-	-	-
Totals	45.1	100.0	-	-	-	118.8	110.5	86.5	100.0	100.0

a/ Excluding Japan and Israel

b/ Excluding South Africa

c/ The projected 1975 output levels are used as regional weights.

trends; the low rates reflect more largely the relative inelasticity of demand for protection by producers of goods in transit.

In any event, these growth rates embody the assumption that development of the main leading sectors of the past is not retarded by constraints on markets or inputs but continues, even at the more pessimistic rates. Typically, these sectors are chemicals, metal fabrication and, to some, metal products. Fast growth in these industries is vital to effect the sharp rise in performance typical of certain other traditional ones (see table, below). Any shortfall in their performance might be made up through a marked acceleration in the growth of some other sectors producing mainly for export. This is a strong assumption, however. If it is not fulfilled, overall manufacturing output may advance at only 6 to 6.5 % per year - the rate of the past 10 to 15 years.

Table 1 also contrasts the levels and growth of manufacturing value added in developing Asia, Africa and Latin America and shows the implied shifts among these regions in shares of the total. If past trends continue, one will find substantially higher rates of manufacturing expansion in Asia and Africa than in Latin America. For Asia (excluding Japan and Israel), the long-run growth rate of manufacturing output has been about 7 %, but a rate of 8.5 % or even more could be reached in the 1970's under the assumption stated in the preceding paragraph. This would increase value added to <sup>by 1980</sup> 2.5 to 3 times the 1968 level and raise its share of manufacturing among developing countries from 41 to about 46 %. These growth rates would fulfill the goals of the International Development Strategy for manufacturing. However, they would not necessarily assure the larger goal of 6 % growth for GDP. If agriculture fulfills its growth target of 4 % per year, then a growth of 9.4 % would be needed in industry for these two sectors combined to reach 6 %.<sup>1/</sup> We do not know what can be expected of the remaining sectors (i.e. the extractive, power and tertiary industries), because information on the tertiary activities is incomplete. In any event, the relatively promising outlook for industrial development in the Asian region is based largely on outstanding records in certain countries and should not obscure the serious difficulties in reaching satisfactory growth rates in numerous other countries.

<sup>1/</sup> This figure is based on estimated 1975 weights for these two sectors of 21 and 36 % of GDP respectively.

In Africa (excluding South Africa) manufacturing output has grown at a long-run rate of about 7.5 %. This rate could be increased to over 9 % in the 1970's, if the dynamic sectors continue their development unabated. This pace would triple value added between 1968 and 1980. Even this improvement may not be adequate to achieve the growth target for GDP, because the manufacturing sector in Africa (producing less than one-tenth of GDP) is still too small relative to the slower-growing agricultural sector (which probably accounts for over half of GDP). Even if agriculture fulfills the growth target of 4 % per year, these two sectors together would grow at only about 5 %. Achievement of the GDP target then would require either an annual growth of 8 % for the remaining sectors or further acceleration of progress in manufacturing.

In Latin America, manufacturing is a more prominent sector (one quarter of GDP), but it has been growing at a rate of only 5 to 5.5 %. If the dynamic sectors, such as chemicals, petroleum and metal products, continue to expand their importance in the industrial structure, this rate could be improved to about 6.5 % in the 1970's, which would not quite double the 1968 output volume by 1980. Thus this region can hardly attain the goals of the International Development Strategy, unless several countries improve their performance. Although the figures are not yet complete for years after 1968, in certain countries a change for the better seems to have been occurring recently. Naturally, the results for each region must be judged in light of the variation of performance in individual countries.

2. Employment and Labour Productivity: The median growth rate of manufacturing employment in developing countries is projected to be 5.3 percent. <sup>1/</sup> If this expansion continues, then an average of 3.6 million new manufacturing jobs per year would be created from 1967 - 1975 and 5.1 million jobs per year from 1976 to 1980. Of the 54 million new jobs in the entire period, four of

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<sup>1/</sup> This figure is obtained by averaging the median regional growth rates weighted by the 1975 employment estimates.



every five would be in Asia. This distribution reflects both the higher projected output growth and also the labour-intensive methods of that populous region. Table 2 shows the range of growth of manufacturing employment for the three developing regions. The best-fit rates would be somewhat above the medians.

These growth rates of manufacturing employment exceed the growth of the total labour force, estimated at about 2.4 percent in developing countries for this period.<sup>1/</sup> The manufacturing sector should thus raise its share of total labour force in developing countries from 8 percent in 1967 to about 12 percent in 1980. If past patterns continue, the largest change - from 6 to 13% - would take place in Asia. Africa, with a small industrial base, has the fastest proportional rate of job creation, and manufacturing in that region should raise its employment from only 3 to about 6% of the labour force. If future industrial development in Latin America remains as sluggish as in the past, the share of labour force working in manufacturing would remain approximately stable at around 13 to 14%. The trends indicate that manufacturing can make a substantial contribution to ameliorating unemployment only in a few fast-growing semi-industrialized countries, especially in Asia. In other countries, the industrial sector still is too small or its development too gradual to make more than a modest contribution toward this goal.<sup>2/</sup>

Table 3 summarizes the information about output per person employed. The growth rates and 1960 levels are obtained by dividing the entries in Table 1 by those in the corresponding cells of Table 2. Table 3 is striking for the fact, among others, that average labour product in 1967 (the last available year) was more than four times as high in Latin America as in Asia. The fact reflects largely the amount of capital and labour skills in the production process and, possibly, the quality of management. It is to be expected in the populous Asian region that the use of labour instead of labour-saving equipment would be prevalent. Statistics place output per person employed in Africa at double that in Asia, although there is some question about the accuracy of this figure.

<sup>1/</sup> This estimate is a weighted average of regional estimates published in UNIDO, Industrial Development Survey, Volume II, p. 60, Table 2).

<sup>2/</sup> See pp. 15-17 below for additional discussion at a country level.

T A B L E 2

PROJECTIONS OF MANUFACTURING EMPLOYMENT IN MAJOR DEVELOPING REGIONS

Region	1967 Employment (million persons)	Projected Growth Rate (percent per year)		Estimated 1980 Employment (million persons)	Estimated 1980 Employment (million persons)
		High	Medium		
Asia <sup>a/</sup>	41.3	5.2	5.7	4.3	84.1
Latin America	11.4	4.3	3.2	3.4	20.7
Africa <sup>b/</sup>	3.5	2.3	2.5	6.7	16.7
Weighted Average <sup>c/</sup>	-	4.5	5.3	4.1	-
Totals	56.2	-	-	-	130.3
					111.1
					19.2

a/ Excluding Japan, Israel and China.

b/ Excluding South Africa

c/ The projected 1975 employment levels are used as regional weights.

TABLE 3

AVERAGE LABOUR PRODUCTIVITY IMPLIED BY OUTPUT AND EMPLOYMENT PROJECTIONS

Region	1967 Labour Productivity \$/employee	Growth Rate Implied by High Median Low			1970 Productivity: Implied by High Medium Low	
		Output + Employment Projections	Output + Employment Projections	Output + Employment Projections	Output + Employment Projections	Output + Employment Projections
Asia	115	3.0	3.1	2.2	\$ 202	\$ 244
Latin America	150	1.0	3.1	2.6	7,500	2,300
Africa	94	-2.7	0.7	-1.1	665	1,050
Weighted Averages	\$ 1,107	1.7	2.3	1.5	\$ 910	\$ 1,110

Labour productivity is advancing about as fast in Latin America as in Asia with the result that the difference in output per man is projected to remain about constant in proportional terms and to increase in absolute numbers. In the past, about one-quarter of this advance in Latin America was due to shifts in the composition of industry toward high-productivity (usually capital-intensive) sectors and the remainder to advances in techniques within sectors. In Asia, almost all was due to advances in techniques within sectors. If progress in labour productivity is the same in both regions, then the faster output growth projected for Asia must be based on more rapid expansion of industrial employment, accompanied by a correspondingly faster "widening" of the capital stock. In the case of Africa, figures for the past indicate that all added product is accounted for by resource widening with virtually no increase in product per man. Indeed average product in Africa is shown to decline in two instances in Table 3. This lag in labour productivity could be caused partly by shifts in the balance of development toward more labour-intensive industries, although no such shifts appear at the two-digit level of data aggregation. It could also reflect the employment-generating policies of African governments, or "localization" policies which replace highly educated expatriates with a larger number of less highly trained local personnel. It could also be due to technical problems in production or to deficiencies in management or, possibly, to inaccuracy in the statistics or some combination of these things. In any event, this phenomenon calls for closer investigation and, if traceable to real difficulties, it would indicate need for technical assistance and/or revision of policy.

3. Manufacturing's Share of National Production: What do the above projections indicate about the evolution of manufacturing's role in the developing economies at large during the 1970's. Implications about this sector's role as an employer were discussed on page 9 above. Data for 1960-68 on gross domestic product (GDP) for Asia show very consistent growth at 4 to 4 1/2 percent per year in contrast to growth of manufacturing at nearly twice that rate. Thus manufacturing would increase its share of total value added from 15 percent of GDP in 1968 to 27 percent in 1980. This compares with 32 and 37 percent in the developed market economies. On the other hand, the share of manufacturing in Latin America would increase only slightly from 24 percent in 1968 to 27 % in



1980. The growth of manufacturing is slower in Latin America, and that of GDP is slightly higher, presumably because of the faster development of the tertiary sector at higher levels of per-capita income. Although faster future development of tertiary activities in Asia too may slow the advance of manufacturing's share in a way not foreseen by our projection method, it appears that Asia may be a long way toward catching up with Latin America in industrialization during the 1970's. The available data series for GDP in Africa is not adequate for trend projections.

#### B. CONTRASTS AMONG SINGLE COUNTRIES

The regional results presented above provide merely a convenient means of summarizing information. Within each region is a wide range of more and less satisfying country experience. Table 4 displays data on the experience of 12 of the largest industrial producers among developing countries. The 1968 output level indicates the base-year size of the manufacturing sectors in these countries. The table shows explicitly the highest and lowest growth rates recorded for production in the periods examined. The median rate may be approximated by adding the median growth rates shown for employment and productivity. We can be less confident that the country growth rates will continue unchanged, because development can shift more easily among these smaller areas than among the larger regional aggregates.<sup>1/</sup>

Leading these 12 countries in rate of industrialization is Korea, surging ahead under the influence of an export boom. This country enjoys a powerful stimulus through their proximity to Japan. Although the Japanese boom seems likely to decelerate somewhat, it will continue to provide growing markets and large direct investments. It is interesting to note that Korea's development, unlike other cases, encompasses all sectors rather uniformly with no great changes in the composition of output. Manufacturing in Pakistan and India have progressed with less external stimulus. Pakistan has reached above average growth rates through the success of two

<sup>1/</sup> Also, more extreme rates of growth (or contraction), which are not likely to persist over the projection period, occur at the country level. Projection of sector growth rates above about 20% p.a. is ill-advised, because they typically refer to short boom periods or to growth from very low base levels. Moreover, their projection gives implausible results. Therefore, sector growth rates above 20% were reduced to this level. Affected are five sectors in Korea, two in Venezuela and two in the UAR. This question does not arise in the regionally aggregated data.

TABLE 4

## MANUFACTURING GROWTH PROJECTIONS AND TARGET FULFILLMENT IN SELECTED DEVELOPING COUNTRIES

Region or Country	1963 Output Level (million 1963 \$)	Range of Output Growth Rates (%)	Median Growth Rate of Employment (%)	Average La- bour Pro- ductivity (%)	Increase from Median Needed to Reach 9% Growth Target (%)
ASIA <sup>a/</sup>	18566	6.6 - 9.4	5.5	3.0	-
Korea <sup>b/</sup>	1139	13.5 - 18.9	13.5	3.0	-
Pakistan <sup>c/</sup>	1113	8.6 - 10.4	6.4	3.8	-
India	6951	5.2 - 9.9	6.3	2.4	-
Philippines	1051	5.8 - 7.7	1.7	5.4	0.8
Indonesia <sup>d/</sup>	1114	0.2 - 2.5	0.9	1.5	5.5
LATIN AMERICA <sup>e/</sup>	2902	5.1 - 6.7	3.2	3.1	1.0
Mexico <sup>e/</sup>	6614	3.6 - 9.6	10.1	0.8	-
Venezuela <sup>b/</sup>	1349	6.5 - 9.9	5.9	3.0	-
Colombia	1107	4.7 - 8.7	2.2	4.4	1.2
Brazil	5588	4.8 - 6.7	3.4	2.6	1.9
Chile	1363	3.5 - 6.0	4.3	1.1	2.5
Argentina	4937	3.2 - 6.0	1.8	3.4	2.6
AFRICA	3597	5.5 - 9.5	8.5	0.8	-
U.A.R. <sup>b/</sup>	948	5.1 - 16.1	-	-	-

<sup>a/</sup> Regional figures are not derived directly from country figures but from aggregate regional data which include additional countries.

<sup>b/</sup> Industrial sectors with growth rates exceeding 20 percent were rounded down to this level. There are five such sectors for Korea, two in Venezuela and two in the UAR.

<sup>c/</sup> Production data are available only for ISIC sectors 22-23 and 27-34.

<sup>d/</sup> Production data are available only for ISIC sectors 22-23 and 30-33.

<sup>e/</sup> Results for employment based only on ISIC sectors 22-27 and 30-34.

larger sectors, i.e. the engineering and non-ferrous metals sectors, and high productivity growth, i.e. the expansion of growth in the chemical and electronics sectors, which are highlighted in various years. The data are available on the status of the important metal products sector. The pillars of Indian development are the steel production, metals and metal fabrication sectors. The Philippines have remained at a modest pace in all sectors with no marked change in industrial structure. Thus the patterns of manufacturing growth are different from country to country.

In Latin America, the leading economies in case of industrial growth are Mexico and Venezuela. The former is developing a manufacturing sector with especially significant progress in the chemicals and metal fabrication industries. Mexico's sizable textiles sector also is keeping pace. The rapid growth of Venezuela's industry has been based on expansion in the large metal fabrication sector and the emergence of sizable sectors producing basic metals and paper. This represents diversification from the heretofore leading petroleum-related industries, which continue to facilitate development by providing ready access to foreign exchange.

The modest record of most other large Latin American countries may improve gradually through regional co-operation and the adoption of more outward-looking industrial policies. If this occurs, the outlook for the region must be somewhat revised. It also seems unlikely that the economic stagnation which has characterized Indonesia will continue throughout the 1970s. Already a partial recovery is occurring. If this change holds, the Indonesian projection will have to be revised upward.

By focusing on the relative growth rates of employment and average labour productivity in Table 4, we can form some ideas about the process and orientation of industrial development in the countries shown there. The growth of average labour productivity ranged for these countries between about -1 and 7% with a mean of about 3%. This gauge, however, reflects many things that cannot be seen simply in terms of efficiency. High productivity growth (or a high ratio of productivity growth to employment growth) may signify the development of industries that are capital intensive relative to the pre-existing set, i.e. industries in which large expenditures for equipment to accompany labour raise output per man. It may also reflect heavy investments in modernization or replacement of outdated facilities in contrast

to investments in expansion. One of these explanations presumably applies to the median rate of productivity growth shown in Table 4 for the Philippines and to a lesser extent for Colombia.<sup>1/</sup> On the other hand, Mexican and Korean industries appear to be expanding rapidly in labour-intensive sectors with less productivity advance. This pattern is prevalent also for the Africa region. Pakistan, Venezuela and India, appear to be both "widening" their industries steadily and simultaneously improving their capital stock and level of technology.

Five of the twelve countries shown in Table 4 should reach the 8 % manufacturing growth target for the Second UN Development Decade. The other countries (except Indonesia) must boost by 1 to 2.5 % per year either their expansion of manufacturing employment or their productivity increase or some equivalent combination of the two. It would be interesting to speculate about the magnitude of added investment needed to achieve this goal. For illustration, let us take a manufacturing sector producing 20 % of national value added with a marginal capital-output ratio of three (including a proper allocation of infrastructure expenditures). Then this added output would require a boost in manufacturing investment of 0.6 to 1.5 % of G.D.P. In the case of Indonesia, a much larger increase would be required.

Table 5 indicates the changing importance of manufacturing in developing economies during the coming decade in terms of both production and employment. In light of these projections of the share of total labour force employed in manufacturing, one can compare the growth rate of employment in this sector (shown in Table 4) to the growth of total labour to ascertain the fraction of labour-force expansion absorbed by manufacturing. For instance, employment growth at 5.5 % in a manufacturing sector involving 3.2 % of the total working population, as in Asia, means only a 0.45 % annual increase in employment relative to this total. Then if the Asian labour force grows at 2.2 % annually,<sup>2/</sup> manufacturing would absorb just one-fifth of its annual growth.

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1/ I assume that change in average capacity utilization is a cyclical phenomenon and does not influence the long-run rate of productivity growth cited here.

2/ UNIDO, loc.cit.



TABLE 5

CHANGE IN MANUFACTURING'S SIGNIFICANCE IN DEVELOPING ECONOMIES DURING THE 1970's

Region or Country	Manufacturing's Share of GDP at 1963 prices (%)		Manufacturing's Share of Labour Force (%)		Percent of New Labour Absorbed by Manufacturing	
	1966	1980 Median	1967	1980 Median	1967	1980 Median
Asia	15.4	25.9	8.2	13.0	20.5	32.5
Korea	19.7	50.0	12.2	34.4	58.6	149.0
Pakistan	10.2	17.2	8.7	15.4	32.7	49.3
India	16.2	35.2	10.0	21.0	44.5	86.1
Philippines	11.6	15.4	3.7	8.1	7.3	7.5
Indonesia	10.3	9.7	7.3	5.9	3.3	2.1
Latin America	24.0	26.8	13.4	14.0	16.5	16.0
Venezuela	17.3	29.9	12.7	14.7	26.0	28.9
Mexico	21.6	29.1	15.9	33.7	53.5	100.1
Colombia	19.3	30.7	12.2	11.1	9.6	3.4
Brazil	18.2	16.3	8.6	8.9	10.7	10.1
Chile	44.0	49.1	21.4	30.2	61.3	86.9
Argentina	34.5	45.8	27.2	27.7	32.6	33.2
Africa	-	-	2.9	6.3	12.3	25.5
U.A.R.	20.0	67.6	-	-	-	-

At the country level, the results shown in Table 5 are quite plausible except for manufacturing's projected 1980 shares of production and/or employment in Korea and the U.A.R. While in these countries the shares are implausibly large, it is nonetheless clear that manufacturing comes to play a major role.<sup>1/</sup> Indeed, by the mid-1970's this sector should be providing employment for all of the net accretions to the labour force in these two countries, and by 1980 it should be absorbing a substantial part of the pre-existing unemployment. Judging from the present low levels of unemployment in Korea, one may predict development of a labour shortage before the end of the decade.<sup>2/</sup> A labour shortage in turn would tend to reduce the high growth rates and to impel changes in economic structure and technique. Nonetheless, this development would begin to raise the wages and welfare of the working population. A less pronounced but still significant increase in manufacturing's role as a producer and employer can be foreseen for the 1970's in India and Mexico. Its role as producer climbs in Colombia, but the relatively small growth in demand for labour stemming from this development limits its significance for employment. Manufacturing already bulks large in the economies of Chile and Argentina, but the projected growth of its employment is too low to absorb as many workers as this level of industrialization would lead one to expect. In the other countries in the table and in most countries not included in our analysis the manufacturing sector is still too small to make a decisive contribution to growth in either production or employment.

### C. CONTRASTS AMONG INDIVIDUAL MANUFACTURING SECTORS

The six manufacturing sectors with the largest 1968 production in developing regions accounted for about 80 percent of all manufacturing in each of the three regions. These sectors are food and beverages, fabricated metal products, chemicals and petroleum refining, textiles, china and glass, and basic metals production. Table 6 presents data on past performance and projections of the future for these important industries, arranged according to their size.

The food, beverages and tobacco sector -- the biggest in many developing countries -- normally is one of the slowest-growing. Textile manufacturing,

- 1/ It can be expected that the proportional role of manufacturing will be constrained by the faster development of the non-industrial tertiary sector as <sup>these</sup> countries reach higher levels of per-capita income.
- 2/ Estimates based on sample survey place countrywide unemployment in Korea in 1969 at 3.4 % (382 thousand). See International Labour Office, Yearbook of Labour Statistics, 1969. For the U.A.R., no employment data are available.

PROJECTIONS FOR MAIN INDUSTRIAL SECTORS IN DEVELOPING REGIONS

Sector/Region	Range of Output Growth Rates	Median Growth of		1968 Output Level	Median 1980 Output Projection	Percent of Sector's Total Manufacturing Output 1968	Percent of Sector's Total Manufacturing Output 1980
		Employment	Productivity				
(Million 1963 \$)							
ISIC 20-22 Food, Beverages + Tobacco							
Asia.....	4.6 - 5.5	2.4	2.3	4,121	1,173	24.2	21.6
Latin America....	4.2 - 5.0	3.7	0.7	6,069	10,133	26.5	28.9
Africa.....	4.4 - 6.1	5.7	0.5	1,073	2,588	29.8	34.1
ISIC 35-38 Metal Products, Machinery and Transport Equipment.							
Asia.....	11.9 <sup>a</sup> - 17.5	5.3	4.3	2,820	13,380	15.2	16.2
Latin America....	6.5 <sup>a</sup> - 11.5	3.2	5.7	4,253	13,284	15.7	17.4
Africa.....	5.5 - 6.1	11.0	11.1	549	1,539	15.3	15.9
ISIC 31-32 Chemicals and Refining							
Asia.....	7.4 - 8.0	5.0	3.7	2,347	3,536	12.6	10.8
Latin America....	7.0 - 7.8	2.8	4.8	3,872	9,200	16.9	13.9
Africa.....	7.7 - 10.9	12.0	- 0.1	413	1,539	11.5	11.6
ISIC 25 Textiles							
Asia.....	4.1 - 5.2	1.6	2.6	1,325	5,426	17.9	17.7
Latin America....	2.5 - 2.9	- 0.3	3.0	1,843	2,821	8.0	5.2
Africa.....	5.3 - 5.9	9.1	- 2.9	541	1,070	15.0	9.9
ISIC 33 Non-metallic mineral products							
Asia.....	7.1 - 9.3	5.8	2.8	1,210	3,509	6.5	6.9
Latin America....	5.4 - 6.0 <sup>a</sup>	2.4	3.2	1,124	2,140	4.9	4.4
Africa.....	5.6 - 6.3	3.8	3.0	170	396	4.7	3.7
ISIC 34 Basic Metals							
Asia.....	10.5 <sup>a</sup> - 13.3	6.4	4.4	885	4,430	4.8	6.8
Latin America....	5.8 - 7.5	3.9	3.2	1,438	3,332	6.3	5.9
Africa.....	1.8 - 3.6	6.4	- 1.7	182	311	5.1	2.9

<sup>a</sup> The most extreme growth rate was dropped because scatter diagrams show that it referred to an unsuitable time period. In these cases, the next rate was taken.

another large sector in Africa and Asia is also expanding slowly. The shares of these two sectors in industrial output are declining in nearly all countries of our sample. The decline of the food and beverages share is most rapid in the UAR, India and Venezuela. In textiles, the decline in share is greatest in the UAR, India, Pakistan and Korea. Both sectors decline in Africa also, and there they are joined, surprisingly, by basic metals. In Venezuela, the share of the heretofore dominant chemicals and refining industry is falling fast. Of course, these declines in output share represent no slump in absolute output but rather an evolution in industrial structure resulting from a planned emphasis on other industries or from the natural tendency for industry to diversify as it matures. In the anomalous cases of Pakistan, food processing appears to be a leading growth sector, and its share of output in the Philippines is rising slowly; moreover, textiles encompass a growing share in Chile.

At the other extreme, the most rapidly growing sector in Asia and Latin America is that making metal products, machinery and transport equipment. As Table 5 shows, this sector comes to account for one-quarter of all manufacturing output in these two regions by 1980. Growth in this sector is especially important for India, the UAR and Colombia, and this fact is one reason for the relative decline in these countries of the output shares of the traditional sectors mentioned above.

Chemicals and petroleum-refining is a leading sector also in the development of several Latin American countries, e.g. in Brazil and Argentina and to a lesser extent in Mexico. Chemicals and refining play a significant role, moreover, in Pakistan and the UAR and appear to be growing in importance in Africa. In Venezuela and Chile, the basic metals sector is developing rapidly. In all of these countries, heavy industry is becoming established. A secondary growth sector in India is the wood products industry. The most progressive sector in Indonesia is rubber products.

Another sizeable sector - non-metallic mineral products - is growing in most countries at about the average rate. In Pakistan, where it is unusually large, it is growing at about this rate, and in Korea it is expanding its relative importance.

The manufacturing sectors mentioned above will continue to play a relatively minor role because of their small size. Nonetheless, Table 7 presents for every industry the average of the mean growth rates projected for the 12 countries and a measure of the dispersion of country experience from this average. (The coefficient of relative variation is the standard deviation among country growth rates for each sector divided by the mean for that sector.)

Thus one sees that the leather sector experiences the slowest average growth, followed by textiles, printing, apparel and food. At the other extreme, metal fabrication shows the fastest growth followed by basic metals production, paper and chemicals. It has been suggested that production for export of basic metals, paper and chemicals may be given new stimulus in developing countries by restrictions on atmospheric and water pollution in the densely industrialized regions of the world. If properly dispersed and controlled, these enterprises could be accommodated in lightly industrialized areas without creating harmful pollution.

The low coefficients of relative variations for food, paper and rubber products indicate that country growth rates in these branches of industry tend to cluster more closely around their means than in other sectors. In the cases of food and paper, this situation would stem from the widespread availability of raw materials for these industries and the relative accessibility of the technology for countries at the development level of those in the sample. For rubber, the clustering probably is explained by the market-oriented economics of the tire industry, stemming from shipping costs. The high coefficients apply to specialized equipment, textiles, apparel and leather-products. The first of these industries clearly has not grown up in many countries because the product is advantageously imported. The reason for the wide diversity of growth rates in the others is not clear.

### III. PROJECTIONS OF INTERNATIONAL TRADE IN MANUFACTURED GOODS

The historical data for international trade by individual countries and sectors are in many cases so disorderly that no projection can be made using the simplified method of this paper. Moreover, the data series, which



TABLE 7

## AVERAGE SECTOR GROWTH RATES IN THE SAMPLE COUNTRIES

ISIC	Sector	Average of Median Growth Rates (percent p.a.)	Coefficient of Relative Variation
20 - 22	Food, Beverages and Tobacco	7.1	0.58
23	Textiles	5.4	1.10
24	Apparel and Footwear	6.9	1.01
25-26	Wood and wood products	8.5	0.71
27	Paper and paper products	10.7	0.59
28	Printing and Allied	6.5	0.83
29*	Leather and leather products	8.8	0.97
30	Rubber Products	8.5	0.61
31-32	Chemicals and Petroleum Refining	10.6	0.69
33	Non-metallic Mineral Products	7.7	0.76
34	Basic Metals	11.9	0.81
35 - 38	Metal Products, Machinery and Transport Equipmt.	12.8	0.72
39	Other Manufactured Products	10.1	1.20

usually begin between 1957 and 1960, are too short to permit elimination of cyclical effects. In most Latin American countries except Mexico, manufactured imports show no clear trend because of sharp fluctuations in response to government balance-of-payment policies. Exports from some of the countries appear to be more regular than their imports. On the other hand, manufactured exports of several countries grew during the 1960's at rates too high to be extrapolated over a decade into the future, e.g. 30 to 50 percent per annum. It must be recognized, moreover, that policy actions can produce radical shifts in export and import trends, which may invalidate such projections, especially for the country level.

The regional aggregations remain more orderly than the country series, because both natural and political disturbances and also high and low growth rates tend to offset each other in the aggregated data. Due to the difficulties with the country data, we must rely even more heavily on the regional level in projecting trade than we did for output and employment. One may hope to obtain better projections of trade with more advanced methods.

To eliminate the influence of price inflation from the data for trade in manufactures, all series were deflated by the IMF price index for exports from industrial Europe. As noted above (p. 2), this index is considered to be the most appropriate among the alternatives available. Admittedly, the rationale for conversion of trade values to constant prices is not so clear as for domestic output, but this method is used to maintain at least tentative comparability between the two data sets. The prices of traded manufactures fluctuated only slightly. Total commodity trade is converted to 1963 prices using procedures set out in Appendix B.

One must bear in mind that the categories of trade projected here (SITC-5-8) exclude certain important items, namely processed food, drink and tobacco, timber and refined petroleum. These items are grouped in other categories with non-manufactured items. An effort will be made to separate them as part of our subsequent work.<sup>1/</sup>

#### A. REGIONAL PROJECTIONS

In 1968, developing countries exported goods valued at \$ 42.1 billion in 1963 prices; about \$ 9 billion (21 %) were manufactured products (Standard International Trade Classes 5 through 8). Their total exports comprised nearly one-fifth of world exports, but their manufactured shipments were only 6 % of

<sup>1/</sup> More detailed historical data have been published by UNCTAD in "Trade Manufactures of Developing Countries: 1970 Review" (TD/B/C.2/102) and in earlier publications of this series. The minor differences between UNCTAD and UNIDO interpretations are attributable to differences in levels of data aggregation and coverage.

worldwide trade in this category. Total visible imports into developing countries amounted to \$100 billion, which almost 70% were manufactured goods. Developing countries together had a deficit of \$100 billion in total visible trade in that year; Asia alone had a small surplus.<sup>1/</sup> This picture for total trade consisted in each region of large deficits for manufactured goods and roughly offsetting surpluses in non-manufactured goods. As shown in Table 6, the growth rate of manufactured exports from the developing regions is forecast to range between 12 and about 15% per annum for the 1970's before counting price changes. Such exports from the industrialized countries should grow at 5.5 to 11%. At these rates, the developing regions would raise their share of world manufactured exports from 6 to between 8 and 9%. This prospect assumes continuing expansion of present exporting sectors and vigorous development of new ones.

Imports of manufactures into developing countries grow significantly more slowly than their exports but from a much higher base level, yielding a continuing negative balance in manufactured trade. Although regulation of the balance of trade in manufactures alone should not necessarily be a policy goal, the size of this imbalance is one indicator of the extent of dependence on offsetting items such as an export surplus in non-manufactured trade (e.g. minerals, agricultural products, and tourism) and imports of capital.

Table 8 shows that the highest percentage growth in manufactured exports is taking place in Latin America. Despite the fact, however, that this region manufactures a greater volume of goods with far higher output per person employed than any other developing region, the 1966 level of its manufactured exports as defined here was less than half of that for Asia and lower than for Africa. Asian manufactured exports, therefore, are moving ahead more slowly in percentage terms, but they are advancing by larger steps in absolute dollars, and the 1980 projection for Asia in Table 8 still leads that for Latin America by a sizable margin. The growth rates for Africa's exports again span most of the other three.

Each region's 1966 imports of manufactures are three to four times as high as its exports. As reported above, however, imports grow at much slower rates with the result that in two regions - Latin America and Africa - the absolute deficit in trade of manufactured goods could go down.<sup>2/</sup> This outcome will be

<sup>1/</sup> A restatement of these values in current prices would make only an insubstantial change.

<sup>2/</sup> The higher rate of import growth shown in Table 8 for Latin America is influenced by cyclical aspects of the 1966 observation and thus the lower estimate of the deficit appears to be more realistic for this region.

PROJECTIONS OF MANUFACTURED EXPORTS AND IMPORTS OF MAJOR WORLD REGIONS<sup>a/</sup>

Region	Manufactured Exports		Manufactured Imports		Balance of Trade in Manufactures b/
	Growth Rate (percent per annum)	1968 Level (Billion 1963 \$'s)	Growth Rate (percent per annum)	1968 Level (Billion 1963 \$'s)	
Asia					
High	13.2	4.6	9.2	13.1	-8.7
Low	11.5	19.7	8.3	37.0	-17.3
Latin America					
High	17.2	2.0	8.6	9.0	-7.0
Low	14.5	12.7	5.0	14.4	-1.2
Africa					
High	15.1	2.4	6.4	7.9	-5.5
Low	10.6	7.7	5.9	16.4	-1.4
Weighted Average					
High	14.7	--	6.0	--	--
Low	12.1	--	6.9	--	--
Totals					
High	9.6	45.4	30.2	76.4	-21.2
Low	12.5	32.8	100.1	52.6	22.2
Developed Mkt. Econ.					
High	11.1	422.1	12.6	408.9	13.2
Low	9.7	353.0	11.7	363.0	-10.0
Centrally Pl. Econ.					
High	8.7	41.3	9.3	42.7	-1.4
Low	7.8	37.0	8.7	39.5	-2.5
Weighted Average					
High	10.9	--	12.3	--	--
Low	9.5	--	11.4	--	--
Totals					
High	137.8	463.4	115.4	451.6	11.2
Low	390.0	390.0	402.5	402.5	-12.5

a/ Because the historical data series contain only nine years, only two trend equations were calculated. Therefore, the annual median projections for trade.

b/ The sum of all regional imbalances for 1980 will have to approximate zero instead of the negative value indicated above. It is assumed that trends for the developing countries will develop as in the past and that the centrally planned economies continue to be zero. Therefore, the exports of the developed market econ. should be adjusted to show the offsetting surplus on this account.

heavily influenced by policies. The deficit for Asia is widening rapidly - presumably as a result of boom conditions in several countries - but the compensating surplus in trade of non-manufactured goods seems to be keeping pace. Most of the imbalance in the trade of the developing countries takes place in their trade with the developed market economies. The figures in Table 8 indicate this fact for 1968. The projections for 1980, however, are made for each region independently and therefore are not perfectly consistent with each other. No attempt has been made here to "fudge" the results into consistency. Failure of the worldwide balance to come to zero must be traceable to errors and omissions.

Table 9 shows the growth rates of total visible exports and imports and the share of manufactured products in these totals. One can infer from this information the growth rates of non-manufactured trade. One sees by comparing Tables 8 and 9 that the export of manufactured products from developing countries is growing more than twice as fast as their total visible exports. Thus the share of manufactures in total visible exports of these countries should increase from 21% in 1968 to well over 40% in 1980 (see Table 9).<sup>2/</sup>

The experiences of Asia and Africa in this respect resemble roughly the overall picture. Asia, the region exporting the largest volume of manufactured products, also exports the greatest amount of raw materials and agricultural commodities and shows the highest growth rate for these non-industrial exports. Thus the share of manufactures in its exports rises only gradually. For Africa, the wide span of uncertainty about the growth rate of manufactured exports yields a correspondingly wide span for the manufactured share of total exports. In Latin America, however, which had the smallest manufactured export share in 1968, this ratio is projected to overtake those for the other two regions by 1980. This prospect is due as much to the very sluggish growth of Latin American non-manufactured exports as to the rapid advance of its manufactured exports. The ratios of manufactured to total visible exports for the industrialized areas should rise from about 74 percent to around 90 percent.

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1/ An adjustment of the imports and exports of the developed market economies by two to five percent would be necessary to retain a constant balance in the world total.

2/ Readers must bear in mind that these percentages exclude exports of processed food, timber and refined petroleum.



Region	Total Visible Exports			Total Visible Imports		
	Growth Rate	Share of Mfrs.	1980	Growth Rate	Share of Mfrs.	1980
		1968			1963	
Asia		23		65		
High	8.3		39	7.2		80
Low	6.7		39	6.4		76
Latin America		15		63		
High	3.6		63	5.4		87
Low	3.2		49	3.8		63
Africa		22		69		
High	7.3		53	5.3		75
Low	6.0		35	4.5		79
Weighted Average for Developing Regions		21		66		
High	6.9		47	6.3		21
Low	5.6		41	5.3		76
Developed Mkt. Economics		75		57		
High	8.7		97	8.9		85
Low	8.1		88	8.7		78
Centrally Planned Economics		64		62		
High	7.8		69	8.0		68
Low	6.8		71	6.3		79
Weighted Average for Developed Regions		74		58		
High	8.6		94	8.5		83
Low	7.9		86	8.4		78

The composition of exports (manufactured and other goods) is quite uniform for all developing regions and remains so, as the share of manufactures in the total increases gradually through 1980. The rather wide span of uncertainty about the growth of non-manufactured exports into Latin America, however, gives rise to a larger gap than for other regions between the low and high estimates of the 1980 manufactured share. The structure of visible imports, moreover, is remarkably similar for both developing and developed regions.

The portion of manufactured output that is exported is impossible to calculate with any precision, because the statistics for trade and production are not comparable (see p. 2 above). As a rough estimate, however, it appears that the developing regions presently export about 7 to 10 % of their manufactured output (mainly in Standard International Trade Classifications 6 and 8) and that this fraction will double approximately during the 1970's. Their manufactured imports amount to some 25 to 30 % of their industrial production, and this fraction should remain fairly stable.

It is safe to say that the Latin American countries exported a negligible share of their manufactured production in '65, but they may boost their exports to about 8 to 10 % by 1980. They also show the smallest import ratio. Asia and Africa engage in considerably more manufactured trade.<sup>1/</sup> Manufactured exports from the developed economies should rise from about 15 to some 20 % of industrial output with a roughly equivalent import share.<sup>2/</sup> In comparing exports and imports among regions, one must recognize that the extent to which commerce (external or internal) depends heavily on the mere size of the countries in question as well as on their economic orientation; that is, small countries naturally export and import larger shares of their output than large ones. Both the level and growth of the ratio depend also on the extent and effectiveness of regional economic integration.

<sup>1/</sup> These estimates are based on the assumption that one-third of the manufactured trade is contained in categories other than those analyzed here (i.e. SITC categories 7 through 9); these other items include processed food, timber and petroleum products. It is assumed, moreover, that only one-third of the value of manufactured exports and imports consists of industrial value added.

<sup>2/</sup> For the developed economies it is assumed that one-half of the value of traded goods is added through manufacturing.

B. CONTRASTS AMONG INDUSTRIAL COUNTRIES

Table 10 indicates the high and low growth rates for each country's manufactured and total visible exports and imports. For total visible exports, the rates for manufactured and non-manufactured exports were averaged together using projected 1975 levels as weights, yielding a composite rate for the 1970's that exceeds past performance. (See bottom paragraph). Considerable discretion has been exercised in weeding out growth rates that are excessively influenced by cyclical and other inappropriate factors, with the effect of reducing the spread between high and low. Nonetheless, many of the time series, especially for manufactured exports, registered growth rates in the 1960's that were incontrovertibly large. Growth rates of 20% (yielding a ninefold increase between 1968 and 1980) or even 30% (a 24-fold increase) are not uncommon. It seems reckless to project such rates. At present, however, the growth of manufactured exports seems to be accelerating rather than leveling off. Moreover, several important new stimuli are anticipated in the 1970's, such as preferred entry into large high-income markets, progress toward regional integration, and other policy reforms to facilitate industrial exports.

If manufactured exports from several countries continue to grow at rates exceeding 20%, then the share of such products as a fraction of their total visible exports will increase markedly. As shown in Table 10, this share would rise in Brazil, Colombia, Argentina and the Philippines from less than 13% in 1968 to a level near or above 50% in 1990. In Pakistan and Chile, it grows from above 10% to over 90%.<sup>1/</sup> The UAR and India also will experience substantial increases. The countries in the sample are the most highly industrialized developing lands and tend, especially in Asia, to be growing faster than other countries in the region. Thus the figures in Table 10 are generally higher than the regional results shown earlier.

Such radical rises in the significance of manufactured trade and the corresponding decline in the importance of the often stagnant non-manufactured category imply that the growth rates for total exports will climb above their levels of the 1960s. The rates shown in Table 10 include this effect.

<sup>1/</sup> In Korea, manufactures comprised over 90 percent of total visible exports even in 1968.

TABLE 10

## GROWTH RATES OF VISIBLE TRADE AND THE SHARES OF MANUFACTURES IN TRADE OF SELECTED DEVELOPING COUNTRIES

Region and Country	Growth Rates of Exports <sup>a/</sup>			Manufactures' Shares of Visible Exports		Growth Rates of Imports <sup>a/</sup>			Manufactures' Share of Visible Imports					
	Manufactures			1968	1980	Manufactures			1968	1980 <sup>e/</sup>				
	High	Low	Total Visible	High	Low	High	Low	Total Visible	High	Low				
ASIA														
Korea	30 <sup>b/</sup>	25	28	21	23	91	92	91	18	20	15	64	74	69
Pakistan	27	22	23	16	16	94	92	92	5	6	4	70	84	82
India	6	4	4	2	2	52	65	63	3	5	4	56	67	41
Philippines	22	20	10	7	7	11	47	43	5	10	5	57	70	71
LATIN AMERICA														
Mexico	11	8	7	-	-	70	36	37	6	8	6	89	97	94
Venezuela	-	-	-	-	-	-	-	-	5	10	4	86	89	81
Brazil	29	26	13	10	10	10	71	66	5	9	4	67	83	76
Colombia	27	25	11	9	9	10	62	57	3	4	3	87	89	87
Argentina	24	14	8	2	2	13	51	37	3	5	2	77	85	73
Chile	15	15	14	14	14	68 <sup>c/</sup>	95	95	5	6	6	68 <sup>c/</sup>	69	69
AFRICA														
U.A.R.	11	10	5	3	3	27	50	50	3	5	0	50	55	53

<sup>a/</sup> Based on SITC Categories 5 through 8.

<sup>b/</sup> The actual growth rates of Korean manufactures exports for 1958-68 were in the range of 55 to 85 percent per annum. The rates shown here are chosen arbitrarily for use in the projections.

<sup>c/</sup> Based on 1963 data.

<sup>d/</sup> Based on 1967 data.

<sup>e/</sup> Where identical growth rates are shown for manufactured and total imports, changes in manufactures' share are due to small growth differences which have been rounded off.



in extent of growth of manufactured exports, the growth rates of manufactured and non-manufactured exports are similar in most of the two categories. The third sector is expected to increase, in which the evolution of export composition should boost the growth rate for total exports from about 3 percent in the 1960's to the levels shown in Table 1a. Increases of 6 to 10 percentage points should take place in Brazil, Colombia and Chile, with smaller upward trends in the remaining countries. On the import side, the rates of growth are in a much lower range with the exception of Korea, and no such large differences exist between growth rates of manufactured and non-manufactured imports.

Despite the wide range of country experiences, the growth rate of manufactured exports consistently exceeds that of imports. The differences are sufficient (or the growth rates high enough) so that the present deficits in several countries' trade of manufactures should be reduced or even replaced by surpluses during the 1970's.

In Asia, prospects for trade in manufactures are especially promising for Korea and Pakistan.

For Korea the achievement of balance in manufactures by 1975 would be an impressive achievement in consideration of deficit of nearly 2,000 million on this account in 1969. In Latin America, Colombia may balance her manufactured trade by 1975 if imports remain tightly controlled, and Brazil and Argentina should approach it.<sup>1/</sup> The trend toward balance in manufacturing would be reflected clearly in their overall trade positions. These countries would eliminate excessive dependence on their typically slow-growing non-manufactured exports and on capital imports.

On the other hand, export development in the Philippines and the JAF is barely adequate to keep pace with imports, and the deficits on account of trade in manufactures in India and Mexico are increasing. This too is conspicuously reflected in their total trade positions. Moreover, the countries singled out here for separate treatment are the most advanced among

<sup>1/</sup> Chile ran a considerable surplus in 1967.



developing countries. In other countries at earlier stages of industrialization, the trade deficit must be corrected to allow substantially before it can be reversed.

The question remains whether the growth rates for manufactured exports in Table 10 will persist throughout the 1970's. Governments and entrepreneurs will have to prove themselves very nimble to develop new export markets as the older ones tend to reach a "saturation" point. As suggested above (pp. 15-17), moreover, it is likely that labour shortages will slow export development in Korea. One may question, moreover, whether the performances of Brazil, Colombia and Argentina are based on normal long-term trends. Nonetheless, even slower export growth than shown in Table 10 would yield substantial progress in these countries toward trade balance. It must be emphasized, however, that many developing countries will not achieve the same success in exporting as the leading ones in this sample.

#### C. TRADE IN INDIVIDUAL INDUSTRIAL CATEGORIES

Because of the lack of detail in our trade categorization and the failure of these categories to match the classification of production, we cannot say as much as we should like to say about the composition of trade in manufactures and the impact of trade on specific branches of industry. We have a relatively unobstructed view only of trade in chemicals (Standard International Trade Category No. 4) and in machinery and transport equipment (Category No. 7). Other manufactures, except processed food, petroleum and lumber are lumped together in Categories 6 and 8, which are combined. This conglomerate category contains a large number of consumer goods.

Table 11 indicates that over four-fifths of the 1963 manufactured exports from developing countries fall within SITC Categories 6 and 8. In the already industrialized countries, the role in exports of Categories 6 and 8 is now only 40 % and should decline to 36 % by 1980. This confirms the general impression that manufactured exports from developing lands consist heavily of consumer products and other light manufactures. Exceptions to this statement were Argentina and Brazil, in which these categories are lagging and where the

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1/ The growth of exports projected for Korea already has been arbitrarily reduced from historical rates. See Table 10, footnote b/.

TABLE 11

PERSPECTS FOR CHANGE IN THE COMPOSITION OF TRADE IN MANUFACTURES BY EXPORTING COUNTRIES

Region	Composition of U.S. Exports		Composition of U.S. Imports	
	1969	1980	1969	1980
AMERICA				
1969	11	35	13	32
1980	3	73	19	47
NORTH AMERICA				
1969	12	60	17	54
1980	9	61	16	58
AMERICA				
1969	6	43	12	46
1980	3	45	12	51
EUROPEAN REGIONS				
1969	7	43	14	46
1980	6	71	17	51

other two groups already play a significant role. The share of categories 6 and 8 is expected to fall somewhat except for Colombia, the Philippines and several countries in Africa. Especially Latin America appears to be reducing its dependence on exports of this type and shifting fairly rapidly (with growth rates of about 30%) into the export of machinery and transport equipment. In Asia, Pakistan is moving especially quickly in this direction. The export of chemicals (SITC 5) is growing rather slowly, and its share is declining in almost all developing countries, despite rapid expansion in domestic chemical production. However, Mexico is a conspicuous exception to this rule.

On the import side also, we find that the role of SITC Categories 6 and 8 is declining for each region. This reflects a natural as well as policy-fed process of import substitution in light manufactures as industrialization progresses. Corresponding to the widespread impression, this process has gone farthest to date in Latin America, and the data indicate that it is continuing in most Latin American countries. The other regions also will take major strides in this direction in the 1970s. Indeed, some countries are reducing imports in Categories 6 and 8 in absolute terms. In the meantime, imports of machinery and transport equipment are growing apace, except in Brazil and Argentina, where their share is declining, and in Mexico and Chile, where it is constant. In these countries, automobiles and producers' goods increasingly are being made at home. There is no apparent pattern in the behaviour of imports of chemicals.

#### D. PENETRATION OF MARKETS IN ADVANCED COUNTRIES BY MANUFACTURED EXPORTS OF DEVELOPING COUNTRIES

One cross-check of the feasibility of the high rates of expansion projected for the industrial exports of developing countries would be the extent to which these exports would impinge on existing patterns of supply in the importing countries. Our data permit a sensible analysis only at a high level of aggregation (e.g. major regions), which does not take account of developments in individual countries or commodity groups.

Referring to Table 5 above, we see that manufactured imports in the advanced countries (including centrally planned economies) are growing almost as rapidly as the manufactured exports of the developing countries. Even if

We assume, therefore, that all of the developing countries' exports go to the advanced countries, their overall share of the imports of the latter areas in SITC classes 5 through 8 would rise very gradually from its low level of about 3% in 1960. Table 12 indicates the historical and prospective evolution of developing countries' exports as a share of the imports of the advanced countries and also of the global totals in each category of manufactured trade. It is apparent that developing countries possess a significant share of exports only in SITC Classes 6 and 8, but neither the level nor the growth of their exports can be construed as a dominant market factor at this level of aggregation. In SITC Class 7, in which developing countries' exports are growing fastest, their share of the total trade is, and remains, negligible. The true shares with respect to the advanced countries are even smaller, of course, because some trade takes place among developing countries themselves. Developing countries' exports amount to a vanishing fraction of total sales in advanced countries.

In conclusion, we may say that the rapid growth of manufactured exports from developing countries does not appear to threaten the pre-existing pattern of trade; nor does it threaten the domestic industries of the importing countries because these exports remain a small part of total sales. Needless to say, their impact may be larger in the markets for certain individual products in certain importing countries. With very few exceptions, however, this impact will be within the limits of normal and desirable shifts in the locus of production in the world and will serve to raise overall efficiency in both developing and advanced countries. Thus recent measures to encourage such exports should be consolidated, including measures to facilitate adjustment in the importing countries.



TABLE 12

SHARE OF WORLD AND ADVANCED COUNTRIES' MANUFACTURED IMPORTS SUPPLIED BY DEVELOPING COUNTRIES

Country	Importing Period	Developing Countries' Exports as Share of Designated Countries' Imports	
		1970	1977
6	Developing Countries	5.5	6.8
	World	3.9	3.9
7	Developing Countries	3.0	2.2
	World	0.7	2.2
8 and 9	Developing Countries	12.7	16.1
	World	9.0	15.1
Total	Developing Countries	7.5	8.2
	World	5.6	7.5



Appendix A

AN INTERDEPENDENT MODEL OF MANUFACTURING OUTPUT, EMPLOYMENT AND TRADE  
FOR PHASE II OF THE PROJECTIONS PROJECT

The set of functions determining industrial output and trade which appears below is proposed as a prototype model for Phase II of the projections project. An econometric estimation of such a model for developing countries or regions would illuminate the factors operating within the historical data and should permit more accurate projections than the time trends of Phase I. It also would make possible tests of the sensitivity of results to changes in interesting economic or political variables. These advances in method are especially critical to an understanding of the rather volatile data on international trade in manufactures.

First a key to the variables is presented:

Endogenous variables

- X - manufactured exports of developing country
- M - manufactured imports of developing country
- D - demand for manufactured products for use within developing country
- S - supply of manufactures produced within developing country for home use and export
- E - employment in manufacturing

Exogenous Variables

- PX - foreign-exchange reserves of developing country
- AR - exchange rate
- C - consumption expenditure in export market area
- WPI - wholesale price index of developing country
- t - time
- GDP - gross domestic product of developing country
- pop - population

Subscripts:

- i - developing country or region
- j - commodity category
- k - export market

The proposed model would function as follows:

1.  $M_{1j} = f(EX_{1j}, X_{1j}, X_{2j}, GDP_{1j}, \text{ or } Y_{1j}, \text{ policy variables})$
2.  $X_{1jk} = f(C_k, \frac{WPI_{1j}}{X_{1j}})$
3.  $S_{1j} = f(E_{1j}, t; \text{ variable for changes in tax-subsidy policies, where appropriate})$
4.  $D_{1j} = f(\frac{GDP_{1j}}{pop_{1j}} \text{ and/or } pop_{1j})$
5.  $S_{1j} = D_{1j} + X_{1j} - M_{1j}$

It is envisioned to estimate such a model for major countries and, if possible, for major industrial sub-sectors in these countries. We might experiment also at the regional level. At present, single-equation estimates have been made without policy variables for several versions of Equations 1 - 3 and for a variant of equation 4 for the aggregated manufacturing sector and for 3 sub-sectors in India, Korea and Mexico. Plausible equations have been obtained in most cases, although some of the coefficients are statistically weak. The data base is now to be completed and a method to be worked out for an interdependent estimation of these equations, building where possible on the information obtained from the single-equation estimates.

The problems of specification and of obtaining appropriate data for this model are apparent. Some of them may be overcome through discussion and testing. General problems include the lack of sector price indices, which makes proper specification of the equations impossible. Moreover, in order for the trade data to be made consistent with those for industrial output, one of these data sets must be reclassified to match the other.

Looking at each equation separately, Equation (1) is constructed as a demand function. The question of specification revolves around whether imports are limited by absolute quantitative constraints (i.e. physical quotas related to exchange reserves or other considerations) or whether they respond to price and income influences. Econometric indications are mixed in this regard. The import supply function, which is assumed to be infinitely elastic for single developing countries, is omitted.

Equation (2) also is estimated with several functions. A consumer spending variable has been chosen on the hypothesis that most exports from developing countries are consumer goods. This variable can be tailored to the main trading partners of the reporting country, but these partners should be lumped together to save degrees of freedom. As a price variable, the wholesale price index for "consumer goods" was used, when available, because it supposedly includes the highest fraction of industrial goods in its make-up; otherwise the index for "domestic goods" or the "general wholesale price index" was used. In the single-equation estimations, however, this variable has evolved with the wrong sign, except in the equations for Mexico. In a simultaneous estimation, the supply side of the export market would be accounted for in Equation (5).

In Equation (3), the employment variable is used as a proxy for "widening" of industry and the time variable as a proxy for capital "deepening" and technical progress. Admittedly this is a weak formulation, adopted because data on capital stock are lacking. Not even data on annual industrial investment are available.

Equation (4) has been estimated up to now with domestic production rather than consumption as the dependent variable, because of the need to reclassifiy imports and exports in order to calculate consumption. Various combinations of GDP or GDP/head and/or population as independent variables have yielded reasonable results. The dependent variable must be properly defined for future use. For some countries, consumption spending would be more appropriate than GDP, but this data is not compiled for many developing countries.

There is room for debate concerning whether certain variables listed as exogenous are truly independent of the model. Foreign-exchange reserves (FX) have been rendered exogenous through introduction with a lag. GDP in developing countries is considered exogenous with respect to output in any industrial sector because industry in these countries is only a small component of the economy.

Appendix B

PROCEDURES FOR CONVERTING VALUES OF COMMODITY TRADE  
TO CONSTANT 1963 PRICES

Value added in production is shown in constant 1963 prices by the U N Statistical Office. Data on international trade are provided only in current prices, however, and any attempt to render them comparable to production values must be undertaken by the user. The method for doing this adopted for this provisional study is laid out here.

As stated on page 2 of the text, the values of manufactured exports and imports for all countries and regions were deflated by the export price index for industrial Europe.<sup>1/</sup> This index represents the world-market prices of goods actually traded internationally and contains the lowest proportion of non-manufactured items of any index available. This index is quite appropriate for the industrial trade of all developed countries and even for the manufactured imports of developing countries. Its deficiency for deflating the exports of developing countries is, of course, that the index assigns low weights to price movements for manufactured products of the type these countries export. However, all available alternative indices of traded goods' prices are considered inferior for this purpose because they are much more heavily influenced by the prices of unprocessed minerals and agricultural products. The chosen index changed rather little over the time period, 1956-1968. Its extreme values were 96 in the recession year 1959 and 105 in the year 1966 (1963 = 100).

For the conversion to current prices of the values of total exports, including non-manufactured goods, a much larger set of applicable and

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<sup>1/</sup> See International Monetary Fund, International Financial Statistics, "World Tables, Export and Import Price Indexes," in each issue.



often precisely tailored price indices is published monthly by the International Monetary Fund. Table B/1 identifies those used in this report. Directly applicable indices are provided for each of the included countries except for Mexico, Indonesia, Venezuela and the U.A.R. For certain other countries a few observations must be estimated by reference to the regional index relevant for each case (see footnotes to Table B/1).

In the case of total imports, on the other hand, rather little detailed information exists for developing countries. For each such country and region, the UN-compiled import price index for "less developed areas" as a whole was used. For Latin American countries, this general index could be linked to one for the Latin American region available after 1962. For the Developed Market Economies and Centrally Planned Economies, the import price index for "developed areas" was used. For aggregations including developed and developing areas, a weighted average of the two indices for these areas was compiled with the 1965 import levels as weights. None of the indices used to deflate imports varied by more than 10 percent from 1956 to 1968.

Table B/1

PRICE DEFLATORS USED FOR VALUING EXPORTS

<u>Region or Country</u>	<u>Index and Source</u> <sup>1/</sup>
developing countries	less developed areas, including petroleum, UN
developed market economies	developed areas, UN
world excluding centrally planned economies	weighted average of the above indices
centrally planned economies	developed areas (UN)
world	weighted average of the above two indices
Asia	other Asia, IMF
Latin America	Latin America, including petroleum, UN
Africa	other Africa, IMF
Korea <sup>2/</sup>	Korea, IMF
Pakistan	Pakistan, IMF
India	India, IMF
Philippines	Philippines, IMF
Indonesia	other Asia, IMF
Mexico	Latin America, including petroleum, UN
Venezuela	Venezuela, IMF (includes only petroleum)
Colombia	Colombia, IMF
Brazil <sup>3/</sup>	Brazil, IMF
Chile <sup>4/</sup>	Chile, IMF
Argentina <sup>5/</sup>	Argentina, IMF
United Arab Republic	less developed areas, excluding petroleum, IMF

<sup>1/</sup> All listed indices are published monthly in International Monetary Fund, International Financial Statistics, "World Tables, Export and Import Price Indexes."

<sup>2/</sup> The series originates in 1961.

<sup>3/</sup> The 1968 observation, not yet published, was estimated using the rate of change shown by the UN index for Latin America as a whole, excluding petroleum.

<sup>4/</sup> Observations for 1967 and 1968 estimated as described in footnote <sup>3/</sup> above.

<sup>5/</sup> Observations for 1956-1968 estimated as described in footnote <sup>3/</sup> above.

APPENDIX C

TABLES



TABLE 1. PROJECTIONS OF INDUSTRIAL PRODUCTION IN DEVELOPING COUNTRIES, BY SECTORS

Sector/Description	Presenting Period Rate (%)	1961 Pro-duction (billions of 1960 Dollars)	Anticipated Production (billions of 1960 Dollars)		Period of Data	Student's t-Statistic
16 Iron and Steel						
20-25 Iron and Steel		11.3			1950-68	
High Projection	5.2		16.3	21.1	1963-68	12.5
Low "	4.6		15.4	19.3	1963-68	24.2
Best-Fit "	4.9		15.9	20.2	1950-68	53.7
26 Fertilizers		5.7			1950-68	
High Projection <sup>b)</sup>	5.1		8.5	10.9	1950-68	27.9
Low "	3.6		7.3	8.8	1950-68	11.1
27 Apparel and Footwear		2.3			1950-68	
High Projection	7.9		4.0	5.9	1963-68	8.7
Low "	6.0		3.3	4.5	1950-68	20.0
Best-Fit "	6.3		3.6	5.1	1953-68	17.3
28 Food and Beverages		1.8			1950-68	
High Projection	7.9		3.2	4.5	1963-68	6.0
Low "	7.0		2.9	4.1	1950-68	26.6
29 Paper and Paper-Products		1.0			1950-68	
High Projection	2.9		2.0	3.1	1950-68	40.8
Low "	7.0		1.5	2.2	1963-68	16.4
Best-Fit "	8.6		1.8	2.7	1955-68	48.9
30 Printing and Allied		1.1			1960-68	
High Projection <sup>b)</sup>	3.0		1.4	1.7	1960-68	10.0
Low "	3.0		1.3	1.5	1963-68	7.7
31 Leather, Md. + Prod.		0.42			1960-68	
High Projection <sup>b)</sup>	4.3		0.56	0.69	1963-68	8.5
Low "	2.5		0.48	0.54	1960-68	4.7
32 Rubber Products		1.1			1960-68	
High Projection	7.4		1.9	2.7	1963-68	12.8
Low "	6.0		1.7	2.2	1960-68	14.3
33-37 Chemicals and Petroleum Refining		6.6			1950-68	
High Projection	8.5		11.8	17.8	1953-68	37.0
Low "	7.8		11.0	15.9	1963-68	16.1
Best-Fit "	7.9		11.1	16.2	1955-68	81.8
38 China and Glassware		2.5			1950-68	
High Projection	7.1		4.1	5.8	1963-68	19.3
Low "	6.4		3.8	5.2	1955-68	39.2
Best-Fit "	7.0		4.0	5.7	1960-68	46.8
39 Basic Metals		2.5			1950-68	
High Projection	8.4		4.6	6.9	1955-68	32.0
Low "	6.1		3.8	5.1	1963-68	8.7
Best-Fit "	7.8		4.3	6.3	1950-68	36.9
40-46 Metal Products, Machinery/Transport Equipment		7.6			1950-68	
High Projection	10.7		17.2	28.7	1953-68	26.1
Low "	7.1		12.2	17.2	1963-68	7.1
Best-Fit "	10.4		16.5	27.1	1950-68	32.0
47 Prof. and Scientific Eq.		1.1			1960-68	
High Projection <sup>b)</sup>	5.7		1.8	2.3	1960-68	8.0
Low "	4.7		1.6	2.0	1963-68	2.8

a) The Best-Fit Equation is the one equation with the highest Student's t-statistic for the sector.

b) This equation is also the Best-Fit equation.



ALTERNATIVE PROJECTIONS OF MANUFACTURING PRODUCTION IN THE UNITED STATES

1950	Sector/Criterion	Compound Growth Rate (%)	1953 Level	Production (Millions of 1953 Dollars)		Period	Student's t-Statistic
				1955	1963		
(Millions of 1953 Dollars)							
	Weighted Average Growth Rate and Total Projected Production		18,540				
	High Projection	9.4		35,393	55,013		
	Low "	6.6		28,406	30,693		
	Best-Fit "	8.9		33,613	52,160		
20 - 22	Food, Beverage and Tobacco		4,123			1955-1963	
	High Projection	5.8		6,222	9,242	1955-1963	11.3
	Low " <u>a/</u>	4.6		5,620	7,059	1955-1963	25.1
23	Textiles		3,325			1955-1963	
	High Projections	5.2		4,933	6,355	1955-1963	21.3
	Low " <u>a/</u>	4.1		4,309	5,379	1955-1963	25.2
	Best-Fit "	4.9		4,415	5,426	1955-1963	20.1
24	Apparel and Footwear		1,030			1955-1963	
	High Projection	11.4		2,307	4,106	1955-1963	7.0
	Low " <u>a/</u>	9.4		2,001	3,130	1955-1963	15.9
	Best-Fit "	9.8		2,103	3,371	1955-1963	12.1
25 - 26	Wood and Wood Products		1,027			1955-1963	
	High Projection	12.7		2,475	4,433	1955-1963	10.2
	Low " <u>a/</u>	11.2		2,125	3,413	1955-1963	19.1
	Best-Fit "	11.3		2,225	3,635	1955-1963	20.1
27	Paper and Paper Prod.		239			1955-1963	
	High Projection	12.1		730	1,292	1955-1963	11.3
	Low " <u>a/</u>	6.2		426	578	1955-1963	17.7
	Best-Fit "	10.4		600	907	1955-1963	25.4
28	Printing and Allied		402			1955-1963	
	High Projection	2.3		507	602	1955-1963	2.0
	Low " <u>a/</u>	1.8		461	503	1955-1963	6.0
29	Tannery and Leather Finishing Plants		101			1955-1963	
	High Projection <u>a/</u>	4.7		143	130	1955-1963	5.4
	Low " <u>a/</u>	1.6		109	115	1955-1963	1.9
30	Rubber Products		633			1955-1963	
	High Projection <u>a/</u>	7.1		1,028	1,451	1955-1963	10.4
	Low " <u>a/</u>	5.3		851	1,140	1955-1963	22.9
31 - 32	Chemical and Petroleum Refining		2,347			1955-1963	
	High Projection	8.0		3,492	5,707	1955-1963	11.5
	Low " <u>a/</u>	7.4		3,709	5,297	1955-1963	21.7
	Best-Fit "	7.8		3,347	5,596	1955-1963	19.2
33	China and Glassware		1,210			1955-1963	
	High Projection <u>a/</u>	9.8		2,523	4,039	1955-1963	29.6
	Low " <u>a/</u>	7.1		1,983	2,722	1955-1963	15.9
34	Basic Metals		885			1955-1963	
	High Projection <u>a/</u>	13.3		2,436	4,549	1955-1963	17.5
	Low Projection	7.0		1,424	1,994	1955-1963	14.3
35 - 38	Metal Products, Machinery +Transpt. Eqpt.		2,820			1955-1963	
	High Projection <u>a/</u>	13.5		7,600	14,342	1955-1963	25.8
	Low " <u>a/</u>	6.1		4,814	7,105	1955-1963	5.4
39	Prof.+ Scientif. Eqpt.		363			1955-1963	
	High Projection <u>a/</u>	4.5		532	663	1955-1963	6.0
	Low " <u>a/</u>	1.0		448	508	1955-1963	1.9

a/ This equation is also the best-fit-equation; the best-fit-equation is the one with the highest Student's t-statistic.

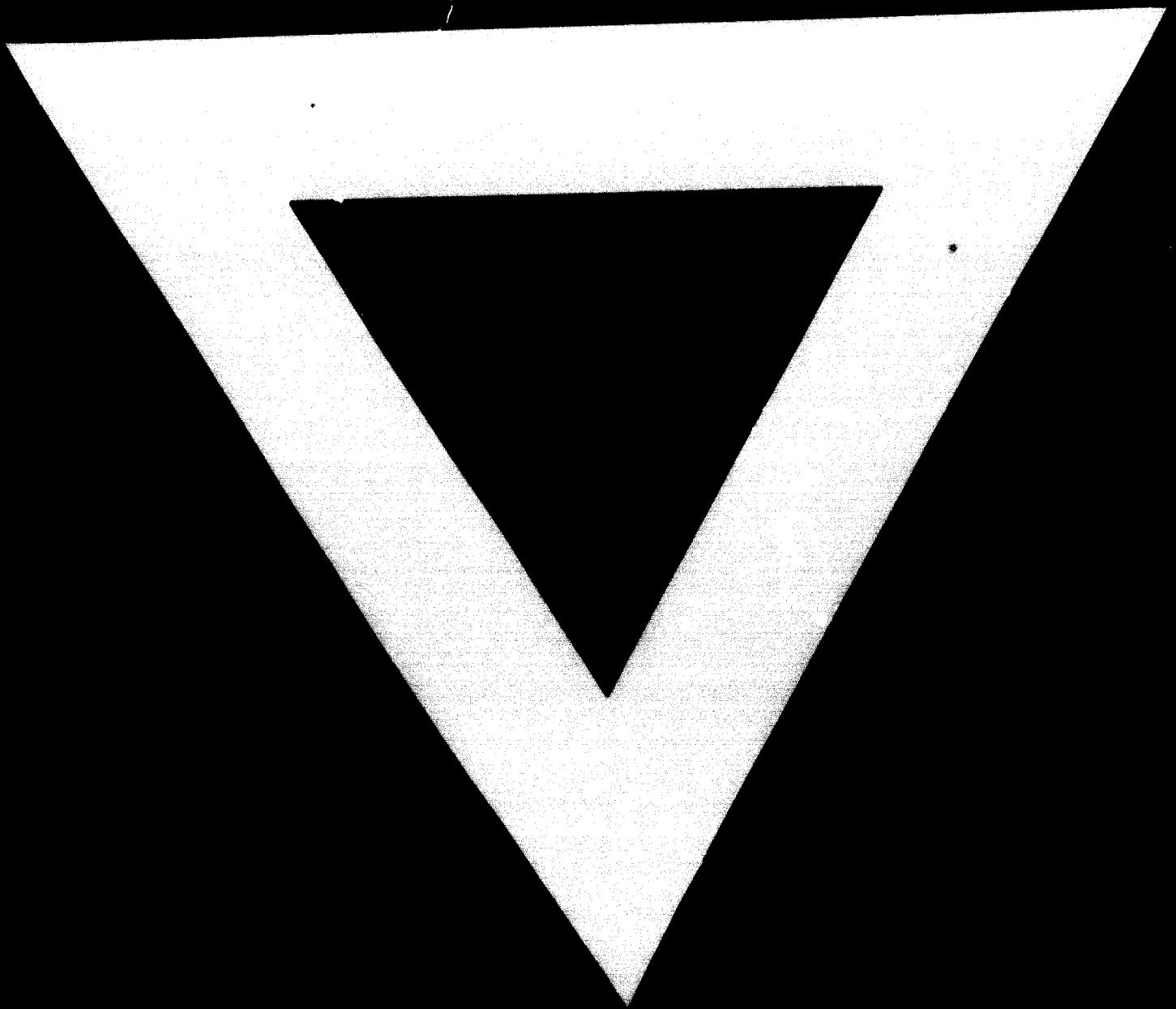


ALTERNATIVE PROJECTIONS OF MANUFACTURING PRODUCTION IN AFRICA BY REGION

ISIC	Sector, Subsector a	Projected Growth Rate (%) <sup>a</sup>	1968 Level	Projection for		Period of Data	Student's t-statistic
				1975	1980		
			(Millions of 1963 Dollars)				
Weighted Average Growth Rate and Total Projected Production			3,597				
	High Projection	9.5		6,947	11,119		
	Low " "	5.5		5,174	6,795		
	Best-Fit " "	9.5		6,809	11,050		
20-22	Food, Beverage and Tobacco		1,073			1955-1968	
	High Projection <sup>a</sup>	9.1		2,015	2,330	1955-1968	15.9
	Low " "	4.4		1,433	1,731	1963-1968	7.7
23	Textiles		543			1960-1968	
	High Projection	5.9		803	1,070	1963-1968	12.4
	Low " "	5.1		764	989	1960-1968	20.4
24	Apparel + Footwear		141			1960-1968	
	High Projection <sup>a</sup>	4.5		213	273	1960-1968	8.9
	Low " "	4.4		194	240	1963-1968	6.8
25-26	Food + Food Products		130			1960-1968	
	High Projection <sup>a</sup>	5.9		277	357	1960-1968	5.0
	Low " "	2.6		224	255	1963-1968	1.3
27	Paper + Paper Prod.		72			1960-1968	
	High Projection <sup>a</sup>	13.5		194	366	1960-1968	5.5
	Low " "	6.4		108	147	1963-1968	4.5
28	Printing and Allied		72			1960-1968	
	High Projection <sup>a</sup>	4.6		105	131	1960-1968	4.5
	Low " "	0.6		74	76	1963-1968	0.9
29	Tanneries and Leather Finishing Plants		27			1960-1968	
	High Projection <sup>a</sup>	6.1		41	55	1963-1968	18.0
	Low " "	4.9		37	47	1960-1968	10.6
30	Rubber Products		50			1960-1968	
	High Projection <sup>a</sup>	6.7		79	109	1960-1968	12.5
	Low " "	5.3		71	92	1963-1968	8.5
31-32	Chemicals and Petroleum Refining		413			1960-1968	
	High Projection <sup>a</sup>	10.9		935	1,569	1960-1968	7.4
	Low " "	7.4		711	1,019	1963-1968	3.8
33	China and Glassware		170			1960-1968	
	High Projection	6.9		283	336	1963-1968	5.4
	Low " "	5.6		274	377	1960-1968	8.0
34	Basic Metals		182			1960-1968	
	High Projection <sup>a</sup>	4.6		269	311	1963-1968	5.0
	Low " "	1.8		195	213	1960-1968	2.2
35-38	Metal Products, Machinery and Transp. Equipment		549			1960-1968	
	High Projection <sup>a</sup>	9.1		1,032	1,599	1960-1968	9.3
	Low " "	5.5		764	999	1963-1968	4.9
39	Prof. + Scientific Smt.		127			1960-1968	
	High Projection <sup>a</sup>	21.7		722	1,929	1960-1968	5.7
	Low " "	11.3		322	550	1963-1968	1.9

a/ This equation is also the best-fit-equation; the best-fit-equation is the one with the highest Student's t-statistic.





**17.7.74**