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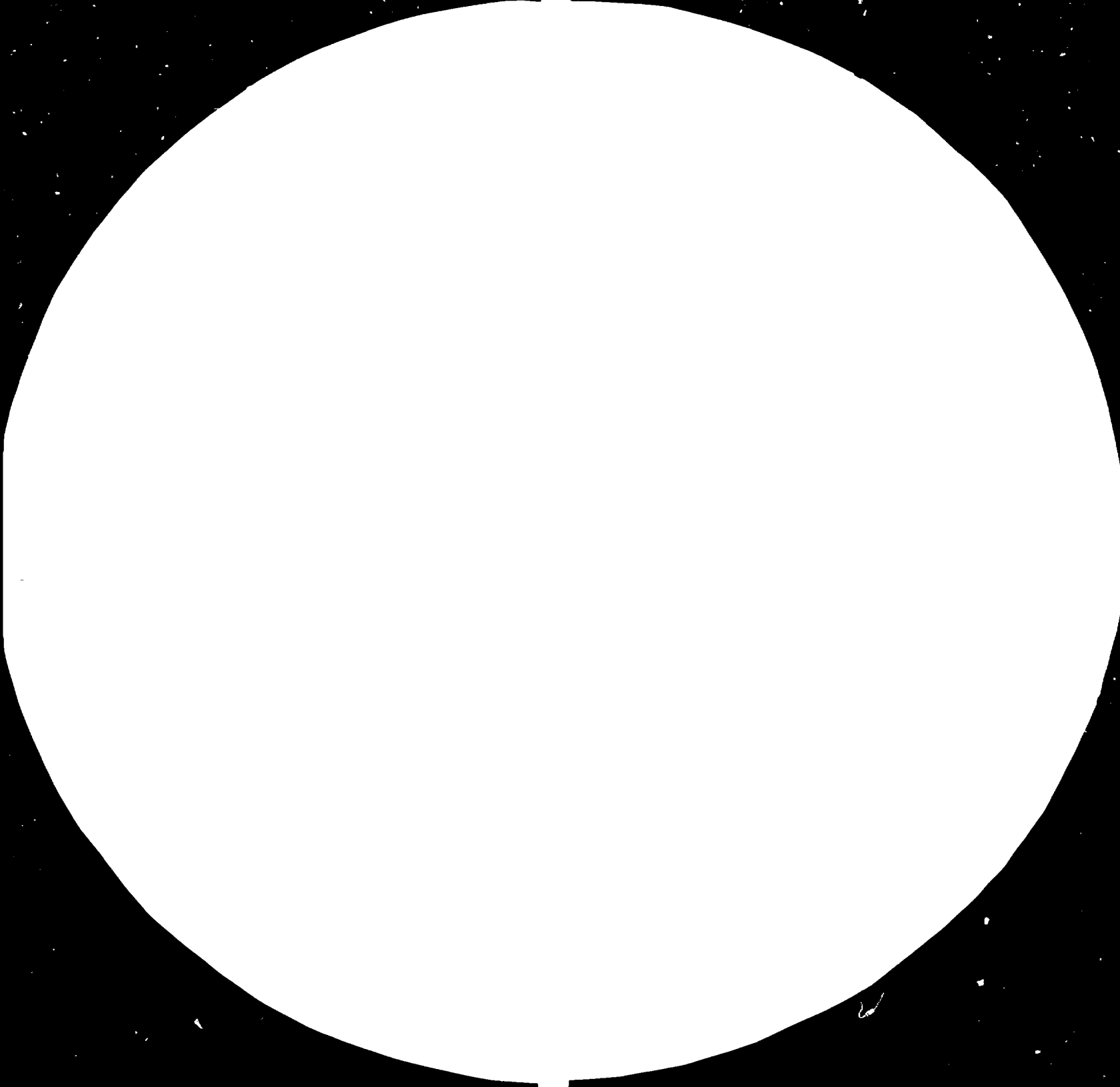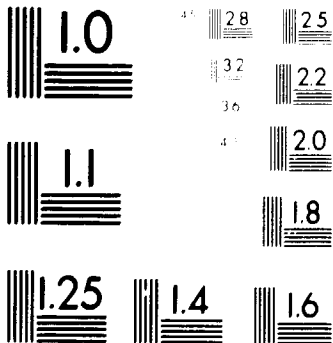
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GROWTH OF LABOUR PRODUCTIVITY IN BRANCHES[1]/ OF THE MANUFACTURING SECTOR.

Introduction

In the simple concept used here labour productivity is defined as a ratio of two variables - production in the numerator and labour input in the denominator. The most appropriate measure of production for productivity studies would be the net value added at factor cost or the contribution of the branch to net domestic product at factor cost. The measure will eliminate variations on account of differences in rates of indirect taxes, subsidies and depreciation of fixed assets. Thus it will provide a more homogenous set of estimates of productivity for inter-branch, inter-industry or cross-country comparisons. Depreciation is, however, an artificial measure and many countries, especially developing ones, are not able either to estimate depreciation at all or the estimates are not realistic, particula-ly when it comes to measure depreciation in constant prices. Under the circumstance it would be advisable to use gross concept of production, that is, contribution of the branch or industry to gross domestic product of the country.

The variable in the denominator, that is, labour input can be measured in a number of ways. The most homogenous and meaningful measure of this variable for use in computation of productivity estimates would be the average number of hours put in by the operatives. Here again developing countries do not collect data on this variable or even on average number of man-days worked. Thus, the only alternative measure of labour input which are available presently are average number of persons engaged and average number

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1/ Refer to 'major groups', that is, 3-digit level of United Nations, International Standard Industrial Calssification of All Economic Activity (ISIC), Series M, No. 4, rev. 2.

of employees. The first measure should however be preferred over the second
as it will provide more realistic estimate of productivity of the household
and cottage industries sector of manufacturing where paid workers constitute a
very small proportion of the labour force engaged in this sector.

Sources of data:

The only source of data on value added and employment at the 3-digit level
of ISIC is the current industrial statistics released by the Statistical
Office of the United Nations in its annual publication "Yearbook of Industrial
Statistics" volume 1. The information furnished by the countries in reply to
the UN questionnaire forms the basis of current industrial statistics. It
will however be noted that in collection and compilation of industrial
statistics country practices differ in concepts, classifications and coverage
of establishments, though by and large international recommendations are
followed. To the extent that varying country practices affect estimates of
productivity they are reviewed below:

Cut-off point:

For collection of current industrial statistics on annual basis many
countries use a cut-off point, meaning thereby that establishments below a
certain size in terms of either employment, gross out-put or capital employed
are excluded. Not only that cut-off point may differ from one country to
another it may differ from one variable to another in the same country or the
country may have changed the cut-off point during the course of time. For
countries where cut-off points for value added and employment data differ
meaningful estimates of productivity cannot be computed. The countries of

this category are belgium, Denmark, Dominican Republic, Ivory Coast, Jamaica, Mexico and Peru. These countries have been excluded from the purview of the present study.

The problem of changing cut-off point over time can be met by dividing the whole period of study into two or more subperiods of consistent cut-off point. This has been done in the case of Australia, Federal Republic of Germany, Indonesia and Tunisia.

The countries were further reviewed from the angle of availability of consistent set of value added and employment figures. In respect of many countries either the value added figures or employment figures or both are not available. Obviously productivity estimates cannot be computed for such countries. There are some other countries where two or more branches have been combined. In case branch combinations for value added and employment data differ or a three digit branch of a certain major branch (two digit) has been combined with a 3-digit branch of another major branch either such countries were left out of the study or the combined branches were not considered.

On the basis of the above criteria a sample of 53 countries - 34 developing countries and 19 developed market economies was selected initially. The countries with period or sub-periods selected for study and a brief description of cut-off points are given in Annex 1.

Value added:

Value added figures directly available from the Yearbook of Industrial Statistics are in current prices and in national currencies. For time studies value added in constant prices would be necessary. Similarly, for cross-country comparisons value added figures should in some common currency, say US dollar. UNIDO data base provides such a series. Value added estimates in 1975 US dollar in the UNIDO data base have been prepared on the basis of the index of industrial production, 1975 = 100. Value added figures at the 3-digit level of ISIC which were used to work out the weighting diagram of the index for the country have been moved to other years on the basis of the index of industrial production of the branch. However, it is not known whether the coverage of establishments in value added figures which formed the basis of the base weights of the index is identical with those to which the employment data in the Yearbook relate. In order to ensure consistency in this respect it was decided to replace the base year value added figures of the index by the value added figures of 1975 as available from the Yearbook. And to get a time series of value added in constant prices the new set of figures was moved to other years i.e. 1970 through 1981 with the help of the index of industrial production at the 3-digit level of ISIC. The exercise makes the implicit assumption that the production relatives used in computation of the index are in conformity with the employment data in the Yearbook. This may not be always true. For instance, in Singapore the cut-off point for collection of current industrial statistics is identical witn the coverage of establishments which furnish data for the production relatives of the index. On the other hand there is the case of India. In that country the cut-off point for current industrial statistics is based on employment size (establishments with

10 or more persons engaged, using power or 20 or more persons, while not using power are covered). Production relatives in the index are however based on production data of establishments employing plant and machinery worth one million rupees or more (recently it has been revised to 2 million rupees). In the absence of any empirical evidence it is difficult to say that production relatives based on two sets of establishments will have similar movement over time. For obvious reasons in case of most countries and most branches the assumption should not be unrealistic and, is not expected to vitiate the estimates of productivity. It seems more reasonable, however, that movements of value added based on two sets of establishments would be more similar at an aggregated level of industrial classification say 2-digit. It may also be recalled that weights to individual items within a 3-digit branch are generally assigned in proportion of their gross output in the base year and not in proportion to value added. The method makes the implicit assumption of constant input output relationship at the commodity level. The assumption may not hold good over long periods.

Differences in concepts and valuation of value added are also there. For current industrial statistics (and it is true as well of the base year figures of value added used for the weighting digram of the index) some countries follow "census value added" concept, while other follow "national accounts" concept, that is contribution of manufacturing sector to net or gross domestic product. In either case valuation may be in factor prices or in producers' prices, difference in the two valuation being on account of indirect taxes and subsidies. There are other differences as well. For instance, value of work in progress is not considered either in gross output or in value added by some countries. Such differences may sometimes render cross-country as well as inter-branch

comparisons difficult and it would be desirable to bring value added figures to the uniform concept of national accounts net value added in factor prices. The existing supplementary information, however, does not permit to carry out such an exercise objectively. It should be noted that as the estimates of value added in constant prices are to be obtained by moving the 1975 value added the effect of depreciation and indirect taxes and subsidies is neutralized to a great extent in time studies. Even in other studies of productivity like inter-branch and cross ountry comparisons the results are not likely to be off the mark especially in view of the method of getting estimates of constant price value added which maintains depreciation and indirect taxes as a fixed proportion of value added. However, the limitations of data should always be borne in mind when interpreting the results.

Employment:

It was stated earlier that "number of persons engaged" would be a better indicator of labour inputs than "number of employees". However, in the UNIDO data base more attention has been paid to the variable "employees" and possible refinements and adjustments have been carried out mostly in compilation of data on this variable. A quick examination of data on "number of persons engaged" and "number of employees" revealed that because of the cut-off point used by the countries in collection and compilation of industrial statistics the differences are not very significant, even at the 3-digit level of ISIC. Thus for computation of productivity estimates use may be made of data on "number of employees", whereever data on the other variable are either not available or not good. Nature of data used to compute productivity estimates is given in annex 2.

Employment data as available from the Yearbook carry some other drawbacks

of serious nature in so far as their use in productivity estimates is concerned. The drawback is intrinsic in the methods which countries follow for collection of employment statistics. Based on the differences in methods used countries may be put into the following broad categories:

1. Employment refers to a single day (generally last day) or a single pay period (last pay period) of the reference year. There are slight variations in the practice. Instead of taking the last day or last pay period of the reference year some countries have chosen last day or last pay period in June, August or in September, while others have taken first or last day/pay period in some other month of the year. The countries belonging to the category are: Austria, Belgium, Brazil, Colombia, Ecuador, El Salvador, Hong Kong, Ireland, Japan, Madagascar, Malaysia, New Zealand, Portugal, Singapore, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Tunisia and UK.

It is doubtful that the annual figures of productivity based on value added for the whole year and employment for a single day or pay period can be subjected to meaningful analysis, particularly in those branches which have strong seasonality in production and employment. In other branches too the estimates of productivity may at best indicate to the direction of the trend. In those branches some erratic fluctuations may be ironed out by computing average productivity over a suitable range of years. These countries were however deleted from the initial sample.

2. Employment refers to an average of figures which cover the entire reference year. Again the practice varies. There are countries like India which collect data on average daily employment and the annual average is

computed from figures of daily employment. Some countries record employment on a single day or single pay period during each of the 12 months and the annual figure is an average of the 12 figures. Countries of this category are Argentina, Australia, Canada, Cyprus, Finland, France, Germany, F.R., Ghana, Greece, Guyana, India, Italy, Korea, Rep.of, Mexico, Netherlands, Nicaragua, Norway, Turkey, Yugoslavia and Zimbabwe. These countries provide the most appropriate set of data for computation of productivity estimates.

3. Annual employment is an average of quarterly figures which refer to a single day or a single pay period in each of the four quarters of the reference year. The countries which follow this method are: Barbados, Chile, Denmark, Israel, Nigeria, Panama, Philippines and USA. Estimates of average annual employment of these countries, though not ideal, are considered usable for productivity studies.

In Guatemala and Honduras employment numbers refer to averages during the reference year, but basis of averaging is not known. The countries have been included in this category on the assumption that annual averages would have been worked out from four quarterly figures at least.

4. Average employment is based on country's own specific method. Kenya, for example, records employment on the first and the last day of the reference year and the annual figure is the average of these two figures. In Zambia the annual average employment is based on the numbers at 30 June and 31 December of each year.

5. For the remaining countries information on the method of compilation

of average employment is not given   the Yearbook.

In addition to differences in :   :ods of working out averages the scope of
employment also varies. Some count   :s include temporary employees, while
others exclude. Similarly, some c: ·ries treat apprentices as employees, but
others do not. In collection of d:. on "number of persons engaged" some
countries restrict the scope of emp! :ment by excluding unpaid family
workers. It is by no means possib!   : adjust data on account of these
variations. Moreover, it is not li:. 'y that such variations will render the
results meaningless.

After taking the methods of arri:.:ng at the figures of annual average
employment into account the initial · :ple of countries was cut down to the
following 26 countries:

A. Developing countries

1. Argentina, 2. Chile, 3. Cyprus, 4. Ghana, 5. Guatemala, 6. Honduras,
7. India, 8. Iraq, 9. Kenya, 10. Nicaragua, 11. Nigeria, 12. Panama,
13. Turkey, 14. Zambia, and 15. Zimbabwe.

B. Developed market economies

1. Australia, 2. Finland, 3. France, -. Germany, F.R., 5. Greece, 6. Israel,
7. Italy, 8. Netherlands, 9. Norway, 10. USA, and 11. Yugoslavia.

Productivity levels - general observations:

The estimates of productivity for the sample countries lead to some
general observations in regard to differences in productivity levels among

branches and among countries. Distribution of branches according to productivity size for 1975, the price and comparison base, is summarized in annex 3. Marked differences in productivity levels of developing countries and developed market economies emerge immediately. In the first group of countries only few branches and that too in few countries were able to achieve a productivity level exceeding $10,000 per person per annum. In developed market economies, on the other hand, most of the branches operated at a level much higher than $10,000.

In the group of developing countries itself productivity levels varied rather widely. Countries of Latin America have attained much higher productivity levels than those of Africa. Productivity levels were particularly low in India. In cross-country comparisons some differences in productivity may be explained on the ground that foreign exchange rates which form the basis of conversion of data in national currencies to common denominator are hardly able to account for the differences in price levels. However, this factor alone is far from being adequate to explain strikingly large differences as they happen to be for most of the branches in India. Market for low-cost products of manufacturing is characteristic of Indian economy due to low per capita income. Such products are made by following technologies which involve low capital costs as well as low labour cost, wage rates being quite low.

Despite variations in productivity level of a branch over countries of the sample it discerns from the figures that "wood and cork products" and "other manufactures" are branches of very low productivity in developing countries group. The branches at the other end of spectrum are "industrial chemicals," "petroleum refineries" and "misc. products of petroleum and coal." Low

productivity is also characteristic of branches like tobacco products, wearing apparel, leather and fur products, footwear, furniture and fixtures, plastic products, metal products, non-electrical machinery, transport equipment and professional and scientific equipment, photographic and optical goods. Many of the branches follow labour intensive technology to a significant extent. For instance, traditional modes of transportation using unsophisticated equipment are still in vogue in almost all the developing countries. Such equpment is mostly manufactured by following labour intensive methods. For sophisticated modern equipment most of the developing countries depend on imports or have started assembly of imported components. The same is true of machinery.

In the group of developed market economies industrial chemicals, other chemicals, petroleum refineries, misc. products of petroleum and coal, rubber products and plastic products, together with beverages, tobacco, iron and steel and non-ferrous metals enjoyed high levels of productivity. Machinery manufacturing branches operated at comparatively low levels of productivity. Low productivity was however characteristic of textiles, wearing apparel, leather and fur products, footwear, wood and cork products and furniture and fixtures branches. The nebulous difference in the productivity of beverages and tobacco branches in this group of countries vis-a-vis developing countries is worth noting. In the later group of countries the respective branches are engaged in simple processing using labour intensive technology. For instance, many developing countries do very little processing of their agricultural products like tea, coffee and tobacco before exporting them to developed countries where they undergo intensive processing. The same is true of other food products as the branch is in the initial stages of development in many developing countries.

Large differences in the levels of productivity attained by countries of
the group of developed market economies are obvious. Most of the branches in
Greece and Yugoslavia operated on comparatively low levels. These countries
seem to be following intermediate technology in the respective branches.

Contributions of branches to manufacturing value added and employment by
productivity size are shown in table 1. The figures shed light on the lope
sided character of productivity growth at the branch level. For instance, in
Honduras, only the beverages branch had attained a productivity level of
higher than $10,000 per person and contributed 24.4 per cent of manufacturing
value added. In Iraq three branches enjoyed high levels of productivity,
contributing some 33.2 per cent of manufacturing value added. In some
countries of the sample - Chile, Ghana, Nicaragua, Panama and Zambia high
productivi'y branches claimed more than 50 per cent of the manufacturing value
added. On the other hand, there are countries like India, Iraq and Kenya
where branches of low productivity shared more than 50 per cent of value
addeed of the manufacturing sector and bulk of manufacturing employment. In
India and Kenya low productivity combined with low share of manufacturing in
GDP would have exercised only a marginal effect on per capita GDP. At the
same time manufacturing productivity as high as ten times of per capita GDP
would have worked against equitable distribution of income.

Large differences in manufacturing productivity and per capita GDP are
characteristic of almost all the countries in the sample of developing
countries. The differences are the combined effect of two factors - labour
participation rates and low productivity in other sectors of the economy.
Obviously, the second factor would have been primarily responsible for the
large differences.

Like developing countries the figures for the sample countries of the
other group do not reveal large differences in manufacturing productivity and

Table 1. Distribution of value added and employment by size of labour productivity, 1975

Country	Per capita GDP ($)	Share of MVA in GDP	Percentage share in total value added (employment) of branches with labour productivity				Average productivity in manufacturing ($)
			≤$2,500	$2,500-5,000	$5,000-10,000	>$10,000	
Developing countries							
Argentina	1563	31.9	1.3 (4.4)	6.8 (3.0)	82.1 (78.3)	9.8 (4.3)	6204
Chile	841	20.5	- (-)	3.3 (10.3)	22.0 (45.2)	74.7 (44.4)	13168
Cyprus	1147	14.1	- (-)	31.1 (42.8)	63.4 (51.1)	5.5 (0.7)	5410
Ghana	460	14.2	9.9 (28.3)	18.6 (36.7)	12.6 (14.3)	58.9 (20.7)	6709
Guatemala	584	16.9	10.9 (20.3)	23.4 (29.8)	47.6 (43.3)	18.1 (6.6)	5900
Honduras	362	15.6	16.0 (36.2)	51.2 (51.5)	8.4 (6.1)	24.4 (6.2)	3823
India	144	15.6	80.5 (92.4)	17.8 (7.4)	- (-)	1.7 (0.2)	1358
Iraq	1236	6.0	37.9 (65.6)	17.6 (20.1)	11.3 (5.7)	33.2 (8.6)	3958
Kenya	242	11.8	19.2 (43.0)	52.0 (57.1)	28.7 (13.8)	4.1 (0.3)	3377
Nicaragua	673	22.5	- (-)	4.9 (17.4)	14.8 (23.1)	80.3 (59.5)	13178
Nigeria	562	5.4	0.1 (0.2)	3.9 (9.3)	60.4 (77.7)	35.6 (12.8)	7886
Panama	1097	12.8	- (-)	7.3 (17.8)	28.4 (38.1)	64.3 (44.1)	10194
Turkey	892	19.7	- (-)	1.6 (3.3)	61.5 (82.4)	36.9 (14.3)	8602
Zambia	501	16.6	- (-)	33.8 (70.6)	15.0 (14.3)	51.2 (15.1)	7931
Zimbabwe	562	25.0	- (-)	35.5 (49.2)	53.8 (46.1)	10.7 (4.7)	6236
			≤$10,000	$10,000-15,000	$15,000-20,000	>$20,000	
Developed market economies							
Australia	6970	24.2	3.0 (4.9)	32.9 (38.2)	43.8 (43.0)	20.3 (13.9)	16204
Finland	5889	27.2	8.9 (16.1)	41.4 (44.9)	41.2 (34.4)	8.5 (4.6)	14186
France	6437	30.1	0.4 (0.9)	38.1 (51.1)	34.8 (34.4)	26.6 (13.6)	17990
Germany, Federal Republic	6764	37.9	- (-)	15.9 (23.2)	59.0 (57.1)	25.1 (19.7)	19808
Greece	2313	19.9	78.5 (87.5)	12.1 (9.3)	- (-)	9.4 (3.2)	8608
Israel	3781	19.5	21.4 (35.1)	48.9 (45.2)	17.7 (14.3)	12.0 (5.4)	12343
Italy	3440	29.0	9.3 (14.6)	42.7 (47.9)	36.0 (31.2)	12.0 (6.3)	14791
Netherlands	6378	29.3	1.5 (3.9)	11.3 (15.4)	62.5 (67.8)	24.7 (12.9)	18568
Norway	7120	23.1	8.4 (15.6)	15.1 (20.2)	50.4 (49.6)	26.1 (14.6)	16554
United States	7206	24.0	- (-)	7.7 (15.0)	3.9 (5.7)	88.4 (79.3)	25764
Yugoslavia	1354	35.2	94.7 (98.4)	0.4 (0.2)	2.9 (1.0)	2.0 (0.4)	5742

Source: UNIDO data base

Note: Figures in parentheses are shares of employment.

per capita GDP. In other words, growth of manufacturing productivity had influenced the productivity in other sectors to grow simultaneously through strong backward and forward linkages.

Growth of productivity in the manufacturing sector

The figures in table 1 do not reveal a specific pattern of productivity growth in developing countries. During early years of 1970's most of the developing countries experienced rising trend in productivity, though growth rates were meagre when compared with rates of employment expansion. In this period too many countries like Chile, Honduras, India, Kenya, Nicaragua and Nigeria were witnessing a declining trend in productivity and sharp rises in employment.

In the second period of 1970's many developing countries were effected by adverse external economic environment. Manufacturing production and productivity growth in these countries started to contract, so much so that in Ghana, Guatemala, Honduras, Zambia and Zimbabwe productivity level fell sharply in 1975. This helped the developing countries to maintain the tempo of employment expansion. At the other end of the scale were countries like Chile, India, Kenya and Nigeria which despite adversity of foreign economic factors successfully carried out expansion of their manufacturing activity. In the first three countries there were substantial gains in productivity as well. In Nigeria, however, where productivity was already declining fell sharply in 1975.

The limited data leads to the general conclusion that over the longer period of 1970's most of the developing countries concentrated efforts on expansion of manufacturing production largely through expansion of employment; productivity gains acrued but they were comparatively very small. Labour

intensive branches characterized by low productivity levels continued to enjoy their important position, though their share in value added somewhat declined.

In the group of developed market economies the whole emphasis seems to have been laid on productivity gains to increase manufacturing production. During 1970-1974 expansion of manufacturing activity was associated with fast gains in productivity, leaving employment to play a secondary role. In the second half of 1970's the manufacturing activity went down considerably in all the sample countries of the group. However, productivity continued its rising trend with acceleration in some countries like Finland, Germany FR, Israel and Italy. Contraction of production combined with productivity gains tended to lower manufacturing employment in many developed countries even below the levels achieved in 1970-1974.

The position for the sample countries is summarized in figure 1. In the group of developing countries manufacturing production increased at a rate of 3.41 percent per annum during 1970-1978. The growth rate was achieved by expansion of employment at a rate of 3.30 percent per annum; productivity gain being meagre 0.11 percent per annum. On the other hand growth rate of manufacturing production at a rate of 3.17 percent per annum over 1970-1980 was attained by the sample countries of the group of developed market economies through sharp rises in productivity at 2.68 per cent per annum. Employment in these countries increased at a nominal rate of 0.48 per cent.

(INDEX: 1970=100)

A - DEVELOPING COUNTRIES, 1970-1978

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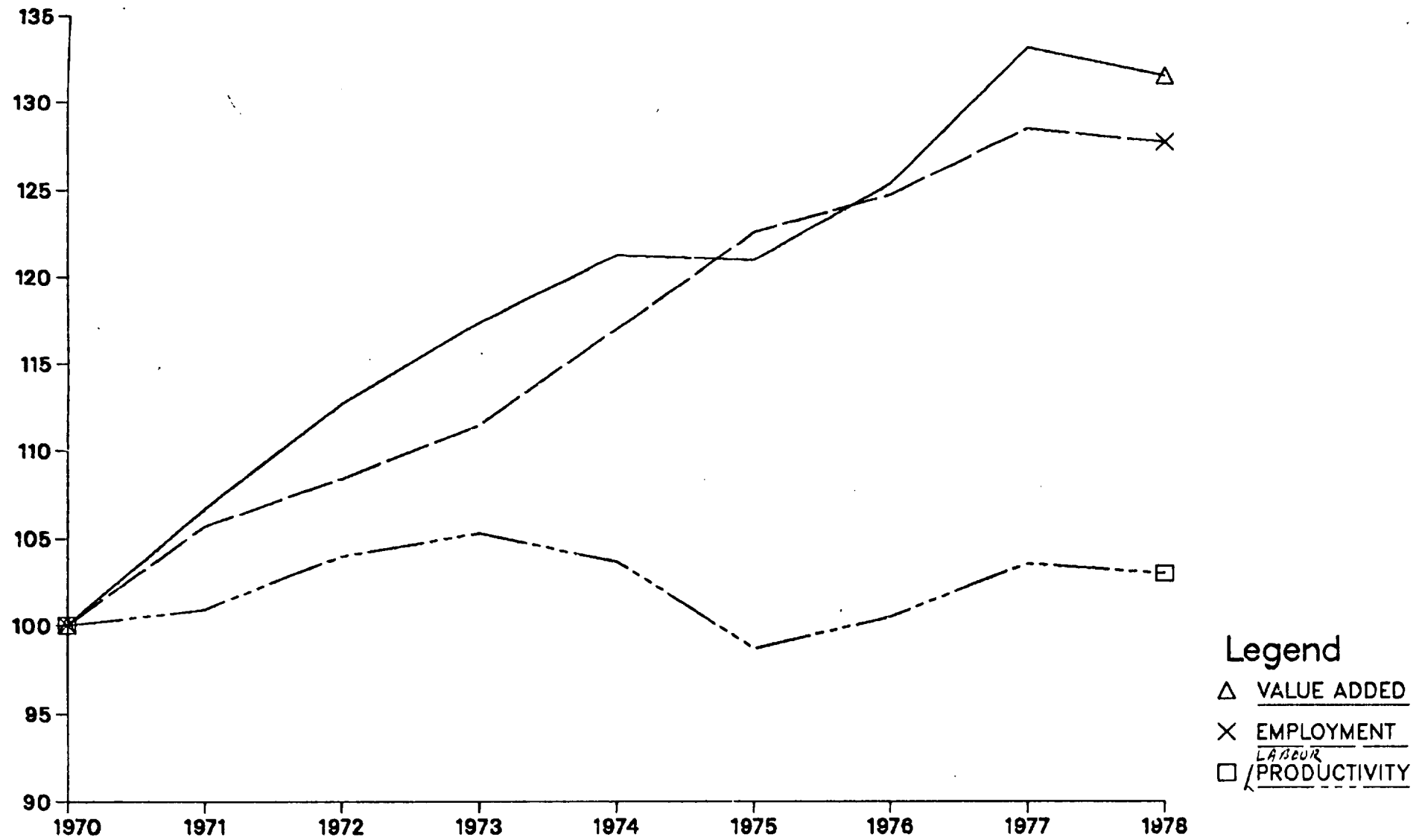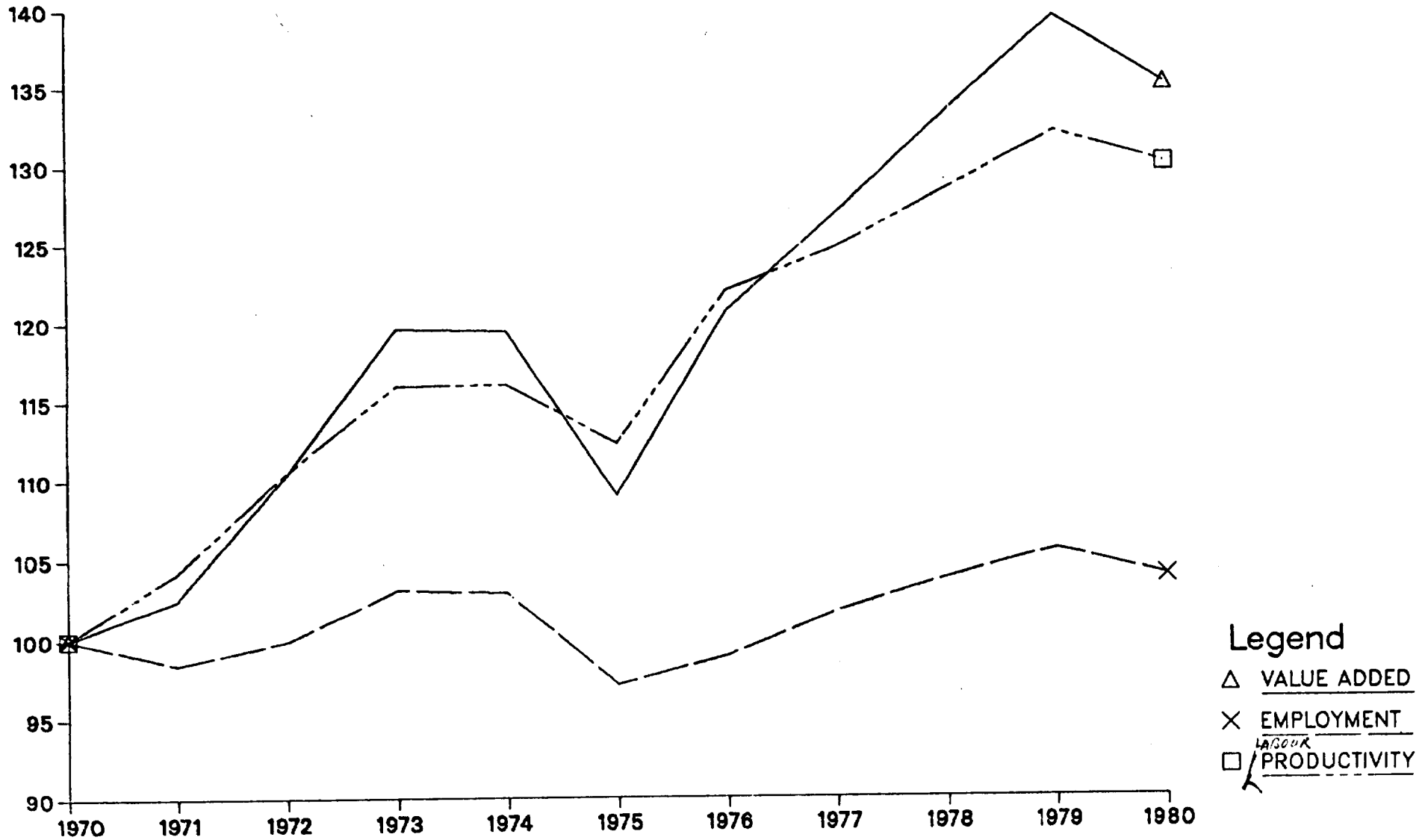
△ VALUE ADDED

✕ EMPLOYMENT

□ LABOUR PRODUCTIVITY

FIGURE : GROWTH OF MANUFACTURING VALUE ADDED,EMPLOYMENT AND /PRODUCTIVITY·

(INDEX: 1970=100)

B- DEVELOPED MARKET ECONOMIES, 1970-1980

Legend

△ VALUE ADDED

✕ EMPLOYMENT

☐ / PRODUCTIVITY

Patterns of productivity growth at branch level

The figures present markedly different patterns of growth in productivity
in the two groups of countries. In developing countries most of the branches
suffered loss in productivity even when production was expanding. For
instance, in India food products, beverages, tobacco, textiles, paper and
paper products, other chemicals, products of petroleum and coal, non-ferrous
metals and professional and scientific equipment branches registered declines
in productivity of varying degree, while production in all of them had been
rising. In other words, employment expanded more rapidly in all these
branches than production. A number of factors may have contributed to such a
growth pattern. In most of the developing countries expansion of production
was achieved through expansion of labour intensive technology. In many
countries a number of products has been earmarked where expansion of capacity
to meet increasing demand is permitted only in the small-scale sector which is
generally more labour intensive. In some developing countries competitive
capacity of the large-scale sector has been curtailed by imposing higher rates
of indirect taxes on its products. On the other hand same or similar products
of the small-scale sector are sometimes subsidized by the governments. Then
there are price controls, either formal or informal, on a number of products
of the large-scale sector. This might reduce profitability to a level when
expansion of production does not remain of much interest to the enterprise.

In developed market economies this type of growth pattern is almost
absent. There production increases have been achieved by fast gains in
productivity, resulting in declines in employment levels. Where ever
production registered declines, these were accompanied by faster declines in

Table 2 : Growth of labour productivity in manufacturing

A. Developing Countries	Period	Growth rates		
		Value added	Employment	Productivity
1. Argentina	1970-1974	4.47	3.47	0.96
	1974-1981	-1.79	-5.68	4.13
	1970-1981	0.33	-1.93	2.30
2. Chile[1]/	1971-1974	-0.26	1.00	-1.25
	1974-1979	2.82	-2.64	5.61
	1971-1979	-1.22	-2.38	1.9
3. Cyprus[2]/	1974-1980	12.51	8.60	3.60
4. Ghana[3]/	1970-1974	8.68	6.41	2.13
	1974-1975	-3.63	4.83	-8.07
	1970-1975	7.15	6.50	0.62
5. Guatemala[4]/	1971-1974	6.84	3.87	2.85
	1974-1975	0.68	3.51	-2.73
	1971-1975	5.42	4.02	1.35
6. Honduras[5]/	1971-1974	4.61	7.09	-2.32
	1974-1975	0.42	7.85	-6.89
	1971-1975	3.45	7.69	-3.94
7. India[6]/	1970-1974	2.33	2.95	-0.60
	1974-1978	6.40	4.33	1.98
	1970-1978	4.14	3.78	0.35
8. Iraq[7]/	1970-1974	8.96	8.55	0.36
	1974-1975	14.32	8.65	5.22
	1970-1975	9.36	7.79	1.45
9. Kenya[8]/	1970-1974	8.90	10.59	-1.53
	1974-1980	14.61	5.22	8.93
	1970-1980	11.30	6.58	4.42

10. Nicaragua	1973–1974	10.87	14.71	–3.34
	1974–1977	6.89	6.09	0.76
	1973–1977	7.58	7.54	0.04
11. Nigeria[9]/	1970–1974	6.86	9.18	–2.12
	1974–1975	20.65	31.24	–8.07
	1970–1975	7.85	11.99	–3.70
12. Panama	1970–1974	5.47	5.11	0.34
	1974–1979	3.37	1.96	1.38
	1970–1979	3.01	2.18	0.81
13. Turkey[10]/	1970–1974	10.58	7.28	3.08
	1974–1979	5.66	3.86	1.74
	1970–1979	7.86	5.30	2.44
14. Zambia[11]	1970–1974	7.29	6.16	1.07
	1974–1975	–4.36	3.19	–7.32
	1970–1975	5.62	6.19	–0.53
15. Zimbabwe[12]/	1970–1974	9.66	7.86	1.67
	1974–1980	0.18	0.33	–0.14
	1970–1980	2.52	2.64	–0.12

B. Developed market economies

1. Australia[13]/	1975–1981	1.62	–1.24	2.90
2. Finland	1970–1974	6.85	3.25	3.49
	1974–1981	3.84	0.13	3.70
	1970–1981	3.70	0.86	2.82
3. France[14]/	1970–1974	5.39	1.82	3.51
	1974–1981	1.31	–1.49	2.84
	1970–1981	2.01	–0.47	2.50

4. Germany, FR	1970-1974	2.33	-1.12	3.49
	1974-1976	0.43	-4.60	5.27
	1970-1976	0.90	-2.37	3.35
5. Greece	1970-1974	8.88	12.52	-3.24
	1974-1977	7.19	-6.07	14.11
	1970-1977	7.14	7.16	-0.02
6. Israel	1970-1974	7.69	5.19	2.38
	1974-1981	4.14	1.22	2.89
	1970-1981	5.06	2.09	2.91
7. Italy[5]	1970-1974	4.76	2.23	2.47
	1974-1980	3.05	-1.18	4.27
	1970-1980	2.89	-0.03	2.92
8. Netherlands[16]	1970-1974	3.50	-2.04	5.66
	1974-1981	1.44	-1.97	3.48
	1970-1981	1.62	-2.09	3.79
9. Norway	1970-1974	4.76	0.80	3.92
	1974-1981	-0.25	-0.67	0.43
	1970-1981	1.10	-0.05	1.15
10. USA	1970-1974	6.13	1.26	4.81
	1974-1980	3.85	1.63	2.18
	1970-1980	3.57	0.79	2.76
11. Yugoslavia	1970-1974	8.60	5.17	3.27
	1974-1980	7.24	5.12	2.02
	1970-1980	7.59	5.10	2.37

The following branches are excluded:

1/ 356, 385

2/ 356, 362

3/ 354, 361

4/ 354, 356, 361

5/ 384

6/ 356

7/ 371

8/ 371, 372, 385

9/ 371, 385

10/ 332, 356, 361, 385

11/ 324, 353, 362, 372, 385

12/ 323, 354, 355, 356, 385

13/ 323, 356

14/ 322, 390

15/ 322, 381, 390

16/ 385, 390

employment, again due to rises in productivity. On the other hand developing countries present examples of branches where even declines in production are associated with increases in employment. In Zimbabwe, for instance, products of petroleum and coal; pottery, china and earthen ware; glass; and professional and scientific instruments registered declines in production during 1970-1980, while employment had been increasing. The phenomenom can be explained on the ground that large-scale capital intensive units in specific branches would have curtailed their production and labour intensive units would have stepped up their activity to fill the gap in supply and demand.

The possible patterns of growth from the viewpoint of productivity can be summarized as:

A. Gains in productivity

1. Increase in production associated with increases in employment; the former expanding faster than the latter;

2. Increases in production associated with losses in employment;

3. Losses in production associated with losses in employment; the former declining at a slower rate than the latter;

B. Losses in productivity

4. Increases in production associated with increases in employment, the former expanding slower than the latter;

5. Losses in production associated with losses in employment; the former losing faster than the latter; and

6. Losses in production associated with gains in employment.

Most of the branches in developing countries experienced a growth pattern of type 4, while some branches followed the pattern of type 6. Contrary to this the developed market economies group seems to have followed the growth pattern of type 3. Thus manufacturing industry in developing countries helped in generating employment, in developed market economies it contributed to technological advancements, though creating unemployment at the same time.

Leading branches and productivity

Leading branch is a branch which expands at a faster rate than the manufacturing sector as a whole. Thus the leading branch claims an increasing share in value added of the sector. In the analysis which is presented in table 3 the first three leading branches were considered. Leading branches in developing countries are spread over a wide spectrum, covering traditional activities like beverages, tobacco products, leather and fur products, wood and cork products, and furniture and fixtures on the one hand and intermediate and capital goods manufacturing branches like iron and steel, non-ferrous metals, non-electrical machinery and transport equipment on the other. During the 1970s all the leading branches registered very high growth rates. Their share in total production was, however, low in almost all the sample countries. In Chile, India and Zambia only the first three leading branches together claimed a share higher than 15 per cent. In many countries it was not even 5 per cent. Thus, effect of the leading branches on the manufacturing growth rate was very modest.

High growth rates of leading branches were not always associated with high rates of productivity increases. In many leading branches fast expansion was achieved through employment expansion and productivity increases were only modest. The category included intermediate and capital goods producing

Table 43   <u>Dominant branch and growth of labour productivity</u>

	Country	Dominant branch	Share of branch in MVA in 1975	Period	Growth rate value added	Employment	Productivit
1.	Argentina	Food products	18.1	1970-1981	1.7	-0.7	2.4
2.	Chile	Non-ferrous metals	18.1	1971-1979	6.3	-2.1	8.5
3.	Cyprus	Food products	14.9	1974-1980	6.1	2.7	3.2
4.	Ghana	Food products	18.8	1970-1975	4.7	8.3	-3.3
5.	Guatemala	Food products	29.4	1971-1975	6.9	3.7	-3.1
6.	Honduras	Food products	25.6	1971-1975	3.1	6.6	-3.4
7.	India	Textiles	18.7	1970-1978	0.9	2.1	-1.2
8.	Iraq	Petroleum refineries	13.9	1970-1975	11.3	8.0	3.1
9.	Kenya	Food products	26.3	1970-1980	8.1	10.4	-2.1
10.	Nicaragua	Food products	38.4	1973-1977	7.3	6.0	1.2
11.	Nigeria	Food products	16.9	1970-1975	8.8	14.9	-5.3
12.	Panama	Food products	42.4	1970-1979	6.0	5.3	0.7
13.	Turkey	Petroleum refineries	15.4	1970-1979	9.9	21.2	-9.3
14.	Zambia	Beverages	28.6	1970-1975	3.1	4.0	-0.9
15.	Zimbabwe	Iron and steel	13.4	1970-1980	2.8	6.8	-3.8

B. <u>Developed market economies</u>

	Country	Dominant branch	Share of branch in MVA in 1975	Period	Growth rate value added	Employment	Productivit
1.	Australia	Food producs	14.3	1975-1981	0.5	-0.9	1.4
2.	Finland	Paper and products	13.8	1970-1981	2.2	0.4	1.8
3.	France	Non-electrical machinery	14.0	1970-1981	2.9	-0.6	3.5
4.	Germany, Federal Republic of	Non-electrical machinery	13.0	1970-1976	0.1	-1.8	2.0
5.	Greece	Food products	15.1	1970-1977	3.7	6.5	-2.6
6.	Israel	Metal products	12.2	1970-1981	4.3	5.7	-1.4
7.	Italy	Transport equipment	12.0	1970-1980	2.8	2.1	0.7
8.	Netherlands	Food products	14.4	1970-1981	3.3	-1.0	4.4
9.	Norway	Transport equipment	13.0	1970-1981	0.1	-0.5	0.6
10.	United States	Non electrical machinery	12.0	1970-1980	4.8	2.5	2.3
11.	Yugoslavia	Food products	9.8	1970-1980	6.3	9.0	-2.5

Source: Based on data supplied by the United Nations Statistical Office, with estimates by the UNIDO secretariat.

Note: For excluded branches see footnote of table 2.

branches as well. For example, an annual increase of 13.8 per cent in the production of industrial chemicals in Panama during 1970-1979 was matched by a mere 1.0 per cent growth rate of productivity. In the same country production of electrical machinery registered a high growth rate of 12.2 per cent while productivity increased at a modest rate of 4.5 per cent. In Turkey too a high growth rate of 21.1 per cent of industrial chemicals met with productivity growing at a rate of 6.2 per cent.

Few interesting features of productivity growth in the group of developing countries are: leading branches are mostly the consumer goods industries following low levels of technology. The rise in per capita income would have boosted the demand for consumer goods. This in turn helped the branches to improve technology and productivity. However, effect of fast increasing productivity seems to have been contained in the absence of strong linkages with other branches of the manufacturing sector. Second, some of the sample countries, Honduras and Zambia for instance, seem to have concetrated their efforts on expansion of employment so much so that productivity in leading branches registered declines. Non-electrical machinery, rubber products, and other non-metallic mineral products in Honduras, and miscellaneous products of petroleum and coal, plastic products, and furniture and fixtures in Zambia are the leading branches in the two countries which witnessed a fall in productivity. It is worth noting that only few branches which belonged to the highest category of productivity level in 1975 emerged as the first three leading branches in the respective countries. Thus leading branches with comparatively lower shares in manufacturing value added and enjoying relatively lower levels of productivity would have exercised a moderate effect only on the growth rate of productivity of the manufacturing sector as a whole, evidence of which is also borne by the figure.

Data for the sample countries of developed market economies present a very different picture of leading branches and growth of productivity in them. In these countries branches producing chemicals or machinery and transport equipment emerged as the first three leading branches. The only consumer goods branches which qualified as leading branches were wearing apparel and other manufactures in Greece, furniture and fixtures in Italy and beverages in the Netherlands. In almost all countries expansion of production of leading branches was sought through fast growth of productivity, allowing employment at times to decline in absolute terms. Industrial chemicals and transport equipment branches in Australia are examples. The three leading branches together accounted for more than 10 per cent of manufacturing value added in 1975 in all the sample countries, excepting Greece and Yugoslavia. Thus, fast expansion of productivity of these branches was instrumental in pushing up the productivity growth rate of the manufacturing sector.

Productivity growth in dominant branch

The dominant branch is the branch with the highest share in manufacturing value added. The year 1975 was chosen as the reference period as it was common to all countries of the sample. The analysis of productivity of dominant branch in table 4 reveals some interesting aspects of industrial structure. In many developing countries food products qualified as the dominant branch claiming as high a share as 42.4 per cent in Panama, 38.4 per cent in Nicaragua and more than 25 per cent in Guatemala, Honduras and Kenya. In other countries also the branch's contribution to manufacturing value added was above 15 per cent. Dominance of other branches in some developing countries is an indication of mineral resources endowment and creation of facility to process available minerals in those countries. Examples are the
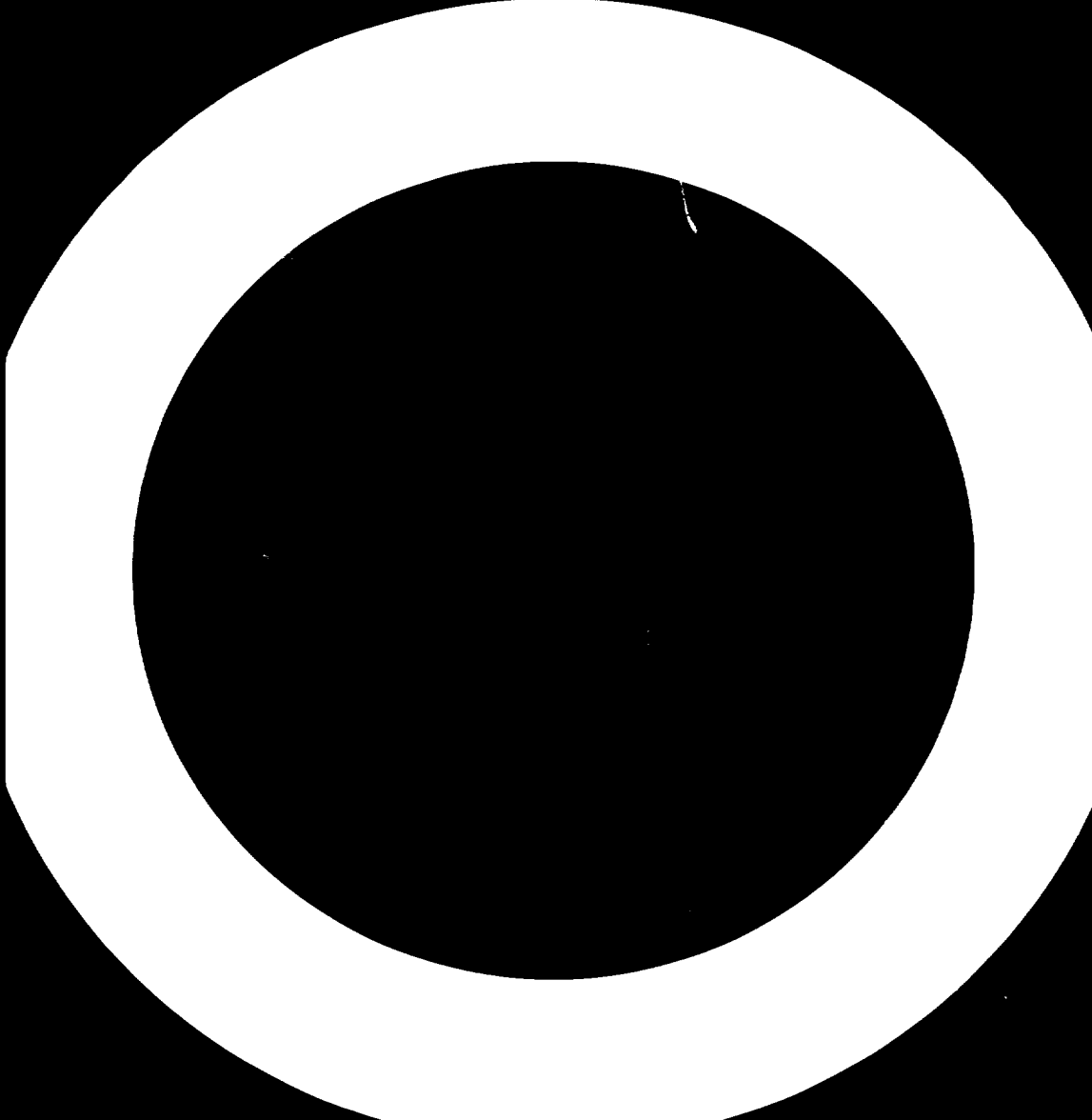
non-ferrous metals branch in Chile, iron and steel in Zimbabwe and petroleum refineries in Iraq. It is also interesting to note that dominant branches are not the leading branches. Therefore, their share in manufacturing value added has been declining. Analysis of productivity growth in dominant branches re-enforce the earlier observation that expansion of the manufacturing sector in developing countries was generally carried out by fast increases in employment, gains in productivity were only marginal.

Dominant branches in the group of developed market economies were well diversified; food products enjoyed the dominant position in four countries only. Unlike developing countries the food products branch in developed market economies operated at a fairly high level of productivity. A comparatively low share of dominant branch indicates the diversified branch structure of the manufacturing sector in the group. For this group of countries too the figures in table 4 support the earlier finding that it was productivity which played the leading role in the expansion of manufacturing production.